MCA

LOCF SYLLABUS – 2021

SCHOOLS OF EXCELLENCE

WITH CHOICE BASED CREDIT SYSTEM (CBCS)

DEPARTMENT OF COMPUTER SCIENCE
SCHOOL OF COMPUTING SCIENCES
ST. JOSEPH'S COLLEGE (AUTONOMOUS)
Special Heritage Status Awarded by UGC
Accredited at A^{++} Grade (IV Cycle) by NAAC
College with Potential for Excellence by UGC
DBT-STAR & DST-FIST Sponsored College
Tiruchirappalli - 620 002, Tamil Nadu, India

SCHOOLS OF EXCELLENCE WITH CHOICE BASED CREDIT SYSTEM (CBCS)
POSTGRADUATE COURSES

St. Joseph's College (Autonomous), a pioneer in higher education in India, strives to maintain and uphold the academic excellence. In this regard, it has initiated the implementation of five "Schools of Excellence" from the academic year 2014 – 15, to meet and excel the challenges of the 21st century.

Each School integrates related disciplines under one roof. The school system enhances the optimal utilization of both human and infrastructural resources. It also enhances academic mobility and enriches employability. The School system preserves the identity, autonomy and uniqueness of every department and reinforces Student centric curriculum designing and skill imparting. These five schools adhere to achieve and accomplish the following objectives.

Optimal utilization of resources both human and material for the academic flexibility leading to excellence.

Students experience or enjoy their choice of courses and credits for their horizontal mobility.

The existing curricular structure as specified by TANSCHE and other higher educational institutions facilitate the Credit-Transfer Across the Disciplines (CTAD) - a uniqueness of the choice based credit system.

Human excellence in specialized areas

Thrust in internship and / or projects as a lead towards research and

The multi-discipline nature of the School System caters to the needs of stake-holders, especially the employers.

Credit system:

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The credits and hours of each course of a programme is given in the table of Programme Pattern. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For PG courses, a student must earn a minimum of 110 credits as mentioned in the programme pattern table. The total number of minimum courses offered by the Department is given in the Programme Structure.

OUTCOME-BASED EDUCATION (OBE)
LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

OBE is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience, each student should have achieved the goal. There is no single specified style of teaching or assessment in OBE; instead, classes, opportunities and assessments should all help the students achieve the specific outcomes

Outcome Based Education, as the name suggests depends on Outcomes and not Inputs. The outcomes in OBE are expected to be measurable. In fact each Educational Institute can state its own outcomes. The ultimate goal is to ensure that there is a correlation between education and employability

Outcome –Based Education (OBE): is a student-centric teaching and learning methodology in which the course delivery, assessment are planned to achieve, stated objectives and outcomes. It focuses on measuring student performance i.e. outcomes at different levels.

Some important aspects of the Outcome Based Education

Course: is defined as a theory, practical or theory cum practical subject studied in a semester.

Course Outcomes (COs): are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more course outcomes may be specified for each course based on its weightage.

Programme: is defined as the specialization or discipline of a Degree.

Programme Outcomes (POs): Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

Programme Specific Outcomes (PSOs):

PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline.

Programme Educational Objectives (PEOs): The PEOs of a programme are the statements that describe the expected achievement of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after Graduation.

Some important terminologies repeatedly used in LOCF.

Core Courses (CC)

A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program.

Discipline Specific Elective Courses (DSE)

Elective course may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

DSE: Four courses are offered, one course in each semester.

Note: To offer **one DSE**, a minimum of two courses of equal importance / weightage is a must.

One DSE Course in semester two is offered as interdisciplinary/common course among the departments in a School (Common Core Course) at the PG level.

Generic Elective Courses

An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective.

Generic Elective courses are designed for the students of **other disciplines**. Thus, as per the CBCS policy, the students pursuing particular disciplines would have to opt Generic Elective courses offered by other disciplines, as per the basket of courses offered by the college. The scope of the Generic Elective (GE) Courses is positively related to the diversity of disciplines in which programmes are being offered by the college.

Two GE Courses are offered, one each in semesters II and III. The GE course offered in semester II is within the school level and the GE in semester III is Between Schools level

The Ability Enhancement Courses (AEC)

One Main discipline related Ability Enhancement Course for 3 credits is offered for a PG programme by the Department.

Skill Enhancement Courses (SECs)

These courses focus on developing skills or proficiencies in the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme.

One SEC is offered in semester II as a compulsory course on Soft Skills, offered by the Department of Human Excellence, common to all the students of PG programme.

Self–paced Learning: It is a course for two credits. It is offered to promote the habit of independent/self learning of Students. Since it is a two credit course, syllabus is framed to complete within 45 hours. It is not taught in the regular working hours.

Comprehensive Examinations: A detailed syllabus consisting of five units to be chosen from the courses offered over the five semesters which are of immense importance and those portions which could not be accommodated in the regular syllabus.

Extra Credit Courses: In order to facilitate the students, gaining knowledge/skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL and etc.

Course Coding:

The following code system (10 alphanumeric characters) is adopted for Post Graduate courses:

21	PXX	N	XX	NN/NNX
Year of Revision	PG Department Code	Semester number.	Part Category	running number/with choice

N:- Numerals X :- Alphabet

Part Category

CC - Core Theory

CP- Core Practical

IS- Internship

SP- Self Paced Learning

CE- Comprehensive Examination

PW- Project Work & viva-voce

Electives Courses

ES – Department Specific Electives

EG- Generic Electives

EC - Additional core Courses for Extra Credits (If any)*

Ability Enhancement Courses

AE – Ability Enhancement Course

SE – Skill Enhancement Course – Soft skills

CW - SHEPHERD & Gender Studies (Outreach)

CIA AND SEMESTER EXAMINATION

Continuous Internal Assessment (CIA):

Distribution of CIA Marks	
Passing Minimum: 50 Marks	
Library Referencing	5
3 Components	35
Mid-Semester Test	30
End-Semester Test	30
CIA	100

MID-SEM & END-SEM TEST

Centralised – Conducted by the office of COE

1. Mid-Sem Test & End-Sem Test: (2 Hours each); will have Objective and Descriptive elements; with the existing question pattern PART-A; PART-B; PART-C and PART D.
2. One of the CIA Component II/III for UG & PG will be of 15 marks and compulsorily a online objective multiple choice question type.
3. The online CIA Component must be conducted by the Department / faculty concerned at a suitable computer centre.
4. The one marks of PART-A of Mid-Sem and End-Sem Tests will comprise only: OBJECTIVE MULTIPLE CHOICE QUESTIONS.
5. The number of hours for the 5 marks allotted for Library Referencing/ work would be 30 hours per semester. The marks scored out of 5 will be given to all the courses (Courses) of the Semester.

Duration of Examination must be rational; proportional to teaching hours 90 minute-examination / 50 Marks for courses of 2/3 hours/week (all Part IV UG Courses) 3-hours examination for courses of 4-6 hours/week.

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No.	Level	Parameter	Description
1	K1	Knowledge/Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/Understanding	The learner explains ideas or concepts
3	K3	Application/Applying	The learner uses information in a new way
4	K4	Analysis/Analysing	The learner distinguishes among different parts
5	K5	Evaluation/Evaluating	The learner justifies a stand or decision
6	K6	Synthesis /Creating	The learner creates a new product or point of view

WEIGHTAGE of K – LEVELS IN QUESTION PAPER

(Cognitive Level)	Lower Order Thinking			Higher Order Thinking			Total
K- LEVELS	K1	K2	K3	K4	K5	K6	%
SEMESTER EXAMINATIONS	15	20	35	30			**100**
MID / END Semester TESTS	12	20	35	33			**100**

QUESTION PATTERN FOR SEMESTER EXAMINATION	
SECTION	**MARKS**
SECTION–A (No choice ,One Mark) **THREE** questions from each unit **(**15x1 =15)	**15**
SECTION-B (No choice ,2-Marks) **TWO** questions from each unit (10x2 =20)	**20**
SECTION-C (Either/or type) (7- Marks) **ONE** question from each unit (5x7 =35)	**35**
SECTION-D (3 out of 5) (10 Marks) **ONE** question from each unit (3x10 =30)	**30**
Total	**100**

BLUE PRINT OF QUESTION PAPER FOR SEMESTER EXAMINATION							
DURATION: 3. 00 Hours.							**Max Mark : 100**
K- LEVELS / **SECTIONS**	**K1**	**K2**	**K3**	**K4**	**K5**	**K6**	**Total Marks**
SECTION–A (One Mark, No choice) (15x1 =15)	15						**15**
SECTION-B (2-Marks, No choice) (10x2=20)		10					**20**
SECTION-C (7- Marks) (Either/or type) (5x7=35)			5				**35**
SECTION-D (10 Marks) (3 out of 5) (3x10=30) Courses having only **K4** levels				3			**30**
Courses having **K4** and **K5** levels **One K5 level question is compulsory**				2	1		
(Courses having **all the 6** cognitive levels **One K5 and K6 level questions can be compulsory**				1	1	1	
Total	**15**	**20**	**35**	**30**			**100**

QUESTION PATTERN FOR MID/END TEST		
SECTION		**MARKS**
SECTION–A (No choice, One Mark)	(7x1 =7)	**7**
SECTION-B (No choice , 2-Marks)	(6x2 =12)	**12**
SECTION-C (Either/or type) (7- Marks)	(3x7 =21)	**21**
SECTION-D (2 out of 3) (10 Marks)	(2x10=20)	**20**
	Total	**60**

BLUE PRINT OF QUESTION PAPER FOR MID/END TEST							
DURATION: 2. 00 Hours.							**Max Mark: 60.**
K- LEVELS / **SECTIONS**	**K1**	**K2**	**K3**	**K4**	**K5**	**K6**	**Total Marks**
SECTION –A (One Mark, No choice) (7 x 1 = 7)	7						**07**
SECTION-B (2-Marks, No choice) (6 x 2 = 12)		6					**12**
SECTION-C (Either/or type) (7-Marks) (3 x 7 =21)			3				**21**
SECTION-D (2 out of 3) (10 Marks) (2x10=20) Courses having only **K4** levels				2			**20**
Courses having **K4** and **K5** levels **One K5 level question is compulsory**				1	1		
Courses having **all the 6** cognitive levels **One K6 level question is compulsory**					1	1	
Total Marks	**07**	**12**	**21**	**20**			**60**
Weightage for 100 %	**12**	**20**	**35**	**33**			**100**

Assessment pattern for two credit courses.

S. No.	Course Title	CIA	Semester Examination	Total Marks
1	Self Paced Learning Course	25 + 25 = 50	50 Marks MCQ (COE)	100
2	Comprehensive Examinations	25 +25 = 50	50 Marks (MCQ) (COE)	100
3	Internship	100	--	100
4	Field Visit	100	--	100
5	Ability Enhancement Course (AEC) for PG (3 credits)	50 (Three Components)	50 (COE) Specific Question Pattern	100
Assessment Pattern for Courses in Part - IV				
6	Value Education Courses and Environmental Studies	50	50 Marks (For 2.00 hours) (COE)	100
7	Skill Enhancement Courses(SECs)	50 marks (by Course in-charge) 50 Marks (by an External member from the Department)		100
8	SEC: SOFT SKILLS (For UG and PG)	100	(Fully Internal)	100

EVALUATION

GRADING SYSTEM

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added and converted as final mark. The marks thus obtained will then be graded as per the scheme provided in Table-1.

From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by semester Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) respectively. These two are calculated by the following formulae:

$GPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$	$WAM\,(\text{Weighted Average Marks}) = \frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$
Where, C_i is the Credit earned for the Course i G_i is the Grade Point obtained by the student for the Course i M_i is the marks obtained for the course i and n is the number of Courses **Passed** in that semester.	

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

CLASSIFICATION OF FINAL RESULTS:

i) The classification of final results shall be based on the CGPA, as indicated in Table-2.

ii) For the purpose of Classification of Final Results, the candidates who earn the CGPA 9.00 and above shall be declared to have qualified for the Degree as 'Outstanding'. Similarly the candidates who earn the CGPA between 8.00 and 8.99, 7.00 and 7.99, 6.00 and 6.99 and 5.00 and 5.99 shall be declared to have qualified for their Degree in the respective programmes as 'Excellent', 'Very Good', 'Good', and 'Above Average' respectively.

iii) A Pass in SHEPHERD will continue to be mandatory although the marks will not count for the calculation of the CGPA.

iv) Absence from an examination shall not be taken an attempt.

Table-1: Grading of the Courses

Marks Range	Grade Point	Corresponding Grade
90 and above	**10**	**O**
80 and above and below 90	**9**	A+
70 and above and below 80	**8**	**A**
60 and above and below 70	**7**	**B+**
50 and above and below 60	**6**	**B**
Below 50	**0**	**RA**

Table-2: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	**O**	**Outstanding**
8.00 to 8.99	A+	Excellent
7.00 to 7.99	**A**	**Very Good**
6.00 to 6.99	**B+**	**Good**
5.0 0 to 5.99	**B**	**Above Average**
Below 5.00	**RA**	**Re-appearance**

Credit based weighted Mark System is adopted for the individual semesters and cumulative semesters in the column 'Marks secured' (for 100)

Declaration of Result

Mr./ MS. _____ has successfully completed the Post Graduate in _____ programme. The candidate's Cumulative Grade Point Average (CGPA) is _____ and the class secured is _____ by completing the minimum of 110 credits.

The candidate has also acquired _____ (if any) extra by attending MOOC courses.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

The Programme Outcomes(POs)/Programme Specific Outcomes(PSOs) are the qualities that must be imbibed in the graduates by the time of completion of their programme. At the end of each programme the PO/PSO assessment in done from the CO attainment of all curriculum components. The POs/PSOs are framed based on the guidelines of LOCF. There are five POs UG programme and five POs for PG programme framed by the college. PSOs are framed by the departments and they are five in numbers.

For each Course, there are five Course Outcomes to be achieved at the end of the course. These Course outcomes are framed to achieve the POs/PSOs. All course outcomes shall have linkage to POs/PSOs in such a way that the strongest relation has the weight 3 and the weakest is 1. This relation is defined by using the following table.

Mapping	<40%	≥ 40% and < 70%	≥ 70%
Relation	Low Level	Medium Level	High Level
Scale	1	2	3

Mean Scores of COs = $\frac{\text{Sum of values}}{\text{Total No.of POs \& PSOs}}$		**Mean Overall Score =** $\frac{\text{Sum of Mean Scores}}{\text{Total No.of COs}}$	
Result	**Mean Overall Score**	**< 1.2**	**# Low**
		≥ 1.2 and < 2.2	**# Medium**
		≥ 2.2	**# High**

If the mean overall score is low then the course in charge has to redesign the particular course content so as to achieve high level mean overall score.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

The Programme Outcomes (POs)/Programme Specific Outcomes(PSOs) are the qualities that must be imbibed in the graduates by the time of completion of their programme. At the end of each programme the PO/PSO assessment in done from the CO attainment of all curriculum components. The POs/PSOs are framed based on the guidelines of LOCF. There are five POs UG programme and five POs for PG programme framed by the college. PSOs are framed by the departments and they are five in numbers.

For each Course, there are five Course Outcomes to be achieved at the end of the course. These Course outcomes are framed to achieve the POs/PSOs. All course outcomes shall have linkage to POs/PSOs in such a way that the strongest relation has the weight 3 and the weakest is 1. This relation is defined by using the following table.

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Result	**Mean Overall Score**	**< 1.2**	**# Low**
		≥ 1.2 and < 2.2	**# Medium**
		≥ 2.2	**# High**

If the mean overall score is low then the course in charge has to redesign the particular course content so as to achieve high level mean overall score.

VISION

Forming globally competent, committed, compassionate and holistic persons, to be men and women for others, promoting a just society.

MISSION

- Fostering learning environment to students of diverse background, developing their inherent skills and competencies through reflection, creation of knowledge and service.
- Nurturing comprehensive learning and best practices through innovative and value-driven pedagogy.
- Contributing significantly to Higher Education through Teaching, Learning, Research and Extension.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- Graduates will be able to accomplish professional standards in the global environment.
- Graduates will be able to uphold integrity and human values.
- Graduates will be able to appreciate and promote pluralism and multiculturalism in working environment.

PROGRAMME OUTCOMES (POs) PG

1. Graduates will be able to apply assimilated knowledge to evolve tangible solution to emerging problems.
2. Graduates will be able to analyze and interpret data to create and design new knowledge.
3. Graduates will be able to engage in innovative and socially relevant research and effectively communicate the findings.
4. Graduates will become ethically committed professional and entrepreneurs upholding human values.
5. Graduates imbibed with ethical values and social concern will be able to understand and appreciate cultural diversity, social harmony and ensure sustainable environment.

Programme Specific Outcomes (PSOs)	
After completing the MCA Programme, the graduates will be able to	
PSO1	implement the logic for solving the real life problems by using the knowledge gained
PSO2	understand, analyze, design, develop, test, implement and document software systems
PSO3	use their creative skill to evolve new ideas, defend their findings at the peer level and able to manage IT and ITES organizations.
PSO4	work in public and private sectors satisfying social and environmental obligations with multiple cultures
PSO5	act as socially responsible IT professionals or service minded entrepreneurs

MCA (MASTER OF COMPUTER APPLICATIONS)					
PROGRAMME STRUCTURE					
Sem.	**Specification**	**No. of Courses**	**No. of Hours**	**Credits**	**Total Credits**
I-III	Core Courses: Theory	9	42	33	33
I-III	Core Courses: Practical	6	17	17	17
II	Self-paced Learning	1	-	2	2
III	Comprehensive Examination	1	-	2	2
IV	Project Work & Viva-Voce	1	25	24	24
I- IV	Discipline Specific Elective	4	20	16	16
I	Ability Enhancement Course	1	4	3	3
II	Skill Enhancement Course (Soft Skills)	1	4	3	3
II	Generic Elective IDC (WS)	1	4	3	3
III	Generic Elective IDC (BS)	1	4	3	3
II – IV	Online Courses (MOOC)	3	-	(6)	(6)
I-IV	Outreach Programme	-	-	4	4
	Total		**120**		**110(6)**

MCA (MASTER OF COMPUTER APPLICATIONS)							
PROGRAMME PATTERN							
Course Details					**Scheme of Exams**		
Sem	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
I	21PCA1CC01	Database Systems	5	4	100	100	100
	21PCA1CC02	Operations Research	5	4	100	100	100
	21PCA1CC03	Programming in Java	5	4	100	100	100
	21PCA1CP01	Software Lab – 1: Java	3	3	100	100	100
	21PCA1CP02	Software Lab – 2: RDBMS	3	3	100	100	100
	21PCA1ES01A	**DSE-1:** Digital Computer Architecture	5	4	100	100	100
	21PCA1ES01B	**DSE -1 :**Graph and Automata Theory					
	21PCA1AE01	**AEC :** Organisational Behaviour	4	3	50	50	50
		Total	**30**	**25**			
II	21PCA2CC04	Programming Smart Devices	4	3	100	100	100
	21PCA2CC05	Software Engineering	4	3	100	100	100
	21PCA2CC06	Data Analysis using Python	4	3	100	100	100
	21PCA2CP03	Software Lab – 3: Programming Smart Devices	3	3	100	100	100
	21PCA2CP04	Software Lab – 4: Python	2	2	100	100	100
	21PCA2SP01	**Self-Paced Learning:** XML	-	*2*	50	50	50
	21SCS2ES02	**DSE -2:** Design and Analysis of Algorithms	5	4	100	100	100
	21PSS2SE01	**SEC:** Soft skills	4	3	100	-	100
	21PCA2EG01	**GE-1**(WS): Applied Statistics using R	4	3	100	100	100
	21PMA2EG01	**GE-1**(WS): Mathematical Foundations					
	---	Extra Credit Courses (MOOC)-1	-	(2)			
		Total	**30**	**26(2)**			
III	21PCA3CC07	Distributed Technologies	5	4	100	100	100
	21PCA3CC08	Computer Networks and Security	5	4	100	100	100
	21PCA3CC09	Accounting and Financial Management	5	4	100	100	100
	21PCA3CP05	Software Lab -5: Distributed Technologies	3	3	100	100	100
	21PCA3CP06	Case Study based Application Development	3	3	100	100	100
	21PCA3ES03A	**DSE -3:** MEAN Stack WebApp Development	5	4	100	100	100
	21PCA3ES03B	**DSE -3:**PHP Programming					
	21PCA3EG02	**GE-2** (BS): Web Design	4	3	100	100	100
	21PCA3CE01	Comprehensive Examination	-	2	50	50	50
	---	Extra Credit Courses (MOOC)-2		(2)			
		Total	**30**	**27(2)**			
IV	21PCA4ES04A	**DSE -4:**Recent trends in Computer Science#	5	4	100	100	100
	21PCA4ES04B	**DSE -4:**Big Data Analytics #					
	21PCA4PW01	Project Work & Viva-Voce	25	24	100	100	100
	---	Extra Credit Courses (MOOC)-3	-	(2)			
		Total	**30**	**28(2)**			
I-IV	21PCW4OR01	Outreach Programme (SHEPHERD)		4			
		Total (Four Semesters)	**120**	**110(6)**			

*The courses with a scheme of Exam 50 in CIA and SE will be converted to 100 for grading.

Blended Learning – Online Evaluation

Mandatory Bridge Courses for Non-Computer Science Stream Students
(Courses are fully internal & for 100 marks)

Sem	Course Code	Course	Course Title	Hrs	Cr	CIA	SE	Final
I	21PCA1BC01	ADDL. Core I	C Programming	-	5	100	-	100
	21PCA1BC02	ADDL. Core II	C Programming Lab	-	5	100	-	100
			Total	-	10			
II	21PCA2BC03	ADDL. Core III	Web Design (HTML5, Java Script & CSS)	-	5	100	-	100
	21PCA2BC04	ADDL. Core IV	Web Design (HTML5, Java Script & CSS) Lab	-	5	100	-	100
			Total	-	10			
III	21PCA3BC05	ADDL. Core V	Web Graphics	-	5	100	-	100
	21PCA3BC06	ADDL. Core VI	Web Graphics Lab	-	5	100	-	100
			Total		10			

GENERIC ELECTIVE -1: 2nd Semester Within school (WS)- Offered to students belong to other Departments in the School							
Course Details					Scheme of Exams		
School	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
SBS	21PBI2EG01	Herbal Technology	4	3	100	100	100
	21PBT2EG01	Medical Biotechnology	4	3	100	100	100
	21PBO2EG01	Medicinal Botany	4	3	100	100	100
SCS	21PCA2EG01	Applied Statistics using R	4	3	100	100	100
	21PMA2EG01	Mathematical Foundations	4	3	100	100	100
	21PCS2EG01	Mobile Adhoc Networks (MANET)	4	3	100	100	100
SLAC	21PEN2EG01A	Indian Literature in Translation	4	3	100	100	100
	21PEN2EG01B	English Literature For Competitive Examinations					
SMS	21PCO2EG01	Supply Chain Management	4	3	100	100	100
	21PEC2EG01	Labour Economics	4	3	100	100	100
	21PHR2EG01	Organizational Behaviour	4	3	100	100	100
	21PCC2EG01	Stress Management	4	3	100	100	100
SPS	21PCH2EG01	Industrial Products	4	3	100	100	100
	21PPH2EG01A	Solar Energy and Utilization	4	3	100	100	100
	21PPH2EG01B	Renewable Energy Resources	4	3	100	100	100

GENERIC ELECTIVE -2: 3rd Semester Between schools (BS)- Offered to students in the Departments belong to other Schools (Except the school offering the course)							
Course Details					Scheme of Exams		
School	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
SBS	21PBI3EG02	First Aid Management	4	3	100	100	100
	21PBT3EG02	Food Technology	4	3	100	100	100
	21PBO3EG02	Horticulture and Landscaping	4	3	100	100	100
SCS	21PCA3EG02	Web Design	4	3	100	100	100
	21PMA3EG02	Operations Research	4	3	100	100	100
	21PCS3EG02	Advances in Computer Science	4	3	100	100	100
	21PDS3EG02	Deep Learning	4	3	100	100	100
SLAC	21PEN3EG02	English for Effective Communication	4	3	100	100	100
SMS	21PCO3EG02	Basics of Taxation	4	3	100	100	100
	21PEC3EG02	Managerial Economics	4	3	100	100	100
	21PHR3EG02	Counselling and Guidance	4	3	100	100	100
	21PCC3EG02	Dynamics of Human Behaviour in Business	4	3	100	100	100
SPS	21PCH3EG02	Health Science	4	3	100	100	100
	21PPH3EG02A	Physics for Competitive Exam	4	3	100	100	100
	21PPH3EG02B	Nano Science	4	3	100	100	100

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1CC01	CORE-1: DATABASE SYSTEMS	5	4

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	define the basic commands of the SQL and the constructs of PL/SQL	K1
CO-2	discuss the intricacies of the schema & database design aspects and the issues connected with transaction processing.	K2
CO-3	apply the normalization procedure and solve the problems by constructing queries with SQL commands.	K3
CO-4	compare the SQL commands and demonstrate its use within PL/SQL blocks.	K4
CO-5	design database structures, frame and execute complex queries and implement backend routines.	K5 & K6

Unit-I **(15 hours)**

Introduction to DBS: Basic Concepts and Definitions - Data Dictionary - Database System - DBA - Database Languages - Database System Architecture: Schemas, Sub-schemas and Instances - Three-level Architecture - Data Independence - Mappings -Data Models - Types- Relational Algebra and Calculus: Structure - Relational Algebra - Relational Calculus - ER Model - Specialization and Generalization.

Unit-II **(15 hours)**

Relational Query Languages: Introduction - Codd's Rules-Information System Based Language - Structured Query Language (SQL)-Embedded SQL

Unit-III **(15 hours)**

Normalization: Introduction to Database Design - Functional Dependency and Decomposition - Normalization - Normal Forms - BCNF - Multi-valued and Join Dependencies

Unit-IV **(15 hours)**

PL/SQL: A Programming Language: History - Fundamentals -Data types - Operators. Control Structures: Control Structures - Nested Blocks - SQL in PL/SQL - Data Manipulation - Transaction Control statements. PL/SQL Cursors and Exceptions - Named Blocks: Procedures - Functions-Packages -Triggers

Unit-V **(15 hours)**

Transaction Processing and Concurrency Control - Database Recovery System - Database Security - Object Oriented Databases: Introduction - Object Oriented Data Model (OODM) – Concepts of Object Oriented Database (OODB) - Object Oriented DBMS (OODBMS) - Object Data Management Group (OMDG) and Object Oriented Languages - Parallel Database Systems: Introduction to Parallel databases - Architecture - Key Elements of

Parallel Database Processing -Distributed Databases - Architecture - Distributed Database design.

Books for Study

1. S K Singh, "Database Systems Concepts, Design and Applications", Pearson Education, India, 2006.

   Unit-I
   Chapter 1 (Sec:1.2, 1.2, 1.3, 1.5,1.7, 1.10),
   Chapter 2 (Sec:2.1, 2.2, 2.3, 2.4, 2.5, 2.7, 2.8)
   Chapter 4 (Sec:4.1, 4.3, 4.4, 4.5)
   Chapter 6 (Sec: 6.1, 6.2, 6.3, 6.4, 6.5)
   Chapter 7 (Sec:7.1, 7.3)
   Unit-II
   Chapter 5 (Sec:5.1, 5.2, 5.3, 5.5, 5.6)

   Unit-III
   Chapter 10 (Sec:10.1, 10.2, 10.3, 10.4, 10.5, 10.6),

   Unit – V
   Chapter 12 (Sec:12.1, 12.2, 12.3)
   Chapter 13 (Sec:13.1, 13.2, 13.3, 13.4, 13.5, 13.6)
   Chapter 14 (Sec:14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7)
   Chapter 15 (Sec:15.1, 15.2, 15.3, 15.4, 15.5)
   Chapter 17 (Sec:17.1, 17.2, 17.3, 17.4)
   Chapter 18 (Sec:18.1, 18.2, 18.3, 18.4)

2. Nilesh Shah, "Database Systems using ORACLE", Second Edition, Pearson India Education Services, 2016.
   Unit – IV
   Chapter *10 (Pages: 225 to 241),*
   Chapter *11 (Pages: 244 to 264),*
   Chapter *12 (Pages: 267 to 289),*
   Chapter *14 (Pages: 313 to 334)*

Books for Reference

1. Abraham Silberschatz, "Database Systems", McGraw Hill International, New York, 1997.
2. CJ Date, "An Introduction to Database Systems", 6th Edition, Addison Wesley Publishing Company, New York, 1995.
3. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, "Database Systems: The Complete Book", Pearson, USA, 2009

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course				Hours		Credit
I	21PCA1CC01			CORE-1: DATABASE SYSTEMS				5		4
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	3	1	2	2	2	3	2	2	2.2
CO-2	3	3	2	1	1	3	2	3	2	2	2.2
CO-3	3	2	3	1	1	3	3	3	2	2	2.3
CO-4	2	3	3	1	3	1	3	2	2	3	2.3
CO-5	3	2	3	2	2	2	2	3	1	2	2.2
Mean Overall Score											2.24 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1CC02	CORE-2: OPERATIONS RESEARCH	5	4

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall the basic concepts in LPP, TP, AP, CPM, PERT, Queue and Inventory	K1
CO-2	remember the characteristics and relationships in LPP, TP, AP, CPM, PERT, Queue and Inventory	K2
CO-3	identify the activities, model, methods and procedures in LPP, TP, AP, CPM, PERT, Queue and Inventory	K3
CO-4	analyze and apply the procedure for problem solving in LPP, TP, AP, CPM, PERT, Queue and Inventory	K4
CO-5	adopt the LPP, TP, AP, CPM, PERT, Queue and Inventory methods to real-life./ business problems	K5 & K6

Unit – I **(15 hours)**

Linear Programming: Formulations and Graphical solution to L.P. Problem- Simplex method-Degeneracy, Unbounded and infeasible solution- Two Phase Method.

Unit – II **(15 hours)**

Linear Programming (contd.): Duality-Primal and Dual Computations –Dual Simplex Method - Transportation problem and its solution – Assignment problem and its solution by Hungarian method.

Unit – III **(15 hours)**

Project scheduling by PERT - CPM: Phases of project scheduling –Arrow Diagram - Critical Path Method - Probability Considerations in Project Scheduling.

Unit – IV **(15 hours)**

Queueing Theory: Queueing System - Characteristics of Queueing system - classification of queues - Poisson Queues - M/M/1 and M/M/C Queueing Models.

Unit – V **(15 hours)**

Inventory Management: Inventory Control - ABC analysis - Economic Lot size Problems - EOQ with uniform Demand and shortages - Limitations of inventories - Buffer stock - Determination of Buffer stocks.

(Note: Stress to be on solving Numerical Problems only.)

Book for Study

1. KantiSwarup, P K Guptha and Man Mohan, "Operations Research", Sultan Chand &Sons, New Delhi, 2013.
   Unit-I *Chapter 1 (Sec: 1.1-1:6, 1:10), Chapter 2, Chapter 3(Sec: 3:1-3:5),Chapter 4(Sec: 4:1, 4:3, 4:4(only Two-Phase Method), 4:5),*

Unit-II *Chapter 5 (Sec: 5:1-5:5, 5:7, 5:9),Chapter 10 (Sec: 10:1, 10:5-10:6, 10:8-10:10, 10:12-10:13, 10:15)*
Unit-III Chapter *25 (Sec 25:1-25:7)*
Unit – IV Chapter 21(Sec: 21:1-21:9)
Unit – V *Chapter 19 (Sec: 19:1-19:2, 19:6-19:10(case1&2 only), 19:15)*

Books for Reference

1. Hamdy A. Taha, "Operations Research-An Introduction", Macmillan Publishing Co, 5th Edition, 1987
2. P.K.Gupta, Man Mohan, "Operations Research and Quantitative Analysis", Sultan Chand & Sons, New Delhi First Edition, 1987
3. S.Kalavathy, "Operations Research", Vikas Publishing House Pvt Ltd, Noida India-2013

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code		Title of the Course					Hours		Credit
I	21PCA1CC02		CORE-2: OPERATIONS RESEARCH					5		4
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	2	3	3	2	2	2	2.4
CO-2	2	3	2	2	2	3	3	2	2	3	2.4
CO-3	3	3	2	2	3	2	2	3	3	2	2.5
CO-4	2	3	2	3	3	2	2	3	3	2	2.5
CO-5	3	3	2	3	3	3	3	2	2	3	2.7
									Mean Overall Score		2.5 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1CC03	CORE-3: PROGRAMMING IN JAVA	5	4

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	define the fundamentals of object oriented programming concepts	K1
CO-2	summarize various object oriented techniques	K2
CO-3	apply the object oriented programming concepts to write simple Java applications	K3
CO-4	classify various principles of object oriented programming methodologies	K4
CO-5	build a standard object oriented application in Java	K5 & K6

Unit – I **(15 hours)**

CLASSES AND OBJECTS**:** Class Fundamentals – Declaring Objects – Assigning Object Reference Variables – Introducing Methods – Constructors – 'this' Keyword – Garbage Collection. METHODS AND CLASSES: Overloading Methods – Objects as Parameters – Returning Objects – Access Control – Static and Final – Nested and Inner Classes – Exploring the String Class – Command Line Arguments.

Unit – II **(15 hours)**

INHERITANCE: Inheritance Basics – Using Super – Creating Multilevel Hierarchy – Method Overriding – Dynamic Method Dispatch – Abstract Classes – Final with Inheritance. PACKAGES AND INTERFACES: Packages – Packages and Member Access – Importing Packages – Interfaces. EXCEPTION HANDLING: Fundamentals – Exception Types – Using try and catch – Multiple catch Clauses – Nested try Statements – throw, throws, finally – Java's Built-in Exceptions.

Unit – III **(15 hours)**

MULTITHREADED PROGRAMMING: Java Thread Model – Main Thread – Creating a Thread and Multiple Threads – Using is Alive() and join() – Thread Priorities – Synchronization – Interthread Communication -Suspending, Resuming and Stopping Threads. EVENT HANDLING: Two Event Handling Mechanisms – Delegation Event Model – Event Classes – Key Event Class – Sources of Events – Event Listener Interfaces. SWING: Two Swing Features – Components and Containers – Swing Packages – Exploring Swing.

Unit – IV **(15 hours)**

STRING HANDLING CLASSES: String Constructors – Special String operations – Character extraction – String comparison – searching strings – modifying strings. String Buffer**.** EXPLORING JAVA LANG: Primitive type wrappers**.** JAVA.UTIL COLLECTIONS FRAMEWORK: Collections overview – Collection interfaces**:** Collection interface **-** Queue interface**.** The Collection classes**:** Array List – Linked List – Tree set- Enumset. Arrays -The Legacy classes and interfaces**:** Enumeration interface- Vector-Stack**.**

Unit – V **(15 hours)**

UTILITY CLASSES: String Tokenizer– Date-Calendar-Gregorian Calendar Formatter**:** Formatting basics – strings and characters – numbers. EXPLORING JAVA.IO: IO Exceptions-Stream Classes-Byte Streams-Character Streams. JDBC: Establishing a Connection - Creation of Data Tables - Entering Data into The Tables - Table Updating – Prepared Statement.

Books for Study

1. Herbert Schildt, "Java The Complete Reference", Tata McGraw Hill, 11th Ed., 2019
   - **Unit-I** - *Chapter 6 & 7*
   - **Unit-II** - *Chapter 8, 9 & 10*
   - **Unit-III** - *Chapter 11, 24, 31 & 32*
   - **Unit-IV** - *Chapter 17, 18 & 19*
   - **Unit-V** - *Chapter 20 & 21*
2. C. Muthu, "Programming with JAVA**"**, Vijay Nicole Imprints Private Limited, 2nd Ed, Chennai, 2018
   - **Unit-V** - *Chapter 18*

Books for Reference

1. Sagayaraj, Denis, Karthik and Gajalakshmi, "Java Programming-for Core and Advanced Users", Universities Press, Hyderabad, 2017
2. P. Radhakrishna, "Object Oriented Programming through JAVA", Universities Press, 2016
3. K. Rajkumar, "Java Programming", Pearson India, 2013

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
I	**21PCA1CC03**			**CORE-3: PROGRAMMING IN JAVA**				**5**		**4**
Course Outcomes ↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO 5**	
CO-1	2	3	2	1	1	3	3	3	2	1	2.1
CO-2	3	3	2	2	1	3	2	3	2	1	2.2
CO-3	3	3	3	2	2	3	3	2	2	1	2.4
CO-4	3	2	2	2	1	3	3	2	2	2	2.2
CO-5	3	3	3	2	2	3	3	3	2	3	2.7
Mean Overall Score											**2.32 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
I	**21PCA1CP01**	**SOFTWARE LAB-1: JAVA**	**3**	**3**

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall and apply the core OOP concepts to develop simple java programs	**K1**
CO-2	demonstrate the purpose of various predefined Java Libraries	**K2**
CO-3	solve real-world problems using Java	**K3**
CO-4	analyse the speed and memory utilization in Java environment	**K4**
CO-5	develop a simple project for real time environment	**K5 & K6**

List of Exercises

1. Classes & Objects
2. Inheritance & Polymorphism
3. Packages & Interfaces
4. Exception Handling
5. Multithreading
6. Swing
7. String Handling Classes
8. java.util and java.lang Classes
9. I/O Streams
10. JDBC

Web Links

Virtual Lab

http://vlabs.iitb.ac.in/vlabs-dev/labs/java-iitd/experiments/java-intro-iitd/

Online Java Compiler

https://www.onlinegdb.com/online_java_compiler

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course					Hours	Credit			
I	**21PCA1CP01**	**SOFTWARE LAB-1: JAVA**					**3**	**3**			
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	2	1	3	2	2	2	2	2.3
CO-2	3	3	2	2	1	3	3	3	2	2	2.4
CO-3	3	3	2	2	1	3	3	2	3	2	2.4
CO-4	3	3	3	2	1	3	3	3	3	2	2.6
CO-5	3	3	3	2	1	3	3	3	3	2	2.6
Mean Overall Score											**2.46 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1CP02	SOFTWARE LAB- 2: RDBMS	3	3

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	create database tables with all integrity constraints	K1
CO-2	understand and execute SQL queries to interact with the database.	K2
CO-3	apply the SQL commands to frame queries and SQL Plus commands to generate reports.	K3
CO-4	implement processing logic in the form of PL/SQL routines like functions, procedures, packages, triggers and PL/SQL blocks.	K4
CO-5	design forms with event handling feature to interact with database.	K5 & K6

SQL - Simple queries using DDL, DML, and DCL

1. SQL functions
   - Creation of Tables (along with Primary and Foreign keys),
   - Altering Tables and Dropping Tables
   - Practicing DML commands- Insert, Select, Update, Delete
2. SET operations
3. View and Snapshots
4. Practicing Sub queries (Nested, Correlated) and Joins (Inner, Outer and Equi).

PL/SQL

5. PL/SQL Block
6. Cursors – Declaring, Opening & closing Cursor, Fetching the data
7. Database triggers - creation of trigger, Insertion, Deletion, Updating using trigger.
8. Subprograms and packages.

Forms and Reports

9. Designing forms with menus, buttons and List of values
10. Master-Detail form design.
11. Developing reports (Tabular, Master/detail, Matrix and Mailing label)

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course				Hours		Credits
I	21PCA1CP02			Software Lab- 2: RDBMS				3		3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	1	3	3	2	2	1	3	2.4
CO-2	2	2	3	2	3	3	3	3	1	2	2.4
CO-3	3	3	3	2	2	3	3	2	2	3	2.6
CO-4	2	2	3	2	2	2	2	1	2	3	2.1
CO-5	3	3	2	3	3	3	2	1	1	2	2.3
Mean Overall Score											2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1ES01A	DSE- 1: DIGITAL COMPUTER ARCHITECTURE	5	4

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO-1	recall the basic concepts of logic gates and logic circuits	K1
CO-2	compare the logical functions of digital circuits	K2
CO-3	construct the combinational and sequential circuits based on the digital logics	K3
CO-4	analyze the functioning the digital circuits and basic computer architecture	K4
CO-5	compare the digital logics and construct the digital circuits for various applications	K5 & K6

Unit-I **(15 hours)**

Digital Logic: The Basic Gates-NOT, OR, AND - Universal Logic Gates: NOR, NAND - AND-OR-Invert Gates. Combinational Logic Circuits: Boolean Laws and Theorems - Sum-of-Products Method - Truth Table to Karnaugh Map - Pairs, Quads, and Octets - Karnaugh Simplifications - Don't-care Conditions - Product-of-sums Method - Product-of-sums Simplification

Unit-II **(15 hours)**

Data-Processing Circuits: Multiplexers - Demultiplexers - 1-of-16 Decoder - BCD-to-decimal Decoders - Seven-segment Decoders - Encoders – Exclusive-OR Gates. Number Systems and Codes: Binary Number System - Binary-to-decimal Conversion - Decimal-to-binary Conversion- Octal Numbers - Hexadecimal Numbers - The ASCII Code-The Excess-3 Code - The Gray Code

Unit-III **(15 hours)**

Arithmetic Circuits: Binary Addition - Binary Subtraction - Unsigned Binary Numbers - Sign-magnitude Numbers - 2's Complement Representation - 2's Complement Arithmetic-Arithmetic Building Blocks - The Adder-subtracter - Arithmetic Logic Unit - Binary Multiplication and Division. Flip-Flops: RS FLIP-FLOPs - Gated FLIP-FLOPs - Edge-triggered RS FLIP-FLOPs – Edge-triggered D FLIP-FLOPs - Edge-triggered JK FLIP-FLOPs - JK Master-slave FLIP-FLOPs

Unit-IV **(15 hours)**

Basic Computer Organisation and Design: Instruction codes - Computer Registers - Computer Instructions - Timing and Control - Instruction Cycle - Memory Reference Instructions -Input/output & Interrupt – Complete Computer Description - Design of Basic Computer - Design of Accumulator Logic

Unit-V **(15 hours)**

CPU: General Register Organisation - Stack Organisation - Instruction Formats - Addressing Modes - Data Transfer and Manipulation - Program Control - RISC

Books for Study

Unit I, II and III

1. Donald P. Leach and Albert Paul Malvino, "Digital Principles and Application", Seventh Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2011.
   Unit-I *Chapter 1 (Sec: 2.1 to 2.3), Chapter 3 (Sec: 3.1 to 3.9)*
   Unit-II *Chapter 4 (Sec: 4.1 to 4.7), Chapter 5 (Sec: 5.1 to 5.8)*
   Unit-III *Chapter 6 (Sec: 6.1 – 6.11), Chapter 8 (Sec:8.1 – 8.5, 8.8)*

Unit IV and V

2. M. Morris Mano, "Computer System Architecture", Third Edition, Prentice Hall of India, New Delhi, 2003.
   Unit-IV *Chapter 5 (Sec: 5.1 – 5.10)*
   Unit-V *Chapter 8 (Sec: 8.1 – 8.8)*

Books for Reference

1. Morris Mano and Michael D Ciletti, "Digital Design", 4th Edition, Pearson publications, 2008.
2. Rafiquzzaman "Microprocessors Theory and Applications" Revised Edition, PHI Learning Pvt. Ltd, New Delhi, 2012.
3. Smruti Ranjan Sarangi, "Computer Organisation and Architecture", TMH, New Delhi, 2014.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
I	21PCA1ES01A	DSE- 1: DIGITAL COMPUTER ARCHITECTURE	5	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	2	3	2	3	2	2	2.2
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	2	3	3	2	1	2	3	3	2	2	2.3
CO-4	3	3	3	2	1	3	3	3	2	2	2.5
CO-5	3	3	3	1	1	2	3	3	2	2	2.3
									Mean Overall Score		2.4 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1ES01B	DSE- 1: GRAPH AND AUTOMATA THEORY	5	4

CO No.	CO- Statements	Cognitive Levels (K-Levels)
	On successful completion of this course, students will be able to	
CO-1	define various basic terms in graph and automata theory.	K1
CO-2	explain the fundamentals of theories in graph and automata theory.	K2
CO-3	apply the concepts of graph and automata theory to solve in real world problems.	K3
CO-4	analyze and compare the different procedures used in graph and automata theory.	K4
CO-5	build standard applications using graph and automata theory.	K5 & K6

Unit-I **(15 hours)**

Graph Introduction: Paths and Circuits - Isomorphism, Connected & Disconnected Graphs - Walk –Path -Euler graphs - Operations on Graphs-Hamiltonian Paths & Circuits- Travelling Sales Man Problem.

Unit-II **(15 hours)**

Trees and Matrix Representations: Definition and Properties of Trees, Rooted and Binary Trees, Spanning trees. Matrix representation of Graphs: Incidence Matrix, Adjacency Matrix - Algorithms: Shortest Path from a Specified Vertex to another Specified Vertex – Shortest Path between All Pairs of Vertices.

Unit-III **(15 hours)**

Theory of Automata: Definition of an Automaton – Description of a Finite Automaton (FA) – Transition Systems – Properties of Transition Functions – acceptability of a string by a FA – Non Deterministic Finite State Machines – Regular Expressions - Identities for Regular Expressions.

Unit-IV **(15 hours)**

Formal Languages: Basic Definition and Examples - Definition of a Grammar – Derivations and the Language generated by a Grammar - Chomsky classification of Languages – Context Free Languages (CFL's) and Derivation Trees – Ambiguity in CFG - Chomsky Normal Form - Pumping Lemma for CFL's.

Unit-V **(15 hours)**

Applications of Automata and Formal Languages: Lexical Analysis: The Role of the Lexical Analyzer - From Regular Expressions to Automata: Conversion of an NFAto DFA– Simulation of an NFA- Construction of an NFA from Regular Expression. Optimization of DFA: Minimizing the Number of states of DFA. Syntax Analysis: The role of parser – Representative Grammars- Syntax Error Handling –Bottom-Up Parsing: Reductions – Handling Pruning –Shift Reduce Parsing.

(Note: Stress can be given to problem solving instead of proof of theorems in Units III, IV and V)

Books for Study

1. Narsingh Deo, "Graph Theory with applications to Engineering and Computer Science", Dover Publications, First Edition, 2016). (Units I and II)
   Chapter-1: (Sec.: 1.1 to 1.5) Chapter-2: (Sec.: 2.1, 2.2, 2.4 to 2.10)
   Chapter 3: (Sec.: 3.1 to 3.7) Chapter-7: (Sec.: 7:7.1, 7.9)
   Chapter-11: (Sec.: 11.5)
2. Mishra K L P, Chandrasekaran N, "Theory of Computer Science Automata, Languages and Computation", Third Edition, PHI Learning private limited, 2019. (Units III, IV)
   Chapter-3: (Sec.: 3.1 – 3.6) Chapter-4: (Sec.: 4.1, 4.2)
   Chapter-5: (Sec.: 5.1) Chapter-6: (Sec.: 6.1, 6.2, 6.4.1, 6.5)
3. Alfred V.Aho, Ravi Sethi, Jeffrey D. Ullman, "Compilers Principles, Techniques and Tools", Pearson Education, Inc. Publishing as Addison-Wesley Higher Education, Second Edition, 2011. (Unit V)
   Chapter- 3: (Sec.:3.1, 3.7.1, 3.7.2, 3.7.4, 3.9.6)
   Chapter-4: (Sec.:4.1.1, 4.1.2, 4.1.3, 4.5.1, 4.5.2, 4.5.3)

Books for References

1. Douglas B. West, "Introduction to Graph Theory", Pearson Education, India 2nd edition, 2015.
2. John E. Hopcroft & Jeffery D. Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, New Delhi, 2002.
3. Peter Linz, "An Introduction to Formal Languages and Automata", Bartlett Publication, 2011.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
I	21PCA1ES01B	DSE- 1: GRAPH AND AUTOMATA THEORY	5	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	2	1	3	3	3	2	1	2.2
CO-2	3	2	2	2	1	3	3	3	1	1	2.1
CO-3	3	3	2	2	1	3	3	3	1	2	2.3
CO-4	3	3	3	1	1	3	3	3	1	1	2.2
CO-5	3	3	3	2	2	3	3	3	2	2	2.6
										Mean Overall Score	2.28 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1AE01	AEC: ORGANISATIONAL BEHAVIOUR	4	3

CO No.	CO-Statements	Cognitive Levels (K-Levels)
	On successful completion of this course, students will be able to	
CO-1	find differences of various basic concepts of organization.	K1
CO-2	relate the factors of formation of attitudes and formulate factors for attitude change	K2
CO-3	apply and build the perceptual interpretation and motivation	K3
CO-4	categorize leadership skills through various activities	K4
CO-5	create new organizational structure and projects	K5 & K6

Unit – I **(12 hours)**

NATURE OF ORGANIZATION – features – types – goals. NATURE OF ORGANIZATIONAL BEHAVIOR – Nature of OB – Role of OB – Foundations of OB.

Unit – II **(12 hours)**

NATURE OF HUMAN BEHAVIOR: Nature and causes of individual differences – models of man. PERCEPTION: concept – process – perceptual selectivity and distortion – Developing perceptual skills. ATTITUDES: Concept – Theories – Formation factors – measurements – Attitude change.

Unit – III **(12 hours)**

PERSONALITY: Concept – theories – determinants of personality- Personality and behaviour - MOTIVATION: Definition – Motivation & Behavior – Theories – approaches – incentives. INTERPERSONAL BEHAVIOR: Transactional analysis – Ego states – life scripts – life positions – transactions – stroking – Psychological games – Benefits of TA.

Unit – IV **(12 hours)**

GROUP DYNAMICS: Concepts & features of group – types of groups – group behavior – group decision making – committee – task group – inter group behavior. LEADERSHIP: Definitions – types – importance theories – styles. COMMUNICATION: Basics of communication – Communication network – Factors affecting communication – Business writing – Office management – Presentation strategies.

Unit – V **(12 hours)**

ORGANIZATION THEORY: Classical organizational theory – neoclassical organization theory – DESIGNING OF ORGANIZATIONAL STRUCTURE: need – planning and process – Departmentation Span of management – delegation of authorities – centralization & decentralization – FORMS OF ORGANIZATIONAL STRUCTURES: line and staff – functional – divisional – project – matrix – free form.

Book for Study

1. Prasad LM, "Organisational Behavior", Sultan Chand and Sons, New Delhi, 2014.
   Unit-I : Chapters: 1 and 2
   Unit-II : Chapters: 3, 4 and 7
   Unit-III : Chapters: 8 and 11
   Unit-IV : Chapters: 12, 14 and 15
   Unit-V : Chapters: 18, 20 and 21

Books for Reference

1. S. S. Khanka, "Organisational Behavior", S. Chand Ltd., New Delhi, 2001
2. K. Aswathappa, "Organisational Behavior", Himalaya Publishing house, New Delhi, 2001

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
I	21PCA1AE01	AEC: ORGANISATIONAL BEHAVIOUR	4	3

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	2	2	2	2	2	3	2.5
CO-2	3	3	2	3	3	2	2	3	3	3	2.7
CO-3	3	3	2	3	2	2	2	2	2	3	2.4
CO-4	3	2	3	2	2	2	2	3	3	3	2.5
CO-5	3	2	3	2	2	2	3	3	3	3	2.6
Mean Overall Score											2.54 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	21PCA2CC04	CORE-4: PROGRAMMING SMART DEVICES	4	3

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	state the fundamental building blocks of mobile apps.	K1
CO-2	select various modules for designing React Native components to build powerful and stylish mobile applications.	K2
CO-3	use stylesheets, APIs and cross-platform native modules in React Native apps.	K3
CO-4	organize React Native components and examine the parameter passing mechanism among them.	K4
CO-5	debug and use developer Tools to build native mobile applications in React Native.	K5 & K6

Unit-I **(12 hours)**

React Native - Advantages of React Native- Working with React Native- React Native Work- Rendering Lifecycle- Creating Components in React Native- Working with Views- Using JSX- Styling Native Components- Host Platform APIs. - Building Your First Application: Setting Up Your Environment - Creating a New Application- Exploring the Sample Code - Building a Weather App.

Unit-II **(12 hours)**

Components for Mobile - Analogies Between HTML Elements and Native Components - The Text Component- The Image Component- Working with Touch and Gestures- Using Touchable Highlight- The Gesture Responder System- Pan Responder- Working with Organizational Components - Using List View- Using Navigators- Other Organizational Components - Platform-Specific Components. **Styles**: - Declaring and Manipulating Styles- Organization and Inheritance- Positioning and Designing Layouts.

Unit-III **(12 hours)**

Platform APIs: Using Geolocation- Accessing the User's Images and Camera- Storing Persistent Data with AsyncStore- TheSmarter Weather Application. Modules: Installing JavaScript Libraries with npm- Native Modules for iOS- Native Modules for Android- Cross-Platform Native Modules.

Unit-IV **(12 hours)**

Debugging and Developer Tools: JavaScript Debugging Practices, Translated- React Native Debugging Tools - Debugging Beyond JavaScript- Testing Your Code- Putting It All Together: The Flashcard Application- Modeling and Storing Data - Using the Navigator- A Look at Third-Party Dependencies - Responsive Design and Font Sizes.

Unit-V **(12 hours)**

Deploying to the iOS App Store: Preparing Your Xcode Project- Uploading Your Application- Beta Testing with TestFlight- Submitting the Application for Review -

Deploying Android Applications: Setting Application Icon- Building the APK for Release - Distributing via Email or Other Links - Submitting Your Application to the Play Store.

Book for Study

1. Bonnie Eisenman, "Learning React Native" - Building Mobile Applications with JavaScript, O'Reilly Media, USA, 2016

Unit-I *Chapter 1 (Pages 1 to 6), Chapter 2 (Pages 7 to 14), Chapter 3 (Pages 15 to 31)*
Unit-II *Chapter 4 (Pages 47 to 81), Chapter 5 (Pages 83 to 100),*
Unit-III *Chapter 6 (Pages 101 to 130), Chapter 7 (Pages 131 to 153),*
Unit – IV *Chapter 8 (Pages 155 to 175), Chapter 9 (Pages 177 to 200),*
Unit – V *Chapter10 (Pages 203 to 222), Chapter 11 (Pages 225 to 236)*

Books for Reference

1. JakobIversen, Michael Eierman, "Learning Mobile App Development -A Hands-on Guide to Building Apps with iOS and Android", Addison-Wesley, USA, 2014.
2. Nader Dabit, "React Native in Action"- Developing iOS and Android apps with JavaScript, Manning Publications Co. USA, 2019
3. Dotan Nahum, "Programming React Native",Leanpub, Canada, 2016.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course					Hours				Credit
II	21PCA2CC04	CORE-4: PROGRAMMING SMART DEVICES					4				3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	3	1	3	3	2	2	2	2.4
CO-2	3	3	3	2	2	2	2	3	2	2	2.4
CO-3	2	2	3	3	3	3	3	3	3	3	2.8
CO-4	3	3	1	3	2	3	1	2	2	3	2.3
CO-5	3	3	1	2	2	2	3	2	3	2	2.3
Mean Overall Score											2.44 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	21PCA2CC05	CORE-5: SOFTWARE ENGINEERING	4	3

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	remember and recall the basic concepts of software engineering and design process models.	K1
CO-2	understand the software requirements and compare the models.	K2
CO-3	construct software design process and develop software structures for real life problems.	K3
CO-4	examine testing concepts and identify them to develop error free software.	K4
CO-5	evaluate the risk and quality issues in project management, validate the solutions and construct alternate solutions if there is a need.	K5 & K6

Unit-I **(12 hours)**

The Nature of Software – The Changing Nature of Software – Software Engineering: Defining the Discipline – The Software Process – Software Engineering Process – Software Development Myths. Process Models: Prescriptive Process Models – Specialized Process Models – The Unified Process – Personal and Team Process Models – Process Technology – Product and Process. Agile Development: Meaning of Agility and Cost of Change – Agile Process – Extreme Programming – Other Agile Process Models – A Tool Set for the Agile Process. Humans Aspects of Software Engineering: Characteristics of a Software Engineer – The Psychology of Software Engineering – The Software Team – Team Structure – Agile teams – The Impact of Social Media – Software Engineering using the Cloud – Collaboration Tools – Global Teams.

Unit-II **(12 hours)**

Understanding Requirements: Requirements Engineering – Establishing Groundwork – Eliciting Requirements – Developing Use Cases – Building the analysis Model – Negotiating Requirements – Requirements Monitoring – Validating Requirements – Avoiding common mistakes. Scenario-Based Methods: Requirements Analysis – Scenario-Based Modeling – UML models that supplement the use cases. Class-Based Methods: Identifying Analysis Classes – Specifying Attributes – Defining Operations – Class-Responsibility – Collaborator Modeling – Associations and Dependencies – Analysis Packages.

Unit-III **(12 hours)**

Design Concepts: The Design Process – Design Concepts – The Design Model. Architectural Design: Software Architecture – Architectural Genres – Architectural Styles – Architectural Considerations – Architectural Decisions – Architectural Design – Assessing Alternative Architectural Design. User Interface Design: The Golden Rules – User Interface Analysis and Design – Interface Analysis – Interface Design Steps – WebApp and Mobile Interface Design – Design Evaluation.

Unit-IV **(12 hours)**

Software Testing Strategies: A Strategic Approach to Software Testing – Test Strategies for Conventional Software – Test Strategies for Object-Oriented Software – Test Strategies for WebApp – Test Strategies for Mobile App – Validation Testing – System Testing – The Art of Debugging. Testing Conventional Applications: Software Testing Fundamentals – Internal and External Views of Testing – White-Box Testing – Basis Path Testing – Control Structure Testing – Black-Box Testing – Model Based Testing – Testing Documentation and help facilities – Testing for Real Time Systems – Pattern for Software Testing. Testing Web Applications: Testing concepts for WebApps – The Testing Process – Content Testing – User Interface Testing – Component-Level Testing – Navigation Testing – Configuration Testing – Security Testing – Performance Testing

Unit-V **(12 hours)**

Project Management Concepts: The Management Spectrum – People – The Product – The Process – The Project – W5H Principle – Critical Process. Process and Project Metrics: Metric in the Process and Project Domains – Software Measurement – Metrics for Software Quality – Integrating Metrics within the Software Process – Metrics for small Organizations – Establishing a Software Metrics Program. Risk Management: Software Risks – Risk Identification – Risk Projection – Risk Refinement – Risk Mitigation, Monitoring, and Management – RMMM Plan.

Book for Study

1. Roger S. Pressman and Bruce Maxim, "Software Engineering", McGraw Hill, International 8th Edition, 2019.
   Unit-1: Chapters 1 - 6
   Unit-2: Chapters 8 - 10
   Unit-3: Chapters 12, 13 & 15
   Unit-4: Chapters 22, 23 & 25
   Unit-5: Chapters 31, 32 & 35

Book for References

1. Roger S. Pressman, "Software Engineering", McGraw Hill, International 9th Edn., New York, 2019.
2. Ian Sommerville, "Software Engineering" Pearson India, 10th Edition 2018.
3. Richard Fairley, "Software Engineering Concepts", McGraw Hill, International Edition 2017.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course					Hours				Credit
II	21PCA2CC05	CORE-5: SOFTWARE ENGINEERING					4				3
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	2	3	3	2	2	2	2.4
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	2	3	3	3	1	2	2.4
CO-5	2	3	3	2	2	2	3	3	2	2	2.5
Mean Overall Score											2.37 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PCA2CC06**	**CORE-6: DATA ANALYSIS USING PYTHON**	**4**	**3**

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	acquire knowledge about various programming constructs and libraries used for data analysis in Python	**K1**
CO-2	explain the basic concepts of object-oriented & procedural programming and concepts used in various data analysis libraries available in Python	**K2**
CO-3	apply core python concepts to write simple programs and various libraries used in python for performing data analysis	**K3**
CO-4	discover how to implement core python concepts in various domains and examine the possibilities of load, inspect, and explore real-world data	**K4**
CO-5	construct simple python applications and develop a real world dataset to perform data analysis and assess the outcome of the results using various libraries	**K5 & K6**

Unit - I **(12 hours)**

INTRODUCTION TO PYTHON: Features of Python - How to Run Python DATA TYPES AND OPERATIONS: Numbers-Strings-List-Tuple-Set-Dictionary. FUNCTIONS: Function Definition-Function Calling - Function Arguments - Anonymous Functions. MODULES AND PACKAGES: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - dir() function - reload() function - Packages in Python - Date and Time Modules.

Unit - II **(12 hours)**

OBJECT ORIENTED PROGRAMMING: Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python-Encapsulation - Data Hiding-Inheritance - Method Overriding-Polymorphism. REGULAR EXPRESSIONS: match() function - search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - find all() method - compile() method. DATABASE PROGRAMMING: Connecting to a Database – Creating Tables – Insert, Update, Delete and Read Operation – Disconnecting from a Database

Unit - III **(12 hours)**

INTRODUCTION TO NUMPY: Introduction to Numpy - Basics of NumPy Array – Computation on NumPy Array – Aggregations – Broadcasting – Comparisons, Masks and Boolean Logic – Sorting Arrays – NumPy Structured Array.

Unit - IV **(12 hours)**

DATA MANIPULATION WITH PANDAS: Introducing Panda Objects – Data Indexing and Selection - Operating Data on Pandas – Handling Missing Data – Hierarchical Indexing – Combining Data Sets – Vectorized String Operations – Working with Time Series.

Unit - V **(12 hours)**

VISUALIZATION WITH MATPLOTLIB: Simple Line Plots – Simple Scatter Plots – Density and Contour Plots – Histograms, Binnings and Density – Customizing Plot Legends – Customising Color bars – Multiple Subplots – Text and Annotation – Three Dimension Plotting in Matplotlib – Geographic Data with Base Map – Visualization with Seaborn

Books for Study

1. Jeeva Jose and P. Sojan Lal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publishing Co. (P) Ltd., 2016.
   Unit-I - *Chapter 3 (3.1,3.2), Chapter 4(4.1-4.6), Chapter 6 (5.1-5.4), Chapter 7 (7.1-7.9)*
   Unit-II - *Chapter 9 (9.1 -9.10), Chapter 11 (11.1-11.5, 11.9,11.10), Chapter 12(12.1-12.6, 12.8)*
2. Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data", 1st Edition, O'Reilly Media, 2016
   Unit-III - *Chapte*r 2
   Unit-IV - *Chapter 3*
   Unit-V - *Chapte*r 4

Books for Reference

1. Wesley J. Chun, "Core Python Programming", Second Edition, Prentice Hall Publication, 2006.
2. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, 2011
3. Alberto Boschetti and Luca Massaron, "Python Data Science Essentials", Packt publishing, 3rd Edition, 2018

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	21PCA2CC06	CORE-6: DATA ANALYSIS USING PYTHON	4	3

Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	1	3	3	2	2	2	2.3
CO-2	3	3	2	2	1	3	3	3	2	3	2.5
CO-3	3	3	2	2	1	3	3	2	2	3	2.4
CO-4	3	3	3	2	1	3	3	3	2	3	2.6
CO-5	3	3	3	2	1	3	3	3	2	3	2.6
Mean Overall Score											2.48 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PCA2CP03**	**SOFTWARE LAB-3: PROGRAMMING SMART DEVICES**	**3**	**3**

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO-1	use the front-end tools to build mobile apps.	**K1**
CO-2	understand the concepts behind components, views, state and properties of mobile Apps.	**K2**
CO-3	handle styling and layout for the mobile app.	**K3**
CO-4	test mobile applications that interact with storage and external APIs.	**K4**
CO-5	design applications for publication in Play Store and iOS App Store.	**K5 & K6**

List of Exercises

1. Create an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and Event Listeners
3. Create a native calculator application.
4. Develop an application that draws basic Graphical Primitives on the screen.
5. Develop a native application that uses GPS location information.
6. Implement an application that writes data to the SD card
7. Implement an application that creates an alert upon receiving a message.
8. Mobile application with alarm clock.
9. Develop a photo gallery with search option.
10. Database Programming for mobile applications.
11. Develop the Tablet Programming.
12. Create Media Player.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	**21PCA2CP03**	**SOFTWARE LAB-3: PROGRAMMING SMART DEVICES**	**3**	**3**

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	2	2	1	3	3	2	1	3	2.3
CO-2	2	2	3	2	3	3	3	3	2	3	2.6
CO-3	2	3	3	2	2	3	2	3	2	3	2.5
CO-4	3	3	1	3	2	3	1	2	2	3	2.3
CO-5	3	2	3	3	1	2	3	2	1	2	2.2
Mean Overall Score											**2.38 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PCA2CP04**	**SOFTWARE LAB-4: PYTHON**	**2**	**2**

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	recall, understand various data structures used in Python	**K1**
CO-2	develop simple python programs by interpreting the core concepts used in python	**K2**
CO-3	apply the methods used in python packages to perform effective data analysis	**K3**
CO-4	explore a dataset to perform effective data analysis and visualization	**K4**
CO-5	combine packages like Numpy, Pandas and Matplotlib and evaluate the outcome of the data analysis	**K5 & K6**

List of Exercises

Basic Python Programs

- Flow controls, Functions and String Manipulation
- Operations on Tuples and Lists
- Operations on Sets and Dictionary
- Simple OOP – Constructors, Method Overloading, Inheritance
- Regular Expressions
- Database Operations

Data Analysis - NumPy

- NumPy Arrays,
- Sorting and Searching on Arrays

Data Analysis - Pandas

- Data Series
- Data Frame
- Combining and Merging Data Sets
- Handling Missing Values, Filter, Grouping and Aggregation

Visualization – MatplotLib & Seaborn

- MatPlotLib – Line Chart, Scatter Plot, Histogram
- Seaborn – Boxplot, HeatMap

Web Links

Virtual Lab

http://vlabs.iitb.ac.in/vlabs-dev/labs/python-basics/index.html

Online Python Compiler

https://www.programiz.com/python-programming/online-compiler/

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	21PCA2CP04	SOFTWARE LAB-4: PYTHON	2	2

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	1	3	2	2	2	2	2.4
CO-2	3	3	2	2	1	3	3	3	2	3	2.5
CO-3	2	3	2	2	2	3	3	2	2	3	2.4
CO-4	3	3	3	2	1	3	3	3	3	3	2.7
CO-5	3	3	3	2	1	3	3	3	3	3	2.7
Mean Overall Score											2.54 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PCA2SP01**	**SELF-PACED LEARNING: XML**	**-**	**2**

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	define the fundamental concepts of XML document	**K1**
CO-2	demonstrate the capacity to use encoding, tools and standards related to XML document	**K2**
CO-3	apply various styles related to DTD, Xml Schemas, CSS and XSL	**K3**
CO-4	distinguish the various supplemental technologies in XML	**K4**
CO-5	develop functional programming using XML	**K5 & K6**

Unit-I

Introducing XML: An Eagle's Eye View of XML – XML Applications – Your First XML Document – Structuring Data – Attributes, Empty – Element Tags, and XSL – Well – formedness.

Unit-II

Document Type Definitions: Validity – Element Declarations – Attribute Declarations – Entity Declarations – Namespaces.

Unit-III

Style Languages: CSS Style Sheets – CSS Layouts – CSS Text Styles – XSL Transformations- XSL Formatting Objects.

Unit-IV:

Supplemental Technologies: XLinks – Xpointers – Xinclude – Schemas.

Unit-V

XML Applications: Mathematical Markup Language – Chemical Markup Languages – Music XML – Voice XML.

Book for Study

1. Elliotte Rusty Harold, "XML Bible", John Wiley & Sons, 3rd Edition, 2004.
   Unit-I *Chapter 1, 3 to 5 and 6*
   Unit-II *Chapter 7 to 11*
   Unit-III *Chapter 12 to 16*
   Unit-IV *Chapter 17 to 20*
   Unit-V *Chapter 2*

Books for Reference

1. Thomas A Powell, "The Complete Reference XML", The McGraw – Hill Companies, 5th Edition, 2010.
2. Erik T. R Ray Learning XML, "O" Reilly Media, Third Edition, 2003.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	21PCA2SP01	SELF-PACED LEARNING: XML	-	2

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	3	2	2	3	2	2	3	2	2.4
CO-2	2	3	2	1	3	2	3	2	3	2	2.3
CO-3	2	3	3	2	3	2	3	3	2	2	2.5
CO-4	3	2	2	3	2	3	2	3	2	2	2.4
CO-5	2	3	3	2	2	2	3	3	2	2	2.4
Mean Overall Score											2.4 (High)

Semester	Course Code	Title of the Course	Hours	Credit
II	**21SCS2ES02**	**DSE-2: DESIGN AND ANALYSIS OF ALGORITHMS**	**5**	**4**

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	acquire the knowledge of data structures, design and analysis of algorithms	**K1**
CO-2	compare the data structures, design of computer algorithms with their complexity.	**K2**
CO-3	experiment with the complexity of algorithms and apply searching and sorting methods.	**K3**
CO-4	discover the basic results of time complexity and space complexity in different types of algorithms.	**K4**
CO-5	learn to develop algorithms for recursive, back-tracking and mathematical problems	**K5 & K6**

Unit-I **(15 hours)**

Introduction-Algorithm-Algorithm specification: Pseudo code Conventions, Recursive algorithms-Performance analysis: Space Complexity, Time Complexity, Asymptotic Notation.

Unit II **(15 hours)**

Ordered lists –Polynomial addition- Representation of Arrays – Stack – Queue – Circular queue – Evaluation of Expressions – Infix to Postfix – Evaluation of Postfix.

Unit III **(15 hours)**

Singly linked list –Linked stacks and queues –The storage pool – More on linked list. Doubly linked list (insertion and deletion only)- Tree- Binary tree representation – Binary tree traversals – Application of tree – Eight coins Decision tree.

Unit-IV **(15 hours)**

Divide and conquer – General method – Binary search- Finding the maximum and minimum in a set of items-Merge sort-Quick sort.

Unit-V **(15 hours)**

The Greedy Method – The General Method –Knapsack Problem – Job Sequencing with Deadlines - Backtracking-The 8-Queens problem-Algebraic problems-The general method-Evaluation and interpolation-Horner'srule-Lagrange interpolation – Newtonian interpolation.

Books for Study

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications Pvt. Ltd., 2004.

UNIT I : *Chapter 1. (Sections: 1.1, 1.2, 1.3.1 to 1.3.3)*
UNIT IV : *Chapter 3. (Sections: 3.1 to 3.5)*
UNIT V : *Chapter 4. (Sections: 4.1,4.2, 4.4)*

Chapter 7 (Sec: 7.2) and Chapter 9 (Sec:9.2)

2. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures", Galgotia Book Source,1981.

UNIT II: *Chapter 2.(Sections:2.2,2.4) Chapter 3.(Sections:3.1,3.3)*

UNIT III: *Chapter 4.(Sec: 4.1,4.2,4.3,4.5,4.8) Chapter 5.(Sec: 5.1,5.2,5.3,5.4,5.8.2)*

Books for Reference

1. A.V.Aho, J.E.Hopcroft, J.D.Ullman, "The Design and Analysis of Computer Algorithms", Addison-Wesley Publ. Comp., 1974.
2. Seymour E.Goodman and S. T. Hedetniemi, "Introduction to the Design and Analysis of Algorithms", McGraw Hill International Edition,2002.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course						Hours	Credit
II	21SCS2ES02	DSE-2: DESIGN AND ANALYSIS OF ALGORITHMS						5	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	2	1	3	3	2	2	3	2.3
CO-2	2	3	2	1	2	3	3	2	2	3	2.3
CO-3	2	2	3	2	3	2	3	2	3	2	2.3
CO-4	2	2	2	3	2	2	3	2	2	3	2.4
CO-5	2	2	2	2	3	1	3	2	2	3	2.2
									Mean Overall Score		2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	21PSS2SE01	SEC: SOFT SKILLS	4	3

Course outcomes (COS)
Upon completion of this course, students will:

- be exposed and trained in various nuances of Soft Skills in a Professional manner responding to the requirements of national and international market
- be able to synthesize the knowledge and practical skills learnt to be personal effective in any managerial positions
- be equipped to construct plans and strategies to work for better human society
- be able to illustrate the problems at work and home and design solutions and Maintain a balance of work and home
- be able to connect on a continuum and maintain growth and sustainability and creativity in employment that increases in productivity, profit for individuals and the society.

Module 1: Effective Communication & Professional communication

Effective communication: Definition of communication, Process of Communication, Barriers of Communication, Non-verbal Communication. JOHARI Window as a tool of effective communication.

Professional Communication: The Art of Listening, The passage, Kinesthetic, Production of Speech, Speech writing ,Organization of Speech, Modes of delivery, Conversation Techniques, Good manners and Etiquettes, Different kinds of Etiquettes, Politeness markers.

Module II. Resume Writing & Interview Skills

Resume Writing: Meaning and Purpose. Resume Formats. Types of Resume. Functional and Mixed Resume**,** Steps in preparation of Resume, Model resumes for an IT professional Chronological, Types of interviews, Creative resumes using online platforms

Interview Skills: Common interview questions, Dos and Don'ts for an interview, Attitude, Emotions, Measurement, Body Language, Facial expressions, Different types of interviews, Telephonic interviews, Behavioral interviews and Mock interviews(Centralized).

Module III: Group Discussion & Team Building

Group Discussion: Group Discussion Basics, GD as the first criterion for selecting software testers, Essentials of GD, Factors that matter in GD, GD parameters for evaluation, Points for GD Topics, GD Topics for Practice, Tips for GD participation. Video shooting of GD presentation & Evaluation (Centralized)

Team Building: Characteristics of a team, Guidelines for effective team membership, Pedagogy of team building, Team building skills. Team Vs Group – synergy, Types of synergy, Synergy relates to leadership ,Stages of Team Formation, Broken Square-Exercise, Leadership, Leadership styles, Conflict styles, Conflict management strategies & Exercises

Module IV: Personal Effectiveness

Personal Effectiveness: Self Discovery: Personality, Characteristics of personality, kinds of self, Personality inventory table, measuring personality, intelligence and Exercises

Self Esteem: Types-High & Low self-esteem, Ways of proving self-esteem, Hypersensitive to criticism, activities. Goal setting: Goal setting process, Decision making process& Exercises.

Stress Management: Identifying stress, Symptoms of stress, Responding to Stress, Sources of stress, Coping with stress and Managing stress.

Module V:Numerical Ability

Average, Percentage, Profit and Loss**,** Problems of ages, Simple Interest, Compound Interest,, Area, Volume and Surface Area, Illustration, Time and Work, Pipes and Cisterns, Time and Distance**,** Problems on Trains**,** Illustrations, Boats and Streams, Calendars and Clocks.

Module VI: Test of Reasoning

Verbal Reasoning: Number series, letter series, coding and decoding, logical sequence of words, Assertion and Reasoning, Data Sufficiency, Analogy, Kinds of relationships.

Non-Verbal Reasoning: Completion of Series**,** Classification, analogical, Pattern comparison, Deduction of figures out of series, Mirror Reflection Pattern, Hidden figures, Rotation pattern, Pattern completion and comparison, Sense of direction, Blood relations.

Text cum Exercise book

Melchias G, Balaiah, John Love Joy (Eds),2018. Winners in the Making: A Primer on soft Skills. SJC, Trichy.

References

* Aggarwal, R.S. *Quantitative Aptitude, S. Chand& Sons*
*.Aggarwal, R.S. (2010). *A Modern Approach to Verbal and Non Verbal Reasoning*. S.Chand & Co, Revised Edition.
* Covey, Stephen. (2004). *7 Habits of Highly effective people,* Free Press.
*Egan,Gerard.(1994).*The Skilled Helper*(5th Ed).Pacific Grove,Brooks/Cole.
* Khera Shiv(2003).*You Can Win.* Macmillan Books, Revised Edition.

Other Text Books

* Murphy, Raymond. (1998). *Essential English Grammar*. 2nded., Cambridge University Press.
* Prasad, L. M. (*2000). Organizational Behaviour, S.Chand & Sons.*
*Sankaran, K., & Kumar, M. *Group Discussion and Public Speaking*. M.I. Pub, Agra, 5thed., Adams Media.
* Schuller, Robert. (2010) .*Positive Attitudes*. Jaico Books.
* Trishna's (2006).*How to do wellin GDs & Interviews,* Trishna Knowledge Systems.
** Yate, Martin. (2005).H*iring the Best: A Manager's Guide to EffectiveInterviewing and Recruiting**

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PCA2EG01**	**GENERIC ELECTIVE – I (WS): APPLIED STATISTICS USING R**	**4**	**3**

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	recall the basic concepts used in R Programming structure	**K1**
CO-2	define different concepts in R Programming such as data structures in R like Vectors, Matrices and Lists	**K2**
CO-3	apply fundamental statistical techniques in R tool and evaluate R commands using an Integrated Development Environment	**K3**
CO-4	compare various statistical methods using R tool	**K4**
CO-5	produce effective data analysis on real time datasets	**K5 & K6**

Unit – I **(12 hours)**

INTRODUCTION TO R PROGRAMMING: Overview of R – Installation of R - Loading R Packages – R Basic Syntax – Data Types and Objects – Variables – Constants – Comments – Debuting in R. DATA DEFINITION AND CATEGORISATION: Overview of Data – Sources of Data – Big Data – Data Categorisation – Data Cube. CONTROL STATEMNETS AND FUNCTIONS: if Statement – for statement – while loop – repeat and break Statements – next Statement – switch Statement – Functions.

Unit – II **(12 hours)**

VECTORS: Overview of Vector – Creating a Vector – Accessing Elements of a Vector – Vector Manipulation and Vector Arithmetic – Deleting a Vector – Vector Element Sorting MATRICES: Creating a Matrix –Matrix Subsetting – Matrix Operations – Combining Matrices – Special Matrices – Eigen Vectors and Eigen Values - Arrays LISTS: Introduction to Lists – Creating a List – General List Operations – Accessing and Manipulating Elements of a List – Merging Lists – Applying Functions to a List – Sorting and Searching.

Unit - III **(12 hours)**

DATA FRAMES: Introduction to Data Frames – Creating a Data Frame – General Operations on Data Frames – Extending a Data Frame – Applying Functions to Data Frame. FACTORS AND TABLES: Introduction to Factors – Creating a Factor – Factor Levels – Summarising a Factor – Ordered Factors – Converting Factors – Common Functions used with Factors – Introduction to Tables and Creating Tables – Table Related Functions – Cross Tabulation. GRAPHICS IN R: Creating Graphs – Histograms – Bar Plot – Line Chart – Pie Chart – Box Plot _ Scatter Plot – Saving Graphs to a File

Unit - IV **(12 hours)**

DESCRIPTIVE STATISTICS USING R: Introduction to Statistical Analysis in R – Measures of Central Tendency or Location – Measures of Dispersion – Measures of Shape. PROBABILITY: Introduction to Probability – Probability and Statistics – Random Variables – Probability Distribution.

Unit - V **(12 hours)**

CORRELATION AND REGRESSION ANALYSIS: Correlation Analysis – Regression Analysis. STATISTICAL INFERENCE: Introduction to Statistical Inference – Hypothesis Testing. ANALYSIS OF VARIANCE: Introduction to Analysis of Variance – Implementing Analysis of Variance - ANNOVA in R.

Book for Study

1. Sandhya Arora and Latesh Malik, "R Programming for Beginners", Universities Press India (P) Ltd., 2020.

Unit-I - *Chapter 1 , 2 & 4*
Unit- II - *Chapter 6, 7 & 8*
Unit-III - *Chapter 9, 10 & 14*
Unit-IV - *Chapter 17 & 18*
Unit-V - *Chapter 20, 21 & 22*

Books for Reference

1. Norman Matloff, "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press, 2011.
2. Mark Gardener, "Beginning R – The Statistical Programming Language", Wiley, 2013
3. AKVerma, "RProgramming", CengageLearning, 2017

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	21PCA2EG01	GENERIC ELECTIVE – I (WS): APPLIED STATISTICS USING R	4	3

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	1	3	3	2	2	2	2.3
CO-2	3	3	2	2	1	3	3	3	2	3	2.5
CO-3	3	3	2	2	1	3	3	2	2	3	2.4
CO-4	2	3	3	2	2	3	3	3	2	3	2.6
CO-5	3	3	3	2	1	3	3	3	2	3	2.6
Mean Overall Score											2.48 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PMA2EG01**	**GENERIC ELECTIVE - I (WS): MATHEMATICAL FOUNDATIONS**	**4**	**3**

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	have knowledge of relations, functions, mathematical logic, lattices and numerical methods.	**K1**
CO-2	understand the types of functions, conditional statements and tautology in mathematical logic, properties of lattices, Boolean algebra, numerical techniques to find the roots and interpolation methods.	**K2**
CO-3	apply mathematical induction, composition of functions, logical notation to write an argument, suitable method to solve linear equations and numerical integration, interpolation.	**K3**
CO-4	analyze various types of function, statements using truth tables, use Boolean algebra to design and simplify logic circuits, numerical methods to find solutions of linear equations and system of equations using different methods.	**K4**
CO-5	justify relations and functions, to construct mathematical arguments using logical connectives and quantifiers, lattices. Evaluate solutions of system of linear equations and numerical integration.	**K5 &K6**

Unit-I **(12 Hours)**

Relations – Equivalence Relation – Functions and Operators – One-to-one, Onto Functions – Special Types of Functions – Invertible Functions – Composition of Function – Mathematical Induction.

Unit –II **(12 Hours)**

Logic: Introduction – TF – Statements – Connectives – Conjunction – Disjunction – Negation – Conditional Statements – Biconditional Statements – The Truth Table of a Formula – Tautology.

Unit- III **(12 Hours)**

Lattices – Some Properties of Lattices - New Lattices – Lattice Homomorphisms – Product Lattices of Two Lattices– Modular and Distributive Lattices – Boolean Algebra.

Unit-IV **(12 Hours)**

Iterative Methods: Birge – Vieta –Graeffe's Root squaring methods. System of linear algebraic equations: Gauss Elimination, Jacobi iteration method - Gauss-Seidel iteration method.

Unit- V **(12 Hours)**

Interpolation: Lagrange interpolation – Newton's Forward Difference Interpolation– Newton's Backward Difference Interpolation – Trapezoidal Rule - Simpson Rule - Romberg integration.

(Note: Stress on solving Numerical problems in Units IV and V. No Derivations).

Books for Study

1. Dr. M.K. Venkataraman, Dr. N. Sridharan, N. Chandrasekaran., ***"Discrete Mathematics"***, The National Publishing Company, Chennai. 2006.

Unit-I *Chapter II (Sec: 2, 5), Chapter III (Sec: 1, 2, 3, 4, 5), Chapter IV (Sec: 2 Theorems are excluded).*
Unit-II *Chapter IX (Sec: 1, 2, 3, 6, 7).*
Unit-III *Chapter X (Sec: 1, 2, 3,4, 5) (Definition and example only for Sec 5)*

2. M.K. Jain, S.R.K. Iyengar, R.K. Jain., "***Numerical Methods for Scientific and Engineering Computation"***, 4th Edition, New Age International (P) Limited, Publishers, 2003.

Unit-IV *Chapter 2 (Sec: 2.9,), Chapter 3 (Sec 3.2, 3.4).*
Unit-V *Chapter 4 (Sec: 4.2, 4.4), Chapter 5 (Sec 5.9, 5.10).*

Books for Reference

1. J.P. Trumblay, R. Manohar. ***"Discrete Mathematical Structures with Applications to Computer Sciences"***, McGraw-Hill International Edition, 1987.
2. S.S. Sastry, ***"Introductory Methods of Numerical Analysis",*** PHI Learning Private Limited, 4th Edition, New Delhi 2009
3. P. Kandasamy, K.Thilagavathy, K.Gunavathi, ***"Numerical methods",*** S. Chand & company Ltd-2008.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credits**
II	**21PMA2EG01**			**GENERIC ELECTIVE- I (WS): MATHEMATICAL FOUNDATIONS**					**4**	**3**
Course Outcomes ↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	2	2	1	3	3	2	2	3	2.4
CO-2	3	3	2	1	2	3	3	2	2	2	2.3
CO-3	3	2	3	2	1	2	3	2	3	2	2.3
CO-4	3	2	3	1	2	3	2	3	2	2	2.3
CO-5	3	3	3	2	1	2	3	3	2	2	2.4
Mean Overall Score											**2.34 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCA3CC07	CORE-7: DISTRIBUTED TECHNOLOGIES	5	4

CO No.	CO- Statement	Cognitive Levels (K- Level)
	On completion of this course, students will be able to	
CO-1	understand the architectures of distributed systems.	K1
CO-2	provide the better understanding of the features of presentation layer.	K2
CO-3	create applications for the implementation of server side distributed technologies.	K3
CO-4	evaluate and compare the technologies associated with presentation and interaction services.	K4
CO-5	design applications that involve presentation, interaction, persistence and component technologies.	K5 & K6

Unit-I **(15 hours)**

Client server computing- classification of client server system- client server advantages and disadvantages. J2EE architecture - MVC architecture - .NET Framework.

Unit-II **(15 hours)**

Presentation services: Servlet - JSP - Javamail - Interaction services: RMI - CORBA – XML-XSL –AJAX.

Unit-III **(15 hours)**

Component model: EJB: Session Beans: Stateless and Stateful - Entity Beans- CMP and BMP - Message Driven Beans.

Unit-IV **(15 hours)**

Getting Started with ASP.NET: Introducing the .NET Framework - Creating an ASP.NET Application- Deploying an ASP.NET Web Application. Building Forms with Web Controls: Introducing ASP.NET Web Forms- Creating Web Forms Application Projects- Using Web Controls- Working with Events.

Unit-V **(15 hours)**

Using Rich Web Controls: Using the AdRotator Control- Using the Calendar Control- Using the Tree View Control- ASP.NET Database Programming: Introducing ADO.NET- ADO.NET Basics- ADO.NET Object Model- Managed Providers- Dataset class.

Books for Study

1. Chandra Yadav Subhash **, "**An Introduction to Client Server Computing**",** New Age International (P) Limited, New Delhi, India, 2009.
   Unit-I *Chapter1 (Sec: 1.1, 1.2, 1.3)*
2. Justin Couch, Daniel H.Steinberg, "J2EE Bible", Wiley India(P) Ltd, New Delhi, India, 2002.
   Unit-I *Chapter1 (Pages3 to 10),*

Unit-II *Chapter 3 (Pages 36 to 46), Chapter 4 (Pages 47 to 68), Chapter 5 (Pages 69 to 93), Chapter 15 (Pages 309 to 327), Chapter 18 (Pages 431 to 461), Chapter 10 (Pages 191 to 208), Chapter 14 (Pages 269 to 276),*

Unit-III *Chapter 16 (Sec: 328 to 378)*

3. Mridula Parihar, "ASP.NET Bible", Hungry Minds, Third Avenue, New York, 2002

Unit-I *Chapter1*

Unit-IV *Chapter 2 and 3*

Unit-V *Chapter 4 and 8*

Books for Reference

1. Stephanie Bodoff, Dale Green, Eric Jendrock, "The J2EE tutorial", Addison-Wesley, New York, 2002.
2. Paul Tremblett, "Instant Enterprise Java - Beans", Tata McGraw Hill Publishing Company, New Delhi, India, 2001.
3. Hitesh Seth, "Microsoft .NET: kick start", Sams Publishing, USA, 2004.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	21PCA3CC07	CORE-7: DISTRIBUTED TECHNOLOGIES	5	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	2	3	1	2	2	3	3	1	3	2.2
CO-2	3	3	3	2	3	2	3	1	2	3	2.5
CO-3	2	1	3	3	2	2	3	3	1	2	2.2
CO-4	3	2	1	1	3	2	3	3	1	2	2.1
CO-5	2	3	1	2	3	3	2	3	1	2	2.2
									Mean Overall Score		2.24 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3CC08**	**CORE-8: COMPUTER NETWORKS AND SECURITY**	**5**	**4**

CO No.	CO-Statements On completion of this course, students will be able to	Cognitive Levels (K-Levels)
CO-1	recall the fundamental knowledge in computer network communication and security	**K1**
CO-2	summarize the technical aspects of every layer of OSI reference model	**K2**
CO-3	identify the issues in the layers of OSI reference model	**K3**
CO-4	analyse the technical factors involved network communication	**K4**
CO-5	evaluate the network security issues and propose appropriate security solution	**K5 & K6**

Unit-I **(15 hours)**

Introduction: Definition of Computer Networks - Uses of Networks - Network Architecture-Protocol hierarchies - Service Primitives - OSI Reference Model - ARPANET - Internet - Physical Layer Transmission Media - Telephone Systems.

Unit-II **(15 hours)**

Data link layer: Data link layer - Design Issues - Error Detection and Correction Data Link Protocols - Sliding Window Protocols - Finite state Machine Model - Petri Networks-PPP-Polling - FDM.

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Unit-III **(15 hours)**

Network Layer: Design Issues - Routing Algorithms - Congestion Control Algorithms - Inter Network Routing - Fragmentation.

Unit-IV **(15 hours)**

Transport Layer - Design Issues - Elements of Transport Protocols - The Internet - Transport Protocol (TCP &UDP) - Application Layer: Design Issues.

Unit-V **(15 hours)**

Network Security: Security Requirements and Attacks - Confidentiality with Symmetric Encryption - Message Authentication and Hash Functions – Public -key Encryption and Digital Signatures - Secure Socket Layer and Transport Layer Security - IPv4 and IPv6 Security.

Books for Study

1. Andrew S Tanenbaum, “Computer Networks”, Prentice Hall of India, New Delhi, 1999.
   - Unit I – Chapters I and II
   - Unit II – Chapters III and IV
   - Unit III – Chapter V
   - Unit IV – Chapter VI

2. William Stallings, “Data and Computer Communications”, Pearson,Eighth Edition, 2007.
Unit V – Chapter 21

Books for Reference

1. Vijay Ahuja, “Design and Analysis of Computer Communication Networks”, McGraw Hill, New York, 1985.
2. Behrouz A Fourouzan, “Data Communications and Networking”, McGraw Hill, Fourth Edition, 2006.
3. Andrew S Tanenbaum, David J. Wetherall, “Computer Networks”, Prentice Hall, 2011.
4. Gregory B. White, ,Eric A. Fisch Udo W. Pooch, “Computer System and Network + .Security”, CRC Press, 2017

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	21PCA3CC08	CORE-8: COMPUTER NETWORKS AND SECURITY	5	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	1	2	2	2	2	1	1.9
CO-2	3	2	3	2	1	3	2	2	2	1	2.1
CO-3	3	2	3	2	1	3	3	2	2	1	2.2
CO-4	3	3	3	3	2	3	3	3	2	2	2.7
CO-5	3	3	3	2	1	3	3	3	3	1	2.5
									Mean Overall Score		2.28 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3CC09**	**CORE-9: ACCOUNTING AND FINANCIAL MANAGEMENT**	**5**	**4**

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	remember the basic concepts of accounting and recalling the financial statements.	**K1**
CO-2	understand the errors in accounting & organizing interpreting them.	**K2**
CO-3	apply acquired knowledge to solve depreciation.	**K3**
CO-4	analyze and examine the business operations based on cost analysis	**K4**
CO-5	evaluate and criticize the various budgets and compile and build in decision-making related to capital expenditure	**K5 & K6**

Unit – I **(15 hours)**

Basic Accounting Terms – Accounting Equation – Accounting Procedures – Rules of Debit and Credit – Transactions – Journals –Ledgers – Trial Balance.

Unit – II **(15 hours)**

Trading account- Rectifications of Errors – Financial Statements – Adjustments – Profit and Loss Account – Balance Sheet.

Unit – III **(15 hours)**

Depreciation; Meaning - need - methods of charging depreciation. Accounting Packages: General Framework - Accounting Applications. (Tally.ERP 9, QuickBooks India, Zoho Books, Busy Accounting)

Unit – IV **(15 hours)**

Marginal Costing - Break Even Analysis - Standard Costing: Analysis of Variance.

Unit – V **(15 hours)**

Budgeting: Characteristics - Advantages - Classification - Preparation of Budgets. Capital Budgeting: Meaning - Methods of Capital Investment Decision making.

Books for Study

1. TS Grewal's "Double Entry Book Keeping-Solutions for Accountancy-Financial Accounting", Sultan Chand Sons, 2021
   Unit-I : Chapters 1 to 6 and 10
   Unit-II : Chapters 14 to 16
   Unit- III : Chapter 11
2. R Ramachandran & R Srinivasan, "Management Accounting" (Theories, Problems & Solutions), Sriram Publications, 6th Revised Edison, 2017.
   Unit-IV : Chapters 6 and 9
   Unit-V : Chapters 7and 8

Books for Reference

1. SN Maheswari "Cost& Management Accounting", Sultan Chand Sons, New Delhi, 2015.
2. Tally ERP9 Training Guide – 4th Revised & Updated Edition, 2018
3. MC Shukla, TS Grewal and SC Gupta "Advanced Accounting", S Chand and Company (Pvt.) Ltd., Ram Nagar, New Delhi, 2016.
4. RSN Pillai & Bagavathi "Management Accounting", Sultan Chand Sons, New Delhi, 2017.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	21PCA3CC09	CORE-9: ACCOUNTING AND FINANCIAL MANAGEMENT	5	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	2	3	3	3	1	2	2.4
CO-5	2	3	3	1	2	2	3	3	2	1	2.3
										Mean Overall Score	2.35 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3CP05**	**SOFTWARE LAB – 5: DISTRIBUTED TECHNOLOGIES**	**3**	**3**

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	acquire the knowledge of distributed applications.	**K1**
CO-2	understand the presentational aspects of distributed applications.	**K2**
CO-3	present web contents by creating web pages.	**K3**
CO-4	test web applications that interact with storage devices.	**K4**
CO-5	design, implement and test distributed applications in J2EE and DOT NET environments.	**K5 & K6**

List of Exercises

1. RMI - Invocation of server side methods.
2. Servlets - Returning Information received from the client.
3. Servlets and JDBC - Constructing a response by accessing a database.
4. JSP - use of script let.
5. JSP - use of java beans.
6. EJB - Session Bean.
7. EJB - Entity Bean.
8. ASP.NET - Server &Client side controls.
9. Database Access - ADO.NET
10. Components Creation and Usage
11. ASP.NET: Data bind Controls.
12. File Accessing
13. Creating Web Services and Access.
14. DOM usage on the server side.
15. AJAX: Dynamic client - server interaction.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	**21PCA3CP05**	**SOFTWARE LAB – 5: DISTRIBUTED TECHNOLOGIES**	**3**	**3**

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	3	3	2	3	1	2	2.4
CO-2	2	3	3	2	2	3	2	3	1	3	2.4
CO-3	3	2	3	1	1	2	3	3	2	3	2.3
CO-4	3	3	3	1	2	1	2	3	2	3	2.3
CO-5	3	2	2	2	3	3	3	1	1	1	2.1
									Mean Overall Score		**2.3 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3CP06**	**CASE STUDY BASED APPLICATION DEVELOPMENT**	**3**	**3**

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall and examine specific functional domains like Marketing, Finance, HR, SCM etc	**K1**
CO-2	gain practical insights in the selected domain	**K2**
CO-3	connect their chosen domain into actual work environment in an organization	**K3**
CO-4	assess the outcome of the project with industry standards	**K4**
CO-5	build career opportunities in a specific domain	**K5 & K6**

Procedure

- Each student will be assigned to a faculty, and the faculty will act as guide and monitor the progress of the work of the assigned student.
- The staff member will assess the work via submission of a report and viva-voce.
- Every student is expected to choose one of the following IT Sector domains

List of Industry Sectors / Specific Domains

Agriculture Industry	Engineering and Construction	Manufacturing Domain
Automotive Industry	Energy Industry	Retail Industry
Banking Domain	Education Domain	Textiles & Clothing
BFSI Industry	Finance Domain	Travel and Tourism Domain
Consumer / FMCG Industry	Hospitality Domain	Telecom Industry
Chemicals Industry	Healthcare Industry	Transport
Construction	Insurance Domain	Utilities (Water, Gas, Electricity)
Commerce / E-Commerce	Media & Entertainment	

- Students are expected to visit a local industry or institute for getting the problem statement / ideas of their case study and data collection.
- They will submit the Case Study Idea to their guide for approval.
- The ideas should be submitted to the respective guide in the beginning of the second week after the college reopens.
- Students can develop their application as Desktop based application/Web Application/ Mobile based application.
- They are also encouraged to develop Data Analytics Applications, or applications based on IoT or any other latest technologies based on the viability of software's and simulation tools available in the Computer Centre/Labs.
- Students can choose any one of the Language, Database, Tools and Techniques they have studied in the previous semesters for their application development.

Schedule

S. No.	Task	Tentative Timescale
1	Guide Allotment	Third Week of June
2	Submission of and Case Study and Title approval	Last Week of June
3	Interim Review	First Week after Mid Semester
4	Demonstration	Last Week of September
5	Draft Report Submission	First Week of October
6	Final Report Submission	Second Week of October
7	Viva-voce	Second Week of October

Evaluation Pattern

Component	Marks
Regularity in Reporting to guide	20
Interim Review	10
Documentation	20
Demonstration	25
Viva	25
Total	**100**

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course							Hours	Credit
III	21PCA3CP06	CASE STUDY BASED APPLICATION DEVELOPMENT							3	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	2	1	3	3	3	3	2	2.6
CO-2	3	3	3	2	1	3	3	3	3	2	2.6
CO-3	3	3	3	2	1	3	3	3	3	2	2.6
CO-4	3	3	3	2	1	3	3	3	3	2	2.6
CO-5	3	3	3	2	1	3	3	3	3	2	2.6
Mean Overall Score											2.6 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3ES03A**	**DSE-3: MEAN STACK WEBAPP DEVELOPMENT**	**5**	**4**

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	define the basic components of Full Stack Development and MEAN Stack Architecture	**K1**
CO-2	discuss the process of setting up a MEAN Project and understanding the nuances.	**K2**
CO-3	implement a Data Model with MongoDB by applying the concepts of REST APIs.	**K3**
CO-4	compare the various tools used in the development of MEAN stack web applications.	**K4**
CO-5	develop end–to–end web applications with Angular, Node, Express and MongoDB.	**K5 & K6**

Unit - I **(15 hours)**

INTRODUCING FULL STACK DEVELOPMENT: Brief History of Web Development – Towards Full Stack Development – Benefits of Full Stack Development –MEAN Stack – Node.js: The Web Server/Platform – Express: The Framework – MongoDB: The Database – AngularJS: The Front End Framework. DESIGNING A MEAN STACK ARCHITECTURE: Common MEAN Stack Architecture – Designing a Flexible MEAN Architecture

Unit - II **(15 hours)**

CREATING AND SETTING UP MEAN PROJECT: Creating an Express Project – Modifying Express for MVC – Import Bootstrap for Responsive Layouts. STATIC SITE WITH NODE AND EXPRESS: Defining Routes in Express – Building Basic Controllers – Creating Some Views – Adding Rest of Views – Take Data out of Views and Make Smarter

Unit - III **(15 hours)**

DATA MODEL with MONGODB: Connecting Express Application to MongoDB using Mongoose – Model the Data – Simple Mongoose Schema – MongoDB Shell to create MongoDB Database REST API: EXPOSE MONGODB DATABASE TO APPLICATION: Setting up API in Express – GET Methods: Reading Data from Mongo DB – POST Methods: Adding Data to MongoDB. PUT Methods: Updating Data in MongoDB. DELETE Method: Deleting Data from MongoDB

Unit - IV **(15 hours)**

CONSUMING A REST API: Call API from Express – List of Data from an API – Getting Single Document from API – Adding Data to Database via API. ADDING ANGULAR COMPONENT TO AN EXPRESS APPLICATION: Getting and Running Angular – Displaying and Filtering the Homepage List – Getting Data from API – Ensuring Forms work as Expected

Unit - V **(15 hours)**

SINGLE PAGE APPLICATION WITH ANGULAR: Groundwork for an Angular SPA – Switch from Express Routing to Angular Routing – Adding First Views, Controllers and Services. BUILDING SPA WITH ANGULAR: Full SPA – Adding Additional Pages and dynamically injecting HTML – Complex Views and Routing Parameters – Angular UI Components to create Modal Popup

Book for Study

1. Simon Holmes, "Getting MEAN with Mongo, Express, Angular, and Node", Manning Publications, 2016

Unit-I - *Chapter 1 (Sec 1,2)*
Unit-II - *Chapter 2 (Sec 3, 4)*
Unit-III - *Chapter 2 (Sec 5, 6)*
Unit-IV - *Chapter 2 (Sec 7), Chapter 3 (Sec 8)*
Unit-V - *Chapter 3 (Sec 9, 10)*

Books for Reference

1. Jeff Dickey, "Write Modern Web Apps with the MEAN Stack: Mongo, Express, AngularJS, and Node.js", Peachpit Press, 2015.
2. Brad Dayley, Brendan Dayley, "Node.js, MongoDB and Angular Web Development", Addison Wesley, 2017.
3. Amos Q. Haviv, Adrian Mejia,"Web Application Development with MEAN ", Kindle, June 15, 2017

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course					Hours	Credit			
III	21PCA3ES03A	DSE-3: MEAN STACK WEBAPP DEVELOPMENT					5	4			
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	1	3	3	2	2	2	2.3
CO-2	3	3	2	2	1	3	3	3	2	3	2.5
CO-3	3	3	2	2	1	3	3	2	2	3	2.4
CO-4	3	3	3	2	1	3	3	3	2	3	2.6
CO-5	3	3	3	2	1	3	3	3	2	3	2.6
Mean Overall Score											2.48 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3ES03B**	**DSE-3:PHP PROGRAMMING**	**5**	**4**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to;	
CO-1	define and relate the basic syntax of PHP and Laravel.	**K1**
CO-2	demonstrate the syntax and semantics of PHP programs in Laravel.	**K2**
CO-3	built simple PHP programs using Laravel	**K3**
CO-4	examine the concepts of Laravel Frameworks and develop web applications using PHP.	**K4**
CO-5	develop websites using built in-functions with PHP/MYSQL in Laravel frameworks.	**K5 & K6**

Unit-I **(15 hours)**

HTML: Structuring Documents – Core Elements – Basic Formatting – Lists – Tables – Basic Table Elements – Nested Tables – Forms – Form Controls – Sending Form Data – CSS: Cascading Style Sheets – CSS Properties – Controlling Text – Text Formatting – Selectors – Links – Backgrounds – Lists – Java Script: – Variables – Operators – Functions – Conditional Statement – Looping - Form Validation.

Unit-II **(15 hours)**

Linux: Introduction - Download and Install - Decisions, Decisions – Linux Partition Sizes - Accounts – Unix Commands - Apache Web server: Starting and Stopping and Restarting Apache - Configuration - Securing Apache - Create the Web Site - Apache Log Files - PHP: Embedding PHP into HTML - Configuration - Language Syntax: Variables - Data Types - Web variables - Operators - Flow Control Constructs- Writing PHP Functions.

Unit-III **(15 hours)**

Built in PHP functions - Important Functions - Array Functions – String Functions - Other Functions - PHP and MySQL: MySQL Functions - My SQL: Commands - Database Independent Interface - Tables – Loading and Dumping Database.

Unit-IV **(15 hours)**

Introduction: Laravel- Framework – History – System Requirements - Composer - Local Development Environments - Creating a New Laravel Project - Laravels Directory Structure - Configuration - Routing and Controllers – MVC - Views - Controllers - Route Model binding - Redirects - Custom Responses.

Unit-V **(15 hours)**

Frontend components – Presets – Pagination – Message Bags – Collecting and Handling User Data - Request Object - Form Requests - Artisian commands - Writing artisian commands -

Calling Artisian commands - Request Object - Response Object - Container – Binding Classes - Writing APIs: REST - Controller - Reading and Sending Headers - Sorting and Filtering - Transforming Results.

Books for Study

1. Jon Duckett, "Beginning HTML, XHTML, CSS, and JavaScript", Wiley Publishing, Indiana, 2010.
   [Unit I: Ch.1, Ch. 4, Ch. 5, Ch. 7, Ch. 8, Ch. 11, Ch. 12: 535 – 554]
2. James Lee and Brent Lee "Open Source Development with LAMP Using Linux, Apache, MySQL, Perl and PHP", Pearson Education, 2009.
   [Unit 2: Ch.2, Ch. 3, Ch. 12 : 12.1 – 12.5, Unit 3: Ch.12: 12.6 – 12.7, Ch.5]
3. Matt Stauffer, "LARAVEL Up and Running, A Framework for building modern PHP Apps", 2nd Edition, O'REILLY, 2019.
   [Unit 4 - Ch.1:1.1, 1.2, Ch.2: 2.1 – 2.5, Ch.3: 3.1, 3.5, 3.6, 3.7, 3.11, 3.13, Unit 5 – Ch.6: 6.2- 6.4, Ch.7: 7.1, 7.4, Ch.8: 8.2, 8.3, 8.4, Ch10: 10.2, 10.3, Ch.11: 11.5, Ch.13:13.1, 13.2, 13.3, 13.5]

Books for Reference

1. John Dean, "Web Programming with HTML5, CSS and JavaScript" Jones & Bartlett Learning, 2019.
2. Json Gerner, Elizabeth Naramore, Morgan Owens and Matt Warden, "Professional LAMP - Using Linux, Apache, My SQL and PHP5 Web development", Wiley Publisher, 2006.
3. Jack Vo, Learning Laravel: The Easiest Way, Learninglaravel.net, 2014.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course						Hours	Credit
III	21PCA3ES03B			DSE-3: PHP PROGRAMMING						5	4
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	2	3	3	2	1	2	2.3
CO-2	3	3	3	2	1	3	3	3	2	1	2.4
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	2	2	3	3	3	1	2	2.5
CO-5	2	3	3	2	2	2	3	3	2	2	2.4
										Mean Overall Score	2.4 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3GE02**	**GENERIC ELECTIVE-2 (BS): WEB DESIGN**	**4**	**3**

CO No.	CO-Statements	Cognitive Levels (K-Levels)
	On successful completion of this course, students will be able to	
CO-1	recall the basic concepts of Internet, E-mail and web design.	**K1**
CO-2	understand the various features of HTML tags and Java script.	**K2**
CO-3	apply the HTML tags to design web pages.	**K3**
CO-4	discover the technical concepts of HTML and JavaScript programming	**K4**
CO-5	evaluate the programming skills using Markup and Scripting Languages and design simple web pages using HTML and JavaScript	**K5 & K6**

Unit-I **(12 hours)**

Accessing the World Wide Web- Internet – Protocols and other Jargon – Host machines and Host names - Internet Architecture and Packet Switching - The Client/Server Software Model - Bandwidth and Asynchronous Communication. Working with E-mail – Anatomy of an E-mail message – Viewing your Inbox – Viewing individual mail messages – Sending a new mail message – Replying to and Forwarding E-mail messages.

Unit-II **(12 hours)**

HTML Tags, Paired Tags, Singular Tags – Structure of a HTML program – Titles and Footers –Text Formatting – Emphasizing material in a web page – Text styles – Other Text Effects – Types of Lists – Adding Graphics to HTML documents.

Unit-III **(12 hours)**

Tables – Linking Documents – Links – Images as Hyperlinks – Frames – Forms – Text element – Password element – Button element – Checkbox element – Radio element – Text Area element – Select and Option elements.

Unit-IV **(12 hours)**

JavaScript: Introduction to JavaScript - JavaScript in web pages - writing JavaScript with HTML - Basic programming techniques - operators and expressions - conditional checking - loops - functions - user defined functions - dialog boxes.

Unit-V **(12 hours)**

JavaScript: JavaScript DOM: JSS DOM - understanding objects in HTML - browser objects - web page object hierarchy - Handling events.

Books for Study

1. Wendy G.Lehnert, "Internet 101 - A Beginners Guide to the Internet and the World Wide Web", Addison Wesley, 1999.
   Unit I – Chapters 1, 2 and 3
2. Ivan N. Bayross, "Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP", 4th Revised Edition, BPB Publications, New Delhi, 2010.
   Unit II – Chapters 2, 3 and 4
   Unit III – Chapters 5, 6, 7 and 10
   Unit IV – Chapter 8
   Unit V – Chapter 9

Books for Reference

1. Chuck Musciano & Bill Kennedy, "HTML - The Definitive Guide", Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.
2. Raj Kamal, "Internet and Web Technologies", TMH, New Delhi, 2002.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	21PCA3GE02	GENERIC ELECTIVE-2 (BS): WEB DESIGN	4	3

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	1	2	1	3	3	3	2	2	2.2
CO-2	3	3	1	2	1	3	3	3	2	2	2.3
CO-3	3	2	2	3	1	3	3	3	2	3	2.5
CO-4	3	2	2	3	1	3	3	3	2	3	2.5
CO-5	3	3	2	3	1	3	3	3	2	3	2.6
									Mean Overall Score		2.42 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PCA3CE01**	**COMPREHENSIVE EXAMINATION**	--	2

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On completion of this course, students will be able to	
CO-1	recall and summarize on the core concepts they have studied in their course of study	**K1**
CO-2	relate the ideas during competitive exams	**K2**
CO-3	build the concepts with industry applications	**K3**
CO-4	appraise themselves by answering core discipline questions during interviews	**K4**
CO-5	synthesize and apply the information in their higher studies/research	**K5 & K6**

Unit I: Data Management Systems

- Database System Concepts & Architecture
- Data Modelling
- SQL
- Normalization
- Transaction Processing and Concurrency Control
- Database Recovery Techniques
- Data warehousing and Data Mining
- Big Data and NoSQL

Unit II: Operations Research

- Linear Programming
- Simplex Method
- Two Phase Method
- Dual Simplex Method
- Transportation
- Assignment Problem
- Project Scheduling by PERT-CPM
- Queuing Theory

Unit III: Data Structures and Algorithms

- Array and its Applications
- Stack, Queue, Linked List
- Trees, Binary Tree
- Sets and Graphs
- Sorting and Searching Algorithms
- Algorithm Complexity
- Algorithm Design Techniques - Divide and Conquer; Dynamic Programming,
- Greedy Algorithms, Backtracking, Branch and Bound

.**Unit IV: Software Engineering**

- Software Process Models
- Software Requirements

- Software Design
- Software Quality
- Software Testing

Unit V: Computer Networks and Security

- Data Communication
- Network Models, OSI and TCP/IP Layers
- Mobile Communication
- Cloud Computing and IoT

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credit**
III	**21PCA3CE01**			**COMPREHENSIVE EXAMINATION**					**--**	**2**
Course Outcomes ↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	2	1	3	3	2	2	2	2.4
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	3	3	3	2	1	3	3	3	3	2	2.6
CO-4	3	3	3	2	1	3	3	3	3	2	2.6
CO-5	3	3	3	2	1	3	3	3	2	2	2.5
Mean Overall Score											**2.52 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PCA4ES04A	DSE- 4: RECENT TRENDS IN COMPUTER SCIENCE	5	4

CO No.	CO-Statements	Cognitive Levels (K-Levels)
	On completion of this course, students will be able to	
CO-1	define the basic concepts and technical aspects of recent trends in computer science	K1
CO-2	relate the technical aspects of cloud computing, IoT and Artificial Intelligence	K2
CO-3	analyse the various concepts of recent trends to apply them in appropriate applications	K3
CO-4	compare various techniques in the recent trends used in the real time applications	K4
CO-5	choose the appropriate mechanism in recent trends to build new smart applications	K5 & K6

Unit – I: Cloud Computing (15 hours)

Evolution of Cloud Computing -Essential Characteristics of cloud computing - Operational models such as private, dedicated, virtual private, community, hybrid and public cloud - Service models such as IaaS, PaaS and SaaS - Governance and Change Management - Business drivers, metrics and typical use cases. Example cloud vendors - Google cloud platform, Amazon AWS, Microsoft Azure, Pivotal cloud foundry and Open Stack.

Unit – II: Internet of Things (15 hours)

Fundamentals of Internet of Things **:** Introduction – Characteristics of IoT – The Physical design of IoT – IoT Architecture and components – Logical design of IoT – Communication models – IoT Communication APIs – Emerging Applications in IoT -IoT Architectures and Protocols :Introduction – Three Layer and five layer architecture of IoT – Cloud and fog based architecture-of IoT - Representative architecture – Near Field Communication (NFC) – Wireless Sensor Network (WSN) – IoT network protocol stack – IoT technology stack – Bluetooth, Zigbee and 6Lowpan

Unit – III: Artificial Intelligence (15 hours)

Introduction: Definitions of Artificial Intelligence – Artificial Intelligence Problems – Topics of Artificial Intelligence – Timelines of Artificial Intelligence – Production Systems – State Space Representation – Branches of Artificial Intelligence – Applications of Artificial Intelligence.

Unit – IV: Machine Learning (15 hours)

Learning: Types of Learning – Machine Learning: Types in Machine Learning – History of Machine Learning – Aspects of Inputs to Training – Learning Systems – Machine Learning Applications- Quantification of Classification – Intelligent Agents

Unit – V: Blockchain **(15 hours)**

Fundamentals of Blockchain: Origin of Blockchain - Blockchain Solution - Components of Blockchain - Block in a Blockchain - The Technology and the Future. Blockchain Types and Consensus Mechanism: Introduction - Decentralization and Distribution - Types of Blockchain - Consensus Protocol.

Books for Study

1. Buyya, Vecciola and Selvi, "Mastering Cloud Computing: Foundations and Applications Programming", Tata McGraw Hill, 2013. Unit I – Chapter 1
2. Dr. Kamlesh Lakhwani, Dr. Hemant Kumar Gianey, Joseph Kofi Wireko, Kamal Kant Hiran, "Internet of Things (IoT), Principles, Paradigms and Applications of IoT", BPB Publications, 2020, Unit II – Chapter 1, 2
3. Vinod Chandra S. S. and Anand Hareendran S. "Artificial Intelligence and Machine Learning", PHI Learning Pvt Ltd, 2014. Unit III, IV – Chapter 1, 7
4. Chandramouli. S, Asha A George, Abhilash K A, and Meena Karthikeyan, "Blockchain Technology", Universities Press (India) Private Limited, Hyderabad-500029, 2021. Unit V – Chapter 1

Books for Reference

1. Joseph Ingeno , "Software Architect's Handbook", PacktPublishing,2018.
2. Stuart J. Russell and Peter Norvit, "Artifical Intelligence A Modern Approach", Third Edition, Pearson Education Limited 2016.
3. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction". Princeton University Press, 2016.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
IV	21PCA4ES04A	DSE- 4: RECENT TRENDS IN COMPUTER SCIENCE	4	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	2	3	3	3	2	2	2.5
CO-2	3	3	3	2	2	2	3	3	3	2	2.6
CO-3	3	3	2	3	2	3	3	3	2	2	2.6
CO-4	3	2	3	2	1	2	2	3	2	2	2.2
CO-5	3	2	3	2	1	2	3	3	3	1	2.3
									Mean Overall Score		2.44 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PCA4ES04B	DSE- 4: BIG DATA ANALYTICS	5	4

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, student will be able to	
CO-1	acquire the knowledge on the basics of Big Data and its role in various Industry verticals	K1
CO-2	identify Big Data concepts and its implications in various business domains	K2
CO-3	explore the cutting-edge tools and technologies to analyze Big Data.	K3
CO-4	appreciate the Big Data Processing concepts and Data visualization techniques	K4
CO-5	analyze and propose the Big data solutions to corporate houses	K5 & K6

Unit-I **(15 hours)**

Introduction: Concepts and Terminology – Big Data Characteristics- Different Types of Data-case study Background- Business goals and Obstacles- Business Motivations and Drivers for Big Data Adoption-Marketplace Dynamic- Business Architecture- Business process Management- Information and Communication Technology-Data Analytics and Data Science-Digitization.

Unit-II **(15 hours)**

Big data Adoption and Planning Considerations-:Organization Prerequisites- Data Procurement - Privacy- Security- Provenance-Limited Realtime Support- Distinct Performance Challenges – Distinct Governance Requirements- Distinct Methodology-Clouds- Big Data Analytics-Data Identification- Data Acquisition and Filtering-Data Extraction- Data validation and cleansing-Data Aggregation and Representation- Data Analysis-Data Visualization-Utilization of Analysis Results.

Unit-III **(15 hours)**

Enterprise Technologies and Big Data Business Intelligence**-:** Online Transaction and Processing (OLTP)-Online Analytical Processing (OLAP)- Extract Transform Load (ETL)-Data Warehouses-Data Marts-Traditional BI-Big Data BI-Big Data Storage Concepts-Clusters- File System and Distributed Systems- No SQL-Shading-Replication-ACID.

Unit-IV **(15 hours)**

Big Data Processing Concepts: Introduction -Parallel Data Processing-Distributed Data Processing- Hadoop-Processing Workloads-Cluster- Processing in Batch Mode-Map-Combine-Partition- Shuffle and Sort—Processing in Real Time Mode- Speed Consistency Volume (SCV)-Event Stream Processing- Complex Event Processing- Realtime Big data Processing and SCV-Realtime Big Data Processing and MapReduce.

Unit-V **(15 hours)**

Big Data Storage Technology: On-Disk Storage Devices-NoSQL Database- In-Memory Storage Device- Big Data Analytics Techniques-Quantitative Analysis- Qualitative Analysis-Data Mining- Statistical Analysis-A/B Testing-Correlation-Regression- Machin Learning-Semantic Analysis- Visual Analysis-Heat Maps-Time Series Plots-Network Graphs-Spatial Data Mapping.

Book for Study

1. Paul Buhler, Wajid Khattak and Thomas Erl, "Big Data Fundamentals: Concepts, Drivers & Techniques", Prentice Hall Publications, January 2016.
   Unit 1: Chapters 1 and 2
   Unit 2: Chapter 3
   Unit 3: Chapters 4 and 5
   Unit 4: Chapter 6
   Unit 5: Chapters 7 and 8

Books for Reference

1. Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, "Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics", Published by Apress Media, 2013.
2. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'reilly Media, 2012.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course					Hours	Credit
IV	21PCA4ES04B			DSE- 4: BIG DATA ANALYTICS					5	4
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	1	3	3	2	2	2	2.3
CO-2	2	3	2	3	2	2	3	2	3	3	2.5
CO-3	3	3	3	3	3	3	2	2	3	2	2.7
CO-4	3	3	3	1	2	3	3	3	1	2	2.4
CO-5	2	3	3	3	2	2	3	3	2	2	2.5
									Mean Overall Score		2.48 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	**21PCA4PW01**	**PROJECT WORK & VIVA-VOCE**	**25**	**24**

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	identify and analyse real world problems on their selected project domain	**K1**
CO-2	apply their skills and knowledge in design, coding and testing using appropriate technological tools and procedures	**K2**
CO-3	evaluate their work and results with proper documentation	**K3**
CO-4	demonstrate the developed application with appropriate personal, societal, and professional ethical standards.	**K4**
CO-5	combine the knowledge gained through various phases of project life cycle and adapt themselves to the software industry needs to engage in lifelong learning	**K5 & K6**

PROJECT

The fourth semester is allotted to do a project work in an organization with sufficient infrastructure to carry out the MCA project work. The students would choose an organization and submit the details of the organization to the project guide and HoD. The students should send a requisition letter from the HoD to the organization and should get the letter of acceptance from the organization. The students can send only one such requisition letter at a time. Only after non-acceptance of the company the student can request another organization for doing the project work. The guide and HoD have to approve the company / organization and in case of any change suggested by the guide or HoD, the student should change the organization. The change would be suggested by the guide &HoD if they find the company not having sufficient infrastructure for computing and an external guide in the organization with required educational qualification such as MCA or ME / MTech who can be external guides in the organization. Only upon the receipt of the acceptance letter, the student will be relieved from the College to join the company. They should submit the acceptance letter from the organization for having accepted the student for pursuing his/her MCA project work. The marks awarded by the external guide in the organization carries a weightage of ten percent.

The students would join the organization in the first week of December and send their joining report on or before the fixed date as fixed by the Department. The students will be supplied with all the details of what are to be done before and after joining the company. They should appear for first review mid-way and they will report the progress of their project work in the presence of their classmates and guide.

The students should send emails to their guides every fifteen days of their progress after joining the organization. Failure to submit the joining report and failure to be present for the first review (except under exempted circumstances by the Department of Computer Science due to long distance) will result in non-acceptance of their project work and such students would repeat the same procedure in the next academic year with the approval of the Principal, Controller of Examinations and the Department of Computer Science after the payment of the fees of the particular semester.

The students appear for the second review during the end semester examinations in the college along with the manuscript of the project work. The manuscript should be prepared

along the guidelines supplied to them by the Department; students should submit three volumes to the Department before the date stipulated by the Department. The viva-voce of the project work would be conducted by both the internal and the external examiners along with semester examinations of the College.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credit**
IV	**21PCA4PW01**			**PROJECT WORK & VIVA-VOCE**					**25**	**24**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	3	3	1	3	3	3	3	3	2.8
CO-2	3	3	3	2	1	3	3	3	3	3	2.8
CO-3	3	3	3	2	1	3	3	3	3	3	2.8
CO-4	3	3	3	3	3	3	3	3	3	3	3
CO-5	3	3	3	3	2	3	3	3	3	3	2.9
Mean Overall Score											**2.86 (High)**

Mandatory Bridge Course
(Non-computer Science Stream Students)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PCA1BC01	ADDL. CORE I: C PROGRAMMING	-	5

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall algorithms and flowcharts for computing logic	K1
CO-2	summarize the basic knowledge to develop C programs	K2
CO-3	apply and implement programs for solving real world problems	K3
CO-4	examine and explore the use of memory allocation for application programs	K4
CO-5	design and develop alternate methods of solving variety of problems	K5 & K6

Unit-I
Algorithms – Flow charts – Developing algorithms and flowcharts for solving simple problems using sequential, selection and iterative programming Structures.

Unit-II
History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Control structures – Looping structures.

Unit-III
Arrays – Character Arrays and Strings – User defined functions.

Unit-IV
Pointers: Introduction – Pointer Expressions – Chain of Pointers –Pointers and Arrays – Array of Pointers – Pointers as function arguments – Function returning Pointers – Pointers to Functions – Function pointer – Pointers and Structures.

Unit-V
Structures: Introduction – Defining a structure – Declaration of structure – Accessing Structures members – Array of Structures – Structures within structures – Structures and functions – Structures and Pointers – Union. Files: Opening and closing files – Operations on files.

Books for Study

1. S. Jaiswal, "Information Technology Today", Galgotia Publications, New Delhi, Fourth Edition, 2009.
   Unit-I *Chapter 20 (Pages CL-3 – CL-26)*
2. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
   Unit-II *Chapter 1 (Sec:1.1-1.2,1.8), Chapter 2 (Sec:2.5 –2.7), Chapter 3, Chapter 5, Chapter 6*
   Unit-III *Chapter 7, Chapter 8 (Sec: 8.2 – 8.8), Chapter 9*
   Unit-IV *Chapter 11*
   Unit-V *Chapter 10, Chapter 12 (Sec: 12.1 – 12.4)*

Books for Reference

1. Byron S. Gottfried, "Programming with C", Schaum's Outline Series, Tata-McGraw Hill Edtion, New Delhi, 1991.
2. E. Karthikeyan, "A Textbook on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.
3. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi: 2010.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course					Hours				Credit
I	21PCA1BC01	ADDL. CORE I: C PROGRAMMING					-				5
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	1	3	3	3	2	1	2.3
CO-2	3	3	2	2	1	3	3	3	2	1	2.3
CO-3	3	3	3	2	1	3	3	3	2	1	2.4
CO-4	3	3	3	2	1	3	3	3	2	1	2.4
CO-5	3	3	3	2	1	3	3	3	2	1	2.4
										Mean Overall Score	2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credit
I	21PCA1BC02	ADDL. CORE II : C PROGRAMMING LAB	-	5

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	relate the ways to solve simple programs	K1
CO-2	understand and trace the execution of programs using arrays	K2
CO-3	develop programs with functions and pointers	K3
CO-4	compare and contrast structures and unions	K4
CO-5	solve data handling problems using files	K5 & K6

List of Exercises

1. Simple Programs using Operators
2. Branching structures
3. Looping structures
4. Arrays
5. Strings
6. Functions
7. Pointers
8. Structures
9. Union
10. Files

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
I	21PCA1BC02	ADDL. CORE II: C PROGRAMMING LAB	-	5

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	2	1	3	3	3	3	1	2.5
CO-2	3	3	3	2	1	3	3	3	2	1	2.4
CO-3	3	3	3	2	1	3	3	3	2	1	2.4
CO-4	3	3	3	2	1	3	3	3	2	1	2.4
CO-5	3	3	3	3	1	3	3	3	2	1	2.5
									Mean Overall Score		2.44 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PCA2BC03**	**ADDL. CORE III: WEB DESIGN (HTML 5, JAVA SCRIPT & CSS)**	**-**	**5**

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall the knowledge on the features of HTML and Java Script.	**K1**
CO-2	understand the design of web pages using HTML tags and CSS	**K2**
CO-3	utilize skills to implement HTML and JavaScript Programming within web pages	**K3**
CO-4	analyze and choose the appropriate HTML and Java Script techniques for designing web pages	**K4**
CO-5	interpret the events and develop the cookies in Java Script for web pages.	**K5 & K6**

Unit-I

Introduction to HTML: HTML Tags - Structure of an HTML Program - Text Formatting- Emphasizing material - Text-Styles

Unit-II

HTML: Tables – Linking documents – Frames – Form and its elements.

Unit-III

Introduction to Cascading Style Sheets: CSS Basics-Style Inclusion Methods – CSS Strings and Keywords – CSS Selectors – Miscellaneous CSS Constructors.

Unit-IV

JavaScript: Introduction to JavaScript – JavaScript in web pages–writing JavaScript with HTML – Basic programming techniques – operators and expressions – conditional checking – loops – functions – user defined functions – dialog boxes.

Unit-V

JavaScript: JavaScript DOM: JSSS DOM – understanding objects in HTML – browser objects – web page object hierarchy – Handling events – The form object – Built-in objects – User defined objects –Cookies – Setting a cookie.

Books for Study

1. Wendy G.Lehnert, “Internet 101 - A Beginners Guide to the Internet and the World Wide Web”, Addison Wesley, 1999.
   Unit I - Chapters 2 and 3
   Unit II - Chapters 5 to 7 and 10

2. Powell and Thomas, “HTML & CSS: The Complete Reference”, McGraw Hill, 2010.
   Unit III - Chapter 4 (Sec. 4.1.1)

3. Ivan N. Bayross, “Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP”, 4th Revised Edition, BPB Publications, New Delhi, 2010.
Unit IV - Chapter 8
Unit V - Chapters 9 to 11

Books for Reference

1. Chuck Musciano& Bill Kennedy, “HTML - The Definitive Guide”, Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.
2. Raj Kamal, “Internet and Web Technologies”, TMH, New Delhi, 2017.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	21PCA2BC03	ADDL. CORE III: WEB DESIGN (HTML 5, JAVA SCRIPT & CSS)	-	5

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	2	3	3	3	2	2	3	2.5
CO-2	2	3	3	2	2	3	3	3	3	3	2.7
CO-3	1	2	3	3	3	3	3	2	3	2	2.5
CO-4	2	2	2	3	1	2	3	2	2	3	2.2
CO-5	2	3	2	3	3	1	3	3	3	3	2.6
									Mean Overall Score		2.5 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PCA2BC04**	**ADDL. CORE IV: WEB DESIGN (HTML 5, JAVA SCRIPT & CSS) LAB**	**-**	**5**

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	relate the ability to design simple web pages with basic HTML tags	**K1**
CO-2	illustrate the use of CSS in web pages	**K2**
CO-3	apply the skill set to analyze the HTML and Java Script for web design	**K3**
CO-4	evaluate the usage of HTML and Java Script in designing web pages	**K4**
CO-5	construct web site using HTML and Java Script for real time applications	**K5 & K6**

List of Exercises

HTML

1. Web Page with Headings and Formatting Tags
2. Web Page with Ordered and Unordered Lists
3. HTML file to demonstrate Tables
4. HTML file to demonstrate Forms
5. HTML file to demonstrate Frames

CSS

6. CSS Background and Text Styles
7. CSS Id and Class

Java Script

8. Java Script Loops
9. Java Script Functions
10. Java Script Form Validation

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	**21PCA2BC04**	**ADDL. Core IV: WEB DESIGN (HTML 5, JAVA SCRIPT & CSS) LAB**	**-**	**5**

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	2	2	1	3	3	2	2	3	2.3
CO-2	2	3	3	2	2	3	3	3	3	3	2.7
CO-3	2	2	3	3	3	3	3	2	3	2	2.6
CO-4	2	2	2	3	2	2	3	2	2	2	2.2
CO-5	2	3	3	3	1	2	3	3	3	3	2.6
Mean Overall Score											**2.48 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCA3BC05	ADDL. CORE V: WEB GRAPHICS	-	5

CO No.	CO Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO-1	recall the existing Multimedia tools	K1
CO-2	illustrate various tools using GIMP	K2
CO-3	develop and design using basic Synfig tools	K3
CO-4	examine the knowledge of advanced tools in Animation	K4
CO-5	appraise presentation package using multimedia	K5 &K6

Unit-I

Introduction to Multimedia Definition – Components of Multimedia – Multimedia and Hypermedia – World Wide Web – Various overview of Multimedia software Tools - Multimedia Authoring and Tools: Multimedia Authoring – VRML – Popular File Formats.

Unit-II

GIMP environment – Layers and work path – Image editing – channels, masks and actions - filters – rollovers and animations.

Unit-III

Synfig: Introduction – drawing and coloring tools.

Unit-IV

Synfig: Animation – tweening – interactive elements.

Unit-V

Inkscape: Interface – working with shapes – layers – blend, path and mask.

Books for Study

1. Ze-Nian Li and Mark S. Drew, “Fundamentals of Multimedia”, Pearson Education, Inc., 2004
2. Phillip Whitt “Beginning Photo Retouching & Restoration Using GIMP”, Apress, 2014.
3. http://wiki.synfig.org/category - Manual. 21-Jun-2016.
4. Bethany Hiitola, Packt Publishing Limited, “Inkscape Starter”, ISBN- 10.1849517568

Books for Reference

1. Fred Halsall, “Multimedia Communications: Applications, Networks, Protocols, and Standards”, Pearson Education, Inc.2001.
2. Jason Van Gumster and Robert Shimonski, “GIMP Bible”, Wiley, 2010.
3. Jesse Russell, Ronald Cohn, “Synfig”, 2012.
4. Bethany Hiitola,“Inkscape Beginner's Guide”, Packt Publishing,2012.

Unit-I *Chapter 1 (Page no. 3-23), Chapter 3 (page no. 69-80***)**
Unit-II *Chapter 7, to 10 and 11*
Unit-III, IV *Manual*
Unit-V *Chapters 1,2,4,5 and 6*

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credit**
III	**21PCA3BC05**			**ADDL. CORE V: WEB GRAPHICS**					**-**	**5**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	2	2	2	3	2	3	2	2	2.4
CO-2	3	2	2	1	3	2	2	3	2	2	2.2
CO-3	3	2	3	2	3	2	3	3	2	2	2.5
CO-4	2	3	2	3	2	2	2	3	2	2	2.3
CO-5	2	3	3	2	2	2	3	3	2	2	2.4
Mean Overall Score											**2.3 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
III	21PCA3BC06	ADDL. CORE VI: WEB GRAPHICS LAB	-	5

CO No.	Course Outcomes	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall and design images using multimedia	K1
CO-2	demonstrate various tools in photo editing	K2
CO-3	apply the knowledge of animation	K3
CO-4	compare and choose the necessary tools to design a project	K4
CO-5	determine animation works using bitmap images	K5 & K6

List of Exercises

1. Design ID card, Pamphlets and Advertisement using GIMP.
2. Design an invitation for a seminar or conference.
3. Design a greeting card
4. Create text effects using text tools
5. Apply various Layer Effects to Images.
6. Apply Filter effects on images.
7. Develop a slide show of Photos with transition.
8. Design brushed outlines for an image using Synfig
9. Create an Animation for bouncing ball.
10. Using Time line Adapt motion tweening Animation.
11. Creating logo using Inkscape.
12. Creating Calligraphic text effects using inkscape.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	21PCA3BC06	ADDL. Core VI: Web Graphics Lab	-	5

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	2	2	3	2	2	3	2	2.4
CO-2	3	2	2	1	3	2	2	3	2	2	2.2
CO-3	3	2	3	2	3	2	3	3	2	2	2.5
CO-4	2	2	3	3	2	3	2	2	2	2	2.3
CO-5	2	3	3	2	2	2	3	3	2	2	2.4
Mean Overall Score											2.3 (High)

For PG - MCA Programme (2020- 2021 Batch)
DEPARTMENT OF COMPUTER SCIENCE
St Joseph's College (Autonomous)
Tiruchirappalli – 620 002
MCA Curriculum (2020-2021)

POs – PG (MCA)

1. Graduates are prepared to be creators of new knowledge leading to innovation, entrepreneur and employable in various sectors such as Private, Government and Research organizations.
2. Graduates are trained to evolve/ adopt new technologies in their own discipline.
3. Graduates are groomed to engage in lifelong learning process by exploring knowledge independently
4. Graduates are framed to design and conduct experiments/ demonstrate/ create models to analyze and interpret data.
5. Graduates ought to have the ability of effectively communicating the findings of Biological Sciences / Computing Sciences / Languages and Culture / Management Studies/ Physical Sciences/ and to incorporate with existing knowledge.

PSOs for PG Programme (MCA) After completing the MCA Programme, the graduates will be able to	
PSO1	implement the logic for solving the real life problems by using the knowledge gained
PSO2	understand, analyze, design, develop, test, implement and document software systems
PSO3	use their creative skill to evolve new ideas, defend their findings at the peer level and able to manage IT and ITES organizations.
PSO4	work in public and private sectors satisfying social and environmental obligations with multiple cultures
PSO5	act as socially responsible IT professionals or service minded entrepreneurs

Department of Computer Science					
MCA - 2020-21					
COURSE STRUCTURE FOR PG PROGRAMME (MCA) (2020-21)					
Sem.	**Specification**	**No. of Courses**	**No. of Hours**	**Credits**	**Total Credits**
I-IV	Core Courses: Theory	13	58	51	51
I-IV	Core Courses: Practical	6	18	12	12
II	Self-paced learning	1	-	2	2
IV	Comprehensive Examination	1	-	2	2
IV	Project work & Viva Voce	2	20	17	17
I- IV	Discipline Specific Elective	3	12	9	9
I	Ability Enhancement Course	-	-	-	-
II	Skill Enhancement Course (Soft Skills)	1	4	4	4
III	Generic Elective IDC (WS)	1	4	4	4
IV	Generic Elective IDC (BS)	1	4	4	4
II - IV	Online courses (MOOC)	2	-	(4)	(4)
I-IV	Outreach Programme	-	-	5	5
	Total		**120**		**110(4)**

MCA COURSE PATTERN (TWO YEARS)								
Sem	Course Code	Course	Course Title	Hrs/ Week	Credit	CIA	Sem	Total
I	20PCA1101	Core I	Programming in Java	5	4	100	100	200
	20PCA1102	Core II	Database Systems	5	4	100	100	200
	20PCA1103	Core III	Organizational Behavior	5	4	100	100	200
	20PCA1104	Core IV	Mathematical Foundation	5	4	100	100	200
	20PCA1201A	Elective-I	▪ Digital Computer Architecture	4	3	100	100	200
	20PCA1201B		▪ Operating System					
	20PCA1201C		▪ Microcontrollers					
	20PCA1105	Core V	Software Lab – 1 – Java	3	2	100	100	200
	20PCA1106	Core VI	Software Lab – 2 – RDBMS	3	2	100	100	200
TOTAL				30	23	700	700	1400
II	20PCA2107	Core VII	Online Course: Distributed Technologies	4	4	100	100	200
	20PCA2108	Core VIII	Accounting and Financial Management	4	4	100	100	200
	20PCA2109	Core IX	Probability and Statistics	4	4	100	100	200
	20PCA2202A	Elective-II	▪ Data Analysis using Python	4	3	100	100	200
	20PCA2202B		▪ Information Security					
	20PCA2202C		▪ Data Science for Business					
	20PCA2110	Core X	Software Lab – 3 – Distributed Programming	3	2	100	100	200
	20PCA2111	Core XI	Software Lab – 4 – Advanced Python	3	2	100	100	200
	18PSS2301	IDC-SS	Soft Skills	4	4	100	-	100
	20PCA2301A	IDC-(WS)	Applications of Statistical Techniques in R	4	4	100	100	200
	18PCA2301B		MATLAB					

	20PCA2401	Extra-CC	Extra Credit Course-1: MOOC #	-	(2)	-	-	-
TOTAL				30	27+ (2)	800	700	1500

III	20PCA3112	Core XII	Online Course: Programming Smart Devices	4	4	100	100	200
	20PCA3113	Core XIII	Compiler Design	4	4	100	100	200
	20PCA3114	Core XIV	Software Engineering	4	3	100	100	200
	18SCS3101	ID Core	Inter-Disciplinary Core: Design and analysis of Algorithms	4	4	100	100	200
	20PCA3203A	Elective-III	▪ MEAN Stack Web Development	4	3	100	100	200
	20PCA3203B		▪ Ruby on Rails					
	20PCA3203C		▪ Php					
	20PCA3115	Core XV	Software Lab – 5 – Programming Smart Devices	3	2	100	100	200
	20PCA3116	Core XVI	Software Lab – 6 – Mean Stack Webapp Lab	3	2	100	100	200
	20PCA3302	**IDC-(BS)**	Web Design	**4**	**4**	100	100	200
	20PCA3117	Core XVII	Mini Project(summer Vacation) * / Internship	-	2	100	-	100
	20PCA3118	Core XVIII	Self-paced Learning: XML	**-**	**2**	50	50	100
	20PCA3402	Extra-CC	Extra Credit Course-2: MOOC #	-	(2)	-	-	-
TOTAL				30	30(2)	950	850	1800
	20PCA4119	Core XIX	Big data Analytics *	5	4	100	-	100
	20PCA4120	Core XX	Recent Trends in Computer Science *	5	4	100	-	100
	20PCA4121	Core XXI	Comprehensive Examination	**-**	**2**	50	50	100
	20PCA4122	Core XXII	Project work	20	15	100	100	200
			TOTAL	30	25	350	150	500
	20PCW4501	Extension	Outreach Programme (SHEPHERD)	-	5			

GRAND TOTAL	**120**	**110+ (4)**	**2800**	**2400**	**5200**

*** Papers - Fully internal** **# - Not considered for Grand Total and CGPA calculation**

Mandatory Bridge Courses for Non-Computer Science Stream Students

Sem	Course Code	Course	Course Title	Hrs/ Week	Credit	CIA	SE	Total
I	20MCA1ACC1	ADDL.Core I	C Programming **	-	5	100	-	100
	20MCA1ACC2	ADDL. Core II	C Programming Lab **	-	5	100	-	100
TOTAL				-	10	200	-	200
II	20MCA2ACC3	ADDL. Core III	Web Design (HTML5, Java Script & CSS) **	-	5	100	-	100
	20MCA2ACC4	ADDL. Core IV	Web Design (HTML5, Java Script & CSS) Lab **	-	5	100	-	100
TOTAL				-	10	200	-	200
III	20MCA3ACC5	ADDL. Core V	Web Graphics **	-	5	100	-	100
	20MCA3ACC6	ADDL. Core VI	Web Graphics Lab **	-	5	100	-	100
					10	200	-	200
Grand Total					**30**	**600**	**-**	**600**

**** Papers Fully Internal**

Semester I **Hours/Week: 5**
20PCA1101 **Credits: 4**

PROGRAMMING IN JAVA

Course Outcomes

On completion of the course the student will be able to

1. Understand and explain the purpose of Object Oriented Programming concepts
2. Understand the applicability of Packages, Interfaces and write simple Applets in Java
3. Design User Interfaces using SWING Components and able to handle errors in programs
4. Develop Threaded applications and perform Data Access using JDBC
5. Develop distributed applications using RMI, Servlets and Cookies

Unit-I: (12)

CLASSES AND OBJECTS: General Form of A Class - Creation of Objects - Usage of Constructors - 'this' Keyword- Constructor Overloading-Copy Constructors-Static Data Members - Static Methods- Finalize Method. **INHERITANCE AND POLYMORPHISM:** Inheriting Variables in a Class - Inheriting Methods in a Class - Inheritance and Constructors – Abstract Classes - Final Classes.

Unit-II: (12)

INTERFACES AND PACKAGES: Interfaces-Structure of an Interface - Implementation of an Interface- Interface Inheritance. Packages - Placing the Classes in a Package - Package Hierarchy- Access Control Modifiers. **APPLETS:** The Life Cycle of an Applet -The Applet Class – Development and Execution of a Simple Applet - Syntax Of Applet Tag- Methods in the Graphic Class.

Unit-III: (12)

SWING:JApplet class - Icons - JLabel Control - JOptionPane Class – JtextField Control - JButton Control - JCheckBox Control - JRadioButton Control Menus. **EXCEPTION HANDLING:** Default Exception Handling – Exception and Error Classes - Catch Block Searching Pattern - Custom Exceptions. **I/O STREAMS:** Text And Binary Formats of Data - Input Stream and Output Stream Classes - Reader and Writer Classes - Data Output Stream and Data Input Stream Classes.

Unit-IV: (12)

THREADS: Life Cycle of a Thread - Creating And Running Threads – Method in the Thread Class - Setting The Priority Of A Thread - Synchronization. **NETWORKING:** TCP Server Socket Class - TCP Socket Class. **JAVA DATABASE CONNECTIVITY:** Establishing a Connection - Creation Of Data Tables Entering Data Into The Tables - Table Updating.

Unit-V: (12)

REMOTE METHOD INVOCATION: Remote Interface-Java.Rmi. Server Package The Naming Class - Creating RMI Client And Server Classes. **SERVLET:** Servlet and Dynamic Webpages Life Cycle of a Servlet a Simple Servlet JavaX. Servlet Package Retrieving the Values of Parameters. **COOKIES:** Creating a Cookie and sending it to the Client - Retrieving the Stored Cookies.

Book for Study:

1. C. Muthu, "Programming with JAVA**"**, Vijay Nicole Imprints Private Limited, 2nd Ed, Chennai, 2011

Books for Reference

1. Sagayaraj, Denis, Karthik and Gajalakshmi, "Java Programming-for Core and Advanced Users", Universities Press, Hyderabad, 2017.
2. Herbert Schildt, ¯Java 2: Complete Reference, Tata McGraw Hill, 5th Ed., 2009

Semester	Course Code			Title of the Course				Hours	Credits	
I	**20PCA1101**			**PROGRAMMING IN JAVA**				5	4	
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	3	4	5	4	4	4	3	3	3.8
CO-2	5	4	3	4	4	4	4	4	3	3	3.8
CO-3	5	4	3	4	3	5	4	4	3	3	3.8
CO-4	4	4	5	4	4	4	4	4	3	3	3.9
CO-5	4	5	4	4	3	4	4	5	3	3	3.9
Mean Overall Score											3.84
Result											High

Semester I **Hours/Week: 5**
20PCA1102 **Credits: 4**

DATABASE SYSTEMS

Course Outcomes:

On completion of the course the student will be able to

1. Understand the workings of a relational database system and normalize data;
2. Write SQL queries to access data.
3. Normalize the data up to BCNF.
4. Write PL/SQL routines to process the data in the database
5. Implement concurrency and parallelism in a database.

Unit-I: (12)

Introduction to DBS: Basic Concepts and Definitions - Data Dictionary - Database System - DBA - Database Languages - Database System Architecture: Schemas, Sub-schemas and Instances - Three-level Architecture - Data Independence - Mappings -Data Models - Types-ER Model - Specialization and Generalization - Relational Algebra and Calculus: Structure - Relational Algebra - Relational Calculus

Unit-II: (12)

Relational Query Languages: Introduction - Codd's Rules-Information System Based Language - Structured Query Language (SQL)-Embedded SQL

Unit-III: (12)

Normalization: Introduction to Database Design - Functional Dependency and Decomposition - Normalization - Normal Forms - BCNF - Multi-valued and Join Dependencies

Unit-IV: (12)

PL/SQL: A Programming Language: History - Fundamentals -Data types - Operators. Control Structures: Control Structures - Nested Blocks - SQL in PL/SQL - Data Manipulation - Transaction Control statements. PL/SQL Cursors and Exceptions - Named Blocks: Procedures - Functions- Packages -Triggers

Unit-V: (12)

Transaction Processing and Concurrency Control - Database Recovery System - Database Security - Parallel Database Systems: Introduction to Parallel databases - Architecture - Key Elements of Parallel Database Processing -Distributed Databases - Architecture - Distributed Database design.

Books for Study

Unit I, II, III and V

1. S K Singh, “Database Systems Concepts, Design and Applications”, Pearson Education, 2006.

Unit IV

2. Nilesh Shah, “Database Systems using ORACLE”, Prentice Hall of India, 2005.

Books for Reference

1. Abraham Silberschatz, “Database Systems”, McGraw Hill International, 1997.
2. CJ Date, “An Introduction to Database Systems”, 6th Edn, Addison Wesley Publishing Company, New York, 1995.

Semester	Course Code	Title of the Course				Hours	Credit			
I	**20PCA1102**	**DATABASE SYSTEMS**				**5**	**4**			
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				Mean Scores of COs
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PSO-1**	**PSO-2**	**PSO-3**	**PSO-4**	**PSO-5**	
CO-1	5	4	4	3	4	4	4	4	3	3	3.8
CO-2	5	5	4	3	3	4	4	3	3	3	3.7
CO-3	4	4	4	3	4	4	4	4	3	3	3.7
CO-4	4	4	5	4	4	4	5	3	3	3	3.9
CO-5	4	4	4	5	3	3	4	4	3	3	3.9
Mean Overall Score											3.8
Result											High

Semester I **Hours/Week: 5**
20PCA1103 **Credits: 4**

ORGANISATIONAL BEHAVIOUR

Course Objectives:

On completion of the course the student will be

1. Familiar with the basic concepts of organizational structure and its behaviour.
2. Able to understand the development of Attitudes, Formation factors and attitude changes
3. Equippedin building the Perceptual Interpretation and Motivation.
4. Enhancing their Leadership skills through various activities.
5. Soundknowledge about organizational structure and projects

Unit – I:

NATURE OF ORGANIZATION – features – types – goals. NATURE OF ORGANIZATIONAL BEHAVIOR – Nature of OB – Role of OB – Foundations of OB.

Unit – II:

NATURE OF HUMAN BEHAVIOR: Nature and causes of individual differences – models of man. PERCEPTION: concept – process – perceptual selectivity and distortion – Developing perceptual skills. ATTITUDES: Concept – Theories – Formation factors – measurements – Attitude change.

Unit – III:

MOTIVATION: Definition – Motivation &Behavior – Theories – approaches – incentives.
INTERPERSONAL BEHAVIOR: Transactional analysis – Ego states – life scripts – life positions – transactions – stroking – Psychological games – Benefits of TA.

Unit – IV:

GROUP DYNAMICS: Concepts & features of group – types of groups – group behavior – group decision making – committee – task group – inter group behavior. LEADERSHIP: Definitions – types – importance theories – styles. COMMUNICATION: Basics of communication – Communication network – Factors affecting communication – Business writing – Office management – Presentation strategies.

Unit – V:

ORGANIZATION THEORY: Classical organizational theory – neoclassical organization theory – DESIGNING OF ORGANIZATIONAL STRUCTURE: need – planning and process –

Departmentation Span of management – delegation of authorities – centralization & decentralization – FORMS OF ORGANIZATIONAL STRUCTURES: line and staff – functional – divisional – project – matrix – free form.

Book for study

1. Prasad LM, "Organisational Behavior", Sultan Chand and Sons, New Delhi, 2014.

Books for Reference

1. S. S. Khanka, "Organisational Behavior", S. Chand Ltd., New Delhi
2. K. Aswathappa, "Organisational Behavior", Himalaya Publishing house, New Delhi

Semester	CourseCode			TitleoftheCourse					Hours	Credit
I	**20PCA1103**			**ORGANISATIONAL BEHAVIOUR**					**5**	**4**
CourseOutcomes↓	ProgrammeOutcomes(PO)					ProgrammeSpecificOutcomes(PSO)					**MeanScores ofCOs**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	4	3	4	4	4	3	3	3	3.5
CO-2	4	4	3	4	4	5	4	4	3	3	3.8
CO-3	4	4	3	3	3	4	4	4	3	3	3.5
CO-4	4	5	4	3	3	4	5	4	3	3	3.8
CO-5	4	4	5	3	4	4	5	3	3	3	3.8
MeanOverallScore											**3.68**
Result											**High**

Sem. I **Hours/Week: 5**
20PCA1104 **Credits: 4**

MATHEMATICAL FOUNDATIONS

Course Learning Outcomes

Upon successful completion of this subject, the student will be able to:

1. Ability to apply mathematical logic to solve problems and apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.
2. Understand sets, relations, relations, functions, and discrete structure and know the properties of lattices and Boolean Algebra
3. Solve polynomial equation using Birge-Vieta and Graffe's root squaring method and Solve linear system of equation using direct methods Gauss-elimination and Gauss-Jordan Method and Iterative methods Gauss-Jacobi and Gauss-Seidal Method.
4. Know the interpolation techniques and predicting the unknown values for a given value
5. Apply numerical integration using Trapezoidal, Simpson's rules and Romberg's Method

Unit – I: **(15)**

Mathematical Logic: Statements and Notation - Connectives – Statement Formulas and Truth Tables - Tautologies - Equivalence of Formulas – Duality Law. Tautological implications - Theory of inference - validity using truth tables-Rules of Inference

Unit – II: **(15)**

Basic concepts of Set Theory : Inclusion and Equality of sets - Power set -Operations on Sets - Venn Diagrams - Cartesian Products. Relations and Ordering - Binary & Equivalence relations - Partial Ordering. Functions Composition of functions, inverse functions, Binary & n-ary operations

Unit – III: **(15)**

Lattices as Partially ordered sets - Hasse diagrams - Properties of Lattices Distributive & Modular inequalities-Special lattices -Complete, Bounded, Complemented &Distributive lattices. Properties of Boolean Algebra

Unit – IV: **(15)**

Solution of polynomial equations: Birge-Vieta and Root squaring methods. System of linear algebraic equations: Gauss - elimination, Gauss - Jordan, Triangularization, Jacobi, Gauss-Seidal iterative methods.

Unit – V: **(15)**

Interpolation: Lagrange's and Newton's interpolation –interpolating polynomials using finite difference. Numerical integration: Trapezoidal, Simpson's rules and Romberg integration.

Note: Stress on solving Numerical Problems in Units IV and V

Books for Study

Units I, II, III

1. J.P.Tremblay&R.Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw-Hill International Edition, 2008.

Units IV, V

2. M.K.Jain, S.R.K.Iyengar& R.K. Jain, "Numerical Methods for Scientific and Engineering Computation", Wiley Eastern Limited, New Delhi, 2003.

Books for Reference

1. Bernard Kolman& Robert C. Busy by, "Discrete Mathematical Structures for Computer Science", Prentice Hall of India, New Delhi, 1987.

2. S.S. Sastry, "Introductory Methods of Numerical Analysis", Prentice Hall of India, New Delhi, 2005.

Semester	Course Code			Title of the Course					Hours	Credits
I	**20PCA1104**			**MATHEMATICAL FOUNDATIONS**					5	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	3	4	4	4	3	4	3	3	3.5
CO-2	4	4	4	3	4	5	4	3	3	3	3.7
CO-3	4	5	5	4	3	4	4	4	3	3	3.9
CO-4	5	5	3	4	4	3	4	4	3	3	3.8
CO-5	4	5	4	3	3	4	4	3	3	3	3.6
Mean Overall Score											3.7
Result											High

Semester I **Hours/Week: 3**
20PCA1105 **Credits: 2**

Software Lab-I: JAVA

Course Outcomes

On completion of the course the student will be able to

1. Solvereal world problems using OOP techniques.
2. Design GUI based applications using SWING
3. Develop Applets and Servlets for distributed web applications.
4. Perform Database Operations using JDBC
5. Design and Develop a Java Application for real time environment

List of Exercises

1. Classes & Objects
2. Inheritance & Polymorphism
3. Packages & Interfaces
4. Applet & Swing
5. Exception Handling
6. I/O Streams
7. Multithreading
8. Networking &JDBC
9. RMI
10. Servlets
11. Cookies
12. JDBC

Semester I **Hours/Week: 3**

20PCA1106 **Credits: 2**

Software Lab-II: RDBMS

Course Outcomes

On completion of the course the student will be able to

1. Create tables with all possible integrity constraints.
2. Write complex SQL queries
3. Generate reports by using SQL plus commands
4. Use cursors, functions, procedures, packages and triggers in the back end
5. Design and Develop forms to interact with the database

1. DDL – Table creation with Integrity constraints
2. DML - Basic Operations – INSERT/UPDATE/DELETE/SELECT…[where]/order by/group by
3. DML - Join / Nesting / views / snapshots
4. SQL – Functions / operators / set operators
5. SQL Plus – Reports
6. PL/SQL – Block with Cursors
7. PL/SQL – Functions & Procedures
8. PL/SQL – Packages
9. PL/SQL – DB Triggers
10. Oracle Forms
11. Master-Detail form design.
12. Developing reports (Tabular, Master/detail, Matrix and Mailing label)

Semester I **Hours/Week: 4**
20PCA1201A **Credits: 3**

Elective-1A: DIGITAL COMPUTER ARCHITECTURE

Course Outcomes

On completion of the course the student will

1. Understand the fundamental concepts of digital computer
2. Know the logics of different ICs and Boolean Algebra
3. Learn the functionalities of Data processing circuits and Arithmetic circuits
4. be skilful in digital numbers systems and code conversions
5. Understand the CPU organization and different kinds of addressing formats

Unit-I:

Digital Logic: The Basic Gates-NOT, OR, AND - Universal Logic Gates: NOR, NAND - AND-OR-Invert Gates. Combinational Logic Circuits: Boolean Laws and Theorems - Sum-of-Products Method - Truth Table to Karnaugh Map - Pairs, Quads, and Octets - Karnaugh Simplifications - Don't-care Conditions - Product-of-sums Method - Product-of-sums Simplification.

Unit-II:

Data-Processing Circuits: Multiplexers - Demultiplexers - 1-of-16 Decoder - BCD-to-decimal Decoders - Seven-segment Decoders - Encoders – Exclusive-OR Gates. Number Systems and Codes: Binary Number System - Binary-to-decimal Conversion - Decimal-to-binary Conversion-Octal Numbers - Hexadecimal Numbers - The ASCII Code-The Excess-3 Code - The Gray Code.

Unit-III:

Arithmetic Circuits: Binary Addition - Binary Subtraction - Unsigned Binary Numbers - Sign-magnitude Numbers - 2's Complement Representation - 2's Complement Arithmetic- Arithmetic Building Blocks - The Adder-subtracter - Arithmetic Logic Unit - Binary Multiplication and Division. Flip-Flops: RS FLIP-FLOPs - Gated FLIP-FLOPs - Edge-triggered RS FLIP-FLOPs – Edge-triggered D FLIP-FLOPs - Edge-triggered JK FLIP-FLOPs - JK Master-slave FLIP-FLOPs.

Unit-IV:

Basic Computer Organisation and Design: Instruction codes-Computer registers - Computer Instructions - Timing and Control - Instruction cycle Memory reference instructions-Input/output & Interrupt-Design of Basic Computer-Design of Accumulator Logic.

Unit-V:

CPU: General register organisation - Stack organisation - Instruction formats addressing modes - data transfer and manipulation - Program Control RISC.

Books for Study:

Units 1 to III

1. Donald P. Leach and Albert Paul Malvino, "Digital Principles and Application", Seventh Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2011.

Units IV & V

2. M. Morris Mano, "Computer System Architecture", Third Edition, Prentice Hall of India, New Delhi, 2003.

Books for Reference:

1. Morris Mano and Michael D Ciletti, "Digital Design", 4th Edition, Pearson publications, 2008.
2. Rafiquzzaman "Microprocessors Theory and Applications" Revised Edition, PHI Learning Pvt. Ltd, New Delhi, 2012.
3. SmrutiRanjanSarangi, "Computer Organisation and Architecture", TMH, New Delhi, ISBN: 9789332901834, 2014.

Semester	Course Code			Title of the Course				Hours	Credits
I	**20PCA1201A**			**Elective-1A: DIGITAL COMPUTER ARCHITECTURE**				4	3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	3	4	3	4	3	4	3	3	3.4
CO-2	5	4	3	4	4	4	3	3	3	3	3.6
CO-3	5	4	3	3	3	4	4	3	3	3	3.5
CO-4	4	4	3	4	4	3	4	4	3	3	3.6
CO-5	4	3	3	4	3	4	3	4	3	3	3.4
									Mean Overall Score		3.5
									Result		High

Semester: I **Hours/Week: 4**
20PCA1201B **Credit: 3**

Elective-1B: OPERATING SYSTEMS

Course Outcomes

On completion of the course the student will be able to

1. Understand the fundamental concepts of an Operating systems.
2. Design and solve synchronization, deadlock problems.
3. Understand and analyse theory concepts of Memory Management
4. Ability to analyse the structure and basic architectural components involved in file System
5. Acquire knowledge about protection and security mechanisms in Operating system

Unit-I:

Introduction: Operating System-Multiprocessor Systems-Distributed Systems- Real Time Systems. Computer- System Structures: Computer System Operation- I/ O structure-Storage Structure-Hardware Protection. Operating System Structure: System Components- Operating – System Services –System Calls-System Programs-System Structure.

Unit-II:

Process Management: Processes: Process concept-Process Scheduling Operations On processes-Cooperating Processes-Inter Process Communication. CPU scheduling: Basic Concepts-Scheduling Criteria Scheduling Algorithms- Multi- Processor Scheduling-Real- Time Scheduling. Process Synchronization: The Critical-Section Problem Synchronization Hardware- Semaphores. Deadlocks: System model - deadlock characterization-Methods for handling deadlocks-Deadlock Prevention-Deadlock Avoidance- Deadlock Detection Recovery from Deadlock-Combined approach to deadlock handling.

Unit-III:

Memory Management: Background-Swapping-Contiguous Memory Allocation- Paging-Segmentation-Segmentation with Paging. Virtual Memory: Demand Paging-Process Creation-Page Replacement-Allocation of Frames - Thrashing.

Unit-IV:

File-System Interface: File Concept-Access Methods-Directory Structure File-Systems - Mounting-File sharing –Protection. File-System Implementation: File-System Structure - File-System Implementation-Allocation Methods- Free-Space Management.

Unit-V: Protection and Security : Protection-Goals of Protection-Domain of Protection-Access Matrix-Implementation of Access Matrix - Capability- Based Systems-Language- Based Protection - Security: The Security Problem-User Authentication- Program Threats System Threats-Securing System and Facilities-Intrusion Detection – Cryptography - Computer-Security Classifications.

Book for Study

1. Abraham Silberschatz and Peter Baer Galvin, "Operating System Concepts" 6th edition, 2007.

Books for Reference

1. Harvey M. Deitel, "An Introduction to Operating System", Addison Wesley Publishing Company, California, 1984.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Private Ltd, New Delhi, 1997.

Semester	Course Code			Title of the Course				Hours	Credits
I	**20PCA1201B**			**Elective-1B: OPERATING SYSTEM**				4	3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	4	3	3	5	4	3	3	3	3.6
CO-2	3	4	4	3	3	4	4	3	3	3	3.4
CO-3	4	4	3	3	3	3	4	4	3	3	3.4
CO-4	5	4	3	3	3	4	4	3	3	3	3.5
CO-5	5	4	4	3	3	4	3	3	3	3	3.5
										Mean Overall Score	3.48
										Result	High

Semester I **Hours/Week: 4**
20PCA1201C **Credits: 3**

Elective-IC: MICROCONTROLLERS

Course Outcomes

On completion of the course the student will be able to

1. Understand the difference between a Microprocessor and a Microcontroller.
2. Explain the basic architecture of 8051 microcontroller.
3. Implement the Logical and Arithmetic Operations of 8051.
4. Understand the concept of Subroutines and interrupts.
5. Implement the logic to develop Applications using 8051.

Unit-I: **(12)**

Introduction – Microprocessors and Microcontrollers – The Z80 and the 8051 - A Microcontroller Survey – Development Systems for Microcontrollers – **The 8051 Architecture:** Introduction – 8051 Microcontroller Hardware – Input / Output pins, Ports and Circuits – External Memory – Counter and Timers – Serial Data Input / Output – Interrupts

Unit-II: **(12)**

Moving Data: Introduction – Addressing Modes – External Data Moves – Code Memory Read-Only Data Moves – PUSH and POP Opcodes – Data Exchanges – Example Programs – **Logical Operations:** Byte-Level Logical Operations – Bit-Level Logical Operations – Rotate and Swap Operations.

Unit-III: **(12)**

Arithmetic Operations: Flags – Incrementing and Decrementing – Addition – Subtraction – Multiplication and Division – Decimal Arithmetic

Unit-IV: **(12)**

JUMP and CALL Opcodes: Introduction– The Jump and Call Program Range - Jumps – Calls and Subroutines – Interrupts and Returns

Unit-V: **(12)**

Applications: Introduction – Keyboards – Displays – D/A and A/D Conversions – Multiple interrupts.

Books for Study:

1. Kenneth J. Ayala, “The 8051 Microcontroller Architecture, Programming and Applications”, 3rd Edition, Thomson/Cengage Learning.

Book for Reference

1. The 8051 Microcontroller Based Embedded Systems, Manish K Patel, McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
2. Microcontrollers: Architecture, Programming, Interfacing and System Design, Raj Kamal, Pearson Education, 2005.

Semester	Course Code			Title of the Course				Hours	Credits
I	**20PCA1201C**			**Elective-IC: MICROCONTROLLERS**				4	3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	5	4	4	3	3	4	3	4	3	3	3.6
CO-2	4	4	3	3	4	5	4	3	3	3	3.6
CO-3	5	4	3	3	4	4	4	3	3	3	3.6
CO-4	5	5	3	3	4	3	4	3	3	3	3.6
CO-5	4	4	4	3	3	3	4	4	3	3	3.5
Mean Overall Score											3.58
Result											High

Sem. II **Hours/Week: 4**
20PCA2107 **Credits: 4**

DISTRIBUTED TECHNOLOGIES

Course Outcomes:

On completion of the course the student will be

1. Able to compare the architectures of distributed systems.
2. Able to differentiate the technologies associated with presentation and interaction services.
3. Having sound knowledge in developing applications with components.
4. Know the art of developing ASP.NET pages with web server and HTML controls.
5. Familiar with the disconnected data access technology in ADO.NET.

Unit I **(12)**

Client server architecture: 2-tier model - 3-tier model - n-tier model - J2EE architecture - DOTNET architecture - MVC architecture.

Unit II **(12)**

Presentation services: Servlet - JSP - Javamail - Interaction services: RMI - CORBA – XML-XSL.

Unit III **(12)**

Component model: EJB : Session Beans: Stateless and Stateful - Entity Beans- CMP and BMP - Message Driven Beans.

Unit IV **(12)**

ASP.NET : Introduction - architecture - ASP.NET Runtime - ASP.NET Parser- Assembly - Page class. Web Server Controls - HTML Controls – AdRotator and Calendar controls - Validation Controls - Security Management.

Unit V **(12)**

ADO.NET: System.Data, SqlClient and Xml namespaces - Provider objects and Consumer objects - Disconnected data access - GridView&FormView.

Books for Study:

Unit I,II

1. Justin Couch, Daniel H.Steinberg, “J2EE Bible”, Wiley India(P) Ltd, New Delhi, 2002.

Unit III

2. Paul Tremblett, “Instant Enterprise Java y - Beans”, Tata McGraw Hill Publishing Company, New Delhi, 2001.

Unit IV, V
3. Platt S David, “Introducing Micorsoft .Net”, Prentice Hall of India, New Delhi, 2003.

Books for Reference:

1. Stephanie Bodoff, Dale Green, Eric Jendrock, “The J2EE tutorial”, Addison-Wesley, 2002.
2. Hitesh Seth, “Microsoft .NET: kick start”, Sams Publishing, 2004.

Semester	Course Code			Title of the Course					Hours	Credits
II	**20PCA1107**			**DISTRIBUTED TECHNOLOGIES**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	5	5	4	3	5	4	5	2	4	4.1
CO-2	5	4	4	5	3	5	4	5	3	2	3.9
CO-3	4	4	3	3	3	4	5	5	3	3	3.7
CO-4	4	5	4	5	4	4	4	4	3	3	4.0
CO-5	5	4	4	3	3	5	5	5	3	2	3.9
Mean Overall Score											3.92
Result											High

Sem: II **Hours/Week: 4**
Code: 20PCA2108 **Credit: 4**

ACCOUNTING AND FINANCIAL MANAGEMENT

Learning Outcomes:

On completion of the course the student will be able to

1. Analyze and record transactions, construct financial statements, and close the books for the accounting period and will have the ability to adjust and correct errors in the process of accounting.
2. Understand the fall in value of assets and use of accounting packages.
3. Identify and analyze the costing systems adopted in the business organizations and can demonstrate mastery of costing systems, cost management systems.
4. Appreciate budgeting systems and performance and critically analyze and provide recommendations to improve the operations of organizations.
5. Demonstrate the need for appropriate decision making, control and performance evaluation of an organization.

Unit – I: **(15)**

Accounting: Principles-Concepts-Conventions-Journals-Ledger-Trial Balance.

Unit – II: **(15)**

Trading account: Profit and Loss Account-Balance Sheet-Adjustments-Error Correction

Unit – III: **(15)**

Depreciation; Meaning - need - methods of charging depreciation (Straight Line Method, Diminishing Balance Method). Accounting Packages: General Framework - Accounting Applications.

Unit – IV: **(15)**

Marginal Costing - Break Even Analysis - Standard Costing: Analysis of Variance.

Unit – V: **(15)**

Budgeting: Characteristics - Advantages - Classification - Preparation of Budgets. Capital Budgeting: Meaning - Methods of Capital Investment Decision-making.

Book(s) for Study

1. T S Grewal's, "Double Entry Book Keeping", Sultan chand Sons, New Delhi, 2020.
2. S N Maheswari's "Management Accounting", Sultan chand Sons, New Delhi.

3. R Ramachandran & R Srinivasan, “Management Accounting” (Theories, Problems & Solutions), Sriram Publications, 2018.

Book(s) for Reference

1. RSN Pillai &Bagavathi “Management Accounting”, Sultan chand Sons, New Delhi.
2. M C Shukla, T S Grewal and S C Gupta “Advanced Accounting”, S Chand and Company (Pvt.) Ltd., Ram Nagar, New Delhi, 2016..

Semester	Course Code			Title of the Course					Hours	Credits
II	**20PCA1108**			**ACCOUNTING AND FINANCIAL MANAGEMENT**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	5	4	4	3	5	3	3	3	2	3.6
CO-2	4	3	3	5	3	4	5	4	4	3	3.8
CO-3	5	3	4	4	3	5	4	5	3	3	3.9
CO-4	3	4	5	4	3	4	3	4	3	4	3.7
CO-5	5	4	5	5	4	4	5	3	4	3	4.2
Mean Overall Score											3.84
Result											High

Sem. II **Hours/Week: 4**
20PCA2109 **Credits: 4**

PROBABILITY AND STATISTICS

Course Learning Outcomes

Upon successful completion of this subject, the student will be able to:

1. Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena and translate real-world problems into probability models and finding a reasonable solution
2. Understand and use the properties of discrete and continuous distribution functions and its applications
3. Apply Mathematical expectations, Correlation and Regression for Practical Problems and Identify when and how to use various tests of hypothesis such as t, F, Chi-square
4. Compute the ANOVA table for the testing of more than two means
5. Analyze variance and design Experiments in agricultural data

Unit – I: **(15)**

Sample space: Events - Probability - Probability axioms - addition and multiplication law of probabilities - conditional probability – Independent events - Baye's theorem.

Unit – II: **(15)**

Random Variables: distribution functions (discrete and continuous) – Joint probability distribution - Marginal and conditional distribution. Mathematical expectations - Moment Generating Functions. Chebyshev's inequality.

Unit – III: **(15)**

Discrete distributions: Binomial and Poisson -Continuous distributions: Uniform, Exponential and Normal. Correlation and Regression.

Unit – IV: **(15)**

Testing of hypothesis: Tests based on normal population. Applications of chi -square, Student's-T, F- distributions - Chi-square Test - goodness of fit - Test based on mean, means, variance, correlation and regression coefficients.

Unit – V: **(15)**

Analysis of Variance (one way and two way classifications). Design of Experiments - Principles of Design of Experiments - Completely Randomized Design - Randomized Block Design and Latin Square Design.

Note: Stress is given on the working of problems.

Books for Study

Units I, II, III, IV

1. S.C.Gupta and V.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 11th edition, 2002.

Unit V

2. S.C. Gupta and V.K. Kapoor, "Fundamentals of Applied Statistics", Sultan Chand & Sons, New Delhi, 4th edition, 2007.

Books for Reference

1. Erwin Kryszig, "Introductory Mathematical Statistics", John Wiley & sons, New York, 1990.
2. J.S. Milton and J.C. Arnold, "Probability and Statistics in Engineering and Computer Science", McGraw Hill, New York, 1986.

Semester	Course Code			Title of the Course					Hours	Credits
II	**20PCA1109**			**PROBABILITY AND STATISTICS**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	5	4	5	5	4	5	3	2	4.1
CO-2	5	5	4	2	3	4	3	5	3	3	3.7
CO-3	5	4	5	5	3	4	4	3	2	4	3.7
CO-4	4	3	4	3	4	5	5	4	4	3	3.9
CO-5	3	4	3	4	2	3	3	5	3	2	3.2
Mean Overall Score											3.72
Result											High

Semester II **Hours/Week: 4**
20PCA2202A **Credits : 3**

Core Elective-II: DATA ANALYSIS USING PYTHON

Course Outcomes

On completion of the course the student will

1. Understand nuances of Python programming language
2. Know the usage of Functions, Modules, Packages and Files in Python
3. Implement Object Oriented Concepts and to handle errors in Python Programs and perform pattern matching
4. Perform number crunching using NumPy and data manipulation using Pandas in Python
5. Visualize outcome of data analysis using Matplotlib in Python

Unit-I **(10)**

Introduction to Python: Features of Python - How to Run Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) - Input, Output and Import Functions. Data Types and Operations: Numbers-Strings-List-Tuple-Set-Dictionary. **Flow Control:** Decision Making-Loops-Nested Loops-Types of Loops.

Unit-II **(14)**

Functions: Function Definition-Function Calling - Function Arguments - Recursive Functions - Function with more than one return value. **Modules and Packages:** Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - dir() function - reload() function - Packages in Python - Date and Time Modules. **File Handling:** Opening a File - Closing a File - Writing to a File - Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python.

Unit-III **(12)**

Object Oriented Programming: Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python-Encapsulation - Data Hiding-Inheritance - Method Overriding-Polymorphism. **Exception Handling:** Built-in Exceptions - Handling Exceptions - Exception with Arguments - Raising Exception - User-defined Exceptions. **Regular Expressions:**match() function - search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - findall() method - compile() method.

Unit-IV **(14)**

Introduction to NumPy: Basics of NumPy Array – Computation on NumPy Array – Aggregations – Broadcasting – Comparisons, Masks and Boolean Logic – Sorting Arrays –

NumPy Structured Array. **Data Manipulation with Pandas**: Introducing Panda Objects – Data Indexing and Selection - Operating Data on Pandas – Handling Missing Data – Hierrachical Indexing – Combining DataSets – Vectorized String Operations – Working with Time Series.

Unit-V **(10)**

Visualization with Matplotlib: Simple Line Plots – Simple Scatter Plots – Visualizing Errors – Density and Contour Plots – Histograms, Binnings and Density – Customizing Plot Legends – Customising Colorbars – Multiple Subplots – Text and Annotation – Three Dimension Plotting in Matplotlib – Geographic Data with Basemap – Visualization with Seaborn

Text Book(s)

1. Jeeva Jose and P. SojanLal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publising Co. (P) Ltd., 2016.
Units: I, II & III
2. Jake Vander Plas, "**Python Data Science Handbook: Essential Tools for Working with Data",** 1st Edition, O'Reilly Media, 2016.
Units: IV & V

Book for References

1. Wesley J. Chun, "Core Python Programming", Second Edition, PrenticeHall Publication, 2006.
2. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, ISBN: 9780071321228

Semester	Course Code			Title of the Course				Hours	Credits
II	**20PCA2202A**			**Core Elective-II A: DATA ANALYSIS USING PYTHON**				4	3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	5	5	5	4	3	4	5	5	3	4	4.3
CO-2	3	4	4	3	2	5	4	4	3	2	3.4
CO-3	5	4	5	5	2	5	3	4	2	3	3.8
CO-4	5	5	3	4	3	3	5	5	2	3	3.8
CO-5	4	3	3	4	2	4	3	5	2	3	3.3
Mean Overall Score											3.72
Result											High

Semester II **Hours/Week: 4**
20PCA2202B **Credits: 3**

Core Elective-II B: Information Security

Course Outcome

On completion of the course the student will

1. Understand the Basic Elements of Information Security
2. Explore Data Encryption Techniques and Standards
3. Get enlightenment on Advanced Encryption Standard
4. Cognize different symmetric cipher techniques and Public Key Management Algorithms
5. Have the knowledge on the advanced Key Management Techniques and other information security techniques such as Authentication and Digital Signatures

UNIT I **12 Hours**

Introduction to Information Security: Security – Elements of Information Security – Security Policy – Security Techniques – Category of Computer Security – The operational model for Network security – Security services – Basic Network security terminologies – Security Attacks – Open source tools. **Data Encryption Techniques**: Introduction – Encryption methods – Cryptography – Substitution Ciphers – Transposition ciphers – Cryptanalysis – Steganography.

UNIT II **12 Hours**

Data Encryption Standards: Introduction – Block ciphers – Block cipher modes of operations – Feistel Ciphers – Data Encryption Standard – Simplified Data Encryption Standard – Triple DES – DES Design Criteria – Other Block ciphers – Differential Cryptanalysis – Linear Cryptanalysis – Weak Keys in DES Algorithms.

UNIT III **12 Hours**

Advanced Encryption Standard: Introduction – Advanced Encryption Standard (AES) – Key Generation – Encryption – Decryption – Galois Field of Multiplication – Advantages of AES – Comparison of AES with other ciphers – Simplified AES.

UNIT IV **12 Hours**

Symmetric Ciphers: Introduction –BlowfishEncryption Algorithm – RC5 – RC4 – RC6 – Comparison between RC6 and RC5 – IDEA. **Public Key Management**: Public Key Cryptography – RSA Algorithm.

UNIT V **12 Hours**

Key Management: Introduction – Key Distribution – Diffie Hellman Key Exchange – Elliptic Curve Arithmetic – Elliptic Curve Cryptography (ECC) – Elliptic Curve Security and Efficiency. **Authentication:** Authentication Methods. **Digital Signatures**: Introduction - Algorithms for Digital Signature.

Book for Study:

1. V.K Pachghare, “Cryptography and Information Security”, PHI publications, 2019, Third Edition.

Books Reference:

1. S. Musa, “Network Security and Cryptography”, Mercury Learning and Information, 2018.
2. Dr. Manoj Kumar, “Cryptography and Network Security”, Krishna Prkasan Media Pvt Limited, 2008, Third Edison.

Semester	Course Code			Title of the Course					Hours	Credits
II	**20PCA2202B**			**Core Elective-II: Information Security**					4	3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	5	4	4	4	3	5	5	4	3	2	3.9
CO-2	4	4	5	5	3	4	4	5	2	3	3.9
CO-3	5	3	3	5	3	4	5	3	2	2	3.5
CO-4	5	4	3	5	2	4	5	5	3	3	3.9
CO-5	5	5	4	4	2	5	5	4	3	3	4.0
Mean Overall Score											3.84
Result											High

Semester II **Hours/Week: 4**
20PCA2202C **Credits: 3**

ELECTIVE II C: - DATA SCIENCE FOR BUSINESS

Course Outcomes
On successful completion of the course, the students will be able to

1. Recall data science techniques and methodologies to business environment
2. Demonstrate analytic thinking capacity to address business problems
3. Interpret the findings using visualization techniques
4. Make use of fundamental algorithmic ideas to process data
5. Apply modeling and predictive strategies and make estimation and build models with efficient decision making abilities

Unit - I
Introduction: Data-Analytic Thinking - The Ubiquity of Data Opportunities -Data Science, Engineering, and Data-Driven Decision Making - Data Processing and "Big Data" - Data and Data Science Capability as a Strategic Asset. Business Problems and Data Science Solutions - From Business Problems to Data Mining Tasks - Supervised Versus Unsupervised Methods - Data Mining and Its Results - The Data Mining Process - Other Analytics Techniques and Technologies.

Unit - II
Introduction to Predictive Modeling: From Correlation to Supervised Segmentation - Models, Induction, and Prediction - Supervised Segmentation -Visualizing Segmentations - Trees as Sets of Rules - Probability Estimation.

Unit - III
Overfitting and Its Avoidance - Generalization - Overfitting - Overfitting Examined -From Holdout Evaluation to Cross-Validation - Learning Curves - Overfitting Avoidance and Complexity Control.

Unit - IV
Similarity, Neighbors, and Clusters - Similarity and Distance - Nearest-Neighbor Reasoning - Some Important Technical Details Relating to Similarities and Neighbors - Clustering - Stepping Back: Solving a Business Problem versus Data Exploration.

Unit - V

Decision Analytic Thinking: characteristics of a Good Model - Visualizing Model Performance - Representing and Mining Text

Text book

1. Provost, Foster, and Tom Fawcett, “Data Science for Business: What you need to know about data mining and data-analytic thinking”, O’Reilly Media, Inc., 2013.

References

1. Foster Provost and Tom Fawcett, “Data Science for Business”, Published by O’Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472, 2013, ISBN: 978-1-449-36132-7.

2.Asllani, Arben, “Business Analytics with Management Science Models and Methods”, FT Press, 2014.

3.Igual, Laura, and SantiSeguí, "Introduction to Data Science", In Introduction to Data Science, pp. 1-4. Springer, Cham, 2017.

Semester	Course Code			Title of the Course				Hours	Credits
II	**20PCA2202C**			**ELECTIVE II C: DATA SCIENCE FOR BUSINESS**				4	3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	5	5	5	4	3	5	5	4	2	3	4.1
CO-2	5	4	4	3	2	4	5	5	2	2	3.2
CO-3	4	5	5	2	2	3	5	5	3	3	3.7
CO-4	5	5	4	4	3	5	4	4	3	2	3.9
CO-5	4	5	5	3	3	4	5	4	3	3	3.9
Mean Overall Score											3.76
Result											High

Sem. II **Hours/Week: 3**
20PCA2110 **Credits: 2**

Software Lab-III: DISTRIBUTED PROGRAMMING

Course Outcomes:
On completion of the course the student will

1. Have the ability to develop RMI/CORBA applications.
2. Have skills to develop web applications using Servlet and JDBC.
3. Have experience to create presentation services using JSP.
4. develop secured, robust and scalable distributed applications.
5. Have the knowledge to develop appropriate ASP.NET web applications and understand the disconnected data access technology in ADO.NET.

Exercises:
1. RMI - Invocation of server side methods.
CORBA - Invocation of server side methods.
2. Servlets - Returning Information received from the client.
3. Servlets and JDBC - Constructing a response by accessing a database.
4. JSP - use of scriptlet.
5. JSP - use of java beans.
6. EJB - Session Bean.
7. EJB - Entity Bean.
8. ASP.NET - Server & Client side controls.
9. ASP.NET and ADO.NET - use of disconnected data object.
10. ASP.NET: Databind Controls.
11. DOM usage on the server side.
12. AJAX: Dynamic client - server interaction example.

Sem. II **Hours/Week: 3**
20PCA2111 **Credits: 2**

Software Lab-IV: Advanced Python

Course Outcomes:

On completion of the course the student will

1. Have the ability to develop basic Python programs.
2. Have skills to develop Object Oriented programs using Python.
3. Have experience to use NumPy.
4. develop applications using Pandas.
5. Have the knowledge to present graphical outputs using Python.

Basic Python Programs

1. Flow controls, Functions and String Manipulation
2. Operations on Tuples and Lists
3. Operations on Sets and Dictionary
4. Operations on Dictionary
5. Simple OOP – Constructors, Method Overloading, Inheritance
6. Reading and Writing Files – CSV, Excel, XML, JSON
7. Regular Expressions

NumPy

8. NumPy Arrays, Sorting and Searching on Arrays
9. String and DateTime Functions

Pandas

10. Data Series
11. Data Frame
12. Combining and Merging Data Sets
13. Handling Missing Values, Filter, Grouping and Aggregation

Visualization

14. MatPlotLib – Line Chart, Scatter Plot, Histogram
15. Seaborn – Boxplot, HeatMap

Sem. II **Hours/Week: 4**

18PSS2301 **Credits: 4**

IDC: SOFT SKILLS

CourseOutcomes:

1. Studentsaretaughtthevarious nuancesofgroomingsuchas,good manners andetiquettes andtheyaretrainedtopracticetheminthe classrooms.
2. Studentsare empoweredwith publicspeakingskillsviaextempore speeches andprepared speeches,presentedbefore theclassand assessedbythetraineraswellasthecompanions whicheventually helpsbuildself-confidenceofthestudents.
3. Studentslearnthedifferenttypesofresumesanddifferenttypesof interviewskillsandwriteandprinttheirownresumesandpresentbefore theinterviewpanelfortheirmockinterview.
4. Studentsactivelylearnthetenparametersofgroupdiscussion,perform onthestagewiththeircolleagues,whichisvideotaped,reviewedand evaluated.
5. Asstudentsgothroughtheirteenage,self-discoverybecomesatool to developtheirpersonality facilitatedwithscientificpsychological personalitytests.
6. Students areguidedtoknowingtheirSWOT (Strengths,Weaknesses, Opportunities andThreats) andsettingtheirshorttermandlongterm goalsfortheirlives.

Module1: BasicsofCommunication:Definitionofcommunication,Process ofCommunication, BarriersofCommunication,Non-verbalCommunication, EffectiveCommunication:TheArtofListening,ExercisesinKinesthetics, ProductionofSpeech,OrganizationofSpeech,Modes ofdelivery, ConversationTechniques,Dialogue,GoodmannersandEtiquettes, Politenessmarkers&Listeninglinks.

Module II: Resume Writing:WhatisResume?TypesofResume? Chronological, FunctionalandMixedResume,Stepsinpreparationof Resume,structureandframework forwritingresume,Intensive training/ personalizedtrainingonresumewriting.InterviewSkills:Commoninterview questions,Attitude,BodyLanguage,Themockinterviews,Phoneinterviews, Behavioralinterviews.

ModuleIII: GroupDiscussion:GroupDiscussionBasics,GDTopicsfor Practice,PointsforGDTopics,Case-Basedand ArticlebasedGroup Discussions,PointsforCaseStudies,andNotesonCurrentIssuesforGDS &Practicumwithvideocoverage.TeamBuilding:TeamVsGroup–Synergy,

StagesofTeamFormation,BrokenSquare-Exercise,Winasmuchasyou win-Exercise,Leadership–Styles,Workethics.

ModuleIV: PersonalEffectiveness:SelfDiscovery,SelfEsteem,Goalsetting, Problem-solving,ConflictandStressManagement

ModuleV: NumericalAbility: Average,Percentage,ProfitandLoss,Problems onages,SimpleInterest,CompoundInterest, Area,VolumeandSurface Area,TimeandWork,PipesandCisterns,TimeandDistance,Problemson Trains,BoatsandStreams,Calendar,Clocks,PermutationsandCombinations, Probability.
ModuleVI: TestofReasoning:SeriesCompletion,Analogy,DataSufficiency, BloodRelations,Assertion andReasoning,LogicalDeduction,Direction. Non-VerbalReasoning:Series,Classification

TextBook

1. Melchias,G.,BalaiahJohn.,JohnLoveJoy(Eds)2015.Winnersinthe making.St.Joseph'sCollege,Trichy-2

References

1. Aggarwal, R. S. Quantitative Aptitude, S.Chand & Sons
2. Aggarwal, R.S. (2010). A Modern Approach to Verbal and Non VerbalReasoning. S. Chand & Co, Revised Edition.
3. Covey, Stephen. (2004). 7 Habits of Highly effective people, Free Press.
4. Egan Gerard (1994). The Skilled Helper (5th Ed). Pacific Grove, Brooks/ Cole.
5. Khera, Shiv (2003). You Can Win. Macmillan Books, Revised Edition.
6. Murphy, Raymond. (1998). Essential English Grammar. 2nd ed., Cambridge University Press.
7. Prasad, L. M. (2000). Organizational Behaviour, S.Chand& Sons.
8. Schuller, Robert. (2010). Positive Attitudes. Jaico Books.
9. Trishna's (2006). How to do well in GDs & Interviews, TrishnaKnowledge Systems.
10. Yate, Martin. (2005). Hiring the Best: A Manager's Guide to EffectiveInterviewing and Recruiting.

Sem. II **Hours/Week: 4**
20PCA2301A **Credits: 4**

IDC (WS): APPLICATION OF STATISTICAL TECHNIQUES USING R

Course Outcomes

Aftercompleting this course the students will be able to

1. Understand the R environment and apply basic statistical commands in R
2. Interpret data in both Diagrammatic and Graphical Representation
3. Apply Probability Distributions in R environment
4. Perform Correlation Analysis and provide inference
5. Perform Regression Analysis for data prediction

UNIT I (10)
INTRODUCTION TO R: R as Statistical Software and Language – R as a Calculator – R Preliminaries – Methods of Data Input – Data Accessing or Indexing – Built-in Functions.

UNIT II (10)
GRAPHICS WITH R: Graphics Functions – Diagrammatic Representation of Data – Graphical Representation of Data – Measures of Central Tendency.

UNIT III (10)
PROBABLITY AND PROBABILITY DISTRIBUTIONS: Probability: Definition and Properties – Probability Distributions – Some Special Discrete Distributions

UNIT IV (10)
CORRELATION: Introduction – Types of Correlation – Scatter Diagram- Coefficient Correlation and its Properties – Computation of Correlation Coefficient - Inference Procedures for Correlation Coefficient.

UNIT V (10)
REGRESSION ANALYSIS: Linear Regression **–** Linear Regression Model **–** Model Assumptions **–** Linear Calibration **-** Inference Procedures for Simple Linear Model

Books for Study
1. Sudha G. Purohit, Sharad D. Gore, Shailaja R. Deshmukh, "Statistics Using R", Narosa, Publishing House Pvt. Ltd.. 2nd Ed., 2015.

Books for Reference
1. John Maindonald and John Braun. "Data Analysis and Graphics UsingR". Cambridge University Press, Cambridge, 2003.
2. Brian Everitt and TorstenHothorn. "A Handbook of Statistical Analyses Using R". Chapman & Hall/CRC, Boca Raton, FL, 2006. ISBN 1-584-88539-4.

Semester	Course Code	Title of the Course	Hours	Credits
II	**20PCA2301A**	**IDC (WS): APPLICATION OF STATISTICAL TECHNIQUES USING R**	4	4

Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	5	5	5	3	3	5	5	3	2	3	3.9
CO-2	5	4	5	4	2	4	5	5	4	2	4.0
CO-3	4	3	5	3	4	3	5	4	4	2	3.7
CO-4	3	5	5	4	3	4	4	4	2	3	3.7
CO-5	5	4	5	3	2	4	3	5	3	2	3.6
Mean Overall Score											3.78
Result											High

Sem. II **Hours/Week: 4**
20PCA2301B **Credits: 4**

IDC (WS): MATLAB

Course Outcomes

After learning this course, the learner would have acquired skills to

1. Associate Mathematical and computing techniques and Infer analytical and problem solving skills.
2. Prescribe commercial solution based on data analysis.
3. Interpret statistical manipulation of data and generate simulations for scientific problems.
4. Automate solutions for Algebraic Equations and predict graphical output for optimized outcomes.
5. Avail means to visualize given data in graphical format.

Unit-I: (10)
Basics of MATLAB: Basics, windows, Variables, File types, Matrices and Vectors, Matrix manipulation, Matrix and Array Operations.

Unit-II: (10)
Matrix functions: Arithmetic operations, Relational operations, Logical operations, Elementary math functions, Matrix functions, Manipulating character strings, Array Operations, Vectorization.

Unit-III: (10)
Built-in functions - Inline functions, Anonymous functions, Built-in functions, Complex Arithmetic, solving linear systems, Eigen Values and Vectors, Calculus.

Unit-IV: (10)
MATLAB programming: Script Files, Function Files, Curve Fitting and Interpolation, Numerical - Integration, Ordinary Differential Equations, Statistics, Nonlinear Algebraic Equations.

Unit-V: (10)
Graphics - Basic 2-D Plots, Specialized 2-D plots, 3-D Plots, 3-D Surface Graphics.

Book for Study:
1. RudraPratap, Getting started with MATLAB 7, Oxford University Press, 2008.

Book for Reference:
1. JaydeepChakravorty, “Introduction MATLAB Programming, Toolbox and Simulink”, Universities press, Hyderabad, 2014.
2. Brain R Hunt, Ronald L Lipsman, Jonathan M Rosenberg, “A Guide to MATLAB for Beginners and Experienced Users”, Cambridge University Press, 2003

Semester	Course Code			Title of the Course					Hours	Credits
II	**20PCA2301B**			**IDC (WS): MATLAB**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	5	4	5	4	3	5	5	4	4	2	4.1
CO-2	5	5	5	3	2	4	5	5	2	3	3.9
CO-3	4	5	4	2	2	3	5	5	2	3	3.5
CO-4	3	5	3	4	3	5	4	4	3	2	3.6
CO-5	4	3	5	3	3	4	5	3	3	2	3.5
Mean Overall Score											3.72
Result											High

Semester: III **Hours/Week : 4**
Code: 20PCA3112 **Credit: 4**

PROGRAMMING SMART DEVICES

Course Outcomes:

1. To provide concepts to enable the students for creating applications on smart devices using React.
2. To learn how to use React components to build powerful and stylish mobile applications.
3. To obtain a better knowledge of the APIsandCross-Platform Native Modules in React.
4. To understand the familiarity of Debugging and Developer Tools to build native mobile applications in React JS.
5. To provide necessary skills and experiences to deploy applications on iOS App Store and Android Play Store.

Unit: I **(12)**

React Native - Advantages of React Native- Working with React Native- React Native Work- Rendering Lifecycle- Creating Components in React Native- Working with Views- Using JSX- Styling Native Components- Host Platform APIs. - Building Your First Application: Setting Up Your Environment - Creating a New Application- Exploring the Sample Code - Building a Weather App.

Unit: II **(12)**

Components for Mobile - Analogies Between HTML Elements and Native Components - The Text Component- The Image Component- Working with Touch and Gestures- Using TouchableHighlight- The GestureResponder System- PanResponder- Working with Organizational Components - Using ListView- Using Navigators- Other Organizational Components - Platform-Specific Components. **Styles**:- Declaring and Manipulating Styles- Organization and Inheritance- Positioning and Designing Layouts.

Unit: III **(12)**

Platform APIs: Using Geolocation- Accessing the User's Images and Camera- Storing Persistent Data with AsyncStore- TheSmarterWeather Application. **Modules**: Installing JavaScript Libraries with npm- Native Modules for iOS- Native Modules for Android- Cross-Platform Native Modules.

Unit: IV **(12)**

Debugging and Developer Tools : JavaScript Debugging Practices, Translated- React Native Debugging Tools - Debugging Beyond JavaScript- Testing Your Code- **Putting It All Together**: The Flashcard Application- Modeling and Storing Data - Using the Navigator- A Look at Third-Party Dependencies - Responsive Design and Font Sizes.

Unit: V **(12)**

Deploying to the iOS App Store: Preparing Your Xcode Project- Uploading Your Application- Beta Testing with TestFlight- Submitting the Application for Review - **Deploying Android Applications:** Setting Application Icon- Building the APK for Release - Distributing via Email or Other Links - Submitting Your Application to the Play Store.

BOOK FOR STUDY:

1) *Bonnie Eisenman*, "Learning React Native" - Building Mobile Applications with JavaScript, O'Reilly Media, Inc., 2016

BOOK (S) FOR REFERENCE:

1) *JakobIversen, Michael Eierman*, "Learning Mobile App Development" -A Hands-on Guide to Building Apps with iOS and Android, Addison-Wesley, USA, Pearson Education, Inc.2013.
2) *Nader Dabit*, "React Native in Action"- Developing iOS and Android apps with JavaScript, Manning Publications Co. 2019.

WEB REFERENCE

1) https://reactjs.org/
2) https://www.digitalocean.com/community/tutorials/build-mobile-friendly-web-apps-with-react-native-web

Semester	Course Code			Title of the Course					Hours	Credits
III	**20PCA3112**			**PROGRAMMING SMART DEVICES**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	3	3	2	4	4	3	3	4	3.4
CO-2	3	4	4	3	4	4	4	4	4	4	3.8
CO-3	4	4	4	3	3	3	3	4	3	3	3.4
CO-4	4	4	2	4	3	4	2	3	3	4	3.3
CO-5	4	4	2	4	3	3	4	3	3	3	3.3
									Mean Overall Score		3.44
									Result		High

Semester III **Hours/Week: 4**
Code: 20PCA3113 **Credits: 4**

COMPILER DESIGN

Course Outcomes:

1. To introduce the Language Processors and the structure of a compiler
2. To give the basic ideas on automata theory
3. To know the various parsing techniques.
4. To develop skills in generating intermediate code
5. To introduce code generation and optimization techniques

Unit I

Language Processors: Structure of Compilers: Lexical Analysis-Syntax Analysis-Semantic Analysis-Intermediate Code Generation-Code Generation-Symbol Table Management-The Grouping of Phases into Passes-Compiler-Construction Tools. **Programming Language Basics:** The Static/Dynamic distinction-Environment and States-Static Scope and Block Structure-Explicit Access Control- Dynamic Scope-Parameter Passing Mechanism-Aliasing.

Unit II

Lexical Analysis: Specification of Tokens: Operations on Languages-Regular Expressions-Regular Definitions-Extensions of Regular Expressions. **Recognition of Tokens:** Transition Diagrams -Recognition of Reserved Words and identifiers. **Lexical-Analyzer Generator-Lex:** Use of Lex-Structure of Lex Programs. **Finite Automata:** Non-deterministic Finite Automata-Transition Tables-Acceptance of Input Strings by Automata-Deterministic Finite Automata. **From Regular Expressions to Automata:** Conversion of an NFA to a DFA-Simulation of an NFA-Construction of an NFA from a Regular Expression. **Optimization of DFA:** Minimizing the Number of states of DFA.

Unit III

Syntax Analysis: The Role of Parser-Syntax Error Handling. **Context Free Grammar:** Formal Definition of CFG-Notational Conventions-Derivations-Parse Trees and derivations-Ambiguity-Context Free Grammars Versus Regular Expressions.

Writing a Grammar: Lexical Versus Syntactic Analysis-Eliminating Ambiguity-Elimination of Left Recursion-Left Factoring. **Top-Down Parsing**-Recursive-Descent Parsing. **Bottom-Up Parsing**-Reductions-Handle Pruning-Shift-Reduce Parsing.

Unit IV

Syntax-Directed Translation: Postfix Notation-Simple Syntax Directed Definitions-Tree Traversals-Translation Schemes-Inherited and Synthesized Attributes-Evaluating an SDD at the nodes of a Parse Tree. **Intermediate Code Generation: Variants of Syntax Trees:** Directed

Acyclic Graphs for Expressions-The Value-Number Method for Constructing DAG's. **Three Address Code:** Addresses and Instructions-Quadruples-Triples-Static Single-Assignment Form **Run-time Environments: Storage Organization:** Static Versus Dynamic Storage Allocation. **Stack Allocation of Space:** Activation Trees-Activation Records.

Unit V

Code Generation: Issues in the Design of a Code Generator: Input to the Code Generator-Target Program-Instruction Selection-Register Allocation-Evaluation Order. **The Target Language:** A simple Target Machine Model-Program and Instruction Costs. **Basic Blocks and Flow Graphs:** Basic Blocks-Flow graphs-Representation of Flow Graphs-Loops. **Optimization of Basic Blocks:** The DAG Representation of Basic Blocks-Finding Local Common Sub-Expressions-Dead-Code Elimination-The use of Algebraic Identities-Representation of Array References-Pointer Assignments and Procedure Calls-Resembling Basic Blocks from DAG's. **Simple Code Generator:** Register and Address Descriptors-The Code Generation Algorithm.

Text Book:

1. Alfred V.Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, *"Compilers Principles, Techniques and Tools"*, Anna University, Pearson Education, Inc. Publishing as Addison-Wesley Higher Education, II Edition, 2011.

Reference:

1. Alfred V. Aho, Jeffery D.Ullman, "Principles of Compiler Design", Narosa Publishing House, New Delhi, 1985.
2. TorbenÆgidius**Mogensen, "**Introduction to Compiler Design**".** Springer-Verlag London, 2011.
3. AAPutambekar, "Compiler Design", Technical Publications, 2010.

Semester	Course Code			Title of the Course						Hours	Credits
III	**20PCA3113**			**COMPILER DESIGN**						4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	4	1	3	3	3	4	4	3	3.2
CO-2	4	4	3	2	4	4	3	2	4	2	3.2
CO-3	4	4	3	1	4	4	3	4	4	3	3.4
CO-4	4	3	3	2	3	3	4	3	3	3	3.1
CO-5	4	3	4	1	4	4	4	4	4	3	3.5

Mean Overall Score	3.28
Result	High

Semester III **Hours/Week: 4**
Code: 20PCA3114 **Credits: 4**

Software Engineering

Course Outcomes:

1. To acquire knowledge in various software development models
2. Extract and analyze software requirements specifications for different projects
3. Develop skills in basic architecture/design and apply standard coding practices
4. Ability to define the basic concepts and importance of software project management concepts like cost estimation, scheduling and reviewing progress
5. Identify and implement of the software metrics
6. Apply different testing and debugging techniques and analyzing their effectiveness
7. Critically analyse and provide recommendations to improve the operations of the development of the project
8. Demonstrate the need for appropriate decision making, control and performance evaluation of a project.

Unit-I: (12)

Introduction to Software Engineering: The Evolving Role of Software-Software-The changing nature of software-Software Myths. A generic View of Process: A Layered technology-process models: The Waterfall Model-Evolutionary Process Models.

Unit-II: (12)

System Engineering: Computer-Based Systems-The System Engineering Hierarchy. Requirement Engineering: Requirements Engineering Tasks- Initiating the Requirement Engineering Process-Eliciting Requirements-Building the Analysis Model-Requirement Analysis-Data Modeling Concepts-Flow Oriented Modeling-Class based Modeling-Creating Behavior Model.

Unit-III: (12)

Design Engineering: Design process and Design Quality-Design Concepts-The Design Model. Creating the Architectural Design: Software Architecture-Data Design-Architectural Design-Mapping Data Flow into Software Architecture. Modeling component level design: Designing class based components-Performing User Interface Design: The Golden Rules-User Interface Analysis and Design-Interface Analysis-Interface Design Steps- Design Evaluation.

Unit-IV: (12)

Testing Strategies: A Strategic Approach of Software Testing-Test strategies for Conventional Software and Object Oriented Software-Validation Testing- System Testing-The art of Debugging. Testing Tactics: Software Testing Fundamentals-White Box Testing-Basis Path Testing-Control Structure Testing-Block Box Testing-Object Oriented Testing Methods.

Unit-V: (12)

Project Management: The Management Spectrum-The People-The Product-The Process-The Project. Estimation: The Project Planning Process-Resources-Software Project Estimation-Decomposition Techniques-Empirical Estimation Models. Project Scheduling: Project scheduling-Scheduling. Quality Management: Quality Concepts-Software Quality Assurance-Formal Technical Reviews.

Book for Study

1. Roger S. Pressman, "Software Engineering", McGraw Hill, International 8th Edition, New York.

Books for References

1. Richard Fairley, "Software Engineering Concepts", McGraw Hill, International Edition 2014.
2. Rajib Mall, "Fundamentals of Software Engineering", PHI, New Delhi, 2014.

Semester	Course Code			Title of the Course					Hours	Credits
III	**20PCA3114**			**Software Engineering**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	3	3	3	4	4	4	4	3	3	3	3.4
CO-2	3	3	4	4	3	4	4	4	3	3	3.5
CO-3	4	4	3	3	4	3	4	4	3	3	3.5
CO-4	2	4	3	3	3	3	2	4	3	3	3.0
CO-5	4	4	3	3	4	3	4	4	3	3	3.5
CO-6	4	4	4	3	4	4	4	4	2	3	3.6
CO-7	4	3	4	4	4	3	4	4	3	3	3.6
CO-8	4	3	3	4	4	2	3	3	4	3	3.3
Mean Overall Score											3.43
Result											High

Semester III **Hours/Week: 4**
Code: 18SCS3101 **Credits: 4**

Inter Disciplinary Core:
DESIGN AND ANALYSIS OF ALGORITHMS

Course Outcomes:

On completion, the students will have

1. the knowledge to design and analyze algorithms
2. the skill in finding the complexity (order) of algorithms.
3. experience in the implementation of linked lists and trees
4. the required information in searching and sorting.
5. the skill to implement search and sort methods.

Unit-I: Algorithms: Introduction- Algorithm - Algorithm specification: Pseudocode Conventions, Recursive algorithms - Performance analysis: Space Complexity, Time Complexity, Asymptotic Notation, Practical Complexities. (Sections: 1.1, 1.2, 1.3.1 to 1.3.4)

Unit-II: Data structures and Queues Arrays – ordered lists- Representation of Arrays-Stack and Queues – Fundamentals-Evaluation of Expressions. (Sections: 2.2,2.4,3.1,3.3)

Unit-III: Linked lists and trees Linked Lists - Singly Linked Lists- Linked Stacks and Queues-More on Linked Lists-Simple algorithms of Doubly Linked Lists (insertion and deletion only).Trees- Binary Trees- Binary Tree Representations- Binary Tree Traversal. (Sections: 4.1,4.2,4.5,4.8,5.2,5.3,5.4).

Unit-IV: Search and Sort Divide and conquer - General method - Binary search - Finding the maximum and minimum in a set of items - Merge sort - Quick sort - Selection sort. Basic Traversal and Search Techniques for graphs: Breadth First Search - Depth First Search. (Sections: 3.1 to 3.5,6.2)

Unit-V: Interpolations Backtracking - The 8-Queens problem - Algebraic problems - The general method - Evaluation and interpolation - Horner’s rule - Lagrange interpolation - Newtonian interpolation. (Sections: 7.1,7.2,9.1,9.2)

Textbooks:

1. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, Fundamentals of Computer algorithms, Galgotia Publications Pvt. Ltd., 2004. Units: I, IV, V

2. Ellis Horowitz, SartajSahni, Fundamentals of Data Structures, Galgotia Book Source, 1981.Units: II, III

References

1. A.V. Aho, J.E.Hopcroft, J.D. Ullman, The Design and Analysis of Computer Algorithms, Addison-Wesley Publ. Comp., 1974.

2. Seymour E.Goodman and S.T. Hedetniemi, Introduction to the design and analysis of algorithms, McGraw Hill International Edition, 2002.

Semester	Course Code	Title of the Course					Hours	Credits
III	**18SCS3101**	**Inter Disciplinary Core: DESIGN AND ANALYSIS OF ALGORITHMS**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	3	3	2	4	4	3	3	4	3.3
CO-2	3	4	3	2	3	4	4	3	3	4	3.3
CO-3	3	3	4	3	4	3	4	3	4	3	3.4
CO-4	3	3	3	4	3	3	4	3	3	4	3.3
CO-5	3	3	3	3	4	2	4	3	3	4	3.2
Mean Overall Score											3.3
Result											High

Semester III **Hours/Week: 4**
20PCA3203A **Credits: 3**

Core Elective-III A:
MEAN STACK WEBAPP DEVELOPMENT

Course Outcomes:
On successful completion of the course, the students will be able to
1. Understand the fundamentals of Full Stack Development and MEAN Stack Architecture
2. Create and Setup a MEAN Project with Node and Express
3. Build a Data Model with Mongo DB using REST API
4. Demonstrate how to consume REST API
5. Ability to develop applications using AngularJS

Unit-I (11)
Introducing Full Stack Development: Brief History of Web Development – Towards Full Stack Development – Benefits of Full Stack Development –MEAN Stack – Node.js: The Web Server/Platform – Express: The Framework – MongoDB: The Database – AngularJS: The Front End Framework. **Designing a MEAN Stack Architecture:** Common MEAN Stack Architecture – Designing a Flexible MEAN Architecture

Unit-II (11)
Creating and Setting up MEAN Project: Creating an Express Project – Modifying Express for MVC – Import Bootstrap for Responsive Layouts. **Static Site with Node and Express:** Defining Routes in Express – Building Basic Controllers – Creating Some Views **–** Adding Rest of Views – Take Data out of Views and Make Smarter

Unit-III (11)
Data Model with MongoDB: Connecting Express Application to MongoDB using Mongoose – Model the Data – Simple Mongoose Schema – MongoDB Shell to create MongoDB Database **WritingREST API: Expose MongoDB database to Application:** Setting up API in Express – GET Methods: Reading Data from Mongo DB – POST Methods: Adding Data to MongoDB. PUT Methods: Updating Data in MongoDB. DELETE Method: Deleting Data from MongoDB

Unit – IV (11)
Consuming a REST API: Call API from Express – List of Data from an API – Getting Single Document from API – Adding Data to Database via API. **Adding Angular Component to an Express Application:** Getting and Running Angular – Displaying and Filtering the Homepage List – Getting Data from API – Ensuring Forms work as Expected

Unit-V (11)

Single Page Application with Angular: Groundwork for an Angular SPA – Switch from Express Routing to Angular Routing – Adding First Views, Controllers and Services. **Building SPA with Angular:** Full SPA **–** Adding Additional Pages and dynamically injecting HTML – Complex Views and Routing Parameters – Angular UI Components to create Modal Popup

Book for Study

1. Simon Holmes, "Getting MEAN with Mongo, Express, Angular, and Node, Manning Publications, 2016

Books for Reference

1. Jeff Dickey, "Write Modern Web Apps with the MEAN Stack: Mongo, Express, AngularJS, and Node.js", Peachpit Press, 2015.
2. Brad Dayley, Brendan Dayley, "Node.js, MongoDB and Angular Web Development", Addison Wesley, 2017.
3. Amos Q. Haviv, Adrian Mejia,"Web Application Development with MEAN ", Kindle, June 15, 2017.

Semester	Course Code			Title of the Course				Hours	Credits
III	**20PCA3203A**			**Core Elective-III A: MEAN STACK WEBAPP DEVELOPMENT**				4	3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	3	3	2	4	4	3	3	3	3.3
CO-2	4	4	3	3	2	4	4	4	3	4	3.5
CO-3	4	4	3	3	2	4	4	3	3	4	3.4
CO-4	4	4	4	3	2	4	4	4	3	4	3.6
CO-5	4	4	4	3	2	4	4	4	3	4	3.6
Mean Overall Score											3.48
Result											High

Semester III | Hours / Week: 4
Code: 20PCA3203B | Credit: 3

Elective-III B:
RUBY ON RAILS

Course Outcomes
On successful completion of the course, the students will be able to

1. Understand the fundamental concepts of Ruby.
2. Construct and execute basic programs in Ruby.
3. write programs using classes, objects and methods
4. design programs based on Model-View-Controller Architecture
5. write applications to access databases and validate the data.

Unit – I:
Introduction: Installing Ruby and Rails - Getting started with Ruby – Working with numbers and string in Ruby – Storing data in Variables –Creating Constants – Interpolating variables in double-quoted strings – Reading text on the command Line – Creating symbols in Ruby – Working with Operators - Handling Operator Precedence - Working with Array – Using two Array Indices- Working with Hashes and Ranges.

Unit – II:
Conditionals, Loops, Methods and Blocks: The if statement - Using the case statement – Using Loops – Creating and Calling a method – Making use of Scope – Working with Blocks.

Unit-III:
Classes and Objects: Creating a Class – Creating an Object – Basing One Class on Another – Understanding Ruby's Object Access – Overriding Methods – Creating Class Variables – Creating Class Methods – Creating Modules
Unit-IV:
Welcome to Rails: Putting Ruby on Rails – Introducing Model-View-Controller Architecture – Giving the View Something to Do – Mixing Ruby Code and HTML Inside the View – Passing Data from an Action to a View - **Building Simple Rails Applications:** Accessing Data the User Provides – Using Rails Shortcuts for HTML Controls
Unit-V:
Connecting to Databases: Tutorial on Databases – Creating a Data-Aware Rails Application – Creating the Database – Running the Store Application – Adding Another Record – **Working with Databases:** Displaying Items to the Customer – Creating a Shopping Cart – **Validating**

and Testing: Validating the Presence of Data – Validating if Data is Numeric – Validating if Data is Unique

Books for Study:

1. Steve Holzner, "Beginning Ruby on Rails", John Wiley & Sons, 2006

Books for Reference:

1. David Flanagan, Yukihiro Matsumoto, The Ruby Programming language, O'Reilly.
2. Noel Rappin, Professional Ruby on Rails, Wrox.
3. Michael Fitzgerald, Ruby - Pocket Reference, O'Reilly.

Semester	Course Code	Title of the Course					Hours	Credits
III	20PCA3203B	**Elective-III B: RUBY ON RAILS**					4	3

Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	3	4	3	3	4	3	4	3	3.4
CO-2	4	3	3	4	3	4	4	4	3	3	3.5
CO-3	4	3	2	4	3	4	4	4	4	4	3.6
CO-4	3	4	3	4	3	4	3	4	3	4	3.5
CO-5	4	3	3	4	3	4	4	4	3	3	3.5
Mean Overall Score											3.5
Result											High

Semester: III Hours/Week: 4

Code: 20PCA3203C Credits: 3

Elective-III C:

PHP Programming

Course Outcomes

After learning this course, the learner would have:

1. The knowledge to design static and dynamic websites using HTML, CSS and Java scripts.
2. The idea about basic administration activities on Linux environment.
3. Skill to develop and Test PHP programs and host the websites in the Web Server.

4. Knowledge on the basic concepts of frameworks used to develop web applications.
5. Acquired the skillset to develop websites using Laravel framework.

Unit I **(12 hours)**

HTML: Structuring Documents for the Web - Links and Navigation - Images, Audio, and Video - Tables - Forms - Frames - CSS: Cascading Style Sheets - More Cascading Style Sheets - Page Layout - JS: Learning JavaScript - Working with JavaScript - Putting Your Site on the Web.

Unit II **(12 hours)**

Linux: Introduction - Download and Install - Decisions, Decisions – Linux Partition Sizes - Accounts - Apache Web server: Starting and Stopping and Restarting Apache - Configuration - Securing Apache - Create the Web Site - Apache Log Files - PHP: Embedding PHP into HTML - Configuration - Language Syntax: Variables - Data Types - Web variables - Operators - Flow Control Constructs- Writing PHP Functions.

Unit III **(12 hours)**

Built in PHP functions - Important Functions - Array Functions – String Functions - Other Functions - PHP and MySQL: MySQL Functions - My SQL: Commands - Database Independent Interface - Tables – Loading and Dumping Database.

Unit IV **(12 hours)**

Introduction: Laravel - Framework - History - Setting up a Laravel Development Environment – System Requirements - Composer - Local Development Environments - Creating a New Laravel Project - Laravels Directory Structure - Configuration - Routing and Controllers - Introduction to MVC, HTTP verbs, REST - Route Definitions - Views - Controllers - Route Model binding - Form Method Spoofing - Redirects - Custom Responses.

Unit V **(12 hours)**

Frontend components - Collecting and Handling User Data – Injecting Request Object - Route Data - Upload files - Validation - Artisian - Request, Response and Middleware - Request lifecycle - Request Object - Response Object - Laravel and Middleware - Container - Writing APIs : The Basics of REST - Controller - Reading and Sending Headers - Eloquent Pagination - Sorting and Filtering - Transforming Results - Mail - Notifications - Storage and Retrieval: Basic File Uploads and Manipulation - Sessions - Cache - Cookies - Full-Text Search with Laravel Scout.

Book for Study

1. Jon Duckett, "Beginning HTML, XHTML, CSS, and JavaScript", Wiley Publishing, Indiana, 2010. (Unit I)

2. James Lee and Brent Lee “Open Source Development with LAMP Using Linux, Apache, MySQL, Perl and PHP”, Pearson Education, 2009. (Unit 2, 3)
3. Matt Stauffer, “LARAVEL Up and Running, A Framework for building modern PHP Apps”, 2nd Edition, O'REILLY, 2019. (Unit 4, 5)

Book for Reference

1. John Dean, "Web Programming with HTML5, CSS and Javascript" Jones & Bartlett Learning, 2019.
2. JsonGerner, Elizabeth Naramore, Morgan Owens and Matt Warden, "Professional LAMP - Using Linux , Apache, My SQL and PHP5 Web development", Wiley Publisher, 2006.

Semester	Course Code			Title of the Course				Hours		Credits
III	20PCA3203C			**Elective-III C: PHP Programming**				4		3
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	3	3	3	4	4	3	2	3	3.3
CO-2	4	4	4	3	2	4	4	4	3	2	3.4
CO-3	3	4	4	3	3	3	4	4	3	3	3.4
CO-4	4	4	4	3	3	4	4	4	2	3	3.5
CO-5	3	4	4	3	3	3	4	4	3	3	3.4
Mean Overall Score											3.4
Result											High

Sem. III **Hours/Week: 3**
20PCA3115 **Credits: 2**

Software Lab-V:
PROGRAMMING SMART DEVICES

Course Outcomes:
On successful completion of the course, the students will be able to

1. Use the features of React Native
2. Create effective mobile app with components, views, state and properties
3. Handle styling and layout for a mobile app
4. to interact with external APIs
5. Develop geo-location awareness on mobile app

ReactJS:

1. Create an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and Event Listeners
3. Create a native calculator application.
4. Develop an application that draws basic Graphical Primitives on the screen.
5. Develop a native application that uses GPS location information.
6. Implement an application that writes data to the SD card
7. Implement an application that creates an alert upon receiving a message.
8. Write a mobile application that creates alarm clock.
9. Develop a photo gallery with search option.
10. Database: Student Biodata
11. Tablet Programming
12. Media Player

Semester III **Hours/Week: 3**
20PCA3116 **Credits: 2**

Software Lab-VI:
MEAN STACK WEBAPP LAB

Course Outcomes:
On successful completion of the course, the students will be able to
1. Execute Programs based on DOM and JavaScript Frameworks
2. Execute programs using basic functionality available in AngularJS and NodeJS
3. Demonstrate how to consume REST API using Express
4. Perform basic data access operations in MongoDB
5. Ability to develop simple web application connecting all the components of MEAN Stack

JavaScript
1. Document Object Model
2. JavaScript Frameworks – jQuery, AngularJS, BootStrap

Angular JS
3. Directives, Expressions, Controllers and Filters
4. AngularJS Modules and Forms

Node JS
5. CallBacks, Events, Global Objects
6. Buffers, Streams and File System

Express
7. Express Framework
8. RESTFul API

MongoDB
9. Data Modeling – Create Database, Drop Database
10. CRUD Operations
11. Document Querying and Functions

Project
12. Simple Web Application connecting component of MEAN Stack

Semester III **Hours/Week: 4**
20PCA3302 **Credits: 4**

IDC (BS): WEB DESIGN

Course Outcomes

After completing this course the students will be able to

1. Understand the basic concepts of Internet
2. Identify the features of HTML tags
3. Design the HTML tables, frames and forms
4. design applications with JavaScript Programming
5. Comprehend the objects in HTML and Java Script

Unit-I: (12)

Networking Concepts: INTERNET - History - Applications-Users – Protocols - Host Machines and Host Names - Internet Architecture and Packet Switching- Client Server Model - Band width and Asynchronous Communication. Connection: Dial-up Access-Direct and Dedicated Connections - shell or TCP/ IP accounts - Domains and Addresses – IP addresses.

Unit-II: (12)

HTML: Introduction to HTML Tags - Document Layout - Comments - Headings-Paragraphs - Breaks - Texts - Lists - Special Characters.

Unit-III: (12)

HTML (Contd.): Tables - Linking documents - Frames - Form and its elements.

Unit-IV: (12)

JavaScript: Introduction to JavaScript - JavaScript in web pages-writing JavaScript with HTML - Basic programming techniques - operators and expressions - conditional checking - loops - functions - user defined functions - dialog boxes.

Unit-V: (12)

JavaScript (Contd.): JavaScript DOM: JSS DOM - understanding objects in HTML - browser objects - web page object hierarchy - Handling events - The form object - built-in objects-user defined objects - cookies - setting a cookie.

Books for Study

1. Wendy G.Lehnert, “Internet 101 - A beginners guide to the Internet and the World Wide

Web", Addison Wesley, 1999. (Unit I)
2. Ivan N. Bayross, "Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP", 4th Revised Edition, BPB Publications, New Delhi, 2010. (Units II, III, IV and V)

Books for Reference

1. Chuck Musciano& Bill Kennedy, "HTML - The Definitive Guide", Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.
2. Raj Kamal, " Internet And Web Technologies", TMH, New Delhi, ISBN:9780070472969

Semester	Course Code			Title of the Course					Hours	Credits
III	**20PCA3302**			**IDC (BS): WEB DESIGN**					4	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	2	3	2	4	4	4	3	3	3.2
CO-2	4	4	2	3	2	4	4	4	3	3	3.2
CO-3	4	3	3	4	2	4	4	4	3	4	3.5
CO-4	4	3	3	4	2	4	4	4	3	4	3.5
CO-5	4	4	3	4	2	4	4	4	3	4	3.6
Mean Overall Score											3.42
Result											High

Semester III **Hours/Week: -**
20PCA3117 **Credits: 2**

Mini Project
(During Summer Vacation)

Course Outcomes:

Students should have acquired

1. the knowledge and skills for system development
2. the familiarity with various domains like Banking, Finance, Health Care, Job portal and Insurance
3. the knowledge on the design aspects
4. the skills in the development, installation and testing of software
5. report generating skills

Semester	Course Code			Title of the Course					Hours	Credits
III	**20PCA3117**			Mini Project					-	2
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	4	3	2	4	4	4	4	3	3.6
CO-2	4	4	4	3	2	4	4	4	4	3	3.6
CO-3	4	4	4	3	2	4	4	4	4	3	3.6
CO-4	4	4	4	3	2	4	4	4	4	3	3.6
CO-5	4	4	4	3	2	4	4	4	4	3	3.6
Mean Overall Score											3.6
Result											High

Semester III **Hours/Week: -**
20PCA3118 **Credits: 2**

Self-paced Learning: XML

Course Outcomes

After learning this course, the learner will be able to

1. Create well-formed XML documents
2. Present web contents by using Style sheets
3. Write type definitions to validate XML documents
4. use the Xlinks and Xpointers to connect distributed XML documents
5. apply the XML syntax in different applications

Unit-I
Introduction to XML - XML Document structure - elements and attributes - Well-Formed XML Document.

Unit-II
Formatting Languages: CSS - XSL documents - XSL Basics - linking XSL with XML - XSL Tags.

Unit-III
Validity - Document Type Declaration - Document Type Definitions (DTDs) - DTD Syntax: Element and Attribute Declarations - Entity Declaration.

Unit-IV
Xlink: Simple and extended links - Xpath - Xpointers - XML namespaces.

Unit-V
XML Applications: Mathematical markup languages - chemical markup languages - wireless markup languages - Data interchange.

Book for Study
1. Elliotte Rusty Harold, “XML Bible”, John Wiley & Sons, 2nd Edition, 2001.

Books for Reference
1. Erik T. Ray, “Learning XML”, O’Reilly Media, First Edition, 2001.

2. Sandra Eddy & John E. Schnyder, “Teach yourself XML”, Hungry minds, 1999

Semester	Course Code			Title of the Course						Hours	Credits
III	**20PCA3118**			**Self-paced Learning: XML**						-	2
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	3	4	3	3	4	3	3	4	3	3.4
CO-2	3	4	3	2	4	3	4	3	4	3	3.3
CO-3	3	4	4	3	4	3	4	4	3	3	3.5
CO-4	4	3	3	4	3	4	3	4	3	3	3.4
CO-5	3	4	4	3	3	3	4	4	3	3	3.4
Mean Overall Score											3.4
Result											High

Semester IV **Hours/Week: 5**
20PCA4119 **Credits: 4**

BIG DATA ANALYTICS

Course Outcomes

On successful completion of the course, the students will be able to

1. Acquire the knowledge on the basics of Big Data and its role in various Industries
2. Understand the various techniques of Big Data Analytics
3. Learn the cutting edge tools and technologies to analyze Big Data
4. Ability to appreciate the Big Data Storage concepts and Data Visualization techniques
5. To get insights into social media and mobile analytics

UNIT I **(15)**

Overview of Big Data: Big Data - History of Data Management – Evolution of Big Data - Structuring Big Data - Types of Data - Elements of Big Data - Big Data Analytics - Careers in Big Data. **Use of Big Data in Business Context**: Use of Big Data in Social Networking – Use of Big Data in Preventing Fraud Using Big Data Analytics - Use of Big Data in Detecting Fraudulent Activities in Insurance Sector - Use of Big Data in Retail Industry.

UNIT II **(15)**

Understanding Analytics and Big Data: Reporting and Analysis - Types of Analytics - Points to Consider during Analysis – Understanding Text Analytics. **Analytical Approaches and Tools to Analyze Data**: Analytical Approaches - History of Analytical Tools - Introducing Popular Analytical Tools - Comparing Various Analytical Tools.

UNIT III **(15)**

Introducing Technologies for Handling Big Data: Distributed and Parallel Computing for Big Data - Introducing Hadoop - Cloud Computing and Big Data - In-Memory Computing Technology for Big Data. **Understanding Hadoop Ecosystem:** Hadoop Ecosystem - Hadoop Distributed File System – MapReduce - Features of MapReduce -Hadoop YARN – Hbase - Features of HBase – Hive - Pig and Pig Latin – Sqoop – ZooKeeper – Flume – Oozie.

UNIT IV **(15)**

NoSQL Data Management: Introduction to NoSQL - Aggregate Data Models - Key Value Data Model - Document Databases –Relationships - Graph Databases - Schema-Less Databases - Materialized Views - Distribution Models – Sharding - MapReduce Partitioning and Combining - Composing MapReduce Calculations. **Data Visualization:** Introducing Data Visualization - Techniques Used for Visual Data Representation - Types of Data Visualization - Applications of Data Visualization - Visualizing Big Data - Tools Used in Data Visualization.

UNIT V **(15)**

Social Media Analytics and Text Mining: Introducing Social Media - Introducing Key Elements of Social Media - Introducing Text Mining - Understanding Text Mining Process - Sentiment Analysis - Performing Social Media Analytics and Opinion - Mining on Tweets. **Mobile Analytics:** Introducing Mobile Analytics - Introducing Mobile Analytics Tools - Performing Mobile Analytics - Challenges of Mobile Analytics.

Book for Study:

1. Big Data (Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization) Black Book, published by Dreamtech Press, 2016.

Book(s) for Reference:

1. Paul Buhler, WajidKhattak and Thomas Erl, "Big Data Fundamentals: Concepts, Drivers & Techniques", Prentice Hall Publications, January 2016, ISBN: 9780134291185.
2. SoumendraMohanty, MadhuJagadeesh, and HarshaSrivatsa, "Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics", Published by Apress Media, 2013.
3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'reilly Media, 2012.

Semester	Course Code			Title of the Course					Hours	Credits
IV	**20PCA4119**			**BIG DATA ANALYTICS**					5	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	3	3	2	4	4	3	3	3	3.3
CO-2	3	4	3	4	3	3	4	3	4	4	3.5
CO-3	4	4	4	4	4	4	3	3	4	3	3.7
CO-4	4	4	4	2	3	4	4	4	2	3	3.4
CO-5	3	4	4	4	3	3	4	4	3	3	3.5
Mean Overall Score											3.48
Result											

Semester IV **Hours/Week: 5**
20PCA4120 **Credits: 4**

RECENT TRENDS IN COMPUTER SCIENCE

Course Outcome

On successful completion of the course, the students will be able to

1. Recall the basic concepts of cloud computing technology
2. Understand the fundamental concepts of Internet of Things (IoT), Things and objects used and emerging IoT enabled Smart Applications
3. Understand the fundamental concepts of Artificial Intelligence
4. Distinguish different learning methods with Machine Learning Techniques
5. Understand the fundamental concepts of block chain technology

Unit - I: **(15)**

Evolution of Cloud Computing -Essential Characteristics of cloud computing - Operational models such as private, dedicated, virtual private, community, hybrid and public cloud - Service models such as IaaS, PaaS and SaaS - Governance and Change Management - Business drivers, metrics and typical use cases. Example cloud vendors - Google cloud platform, Amazon AWS, Microsoft Azure, Pivotal cloud foundry and Open Stack.

UNIT II **(15)**

Fundamentals of Internet of Things **:** Introduction – Characteristics of IoT – The Physical design of IoT – IoT Architecture and components – Logical design of IoT – Communication models – IoT Communication APIs – Emerging Applications in IoT -IoT Architectures and Protocols :Introduction – Three Layer and five layer architecture of IoT – Cloud and fog based architecture-of IoT - Representative architecture – Near Field Communication (NFC) – Wireless Sensor Network (WSN) – IoT network protocol stack – IoT technology stack – Bluetooth, Zigbee and 6Lowpan

UNIT III **(15)**

Introduction: Definitions of Artificial Intelligence – Artificial Intelligence Problems – Topics of Artificial Intelligence – Timelines of Artificial Intelligence – Production Systems – State Space Representation – Branches of Artificial Intelligence – Applications of Artificial Intelligence.

UNIT IV **(15)**

Learning : Types of Learning – Machine Learning: Types in Machine Learning – History of Machine Learning – Aspects of Inputs to Training – Learning Systems – Machine Learning Applications- Quantification of Classification – Intelligent Agents

Unit V (15)

Fundamentals of Blockchain: Origin of Blockchain - Blockchain Solution - Components of Blockchain - Block in a Blockchain - The Technology and the Future. Blockchain Types and Consensus Mechanism: Introduction - Decentralization and Distribution - Types of Blockchain - Consensus Protocol.

Books for Study :

1. Buyya, Vecciola and Selvi, "Mastering Cloud Computing: Foundations and Applications Programming", Tata McGraw Hill, 2013.
2. Dr.KamleshLakhwani, Dr.Hemant Kumar Gianey, Joseph Kofi Wireko, Kamal Kant Hiran, " Internet of Things (IoT), Principles, Paradigms and Applications of IoT", BPB Publications, 2020,
3. Vinod Chandra S. S. and AnandHareendran S. "Artificial Intelligence and Machine Learning", PHI Learning Pvt Ltd, 2014.
4. Chandramouli. S, Asha A George, Abhilash K A, and MeenaKarthikeyan, "Blockchain Technology", Universities Press(India) Private Limited, Hyderabad-500029, Copyright Year: 2021. ISBN: 978-93-89211-63-4, First Edition.

Books Reference:

1. Joseph Ingeno , "Software Architect's Handbook", PacktPublishing,2018.
2. Stuart J. Russell and Peter Norvit, "Artifical Intelligence A Modern Approach", Third Edition, Pearson Education Limited 2016.
3. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education
4. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. "Bitcoin and cryptocurrency technologies: a comprehensive introduction". Princeton University Press, 2016.

Semester	Course Code			Title of the Course				Hours	Credits
IV	**20PCA4120**			**RECENT TRENDS IN COMPUTER SCIENCE**				5	4
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	3	3	3	4	4	4	3	3	3.5
CO-2	4	4	4	3	3	3	4	4	4	3	3.6
CO-3	4	4	3	4	3	4	4	4	3	3	3.6
CO-4	4	3	4	3	2	3	3	4	3	3	3.2
CO-5	4	3	4	3	2	3	4	4	4	2	3.3
									Mean Overall Score		3.44
									Result		High

Semester IV **Hours/Week: -**
20PCA4121 **Credits: 2**

COMPREHENSIVE EXAMINATION

Course Outcomes
On successful completion of the course, the students will be able to

1. Solve the problems using c and object oriented programming language, C++.
2. Explain the intricacies of Programming Languages Java and Python
3. Manipulate data structures and explain the features of Operating Systems.
4. Apply the standard procedures in the system design and database design.
5. Comprehend the technologies for distributed system and for mobile app development

Unit-I

C Debugging - Object Oriented Programming with C++

Unit-II

Java Language – Python Language

Unit-III

Data Structures - Algorithms – Operating Systems

Unit-IV

Database Concepts - Software Engineering.

Unit-V

Web Technologies – Mobile app Development.

Semester	Course Code			Title of the Course				Hours	Credits
IV	**20PCA4121**			**COMPREHENSIVE EXAMINATION**				-	2
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	5	4	4	3	3	5	4	2	3	2	3.5
CO-2	4	3	5	4	5	3	4	5	4	1	3.8
CO-3	4	4	5	3	4	4	5	3	5	2	3.9
CO-4	5	5	4	4	3	5	4	5	4	3	4.2
CO-5	4	4	4	3	3	4	4	3	4	3	3.6

Mean Overall Score	3.8
Result	High

Semester IV **Hours/Week: -**
20PCA4122 **Credits: 14**

PROJECT

The second half of the fourth semester is allotted to do a project work in an organization with sufficient infrastructure to carry out the MCA project work. The students would choose an organization and submit the details of the organization to the project guide and HoD. The students should send a requisition letter from the HoD to the organization and should get the letter of acceptance from the organization.The students can send only one such requisition letter at a time. Only after non-acceptance of the company the student can request another organization for doing the project work. The guide and HoD have to approve the company / organization and in case of any change suggested by the guide or HoD, the student should change the organization. The change would be suggested by the guide &HoD if they find the company not having sufficient infrastructure for computing and an external guide in the organization with required educational qualification such as MCA or ME / MTech who can be external guides in the organization. Only upon the receipt of the acceptance letter, the student will be relieved from the College to join the company. They should submit the acceptance letter from the organization for having accepted the student for pursuing his/her MCA project work. The marks awarded by the external guide in the organization carries a weightage of ten percent.

The students would join the organization in the third week of January and send their joining report on or before the fixed date as fixed by the Department. The students will be supplied with all the details of what are to be done before and after joining the company. They should appear for first review mid-way and they will report the progress of their project work in the presence of their classmates and guide.

The students should send emails to their guides every fifteen days of their progress after joining the organization. Failure to submit the joining report and failure to be present for the first review (except under exempted circumstances by the Department of Computer Science due to long distance) will result in non-acceptance of their project work and such students would repeat the same procedure in the next academic year with the approval of the Principal, Controller of Examinations and the Department of Computer Science after the payment of the fees of the particular semester.

The students appear for the second review during the end semester examinations in the college along with the manuscript of the project work. The manuscript should be prepared along the guidelines supplied to them by the Department; students should submit three volumes to the Department before the date stipulated by the Department. The viva-voce of the project work would be conducted by both the internal and the external examiners along with semester examinations of the College.

Semester	Course Code			Title of the Course					Hours	Credits
IV	**20PCA4122**			**PROJECT**					-	14
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	4	4	4	2	4	4	4	4	4	3.8
CO-2	4	4	4	3	2	4	4	4	4	4	3.7
CO-3	4	4	4	3	2	4	4	4	4	4	3.7
CO-4	4	4	4	4	4	4	4	4	4	4	4
CO-5	4	4	4	4	3	4	4	4	4	4	3.9
Mean Overall Score											3.82
Result											High

Department of Computer Science
St Joseph's College (Autonomous) – Tiruchirappalli

Mandatory Bridge Courses for Non-Computer Science Stream Students

Semester I **Hours/Week: -**
20MCA1ACC1 **Credits: 5**

C-PROGRAMMING

Course Outcomes:

Upon successful completion of this course, students will be able

1. To understand the concept of Algorithm and Flow chart.
2. To know the flow of the various control structures.
3. To learn the concept of Strings and Arrays.
4. To handle various types of Functions
5. To make familiar in the logic of Structures and Union.

Unit- I

Introduction to Algorithms - Flow charts - Developing algorithms and flowcharts for solving Simple problems using sequential, selection and iterative programming Structures.

Unit- II

Data Types - Variables - Operators - Control structures - Looping structures - Arrays- Type of Arrays - Strings.

Unit- III

Functions - Built-in-functions - Types of functions –User defined functions- Scope of Variables - Call by value and call by reference.

Unit- IV

Pointers- Array of Pointers - Pointer as Function arguments - Pointer of Pointer - Pointer and structures - Type modifiers and storage class specifiers.

Unit-V

Basics of Structures – Declaration of structure – Referencing Structures elements - Array of Structures – Nesting of structures – Union- Introduction to Files.

Books for Study

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.

Semester	Course Code	Title of the Course	Hours	Credits
I	**20MCA1ACC1**	**C-PROGRAMMING**	-	5
Course Outcomes	Programme Outcomes (PO)	Programme Specific Outcomes (PSO)		**Mean Scores**

	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	**of Cos**
CO-1	4	4	3	4	4	5	5	4	3	3	3.9
CO-2	4	5	3	4	4	5	5	4	3	4	4.1
CO-3	4	3	3	3	4	4	4	4	3	3	3.4
CO-4	5	4	4	4	4	5	5	4	4	3	4.2
CO-5	4	3	3	4	3	4	4	4	3	3	3.5
Mean Overall Score											3.8
Result											high

Semester I **Hours/Week: -**

20MCA1ACC2 **Credits: 5**

Software Lab: C PROGRAMMING

Course Outcomes:

Upon successful completion of this course, students will be able

1. To develop programs using Control Structures.
2. To write programs using Arrays.
3. To make programs using Functions.
4. To understand the programs using Pointers.
5. To write programs using Structures and Union.

1) Simple Programs using Operators
2) Branching structures
3) Looping structures
4) Arrays
5) Strings
6) Functions
7) Mathematical and Recursive functions
8) Pointers
9) Structures
10) Union
11) Files

Semester II **Hours/Week: -**
20MCA2ACC3 **Credits: 5**

WEB DESIGN (HTML 5, Java Script &CSS)

Course Outcomes:
Upon successful completion of this course, students will

1. Have in-depth knowledge on the features of HTML 5
2. Have better understanding on the design of web pages using HTML tags and CSS
3. Acquire skill to implement JavaScript Programming within web pages
4. Have the experience to handle the events and set the cookies in Java Script
5. Be trained in designing web pages using HTML and JavaScript

Unit-I: (12)
HTML: Introduction to HTML Tags - Document Layout - Comments - Headings-Paragraphs - Breaks - Texts - Lists - Special Characters.

Unit-II: (12)
HTML: Tables - Linking documents - Frames - Form and its elements.

Unit-III: (12)
Introduction to Cascading Style Sheets - Concept of CSS - Creating Style Sheet -CSS Properties - CSS Styling (Background, Text Format, Controlling Fonts) - Working with block elements and objects - Working with Lists and Tables - CSS Id and Class

Unit-IV: (12)
JavaScript: Introduction to JavaScript - JavaScript in web pages-writing JavaScript with HTML - Basic programming techniques - operators and expressions - conditional checking - loops - functions - user defined functions - dialog boxes.

Unit-V: (12)

JavaScript: JavaScript DOM: JSS DOM - understanding objects in HTML - browser objects - web page object hierarchy - Handling events - The form object - built-in objects-user defined objects - cookies - setting a cookie.

Books for Study:

1. Wendy G.Lehnert, "Internet 101 - a beginners guide to the internet and the world wide web", addition wesley, 1999. (Unit I, II)
2. Powell and Thomas, "HTML & CSS: The Complete Reference", McGraw Hill (Unit III)
3. Ivan N. Bayross, "Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP", 4th Revised Edition, BPB Publications, New Delhi, 2010. (Unit- IV and V)

Book for Reference

1. Chuck Musciano& Bill Kennedy, "HTML - The Definitive Guide", Shroff Publishers & Distributors Pvt. Ltd., Calcutta - 1999.
2. Raj Kamal, " Internet And Web Technologies", TMH, New Delhi, ISBN:9780070472969

Semester	Course Code			Title of the Course					Hours	Credits
II	**20MCA2ACC3**			**WEB DESIGN (HTML 5, Java Script &CSS)**					-	5
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	4	5	3	5	4	3	3	4	3	3	3.7
CO-2	3	4	3	3	4	4	4	4	3	3	3.5
CO-3	4	3	2	3	4	4	4	3	3	2	3.2
CO-4	5	4	4	3	4	4	4	4	4	3	3.9
CO-5	5	4	3	4	3	4	3	4	4	3	3.7
Mean Overall Score											3.6
Result											High

Semester II **Hours/Week: -**
20MCA2ACC4 **Credits: 5**

WEB DESIGN (HTML 5, Java Script &CSS) Lab

Course Outcomes:
Upon successful completion of this course, students will

1. Have the ability to design simple web pages with basic HTML tags
2. Be well-equipped to use CSS with web pages
3. Have the skill set to design web pages using Java Script.
4. Have mastered the art of event driven programming
5. Be in a state of designing web applications for any organization.

Exercises

1. Web Page with Headings and Formatting Tags
2. Web Page with Ordered and Unordered Lists
3. HTML file to demonstrate Tables
4. HTML file to demonstrate Forms
5. HTML file to demonstrate Frames
6. CSS Background and Text Styles
7. CSS Id and Class
8. Java Script Loops
9. Java Script Functions
10. Java Script Form Validation

Semester III **Hours/Week: -**
20MCA2ACC5 **Credits: 5**

Web Graphics

Course Outcomes:
On completion of the course, the student will be able to

1. Familiar with the existing Multimedia Products
2. Able to work with GIMP
3. Able to learn how to design using basic Synfig tools
4. To use advanced technologies in Synfig
5. To develop presentation package using multimedia tool Inkscape

Unit-I:
Introduction to Multimedia Definition – Components of Multimedia – Multimedia and Hypermedia – World Wide Web – Various overview of Multimedia software Tools - Multimedia Authoring and Tools: Multimedia Authoring – VRML – Popular File Formats.

Unit-II:
GIMP environment – Layers and work path – Image editing – channels, masks and actions - filters – rollovers and animations.

Unit-III:
Synfig: Introduction – drawing and coloring tools.

Unit-IV:
Synfig: Animation – tweening – interactive elements.

Unit-V:
Inkscape: Interface – working with shapes – layers – blend, path and mask.

Books for Study

1. Ze-Nian Li and Mark S. Drew, “Fundamentals of Multimedia”, 2004 by Pearson Education, Inc.
2. Phillip Whitt “Beginning Photo Retouching & Restoration Using GIMP”, Apress/2014. ISBN-13: 978-1-484204-04-7.
3. Http://wiki.synfig.org/category - Manual. 21-Jun-2016.
4. Bethany Hiitola, Packt Publishing Limited, “Inkscape Starter”, ISBN- 10.1849517568,

ISBN-13.978-1849517560

Books for Reference:

1. Fred Halsall**,** "Multimedia Communications: Applications, Networks, Protocols, and Standards", by Pearson Education, Inc.2001.
2. Jason Van Gumster and Robert Shimonski, "GIMP Bible", Wiley, 2010.
3. Jesse Russell, Ronald Cohn, "Synfig", Book on Demand, 2012.
4. Bethany Hiitola,"Inkscape Beginner's Guide", Packt Publishing,2012.

Unit-I Chapter 1:(Page no. 3-23), Chapter 3:(page no. 69-80 **)**
Unit-II Chapter 7,8,9,10,11
Unit-III, IV Manual
Unit-V Chapter 1,2,4,5,6

Semester	Course Code			Title of the Course					Hours	Credits
III	**20MCA3ACC5**			**Web Graphics**					-	5
Course Outcomes	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					**Mean Scores of Cos**
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	3	4	2	4	4	3	3	3	3	3	3.2
CO-2	3	4	3	3	4	4	4	4	3	3	3.5
CO-3	4	3	2	3	4	3	4	3	3	2	3.1
CO-4	5	4	2	3	4	4	4	4	3	3	3.6
CO-5	5	3	3	4	3	4	3	3	4	3	3.5
Mean Overall Score											3.38
Result											High

Semester III **Hours/Week: -**
20MCA2ACC6 **Credits: 5**

Web Graphics Lab

Course Outcomes:

On completion of the course, the student will be able to

1. Knowledge about editing images
2. Familiarisation with the modern GIMP workspace
3. Experience with image Resolution and Retouching
4. Creativity to design a project
5. Skill in cutout animation using bitmap images

Practical Exercises

1. Design ID card, Pamphlets and Advertisement using GIMP.
2. Design an invitation for a seminar or conference.
3. Design a greeting card
4. Create text effects using text tools
5. Apply various Layer Effects to Images.
6. Apply Filter effects on images.
7. Develop a slide show of Photos with transition.
8. Design brushed outlines for an image using Synfig
9. Create an Animation for bouncing ball.
10. Using Time line Adapt motion tweening Animation.
11. Creating logo using Inkscape.
12. Creating Calligraphic text effects using inkscape.

B.Sc. COMPUTER SCIENCE

LOCF SYLLABUS – 2021

SCHOOLS OF EXCELLENCE

WITH CHOICE BASED CREDIT SYSTEM (CBCS)

DEPARTMENT OF COMPUTER SCIENCE
SCHOOL OF COMPUTING SCIENCES
ST. JOSEPH'S COLLEGE (AUTONOMOUS)
Special Heritage Status Awarded by UGC
Accredited at A^{++} Grade (IV Cycle) by NAAC
College with Potential for Excellence by UGC
DBT-STAR & DST-FIST Sponsored College
Tiruchirappalli - 620 002, Tamil Nadu, India

SCHOOLS OF EXCELLENCE WITH CHOICE BASED CREDIT SYSTEM (CBCS)
UNDERGRADUATE COURSES

St. Joseph's College (Autonomous), a pioneer in higher education in India, strives to maintain and uphold the academic excellence. In this regard, it has initiated the implementation of five "Schools of Excellence" from the academic year 2014 – 15, to meet and excel the challenges of the 21st century.

Each School integrates related disciplines under one roof. The school system enhances the optimal utilization of both human and infrastructural resources. It also enhances academic mobility and enriches employability. The School system preserves the identity, autonomy and uniqueness of every department and reinforces Student centric curriculum designing and skill imparting. These five schools adhere to achieve and accomplish the following objectives.

Optimal utilization of resources both human and material for the academic flexibility leading to excellence.

Students experience or enjoy their choice of courses and credits for their horizontal mobility.

The existing curricular structure as specified by TANSCHE and other higher educational institutions facilitate the Credit-Transfer Across the Disciplines (CTAD) - a uniqueness of the choice based credit system.

Human excellence in specialized areas

Thrust in internship and / or projects as a lead towards research and

The multi-discipline nature of the School System caters to the needs of stake-holders, especially the employers.

Credit system:

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The credits and hours of each course of a programme is given in the table of Programme Pattern. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For UG courses, a student must earn a minimum of 130 credits as mentioned in the programme pattern table. The total number of minimum courses offered by the Department is given in the Programme Structure.

OUTCOME-BASED EDUCATION (OBE)
LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

OBE is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience, each student should have achieved the goal. There is no single specified style of teaching or assessment in OBE; instead, classes, opportunities and assessments should all help the students achieve the specific outcomes

Outcome Based Education, as the name suggests depends on Outcomes and not Inputs. The outcomes in OBE are expected to be measurable. In fact each Educational Institute can state its own outcomes. The ultimate goal is to ensure that there is a correlation between education and employability

Outcome –Based Education (OBE): is a student-centric teaching and learning methodology in which the course delivery, assessment are planned to achieve, stated objectives and outcomes. It focuses on measuring student performance i.e. outcomes at different levels.

Some important aspects of the Outcome Based Education

Course: is defined as a theory, practical or theory cum practical subject studied in a semester.

Course Outcomes (COs): are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more course outcomes may be specified for each course based on its weightage.

Programme: is defined as the specialization or discipline of a Degree.

Programme Outcomes (POs): Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

Programme Specific Outcomes (PSOs):

PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline.

Programme Educational Objectives (PEOs): The PEOs of a programme are the statements that describe the expected achievement of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after Graduation.

Some important terminologies repeatedly used in LOCF.

Core Courses (CC)

A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program.

Discipline Specific Elective Courses (DSE)

Elective course may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

DSE: Four courses are offered, two courses each in semester V and VI

Note: To offer **one DSE**, a minimum of two courses of equal importance / weightage is a must.

A department with two sections must offer two courses to the students.

One DSE Course may be offered as interdisciplinary course among the departments in a School (Common Core Course) at the PG level.

Generic Elective Courses

An elective course chosen generally from an **unrelated discipline/subject,** with an intention to seek exposure is called a Generic Elective.

Generic Elective courses are designed for the students of **other disciplines**. Thus, as per the CBCS policy, the students pursuing particular disciplines would have to opt Generic Elective courses offered by other disciplines, as per the basket of courses offered by the college. The scope of the Generic Elective (GE) Courses is positively related to the diversity of disciplines in which programmes are being offered by the college.

Two GE Courses are offered one each in semesters V and VI.

(open to the students of other Departments)

The Ability Enhancement Courses (AEC)

"AECC" are the courses based upon the content that leads to Knowledge enhancement; Communicative English, Environmental Science. These are mandatory for all disciplines.

AECC-1: Communicative English: It is a 4 credits compulsory course offered by the Department of English in the first semester of the Degree Programme, Classes are conducted outside the regular class hours.

AECC-2: Environmental Science: is a 2 credit course offered as a compulsory course during the second semester by the Department of Human Excellence.

Skill Enhancement Courses (SECs)

These courses focus on developing skills or proficiencies in the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme.

These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge**.**

There are four courses under this category

SEC-1 is offered in semester **III as a course** Within the Department **(WD)** it is More of main discipline related skills.

SEC-2is offered in semester **IV as a course** Between schools **(BS)** Offered to students of other schools (Except the school offering the course)

SEC-3 is offered in semester **V as** a compulsory course on Soft Skills offered by the Department of Human Excellence, common to all the students of UG programme.

SEC-4 is offered in semester **VI** as a course **Within School (WS)** Open to all the students within the same school (including the students of the parent department)

Self–paced Learning: It is a course for two credits. It is offered to promote the habit of independent/self learning of Students. Since it is a two credit course, syllabus is framed to complete within 45 hours. It is not taught in the regular working hours.

Field Study/Industrial Visit/Case Study: It has to be completed during the fifth semester of the degree programme. Credit for this course will be entered in the fifth semester's marks statement.

Internship: Students must complete internship during summer holidays after the fourth semester. They have to submit a report of internship training with the necessary documents and have to appear for a viva-voce examination during fifth semester. Credit for internship will be entered in the fifth semester's mark statement.

Comprehensive Examinations: A detailed syllabus consisting of five units to be chosen from the courses offered over the five semesters which are of immense importance and those portions which could not be accommodated in the regular syllabus.

Extra Credit Courses: In order to facilitate the students, gaining knowledge/skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL and etc.

Undergraduate Programme:

Programme Pattern:

The Under Graduate degree programme consists of **FIVE** vital components. They are as follows:

Part -I : Languages (Tamil / Hindi / French / Sanskrit)

Part-II : General English

Part-III : Core Course (Theory, Practicals, Discipline Specific Electives, Compulsory and Optional Allied courses, Project, Self paced courses, Internship , Comprehensive Examinations and field visit /industrial visit/Case Study)

Part-IV: Value Education, Ability Enhancement Courses, Skill Enhancement Courses/ Soft Skills , Generic Electives/ National Cadet Corps etc.

Part-V: Outreach Programme (SHEPHERD).

Ability Enhancement Courses (AEC): There are two Ability Enhancement courses viz AECC and SEC.

Value Education Courses:

There are four courses offered in the first four semesters for the First & Second UG Programme.

Course Coding

The following code system (11 alphanumeric characters) is adopted for Under Graduate courses:

21	UXX	N	N	XX	NN/NNX
Year of Revision	UG Department Code	Semester number	Part specification	Part Category	Running number/with choice

N:- Numeral X :- Alphabet

Part Category

GL - Languages (Tamil / Hindi / French / Sanskrit)

GE - General English

CC - Core Theory; CP- Core Practical

WS- Workshop

SP- Self Paced Learning

IS- Internship

FV- Field visit

CE- Comprehensive Examination

PW- Project Work& viva-voce

Electives Courses

ES – Department Specific Electives

EG- Generic Electives

Allied Courses

AC - Allied Compulsory

AO- Allied Optional

EC - Additional Core Courses for Extra Credits (If any)*

Ability Enhancement Courses

AE – Ability Enhancement Compulsory Courses; Bridge Course and Environment Science

SE – Skill Enhancement (WD), (BS), (WS) and Soft skills

VE - Value Education/ Social Ethics/Religious Doctrine

OR – Outreach SHEPHERD & Gender Studies (Outreach)

SU - AICUF / Nature Club / Fine Arts / NCC / NSS /etc. (Service Unit)

CIA AND SEMESTER EXAMINATION

Continuous Internal Assessment (CIA):

Distribution of CIA Marks	
Passing Minimum: 40 Marks	
Library Referencing	5
3 Components	35
Mid-Semester Test	30
End-Semester Test	30
Total CIA	100

MID-SEM & END – SEM TEST

Centralised – Conducted by the office of COE

1. Mid-Sem Test & End-Sem Test: (2 Hours each); will have Objective and Descriptive elements; with the below mentioned question pattern PART-A; PART-B; PART-C and PART D.
2. One of the CIA Component II/III for UG & PG will be of 15 marks and compulsorily a online objective multiple choice question type.
3. The online CIA Component must be conducted by the Department / faculty concerned at a suitable computer centre.
4. The 7 marks of PART-A of Mid-Sem and End-Sem Tests will comprise only: OBJECTIVE MULTIPLE CHOICE QUESTIONS.
5. The number of hours for the 5 marks allotted for Library Referencing/ work would be 30 hours per semester. The marks scored out of 5 will be given to all the courses (Courses) of the Semester.
6. English Composition once a fortnight will form one of the components for UG general English

Duration of Examination must be rational; proportional to teaching hours 90 minute-examination / 50 Marks for courses of 2/3 hours/week (all Part IV UG Courses) 3-hours examination for courses of 4-6 hours/week.

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No.	Level	Parameter	Description
1	K1	Knowledge/Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/Understanding	The learner explains ideas or concepts
3	K3	Application/Applying	The learner uses information in a new way
4	K4	Analysis/Analysing	The learner distinguishes among different
5	K5	Evaluation/Evaluating	The learner justifies a stand or decision
6	K6	Synthesis /Creating	The learner creates a new product or point of view

WEIGHTAGE of K – LEVELS IN QUESTION PAPER

(Cognitive Level) K- LEVELS	Lower Order Thinking			Higher Order Thinking			Total %
	K1	K2	K3	K4	K5	K6	
SEMESTER EXAMINATIONS	15	20	35	30			**100**
MID / END Semester TESTS	12	20	35	33			**100**

QUESTION PATTERN FOR SEMESTER EXAMINATION	
SECTION	**MARKS**
SECTION–A (No choice ,One Mark) **THREE** questions from each unit **(**15x1 =15)	**15**
SECTION-B (No choice ,2-Marks) **TWO** questions from each unit (10x2 =20)	**20**
SECTION-C (Either/or type) (7- Marks) **ONE** question from each unit (5x7 =35)	**35**
SECTION-D (3 out of 5) (10 Marks) **ONE** question from each unit (3x10 =30)	**30**
Total	**100**

BLUE PRINT OF QUESTION PAPER FOR SEMESTER EXAMINATION							
DURATION: 3. 00 Hours.							**Max Mark : 100**
K- LEVELS / **SECTIONS**	**K1**	**K2**	**K3**	**K4**	**K5**	**K6**	**Total Marks**
SECTION–A (One Mark, No choice) (15x1=15)	15						**15**
SECTION-B (2-Marks, No choice) (10x2=20)		10					**20**
SECTION-C (7- Marks) (Either/or type) (5x7=35)			5				**35**
SECTION-D (10 Marks) (3 out of 5) (3x10=30) Courses having only **K4** levels				3			**30**
Courses having **K4** and **K5** levels **One K5 level question is compulsory**				2	1		
(Courses having **all the 6** cognitive levels **One K5 and K6 level questions can be compulsory**				1	1	1	
Total	**15**	**20**	**35**	**30**			**100**

QUESTION PATTERN FOR MID/END TEST			
SECTIONS			**MARKS**
SECTION–A	(No choice, One Mark)	(7x1 =7)	**7**
SECTION-B	(No choice , 2-Marks)	(6x2 =12)	**12**
SECTION-C	(Either/or type) (7- Marks)	(3x7 =21)	**21**
SECTION-D	(2 out of 3) (10 Marks)	(2x10=20)	**20**
		Total	**60**

BLUE PRINT OF QUESTION PAPER FOR MID/END TEST							
DURATION: 2. 00 Hours.							**Max Mark: 60.**
K- LEVELS / **SECTIONS**	**K1**	**K2**	**K3**	**K4**	**K5**	**K6**	**Total Marks**
SECTION –A (One Mark, No choice) (7 x 1 = 7)	7						**07**
SECTION-B (2-Marks, No choice) (6 x 2 = 12)		6					**12**
SECTION-C (Either/or type) (7- Marks) (3 x 7 =21)			3				**21**
SECTION-D (2 out of 3) (10 Marks) (2x10=20) Courses having only **K4** levels				2			**20**
Courses having **K4** and **K5** levels **One K5 level question is compulsory**				1	1		
Courses having **all the 6** cognitive levels **One K6 level question is compulsory**					1	1	
Total Marks	**07**	**12**	**21**	**20**			**60**
Weightage for 100 %	**12**	**20**	**35**	**33**			**100**

Assessment pattern for two credit courses.

S. No.	Course Title	CIA	Semester Examination	Total Marks
1	Self Paced Learning Course	25 + 25 = 50	50 Marks (MCQ) (COE)	100
2	Comprehensive Examinations	25 +25 = 50	50 Marks (MCQ) (COE)	100
3	Internship	100	--	100
4	Field Visit	100	--	100
5	Ability Enhancement Course (AEC) for PG	50 (Three Components)	50 (COE) (Specific Question Pattern)	100
Assessment Pattern for Courses in Part - IV				
6	Value Education Courses and Environmental Studies	50	50 Marks (For 2.00 hours) (COE)	100
7	Skill Enhancement Courses(SECs)	50 marks (by Course in-charge) 50 Marks (by an External member from the Department)		100
8	SEC: SOFT SKILLS (For UG and PG)	100 (Fully Internal)		100

EVALUATION

GRADING SYSTEM

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added and converted as final mark. The marks thus obtained will then be graded as per the scheme provided in Table-1.

From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by semester Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) respectively. These two are calculated by the following formulae:

$GPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$	$WAM\,(Weighted\,Average\,Marks) = \frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$
Where, C_i is the Credit earned for the Course i G_i is the Grade Point obtained by the student for the Course i M_i is the marks obtained for the course i and n is the number of Courses **Passed** in that semester.	

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

CLASSIFICATION OF FINAL RESULTS:

i) For each of the first three parts, there shall be separate classification on the basis of CGPA, as indicated in Table-2.
ii) For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts/Science/Commerce/Management/Literature as Outstanding/Excellent/Very Good/Good/Above Average/Average, the marks and the corresponding CGPA earned by the candidate in Part-III alone will be the criterion, provided the candidate has secured the prescribed passing minimum in the all the Five parts of the Prgoramme.
iii) Grade in Part –IV and Part-V shall be shown separately and it shall not be taken into account for classification.
iv) A Pass in SHEPHERD will continue to be mandatory although the marks will not count for the calculation of the CGPA.
v) Absence from an examination shall not be taken an attempt.

Table-1: Grading of the Courses

Marks Range	Grade Point	Corresponding Grade
90 and above	**10**	**O**
80 and above and below 90	**9**	A+
70 and above and below 80	**8**	**A**
60 and above and below 70	**7**	**B+**
50 and above and below 60	**6**	**B**
40 and above and below 50	**5**	**C**
Below 40	**0**	**RA**

Table-2: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	**O**	**Outstanding**
8.00 to 8.99	A+	Excellent
7.00 to 7.99	**A**	**Very Good**
6.00 to 6.99	**B+**	**Good**
5.0 0 to 5.99	**B**	**Above Average**
4.00 to 4.99	**C**	**Average**
Below 4.00	**RA**	**Re-appearance**

Credit based weighted Mark System is adopted for the individual semesters and cumulative semesters in the column 'Marks secured' (for 100)

Declaration of Result

Mr./ MS. _____ has successfully completed the Under Graduate in _____programme. The candidate's Cumulative Grade Point Average (CGPA) in Part – III is _____ and the class secured is _____ by completing the minimum of 130 credits. The candidate has acquired _____ (if any) more credits from SHEPHERD / AICUF/ FINE ARTS / SPORTS & GAMES / NCC / NSS / NATURE CLUB, ETC. The candidate has also acquired _____ (if any) extra credits by attending MOOC courses.

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

The Programme Outcomes (POs)/Programme Specific Outcomes(PSOs) are the qualities that must be imbibed in the graduates by the time of completion of their programme. At the end of each programme the PO/PSO assessment in done from the CO attainment of all curriculum components. The POs/PSOs are framed based on the guidelines of LOCF. There are five POs UG programme and five POs for PG programme framed by the college. PSOs are framed by the departments and they are five in numbers.

For each Course, there are five Course Outcomes to be achieved at the end of the course. These Course outcomes are framed to achieve the POs/PSOs. All course outcomes shall have linkage to POs/PSOs in such a way that the strongest relation has the weight 3 and the weakest is 1. This relation is defined by using the following table.

Mapping	<40%	≥ 40% and < 70%	≥ 70%
Relation	Low Level	Medium Level	High Level
Scale	1	2	3

Mean Scores of COs $= \frac{\text{Sum of values}}{\text{Total No.of POs \& PSOs}}$		**Mean Overall Score** $= \frac{\text{Sum of Mean Scores}}{\text{Total No.of COs}}$	
Result	**Mean Overall Score**	**< 1.2**	**# Low**
		≥ 1.2 and < 2.2	**# Medium**
		≥ 2.2	**# High**

If the mean overall score is low then the course in charge has to redesign the particular course content so as to achieve high level mean overall score.

VISION

Forming globally competent, committed, compassionate and holistic persons, to be men and women for others, promoting a just society.

MISSION

- Fostering learning environment to students of diverse background, developing their inherent skills and competencies through reflection, creation of knowledge and service.
- Nurturing comprehensive learning and best practices through innovative and value-driven pedagogy.
- Contributing significantly to Higher Education through Teaching, Learning, Research and Extension.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- Graduates will be able to accomplish professional standards in the global environment.
- Graduates will be able to uphold integrity and human values.
- Graduates will be able to appreciate and promote pluralism and multiculturalism in working environment.

PROGRAMME OUTCOMES (POs) UG

1. Graduates will be able to comprehend the concepts learnt and apply in real life situations with analytical skills.
2. Graduates with acquired skills and enhanced knowledge will be employable/ become entrepreneurs or will pursue higher Education.
3. Graduates with acquired knowledge of modern tools communicative skills and will be able to contribute effectively as team members.
4. Graduates are able to read the signs of the time analyze and provide practical solutions.
5. Graduates imbibed with ethical values and social concern will be able to understand and appreciate social harmony, cultural diversity ensure sustainable environment.

Programme Specific Outcomes (PSOs)

After completing the BSc Computer Science Programme, the graduates would have

PSO 1: acquired the required knowledge in the Hardware and Software aspects of Computer Science domain and the art of programming.

PSO 2: understood the development methodologies of software systems and the ability to analyse, design and develop computer applications for real life problems.

PSO 3: knowledge and skills to collaborate and communicate with peers for performance enhancement in IT / ITES industries.

PSO 4: ability to understand, adjust and adapt with the dynamic technical environment for the growth of IT industry.

PSO 5: capacity to transfer the skills gained, to provide innovative and novel solutions by maintaining ethical norms for the betterment of humane society.

B. Sc. COMPUTER SCIENCE						
PROGRAMME STRUCTURE						
Part	**Sem.**	**Specification**	**No. of Courses**	**No. of Hours**	**Credits**	**Total Credits**
I	**1-IV**	**Languages (Tamil / Hindi/ French/ Sanskrit)**	**4**	**16**	**12**	**12**
II	**I-IV**	**General English**	**4**	**20**	**12**	**12**
	I –VI	**Core course : Theory**	**12**	**50**	**31**	**82**
III	**I –VI**	**Core course : Practical**	**7**	**21**	**14**	
	I-IV	**Core course- Allied /(Practical)**	**6**	**24**	**16**	
	V-VI	**Discipline Specific Elective**	**4**	**20**	**12**	
	VI	**Project Work**	**1**	**3**	**2**	
	V	**Self-paced learning**	**1**	**--**	**2**	
	V	**Field study/ Industrial visit/ Case study**	**1**		**1**	
	V	**Internship**	**1**	**-**	**2**	
	VI	**Comprehensive Exam**	**1**	**--**	**2**	
	II, III,V	**Extra Credit courses (MOOC)**	**(3)**	**--**	**(6)**	**(6)**
IV	**V,VI**	**Generic Elective**	**2**	**8**	**6**	**20**
	I	**AECC-1 Communicative English**	**1**	**--**	**4**	
	II	**AECC-2 Environmental studies**	**1**	**2**	**2**	
	III	**SEC -1 Within Dept. (WD)**	**1**	**2**	**1**	
	IV	**SEC -2 Between Schools (BS)**	**1**	**2**	**1**	
	V	**SEC -3 Soft skill**	**1**	**2**	**1**	
	VI	**SEC -4 within school (WS)**	**1**	**2**	**1**	
	I-IV	**Value Education**	**4**	**8**	**4**	
V	**1-V**	**Outreach Programme /NCC**	**-**	**-**	**4**	**4**
		Total		**180**		**130(6)**

B. Sc. COMPUTER SCIENCE								
PROGRAMME PATTERN								
Course Details						**Scheme of Exams**		
Sem	**Part**	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
I	1	21UTA11GL01	General Tamil - I	4	3	100	100	100
		21UFR11GL01	French-I					
		21UHI11GL01	Hindi-I					
		21USA11GL01	Sanskrit-I					
	2	21UEN12GE01	General English -I	5	3	100	100	100
	3	21UCS13CC01	Problem Solving using C	5	3	100	100	100
		21UCS13CC02	Digital Computer Fundamentals	5	3	100	100	100
		21UCS13CP01	Software Lab 1: Programming with C	3	2	100	100	100
		21UCS13AC01	**Allied:**Mathematics-1	6	4	100	100	100
	4	21UEN14AE01	**AECC-1 :** Communicative English	(6)	4	100	-	100
		21UHE14VE01	Essentials of Humanity	2	1	50	50	50
			Total	**30**	**23**			
II	1	21UTA21GL02	General Tamil - II	4	3	100	100	100
		21UFR21GL02	French-II					
		21UHI21GL02	Hindi-II					
		21USA21GL02	Sanskrit-II					
	2	21UEN22GE02	General English -II	5	3	100	100	100
	3	21UCS23CC03	Object Oriented Programming with C++	4	3	100	100	100
		21UCS23CC04	Data Structures and Algorithms	4	2	100	100	100
		21UCS23CP02	Software Lab 2: C++ and Data Structures	3	2	100	100	100
		21UCS23AC02	**Allied:**Mathematics-2	6	4	100	100	100
	4	21UHE24AE02	**AECC-2:** Environmental Studies	2	2	50	50	50
		21UHE24VE02	Techniques of Social Analysis: Fundamentals of Human Rights	2	1	50	50	50
			Extra Credit Courses (MOOC)-1	-	(2)			
			Total	**30**	**20(2)**			
III	1	21UTA31GL03	General Tamil - III	4	3	100	100	100
		21UFR31GL03	French-III					
		21UHI31GL03	Hindi-III					
		21USA31GL03	Sanskrit-III					
	2	21UEN32GE03	General English -III	5	3	100	100	100
	3	21UCS33CC05	Discrete Mathematics	4	3	100	100	100
		21UCS33CC06	Database Systems	4	2	100	100	100
		21UCS33CP03	Lab 3: Hardware	3	2	100	100	100
		21UCS33AO03A	**Allied Optional** : Applied Physics-I	4	3	100	100	100
		21UCS33AO03B	**Allied Optional** : Principles of Electronics					
		@	Applied Physics Practical	2	*	-	-	-
		@	Electronics Practical					
	4	21UCS34SE01	**SEC -1 (WD):** RDBMS	2	1	100	-	100
		21UHE34VE03A	Professional Ethics–I: Social Ethics - I	2	1	50	50	50
		21UHE34VE03B	Professional Ethics I: Religious Doctrine- I					
			Extra Credit Courses (MOOC)		(2)			
			Total	**30**	**18(2)**			
	1	21UTA41GL04B	Scientific Tamil (SBS, SPS,SCS)	4	3	100	100	100
		21UFR41GL04	French- IV					
		21UHI41GL04	Hindi- IV					
		21USA41GL04	Sanskrit- IV					

IV	2	21UEN42GE04	General English - IV	5	3	100	100	100
	3	21UCS43CC07	Operations Research	4	3	100	100	100
		21UCS43CC08	Python Programming	4	2	100	100	100
		21UCS43CP04	Software Lab 4: Python Programming	3	2	100	100	100
		21UCS43AO04A	**Allied Optional:** Applied Physics-2	4	3	100	100	100
		21UCS43AO04B	**Allied Optional:** Communication Electronics					
		21UCS43AP01A	**Applied Optional:** Physics Practical	2	2	100	100	100
		21UCS43AP01B	**Applied Optional:** Electronics Practical					
	4	21UCS44SE02	**SEC -2 (BS) :** Data Analysis Using Spreadsheet	2	1	100	-	100
	4	21UHE44VE04A	Professional Ethics–II: Social Ethics - II	2	1	50	50	50
		21UHE44VE04B	Professional Ethics II: Religious Doctrine- II					
			Total	**30**	**20**			
V	3	21UCS53CC09	Java Programming	4	2	100	100	100
		21UCS53CC10	Distributed Technology	4	2	100	100	100
		21UCS53CP05	Software Lab 5: Java Programming	3	2	100	100	100
		21UCS53CP06	Software Lab 6: Distributed Programming	3	2	100	100	100
		21UCS53ES01A	**DSE -1:**Operating Systems	5	3	100	100	100
		21UCS53ES01B	**DSE-1:** Digital Marketing					
		21UCS53ES02A	**DSE -2:** Computer Networks	5	3	100	100	100
		21UCS53ES02B	**DSE -2:** Security in Computing					
		21UCS53IS01	Internship	-	2	100	-	100
		21UCS53SP01	**Self-paced Learning :** Web Ethics	-	2	50	50	50
		21UCS53FV01	Field study/ Industrial visit/ Case study	-	1	100	-	100
	4	21USS54SE03	**SEC -3 :** Soft Skills	2	1	100	-	100
	4	21UCS54EG01	**GE-1:**Ethical Hacking	4	3	100	100	100
			Extra Credit Courses (MOOC)-3	-	(2)			
			Total	**30**	**23(2)**			
VI	3	21UCS63CC11	Software Engineering	4	3	100	100	100
		21UCS63CC12	Mobile Application Development using Android	4	3	100	100	100
		21UCS63CP07	Software Lab 7: Android Programming	3	2	100	100	100
		21UCS63ES03A	**DSE -3**: Big Data Analytics	5	3	100	100	100
		21UCS63ES03B	**DSE -3:** Cloud Computing					
		21UCS63ES04A	**DSE -4:** Internet of Things	5	3	100	100	100
		21UCS63ES04B	**DSE-4:** Artificial Intelligence and Machine Learning					
		21UCS63PW01	Project Work	3	2	100	100	100
		21UCS63CE01	Comprehensive Examination	-	2	50	50	50
	4	21UCS64SE04	**SEC -4 (WS):** E-Services and Applications	2	1	100	-	100
		21UCS64EG02	**GE-2:** 3D Printing and Design	4	3	100	100	100
			Total	**30**	**22**			
I-VI	5	21UCW65OR01	Outreach Programme (SHEPHERD)		4			
			TOTAL (three years)	**180**	**130(6)**			

@ Practical Exam will be conducted at even semester

*The courses with a scheme of Exam 50 in CIA and SE will be converted to 100 for grading.

SEC-2: BETWEEN SCHOOL 4th Semester							
Between schools (BS)- Offered to students of other schools (Except the school offering the course)							
Course Details					Scheme of Exams		
Offering Department	**Course Code**	**Course Title**	**Hr**	**Cr**	**CIA**	**SE**	**Final**
SBS							
Botany	21UBO44SE02	Mushroom Technology	2	1	100	-	100
SCS							
Computer Science	21UCS44SE02	Data Analysis Using Spreadsheet	2	1	100	-	100
Mathematics	21UMA44SE02	Numerical Ability	2	1	100	-	100
Statistics	21UST44SE02	Quantitative Methods	2	1	100	-	100
Information Technology	21UBC44SE02	Digital Artwork	2	1	100	-	100
SLAC							
English	21UEN44SE02	English for Competitive Examinations	2	1	100	-	100
History	21UHS44SE02	Historical Monuments in Tiruchirappalli	2	1	100	-	100
Tamil	21UTA44SE02A	மேடைப் பேச்சுக்கலை	2	1	100	-	100
Tamil	21UTA44SE02	திரைப்படத் திறனாய்வும் குறும்படஉருவாக்கம்	2	1	100	-	100
SMS							
Commerce	21UCO44SE02A	Personal Finance Management	2	1	100	-	100
Commerce	21UCO44SE02B	Marketing Skills	2	1	100	-	100
Commerce	21UCO44SE02C	Event Planning and Management	2	1	100	-	100
Economics	21UEC44SE02	Financial Economics	2	1	100	-	100
BBA	21UBU44SE02A	Entrepreneurial Skills Enhancement	2	1	100	-	100
BBA	21UBU44SE02B	Practical Stock Trading	2	1	100	-	100
Commerce CA	21UCC44SE02	Practical Banking in India	2	1	100	-	100
SPS							
Chemistry	21UCH44SE02A	Health Chemistry	2	1	100	-	100
Chemistry	21UCH44SE02B	Industrial Chemistry	2	1	100	-	100
Physics	21UPH44SE02A	Weather Physics	2	1	100	-	100
Physics	21UPH44SE02B	Electrical Wiring	2	1	100	-	100
Electronics	21UEL44SE02	PC Assembling and Servicing	2	1	100	-	100

GENERIC ELECTIVE -1: 5th Semester							
Generic Elective Courses are designed for the students of other disciplines. (open to the students of other departments)							
Course Details					**Scheme of Exams**		
Offering Department	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
SBS							
Botany	21UBO54EG01	Landscape Designing	4	3	100	100	100
SCS							
Computer Science	21UCS54EG01	Ethical Hacking	4	3	100	100	100
Mathematics	21UMA54EG01	Mathematics for Competitive Examinations	4	3	100	100	100
Statistics	21UST54EG01	Actuarial Statistics	4	3	100	100	100
Information Technology	21UBC54EG01	Fundamentals Of Data Science	4	3	100	100	100
SLAC							
English	21UEN54GE01	Film Studies	4	3	100	100	100
History	21UHS54EG01	Tamil Heritage and Culture	4	3	100	100	100
Tamil	21UTA54EG01	தமிழிலயக்கத்தில் மனிதஉரிமைகள்	4	3	100	100	100
SMS							
Commerce	21UCO54EG01A	Computerised Accounting	4	3	100	100	100
Commerce	21UCO54EG01B	Basics of Excel	4	3	100	100	100
Commerce	21UCO54EG01C	Personal Investment Planning	4	3	100	100	100
Economics	21UEC54EG01	Principles of Economics	4	3	100	100	100
Commerce CA	21UCC54EG01	E-commerce and E Business Management	4	3	100	100	100
BBA	21UBU54EG01A	Global Supply Chain Management	4	3	100	100	100
BBA	21UBU54EG01B	Start – Ups and Small Business Management	4	3	100	100	100
SPS							
Chemistry	21UCH54EG01A	Chemistry for Competitive Examinations	4	3	100	100	100
Chemistry	21UCH54EG01B	Everyday Chemistry	4	3	100	100	100
Physics	21UPH54EG01A	Everyday Physics	4	3	100	100	100
Physics	21UPH54EG01B	Renewable Energy Physics	4	3	100	100	100
Electronics	21UEL54EG01A	Everyday Electronics	4	3	100	100	100
Electronics	21UEL54EG01B	Wireless Communication	4	3	100	100	100

GENERIC ELECTIVE -2: 6th Semester							
Generic Elective Courses are designed for the students of other disciplines. (open to the students of other departments)							
Course Details					**Scheme of Exams**		
Offering Department	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
SBS							
Botany	21UBO64EG02	Solid Waste Management	4	3	100	100	100
SCS							
Computer Science	21UCS64EG02	3D Printing and Design	4	3	100	100	100
Mathematics	21UMA64EG02	Analytical Skill for Competitive Examinations	4	3	100	100	100
Statistics	21UST64EG02	Applied Statistics	4	3	100	100	100
Information Technology	21UBC64EG02	Industry 4.0	4	3	100	100	100
SLAC							
English	21UEN64EG02	English for the Media	4	3	100	100	100
History	21UHS64EG02	Intellectual Revivalism in Tamil Nadu	4	3	100	100	100
Tamil	21UTA64EG02	சித்தமருத்துவம்	4	3	100	100	100
SMS							
Commerce	21UCO64EG02A	Rural Marketing	4	3	100	100	100
Commerce	21UCO64EG02B	Entrepreneurship Development	4	3	100	100	100
Commerce	21UCO64EG02C	Digital Marketing	4	3	100	100	100
Economics	21UEC64EG02	Economics for Competitive Exams	4	3	100	100	100
CommerceCA	21UCC64EG02	Total Quality Management	4	3	100	100	100
BBA	21UBU64EG02A	Personality Development	4	3	100	100	100
BBA	21UBU64EG02B	NGO Management	4	3	100	100	100
SPS							
Chemistry	21UCH64EG02A	Food And Nutrition	4	3	100	100	100
Chemistry	21UCH64EG02B	Waste Management	4	3	100	100	100
Physics	21UPH64EG02A	Laser Technology and its Application	4	3	100	100	100
Physics	21UPH64EG02B	Physics of Earth	4	3	100	100	100
Electronics	21UEL64EG02A	CCTV and Smart Security System	4	3	100	100	100
Electronics	21UEL64EG02B	Entrepreneurial Electronics	4	3	100	100	100

Semester	Course Code	Title of the Course	Hours	Credits
I	21UTA11GL01	General Tamil - I	4	3

CO No.	CO–Statements இப்பாடத்தின் நிறைவில் மாணவர்கள்	Cognitive Levels (K –Levels)
CO–1	இக்கால இலக்கிய வகைகளைக் கண்டறிவர்	K1
CO–2	எழுத்து,சொல் இலக்கணங்களின் அடிப்படைகளைக் கண்டறிவர்	K1
CO–3	அயலகக் கவிதை வடிவங்களை விளங்கிக் கொள்வர்	K2
CO–4	மொழிபெயர்ப்புக் கவிதைகளின் வாயிலாக மொழிபெயர்ப்புத் திறனை வளர்த்தெடுப்பர்	K3
CO–5	புதுக்கவிதை வாயிலாக வெளிப்படும் சமூக, அரசியல் விழுமியங்களை மதிப்பிடுவர்	K4

அலகு - 1 **(12 மணிநேரம்)**

பாரதியார் கவிதைகள் - குயில்பாட்டு (குயில் தன் பூர்வ ஜன்மக் கதை உரைத்தல்)
பாரதிதாசன் கவிதைகள் - சஞ்சீவி பர்வதத்தின் சாரல்
உரைநடை - முதல் மூன்று கட்டுரைகள்

அலகு - 2 **(12 மணிநேரம்)**

வெ.இராமலிங்கனார் - சொல், தமிழன் இதயம்
முடியரசனார் - உயிர் வெல்லமோ, மனத்தூய்மை
பெருஞ்சித்திரனார் - அஞ்சாதீர், மொழி இனம் நாடு,
பட்டுக்கோட்டை
கல்யாணசுந்தரனார் - வருங்காலம் உண்டு, உழைக்காமல் சேர்க்கும் பணம்.
இலக்கணம் - எழுத்து
இலக்கிய வரலாறு - மூன்றாம் பாகம் - தண்டமிழ்த் தொண்டர்கள்

அலகு - 3 **(12 மணிநேரம்)**

சுரதா - நல்ல தீர்ப்பு
கண்ணதாசன் - ஒரு பானையின் கதை
அப்துல் ரகுமான் - வீடு
மேத்தா - ஒரே குரல்
இலக்கிய வரலாறு - மூன்றாம் பாகம் - இருபதாம் நூற்றாண்டு
இலக்கியவளர்ச்சி
சிறுகதை - முதல் ஐந்து சிறுகதைகள்

அலகு – 4 : அரசியல் கவிதைகள் **(12 மணிநேரம்)**

ஈரோடு தமிழன்பன் - அகல் விளக்காக இரு

ஆதவன் தீட்சண்யா - இன்னும் இருக்கும் சுவர்களின் பொருட்டு
சுகிர்தராணி - என் கண்மணியே இசைப்பிரியா
சக்தி ஜோதி - யுகாந்திர உறக்கம்
பழநிபாரதி - வெள்ளைக்காகிதம்
லிவிங் ஸ்மைல் வித்யா - நினைவில் பால்யம் அழுத்தம்
இலக்கணம் - சொல்

அலகு - 5 அயலகக் கவிதைகள் (12 மணிநேரம்)

ஓசே ரிசால் - விடைகொடு என் தாய் மண்ணே
ஹைபுன் கவிதைகள் - அறுவடை நாளின் மழை (மூன்று கவிதைகள்)
சிறுகதை - ஆறு முதல் பத்து சிறுகதைகள்
உரைநடை - நான்கு முதல் ஆறு கட்டுரைகள்

பாட நூல்கள்

1. **பொதுத்தமிழ்,** *செய்யுள் திரட்டு, தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, முதற்பதிப்பு, 2021*
2. **சமூகவியல் நோக்கில் தமிழிலக்கிய வரலாறு,** *தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, பத்தாம் பதிப்பு, 2017*
3. **நற்றமிழ்க் கோவை** (கட்டுரைத் தொகுப்பு). *தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, முதற்பதிப்பு, 2021*
4. **சிறுகதைத் தொகுப்பு** - ஒவ்வொரு கல்வியாண்டிற்கும் ஒவ்வொரு சிறுகதைத்தொகுப்பு
5. *(2021–2022* கல்வியாண்டுக்கு மட்டும்): **நல்லாசிரியர்**, சிறுகதைத் தொகுப்பு, - *தமிழாய்வுத்துறை, நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, முதற்பதிப்பு, 2021*

Relationship matrix for Course outcomes, Programme outcomes / Programme Specific Outcomes

Semester	Course code	Title of the Course	Hours	Credits
I	21UTA11GL01	General Tamil - I	4	3

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO–1	PO–2	PO–3	PO–4	PO–5	PSO–1	PSO–2	PSO–3	PSO–4	PSO–5	
CO–1	2	1	2	2	3	3	3	2	3	2	2.3
CO–2	2	1	2	2	2	3	2	2	2	2	2.0
CO–3	2	1	2	2	3	3	3	2	3	2	2.3
CO–4	1	2	1	2	2	3	2	2	3	2	2.0
CO–5	1	1	2	2	3	3	3	2	3	2	2.2
Mean overall Score											2.16 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	**21UFR11GL01**	**FRENCH – I**	**4**	**3**

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of this course, students will be able to	
CO–1	recall and spell the alphabets, numbers, colours, days of the week and months in French.	**K1**
CO–2	compare the definite and indefinite articles and its usages.	**K2**
CO–3	construct simple phrases by using 'er' verbs in present tense.	**K3**
CO–4	make use of correct terminology and introduce oneself in French.	**K3**
CO–5	distinguish between affirmative and negative phrases and take part in role play - conversation.	**K4**

Unit – I **(12 hours)**

TITRE:BONJOUR CA VA?
GRAMMAIRE : Les pronoms personnels sujets, les articles définis et indéfinis, Etre et avoir (verbes auxiliaires)
LEXIQUE : Saluer, Entrer en contact, demander et dire comment ça va ?, L'alphabet, les couleurs, les pays et les nationalités, les animaux domestiques.
PRODUCTION ORALE : Epeler son nom et son prénom, Comprendre des personnes qui se saluent.
PRODUCTION ECRITE : Les formules de politesse

Unit – II **(12 hours)**

TITRE:SALUT ! JE M'APPELLE AGNES
GRAMMAIRE : La conjugaison du 1er groupe, les adjectifs possessifs, la formation du féminin, la formation du pluriel.
LEXIQUE : Se présenter, Présenter quelqu'un, Remercier, Les jours de la semaine, les mois de l'année, les nombres de 0 à 69, la famille
PRODUCTION ORALE : Comprendre des informations essentielles
PRODUCTION ECRITE : Présentez –vous

Unit - III **(12 hours)**

TITRE:QUI EST-CE?
GRAMMAIRE : La phrase interrogative : Qu'est-ce que… ?/Qu'est-ce que c'est ?/Qui est-ce ?, quelques indicateurs du temps, la formation du féminin, les verbes aller et venir
LEXIQUE : Demander et répondre poliment,les professions
PRODUCTION ORALE : Parler de ses projets
PRODUCTION ECRITE : Ecrire de brefs messages

Unit - IV **(12 hours)**

TITRE:DANS MON SAC, J'AI?
GRAMMAIRE : la phrase négative, c'est/il est, les articles contractes, les pronoms personnels toniques

LEXIQUE : Demander des informations personnelles, Quelques objets, la fiche d'identité, les nombres à partir de 70
PRODUCTION ORALE : Comprendre un message sur un répondeur téléphonique
PRODUCTION ECRITE : Remplir une fiche d'identité

Unit - V **(12 hours)**

TITRE:IL EST COMMENT? / ALLO?
GRAMMAIRE : les adverbes interrogatifs, les prépositions de lieu, les verbes du deuxième groupe, le verbe faire
LEXIQUE : Parler au téléphone, décrire quelqu'un, l'aspect physique, le caractère
PRODUCTION ORALE : Un jeu de rôle – la conversation téléphonique
PRODUCTION ECRITE : Décrivez votre aspect physique et votre caractère en quelques lignes

Book for Study

P. Dauda, L.Giachino and C.Baracco, *Generation A1*, Didier, Paris 2016.

Books for Reference

1. J.Girardet and J.Pecheur, *Echo A1*, CLE International, 2^{e}edition, 2017
2. Régine Mérieux and Yves Loiseau, *Latitudes A1*, Didier, 2012.
3. Isabelle Fournier, *Talk French*, Goyal Publishers,2011

Web Resources

1. https://www.wikihow.com/Pronounce-the-Letters-of-the-French-Alphabet
2. https://francais.lingolia.com/en/grammar/tenses/le-present
3. https://www.lawlessfrench.com/grammar/articles/
4. https://www.frenchpod101.com/french-vocabulary-lists/10-lines-you-need-for-introducing-yourself
5. https://www.tolearnfrench.com/exercises/exercise-french-2/exercise-french-3295.php

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course code			Title of the Course				Hours		Credits
I	21UFR11GL01			FRENCH – I				4		3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO–1	3	1	2	3	2	3	2	1	2	3	2.2
CO–2	3	3	3	2	2	2	1	2	2	3	2.3
CO–3	3	1	2	3	2	3	2	1	2	2	2.1
CO–4	2	2	3	2	1	3	2	1	2	3	2.1
CO–5	3	2	3	2	2	3	2	2	3	2	2.4
Mean overall Score											2.22 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UHI11GL01	HINDI- I	4	3

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of the course, students will be able to	
CO -1	list out the literary works in Hindi during the period of 12th century in India.	K1
CO -2	compare the vocabulary & expressions related to day-to-day conversation.	K2
CO -3	use simple Phrases from English to Hindi.	K3
CO -4	investigate the values of Indian society & summarize the duties of a citizen for his/her country.	K4
CO -5	identify the sentences in Hindi using basic grammar.	K4

Unit - I **(12 Hours)**

Dr. Abdul Kalam
Ling
Kabir Ke Dohe
Baathcheeth - Aspathal mein
Adhikal - Namakarn

Unit - II **(12 Hours)**

Vachan Badaliye
Thulasi ke Dohe
Adhikal - Samajik Paristhithiyam
Moun Hee Mantra Hai

Unit - III **(12 Hours)**

Sangya
Soordas ke Pad
Baathcheeth - Hotel mein
Adhikal - Sahithyik Paristhithiyam

Unit - IV **(12 Hours)**

Sarvanam
Rahim ke Dohe
Bathcheeth - Kaksha mein
Adhikal - Salient Features, Main Divisions

Unit - V **(12 Hours)**

Anuvad - 1
Visheshan
Bihari - Dohe
Bathcheeth - Kariyalay mein
Adhikal - Visheshathayem

Books for Study

1. M.kamathaprasad Gupth, *Hindi Vyakaran*, Anand Prakashan, Kolkatta,2020.
   Unit-I *Chapters 2 and 3*
2. Viswanath Tripaty, *Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd, New Delhi,2018.
   Unit-II, III and IV *Chapters 4 and 5*
3. Dr. Sanjeev Kumar Jain, *Anuwad: Siddhant Evam Vyavhar*, Kailash Pustak Sadan, Madhya Pradesh 2019.
   Unit-V *Chapter 1*

Books for Reference

1. Dr.A.P.J.Abdul Kalam, Mere sapnom ka Bharath, Prabath Prakashan, Noida, 2020,
2. Lakshman prasad singh, Kavya ke sopan, Bharathy Bhavan Prakashan, 2017.
3. Aravind Kumar, Sampoorna Hindi Vyakaran our Rachana, Lucent publisher, 2019.
4. Adhunik Hindi Vyakaran our Rachana, bharati bhawan publishers & distributors, 2018.
5. Acharya ramchandra shukla, Hindi Sahitya Ka Itihas, Prabhat Prakashan, 2021.

Web Resources

1. https://youtu.be/LrdrcP2oiyU
2. https://youtu.be/Cib2FNv8KyA
3. https://youtu.be/aXARykpYCxA
4. https://youtu.be/RUDFis-tdg4
5. https://youtu.be/upivTmLTPQA

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course				HINDI - I			Hours	Credits
I	21UHI11GL01										4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)						Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	3	2	3	1	3	1	3	3	2		2.3
CO-2	2	2	3	3	1	3	2	3	3	2		2.4
CO-3	3	2	2	1	2	3	2	3	2	3		2.3
CO-4	3	2	1	3	2	3	2	3	3	2		2.4
CO-5	2	3	3	2	3	2	3	3	3	1		2.5
Mean Overall Score												2.38 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21USA11GL01	SANSKRIT - I	4	3

CO No.	CO–Statements On successful completion of the course, the student will be able to	Cognitive Levels (K –Levels)
CO-1	remember and Recall words relating to objects.	K1
CO-2	understand classified vocabulary	K2
CO-3	apply nouns and verbs.	K3
CO-4	analyze different forms of names and verbs.	K4
CO-5	appreciate the good saying of Sanskrit Improve the self-values.	K5

Unit - I **(12 Hours)**

Samyakthakshatra pada paricaya

Unit - II **(12 Hours)**

Vartmanakala prayogaha

Unit - III **(12 Hours)**

Samskruta varathamanakalaha

Unit - IV **(12 Hours)**

Shadha priyoghaa aakaarnta ikaraantha ukarantha

Unit - V **(12 Hours)**

Subhashitani manoharani Dasaslokani

Book for Study

Shaptamanjari , K.M.,Saral Snakrit Balabodh , Bharathiya Vidya Bhavan , Munushimarg Mumbai – 4000 007 2018, 2019

Books for Reference

1. Kulapathy , K.M.,Saral Snakrit Balabodh , Bharathiya Vidya Bhavan , Munushimarg Mumbai – 4000 007 2018
2. R.S.Vadhar & Sons , Book – Sellers and publishers , Kalpathi.Palgahat 678003, Kerala South India , Shabdha Manjari 2019
3. Balasubramaniam R, Samskrita Akshatra Siksha , Vangals Publications, 14th Main road JP Nagar , Bangalore – 78

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
I	21USA11GL01	SANSKRIT- I	4	3

Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	1	1	3	2	3	2	3	2	2	2.2
CO-2	2	2	3	3	1	2	2	3	3	2	2.3
CO-3	3	2	2	2	2	2	2	3	3	2	2.3
CO-4	3	2	2	3	2	3	3	3	2	2	2.3
CO-5	3	2	3	2	3	2	2	3	3	3	2.6
Mean Overall Score											2.34
Result											# High

Semester	Course Code	Title of the Course	Hours	Credits
I	**21UEN12GE01**	**GENERAL ENGLISH - I**	**5**	**3**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall what they observe and experience	**K1**
CO-2	arrange different parts of a text in a coherent manner	**K2**
CO-3	examine the underlying meaning in a text	**K3**
CO-4	analyse and evaluate letters regarding the use of appropriate language and format	**K4 & K5**
CO-5	use conversational English to communicate with friends	**K6**

Unit-I **(15 Hours)**

01. Personal Details
02. Positive Qualities
03. Listening to Positive Qualities
04. Relating and Grading Qualities
05. My Ambition
06. Abilities and Skills
07. Self-Improvement Word Grid
08. What am I Doing?
09. What was I Doing?
10. Unscramble the Past Actions
11. What did I Do Yesterday?

Unit-II **(15 Hours)**

12. Body Parts
13. Actions and Body Parts
14. Value of Life
15. Describing Self
16. Home Word Grid
17. Unscramble Building Types
18. Plural Forms of Naming Words
19. Irregular Plural Forms
20. Plural Naming Words Practice
21. Whose Words?

Unit-III **(15 Hours)**

22. Plural Forms of Action Words
23. Present Positive Actions
24. Present Negative Actions
25. Un/Countable Naming Words

26. Recognition of Vowel Sounds
27. Indefinite Articles
28. Un/Countable Practice
29. Match the Visual
30. Letter Spell-Check
31. Drafting a Letter

Unit-IV **(15 Hours)**

32. Friendship Word Grid
33. Friends' Details
34. Guess the Favourites
35. Guess Your Friend
36. Friends as Guests
37. Introducing Friends
38. What are We Doing?
39. What is (S)He / are They Doing?
40. Yes / No Question
41. What was S/He Doing?
42. Names and Actions
43. True Friendship
44. Know Your Friends
45. Giving Advice/Suggestions
46. Discussion on Friendship
47. My Best Friend

Unit-V **(15 Hours)**

48. Kinship Words
49. The Odd One Out
50. My Family Tree
51. Little Boy's Request
52. Occasions for Message
53. Words Denoting Place
54. Words Denoting Movement
55. Phrases for Giving Directions
56. Find the Destination
57. Giving Directions Practice
58. SMS Language
59. Converting SMS
60. Writing Short Messages
61. Sending SMS
62. The Family Debate
63. Family Today

Book for Study

Joy, J.L., and Peter, F.M. *Let's Communicate 1*. New Delhi, Trinity P, 2014.

Books for Reference

1. Ahrens, Sönke. *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking*. New York: Create Space, 2017.
2. Aspinall, Tricia. *Test Your Listening.* London: Pearson, 2002.

3. Bailey, Stephen. *Academic Writing: A Practical Guide for Students*. New York: Routledge, 2004.
4. Fitikides, T.J. *Common Mistakes in English* (6th ed.). London: Longman, 2002.
5. Wainwright, Gordon. *How to Read Faster and Recall More: Learn the Art of Speed Reading with Maximum Recall* (3rd ed.). Oxford: How to Books, 2007.

Web Resources

1. https://learnenglish.britishcouncil.org/
2. https://oneminuteenglish.org/en/best-websites-learn-english/
3. https://www.dailywritingtips.com/best-websites-to-learn-english/

Relationship Matrix for Course Outcomes, Programme Outcomes, and Programmes Specific Outcomes

Semester	Course Code			Title of the Course					Hours	Credit
I	21UEN12GE01			GENERAL ENGLISH – I					5	3
Course Outcome (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO -1	2	3	2	2	3	2	3	2	3	2	2.4
CO -2	2	2	3	2	3	3	2	3	2	2	2.3
CO -3	2	3	2	3	2	2	3	2	3	2	2.4
CO -4	2	2	3	2	3	3	2	3	2	3	2.5
CO -5	2	2	2	3	2	2	2	3	2	2	2.2
									Mean Overall Score		2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13CC01	CORE – 1: PROBLEM SOLVING USING C	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall algorithms and flowcharts for computing logic	K1
CO-2	summarize the basic knowledge to develop C programs	K2
CO-3	apply and implement programs for solving real world problems	K3
CO-4	examine and explore the use of memory allocation for application programs	K4
CO-5	design and develop alternate methods of solving variety of problems	K5, K6

UNIT – I **(15 Hours)**

Algorithms – Flow charts – Developing algorithms and flowcharts for solving simple problems using sequential, selection and iterative programming Structures.

UNIT – II **(15 Hours)**

History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Control structures – Looping structures.

UNIT – III **(15 Hours)**

Arrays – Character Arrays and Strings – User defined functions.

UNIT – IV **(15 Hours)**

Pointers: Introduction – Pointer Expressions – Chain of Pointers –Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning Pointers – Pointers to Functions – Function pointer – Pointers and Structures.

UNIT – V **(15 Hours)**

Structures: Introduction – Defining a structure – Declaration of structure – Accessing Structures members – Array of Structures – Structures within structures – Structures and functions – Structures and Pointers – Union. Files: Opening and closing files – Operations on files.

Books for Study

1. S. Jaiswal, "Information Technology Today", Galgotia Publications, New Delhi, Fourth Edition, 2009.
   Unit-I *Chapter 20 (Pages CL-3* to *CL-26)*

2. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
Unit-II *Chapter 1 (Sec:1.1-1.2,1.8),Chapter 2 (Sec:2.5 –2.7),Chapter 3, Chapter 5, Chapter 6*
Unit-III *Chapter 7, Chapter 8 (Sec: 8.2 – 8.8), Chapter 9*
Unit-IV Chapter *11*
Unit-V *Chapter 10, Chapter 12 (Sec: 12.1 – 12.4)*

Books for Reference

1. Byron S. Gottfried, "Programming with C", Schaum's Outline Series, Tata-McGraw Hill Edition, New Delhi, 1991.
2. E. Karthikeyan, "A Textbook on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.
3. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi, 2010.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credit**
I	**21UCS13CC01**			**CORE – 1: PROBLEM SOLVING USING C**				**5**		**3**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	1	2	1	3	3	2	3	1	2.1
CO-2	3	3	3	1	1	3	2	3	2	2	2.3
CO-3	3	3	2	3	2	2	2	3	2	1	2.3
CO-4	3	2	2	3	2	1	2	2	3	3	2.3
CO-5	2	2	3	3	2	1	3	3	3	2	2.4
									Mean Overall Score		**2.28** (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13CC02	CORE – 2: DIGITAL COMPUTER FUNDAMENTALS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the fundamentals of digital logic and elements of a digital computer	K1
CO-2	demonstrate the logics of sequential and combinational circuits	K2
CO-3	solve the problems on logic circuits using digital logics	K3
CO-4	classify the digital logics of sequential and combinational circuits	K4
CO-5	interpret the functioning of logic circuits and memory elements	K5

UNIT- I **(12 Hours)**

Number Systems: Number systems - Decimal, Binary, Octal, Hexadecimal - conversion from one to another. Characters and codes: ASCII code, Excess3 code, gray code - binary addition, subtraction, multiplication and division - unsigned binary numbers - signed magnitude numbers - complements in number systems.

UNIT –II **(12 Hours)**

Logic Gates: AND, OR, NOT, NOR & NAND gates, EX-OR gates. Boolean Algebra and Boolean laws and theorems: De Morgan's theorems - Duality theorem - simplification of sum of product and product of sum expressions - Karnaugh map and simplifications.

UNIT- III **(12 Hours)**

Simple Arithmetic Circuits: Half and Full adders - Binary adder/subtracter - BCD adder Data processing circuits: Multiplexers - Demultiplexers -Encoders and Decoders.

UNIT- IV **(12 hours)**

Sequential Logic Design: Flip-flops - RS, JK, D & T Flip flops - Master / Slave Flip flop - Shift Registers - Counters - Asynchronous and Synchronous Counters.

UNIT- V **(12 hours)**

Memory Elements: RAM - static RAM - Dynamic RAM - ROM - Magnetic Disk memories - Magnetic tape - Cache Memory.

Books for Study

1. Donald P. Leach, Albert Paul Malvino and Goutam Saha "Digital Principles and Application", Seventh Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2010.
   Unit I: Chapter 5, 6
   Unit II: Chapter 2, 3
   Unit III: Chapter 4
   Unit IV: Chapter 8, 9, 10
2. Thomas C. Bartee, "Computer Architecture and Logic Design", McGraw Hill International Edition, New Delhi, 2010.
   Unit V: Chapter 6

Books for Reference

1. Virendra Kumar, "Digital Technology Principles and Practice", New Age International, New Delhi, 2006.
2. Jaydeep Chakravorty, "Digital Electronics and Logic Design", Universites Press, 2012.
3. John F. Wakerly, "Digital Design: Principles And Practices", Pearson Publication, 2008

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credit
I	21UCS13CC02			CORE – 2: DIGITAL COMPUTER FUNDAMENTALS				5		3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	1	2	1	2	1	2	2	2	2	2	1.9
CO-2	2	3	2	2	2	3	2	2	2	2	2.3
CO-3	2	3	3	2	2	3	3	3	2	2	2.5
CO-4	2	2	2	2	2	3	3	3	2	2	2.3
CO-5	2	3	2	2	2	3	3	3	2	2	2.4
Mean Overall Score											2.28 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13CP01	Software Lab 1: PROGRAMMING WITH C	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	relate the ways to solve simple programs	K1
CO-2	understand and trace the execution of programs using arrays	K2
CO-3	develop programs with functions and pointers	K3, K4
CO-4	compare and contrast structures and unions	K4
CO-5	solve data handling problems using files	K5

List of Exercises

1) Simple Programs using Operators
2) Branching structures
3) Looping structures
4) Arrays
5) Strings
6) Functions
7) Pointers
8) Structures
9) Union
10) Files

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
1	21UCS13CP01	Software Lab 1: PROGRAMMING WITH C	3	2

Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	1	2	2	3	3	1	3	2	2.2
CO-2	3	3	2	2	1	3	3	2	3	1	2.3
CO-3	3	2	2	2	2	3	3	1	3	2	2.3
CO-4	3	3	2	2	1	3	3	3	3	2	2.5
CO-5	3	2	2	2	1	3	2	2	2	2	2.1
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13AC01	ALLIED: MATHEMATICS I	6	4

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K-levels)
CO-1	have knowledge of matrices, ordinary differential equations, standard forms of partial differential equations, properties of Laplace transform and Fourier series.	K1
CO-2	solve system of linear equations, matrices to find their eigen values and eigen vectors; ordinary differential equations to find their complex solutions and partial differential equations to find their complete as well as general solutions.	K2
CO-3	evaluate solution of a given problem using differential equations.	K3
CO-4	determine Fourier expansions of a functions in the given intervals.	K4
CO-5	realize the importance of Laplace transform and differential equations as a powerful tool in solving problems arising from physical sciences.	K5

Unit-l **(18 hours)**

Matrices – Rank of a matrix – Solving simultaneous linear equation in three unknowns using Elementary Operations method – Eigen values and Eigen vectors–Verification of Cayley Hamilton Theorem.

Unit-II **(18 hours)**

Differential equations of first order – variable separable – Homogeneous equations – Non-homogeneous equations – Linear equation – Bernoulli's equation.

Unit-III **(18 hours)**

Derivation of partial differential equations – By Elimination of Arbitrary Functions – Different Integrals of partial differential equations – Standard type of First Order Equations – Lagrange's Equation.

Unit-IV **(18 hours)**

Definition – properties – the inverse transforms – solving differential equations using Laplace transforms.

Unit-V **(18 hours)**

Fourier series – Even and odd functions – properties of odd and even functions – Half range Fourier series – Developments in cosine and sine series.

Books for Study

1. S. Narayanan, R. Hanumantha Rao, T.K. Manicavachagom Pillay, "**Ancillary Mathematics Volume-I**", 2011 Edition.

   Unit-I *Chapter 3 : Sec 3.2 - 3.4, pages: 137-160.*

2. S. Narayanan, R. Hanumantha Rao, T.K. ManicavachagomPillay, "**Ancillary Mathematics Volume-II**", 2011 edition.
   Unit – II *Chapter 4: Sec. 1 – 5, pages 205 – 218.*
   Unit – III *Chapter 6: Sec. 1 – 6, pages: 252 – 274.*
   Unit – IV *Chapter 7: Sec. 1 – 6, pages 289 – 312.*
   Unit – V *Chapter 2: Sec. 1 – 5 pages 123 – 149.*

Books for Reference

1. S. Narayanan &T.K.Manichavachagom Pillay, "Differential equation and its applications", S.Viswanathanpvt. Ltd.2001.
2. S. Narayanan and T.K. Manickavachagom Pillai, " Ancillary Mathematics" Book II, S. Viswanathan Pvt. Ltd., Madras
3. Venkataraman, M.K., "Higher Mathematics for Engineering and Science", Third Edition, The National Publishing Co., Madras, 1986.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
I	21UCS13AC01	ALLIED: MATHEMATICS-I	6	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	1	2	3	3	2	2	2	2.3
CO-2	3	2	2	2	2	2	3	2	2	2	2.2
CO-3	2	3	3	2	1	2	3	3	2	2	2.3
CO-4	3	2	2	3	2	3	2	3	2	2	2.4
CO-5	2	2	2	3	2	3	2	3	3	2	2.4
Mean Overall Score											2.32 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UHE14VE01	ESSENTIALS OF HUMANITY	2	1

CO No.	CO – Statements	Cognitive Levels (K-levels)
	On completion of this course, the graduates will be able to:	
CO-1	recall the prescribed values and their dimensions	K1
CO-2	examine themselves by learning the developmental changes happening in the course of their life time	K2
CO-3	apply the trained values in their day today life	K3
CO-4	analyze themselves as responsible men and women	K4
CO-5	create a constructive approach to life	K5 & K6

Unit-I Principles of Value Education (6 Hours)

Introduction to values - Characteristics and Roots of Values - Value Education & Value Clarification - Moral Characters - Kinds of Values - Objectives of Values.

Unit-II The Development of Human Personality (6 Hours)

Personality: Introduction, Theories, Integration &Factors influencing the development of personality - SEL Series - Discovering self - Defense Mechanism - Power of positive thinking - Why worry?

Unit-III The Dimensions of Human Development (6 Hours)

Areas of Development: Physical, Intellectual, Emotional, Social Development, Moral & Spiritual development

Unit-IV Responsible Parenthood (6 Hours)

Human sexuality - Marriage and Family - Sex and Love - Characteristics of Responsible parent - Causes of Marriage disharmony - Art of wise parenting.

Unit-V Gender Equality and Empowerment (6 Hours)

Historical perspective - Women in Independence struggle - Women in Independent India - Education & Economic development - Crimes against Women - Women rights - Time-line of Women Achievements in India

Books for Study

Department of Human Excellence. *Essentials of Humanity*, St. Joseph's College, Tiruchirappali-02, 2021.

Books for Reference

1. Alphonse Xavier Dr SJ. *You Shall Overcome*,(6th Ed.) Chennai: ICRDCE Publication, 2012.
2. Alex K. *Soft Skills*, New Delhi: S. Chand, 2009.
3. Kalam Abdul APJ. *You Are Unique*, Bangalore: Punya Publishing, 2012.

Web Sources

http://livingvalues.net. Accessed 05 Mar. 2021.

https://www.apa.org/topics/personality#. Accessed 05 Mar. 2021.

https://www.peacecorps.gov/educators/resources/global-issues-gender-equality-and-womens-empowerment/. Accessed 05 Mar. 2021.

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UTA21GL02**	**General Tamil - II**	**4**	**3**

CO No.	CO- Statement	Cognitive Level (K- level)
இப்பாடத்தின் நிறைவில் மாணவர்கள்		
CO-1	தமிழிலக்கிய வரலாற்றில் சைவ, வைணவ இலக்கியங்கள் பெறும் இடத்தை அறிந்துகொள்வர்	**K 1**
CO-2	அகப்பொருள், புறப்பொருள் இலக்கணங்களின் அடிப்படை அறிவைப் பெறுவர்.	**K 1**
CO-3	காப்பியச் சுவையை மாணவர்கள் புரிந்துகொள்வர்	**K 2**
CO-4	இஸ்லாமிய இலக்கியச் சிந்தனைகளைப் பெறுவர்	**K 3**
CO-5	கிறித்தவ மதிப்பீடுகளைச் சிற்றிலக்கிய வகைகளின் வழியாகத் திறனாய்வர்.	**K 4**

அலகு - 1 **(12 மணிநேரம்)**

சிலப்பதிகாரம் - கனாத்திறம் உரைத்த காதை
மணிமேகலை - ஆபுத்திரன் திறம் அறிவித்த காதை
இலக்கிய வரலாறு - சைவம் வளர்த்த தமிழ் முதல் புராணங்கள் முடிய.
இலக்கணம் - அகப்பொருள் இலக்கணம்

அலகு - 2 **(12 மணிநேரம்)**

திருவாசகம் - திருச்சாழல்
சிவவாக்கியார் பாடல்கள் - *25* பாடல்கள் *(04, 14, 16, 22, 27, 33, 34, 35, 36,37, 38, 47, 81, 91, 225, 237, 242, 495, 504, 520,522, 533, 534, 536, 548.)*

அலகு - 3 **(12 மணிநேரம்)**

நாலாயிர திவ்வியப் பிரபந்தம்- அமலானாதிபிரான் *(10 பாடல்கள்)*
- பெருமாள் திருமொழி *(11 பாடல்கள்)*
கம்பராமாயணம் - கைகேயி சூழ்வினைப்படலம்
உநைடை - *7* முதல் *9* முடிய உள்ள கட்டுரைகள்

அலகு - 4 **(12 மணிநேரம்)**

சீறாப்புராணம் - உடும்பு பேசிய படலம்
இலக்கணம் - புறப்பொருள் இலக்கணம்
இலக்கிய வரலாறு - தமிழ் இலக்கண நூல்கள் முதல் சிற்றிலக்கியங்கள் முடிய

அலகு - 5 **(12 மணிநேரம்)**

திருக்காவலூர்க் கலம்பகம் - சமூக உல்லாசம்
உரைநடை - *10* முதல் *12* வரையிலான கட்டுரைகள்

பாடநூல்கள்:

1. **பொதுத்தமிழ் - செய்யுள் திரட்டு**, தமிழாய்வுத்துறை வெளியீடு, தூய வளனார் கல்லூரி. திருச்சிராப்பள்ளி, முதற்பதிப்பு, *2021*
2. **சமூகவியல் நோக்கில் தமிழிலக்கிய வரலாறு,** *தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, பத்தாம் பதிப்பு, 2017*
3. **நற்றமிழ்க் கோவை** (கட்டுரைத் தொகுப்பு). *தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி,* முதற்பதிப்பு, *2021*

Relationship Matrix for Course Outcomes, Programme Outcomes, and Programmes Specific Outcomes

Semester	Course Code			Title of the Course				Hours		Credit
II	21UTA21GL02			General Tamil - II				4		3
Course Outcomes (Cos)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	2	2	1	2	3	2	2	2	3	2	2.1
CO-2	2	1	2	2	3	3	2	2	3	2	2.2
CO-3	2	1	2	2	3	3	2	2	3	2	2.2
CO-4	1	1	2	2	3	3	2	2	3	2	2.1
CO-5	1	1	2	2	3	2	2	3	3	2	2.1
Mean Overall Score											2.14 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UFR21GL02**	**FRENCH – II**	**4**	**3**

CO No.	CO–Statements On successful completion of this course, students will be able to	Cognitive Levels (K –Levels)
CO–1	relate pronominal verbs in expressing one's day today activity.	**K1**
CO–2	compare the different types of articles.	**K2**
CO–3	construct texts using pronouns – passages and dialogues.	**K3**
CO–4	discover the food habits of the French culture.	**K4**
CO–5	appraise the French fashion.	**K5**

Unit - I **(12 hours)**

TITRE:LES LOISIRS
GRAMMAIRE : les adjectifs interrogatifs, les nombres ordinaux, les verbes pronominaux
LEXIQUE : les différentes activités quotidiennes,les loisirs, les activités quotidiennes, les matières
PRODUCTION ORALE : parler sur votre passe-temps
PRODUCTION ECRITE : décrire sa journée

Unit -II **(12 hours)**

TITRE:LA ROUTINE
GRAMMAIRE : les pronoms personnels COD, les verbes du premier groupe en e/er/eler/eter, le verbe prendre
LEXIQUE : exprimer ses gouts et ses préférences, le temps, l'heure, la fréquence
PRODUCTION ORALE : savoir comment dire l'heure
PRODUCTION ECRITE : écrire vos préférences en quelques lignes

Unit - III **(12 hours)**

TITRE:OU FAIRE SES COURSES?
GRAMMAIRE : les articles partitifs, le pronom en (la quantité), très ou beaucoup
LEXIQUE : inviter et répondre à une invitation, les commerces et les commerçants, demander et dire le prix, les quantités
PRODUCTION ORALE : faire des courses pour une soirée
PRODUCTION ECRITE : écrire un message en acceptant l'invitation

Unit - IV **(12 hours)**

TITRE:DECOUVREZ ET DEGUSTEZ
GRAMMAIRE : l'impératif, il faut, les verbes devoir, pouvoir, savoir,vouloir
LEXIQUE : Commander et commenter sur un plat de la carte,les aliments, les services, les moyens depaiement
PRODUCTION ORALE : Jeu de rôle – au restaurant (entre vous et le garçon)
PRODUCTION ECRITE : faire une comparaison avec la carte française et indienne

Unit - V **(12 hours)**

TITRE:TOUT LE MONDE S'AMUSE/ LES ADOS AU QUOTIDIEN
GRAMMAIRE : les adjectifs démonstratifs, le pronom indéfini on, le futur proche, le passé composé, les verbes en –yer, voir et sortir
LEXIQUE : connaitre les marques connues sur les vêtements, les sorties, situer dans le temps, les vêtements et les accessoires
PRODUCTION ORALE : décrire une tenue
PRODUCTION ECRITE : écrire une lettre amicale, une carte postale

Book for Study

P.Dauda,L.Giachino and C.Baracco, *Generation A1*, Didier, Paris 2016.

Books for Reference

1. J.Girardet and J.Pecheur, *Echo A1*, CLE International, 2^{e}edition,2017
2. Régine Mérieux and Yves Loiseau, *Latitudes A1*, Didier, 2012.
3. Isabelle Fournier, *Talk French*, Goyal Publishers, 2011

Web Resources

1. https://www.frenchtoday.com/blog/french-verb-conjugation/french-reflexive-verbs-list-exercises/
2. https://www.fluentu.com/blog/french/french-subject-pronouns/
3. https://grammarist.com/french/french-partitive-article/
4. https://www.talkinfrench.com/guide-french-food-habits/
5. https://www.fluentu.com/blog/french/talking-about-clothes-in-french/

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course code	Title of the Course	Hours	Credits
II	21UFR21GL02	FRENCH – II	4	3

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO–1	3	3	3	3	1	3	1	2	2	2	2.2
CO–2	2	1	2	3	2	3	1	2	2	2	2.0
CO–3	3	2	3	2	2	3	3	1	3	2	2.4
CO–4	3	2	2	1	3	3	3	1	1	3	2.2
CO–5	2	1	2	2	3	3	3	2	2	2	2.2
Mean overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UHI21GL02**	**HINDI - II**	**4**	**3**

CO No.	CO–Statements On successful completion of the course, students will be able to	Cognitive Levels (K –Levels)
CO -1	Find out the Terms & Expressions related to letter writing	**K1**
CO -2	Explain the works of Hindi writers	**K2**
CO -3	Complete the sentences in Hindi using basic grammar	**K3**
CO -4	Analyze the social & political conditions of Devotional period in Hindi Literature	**K4**
CO -5	Justify the human values stressed on the works of the following authors “Premchand, Nirala, etc.”	**K5**

Unit - I **(12 Hours)**

Kafan
Letter Writing - Chutti Patra
Bakthikal - Namakarn
Sarkari kariyalayom ka naam

Unit - II **(12 Hours)**

Baathcheeth - Dookan mein
kriya
Letter Writing - Rishthedarom ko patra
Bakthikal - Samajik Paristhithiyam

Unit - III **(12 Hours)**

Vah Thodthi patthar
Adverb
Letter Writing - Naukari keliye Avedan Patra
Bakthikal - Sahithyik Paristhithiyam

Unit - IV **(12 Hours)**

Mukthi
Samas
Letter Writing - Kitab Maangne Keliye Patra
Bakthikal - Salient Features, Main Divisions

Unit - V **(12 Hours)**

Anuvad - 2
Sandhi
Letter writing - Nagarpalika ko Patra
Bakthikal - Visheshathayem

Books for Study

1. Viswanath Tripaty, *Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd, New Delhi, 2018.
   Unit-I *Chapter 1*
2. M.kamathaprasad Gupth, *Hindi Vyakaran*, Anand Prakashan, Kolkatta, 2020.
   Unit-II, III and IV *Chapter 2*
3. Dr.Sadananth Bosalae, *kavya sarang*, Rajkamal Prakashan, New Delhi, 2020.
   Unit-V *Chapter 4*

Books for Reference

1. Adhunik Hindi Vyakaran our Rachana, bharati bhawan publishers & distributors, 2018.
2. Acharya ramchandra shukla, Hindi Sahitya Ka Itihas, Prabhat Prakashan, 2021.
3. Krishnakumar Gosamy, Anuvad vigyan ki Bhumika, Rajkamal Prakashan, 2016.
4. Aravind Kumar, Sampoorna Hindi Vyakaran our Rachana, Lucent publisher, 2019.
5. Lakshman prasad singh, Kavya ke sopan, Bharathy Bhavan Prakashan, 2017.

Web Resources

1. https://youtu.be/tE2RHQcqlbI
2. https://youtu.be/Xxvco3qa284
3. https://youtu.be/1z8x95IFGi4
4. https://youtu.be/CBMYf8NRLW4
5. https://youtu.be/h31tMLeFtHs

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course					Hours	Credits
II	21UHI21GL02			HINDI - II					4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	3	2	2	3	3	3	2	2	2.5
CO-2	1	3	1	2	2	3	3	3	2	3	2.3
CO-3	3	2	3	2	2	3	2	3	2	2	2.4
CO-4	2	3	3	1	3	2	3	2	1	2	2.2
CO-5	3	2	2	2	3	2	3	2	3	2	2.4
Mean Overall Score											2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21USA21GL02**	**SANSKRIT - II**	**4**	**3**

CO No.	CO–Statements On successful completion of the course, the student will be able to	Cognitive Levels (K –Levels)
CO-1	remembering names of different objects , remembering different verbal forms and sandhi.	**K1**
CO-2	contrast different verbal forms Explain good sayings , Relate good saying to life.	**K2**
CO-3	apply and build small sentences.	**K3**
CO-4	analyze different forms of Verbs and nouns.	**K4**
CO-5	appreciate subhashitas and Sanskrit poetry Expand Sanskrit vocabulary.	**K5**

Unit - I **(12 Hours)**

Asmath usmath tat kim (MFN)

Unit - II **(12 Hours)**

Sandhi Niyamaaha Abuyaasha (Guna , Visarga , Dirgha , Vrddhi)

Unit - III: **(12 Hours)**

Lang lakaaraha Kriyapadaani

Unit - IV **(12 Hours)**

Raguvamsaha Pratama sargaha (1 –15)

Unit - V **(12 Hours)**

Suvachana Prayogha

Book for Study

SARALASAMKRITHAM SIKSHA, 2020 , K.M Saral sankrit Balabodh , Bharathiys Vidya Bhavan , Munshimarg Mumbai – 400007, 2018

Books for Reference

1. Paindrapuram Ashram , Srirangam – 620006 Gopalavimshanthi 2019
2. R.S.Vadhyar & Sons book Kulapthy , K.M Saral sankrit Balabodh , Bharathiys Vidya Bhavan , Munshimarg Mumbai – 400007, 2018

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
II	21USA21GL02	SANSKRIT -II	4	2

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	1	3	2	2	2	3	3	2	1	2.1
CO-2	3	2	3	2	2	3	2	3	3	2	2.5
CO-3	2	2	3	2	2	2	2	3	3	1	2.1
CO-4	3	2	3	3	1	2	3	3	3	1	2.4
CO-5	3	2	2	2	3	2	2	3	3	1	2.3
Mean Overall Score											2.28
Result											# High

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UEN22GE02**	**GENERAL ENGLISH - II**	**5**	**3**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	remember the use of suitable punctuation marks in appropriate places	**K1**
CO-2	describe their pictures with appropriate expressions	**K2**
CO-3	infer meaning from the given context	**K3**
CO-4	analyse real-life situations and ask open-ended questions	**K4 & K5**
CO-5	use polite expressions in appropriate ways	**K6**

Unit-I **(15 Hours)**

01. Education Word Grid
02. Reading Problems and Solutions
03. Syllabification
04. Forms for Expressing Quality
05. Expressing Comparison
06. Monosyllabic Comparison
07. Di/polysyllabic Comparison
08. The Best Monosyllabic Comparison
09. The Best Di/Polysyllabic Comparison
10. Practising Quality Words

Unit –II **(15 Hours)**

11. Wh Words
12. Yes/No Recollection
13. Unscramble Wh Questions
14. Wh Practice
15. Education and the Poor
16. Controlled Role Play
17. Debate on Education
18. Education in the Future
19. Entertainment Word Grid
20. Classify Entertainment Wordlist
21. Guess the Missing Letter
22. Proverb-Visual Description
23. Supply Wh Words
24. Rearrange Questions
25. Information Gap Questions

Unit-III **(15 Hours)**

26. Asking Questions
27. More about Actions
28. More about Actions and Uses
29. Crime Puzzle
30. Possessive Quiz
31. Humourous News Report
32. Debate on Media and Politics
33. Best Entertainment Source

Unit-IV **(15 Hours)**

34. Career Word Grid
35. Job-Related Wordlist
36. Who's Who?
37. People at Work
38. Humour at Workplace
39. Profession in Context
40. Functions and Expressions
41. Transition Fill-in
42. Transition Word Selection
43. Professional Qualities
44. Job Procedures
45. Preparing a Resume
46. Interview Questions
47. Job Cover Letter Format
48. Emailing an Application
49. Mock Interview

Unit-V **(15 Hours)**

50. Society Word Grid
51. Classify Society Wordlist
52. Rearrange the Story
53. Storytelling
54. Story Cluster
55. Words Denoting Time
56. Expressing Time
57. What Can You Buy?
58. Noise Pollution
59. Positive News Headlines
60. Negative News Headlines
61. Matching Conditions
62. What Would You Do?
63. If I were Elected
64. My Dream Country

Book for Study

Joy, J.L. & Peter, F.M. *Let's Communicate 2*, New Delhi: Trinity Press, 2014.

Books for Reference

1. Ahrens, Sönke. *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking*. New York: CreateSpace, 2017.

2. Aspinall, Tricia. *Test Your Listening.* London: Pearson, 2002.
3. Bailey, Stephen. *Academic Writing: A Practical Guide for Students*. New York: Routledge, 2004'
4. Fitikides, T.J. *Common Mistakes in English* (6th ed.). London: Longman, 2002
5. Wainwright, Gordon. *How to Read Faster and Recall More: Learn the Art of Speed Reading with Maximum Recall* (3rd ed.). Oxford: How to Books, 2007.

Web Resources

1. https://learnenglish.britishcouncil.org/
2. https://oneminuteenglish.org/en/best-websites-learn-english/
3. https://www.dailywritingtips.com/best-websites-to-learn-english/

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester	Course Code			Title of the Course				Hours	Credits
II	21UEN22GE02			GENERAL ENGLISH - II				5	3
Course Outcomes (COs)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	2	3	2	2	3	2	3	2	3	2	2.4
CO-2	2	2	3	2	3	3	2	3	2	2	2.3
CO-3	2	3	2	3	2	2	3	2	3	2	2.4
CO-4	2	2	3	2	3	3	2	3	2	3	2.5
CO-5	2	2	2	3	2	2	2	3	2	2	2.2
								Mean Overall Score			2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UCS23CC03**	**CORE-3: OBJECT ORIENTED PROGRAMMING WITH C++**	**4**	**3**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define and understand the basic concepts in C++ Programming.	**K1**
CO-2	explain and execute C++ programs to explore the concepts of classes and objects.	**K2**
CO-3	apply the skills to write the C++ code using constructors and operator overloading.	**K3**
CO-4	analyze the concepts of OOPS such as Inheritance, Virtual base classes and Abstract classes	**K4**
CO-5	discover the concept of streams, file management, Template and Exception handling in C++	**K4**

UNIT- I **(12 Hours)**

Object Oriented Programming: Concepts – Benefits – Applications of OOP. Structure-Compiling and linking of C++ program. Functions: Function prototyping – Inline functions - Default arguments - Const Argument - Function Overloading.

UNIT –II **(12 Hours)**

Classes and objects: Specifying a class-Member functions- Private Member functions –Arrays within a class - Static Data Members – Static Member Functions – Array of objects –Object as function arguments – Friendly Functions-Returning objects.

UNIT- III **(12 Hours)**

Constructors and Destructors: Constructors - Parameterized Constructors -Multiple Constructors in a class - Constructors with default arguments – Dynamic Initialization of Object - Copy Constructor - Dynamic Constructors- Destructors - Operator Overloading: Defining Operator Overloading -Overloading unary and binary Operator - Overloading binary operators using friend functions.

UNIT- IV **(12 hours)**

Inheritance: Introduction – Defining Derived Classes – single Inheritance - Multilevel Inheritance – Multiple Inheritance – Hybrid Inheritance – Virtual base classes – abstract classes.

UNIT- V **(12 hours)**

Files and Streams: C++ stream classes – Unformatted I/O Operations – Formatted Console I/O operations- Files: Introduction-Classes for file Streams- Opening and Closing a File – File Modes - File Pointers and their Manipulations - Sequential Input and Output Operations - Command Line Arguments -Templates: Class Templates – Function Templates-Exception Handling.

Books for Study

1.E. Balagurusamy, "*Object Oriented Programming with C++*", Tata McGraw Hill Education Private Limited, New Delhi, 6th edition, Seventh Reprint, 2016.

Unit-I *Chapter 1*: 1.5, 1.6, 1.8 *Chapter 2:* 2.6, 2.8 *Chapter 4:* 4.3, 4.6, 4.7, 4.8, 4.10

Unit-II *Chapter 5:* 5.3, 5.4, 5.8, 5.9, 5.11 – 5.16

Unit-III *Chapter 6:* 6.2 – 6.8, 6.11 *Chapter 7:* 7.2 – 7.5

Unit-IV *Chapter 8:* 8.1 – 8.3, 8.5, 8.6, 8.9, 8.10

Unit-V *Chapter 10:* 10.3 – 10.5 Chapter *11:* 11.1 – 11.3, 11.5 – 11.7, 11.10 *Chapter 12:* 12.2, 12.4 Chapter *13*.

Books for Reference

1. Robert Lafore, "*Object-Oriented Programming in C++*", Pearson Education, New Delhi, Fourth Edition, Ninth Impression, 2012.
2. Bjarne Stroustrup, "*The C++ Programming Language*", Pearson Education and Dorling Kindersley, Third Edition, Tenth Impression, 2012.
3. Herbert Schildt, "*The Complete Reference C++*", Tata Mc-Graw Hill Edition, New Delhi, Fourth Edition, 25th Reprint, 2009.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
II	**21UCS230204**			**CORE-3: OBJECT ORIENTED PROGRAMMING WITH C++**						**4**	**3**
Course Outcomes (COs)↓	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2	2	2	2	3	2	2	3	2	2.3
CO-2	3	3	2	2	2	3	3	1	1	2	2.2
CO-3	2	3	2	3	3	2	3	3	2	2	2.5
CO-4	2	2	2	2	3	2	3	3	2	3	2.4
CO-5	2	2	3	2	3	3	3	2	3	2	2.5
Mean overall Score											2.38 (**High**)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UCS23CC04**	**CORE – 4 : DATA STRUCTURES AND ALGORITHMS**	**4**	**2**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define and understand various terms in data structures and algorithms.	**K1**
CO-2	outline various techniques in data structures and algorithms.	**K2**
CO-3	apply the data structures and algorithms to solve simple problems	**K3**
CO-4	compare various techniques used in data structures and algorithms	**K4**
CO-5	evaluate the importance of data structures and algorithms by developing real world applications.	**K5**

Unit-I **(12 hours)**

Arrays: Definition - Terminology - One dimensional array - multi dimensional arrays. Linked lists: Definition - Circular linked lists - Double linked lists - Circular double linked lists.

Unit-II **(12 hours)**

Stacks: Definition - Representation of a Stack - operations on Stacks - Evaluation of Arithmetic expressions. Queues: Definition – Representation of Queues - various queue structures.

Unit-III **(12 hours)**

Trees: Basic terminologies - Definition and concepts - representation of Binary tree - Binary tree traversal.

Unit-IV **(12 hours)**

Computer Sorting: Terminologies – Techniques – Bubble sort – insertion sort – quick sort – radix sort – Searching – Terminologies - Linear search with arrays – Binary Search.

Unit-V **(12 hours)**

Algorithms - Basic Steps. Algorithm Design Methods: Sub goals - Hill Climbing - Working Backward - Heuristics - Backtrack Programming - Recursion.

Books for Study

Units I, II, III & IV:

1. Debasis Samanta, "Classic Data Structures", Second Edition, PHI Learning Pvt. Ltd., New Delhi, 2009.

Unit I: 2.1-2.3, 2.4.1, 2.4.3, 3.1-3.5
Unit II: 4.1-4. 4, 4.5.1, 5.1-5.4
Unit III: 7.1-7.3, 7.4.3
Unit IV: 10.1, 10.2, 10.3.1 (*Proofs for theorems are not preferred)*

Unit: V:

2. S.E. Goodman and S.T. Hedetniemi, "Introduction to the Design and Analysis of Algorithms", McGraw Hill, International edition, 1988.

Unit V: 1.3, 3.1, 3.2, 3.3, 3.4

Books for Reference

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structure", Galgotia Publications, New Delhi, 1985.
2. Tanenbaum A.M. and Augustein M.J., "Data structures with Pascal", Prentice Hall of India Ltd, New Delhi, 1985.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course							Hours	Credits
II	21UCS23CC04	CORE – 4 : DATA STRUCTURES AND ALGORITHMS							4	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	2	2	2	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	3	3	3	3	1	2	2.5
CO-5	2	3	3	2	2	2	3	3	2	1	2.4
Mean Overall Score											2.4 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UCS23CP02**	**Software Lab 2: C++ AND DATA STRUCTURES**	**3**	**2**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic concepts of data structures and C++.	**K1**
CO-2	demonstrate various features of C++ with data structures.	**K2**
CO-3	apply Oop's concepts to solve simple data structure problems.	**K3**
CO-4	examine various data structures using C++ programs.	**K4**
CO-5	determine the importance of data structures to solve real life problems.	**K5**

List of Exercises

1. Classes and Objects
2. Constructors
3. Inheritance
4. Function Overriding and Overloading
5. Operations on array
6. Operations on stack
7. Convert Infix to Postfix and evaluate Postfix using Stack class
8. Operations on Queue
9. Operations on Singly linked list
10. Binary Tree Creation and Traversals
11. Analyze Bubble Sort with number of passes, comparisons and data moves
12. Sequential and Binary Search
13. Merge two sorted data files

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course					Hours				Credits
II	**21UCS23CP02**	**Software Lab 2: C++ AND DATA STRUCTURES**					**3**				**2**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	2	2	2	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	3	3	3	3	1	2	2.5
CO-5	2	3	3	2	2	2	3	3	2	1	2.4
Mean Overall Score											**2.4** (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UCS23AC02**	**ALLIED: MATHEMATICS-II**	**6**	**4**

CO No.	CO-Statements	Cognitive Levels (K-levels)
	On successful completion of this course, students will be able to	
CO-1	acquire knowledge of statistical and numerical methods.	**K1**
CO-2	understand direct and iterative methods of solving problems.	**K2**
CO-3	apply suitable approximation method to evaluate the real life problems.	**K3**
CO-4	analyse the error estimation of the numerical solution with the exact solution	**K4**
CO-5	compare the efficiency of different numerical methods.	**K5**

Unit-I **(18 Hours)**

Averages: Mean, Median, Mode - Measures of variation: Range, Standard deviation (Direct method only)

Unit-II **(18 Hours)**

Measures of Skewness - computation of Karl Pearson's coefficient of skewness - Correlation analysis - types of correlation - Karl Pearson's coefficient of correlation - rank correlation

Unit-III **(18 Hours)**

Curve fitting by least square methods - Fitting a straight line, Parabola and exponential curve - Solving algebraic and transcendental equations - Bisection method – Newton - Raphson method. (Problems only).

Unit-IV **(18Hours)**

Solving simultaneous equations - Gauss elimination method - Gauss-Seidel Method. Interpolation- Newton Gregory forward and backward interpolation formulae Lagrange's Interpolation formula. (Problems only)

Unit-V **(18 Hours)**

Numerical Integration - Trapezoidal rule and Simpson's 1/3rd rule - Solving differential equations (First order differential equation only). Solutions by Taylor's series - Euler's Method- Runge - Kutta 4^{th} order method. (Problems only).

Books for Study:

1. R.S.N. Pillai and Bagavathi, **"Statistics Theory and Practice 7thEdition"**,S. Chand and Company Ltd., New Delhi 2009.

Unit – I*Chapter 9 (Pages 126-139,145-154,166-170,172),*
Chapter 10 (Pages 245,259-268)

Unit – II*Chapter 11 (Pages 341-348) Chapter 12 (Pages 397-410,417-421)*

2. Venkataraman, M. K., **"Numerical Methods in science and Engineering5th Edition"**,

The National Publishing Company, Chennai. 2013

Unit-III *Chapter 1 (Sec: 1.7, 1.8, 1.9), Chapter 3 (Sec 2, 5)*

Unit-IV *Chapter 4 (Sec: 2, 6.2), Chapter 6 (Sec 3, 4) Chapter 8 (Sec: 4)*

Unit-V *Chapter 9 (Sec: 8, 10), Chapter 11 (Sec 6, 10, 16)*

Books for Reference

1. S.C.Gupta and V.K.Kapor, "Fundamentals of Mathematical Statistics",11th edition, Sultan Chand and Sons, 2002.
2. S.S. Sastry, "Introductory methods of Numerical Analysis ",PHI Learning Private ltd, New Delhi 2009
3. P. Kandasamy, K.Thilagavathy, K.Gunavathi, "Numerical methods", S. Chand & company Ltd-2008.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course					Hours				Credits
II	21UCS23AC02	ALLIED: MATHEMATICS-II					6				4
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	2	2	3	2	3	2	2	2.5
CO-2	2	3	3	2	2	2	3	2	2	3	2.4
CO-3	3	1	3	2	2	3	2	2	1	2	2.1
CO-4	3	3	2	2	1	2	3	3	2	3	2.4
CO-5	2	3	3	1	2	3	3	2	2	3	2.4
Mean Overall Score											2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UHE24AE02**	**AECC-2: Environmental Studies**	**2**	**2**

CO No.	CO-Statements	Cognitive Levels (K-levels)
On Completion of this course, the graduates will be able to		
CO-1	Identify the concepts related to the environmental global scenario	**K1**
CO-2	Comprehend the natural resources and environmental organizations	**K2**
CO-3	Analyze the causes and changes in the structure of biodiversity	**K4**
CO-4	Apply the acquired knowledge to sensitize individuals and public about the environmental crisis	**K3**
CO-5	Enhance their skills in the societyby solving the environmental problems and preserving nature by the acquired knowledge	**K6**

Unit I Introduction to Environmental Studies (6 Hours)
Introduction – Scope and Importance – Subsystems of Earth – Various recycling Methods – Environmental Movements in India – Eco- Feminism – Public awareness – Suggestions to conserve environment

Unit II Natural Resources (6 Hours)
Food Resources – Land Resources – Forest resources – Mineral Resources – Water Resources – Energy Resources

Unit III Ecosystems, Biodiversity and Conservation (6 Hours)
General structure of ecosystem - Functions of Ecosystem - Energy flow and Ecological pyramids – Levels of Biodiversity - Hot spots of Biodiversity - Endangered and Endemic Species - Value of Biodiversity - Threats to Biodiversity - Conservation of Biodiversity

Unit IV Environmental Pollution (6 Hours)
Air Pollution – Water Pollution – Oil Pollution – Soil Pollution – Marine Pollution – Noise Pollution - Thermal Pollution – Radiation Pollution

Unit V Environmental Organizations and Treatise (6 Hours)
United Nations Environment Program (UNEP) - International treaties on Environmental protection - Ministry of Environment, Forest and Climate Change - Important National Environmental Acts and rules– Environmental Impact assessment - Issues deals with Population growth.

Books for Study
Department of Foundation Course, *Environmental Studies*, St. Joseph's College, Tiruchirappali-2, 2015.

Books for Reference

Rathor, V.S. and Rathor B. S. *Management of Natural Resources for Sustainable Development*.
New Delhi: Daya Publishing House, 2013.
Sharma P.D,*Ecology and Environment*, 8 ed., Meerut: Rastogi Publications, 2010.
Agrawal, A and C.C. Gibson. *Introduction: The Role of Community in Natural Resource Conservation.* NJ: Rutgers University Press, 2001.

Web Sources:

UNEP- UN Environmental Program, https://www.unep.org/. Accessed 05 Mar. 2021.
The official website of ministry of environment, Forest and Climate change, http://moef.gov.in/en/ Accessed 05 Mar. 2021.
The International Panel on Climate Change, https://www.ipcc.ch/reports/. Accessed 05 Mar. 2021.

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UHE14VE02**	**TECHNIQUES OF SOCIAL ANALYSIS: FUNDAMENTALS OF HUMAN RIGHTS**	**2**	**1**

CO No.	CO - Statements	Cognitive Levels (K- Levels)
	On completion of this course, the graduates will be able to:	
CO-1	identify the importance and the values of human rights	**K1**
CO-2	understand the historical background and the development of Human Rights and the related organizations	**K2**
CO-3	apply the provisions of National and International human rights to themselves and the society	**K3**
CO-4	analyse the violations of human rights to the marginalized section in the society	**K4**
CO-5	animate the people to involve in the struggles and activities of the human rights organizations	**K5**

Unit-I Human Rights - An Introduction (6-Hours)
Introduction- Classification of Human Rights- Scope of Human Rights-Characteristics of Human Rights-NHRC-SHRC- Challenges for Human Rights in the 21stCentury.

Unit-II Historical Development of Human Rights (6-Hours)
Human Rights in Pre-World War Era- Human Rights in Post-World War Era- Evolution of International Human Rights Law - the General Assembly Proclamation- Institution Building, Implementation and the Post- Cold War Period. The ICC.

Unit-III India and Human Rights (6-Hours)
Introduction-Classification of Fundamental Rights-Salient Features of Fundamental Rights- and Fundamental Duties.

Unit-IV Human Rights of Women and Children (6-Hours)
Women's Human Rights- Issues related to women's rights - and Rights of Women's and Children

Unit-V Human Rights Violations and Organizations (6-Hours)
Human Rights Violations - Human Rights Violations in India - the Human Rights Watch Report, January 2012- Human Rights Organizations.

Books for Study
The Department of Human Excellence, *Techniques of Social Analysis: Fundamentals of Human Rights*, St. Joseph's college, Tiruchirappalli -02, 2021.

Books for Reference
1. Venkatachalem. Dr.*The Constitution of India,Salem:Giri Law House,* 2005.

2. NaikVarunand Mukesh Shany. *Human rights education and training*, New Delhi:crescent Publishing Corporation, 2011.
3. BhathokeNeera. *Human Rights content and extent*,New Delhi: swastika publications, 2011.

Web Sources:

https://www.un.org/en/universal-declaration-human-rights/. Accessed 05 Mar. 2021.
https://www.ilo.org/global/lang--en/index.htm. Accessed 05 Mar. 2021.
https://www.amnesty.org/en/. Accessed 05 Mar. 2021.

Semester	Course Code	Title of the Course	Hours	Credits
III	21UTA31GL03	General Tamil - III	4	3

CO No.	CO- Statement	Cognitive Level (K- level)
	இப்பாடத்தின் நிறைவில் மாணவர்கள்	
CO-1	சங்க இலக்கிய வகைகளை நினைவுகூருவர்	K 1
CO-2	இலக்கியத்தினை நுட்பமாக அறிதலின் வழியாக ஆற்றுப்படுத்தும் திறன் பெறுவர்	K 2
CO-3	இலக்கிய அறநெறிகளைத் தற்கால வாழ்வியலில் பயன்படுத்தும் திறன் பெறுவர்	K 3
CO-4	அகம் மற்றும் புற இலக்கியத் திணை, துறைகளைப் பகுத்தாராய்வர்	K 4
CO-5	யாப்பு, அணி இலக்கண நுட்பங்களை இலக்கியங்களில் மதிப்பிடுவர்	K 5

அலகு - 1 **(12 மணிநேரம்)**

பொருநராற்றுப்படை (முழுமையும்)

அலகு - 2 **(12 மணிநேரம்)**

நற்றிணை - 5 பாடல்கள் - (1, 19, 21, 70, 148)
ஐங்குறுநூறு - அன்னாய் வாழிப்பத்து.
யாப்பிலக்கணம் - வெண்பா, ஆசிரியப்பா

அலகு - 3 **(12 மணிநேரம்)**

கலித்தொகை - (குறிஞ்சிக்கலி- 62, பாலைக்கலி -22, மருதக்கலி- 87, நெய்தற்கலி-149, முல்லைக்கலி - 116)
இலக்கிய வரலாறு - முதற்பாகம் ('தமிழ் மொழியின் தொன்மையும் சிறப்பும்' முதல் 'சங்க தொகை நூல்கள்' முடிய),
புதினம் - குடும்ப அட்டை (2022-2023)

அலகு - 4 **(12 மணிநேரம்)**

பதிற்றுப்பத்து - 3 பாடல்கள் (14, 32, 61)
புறநானூறு - 5 பாடல்கள் (95, 121, 130, 204, 279)
அணியிலக்கணம்

அலகு - 5 **(12 மணிநேரம்)**

திருக்குறள் - புறங்கூறாமை, பழமை, புலவி நுணுக்கம் ஆகிய அதிகாரங்கள்
திரிகடுகம் - 5 பாடல்கள் (2, 6, 12, 15, 42)

இலக்கிய வரலாறு - சங்க இலக்கியங்களின் தனித்தன்மைகள் முதல் இரட்டைக் காப்பியங்கள் முடிய

பாடநூல்கள் :

1. **பொதுத்தமிழ்** செய்யுள் திரட்டு, தமிழாய்வுத்துறை வெளியீடு, தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி-2, முதற்பதிப்பு, *2021*
2. **சமூகவியல் நோக்கில் தமிழிலக்கிய வரலாறு,** *தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, பத்தாம் பதிப்பு, 2017*
3. **புதினம்** (ஒவ்வொரு கல்வியாண்டிற்கும் ஒவ்வொரு புதினம்)
   2022 – 2023 கல்வியாண்டுக்கு மட்டும் : வீ.செந்தில் குமார், **குடும்ப அட்டை,** தாமரை பப்ளிகேஷன்ஸ் பிரைவேட் லிமிடெட், சென்னை, முதற்பதிப்பு, *2009*

Relationship Matrix for Course Outcomes, Programme Outcomes, and Programmes Specific Outcomes

Semester	Course Code	Title of the Course					Hours	Credit
III	21UTA31GL03	General Tamil - III					4	3
Course Outcomes (COs)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	3	2	2	3	2	3	2	3	3	2	2.5
CO-2	2	2	2	3	3	2	2	3	3	2	2.4
CO-3	3	3	2	3	3	2	2	3	3	3	2.7
CO-4	3	2	2	3	2	3	2	3	2	3	2.5
CO-5	2	3	2	3	2	3	2	3	2	3	2.5
Mean Overall Score											2.52 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UFR31GL03**	**FRENCH – III**	**4**	**3**

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of this course, students will be able to	
CO–1	relate colours, materials and shapes to the french clothing.	**K1**
CO–2	select appropriate prepositions in giving directions.	**K2**
CO–3	construct a text in present tense using different verbs.	**K3**
CO–4	examine the travel manners and celebrations of the French.	**K4**
CO–5	justify the usage of past tense in a biography.	**K5**

Unit – I **(12 hours)**

TITRE:VIVRE LAVILLE

GRAMMAIRE : la comparaison, les prépositions avec les noms géographiques, les pronoms personnels COI, le pronom y (le lieu)

LEXIQUE : se repérer sur un plan de ville, la ville, les lieux de la ville

PRODUCTION ORALE : demander et indiquer une direction dans un dialogue

PRODUCTION ECRITE : décrire votre ville natale, créez les affiches en appréciant votre ville

Unit - II **(12 hours)**

TITRE:VISITER UNE VILLE

GRAMMAIRE : la position des pronoms compléments, les verbes du premier groupe en – ger et – cer, les verbes ouvrir et accueillir

LEXIQUE : dire les informations sur une ville de votre choix, les transports, les points cardinaux, les prépositions de lieu

PRODUCTION ORALE : Indiquer le chemin

PRODUCTION ECRITE : Demander des renseignements touristiques

Unit - III **(12 hours)**

TITRE:ON VEND OU ON GARDE

GRAMMAIRE : la formation du pluriel, les adjectifs de couleurs, l'adjectif beau, nouveau,vieux

LEXIQUE : savoir comment s'habiller des grandes occasions, les couleurs, les formes, les matériaux

PRODUCTION ORALE : comprendre une présentation de catalogues vestimentaires en France

PRODUCTION ECRITE : adresser des souhaits à quelqu'un

Unit - IV **(12 hours)**

TITRE:VENTES D'AUTREFOIS, VENTES D'AUJOURD'HUI

GRAMMAIRE : les pronoms relatifs qui et que, l'imparfait, les verbes connaitre, écrire, mettre et vendre, la question avec inversion

LEXIQUE : comprendre la description de personnes dans un extrait de roman, les mesures,

l'informatique
PRODUCTION ORALE : imaginez un dialogue avec un personnage célèbre. Utilisez l'inversion.
PRODUCTION ECRITE : écrire une biographie en utilisant les pronoms relatifs

Unit- V **(12 hours)**

TITRE:FELICITATIONS ! / ON VOYAGE!
GRAMMAIRE : les pronoms démonstratifs, les articles : particularités, les pronoms interrogatifs variables : lequel, les adverbes de manières, les verbes recevoir et conduire
LEXIQUE : les moyens de transports, les voyages, les fêtes, l'aéroport et l'avion, la gare et le train, l'hôtel
PRODUCTION ORALE : Présenter ses vœux
PRODUCTION ECRITE : Faire une réservation

Book for Study

P.Dauda,L.Giachino and C.Baracco, *Generation A2*, Didier, Paris 2016.

Books for Reference

1. J.Girardet and J.Pecheur, *EchoA2*, CLE International, 2^{e}edition,2017
2. Régine Mérieux and Yves Loiseau, *Latitudes A2*, Didier, 2012.
3. Isabelle Fournier, *Talk French*, Goyal Publishers, 2011

Web Resources

1. https://francais.lingolia.com/en/grammar/prepositions
2. https://www.lawlessfrench.com/grammar/present-tense/
3. https://www.thoughtco.com/textures-french-adjectives-and-expressions-1368980
4. https://study.com/academy/lesson/past-tense-in-french.html
5. https://absolutely-french.eu/french-celebrations/?lang=en

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course code			Title of the Course				Hours		Credits
III	21UFR31GL03			FRENCH – III				4		3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO–1	2	1	2	2	3	2	3	1	2	3	2.1
CO–2	3	2	3	3	1	2	1	2	2	3	2.2
CO–3	2	1	3	2	2	3	1	3	2	2	2.1
CO–4	3	1	3	2	3	3	3	1	2	3	2.4
CO–5	3	2	3	2	2	3	3	2	2	1	2.3
Mean overall Score											2.22 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UHI31GL03**	**HINDI - III**	**4**	**3**

CO No.	CO–Statements On successful completion of the course, students will be able to	Cognitive Levels (K –Levels)
CO-1	find out the dialects of Hindi language.	**K1**
CO-2	compare the poems of Sumithra Nandanpanth, Prasad & Bachan in Context with their experience of life.	**K2**
CO-3	illustrate the importance given to family ethics by the youth in the modern period according to "Bahoo Ki vidha" One Act play.	**K3**
CO-4	categorize the poetics in some selective poems.	**K4**
CO-5	justify the social & political conditions of Devotional period in Hindi Literature.	**K5**

Unit - I **(12 Hours)**

Tera sneh na khooon
Samband Bodak
Reethikal - Namakarn
Tense

Unit - II **(12 Hours)**

Himadri Thung Sring Se
Paribakshik shabdavali
Samuchaya Bodak
Reethikal - Samajik Paristhithiyam

Unit - III **(12 Hours)**

Insan our Kuthae
Vismayadi Bodak
Reethikal - Sahithyik Paristhithiyam
Reethikal - Salient Features

Unit - IV **(12 Hours)**

Shokgeeth
Avikary shabdh
Reethikal - Main Divisions
Social media and modern world

Unit - V **(12 Hours)**

Reethikal - Visheshathayem
Anuvad – 3
Bahoo ki vidha (one act play)

Books for Study

1. Dr. Sanjeev Kumar Jain, Anuwad: Siddhant Evam Vyavhar, Kailash Pustak Sadan, Madhya Pradesh, 2019.
   Unit-I *Chapter 1*
2. M. Kamathaprasad Gupth, *Hindi Vyakaran*, Anand Prakashan, Kolkatta, 2020.
   Unit-II, III and IV *Chapter 2*
3. Dr. Sadananth Bosalae, *kavya sarang*, Rajkamal Prakashan, New Delhi, 2020.
   Unit-V *Chapter 4*

Books for Reference

1. Ramdev, Vyakaran Pradeep, Hindi Bhavan, 2016.
2. Lakshman prasad singh, Kavya ke sopan, Bharathy Bhavan Prakashan, 2017.
3. Acharya ramchandra shukla, Hindi Sahitya Ka Itihas, Prabhat Prakashan, 2021.
4. Hindi Niband Sangrah,V&S Publishers, 2015.
5. Krishnakumar Gosamy, Anuvad vigyan ki Bhumika, Rajkamal Prakashan, 2016.

Web Resources

1. https://youtu.be/Xxvco3qa284
2. https://youtu.be/e9wK-pYfVPc
3. https://youtu.be/75tHr53f5_o
4. https://youtu.be/eFNM6y_cpjY
5. https://youtu.be/jHWXWLMxJtw

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course					Hours	Credits
III	21UHI31GL03			HINDI - III					4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	3	3	2	3	2	1	3	2	2.4
CO-2	3	2	3	2	2	3	2	3	2	3	2.5
CO-3	3	2	2	3	1	3	2	3	2	3	2.4
CO-4	2	3	3	2	3	2	3	3	2	1	2.4
CO-5	3	2	2	3	3	2	1	3	2	3	2.4
Mean Overall Score											2.42 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	21USA31GL03	SANSKRIT - III	4	3

CO No.	CO–Statements On successful completion of the course, the student will be able to	Cognitive Levels (K –Levels)
CO-1	remember Characters and events of Ramayana.	K1
CO-2	understand social ethics and moral duties.	K2
CO-3	apply the values learnt , in day to day life.	K3
CO-4	analyzing the Vedic Philosophy.	K4
CO-5	evaluate and create new words with upasargas.	K5

Unit - I **(12 Hours)**

Romodantam , Balakandam (1-15)

Unit - II **(12 Hours)**

Romodantam , Balakandam (15-30)

Unit - III **(12 Hours)**

Vedas – Vedangas vivaranam

Unit - IV **(12 Hours)**

Puranas .Upanishands

Unit - V **(12 Hours)**

Upasargas , Bhavishyat Kaalah

Book for Study

VEDIC LITERATURE, 2019

Books for Reference

1. Parameshwara, Ramodantam, LIFCO Chennai 2018
2. R.S.Vadhyar & Sons , Book – sellers and publishers , Kalpathu ,Palghat – 678003 , Kerala , south India , History of Sanskrit Literature 2019
3. Kulapathy , K.M Saral Sanskrit Balabodh , Bharathita vidya bhavan , Munshimarg Mumbai – 400 007 2018

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course					Hours	Credit
III	21USA31GL03			SANSKRIT-III					4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	1	2	2	3	3	3	3	3	2	1	2.3
CO-2	3	3	2	3	3	2	2	3	3	3	2.7
CO-3	3	3	1	3	3	1	1	3	3	3	2.4
CO-4	2	2	1	2	3	2	2	3	2	1	2.0
CO-5	3	3	2	3	2	2	3	3	3	2	2.6
Mean Overall Score											2.4
Result											# High

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UEN32GE03**	**GENERAL ENGLISH - III**	**5**	**3**

CO No.	CO-Statements	Cognitive Levels (K-Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the meaning of familiar words in different contexts	**K1**
CO-2	comprehend the complex written texts by guessing meaning of unfamiliar words using contextual clues	**K2**
CO-3	use tenses and punctuations appropriately in sentences	**K3**
CO-4	analyse formal and informal letters to rewrite them meaningfully	**K4**
CO-5	compare different genres of writing and construct paragraphs	**K5 & K6**

Unit-I **(15 Hours)**

1. Suggestions to Develop Your Reading Habit
2. General Writing Skill: Letter Writing – Informal
3. Grammar: Simple Present Tense

Unit-II **(15 Hours)**

4. The Secret of Success: An Anecdote
5. General Writing Skill: Letter Writing – Formal
6. Grammar: Present Continuous Tense

Unit-III **(15 Hours)**

7. The Impact of Liquor Consumption on the Society
8. General Writing Skill: Letter to Newspaper
9. Grammar: Simple Past Tense

Unit-IV **(15 Hours)**

10. Dr. A.P.J. Abdul Kalam: A Short Biography
11. General Writing Skill: Job Application Letter
12. Grammar: Past Continuous Tense

Unit-V **(15 Hours)**

13. Golden Rule: A Poem
14. General Writing Skill: Circular-Writing
15. Grammar: Simple Future Tense and Future Continuous Tense

Book for Study

Jayraj, S. Joseph Arul et al. *Trend-Setter*: *An Interactive General English Textbook for Undergraduate Students*. Trinity, 2016.

Books for Reference

1. Malkani, Neelam. *A comprehensive Guide on General English for Competitive Exams*. Agra: Oswal Publications, 2020.
2. Jain, B. B. *Compendium General English*. Agra: Upkar Prakashan, 2010.
3. Aggarwal, R.S. *Quick Learning Objective General English*. India: S Chand, 2006.
4. T. Ferrari, Bernard. *Power Listening: Mastering the Most Critical Business Skill of All.* USA: Penguin Publishers, 2012.
5. Barry, Marian. *Steps to Academic Writing*. USA: Cambridge University Press, 2011.

Web Resources

1. https://www.nypl.org/events/classes/english
2. https://www.waywordradio.org/listen/podcast-itunes/?gclid=EAIaIQobChMIrbeRtbP12AIVCYZpCh0-XwnvEAAYAiAAEgLcjvD_BwE
3. https://eltlearningjourneys.com/2015/05/19/websites-for-learning-english/

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester	Course Code			Title of the Course						Hours	Credits
III	21UEN32GE03			GENERAL ENGLISH - III						5	3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	2	3	2	2	3	2	3	2	3	2	2.4
CO-2	2	2	3	2	3	3	2	3	2	2	2.3
CO-3	2	3	2	3	2	2	3	2	3	2	2.4
CO-4	2	2	3	2	3	3	2	3	2	3	2.5
CO-5	2	2	2	3	2	2	2	3	2	2	2.2
									Mean Overall Score		2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS33CC05	CORE – 5 : DISCRETE MATHEMATICS	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define various basic terms in graph theory and discrete mathematical structure	K1
CO-2	summarize various theories in graph theory and discrete mathematical structure	K2
CO-3	solve simple problems in graph theory and discrete mathematical structure	K3
CO-4	analyze and compare various methods in graph theory and discrete mathematical structure	K4
CO-5	explain and solve problems related graph theory, mathematical logic, set theory and Boolean	K5

UNIT- I **(12 Hours)**

Graph: Introduction – paths and circuits – isomorphism – sub graphs- connectedness – Euler graph – operations – Hamiltonian paths and circuits – Traveling Salesman Problem.

UNIT –II **(12 Hours)**

Trees: properties of trees – distance and centers – rooted and binary tree – spanning tree- matrix representations of graph: Incidence matrix – adjacency matrix – graph theoretic algorithms – shortest path between two vertices – shortest path between all pairs.

UNIT- III **(12 Hours)**

Mathematical Logic: statements and notation – connectives – Well-formed formulas – tautologies – equivalence of formulas – duality law – Normal Forms: Disjunctive Normal Forms – Conjunctive Normal Forms- Principal Disjunctive-Principal Conjunctive Normal Forms.

UNIT- IV **(12 hours)**

Basic concepts of set theory – notation – inclusion and equality – power set – operations – Venn Diagrams – identifiers – Cartesian products – relations and ordering – functions – composition – inverse- binary and n-ary operations.

UNIT- V **(12 hours)**

Lattices as partially ordered sets: Definition – properties – special lattices: complete, complemented, distributive lattices – Boolean Algebra - properties of Boolean algebra.

Books for Study

1. Narsing Deo, "*Graph Theory with Applications to Engineering and Computer Science*", Prentice Hall, 2013,
   Unit-I & II *Chapters: 1,2, 3.1-3.7, 7.1, 7.9, 9.1, 9.2, 11.5*
2. J.P.Tremblay, R. Manohar, "Discrete Mathematical Structure with Applications to Computer Science", McGraw-Hill International Edition, 2008.
   Unit -III: *Chapters: 1.1, 1-.2.1 - 1-2.4, 1.2.6 – 1.2.10, 1-3.1-1-3.4.*
   Unit -IV: *Chapters: 2.1.1 – 2.1.6, 2.1.8, 2.1.9, 2.3.1 – 2.3.7, 2.4.1 – 2.4.4*
   Unit -V: *Chapters: 4.1.1, 4.1.2, 4.1.5, 4.2.1*

(Only definition and applications are expected and proof for theorems are not preferred)

Books for Reference

1. Seymour Lipschutz and Mars Lipson, "Discrete Mathematics", Second Edition, Schaum's outline series, Tata McGraw-Hill publishing Company Limited, New Delhi, 1999.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credits**
III	**21UCS33CC05**			**CORE – 5 : DISCRETE MATHEMATICS**					**4**	**3**
Course Outcomes↓	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	**3**	**3**	**3**	**3**	**1**	**3**	**3**	**3**	**2**	**1**	2.5
CO-2	3	3	3	3	1	3	3	3	3	1	2.6
CO-3	3	2	3	3	1	2	2	3	3	1	2.3
CO-4	3	3	3	2	1	3	3	2	3	1	2.4
CO-5	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**3**	**3**	**2**	2.5
Mean Overall Score											**2.46 (**High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UCS33CC06**	**CORE – 6: DATABASE SYSTEMS**	**4**	**2**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic concepts of relational database management system and ER models	**K1**
CO-2	explain the architecture of Hierarchical DBMS and comparison of different Data models	**K2**
CO-3	apply the normalization procedure to design a suitable structure for a given situation	**K3**
CO-4	analyze processing logic in the form of PL/SQL routine like functions, procedures, packages and triggers.	**K4**
CO-5	evaluate and execute SQL queries to interact with the database	**K5**

Unit – I: **(12 hours)**

Introduction: Flat File - Database System - Database - Actionable for DBA. The Entity - Relationship Model: Introduction - The Entity Relationship Model. Data Models: Introduction - Relational Approach.

Unit – II: **(12 hours)**

Normalization: Introduction - Normalization - Definition of Functional Dependence (FD) – Normal Forms: 1NF, 2NF, 3NF and BCNF.

Unit – III: **(12 hours)**

Structured Query Language: Features of SQL - Select SQL Operations - Grouping the Output of the Query - Querying from Multiple Tables - Retrieval Using Set operators - Nested Queries. T-SQL

Unit – IV: **(12 hours)**

Procedural Language- SQL:PL/SQL Block Structure - PL/SQL Tables. Cursor Management and Advanced PL/SQL: Opening and Closing a Cursor - Processing Explicit Cursor - Implicit Cursor - Exception Handlers – Sub Programs in PL/SQL - Functions - Precaution While Using PL/SQL Functions - Stored Procedure –DB Triggers - Object Oriented Technology.

Unit – V: **(12 hours)**

Architecture of a Hierarchical DBMS: Introduction: Architecture-Data Structure of IMS-Hierarchical Sequence-Logical Databases/External View- Data Manipulation Language DL/1-Internal Level of IMS-HISAM. The Architecture of Network based DBTG System: Introduction: DBTG Data Structure-Network Involving Types of Entity-Data Structure and Network involving n Entities. – Network Data Model. Comparison Between Different Data Models: Introduction: Hierarchical Model-Network Model-Relational Model.

Book for Study

1. Rajesh Narang, "Database Management Systems", PHI Learning Private Limited, New Delhi, 2010

Unit-I Chapter 1, Chapter 2, Chapter 3 (Pages: 39-41)
Unit-II Chapter 7(Pages: 92-114)
Unit-III Chapter 8(Pages: 115-147), Chapter 9(Pages:148-177)
Unit – IV Chapter 10(Pages: 178-190), Chapter11 (Pages:191-222)
Unit – V Chapter 18 (Pages:338-345), Chapter 19(Pages:351-357), Chapter 20(Pages:367-369)

Book for Reference

1. James Martin, "Principles of Database Management", Prentice Hall 1976.
2. Abraham Silberschatz, Hendry F. Korth, S Sudharshan,"Database System Concepts", 6th Edition, McGraw Hill International,2019.
3. C.J. Date, "An Introduction to Database Systems" Addison Wesley, 2000

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course					Hours	Credit
III	21UCS33CC06			CORE – 6: DATABASE SYSTEMS					4	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	1	3	3	2	3	2	2.6
CO-2	3	2	3	3	2	2	3	2	3	2	2.5
CO-3	3	3	3	3	1	3	3	3	2	1	2.5
CO-4	3	2	3	3	1	2	2	3	3	1	2.3
CO-5	3	3	3	2	1	3	3	3	2	1	2.4
Mean Overall Score											2.46 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS33CP03	Lab 3: Hardware	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the application of combinational circuits, 8085 ALP and IoT	K1
CO-2	understand the techniques of logic circuits, 8085 ALP and IoT	K2
CO-3	apply the concepts of combinational circuits, 8085 ALP and IoT for various applications	K3
CO-4	analyze the impact of digital experiments, 8085 ALP and IoT.	K4
CO-5	evaluate the usage of combinational circuits, 8085 ALP and IoT for various real time applications	K5

List of Experiments

1. Design of Basic Logic Gates using Universal Gates (NAND, NOR)
2. Design of Half and Full Adders and Subtractors
3. Design of Multiplexers, De-Multiplexers, Encoders and Decoders
4. Verify the truth table of one bit and two bit comparators
5. Verify Binary to Gray and Gray to Binary conversion using NAND gates.
6. Design of Flip-Flops
7. 8085 Microprogramming – 1
8. 8085 Microprogramming – 2
9. 8085 Microprogramming - 3
10. IoT Experiment – 1
11. IoT Experiment – 2
12. IoT Experiment – 3

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	21UCS33CP03	Lab 3: Hardware	3	2

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	1	2	3	3	3	1	1	2.2
CO-2	3	3	3	2	1	3	3	3	2	1	2.4
CO-3	2	3	3	2	2	3	3	3	1	1	2.3
CO-4	3	3	3	1	1	3	3	3	1	1	2.2
CO-5	3	3	3	1	1	3	3	3	2	1	2.3
Mean Overall Score											2.28 (High)

Semester	Course Code	Title of the Course	Hours	Credit
III	**21UCS33AO03A**	**ALLIED: APPLIED PHYSICS – I**	**4**	**3**

(Offered to Department of Computer Science)

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On the successful completion of the course, student will be able to:	
CO-1	Acquire Basic knowledge and Understand the concepts of Electrostatics, Electromagnetic induction, Magnetic properties, LASER and Opticalfibre.	**K1, K2**
CO-2	Apply and Analyse problems on Electrostatics and Electromagnetic induction with moderate complexity by adopting the basic concepts	**K3, K4**
CO-3	Apply and Solve different problems using mathematical methods involving vectors, differential and integral calculus.	**K3**
CO-4	Account the importance of LASER and Optical Fibre in society especially on technological applications.	**K4**
CO-5	Understand and Explain the concepts and methods related to sustainable development and various components of environment	**K2, K3**

UNIT - I: ELECTROSTATICS (12 Hours)

Electric charge: Its elemental unit, its quantization and conservation - point charges and charges at rest - charge distributions - Coulomb's law - Electric Field - Electric dipole: Dipole moment - Electric field due to a dipole - Lines of force - lines of force of the electric field of a point charge - current - direction of a current - current density - equation of continuity - electromotive force - resistance - Ohm's law - electrical resistivity - combination of resistance - star delta transformation - Definition of electrostatic potential - potential difference - potential due to a point charge - Potentiometer - uses of potentiometer - Capacitance and its units - the two-body system: the capacitor - calculation of capacitance - types of capacitors - uses of the capacitor

UNIT - II: ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS (12 Hours)

Biot and Savart law and its application - field on the axis of the coil - magnetic field due to a solenoid - characteristics of the magnetic field of a solenoid - force on a moving charged particle in a magnetic field definition of B - Lorentz force - magnetic field intensity - Hall effect - Electromagnetic induction - faraday's law - Lenz's law - Fleming right hand rule - induced current and charge - self-induction of a long straight solenoid - mutual inductance - Alternating current: Alternating currents - sinusoidal alternating voltages and current - basic definition - the effective or RMS value - The transformers

UNIT - III: MAGNETIC PROPERTIES AND MAGNETIC CIRCUITS (12 Hours)

Magnetization - Magnetic susceptibility and relative permeability - classification of magnetic materials - properties - energy loss due to hysteresis - magnetomotive force - the value of the

reluctance - comparison of electric and magnetic circuits - Applications of the concepts of magnetic circuits

UNIT - IV: LASERS AND HOLOGRAPHY (12 Hours)

Properties - Induced absorption, spontaneous emission and stimulated emission - Principle of Laser - Population inversion - pumping - Ruby Laser - He-Ne Laser- Semiconductor Laser - Carbon di oxide Laser - dye laser - Nd:YAG Laser - Argon Ion Laser - Free electron Laser - Applications of Laser - Holography - Principle - Applications of Holography.

UNIT - V: FIBRE OPTICS (12 Hours)

Fibre construction - light propagation in fibre - Communication system - advantages - Graded index fibre - single mode fibres - fibre opticsensor - fibre materials - single mode fibres - multimode step index fibres - multimode graded index fibre - comparison - plastic clad fibres - all plastic fibres - Optical fibres as an opticalwave guide - propagation modes in single mode fibres - monomode and multimode step index fibres - attenuation on optical fibres - Analog and Digital fibre communication system.

Books for Study

1. D.L. Sehgal, K.L. Chopra and N.K. Sehgal, Electricity and Magnetism, 6th Edition, Sultan Chand & Sons, 2004.
2. R. Murugeshan and KiruthigaSivaprasath, Optics and Spectroscopy, 9th Edition, S. Chand & Company Ltd., 2016.

UNIT	BOOK	CHAPTER	SECTION
I	1	3, 4, 5, 6, 12 & 15	3.6, 3.8, 3.9, 3.10, 4.2, 4.4, 4.9, 4.11, 4.14, 4.15,
			12.1, 12.2, 12.3, 12.4, 12.5, 12.6,
			12.8, 12.9, 12.13, 5.4, 5.5, 5.6, 5.10, 15.9, 15.10, 6.7-6.10, 6.13, 6.14
II	1	13, 19 & 21	13.3, 13.8-13.10, 13.19-13.21, 13.23,
			19.3-19.5, 19.17, 19.9, 19.22,
			21.2, 21.3, 21.4, 21.6, 21.31
III	1	24 & 25	24.3, 24.6, 24.8, 24.9, 24.16, 25.2, 25.3,
			25.4, 25.5
IV	2	5, 9, 12, 23 & 46	23.8, 5.13-5.19, 46.10, 12.1, 12.2,
			12.5, 9.1, 9.3
V	2	8, 42, 43, 44 & 46	8.2, 8.3, 8.5, 8.6, 8.8, 8.9, 8.10,
			42.1, 42.3-42.8,
			43.1, 43.11, 43.12, 44.1, 46.1, 46.4

BOOK FOR REFERENCE

1. K. K. Tewari, Electricity and magnetism, Revised Edition S. Chand & Co Ltd., New Delhi, Reprint 2003.
2. Introduction to electrodynamics David J Griffiths, 3rd Edition, Prentice Hall of India Pvt. Ltd., New Delhi.
3. Fundamentals of Physics, David Halliday, Robert Resnick and Jearl Walker, 10th Edition, Wiley 2015.

WEB RESOURCES*

1. https://nptel.ac.in/courses/122/101/122101002/
2. https://nptel.ac.in/courses/108/104/108104087/
3. https://physics.iitd.ac.in/assets/uploads/teaching-labs/Study_of_EMI.pdf
4. https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cy13/
5. https://nptel.ac.in/courses/108/106/108106167/

(* subject to availability - not to be used for exam purpose)

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
III	21UCS33AO03A	ALLIED: APPLIED PHYSICS – I	4	4

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	3	1	3	3	3	2	1	2.3
CO-2	3	3	2	2	1	3	3	2	2	1	2.2
CO-3	3	3	2	2	1	3	3	3	2	1	2.3
CO-4	3	3	2	2	1	3	3	3	2	1	2.3
CO-5	3	2	2	2	1	3	3	3	2	1	2.2
Mean Overall Score											2.26
Result											High

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS33AO03B	Allied-II PRINCIPLES OF ELECTRONICS	4	3

CO No.	CO statements	Cognitive Levels (K- levels)
	On completion of this course, students would be able to	
CO-1	Classify and interpret the semiconductor devices	K2
CO-2	Demonstrate and analyze the functionalities of various Electronic circuits	K3
CO-3	Distinguish and evaluate various sensors	K4
CO-4	Compare and estimate the operations of integrated sensors	K5
CO-5	Design and develop Electronic circuits for different applications	K6

UNIT I: SEMICONDUCTOR DEVICES (12 Hours)

Introduction to semiconductor devices-diode-Bipolar Junction Transistor- Field effect Transistor-Applications-Metal oxide Semiconductor - Enhancement mode- Depletion mode-MOSFET -Silicon controlled Rectifier- Laser diode- Photo diode-Optocoupler-Applications.

UNIT II: ELECTRONIC CIRCUITS (12 Hours)

Introduction to Linear Power supply- Voltage regulators-Relays-types-switching applications using relay-solid state relay - Opto-SCR and Opto-triac based switching for high power applications-Switch mode power supply-Block diagram-Applications- UPS - Capacitive power supply.

UNIT III: SENSORS (12 Hours)

Sensors and Transducers - Transducers-Resistive transducers-capacitive transducers-Inductive transducers- LVDT principle and applications. Measurement of non electrical quantity: humidity-flow rate-pH –pressure-thermal conductivity.

UNIT IV: INTEGRATED SENSORS (12 Hours)

Basic sensor signal conditioning networks for interfacing with PC- Integrated sensors overview- temperature module based on LM35-Hall effect sensor module-TSOP17 photo module-MOC 3042 opto-isolator module-kmz51 magnetic field module- ICM105A VGA CMOS sensor-MPXV5004G pressure sensor- 3 axis accelerometer module: MPU 6050 IMU sensor-wearable sensors.

UNIT V: PSPICE SIMULATION FOR ANALOG CIRCUITS (12 Hours)

Introduction to PSPICE-small circuit simulation-circuit examples for worst case design-DC sweep -plotting output-Sources and polynomially controlled sources- Transfer function analysis (one example).

Book for study

1. Albert Malvino, David Bates and Patrick Hoppe, "Electronic Principles" 9th edition ,2015
2. N. Mathivanan, "PC-BASED INSTRUMENTATION: CONCEPTS AND PRACTICE" 2007
3. Paul W. Tuinenga"SPICE- A guide to circuit simulation and Analysis using PSPICE" 2015.
4. Material Prepared by the Department.

Book(s) for Reference

1. Allen Mottershead, “Electronic Devices and Circuits: An Introduction” 1979.
2. Ian Sinclair, “Sensors and Transducers”2000.
3. Rahid, “Introduction to Pspice Using Orcad for Circuits and Electronics”,2005

Unit	Book	Chapter	Sections
I	1	3,5,6,12	3.1,6.1,6.2,6.3,12.1,12.3,12.4,13.2,5.9
II	1,4	22	22.1,22.7
III	2	3	3.1.3,3.2.2,3.3,3.4,3.5
IV	2,4	3,4	3.1.4, Material prepared by the department
V	3,4	1,2,3,5,6	1.1,1.2.2.1-2.4,3.3,5.1,5.6,5.7

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UCS33AO03B**	**Allied-II PRINCIPLES OF ELECTRONICS**	**4**	**3**

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO 1	**2**	**2**	**1**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**2.1**
CO 2	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**2**	**2**	**2.6**
CO 3	**2**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**2**	**3**	**2.4**
CO 4	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**2**	**2**	**3**	**2.6**
CO 5	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**2**	**2**	**3**	**2.6**
										Mean Overall Score	**2.5**
										Result	**High**

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UCS34SE01**	**SEC -1 (WD): RDBMS**	**2**	**1**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basics of SQL and PL/SQL.	**K1**
CO-2	classify and demonstrate SQL and PL/SQL to manipulate data.	**K2**
CO-3	construct solutions to solve simple problems in database.	**K3**
CO-4	examine the use of queries/ blocks for handling the data in database.	**K4**
CO-5	criticize and develop procedures/ queries to interact with database.	**K5, K6**

List of Exercises

SQL

1. Table Creation, Data Insertion, Deletion, Updating and Selection.
2. DML: Operators (Arithmetic, Relational, Logical)
3. SQL Functions: Single Row Function & Group Functions
4. DML: Set operations, Join operations
5. Nested Queries
6. Creation and manipulation of Views.

PL/SQL

7. PL/SQL- block
8. Cursors
9. Functions & Procedures
10. Triggers and Packages

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credits
III	**21UCS34SE01**			**SEC -1 (WD):RDBMS**				**2**		**1**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	2	2	2	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	3	3	3	3	1	2	2.5
CO-5	2	3	3	2	2	2	3	3	2	1	2.4
Mean Overall Score											**2.4** (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	21UHE24VE03A	PROFESSIONAL ETHICS–I: SOCIAL ETHICS - I	2	1

CO No.	Co- Statements	Cognitive Levels (K- Levels)
	On completion of this course the graduates will be able to	
CO-1	know the responsibility of the educated youth.	K1
CO-2	understand the values prescribed under social ethics.	K2
CO-3	apply their minds critically to the various types of cyber crime.	K3
CO-4	analyse the various kinds of political systems.	K4
CO-5	analyse the behaviour of the elected representatives.	K4

Unit-I Introduction to Social Ethics (6-Hours)

Introduction to social ethics and social responsibility, important role of Social ethics on the various areas, religion influences social changes - secularism. Social ethics and corporate dynamics, forms of social ethics.

Unit-II The Economic and Political System of Today (6-Hours)

Planned economy and communism – market economy and capitalism- socialism - mixed economy -the emerging market economy - political system- totalitarian system- oligarchic system.

Unit-III Integrity in Public Life National Integration (6-Hours)

What is Integrity, Public Life, Integrity and Public Life, Integrity in a Democratic State, India as Democratic State, Behavior of a elected representative of India , Noticeable degradation acts of elected Representatives, Suggestions to stem this rot, Types of integrity, Transparency can be a guarantee for integrity.

Unit-IV Cyber Crime (6-Hours)

Business Ethics, Business ethics permeates the whole organization, Measuring business ethics , The Vital factors highlighting the importance of business ethics , Cyber crime, Strategies in committing Cyber Crimes, Factors aiding Cyber Crime, computer Hacking, Cyber Bullying, Telecommunications piracy, Counter Measures to Cyber Crime, Ethical Hacking.

Unit-V Social Integration (6-Hours)

Global challenges, The future is with the Educational Youth, Cost of the Sacrifice, Crusaders against corruption, Responsibility of the Educated Youth, Positive Global Scenario, Right to Education, Eradicating gender inequality, Sustainable Human Development , Social Integration, Elimination Crime, Integration with Global Market

Books for Study

Department of Human Excellence, *Formation of Youth*, St Joseph's College(Autonomous), Tiruchirappali -02, 2021

Books for Reference

1. Ramesh K. Arora, *Ethics, Integrity and Values* by Public Service Paperback ,– 1 January 2014
2. Cunningham, D. *There's something happening here: The new left, the Klan, and FBI counterintelligence*. Berkeley: University of California Press, 2004.
3. Adv. Prashant Mali, *Cyber law & Cyber Crimes simplified* by Cyber Info media Paperback – 1 January 2017.
4. Matthew Richardson, *Cyber Crime: Law and Practice Hardcover – Import*, Wildy publications, 29 November 2019

Web Sources:

https://cybercrime.gov.in/
https://open.lib.umn.edu/sociology/chapter/14-2-types-of-political-systems/
https://www.esv.org/resources/esv-global-study-bible/social-ethics/
https://en.wikipedia.org/wiki/Political_system

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UHE34VE03B**	**PROFESSIONAL ETHICS I: RELIGIOUS DOCTRINE- I**	**2**	**1**

CO No.	Co – Statements	Cognitive Levels (K- Levels)
	On completion of this course, the graduates will be able to:	
CO-1	understand the history of the Catholic Church	**K1**
CO-2	examine and grasp the Sacraments of the Catholic Church	**K2**
CO-3	apply the Christian Prayer to their everyday life	**K3**
CO-4	analyze themselves in the light of Sacraments & Christian Prayer	**K4**
CO-5	create a harmonious society learning values from all religions	**K5 & K6**

Unit-I	**God of salvation**	**(6 Hours)**
Unit-II	**Life & Mission of Jesus Christ**	**(6 Hours)**
Unit-III	**The Holy Spirit**	**(6 Hours)**
Unit-IV	**Biblical Values**	**(6 Hours)**
Unit-V	**Mother Mary**	**(6 Hours)**

Books for Study

Department of Human Excellence, *Life in the Lord: Religious Doctrine.* St. Joseph's College, Trichirappalli-02, 2021.

Books for Reference

1. *Compendium: Catechism of the Catholic Church.* Bengaluru: Theological Publications in India, 1994.
2. Holy Bible (NRSV).

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UTA41GL04B	Scientific Tamil (SBS, SPS,SCS)	4	3

CO No.	CO- Statement	Cognitive Level (K- level)
இப்பாடத்தின் நிறைவில் மாணவர்கள்		
CO-1	பண்டைத் தமிழர்களின் அறிவியலறிவை அறிந்துகொள்வர்.	K 1
CO-2	பண்டைத் தமிழிலக்கியங்களுள் காணலாகும் அறிவியல் சிந்தனைகளைப் புரிந்துகொள்வர்.	K 2
CO-3	தமிழரின் அறிவியல் மருத்துவத்தையும், நீர் மேலாண்மை அறிவையும் அறிந்துகொள்வர்.	K 3
CO-4	இக்கால இலக்கியங்களுள் அறிவியல்துறை பெற்றுள்ள செல்வாக்கை அறிந்துகொள்வர்.	K 4
CO-5	அறிவியல் கலைச்சொற்களைத் தமிழில் கற்றுக் கொண்டு அறிவியல் தமிழ் வளரத் துணைபுரிவர்.	K 5

அலகு – 1 **(12 மணிநேரம்)**

தொல்காப்பியம் :

நிலம் தீ நீர் வளி விசும்போடு (தொல்.பொருள் 635)

ஒன்றறிவதுவே (தொல்.பொருள் 571)

புறநானூறு

மண் திணிந்த நிலனும் (புறம்.2)

செஞ்ஞா யிற்றுச் செலவும் (புறம். 30)

அகநானூறு

அம்ம வாழி, தோழி (அகம்.141)

பதிற்றுப்பத்து

நிலம் நீர் வளி விசும்பு என்ற நான்கின் (பதிற்று.14)

நெடுவயின் ஒளிறு மின்னுப் பரந்தாங்கு (பதிற்று.24)

உரைநடைக்கட்டுரை : வியக்க வைக்கும் தமிழரின் அறிவியல்

அலகு- 2 **(12 மணிநேரம்)**

சித்தர் பாடல்கள்

பதார்த்த குண சிந்தாமணி

குளத்து சலந்தானே கொடிதான (27)

ஏரிசலம் வாதமிகு மதுவே (31)

அருவிநீர் மேக மகற்றுங் *(39)*

மேவிய சீவன் வடிவது சொல்லிடில் *(திருமூலர்)*

அணுவில் அணுவினை ஆதிபிரானை *(திருமூலர்)*
நட்டகல்லைத் தெய்வமென்று *(சிவவாக்கியர்)*
உரைநடைக்கட்டுரை: தமிழர்களின் மருத்துவ அறிவியல்

அலகு - 3 **(12 மணிநேரம்)**

திருக்குறள் *(2 அதிகாரங்கள்)*

வான் சிறப்பு, மருந்து

வலைப்பூக்கள் உருவாக்கல், பராமரித்தல்

புதிய அறிவியல் கலைச்சொல்லாக்கங்களை உருவாக்குதல்

உரைநடைக்கட்டுரை: தமிழ் இலக்கியங்களில் நீர் மேலாண்மையியல்

அலகு- 4 **(12 மணிநேரம்)**

புதினம்: சொர்க்கத்தீவு – சுஜாதா

நூல் - திறனாய்வு

அறிவியல் புனைவு ஆவணப்படம், திரைப்படம் - திறனாய்வு

உரைநடைக்கட்டுரை: தமிழில் அறிவியல் புனைவுகள்

அலகு - 5 **(12 மணிநேரம்)**

அறிவியல் கலைச்சொற்கள்

அன்றாட வாழ்வில் அறிவியல் பழமொழிகளைத் தொகுத்தல்

மூலிகைகள், கீரைகள் ஆகியவற்றின் முக்கியத்துவத்தைக் காட்சிப்படுத்துதல்.

தமிழர் அறிவியல் கண்காட்சி நடத்துதல்

உரைநடைக்கட்டுரை: அறிவியல் தமிழின் வளர்ச்சி நிலைகள்

பாட நூல்கள்

1. **அறிவியல் தமிழ்**, தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, முதற்பதிப்பு, *2022*
2. சுஜாதா, **சொர்க்கத்தீவு,** விசா பப்ளிகேஷன்ஸ், சென்னை-*17*, ஒன்பதாம் பதிப்பு, *2009*
3. மூர்த்தி அ.கி., **அறிவியல் அகராதி,** மணிவாசகர் பதிப்பகம், சென்னை, *2001*

பார்வை நூல்கள்

1. குழந்தைசாமி.வா.செ., **அறிவியல்தமிழ்,** பாரதி பதிப்பகம், சென்னை-*17*, 6ஆம்பதிப்பு, *2001*
2. நெடுஞ்செழியன், **இன்னும் மீதமிருக்கிறது நம்பிக்கை,** பூவுலகின் நண்பர்கள் வெளியீடு, சென்னை, முதற்பதிப்பு, *2017*

3. பரிமேலழகர்(உரை.), **திருக்குறள்,** பாரதி பதிப்பகம், சென்னை-17, ஏழாவது பதிப்பு, *2000.*
4. வையாபுரிப்பிள்ளை, **பாட்டும் தொகையும்,** பாரி நிலையம், சென்னை, இரண்டாம் பதிப்பு, *1967.*

Relationship Matrix for Course Outcomes, Programme Outcomes, and Programmes Specific Outcomes

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UTA41GL04B	Scientific Tamil (SBS, SPS,SCS)	4	3

Course Outcomes (COs)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	
CO-1	1	2	3	2	2	3	3	2	2	2	2.2
CO-2	2	2	3	2	2	2	3	2	3	2	2.3
CO-3	1	2	2	3	2	2	2	3	3	3	2.3
CO-4	2	2	3	2	2	3	2	3	3	2	2.4
CO-5	3	1	2	2	2	2	3	2	3	3	2.3
Mean Overall Score											2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	**21UFR41GL04**	**FRENCH – IV**	**4**	**3**

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of this course, students will be able to	
CO–1	recall the vocabulary pertaining to dwelling place.	**K1**
CO–2	outline crisis management in France.	**K2**
CO–3	develop a travel diary of your own.	**K3**
CO–4	simplify the French education system.	**K4**
CO–5	interpret past tenses in a text.	**K5**

Unit- I **(12 hours)**

TITRE:ON FAIT LE MELANGE!
GRAMMAIRE : le présent progressif, les pronoms possessifs, la phrase négative
LEXIQUE : décrire les étapes d'une action, la maison, les taches ménagères
PRODUCTION ORALE : comprendre le récit d'un voyage
PRODUCTION ECRITE : raconter ses actions quotidiennes

Unit - II **(12 hours)**

TITRE:A PROPOS DE LOGEMENT
GRAMMAIRE : quelques adjectifs et pronoms indéfinis, les verbes lire, rompre et se plaindre
LEXIQUE : la localisation et le logement, les pièces, meubles et équipement
PRODUCTION ORALE : jeu de rôle –votre ami et vous s'installe dans un nouveau meuble
PRODUCTION ECRITE : décrire votre maison/appartement

Unit- III **(12 hours)**

TITRE:TOUS EN FORME!
GRAMMAIRE : le passé composé et l'imparfait, le passé récent, l'expression de la durée
LEXIQUE : un souvenir et les évènements du passées, le corps humain : extérieur, le corps humain : intérieur
PRODUCTION ORALE : échanger sur ses projets de vacances
PRODUCTION ECRITE : raconter un souvenir

Unit - IV **(12 hours)**

TITRE:ACCIDENTS ET CATASTROPHES
GRAMMAIRE : les adjectifs et les pronoms indéfinis : rien/ personne/aucun, les verbes dire, courir et mourir
LEXIQUE : savoir les mots et les expressions des catastrophes naturelles, les maladies et les remédies, les accidents, les catastrophes naturelles
PRODUCTION ORALE : comprendre des personnes qui expriment leur accord ou leur désaccord selon un thème donné
PRODUCTION ECRITE : écrivez sur une catastrophe naturelle en articulant la cause et la conséquence

Unit -V **(12 hours)**

TITRE:FAIRE SES ETUDES A L'ETRANGER/ BON VOYAGE/ LA METEO
GRAMMAIRE : les pronoms démonstratifs neutres, le futur simple, situer dans le temps, moi aussi/non-plus – moi non/si, les verbes impersonnels, les verbes croire, suivre et pleuvoir
LEXIQUE : savoir vivre en France, le système scolaire, les formalités pour partir à l'étranger.
PRODUCTION ORALE : exprimer son opinion sur la météo/parler del'avenir
PRODUCTION ECRITE: comparer le système scolaire français et indien

Book for Study

P.Dauda,L.Giachino and C.Baracco, *Generation A2*, Didier, Paris 2016.

Books for Reference

1. J.Girardet and J.Pecheur, *Echo A2*, CLE International, 2^{e}edition,2013
2. Régine Mérieux and Yves Loiseau, *Latitudes A2*, Didier, 2012.
3. Isabelle Fournier, *Talk French*, Goyal Publishers,2011

Web Resources

1. https://www.frenchcourses-paris.com/french-travel-journal/
2. http://www.saberfrances.com.ar/vocabulary/house.html
3. https://www.thoughtco.com/different-past-tenses-in-french-1368902
4. https://www.youtube.com/watch?v=JZdwJM7sEY8
5. https://www.scholaro.com/pro/Countries/France/Education-System

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course code			Title of the Course				Hours		Credits
IV	21UFR41GL04			FRENCH – IV				4		3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO–1	3	1	3	2	2	3	2	1	2	2	2.1
CO–2	3	1	2	3	3	3	2	1	3	1	2.2
CO–3	3	2	3	2	2	3	2	1	3	2	2.3
CO–4	3	1	2	2	3	3	3	1	3	3	2.4
CO–5	2	2	3	3	1	3	1	2	3	2	2.2
Mean overall Score											2.24 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UHI41GL04	HINDI - IV	4	3

CO No.	CO–Statements On successful completion of the course, students will be able to	Cognitive Levels (K –Levels)
CO-1	list out the social conditions prevailed in Modern Period which are depicted in Hindi Literature.	K1
CO-2	discuss the dialects of Hindi language.	K2
CO-3	illustrate the works of some eminent Hindi Writers related to society.	K3
CO-4	analyze the human values expressed in life and literature of Hindi Novelist “Mamatha Kaliyah”.	K4
CO-5	evaluate the film & Literary works in Hindi.	K5

Unit - I **(12 Hours)**

Computer ka yug
Prathyay
Adhunik Kal - Namakarn
Namakaran

Unit - II **(12 Hours)**

Vigyan hani/labh
Paryayvachy Shabdh
Adhunik Kal - Samajik Paristhithiyam
Samanarthy Shabdh

Unit - III **(12 Hours)**

Nari shiksha
Upasarg
Adhunik Kal – Sahithyik Paristhithiyam
Adhunik kal – Salient Features

Unit - IV **(12 Hours)**

Review- Book/Film
Paryavaran Pradookshan
Adhunik Kal - Main Divisions
Adhunik Kal - Visheshathayem

Unit - V **(12 Hours)**

Sapnom Kee Home Delivery (Novel)
Anuvad - 4

Books for Study

1. Dr. Sadananth Bosalae, *kavya sarang*, Rajkamal Prakashan, New Delhi, 2020. **Unit-I** *Chapters 4*
2. M. Kamathaprasad Gupth, *Hindi Vyakaran*, Anand Prakashan, Kolkatta, 2020. **Unit-II, III and IV** *Chapter 2*
3. Dr. Sanjeev Kumar Jain, *Anuwad: Siddhant Evam Vyavhar*, Kailash Pustak Sadan, MadhyaPradesh,2019 **Unit-V** *Chapter 2*

Books for Reference

1. Hindi Niband Sangrah,V&S Publishers, 2015.
2. Rajeswar Prasad Chaturvedi, Hindi vyakarana, Upakar prakashan,2015.
3. Ramdev,Vyakaran Pradeep, Hindi Bhavan, 2016.
4. Krishnakumar Gosamy, Anuvad vigyan ki Bhumika, Rajkamal Prakashan, 2016.
5. Acharya ramchandra shukla, Hindi Sahitya Ka Itihas, Prabhat Prakashan, 2021.

Web Resources

1. https://youtu.be/xmr-DaQ3LhA
2. https://youtu.be/xIm-VEmgEg0
3. https://youtu.be/ZHuqxWbMtas
4. https://youtu.be/HGS63OJuHto
5. https://youtu.be/r-i3autqPug

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course						Hours	Credits
IV	21UHI41GL04			HINDI - IV						4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	3	2	3	2	3	1	2.4
CO-2	3	2	3	3	2	3	2	3	1	2	2.4
CO-3	3	2	2	3	2	2	1	3	2	3	2.3
CO-4	3	2	3	1	3	3	2	3	3	2	2.5
CO-5	3	2	2	3	3	2	3	2	3	3	2.6
									Mean Overall Score		2.44 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21USA41GL04	SANSKRIT - IV	4	3

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of the course, the student will be able to	
CO-1	remember and identifying Mahabharatha characters and events.	K1
CO-2	understand human behaviors by studying dramas.	K2
CO-3	apply the morals learnt in day to day life.	K3
CO-4	create new conversational sentences and to Improve self-character (Personality Development).	K4
CO-5	appreciate ancient Sanskrit dramas.	K5

Unit - I **(12 Hours)**

Samskrita Vyavahara sahasri vakiya Prayogaha

Unit - II **(12 Hours)**

Lot Lakaarah , Prqayaogh Kartari Vaakyaani

Unit - III **(12 Hours)**

Naatakasya Itihaasah Vivaranam, Thuva and Tum Prathiyaha

Unit - IV **(12 Hours)**

Karnabhaaram , Naatakasya Visistyam

Unit - V **(12 Hours)**

Samskrita Rachanani priyogaha

Book for Study

Karnabhavam & Literature Language, 2019 , K.M Saral Sanskrit Balabodh , Bharathita vidya bhavan , Munshimarg Mumbai – 400 007

Books for Reference

1. R.S.Vadhyar & Sons , Book – sellers and publishers , Kalpathu ,Palghat – 678003 , Kerala , south India , History of Sanskrit Literature 2019
2. Kulapathy , K.M Saral Sanskrit Balabodh , Bharathita vidya bhavan , Munshimarg Mumbai – 400 007 2018
3. Samskrita Bharathi , Aksharam 8 th cross , 2nd phase Giri nagar Bangalore Vadatu sanskritam – Samaskara Binduhu 2019

Relationship matrix for Course outcomes, Programme outcomes /Programme Specific Outcomes

Semester	Course Code			Title of the Course				Hours		Credit
IV	21USA41GL04			SANSKRIT-IV				4		3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)				Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	2	2	3	2	3	2	3	3	2	2.5
CO-2	2	2	3	2	3	3	3	3	3	2	2.4
CO-3	3	3	2	3	2	1	1	3	3	3	2.4
CO-4	2	3	3	3	2	1	3	3	3	2	2.5
CO-5	2	2	3	2	3	3	3	3	2	3	2.6
Mean Overall Score											2.48
Result											# High

Semester	Course Code	Title of the Course	Hours	Credits
IV	**21UEN42GE04**	**GENERAL ENGLISH - IV**	**5**	**3**

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	identify different local and global issues in given passages	**K1**
CO-2	understand explicit and implicit information given in written texts	**K2**
CO-3	use appropriate words and punctuations in writing	**K3**
CO-4	analyse written texts and modify them for better clarity	**K4**
CO-5	assess the coherence and cohesion of written texts and rewrite them	**K5 & K6**

Unit-I **(15 Hours)**

1. Women through the Eyes of Media
2. General Writing Skill: Writing Minutes of a Meeting
3. Grammar: Present Perfect Tense

Unit-II **(15 Hours)**

4. Effects of Tobacco Smoking
5. General Writing Skill: Note-Taking
6. Grammar: Present Perfect Continuous Tense

Unit-III **(15 Hours)**

7. Short Message Service (SMS)
8. General Writing Skill: Note-Making
9. Grammar: Past Perfect Tense

Unit-IV **(15 Hours)**

10. An Engineer Kills Self as Crow Sat on his Head: A Newspaper Report
11. General Writing Skill: Précis Writing
12. Grammar: Past Perfect Continuous Tense

Unit-V **(15 Hours)**

13. Traffic Rules
14. General Writing Skill: Paragraph Writing
15. Grammar: Future Perfect Tense and Future Perfect Continuous Tense

Book for Study

Jayraj, S. Joseph Arul et al. *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*. Trinity, 2016.

Books for Reference

1. Clark Peter, Roy. *Writing Tools: 50 Essential Strategies for Every writer*. USA: Little, Brown Spark Publishers, 2008.
2. Carnegie, Dale. *The Quick and Easy Way to Effective Speaking*. India: Fingerprint Publishers, 2018.
3. Vaughn, Steck. *Reading Comprehension*. USA: Steck-Vaughn Co, 2014.
4. Birkett, Julian. *Word Power: A Guide to Creative writing*. India: Bloomsburry Acdemic, 2016.
5. Knight, Dudley. *Speaking with Skill: An Introduction to Knight-Thompson Speechwork*. USA: Methuen Drama, 2016.

Web Resources

1. https://blog.lingoda.com/en/10-news-sites-to-practice-your-english-reading-skills/
2. https://www.espressoenglish.net/how-to-learn-english-for-free-50-websites-for-free-english-lessons/
3. https://www.ef.com/wwen/english-resources/

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester	Course Code			Title of the Course						Hours	Credits
IV	21UEN42GE04			GENERAL ENGLISH - IV						5	3
Course Outcome (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	3	2	3	2	3	2	2.4
CO-2	2	2	3	2	3	3	2	3	2	2	2.3
CO-3	2	3	2	3	2	2	3	2	3	2	2.4
CO-4	2	2	3	2	3	3	2	3	2	3	2.5
CO-5	2	2	2	3	2	2	2	3	2	2	2.2
										Mean Overall Score	2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43CC07	CORE - 7 : OPERATIONS RESEARCH	4	3

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	recall the basic concepts in LPP, TP, AP, CPM, PERT, and Inventory	K1
CO-2	remember the characteristics and relationships in LPP, TP, AP, CPM, PERT, and Inventory	K2
CO-3	identify the activities, model, methods and procedures in LPP, TP, AP, CPM, PERT, and Inventory	K3
CO-4	analyze and apply the procedure for problem solving in LPP, TP, AP, CPM, PERT, and Inventory	K4
CO-5	adopt the LPP, TP, AP, CPM, PERT, and Inventory methods to real-life / business problems	K5 & K6

Unit – I: **(15 hours)**

Linear Programming - General formulation of the LP Model and its Graphical solution. The Simplex Method - Computational Procedure. Artificial Variable Techniques - the Two Phase Technique – Special cases in Simplex Method.

Unit – II: **(15 hours)**

Duality in Linear Programming - The Dual Problems - Primal Dual Relationships, Primal - Dual Computations - Dual Simplex Method.

Unit – III: **(15 hours)**

Transportation Problems - Transportation Model - Determining the starting solution of Transportation Model, North - West Corner Rule, Least – Cost Method and Vogel's Approximation Method. Determining the optimum solution of Transportation Problems - Assignment Problems and its solution by Hungarian method.

Unit – IV: **(15 hours)**

Project Scheduling by PERT-CPM - Network diagram representations – Critical path calculations - Probability considerations in Project Scheduling.

Unit – V: **(15 hours)**

Inventory Management: Inventory Control - ABC analysis - Economic Lot size Problems - EOQ with uniform Demand and shortages - Limitations of inventories - Buffer stock - Determination of Buffer stocks.

(**Note:** Stress may be on the working of numerical problems)

Book for Study

1. Kanti Swarup, P K Guptha and Manmohan, "Operations Research", Sultan Chand & Sons, New Delhi, 2013.

Unit-I: Chapter 1 (Sec: 1.1-1:6, 1:10), Chapter 2, Chapter 3(Sec:3:1-3:5), Chapter 4(Sec:4:1,4:3,4:4(only Two-Phase Method),4:5)
Unit-II: Chapter 5 (Sec: 5:1-5:5,5:7,5:9)
Unit-III: Chapter 10 (Sec: 10:1,10:5-10:6,10:8-10:10,10:12-10:13,10:15), Chapter 11 (Sec 11:1-11:2,11:3(Pages:298-307)
Unit – IV Chapter 25 (Sec 25:1-25:7)
Unit – V Chapter 19 (Sec: 19:1-19:2, 19:6-19:10(Case 1&2 only),19:15)

Books for Reference

1. Rathindra P. Sen, "Operations Research Algorithms and Applications", PHI, New Delhi, 2010.
2. R. Panneer Selvam, "Operations Research", PHI, NewDelhi, 2nd Ed.,2010.
3. S.Kalavathy, "Operations Research", Vikas Publishing House Pvt Ltd, Noida India-2013.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course					Hours	Credit			
IV	21UCS43CC07	CORE - 7 : OPERATIONS RESEARCH					4	3			
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	3	2	3	3	2	2	3	2.6
CO-2	3	3	3	2	2	3	3	2	2	2	2.5
CO-3	3	3	2	3	2	3	3	3	3	2	2.7
CO-4	3	3	2	2	3	3	2	3	2	3	2.7
CO-5	3	2	2	3	2	3	2	3	2	3	2.5
Mean Overall Score											2.6 (High)

Semester	Course Code	Title of the Course	Hours	Credits
1V	21UCS43CC08	CORE – 8: PYTHON PROGRAMMING	4	2

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO -1	recall and understand the features of python programming language	K1
CO-2	illustrate various programming mechanism used in python	K2
CO-3	apply various language construct to write simple programs in python	K3
CO-4	examine the application of object oriented concept in python	K4
CO-5	distinguish the various constructs used in python	K4

Unit–I: (12 Hours)

Introduction to Python: Features of Python - How to Run Python - Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python -Multi-Line Statements - Multiple Statement Group (Suite) - Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers – Strings – List – Tuple – Set – Dictionary – Data type conversion.

Unit–II: (12 Hours)

Flow Control: Decision Making – Loops – Nested Loops – Types of Loops. Functions: Function Definition – Function Calling - Function Arguments - Recursive Functions - Function with more than one return value.

Unit–III: (12 Hours)

Modules and Packages**:** Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling- Directories in Python.

Unit– IV: (12 Hours)

Object Oriented Programming**:** Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes- Destructors in Python – Encapsulation - Data Hiding – Inheritance - Method Overriding- Polymorphism.

Unit– V: (12 hours)

Exception Handling: Built-in Exceptions-Handling Exceptions-Exception with Arguments - Raising Exception - User-defined Exception - Assertions in Python. Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags-Regular Expression Patterns-Character Classes-Special Character Classes - Repetition Cases - findall() method - compile() method.

Books for Study

1. Jeeva Jose and P. Sojan Lal,"Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publishing Co, 2016.

Unit-I *Chapter 3, 4*
Unit-II *Chapter 5, 6*
Unit-III *Chapter 7, 8*
Unit -IV Chapter *9*
Unit-V *Chapter 10, 11*

Books for Reference

1. Wesley J. Chun, "Core Python Programming", Prentice Hall Publication, 2006.
2. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, 2011
3. Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data**",** O'Reilly Media, 2016.

Relationship matrix for Course outcomes, Programme Outcomes/ Programmes Specific outcomes

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credit**
1V	**21UCS43CC08**			**CORE – 8 : PYTHON PROGRAMMING**				**4**		**2**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	1	2	1	3	2	2	3	2	2.2
CO-2	3	3	1	3	2	3	3	2	3	2	2.5
CO-3	3	3	3	2	1	3	3	2	2	3	2.5
CO-4	3	3	2	3	2	2	3	2	2	2	2.4
CO-5	2	3	2	3	1	3	2	2	3	2	2.3
Mean Overall Score											**2.3 (High)**

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43CP04	Software Lab 4: Python Programming	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall and relate the features of python programming language	K1
CO-2	compare various programming mechanism used in python	K2
CO-3	construct simple programs in python using various language features	K3
CO-4	distinguish the various constructs used in python	K4
CO-5	apprise the application of object oriented concept in python	K5

List of Exercises

1. Flow controls, Functions and String Manipulation
2. Operations on Tuples and Lists
3. Operations on Sets
4. Operations on Dictionary
5. Simple OOP – Constructors
6. Method Overloading
7. Inheritance
8. Files – Reading and Writing
9. Regular Expressions
10. Modules
11. Packages
12. Exception Handling

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS43CP04	Software Lab 4: Python Programming	3	2

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	2	1	3	3	2	2	3	2.3
CO-2	2	3	2	1	2	3	3	2	2	2	2.2
CO-3	1	2	3	2	1	2	3	2	3	2	2.1
CO-4	2	2	2	3	1	2	3	2	2	2	2.2
CO-5	2	2	2	2	3	1	3	2	2	3	2.2
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS43AO04A	ALLIED: APPLIED PHYSICS – II	4	3

CO No.	CO- Statements	COGNITIVE LEVELS (K-Levels)
	On the successful completion of the course, student will be able to:	
CO-1	Acquire knowledge and conceptual understanding of fundamental electronics.	K1, K2
CO-2	Apply the knowledge of microprocessor to write assembly language program for simple applications.	K3, K4
CO-3	Implement the knowledge of s/w, h/w structures of microprocessor and principles of electronics to develop technologies with IT tools to benefit the real world.	K4
CO-4	Describe and understand the basics of modulation and applications of electronic devices in radio communication.	K2, K3
CO-5	Apply and Manage mini projects based on electronic devices.	K3

UNIT - I: DIODE AND TRANSISTOR (12 Hours)

pn junction - properties - biasing - VI characteristics - rectifier - Zener diode- Voltage stabiliser - Transistor - transistor action - symbols - transistor connections - switching action of a transistor - JFET - principle and working - difference between JFET and Bipolar transistor - output characteristics of JFET.

UNIT - II: AMPLIFIERS AND OSCILLATORS (12 Hours)

Transistor as an amplifier in CE arrangement - transistor load line analysis - operating point - performance of transistor amplifier - cut off and saturation points - transistor biasing - feedback. Sinusoidal oscillator - types - oscillatory circuit - Barkhausen criterion - Hartley and Colpitt's oscillator - crystal oscillator.

UNIT - III: OPERATIONAL AMPLIFIER (12 Hours)

Operational amplifier - basic circuit of differential amplifier - operation - CMRR - Applications - Inverting amplifier - noninverting amplifier - voltage follower - summing amplifiers - integrator - differentiator.

UNIT - IV: MODULATION AND DEMODULATION (12 Hours)

Radio Broadcasting, Transmission and Reception - Modulation - types - Amplitude modulation - modulation factor - analysis of Amplitude modulated wave - transistor AM Modulator - power and limitations in AM - Frequency modulation - theory - comparison - Demodulation - essentials - AM Diode detector - AM Radio receivers - types - FM receiver.

UNIT - V: MICROPROCESSOR INTEL 8085 (12 Hours)

Architecture of Intel 8085 - Block Diagram - Buses - Registers - ALU - Memory - Stack Memory - Interfacing Devices - Timing and Control Circuitry - Pin-out Diagram - Instruction

Cycle - Input / Output - Machine Language - Assembly Language - Instruction Set and Format - addition, subtraction, multiplication and division program

Books for Study

1. V.K. Mehta Rohit Mehta, Principles of Electronics, 11th Edition, S. Chand & company 2009.
2. B. Ram, Fundamentals of microprocessor and microcomputers, 7th revised edition, Dhanapat Rai Publications, 2011.

UNIT	BOOK	CHAPTER	SECTION
1	1	5, 6, 8, 18 & 19	5.14, 5.15, 5.16, 5.19, 6.25, 6.27, 6.7, 8.1, 8.4, 8.5, 8.7, 8.12, 18.9, 19.2, 19.3, 19.6, 19.8, 19.10
2	1	8,9,13,14&18	8.16. 18.7, 18.8, 18.21, 18.22, 9.2, 9.4, 13.1, 14.1, 14.2, 14.3, 14.7, 14.11, 14.10, 14.20
3	1	25	25.1-25.8, 25.23, 25.24, 25.26, 25.27, 25.32, 25.33, 25.35, 25.37
4	1	16	16.1-16.22
5	2	3,4,5 & 7	3.1-3.3, 4.1-4.4, 4.6, 5.2, 5.5, 7.1-7.3, 7.5, 7.6

Books for Reference

1. Bhargava N.N, Kulshreshtha D.C and S.C Gupta, Basic electronics and linear circuits, 2nd Edition, Tata McGraw Hill Publishing Company Limited, 2013.
2. Ramesh S. Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition, Prentice Hall, 2002.
3. William A. Routt, Microprocessor Architecture, Programming, and Systems featuring the 8085, 1st Edition, Thomson Delmar Learning, 2006.

WEB RESOURCES*

1. https://nptel.ac.in/courses/117/103/117103063/
2. https://nptel.ac.in/courses/115/102/115102014/
3. https://ict.iitk.ac.in/courses/working-with-op-amps/
4. https://nptel.ac.in/content/storage2/courses/106105080/pdf/M2L5.pdf
5. https://nptel.ac.in/courses/108/107/108107029/

(* subject to availability - not to be used for exam purpose)

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credit
IV	21UCS43AO04A			ALLIED: APPLIED PHYSICS II				4		4
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	3	2	3	2	2	2	1	2.3
CO-2	3	3	2	2	1	3	2	3	2	1	2.2
CO-3	3	2	3	2	1	3	3	1	2	1	2.2
CO-4	3	2	3	2	1	3	2	2		2	2.3
CO-5	3	2	2	2	2	2	3	3	2	1	2.2
Mean Overall Score											2.24
Result											High

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS43AP01A	ALLIED: PHYSICS PRACTICAL	4	4

(Offered to Department of Computer Science)

Any 16 Experiments

1. Junction diode – V I characteristics
2. Zener diode – V I characteristics
3. Transistor characteristics – CE mode
4. FET characteristics
5. Single stage R-C coupled amplifier – Frequency response
6. Operational amplifier – Basic circuits
7. Basic Logic Gates - Using IC's
8. Logic Gates Using IC's -The study of universal gates & De Morgan's Theorem
9. Encoders using Diodes
10. Encoders using OR gates.
11. Shift register using IC7495.
12. R-S, J-K, D, T Flip-flops using Logic gates IC's
13. Potentiometer - Calibration of Ammeter
14. Potentiometer - Calibration of Voltmeter
15. Field along the axis of a coil
16. Resistance of a Thermistor- Multimeter
17. EMF of a Thermocouple – Multimeter
18. Bridge Rectifier - pi filter circuit
19. Hartley / Colpitt's Oscillator
20. Hysteresis
21. Microprocessor I (Data Transfer)
22. Microprocessor II (Addition, subtraction, multiplication & division)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43AO04B	Allied-II COMMUNICATION ELECTRONICS	4	2

CO No.	CO statements	Cognitive Levels (K- levels)
	On completion of this course, students would be able to	
CO-1	Understand serial and parallel Communication	K2
CO-2	Infer and Elaborate Optical Communication	K2
CO-3	Experiment and Perceive various optical sources and detectors	K2,K3
CO-4	Appraise various Wireless Networks	K4
CO-5	Apply and Analyze wireless networking using ESP 8266	K6

UNIT I: SERIAL AND PARALLEL PORT COMMUNICATION (12 Hours)

Basics of digital communication- Parallel port interfacing for simple I/O operations-Serial communication-UART-USART-Data transfer using serial port- USB port specifications-HID device –USB for data transfer applications-Communication protocols-SPI-IIC-Applications.

UNIT II: OPTICAL COMMUNICATION (12 Hours)

Basics of optical communication-Block diagram of Optical fibre communication-advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, Ray theory, single mode fiber, cutoff wave length, fiber alignment and joint loss, single mode fiber joints, fiber splices, fiber connectors and fiber couplers.

UNIT III: OPTICAL COMMUNICATION SOURCES AND DETECTORS (12 Hours)

Introduction, LEDs, Phototransistor characteristics- Photo detector noise, Response time, double hetero junction structure, comparison of photo detectors -LM393 light sensor module TCS3200 color sensor module.

UNIT IV: WIRELESS COMMUNICATION (12 Hours)

Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication-Third generation Cellular Networks- Fourth Generation, fifth generation wireless networks- Wireless Local Loop (WLL)-Wireless Local Area network(WLAN)- Bluetooth and Personal Area Networks.

UNIT V BASIC NETWORKING WITH ESP8266 (12 Hours)

Introduction to ESP8266 Wi-Fi Module- Wi-Fi library-Web server- installation- configuration-Posting sensor(s) data to web server-ThingSpeak API and MQTT.

Book(s) for Study

1. N. Mathivanan, “PC-BASED INSTRUMENTATION: CONCEPTS AND PRACTICE” 2007
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002
3. Manoj R. Thakur,”NodeMCU ESP8266 Communication Methods and Protocols : Programming with Arduino IDE”
4. Material prepared by the Department.

Book(s) for Reference

1. John Axelson, "USB Complete: The Developer's Guide", 4th Edition, 2012

2. Anita Gehlot, Rajesh singh, Praveen Kumar Malik, Lovi Raj Gupta, Bhupendra Singh, "Internet of things with 8051 and ESP8266", 2020

Unit	Book	Chapter	Sections
I	1	6	6.1,6.2,9.2,9.3,9.4,9.5
II	2	1,2,3,5	1.2,1.3,2.1,2.2,3.6,5.3
III	2	7,8	7.2,8.1.8.3,8.5,8.6,8.8
IV	4		Material prepared by the department.
V	3	4,5,21	4.1,4.2,4.3,5.2,21.1-21.3

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credits
IV	**21UCS43AO04B**	**Allied-II COMMUNICATION ELECTRONICS**	**4**	**3**

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	**2**	**2**	**3**	**2**	**1**	**2**	**3**	**3**	**2**	**2**	**2.2**
CO-2	**3**	**3**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**3**	**2.5**
CO-3	**3**	**3**	**2**	**3**	**2**	**2**	**3**	**3**	**2**	**2**	**2.5**
CO-4	**3**	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**2.7**
CO-5	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**2.9**
Mean Overall Score											**2.6**
Result											**High**

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43AP01B	Allied-II ELECTRONICS PRACTICAL	2	2

ALLIED ELECTRONICS PRACTICALS (ANY 16 EXPERIMENTS)

1. Study of Opto-coupler characteristics and application.
2. Study of Photodiode and phototransistor characteristics
3. Study of Transducers for temperature measurements.
4. Study of MOSFET characteristics.
5. Study on Integrated sensors
6. Construction and study of Linear power supply
7. Construction of voltage regulators.
8. Pspice simulation of basic circuits with resistors and node voltage and branch current calculation.
9. Study on magnetic and solid state relay.
10. Study of SCR characteristics
11. DC to DC switching circuits using MOSFET
12. Pspice simulation of active devices.
13. Configuring ESP8266 based Web-server for data acquisition applications.
14. Digitizing temperature sensor data and uploading in thingspeak API.
15. Study of USB communication (HID device).
16. Study of software serial communication in ESP8266.
17. Study of fibre optic communication.
18. Hall effect sensor for current measurement
19. ESP 8266 I/O operations
20. Interfacing RFID module using Arduino.
21. Interfacing IIC memory module using Arduino.
22. Interfacing HC-05 bluetooth module with arduino
23. Study of Parallel port for I/O operations
24. Study of Serial port data transfer to hyper-terminal.
25. Study of Colour sensing using TCS3200.

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS44SE02	SEC -2 (BS): DATA ANALYSIS USING SPREADSHEET	2	1

CO No.	CO – Statements On successful completion of this course, student will be able to	Cognitive Levels (K- Levels)
CO-1	recall and describe the fundamental ideas of data analysis	K1
CO-2	summarize the functions used for data analysis	K2
CO-3	apply the learned skills to analyze various kinds of data	K3
CO-4	analyze advanced spreadsheet functions for data analysis	K4
CO-5	formulate the results to visualize the outcome of data analysis using advanced charts	K5

List of Exercises

1. Data Analysis Fundamentals

2. Basic Mathematical, Statistical and Financial Functions
   a) Mathematical → SUM, AVERAGE, MAX, MIN, COUNT
   b) Statistical → STDDEV, MEAN.MEDIAN, MODE. NORM, SKEW
   c) **Financial → PMT, RATE, NPER, PV**

3. Advanced Excel Functions for Analysis
   IF, SUMIF, COUNTIF, COUNTA, VLOOKUP, HLOOKUP, IFERROR, COUNTIFS, LEFT/RIGHT, RANK, MINIFS, MAXIFS, SUMPRODUCT, FIND/SEARCH

4. Sorting, Filtering, Data Validation, Subtotal
   a) Custom Sorting, Filtering
   b) Validations on Date and Time, Numbers, Strings
   c) Sub Total, Sub Total using Functions

5. What If Analysis, Goal Seek
   a) Analysis with Goal Seek, What If
   b) Break Even Analysis

6. Pivot Table
   a) Construction of Pivot Table
   b) Pivot Chart.

7. Basic Charting Bar Chart, Column Chart, Pie Chart, Line Chart, Scatter Chart

8. Advanced Charts
   a) Actual vs Target Charts
   b) Bell Curve

c) Funnel Chart
d) Pareto Chart

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS44SE02	SEC -2 (BS): DATA ANALYSIS USING SPREADSHEET	2	1

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	3	2	1	3	3	3	2	2	2.4
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	3	3	3	2	1	3	3	2	3	2	2.5
CO-4	3	3	3	2	1	3	3	3	3	2	2.6
CO-5	3	3	3	2	1	3	3	3	3	2	2.6
Mean Overall Score											2.52 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UHE44VE04A	PROFESSIONAL ETHICS–II: SOCIAL ETHICS - II	2	1

Co. No.	CO – Statements	Cognitive Levels (K- Levels)
	On completion of this course the graduates will be able to	
CO-1	know the value of natural recourses and to live in a harmony with nature.	K1
CO-2	comprehend the importance of a healthy life.	K2
CO-3	apply the plans of disaster management in the society.	K3
CO-4	analyse the importance and differences of science and religion.	K3
CO-5	apply counseling skills and solve their problems.	K4

Unit-I Harmony with Nature (6-Hours)

What is environment, Why should we think of harmony, Principles to conserve environmental resources, Causes of disharmony, The fruits of harmony with nature, Natural Resources, Fruits of disharmony, Economic values and growth, Environmental Ethics, Guidelines to live in harmony with nature, Towards life-centered system for better quality of life. Harmony with animal kingdom.

Unit-II Issues Dealing with Science and Religion (6-Hours)

What is Science, Science and Religion, Social Relevance of Science and Technology, Science and technology for social justice, Difference caused by Science and Technology, Need for indigenous technology, Science and Technology Innovation Policy of India.

Unit-III Public Health (6-Hours)

Health related issues, Health Care in India vs Developed Countries, Health and Heredity, Public Health - Objectives of public health in India, Public Health System in India, Failure on the public health front, Role of the central government, Hospitals Services in India, Health and Abortion, Drug Addiction and Drug abuse

Unit-IV Disaster Management (6-Hours)

Disaster Management, Types of disaster, Plans of disaster management, Technology to manage natural disasters and catastrophes, Rehabilitation and Reconstruction, Human-induced disaster, First Aid, The importance of First-aid.

Unit-V Counselling for Adolescents (6-Hours)

High Risk Behaviours, Developmental Changes in Adolescents, Key Issues of the Adolescents, Need for Counselling, Nature of Counselling, Counselling Goals, Does helping help? The Good and the Bad news.Importance of Career Guidance Counselling.

Books for Study

Department of Human Excellence, *Formation of Youth*, St Joseph's College (Autonomous), Tiruchirappali 02, 2021.

Books for Reference

1. Albert, D. and Steinberg, L, *Judgment and decision making in adolescence*: Journal of Research on Adolescence, page no: 211-224. 2011

2. Larry R. Collins, *Disaster Management and Preparedness*, Lewis Publications, 22 November 2000.
3. Elizabeth B. Hurlock, *Developmental Psychology: A: Life-Span Approach*, New Delhi: Tata McGraw-Hill, 1981, 5th Edition, August 18, 2001.
4. Sangha, Kamaljit. *Ways to Live in Harmony with Nature: Living Sustainably and Working with Passion.* Australia, Woodslane Pty Limited, 2015.

Web Sources

https://en.wikipedia.org/wiki/Disaster_management_in_India
https://ndma.gov.in/
https://talkitover.in/services/child-adolescent-counselling/
https://www.nipccd.nic.in/schemes/adolescent-guidance-centre-19#gsc.tab=0

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UHE44VE04B	PROFESSIONAL ETHICS II: RELIGIOUS DOCTRINE - II	2	1

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On completion of this course, the graduates will be able to	
CO-1	Understand the history of the Catholic Church	K1
CO-2	Examine and grasp the Sacraments of the Catholic Church	K2
CO-3	Apply the Christian Prayer to their everyday life	K3
CO-4	Analyze themselves in the light of Sacraments & Christian Prayer	K4
CO-5	Create a harmonious society learning values from all religions	K5 & K6

Unit-I	**The Catholic Church**	**(6 Hours)**
Unit-II	**Sacraments of Initiation**	**(6 Hours)**
Unit-III	**Sacraments of Healing & at the Service of Community**	**(6 Hours)**
Unit-IV	**Christian Prayer**	**(6 Hours)**
Unit-V	**Harmony of Religions**	**(6 Hours)**

Books for Study

Department of Human Excellence, *Life in the Lord: Religious Doctrine.* St. Joseph's College, Trichirappalli 02, 2021.

Books for Reference

1. *Compendium: Catechism of the Catholic Church.* Bengaluru: Theological Publications in India, 1994.
2. Holy Bible (NRSV).

Semester	Course Code	Title of the Course	Hours	Credit
V	21UCS53CC09	CORE – 9: JAVA PROGRAMMING	4	2

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO-1	remember the basic programming skills in java	K1
CO-2	understand the use of inheritance concepts in java programs	K2
CO-3	apply and build simple packages and to handle Exceptions	K3
CO-4	analyse and interpret the use of Multithreading, storage of data in files	K4
CO-5	examine and classify programs using GUI environment	K4

Unit-I **(12 hours)**

The Java Language: How Java Impacted the Internet. Java Buzz Words-An Overview of Java: The Three OOP Principles-A first Simple Program-The Java Keywords-The Java Class Libraries.-Operators-Control Statements.

Unit-II **(12 hours)**

Introducing Classes: Class Fundamentals-Declaring Objects-Introducing Methods-Constructors-The 'this' Keyword. Overloading Methods-Overloading Constructors-Using Nested and Inner Class-Recursion-Arrays Revisited-Using Command Line Arguments. **Inheritance:** Inheritance Basics- Using Super- Creating a Multilevel Hierarchy- Method Overriding- Using Abstract Class- Using final with Inheritance.

Unit-III **(12 hours)**

Packages and Interfaces**:** Packages-Defining a Package-Packages and member Access-Importing Packages- Interface: Defining an Interface-Implementing Interfaces-Nested Interfaces-Exception Handling- Exception Handling Fundamentals-Exception Types-Using Try and Catch-Uncaught Exceptions-Multiple catch Statements-throw-finally-Using Exceptions.

Unit-IV **(12 hours)**

Multithreading: The Java Thread Model-The Mail Thread-Creating a Thread-Creating Multiple Threads-Using is Alive() and Join()-Thread Priorities-Synchronization-Thread Priorities-Suspending, Resuming and Stopping Threads using Multithreading. Input/Output**:** File-The Stream Classes-The Byte Streams-The Character Streams.

Unit-V **(12 hours)**

Event Handling**:** Two Event Handling Mechanisms-The Delegation Event Model-Event Classes-The Key Event Classes-Event Listener Interfaces-Introducing the AWT: AWT Classes-Window Fundamentals-Introducing Graphics-Working with Color: Color Methods-Using AWT Controls**,** Layouts Managers: Labels-Using Buttons-Applying Check Boxes-Checkbox Group-Choice Controls-Handling Choice-Handling Lists-Managing Scroll Bars-Using a Text Field-Using a Text Area-Understanding Layout Managers-Dialog Boxes.

Book for Study

1. Schildt Herbert, Java: *"The Complete Reference"*, New York: McGraw-Hill Education *Tenth Edition*, 2017.

Unit I

Chapter 1 (Sec: 1.3, 1.8, 2.1.3, 2.2, 2.7), Chapter 4, Chapter 5

Unit II

Chapter 6 (Sec: 6.1, 6.2, 6.4- 6.6), Chapter 7 (Sec 7.1, 7.10, 7.12) Chapter 8(8.1-8.3, 8.5, 8.7, 8.8)

Unit III

Chapter 1 (Sec: 9.1.1, 9.2, 9.3, 9.4.1 - 9.4.3), Chapter 10(Sec 10.1-10.5, 10.7, 10.9, 10.14)

Unit IV

Chapter 11 (Sec: 11.1- 11.7, 11.9, 11.12), Chapter 21(Sec: 21.2, 21.6 - 21.8)

Unit V

Chapter 24 (Sec: 24.1-24.4, 24.6), Chapter 26(Sec 26.2-26.11, 26.13)

Books for Reference

1. E. Balagurusamy, *"Programming with JAVA"*, Tata McGraw Hill, New Delhi, 2019.
2. C. Muthu, *"Programming with JAVA"*, Vijay Nicole Imprints Private Limited, Chennai, Second Edition, 2011.
3. Bruce Eckel, Chuck Allison, *"Thinking in Java"*, Prentice Hall Publications, 2006

Semester	Course Code	Title of the Course					Hours	Credit			
V	21UCS53CC09	CORE – 9: JAVA PROGRAMMING					4	2			
Course Outcomes ↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	2	1	3	3	2	3	3	2.4
CO-2	3	3	3	2	2	3	3	3	3	3	2.8
CO-3	3	3	3	3	3	3	3	2	3	1	2.7
CO-4	3	2	2	3	2	2	3	3	2	2	2.4
CO-5	2	3	3	3	1	2	3	3	2	3	2.5
Mean Overall Score											2.56 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53CC10	CORE – 10: DISTRIBUTED TECHNOLOGY	4	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define the elements of distributed systems.	K1
CO-2	understand the ASP.NET development environment.	K2
CO-3	apply various server and client-side controls to create web applications.	K3
CO-4	examine and use the different components in ASP.NET applications.	K3
CO-5	analyze and evaluate the development of web applications with disconnected data access technologies.	K4,K5

Unit-I: (12 hours)

Client server computing: clients - server- networks - Distributed Systems: Distributed applications-Distributed Processing –web technology - Understanding the .NET Framework: Benefits of the .NET Framework- Elements of the .NET Framework- ASP.NET.

Unit-II: (12 hours)

Getting Started with ASP.NET: Introducing the .NET Framework - Introducing ASP.NET- Setting up the Development Environment- Creating an ASP.NET Application- Deploying an ASP.NET Web Application.

Unit-III: (12 hours)

Building Forms with Web Controls: Introducing ASP.NET Web Forms- Creating Web Forms Application Projects- Using Web Controls- Working with Events.

Unit-IV : (12 hours)

Using Rich Web Controls: Using the Ad Rotator Control- Using the Calendar Control- Using the Tree View Control- Validating User Input - Understanding Validation Controls- Introduction to Custom Controls- Basic Structure of Web Forms Controls- Creating Custom Controls- Creating a user control

Unit-V : (12 hours)

ASP.NET Database Programming: Introducing ADO.NET- ADO.NET Basics- ADO.NET Object Model- Managed Providers- DataSet class.

Books for Study

1. Rajesh, Eswara Kumar, Balasubramanian, "Computer Networks, Fundamentals and Applications", Vikas Publishing House Pvt. Ltd., 2002.

Unit-I Chapter 10 (Sec:10.1, 10.2, 10.3), Chapter 11 (Sec:11.1, 11.2,)

2. Mridula Parihar, “ASP.NET Bible”, Hungry Minds © 2002, Inc. 909 Third Avenue New York, NY 10022.

Unit- I Chapter 1
Unit-II Chapter 2
Unit-III Chapter 3
Unit -IV Chapter 4, Chapter 5
Unit -V Chapter 8

Books for Reference

1. Bill Evjenet, “Professional ASP.NET 2.0 Special Edition”, Published by Wrox Press 2006.
2. Stephen Walther, “ASP.NET 2.0 Unleashed”, Sams Publications, 2006.
3. Matthew Macdonald and Mario Szpuszta, “ProASP.NET 3.5 in C# 2008”, second edition,Apress, 2007.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course					Hours				Credits
V	21UCS53CC10	CORE – 10 : DISTRIBUTED TECHNOLOGY					4				2
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	3	3	1	3	3	2	2	2	2.4
CO-2	3	2	2	3	2	2	2	3	3	2	2.4
CO-3	2	3	2	3	2	3	3	3	2	2	2.5
CO-4	3	2	2	2	1	3	2	2	3	1	2.1
CO-5	3	2	3	2	1	3	2	3	2	1	2.2
Mean Overall Score											2.32 (High)

Semester	Course Code	Title of the Course	Hours	Credit
V	21UCS53CP05	Software Lab 5: JAVA PROGRAMMING	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	Remember the concepts of java classes and objects	K1
CO-2	understand the OOP concepts in java	K2
CO-3	develop simple programs with multiple threads	K3
CO-4	analyze and classify programs using AWT	K4
CO-5	compare and examine java programs using GUI environment	K4

List of Exercises

1. Classes and Objects
2. Constructors
3. Inheritance
4. Method Overloading
5. Method Overriding
6. Interfaces
7. Packages
8. Multithreading
9. Input / Output streams
10. AWT Controls

Semester	Course Code	Title of the Course	Hours	Credit
V	21UCS53CP05	Software Lab 5: JAVA PROGRAMMING	3	2

Course Outcomes ↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	2	1	3	3	2	2	3	2.3
CO-2	2	3	3	2	2	3	3	3	2	3	2.6
CO-3	2	2	3	3	3	3	3	3	3	2	2.7
CO-4	2	2	2	3	1	2	3	3	2	3	2.3
CO-5	2	3	2	3	3	1	3	3	3	3	2.6
Mean Overall Score											2.5 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53CP06	Software Lab 6: DISTRIBUTED PROGRAMMING	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the HTML tags and design simple web pages	K1
CO-2	illustrate the procedure of deploying ASP.Net web applications.	K2
CO-3	apply the web server controls to create web applications	K3
CO-4	analyze and use web user controls.	K4
CO-5	develop and evaluate applications using ADO.NET.	K5, K6

List of Exercises:

1. Simple Webpage creation using HTML.
2. HTML form validation using VB Script / Java Script
3. Design a Simple Calculator
4. Request and Response Objects
5. Server-side controls.
6. Working with Toolbox Controls.
7. Validation Controls.
8. AdRotator Control
9. Calendar Control
10. Database Access - ADO.NET

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course					Hours	Credit			
V	21UCS53CP06	Lab- 6 (Software): DISTRIBUTED PROGRAMMING					3	2			
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	2	3	3	3	1	2	2.4
CO-5	2	3	3	1	2	2	3	3	2	1	2.3
Mean Overall Score											2.36
Result											# High

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES01 A	DSE - 1: OPERATING SYSTEMS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic principles and importance of the operating system in a computer	K1
CO-2	illustrate the objectives and functions of the operating system components	K2
CO-3	identify the various operating system techniques and security	K3
CO-4	analyze the issues and challenges of the operating system and security mechanisms	K4
CO-5	evaluate the functions and features of modern operating systems	K5

UNIT- I **(15 Hours)**

Operating Systems: Computer-System Organization - Computer-System Architecture - Operating System Structure - Operating-System Operations – Process Management - Memory Management - Storage Management - Protection and Security.

UNIT –II **(15 Hours)**

Process Concept: Process Scheduling-Operations on Processes –Inter process Communication - CPU Scheduling - Basic Concepts - Scheduling Criteria - Scheduling Algorithms. Deadlocks: System Model - Deadlock Characterization - Methods for Handling Deadlocks.

UNIT- III **(15 Hours)**

Main Memory: Swapping - Contiguous Memory Allocation - Segmentation - Paging - Structure of the Page Table. Virtual Memory: Demand Paging.

UNIT- IV **(15 hours)**

File Concept - Access Methods - Directory and Disk Structure - File-System Mounting File Sharing – Protection.

UNIT- V **(15 hours)**

Protection: Goals of Protection - Principles of Protection - Domain of Protection – Access Matrix - Implementation of the Access Matrix - Access Control. Security: The Security Problem - Cryptography as a Security Tool - User Authentication.

Book for Study

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne "*Operating Systems Concepts*", 9th Edition, Wiley Publications, 2013.
   Unit- I *Chapter 1 (Sec: 1.2 -1.9)*
   Unit – II *Chapter 2 (Sec: 3.1-3.4) Chapter 6(6.1-6.3) Chapter 7(7.1 -7.3)*
   Unit –III *Chapter 8(Sec: 8.2-8.6) Chapter 9 (9.2)*
   Unit –IV *Chapter 11(11.1 -11.6)*
   Unit –V *Chapter 14(14.1-14.6) Chapter 15(15.1, 15.4, 15.5)*

Books for Reference

1. William Stallings, Operating Systems, PHI, Second Edition, 2001.
2. William Stallings, "Operating Systems –Internals and Design Principles", 8/E, Pearson Publications, 2014
3. Andrew S. Tanenbaum, "Modern Operating Systems", 4/E, Pearson Publications, 2014.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course					Hours	Credit
V	21UCS53ES01A			DSE- 1: OPERATING SYSTEMS					5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	2	2	2	3	2	2	2	3	3	2.3
CO-2	2	2	2	3	3	2	2	2	3	3	2.4
CO-3	2	2	3	3	3	2	2	3	3	3	2.6
CO-4	2	2	2	3	3	2	2	2	3	3	2.4
CO-5	2	3	3	3	3	3	1	2	2	2	2.4
Mean Overall Score											2.42 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES01B	DSE- 1: DIGITAL MARKETING	5	3

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO -1	recall the basic elements and factors of digital marketing	K1
CO-2	classify the technology and frameworks in which digital marketing operates	K2
CO-3	choose the key internal analysis elements for the relevant applications of underlying frameworks of digital marketing	K3
CO-4	analyze different digital marketing strategies for the real time business applications	K4
CO-5	determine technical specifications and to develop site/portal to promote digital marketing	K5, K6

UNIT- I **(15 Hours)**

Introduction to Digital Marketing: Evolution of Digital Marketing - From Traditional to Modern Marketing – Growth of 'E' Concepts: from E-Business to Advanced E-Commerce – Digital, The next wave of marketing – Digital Marketing: Emergence of Digital Marketing as a Tool – Digital Marketing Channels – Types and Business Models – Digital Marketing Applications and Benefits. Internet Marketing: Underlying Technology and Frameworks – Digital Marketing Framework.

UNIT –II **(15 Hours)**

Digital Marketing Models Creation: Factors Impacting Digital Marketplace – Value Chain Digitization- Digital Marketing Business Models, Understanding Digital Value Elements – Digital Value – Led Marketing Approach – Digital Marketing Models Creation – Application of Digital Marketing Models. Consumer for Digital Marketing: Consumer Behaviour on the Internet – Evolution of Consumer Behaviour Models – Brand Building on the Web – Web Tracking Audits and Forecasting – Integrated Marketing Communications – Basics of Integrated Marketing Communications – Four Pillers of IMC Construct – Impact of Digital Channels on IMC.

UNIT- III **(15 Hours)**

Digital Marketing Assessment Phase: Elements of the Assessment Phase – Marketing Strategy and its Digital Shifts – The assessment Phase Elements – Macro-Micro Environment Analysis – Marketing Situation Analysis – Digital Marketing Internal Assessment – Analyzing Present Offerings Mix – Marketing Mix Analysis – Internal Resource Mapping – Core Competencies Analysis – Digital Marketing Objectives Planning – Digital Presence Analysis – Digital Presence Analysis Matrix – Digital Marketing Objectives Development – Digital Marketing Objectives Review.

UNIT- IV **(15 hours)**

Digital Marketing Strategy: Groundwork – Understanding Digital Business Strategy – Emerging Digital Business Structures – Digital Core Competency Alignment – Customer Development Strategy – Defining the Digital Marketing Mix – Offering Mix for Digital – Digital Pricing Models – Channels of purchasing, Reaching the E-consumer – Managing Promotional Channels – Digital Marketing Strategy Roadmap – The 6S Digital Marketing Implementation Strategy – PLC Concept.

UNIT- V **(15 hours)**

Digital Marketing Operations Set-up : Understanding Digital Marketing Conversion – Basics of Lead Generation and Conversion Marketing – Setting up for conversion – Lead Management across Channels – Basics of Web Development and Management – Pre Planning for Web Development – Website Development Stages – Developing Site Diagrams and Wireframes – Website Content Development and Management – User Experience, Usability and Service Quality Elements – Understanding Elements of User Experience – Implementation of Interaction Design – Understanding Web Usability and Evaluation – Measuring Service Quality Elements- Introduction to Search Engine Optimization.

Book for Study

1. Puneet Bhatia, "Fundamentals of Digital Marketing, 2/e", Pearson India Publications, New York, 2019.
   Unit I - Chapter 1
   Unit II - Chapter 2, 3
   Unit III - Chapter 4
   Unit IV - Chapter 5
   Unit V - Chapter 7

Books for Reference

1. Vandana Ahuja "Digital Marketing", Oxford University Press, 2015.
2. Marjolein Visser, Berend Sikkenga, Mike Berry, "Digital Marketing Fundamentals: From Strategy to ROI", Noordhoff Groningen / Utrecht, Netherlands, 2018.
3. Jeremy Kagan, Siddharth Shekhar Singh, "Digital Marketing: Strategy & Tactics", Wiley Publications, 2020.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credits
V	21UCS53ES01B			DSE- 1: DIGITAL MARKETING				5		3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	2	3	3	3	2	2	2.7
CO-2	2	3	3	3	2	2	3	3	3	2	2.6
CO-3	3	3	2	3	2	3	3	3	2	2	2.6
CO-4	2	3	3	2	2	2	3	3	2	2	2.4
CO-5	3	3	3	2	1	3	3	3	3	2	2.6
Mean Overall Score											2.58 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES02A	DSE- 2: COMPUTER NETWORKS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic concepts of computer networks	K1
CO-2	summarize the technical specifications of various layers of OSI model for network	K2
CO-3	identify the appropriate protocols and standards for computer networks	K3
CO-4	classify technical factors of cellular networks and satellite communication	K4
CO-5	evaluate the applications of computer networks and communication	K5

UNIT- I **(15 Hours)**

Data Communication – Networks – The Internet – Protocols and Standards – OSI Model- Layers in OSI Model - TCP/IP Protocol Suite – Addressing.

UNIT –II **(15 Hours)**

Analog and Digital – Digital Signals – Transmission Impairment – Performance – Multiplexing – Guided Media – Unguided Media. Switching: Circuit Switched Networks – Datagram Networks – Virtual Circuit Networks.

UNIT- III **(15 Hours)**

Data Link Layer: Error Detection and Correction -Introduction – Block Coding: Error detection, Error correction – Data Link Control: Framing – Flow and Error Control – Protocols – Noiseless Channels – Noisy channels – HDLC – Point to Point Protocol.

UNIT- IV **(15 hours)**

Wired LAN: IEEE Standards – Standard Ethernet. Wireless LAN: IEEE 802.11 – Bluetooth. Connecting LANs: Connecting Devices – Virtual LANs. Wireless WAN: Cellular Telephony – Satellite Networks. Network Layer-Logical Addressing: IPv4 Addresses – IPv6 Addresses

UNIT- V **(15 hours)**

Transport Layer: Process to Process Delivery – User Datagram Protocol - TCP. Application Layer: Domain Name Space – DNS in the Internet – Electronic Mail – File Transfer. WWW: Architecture – HTTP.

Book for Study

1. Behrouz A. Forouzan, “Data Communications and Networking”, McGraw-Hill Companies, New York, 4th Edition, 2007.

UNIT I – Chapters 1,2
UNIT II – Chapters 3,6,7,8
UNIT III – Chapters 10,11
UNIT IV – Chapters 13,14
UNIT V – Chapters 23,25,27

Book for Reference

1. William Stallings "Data and computer communications", Prentice Hall of India, 7th Edition, 2004.
2. Andrew S Tanenbaum, "Computer Networks", Prentice Hall of India, New Delhi, 2013.
3. Nasib Singh Gill, "Essential of Computer and Network Technology", Khanna Book Publishing Company (P) Limited, New Delhi, 2014.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credits
V	21UCS53ES02A			DSE- 2: COMPUTER NETWORKS				5		3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	2	2	2	1	3	2	3	2	2	2.2
CO-2	2	3	3	2	1	3	3	2	2	2	2.3
CO-3	2	3	2	2	1	3	3	2	2	2	2.2
CO-4	3	2	3	2	2	3	3	3	2	2	2.5
CO-5	3	2	3	3	2	3	3	3	3	2	2.7
Mean Overall Score											2.38 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES02B	DSE-2: SECURITY IN COMPUTING	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define and relate the concepts and terms of security	K1
CO-2	classify and outline existing attacks and security measures.	K2
CO-3	identify the techniques used to materialize threats into attacks.	K3
CO-4	analyse the recent threats, vulnerabilities and attacks and discover their effects.	K4
CO-5	criticize and propose solutions for protecting the system from being exposed to the threats and attacks.	K5, K6

UNIT I **(15 hours)**

Introduction: Computer Security - Threats -Harm - Vulnerabilities - Controls - Authentication - Access Control – Cryptography. Web User Side - Browser Attacks - Web Attacks Targeting Users - Obtaining User or Website Data - Email Attacks.

UNIT II **(15 hours)**

Security: Security in Operating Systems - Security in the Design of Operating Systems -Rootkit - Network security attack- Threats to Network Communications - Wireless Network Security - Denial of Service - Distributed Denial-of-Service.

UNIT III **(15 hours)**

Security Countermeasures: Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management - Databases - Security Requirements of Databases - Reliability and Integrity - Database Disclosure.

UNIT IV **(15 hours)**

Privacy: Privacy Concepts - Privacy Principles and Policies - Authentication and Privacy – Governing Data Mining – Privacy Preserving - Privacy on the Web - Email Security - Privacy Impacts of Emerging Technologies.

UNIT V **(15 hours)**

Management and Incidents: Security Planning - Handling Incidents - Risk Analysis - Protecting Programs and Data – Information and law – Rights of Employees and Employers – Ethical Issues – Cryptography - Cyber Warfare.

Book for Study

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies, “Security in Computing”, 5th Edition, Pearson Education, 2015.
   Unit I: Ch1, Ch2, Ch3
   Unit II: Ch5, Ch6 [6.2, 6.4, 6.5]
   Unit III: Ch 6 [6.6, 6.7, 6.8, 6.9], Ch 7

Unit IV: Ch 9
Unit V: Ch 10, 11, 13

Book(s) for Reference

1. George K. Kostopoulous, "Cyber Space and Cyber Security", CRC Press, 2013.
2. Martti Lehto, Pekka Neittaanmaki, "Cyber Security: Analytics, Technology and Automation", Springer International Publishing, Switzerland, 2015.
3. Nelson Phillips, Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi, 2009.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours	Credits	
V	21UCS53ES02B			DSE-2: SECURITY IN COMPUTING				5	3	
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	2	2	2	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	3	3	3	3	1	2	2.5
CO-5	2	3	3	2	2	2	3	3	2	1	2.4
Mean Overall Score											2.4 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53SP01	SELF PACED LEARNING: WEB ETHICS	-	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define the basic concepts of cyber ethics, virtues and values	K1
CO-2	Summarize the overall understanding of cyber laws and regulations in information society	K2
CO-3	Utilize international conventions for cyber space and international treaties	K3
CO-4	Categorize and explore the different types of cyber crimes and offenses	K4
CO-5	determine web ethics to protect children through education for digital literacy	K5

UNIT –I

Cyber Ethics: Ethics in Cyber Society: Core Values and Virtues: Definitions, Specificities of Cyberspace, Dimensions of Cyber Ethics in Cyber Society, Core Values and Virtues, Cyber Ethics by norms, Laws and Relations, Artificial Intelligence Ethics: "AI for Good". Cyber Ethics as Business Ethics.

UNIT –II

Cyber Law and Cyber Ethics: Importance of Cyber Law, The Significance of Cyber Ethics, and Cyber Crime is Unethical and Illegal, The need for Cyber Regulation. Ethics in the Information Society, Technologies Need Standards, Rules and Regulations, Technology Ethics, Legal Ethics, the Nine P's of Ethics in Information Society.

UNIT- III

International Convention for Cyber Space:The Significance of International Cyber Ethics, Bilateral Agreements, From Bilateral to International Convention, Fast Growing Cybercrime, International Cyber Legal Treaty. Republican Net Neutrality: Introduction, The Relevance of the Net and its Neutrality, two sets of values underlying "Neutrality", Republican Net Neutrality.

UNIT- IV

Cyber Crime: Cybercrime offences, Computer Related Offences, Content Related offences, Government Efforts in Cybersecurity, Cybersecurity in the Academic world. Critical Thinking of Citizens: Ethics in Digital Age, Acting Responsibly in the Digital World, Three Dilemmas: Ethical Intelligence in Practice.

UNIT- V

Cyber Bullying: Introduction – Cyber Bullying, Peoples in Cyber Bullying, Signs of Cyber Bullying, Suicidal Tendencies, Role of Children and Duty of parents, Limiting Access of Technology, Child Bullying. Child Protection Online: Prevention through Education for Digital Literacy and Safety, Recommendations of Priority Inventions, Cyber Ethics Research Centres and Networks.

Book for Study

1. Christoph Stackelberger, Pavan Duggal, "*Cyber Ethics 4.0: Serving Humanity with Values*" Globethics.net Global series no 17, 2018.

Unit - I : *Chapter 1 (Sec: 1.1 -1.6, 1.8, 1.10, 1.11)*
Unit - II: *Chapter 2 (Sec: 2.1-2.3,2.5) Chapter 3 (3.1)*
Unit - III: *Chapter 16(Sec: 16.1-16.5) Chapter 17(17.2 -17.4)*
Unit – IV: *Chapter 19(19.2 -19.6) Chapter 22(22.3, 22.4*)
Unit – V: *Chapter 23(23.1 -23.7) Chapter 24(24.1, 24.2)*

Books for Reference

1. Diane Bailey, "Cyber Citizenship and Cyber Safety: Cyber Ethics", The Rosen Publishing group, USA, 2008
2. Kizza, Joseph Migga," Ethical and Social Issues in the Information Age" 5th edition, Springer, 2015
3. Bynum, Terrel Ward & Rogerson, Simon, eds "Computer Ethics & Professional Responsibility: Introductory Text & Readings", Blackwell, 2004

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
V	21UCS53SP01	SELF PACED LEARNING: WEB ETHICS	-	2

Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	1	2	1	3	3	2	2	1	2.0
CO-2	3	3	3	1	1	3	3	3	2	2	2.4
CO-3	3	3	2	3	2	3	3	1	1	1	2.2
CO-4	3	2	2	3	2	3	3	1	2	2	2.3
CO-5	2	2	3	3	2	3	3	3	2	2	2.4
Mean Overall Score											2.29 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21USS54SE03	SEC-3: SOFT SKILLS	2	1

POs (Programme outcomes)

- To provide a focused training on soft skills for students in colleges for better job prospects
- To create and interface between industries and educational institutions in order to match the expectations of employers and abilities of the employees
- To bring a transformation in interpersonal and societal living guided by value laden principals
- To explore and analyze personal attributes that enhance the individual's Interactions, Job Performance and Career Prospects
- To foster teamwork (synergy) that increases productivity and brings benefits to the individuals and the society

PSOs (Programme Specific Outcomes)

After the successful completion of the course, students will learn:

- the various concepts of communication skills as job seekers
- to write a Professional resume as required by the employers
- to demonstrate interview skills and actively participate in GD preparations and presentations in peer groups
- to discover various aspects of self and set short tem and long term goals for successful career and creates a congenial atmosphere
- to have access to solve simple and day to day Arithmetic problems and Verbal and Non-verbal reasoning formulas

Cos (Course Outcomes)

Upon completion of the course, Students will:

- be keen on developing and sustaining Soft Skills required of an educated youth
- be trained to present the best of themselves as job seekers to deal with any problem and conflict situations
- be able to transfer the skills learnt for concrete outcomes and increased productivity of companies
- be able to develop people skills, life skills that are required to be a good human in the long run and set a living standard
- be embedded with Employability skills such as "communication", "teamwork" , "initiative , "enterprise" , the attributes of "reliability", "balance between work -life", "commitment" and continuous learning

Module 1**: Effective Communication**

Definition of communication, Barriers of Communication, Verbal and Non-verbal Communication; Self introduction matrix, Conversation Techniques, Good manners and Etiquettes, Introduction to Professional Communication, Professional Grooming and Presentation Skills and exercises

Module II: **Resume Writing & Interview skills**

Resume Writing: Basic Resume Formats. Types of Resume - Chronological, Functional and Mixed Resume**,** Steps in preparation of Resume, Sample objectives, Model Resumes. **Interview Skills:** Preparation for interview, Common interview questions, Attitude, Body Language, Mock interviews and Practicum, Figuring out common interview questions and answers

Module III: **Group Discussion:** Definition of GD. The salient features of GD,Factors that influence GD, Outcome of GD, Tips for success in GD, Parameters of GD, Essential Points for GD preparation, GD Topics, Model GD and Practicum.

Module IV: **Personal Effectiveness:** Self Discovery: Personality, Traits of Personality; Personality Tests; Intelligence and Skill Assessment Form. **Goal Setting**: Goal setting Process, Questioneers & Presentations

Module V: **Numerical Ability:** Average, Percentage; Profit and Loss**,** Area, Volume and Surface Area. (Simple Interest, Compound Interest; Time and Work, Pipes and Cisterns; Time and Distance**,** Problems on Trains**,** Illustrations, Boats and Streams; Illustrations-Optional)

Module VI: **Test of Reasoning - Verbal Reasoning:** Series Completion, Analogy. **Non-Verbal**
Reasoning

Text Book

Melchias G, Balaiah John, John Love Joy (Eds), 2018. Straight from the Traits: Securing Soft Skills, SJC, Trichy.

References

Aggarwal, R.S. 2010. *A Modern Approach to Verbal and Non Verbal Reasoning*. S.Chand, New Delhi. Covey, Stephen. 2004. *7 Habits of Highly effective people*, Free Press. Egan, Gerard. (1994).
The Skilled Helper (5th Ed). Pacific Grove, Brooks/Cole.
Khera ,Shiv 2003. *You Can Win.* Macmillan Books , Revised Edition.
Melchias G, Balaiah John, John Love Joy (Eds), 2018. Winners in the Making: A primer on soft skills. SJC, Trichy.

Other books

Murphy, Raymond. 1998. *Essential English Grammar*. 2nd ed., Cambridge University Press.
Sankaran, K., & Kumar, M. *Group Discussion and Public Speaking*. M.I. Pub, Agra, 5th ed., Adams, Media.
Trishna's 2006. *How to do well in GDs & Interviews*, Trishna Knowledge Systems.
Yate, Martin. 2005. H*iring the Best: A Manager's Guide to Effective Interviewing and Recruiting**

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS54EG01	GE– 1: ETHICAL HACKING	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	identify various security threats and attacks	K1
CO-2	Interpret various system hacking attacks	K2
CO-3	Model Network Hacking attacks	K3
CO-4	Dissect defending mechanism using Hackers Toolkit	K4
CO-5	appraise and use Penetration testing tools for securing systems	K5

Unit I **(12 hours)**

Introduction to Hacking – Importance of Security – Elements of Security – Phases of an Attack – Types of Hacker Attacks – Hacktivism – Footprinting – Footprinting Tools – WHOIS Tools - DNS Information Tools - Locating the Network Range – Scanning – Scanning Methodology – Scanning Tools - Enumeration – Enumeration Techniques – Enumeration Tools.

Unit II **(12 bours)**

Introduction to System Hacking – Cracking Passwords – Password Cracking Web Sites - Password Guessing - Password Cracking Tools - Password Cracking Counter measures – Escalating Privileges – Executing Applications – Keyloggers And Spyware - Keyloggers And Spyware Counter measures – Hiding Files – Rootkits - Steganography - Covering Tracks.

Unit III **(12 hours)**

Web Application (In) security - Core Defense Mechanisms - Web Application Technologies - Mapping the Application - Bypassing Client-Side Controls - Attacking Authentication - Attacking Session Management - Attacking Access Controls.

Unit IV **(12 hours)**

Attacking Native Compiled Applications - Attacking Application Architecture - Attacking the Application Server - Finding Vulnerabilities in Source Code - A Web Application Hacker's Toolkit - A Web Application Hacker's Methodology

Unit V **(12 hours)**

Introduction to Penetration Testing – Types of Penetration Testing- Phases of Penetration Testing - Penetration-Testing Tools.

Books for Study

1. EC Council, "Ethical Hacking and counter measure attack Phases", 2010.
   Unit 1 – Chapter 1 - 4
   Unit 2 – Chapter 5
   Unit 5 – Chapter 6

2. Dafydd Stuttard, Marcus Pinto, “The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws”, 2nd Edition, 2011.
Unit 3 – Chapter 1 - 8
Unit 4 – Chapter 16 - 21

Books for Reference

1. Michael Gregg, “CEH Certified Ethical Hacker Version 9: Cert Guide”, Second Edition, Pearson, 2017
2. Kenneth C.Brancik “Insider Computer Fraud”, Auerbach Publications Taylor & Francis Group–2008.
3. Gary Hall and Erin Watson, “Hacking”, 2016.
4. Joe Grant, “Ethical Hacking”, 2020
5. Stuart McClure, “Hacking Exposed 7: Network Security Secrets and solutions”, McGraw Hill, Seventh Edition, 2012.
6. John Erickson, “Hacking: The Art of Exploitation”, No Starch Press; 2nd edition, 2008.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS54EG01	GE– 1: ETHICAL HACKING	4	3

Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	2	2	1	3	2	3	3	1	2.4
CO-2	2	3	2	1	2	3	3	2	3	3	2.8
CO-3	1	2	3	2	3	3	3	2	3	3	2.8
CO-4	1	2	2	3	1	3	3	1	2	3	2.4
CO-5	1	2	2	2	3	2	3	1	2	3	2.2
Mean Overall score											2.5

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Semester	Course Code	Title of the Course	Hours	Credit
VI	21UCS63CC11	CORE – 11 : SOFTWARE ENGINEERING	4	3

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- level)
CO-1	recall the various techniques of software process models	K1
CO-2	understand the requirements for a software project	K2
CO-3	develop models for software projects	K3
CO-4	apply the knowledge, techniques, and skills in the development of a software product.	K3
CO-5	compare different software development process models and distinguish the appropriate models for real time project	K4

Unit-I: **(12 hours)**

Introduction to Software Engineering: Introduction - Professional Software Development - Software Processes - Software Process Models - Process Activities - Agile Software Development - Agile methods - Agile development techniques - Agile project management

Unit-II: **(12 hours)**

Requirements Engineering – Functional and non-functional Requirements - Requirements Engineering processes - Requirements elicitation - Requirements Specification - Requirements validation - Requirements Change.

Unit-III: **(12 hours)**

System Modeling: Context Models - Interaction models-Structural Models - Behavioral - Model Driven Architecture - Architectural Design - Design and implementation

Unit-IV: **(12 hours)**

Software Testing: Developmental Testing - Test Driven Development - Release Testing - User Testing - Software Evolution**:** Legacy systems - Software Maintenance.

Unit-V: **(12 hours)**

System Dependability and Security**:** Dependable systems - Reliability Engineering - Safety Engineering - Security Engineering. Software Management - Project Management - Project planning - Quality Management.

Book for Study

1. Ian Sommerville, "Software Engineering", Pearson, 10th Edition, 2017.

Unit-I *Chapter 1 (Sec: 1.1, 1.2), Chapter 2 (Sec 2.1, 2.2), Chapter 3 (Sec 3.1-3.3)*
Unit-II *Chapter 4*
Unit-III *Chapter 5, Chapter 6, Chapter 7*
Unit- IV *Chapter 8, Chapter 9(Sec 9.2, 9.3)*
Unit- V *Chapter 10, Chapter 11, Chapter 12, Chapter 13, Chapter 22, Chapter 24*

Book for Reference

1. Roger S. Pressman, "Software Engineering A Practitioner's Approach", McGraw Hill, International, 8th Edition, New York, 2019.
2. Richard Fairley, "Software Engineering Concepts", McGraw Hill, International Edition 2014.
3. Rajib Mall, "Fundamentals of Software Engineering", PHI, New Delhi, 2014.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
VI	21UCS63CC11	CORE – 11 :SOFTWARE ENGINEERING	4	3

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	2	3	3	3	3	2	2.8
CO-2	2	3	2	3	2	2	3	2	3	3	2.5
CO-3	3	3	3	3	2	2	3	3	2	2	2.6
CO-4	3	2	2	2	2	3	2	2	2	2	2.2
CO-5	2	3	2	3	2	3	3	3	3	3	2.7
Mean Overall Score											2.56 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CC12	CORE – 12: MOBILE APPLICATION DEVELOPMENT USING ANDROID	4	3

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO -1	recall the elements of software development platform to build android programming.	K1
CO-2	understand the UI-component layouts, event handling, and screen orientations to develop mobile applications.	K2
CO-3	apply the Screen Layout and UI Design in Android Framework to implement the android apps.	K3
CO-4	Organize the various resources and examine the parameter passing mechanism among them.	K4
CO-5	design and evaluate the user interfaces to support mobile application development.	K5, K6

Unit–I **(12 hours)**

Introducing the Android Software Development Platform: Understanding Java SE and the Dalvik Virtual Machine-The Directory Structure of an Android Project-Common Default Resources Folders-The Values Folder- Leveraging Android XML- Screen Sizes-Desktop Clocks- Using Android Application Resources-Launching Application: The Android Manifest.xml File - Creating Your First Android Application-Running the App-Adding an Application Icon-Adding Transparency.

Unit–II **(12 hours)**

Android Framework Overview: The Foundation of OOP: The Object-The Blue print for an Object: The Class-Providing Structure for Classes: Inheritance-Defining an Interface-Bundling Classes-An overview of XML- The APK File-Android Application Components-Android Activities- Android Services - Broad cast Receivers - Content Providers – Android Manifest XML.

Unit–III **(12 hours)**

Screen Layout Design- Android View Hierarchies – Nesting Views-Defining Screen Layouts-Editing the main.xml File-Using Relative Layouts- Sliding Drawers-Using Padding and Margins with Views and Layouts.

Unit–IV **(12 hours)**

UI Design: Buttons, Menus, and Dialogs: Using Common UI Elements- Adding an Image Button to Your Layout-Defining Multistate Image Button - Graphics in XML –Editing the main.xml File-Replacing the Default Background- Adding a Text to Your Layout- Adding an Image-Using Menus in Android-Creating the Menu Structure with XML- Running the Application in the Android Emulator- Making the Menu Work-Adding Dialogs.

Unit–V **(12 hours)**

An Introduction to Graphics Resources in Android: Introducing the Drawables-Implementing Images – Creating Animation in Android- Tween Animation in Android-Using Transitions-Creating 9-Patch Custom Scalable Images-Playing Video in Android Apps- SQLite based simple applications

Books for Study

1. Wallace Jackson, "Android Apps for Absolute Beginners", Apress, 2011.
   Unit-I *Chapter 4 (Pages 41 to 65)*
   Unit-II *Chapter 5 (Pages 67 to 87)*
   Unit-III *Chapter 6 (Pages 67 to 112)*
   Unit –IV *Chapter 7 (Pages 115 to 145)*
   Unit - V *Chapter 8 (Pages 147 to 181)*

Books for Reference

1. Dave Smith and Jeff Friesen, "Android Recipes: A Problem –Solution Approach", Rakmo Press (P) Ltd., New Delhi, 2011.
2. J. F. DiMarzio, "Android A Programmers Guide", Tata Mcgraw Hill, New Delhi, 2010.
3. Mark L. Murphy, "The Busy Coder's Guide to Android Development ", Copyright 2008-2010 Commons Ware, LLC. Version 3.0, Feb 2010..

Web Reference:

Android Developer's Guide – available at: http://developer.android.com/

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CC12	CORE – 12: MOBILE APPLICATION DEVELOPMENT USING ANDROID	4	3

Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	3	3	1	3	2	2	3	1	2.4
CO-2	3	2	3	3	2	3	2	3	3	2	2.6
CO-3	3	3	1	3	2	2	3	3	1	2	2.3
CO-4	3	2	3	3	3	3	3	1	2	2	2.5
CO-5	2	3	2	2	1	2	2	3	2	2	2.1
Mean Overall Score											**2.38** (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CP07	Software Lab 7: ANDROID PROGRAMMING	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	remember the different layout design to create mobile apps.	K1
CO-2	understand and explore Android applications related to data storage.	K2
CO-3	design and analyze User Interfaces and Layouts of Android App.	K3
CO-4	experiment on Integrated Development Environment for Android Application Development.	K4
CO-5	appraise the different elements of android programming to build multimedia based mobile applications.	K5, K6

List of Exercises

1. Different Layout design including nested layout
2. Arithmetic Operations
3. Business Calculator
4. Animation: Bouncing of a ball
5. Intent
6. Prepare Student Bio-data using Database SQLite
7. Fragments-Tablet Programming
8. Media Player

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CP07	Software Lab 7: ANDROID PROGRAMMING	3	2

Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	1	3	3	2	2	1	1	2.2
CO-2	2	2	2	2	2	3	2	3	1	3	2.4
CO-3	3	3	2	2	1	1	3	2	3	3	2.3
CO-4	3	3	3	2	2	2	2	3	2	2	2.4
CO-5	3	2	2	3	3	2	3	1	1	1	2.1
Mean Overall Score											2.28 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES03A	DSE -3: BIG DATA ANALYTICS	5	3

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO -1	recall the basics of BigData and its applications	K1
CO-2	Outline big data planning, processing, Storage Techniques and Technologies	K2
CO-3	apply the cutting-edge tools and technologies to analyze Big Data	K3, K4
CO-4	examine various big data tools and techniques	K4
CO-5	evaluate various storage and analytical techniques	K5

UNIT – I **(15 Hours)**

Introduction: Concepts and Terminology – Big Data Characteristics – Different Types of Data – case study Background – Business goals and Obstacles – Business Motivations and Drivers for Big Data Adoption-Marketplace Dynamic – Business Architecture- Business process Management.

UNIT – II **(15 Hours)**

Big data Adoption and Planning Considerations: Organization Prerequisites – Data Procurement – Privacy – Security – Provenance – Limited Realtime Support – Distinct Performance Challenges – Distinct Governance Requirements – Distinct Methodology – Big Data Analytics – Data Identification – Data Acquisition and Filtering – Data Extraction – Data validation and cleansing – Data Aggregation and Representation.

UNIT – III **(15 Hours)**

Enterprise Technologies and Big Data Business Intelligence: Online Transaction and Processing (OLTP) – Online Analytical Processing (OLAP) – Extract Transform Load (ETL) – Data Warehouses – Data Marts.

UNIT – IV **(15 hours)**

Big Data Processing Concepts: Introduction – Parallel Data Processing – Distributed Data Processing – Hadoop – Processing Workloads – Cluster – Processing in Batch Mode – Map – Combine – Partition – Shuffle and Sort.

UNIT – V **(15 hours)**

Big Data Storage Technology: On-Disk Storage Devices – NoSQL Database – In-Memory Storage Device – Big Data Analytics Techniques – Quantitative Analysis – Qualitative Analysis –

Data Mining – Statistical Analysis – A/B Testing – Correlation-Regression – Machine Learning.

Book for Study

1. Paul Buhler, Wajid Khattak and Thomas Erl, "*Big Data Fundamentals: Concepts, Drivers & Techniques*", Prentice Hall Publications, 1st Edition, January 2016.
   Unit I *Chapter 1 and Chapter 2*
   Unit II *Chapter 3*
   Unit III *Chapter 4 and Chapter 5*
   Unit IV *Chapter 6*
   Unit V Chapter *7 and Chapter 8*

Books for Reference

1. DT Editorial Services, "Big Data (Hadoop 2, Map Reduce, Hive, YARN, Pig, R and Data Visualization) Black Book", 1st Edition, Dreamtech Press, 2016.
2. Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, "Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics", Apress Media, 2013.
3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilly Media, 2012.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credit**
VI	**21UCS63ES03A**			**DSE- 3: BIG DATA ANALYTICS**				**5**		**3**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	3	2	1	1	3	3	2	1	1	2.0
CO-2	3	3	3	2	1	3	3	3	1	1	2.2
CO-3	2	2	3	2	2	2	3	2	2	1	2.1
CO-4	3	3	3	1	2	3	2	3	1	1	2.2
CO-5	2	3	3	3	3	2	3	3	3	1	2.6
Mean Overall Score											**2.22 (**High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES03B	DSE- 3: CLOUD COMPUTING	5	3

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO -1	recall the fundamental concepts of cloud computing technology.	K1
CO-2	compare and interpret the various cloud services	K2
CO-3	identify and experiment the virtual machine services and infrastructures.	K3
CO-4	analyze cloud architecture and examine the applications.	K4
CO-5	assess and elaborate the cloud security considerations and models.	K5,K6

UNIT- I **(15 Hours)**

Cloud Computing -Roots of Cloud Computing-Layers-Types of Clouds-Features of a Cloud-Cloud Infrastructure Management - Platform as a Service Providers-Challenges and Risks-Migrating into a Cloud-Broad Approaches to Migrating into the Cloud- Seven-Step Model of Migration into a Cloud.

UNIT –II **(15 Hours)**

Evolution of SaaS- Challenges of SaaS Paradigm-Approaching the SaaS Integration- New Integration Scenarios-Integration Methodologies- SaaS Integration Methodologies- SaaS Integration Products and Platforms-SaaS Integration Services-Business to Business Integration(B2Bi) Services-A Framework of Sensor-Cloud Integration-SaaS Integration Appliances-The Enterprise Cloud Computing Paradigm-Issues for Enterprise Applications on Cloud-Transition Challenges-Cloud Supply Chain

UNIT- III **(15 Hours)**

Introduction and Inspiration-Virtual Machines Provisioning and Manageability-Virtual Machine Migration Services- VM Provisioning and Migration in Action- Provisioning in the cloud Context-Future Research Directions-Virtual machines for cloud infrastructure-Anatomy of cloud Infrastructure-Distributed management of Virtual Infrastructure- Enhancing cloud computing environments using cloud as a service-RVWS Design-Cluster as service.

UNIT- IV **(15 hours)**

The Best Principles of Cloud Computing-A Model for Federated Cloud Computing-Security Considerations-Traditional Approaches to SLO Management- Types of SLA-Life Cycle of SLA-SLA Management in Cloud-Automated Policy-based Management-Best Practices in Architecture Cloud Applications in the AWS Cloud-Cloud Concepts-Cloud Best Practices-Grep TheWeb.

UNIT- V **(15 hours)**

Data Security Considerations – The current state of Data Security in the cloud-Homo Sapiens and Digital Information- Cloud computing and Data Security Risk-Cloud computing and Identity- The cloud, Digital identity and Data Security- Content Level Security-Pros and Cons-Legal issues in Cloud Computing- Data Privacy and Security Issues-Cloud Contracting Models-Virtualization and Data Location-Cloud User's Point.

Books for Study

1. Buyya, James Broberg and AndrzajGoscinski, “Cloud Computing Principles and Paradigms”, Wiley Publication, 2011.

Unit I: Chapter 1 and Chapter 2.
Unit II: Chapter 3 and Chapter 4.
Unit III: Chapter 5,6 and 7.
Unit IV: Chapter 15 and Chapter 16.
Unit V: Chapter 23 and Chapter 24

Books for Reference

1. Buyya, Vecciola and Selvi, “Mastering Cloud Computing: Foundations and Applications Programming”, Tata McGraw Hill, 2013
2.Joseph Ingeno , “Software Architect's Handbook”, Packt Publishing,2018.
3.Scott Goessling , Kevin L. Jackson, “Architecting Cloud Computing Solutions”, Packt Publishing, 2018.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credit
VI	21UCS63ES03B			DSE- 3: CLOUD COMPUTING				5		3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	2	3	3	3	1	2	2.4
CO-5	2	3	3	1	2	2	3	3	2	1	2.3
Mean Overall Score											2.36
Result											# High

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES04A	DSE- 4: INTERNET OF THINGS	5	3

CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO -1	find the characteristics and enabling technologies of IoT	K1
CO-2	Classify the sensors and other necessary hardware for deploying IoT applications	K2
CO-3	select appropriate transport protocols, addressing and identification techniques suitable for IoT Domain	K3
CO-4	analyze the apt cloud services and cloud service providers for IoT based Smart services	K4
CO-5	select appropriate IoT based smart services for real time applications	K5

UNIT- I **(15 Hours)**

Introduction to Internet of Things: Definition of Internet of Things – Application Areas of IoT – Characteristics of IoT – Things in IoT – IoT Stack – Enabling Technologies – IoT Challenges.

UNIT –II **(15 Hours)**

Sensors, Microcontrollers and their interfacing: Introduction to sensor interfacing – Types of Sensors – Controlling sensors through Webpage – Microcontrollers: a quick walkthrough.

UNIT- III **(15 Hours)**

Protocols for IoT: Introduction- Messaging Protocols – XMPP and DDS Protocols – Transport Protocols – Addressing and Identification: Internet Protocol Version 4 – Internet Protocol Version 4 – IPv6 vs IPv4 – Legacy of IPv4 devices – Switching over to IPv6.

UNIT- IV **(15 hours)**

Cloud for IoT: Introduction – IoT with Cloud – challenges – Selection of cloud service provider – Introduction to Fog computing – Cloud computing: Security aspects. Data Analytics: Introduction – Data Analysis.

UNIT- V **(15 hours)**

Application Building with IoT: Introduction – Smart Perishable tracking with IoT and Sensors –

Smart Healthcare – IoT based Application to Monitor Water Quality – Smart Warehouse Monitoring – Smart Retail – IoT based Smart Driver Assistance System – System to measure Collision impact in an accident with IoT – Integrated Vehicle Health Management.

Book for Study

1. Shriram K Vasudevan, Abhishek S. Nagarajan, R.M.D., Sundaran, "Internet of Things", Wiley Publication, United States, 2nd Edition, 2020.

Unit I – Chapter 1
Unit II - Chapter 2
Unit III –Chapter 3, 4
Unit IV -Chapters5, 6
Unit V - Chapter 7

Books for Reference:

1. Arshdeep Bahga and Vijay Madisetti, "Internet of Things- A Hands-on Approach", Universities Press Private Limited, India, 2015
2. Hanes, David, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton and Jerome Henry, "IoT fundamentals: Networking technologies, protocols, and use cases for the Internet of Things". Cisco Press, 2017.
3. Qusay F. Hassan, "Internet of Things A to Z: Technologies and Applications", Wiley Publication, IEEE Press, 2018.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credit
VI	21UCS63ES04A			DSE- 4: INTERNET OF THINGS				5		3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	2	2	3	2	3	2	2	2.3
CO-2	3	3	3	3	2	3	3	3	2	2	2.7
CO-3	2	2	2	2	2	3	2	2	2	2	2.1
CO-4	3	3	3	2	2	3	3	3	3	2	2.7
CO-5	3	3	3	3	2	3	3	3	3	2	2.8
Mean Overall Score											2.52 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES04B	DSE-4: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the fundamentals of artificial intelligence and Machine Learning	K1
CO-2	understand the techniques used for AI and ML applications	K2
CO-3	apply the various AI and ML techniques to real time applications	K3
CO-4	analyze the skills to use the appropriate techniques in AI and ML applications	K4
CO-5	evaluate the design of new artificial intelligence and machine learning applications	K5

UNIT-I **(15 hours)**

Introduction: Definitions of Artificial Intelligence – Artificial Intelligence Problems – Topics of Artificial Intelligence – Timelines of Artificial Intelligence – Production Systems – State Space Representation – Branches of Artificial Intelligence – Applications of Artificial Intelligence.

UNIT-II **(15 hours)**

Heuristic Search Techniques: General and Test – Hill Climbing – Search Techniques – Problem Reduction – Constraints Satisfaction – Means-ends Analysis – Game Playing.

UNIT-III **(15 hours)**

Knowledge Representation: Knowledge Management – Types of Knowledge – Knowledge representation – Approaches to Knowledge Representation – Issues in Knowledge Representation – Knowledge base – First order Logic – Frames – Conceptual Dependency – Scripts – Semantic Network.

UNIT-IV **(15 hours)**

Reasoning: Types of Reasoning – Non-monotonic Inference Methods – Non-monotonic Reasoning – Truth Maintenance Systems – Reasoning with Fuzzy Logic – Rule based Reasoning – Diagnosis Reasoning.

UNIT-V **(15 hours)**

Learning : Types of Learning – Machine Learning: History of Machine Learning – Types in Machine Learning – Aspects of Inputs to Training – Learning Systems – Machine Learning Applications- Quantification of Classification – Intelligent Agents.

Book for Study

1. Vinod Chandra S. S. and Anand Hareendran S. “Artificial Intelligence and Machine Learning”, PHI Learning Pvt Ltd, 2014.

Unit I – Chapter 1

Unit II – Chapter 2, 3
Unit III – Chapter 4, 5
Unit IV – Chapter 7
Unit V – Chapter 8

Book for Reference

1. Stuart J. Russell and Peter Norvit, "Artificial Intelligence A Modern Approach", Third Edition, Pearson Education Limited 2016.
2. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education, 2017.
3. Dr. Dheeraj Mehrotra, " Basics of Artificial Intelligence & Machine Learning", Notion Press, 2019.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
VI	21UCS63ES04B	DSE-4: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	5	3

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	3	2	1	2	2	2	2	1	2.0
CO-2	2	3	3	3	1	2	3	3	2	1	2.3
CO-3	2	3	3	3	1	2	3	3	3	1	2.4
CO-4	2	3	3	3	1	2	3	3	3	1	2.4
CO-5	2	3	3	3	1	2	3	3	3	1	2.4
Mean Overall Score											2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63PW01	PROJECT WORK	3	2

All the B.Sc(CS) students should take up a project work in their sixth semester which needs to apply the knowledge they have gathered in the first five semesters. This could be an application development or system oriented development.
A project guide will approve the project work after going through the synopsis submitted by the student. The project guide will be allotted by the Class-in-charge or the Head of the Department. The synopsis should contain the following.
1. System Analysis
2. System requirements in terms of software and hardware
3. Feasibility Analysis
After the approval from the guide, the students are expected to carry out the project work in the Computer Labs of our college. They should get approval from the guide before start doing the next project work lab by getting the signature of the guide at least a day before the Project work lab.
After the completion of the project work, the students are expected to compile a project work report which will be approved by the guide and it should contain the following.
1. System Analysis.
2. System requirements in terms of software and hardware.
3. Feasibility Analysis.
4. DFD, E-R diagrams, Object-oriented model diagrams, Circuit diagrams, whatever applicable to their project.
5. Tables of Data, Data Dictionary, if applicable.
6. Output models
7. Implementation details.
8. Future enhancements, if any.
9. References / Bibliography, Web references, whatever applicable to their project.

Each volume should be appended with
A. Source Code.
B. Screen shots of model outputs.

Finally, the students should submit the project work in the form of bound volumes of books of A4 size, the number of volumes will be normally two and it may be three depending on the requirements of the Department from time to time, bearing the certificate of bonafide of the work by the guide and of the Head of the Department.
The evaluation of the project work will be done for 100 marks, of which 75 marks for the Internal examiner. The remaining 25 marks for the viva-voce will be jointly evaluated by project guide and an external examiner. The viva-voce will be conducted tentatively during the last week of the semester.

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CE01	COMPREHENSIVE EXAMINATION	-	2

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	recall and explore the concepts and terms related to the subject	K1
CO-2	relate the technical specifications and factors of the subject matter	K2
CO-3	build and classify the various techniques and find the uses of them in each core papers	K3
CO-4	appraise and interpret subject specific concepts	K4
CO-5	synthesize the learned skills.	K5

Unit-I:

DIGITAL COMPUTER FUNDAMENTALS: Number systems - Logic Gates - Arithmetic Circuits - Multiplexers - Demultiplexers -Encoders and Decoders -Sequential Logic Design - Memory Elements

Unit-II:

DATA STRUCTURES AND ALGORITHMS: Arrays – Stacks – Trees - Algorithms: Sorting - Searching - Algorithm Design Methods: Sub goals - Hill Climbing - Working Backward - Heuristics - Backtrack Programming - Recursion. **DATABASE SYSTEMS:** Database - Actionable for DBA. The Entity-Relationship Model – **Normalization - Structured - Query Language** - Procedural Language - Exception Handlers - **Architecture of a Hierarchical DBMS.**

Unit-III:

Programming in C – Control structures – Arrays –Functions- **Object Oriented Programming –** Constructors and Destructors – Inheritance - **Discrete Mathematics – Graphs and Trees – Logic- Operations Research: Introduction to LPP –Transportation and Assignment Problem – Project Scheduling.**

Unit-IV:

OPERATING SYSTEMS: Operating Systems: Computer-System Organization - Computer-System Architecture - Operating System Structure – Operating System - Process Concept: Process Scheduling - Operations on Processes – CPU Scheduling - Main Memory: Contiguous Memory Allocation - Segmentation - Paging. Virtual Memory: Demand Paging - File Concept - Directory and Disk Structure - File-System – Protection

Unit-V:

COMPUTER NETWORKS: Data Communication – Networks – Analog and Digital – Digital Signals – Transmission Impairment - Data Link Layer: Error Detection and Correction -

Wired LAN: IEEE Standards – Standard Ethernet. Wireless LAN - Transport Layer - Application Layer - DNS in the Internet - HTTP.

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Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course				Hours		Credit
VI	21UCS63CE01			COMPREHENSIVE EXAMINATION				-		2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	2	3	2	1	3	3	3	2	2	2.4
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	3	3	3	2	1	3	3	2	3	2	2.5
CO-4	3	3	3	2	1	3	3	3	3	2	2.6
CO-5	3	3	3	2	1	3	3	3	3	2	2.6
Mean Overall Score											2.52 High

Semester	Course Code	Title of the Course	Hours	Credit
VI	21UCS64SE04	SEC-4: (WS): E-Services and Applications	2	1

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the fundamentals of e-services and applications	K1
CO-2	understand the methods of e-services and application	K2
CO-3	apply e-services for various types of applications	K3
CO-4	analyze and use e-services in various applications	K4
CO-5	explore the possibility of applying various e-services	K5

List of Experiments

1. Blog creation
2. Web site creation
3. Railway ticket reservation
4. E-Mailing to the Agency/official Business people
5. Purchase products through online
6. Online Passport Registration
7. Online Fund transfer
8. Electricity Bill Payment
9. Create and display advertisement through online

Relationship matrix for Course outcomes, Programme Outcomes/ Programmes Specific outcomes

Semester	Course Code	Title of the Course	Hours	Credit
VI	21UCS64SE04	SEC-4: (WS): E-Services and Applications	2	1

Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	3	3	2	1	2	3	3	3	1	2	2.3
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	1	2	2.3
CO-4	3	3	3	1	2	3	3	3	1	2	2.4
CO-5	2	2	3	1	2	2	3	3	2	2	2.2
Mean Overall Score											2.34 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS64EG02	GE-2: 3D PRINTING AND DESIGN	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define the fundamental aspects of 3D Printing and Design	K1
CO-2	classify the appropriate applications of 3D Printing	K2
CO-3	identify the necessary materials needed for the 3D Printing	K3
CO-4	compare different techniques and necessary objects for 3D Printing	K4
CO-5	choose the appropriate design and create 3D Printing model	K5, K6

UNIT- I **(12 Hours)**

3D Printers for Modern Manufacturing: Embracing addictive manufacturing – Exploring Applications of 3D Printing. Exploring the types of 3D Printing: Exploring Basic forms of Addictive Manufacturing – Understanding the limitations of Current Technologies.

UNIT –II **(12 Hours)**

Exploring Applications of 3D Printing: Current uses of 3D Printing – Designing for the future with 3D Printing – Examining Moulding and Casting through 3D Printing – Applying Artistic Touches and Personalization – Customizing Designs on the fly.

UNIT- III **(12 Hours)**

Identifying Available Materials for 3D Printing: Exploring Extruded Materials – Identifying Granular Materials – Exploring Photo cured resins – Understanding Bioprinting – Identifying Other Uses for Materials.

UNIT- IV **(12 hours)**

Identifying Sources for 3D Printable objects: Exploring object repositories – Designing in the Computer – Scanning Objects – Capturing Structure from Photographs – Preparing Models for Printing.

UNIT- V **(12 hours)**

Identifying Software and Calibrating your 3D Printer: Finding 3D Design Software and Models – Working with slic3r – Calibrating your 3D Printer – Printing Objects.

Book for Study

1. Richard Horne, Kalani Kirk Hausman, "3D Printing for Dummies", Wiley publications, United States, 2nd Edition, 2017.

Unit I – Chapters 1, 2
Unit II – Chapter 3
Unit III – Chapter 4
Unit IV – Chapter 5,
Unit V – Chapter 15

Books for Reference

1. Dr Sabrie Soloman, "3D Printing and Design", Khanna Book Publishing Co. (P) Ltd, 2020.
2. John M Jordan, "3D Printing", MIT Press, London, 2018
3. James Floyd Kelly, "3D Printing – Build your own 3D printer and Build your own 3D objects", Que Publishing, USA, 2014.

Relationship matrix for Course outcomes, Programme outcomes/ Programmes Specific outcomes

Semester	Course Code			Title of the Course						Hours	Credits
VI	21UCS64EG02			GE-2: 3D PRINTING AND DESIGN						4	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	3	2	1	3	3	3	2	1	2.3
CO-2	2	3	3	2	1	3	3	3	3	2	2.5
CO-3	2	3	3	3	1	3	3	3	2	1	2.4
CO-4	2	3	3	2	1	3	3	3	2	1	2.3
CO-5	3	3	3	2	1	3	3	3	3	1	2.5
Mean Overall Score											2.4 (High)

B.Sc. COMPUTER SCIENCE

SYLLABUS - 2017

SCHOOLS OF EXCELLENCE
with
CHOICE BASED CREDIT SYSTEM (CBCS)

SCHOOL OF COMPUTING SCIENCES
St. JOSEPH'S COLLEGE (Autonomous)
Special Heritage Status Awarded by UGC
Accredited at 'A' Grade (3rd cycle) by NAAC
College with Potential for Excellence Conferred by UGC
DBT-STAR & DST-FIST Sponsored College
TIRUCHIRAPPALLI - 620 002, INDIA

SCHOOLS OF EXCELLENCE
WITH CHOICE BASED CREDIT SYSTEM
(CBCS)

UNDERGRADUATE COURSES

St. Joseph's College (Autonomous), a pioneer in higher education in India, strives to work towards the academic excellence. In this regard, it has initiated the implementation of five "Schools of Excellence" from the academic year 2014 – 15, to standup to the challenges of the 21st century.

Each School integrates related disciplines under one roof. The school system allows the enhanced academic mobility and enriched employability of the students. At the same time this system preserves the identity, autonomy and uniqueness of every department and reinforces their efforts to be student centric in curriculum designing and skill imparting. These five schools will work concertedly to achieve and accomplish the following objectives:

- Optimal utilization of resources both human and material for the academic flexibility leading to excellence.
- Students experience or enjoy their choice of courses and credits for their horizontal mobility.
- The existing curricular structure as specified by TANSCHE and other higher educational institutions facilitate the Credit-Transfer Across the Disciplines (CTAD) - a uniqueness of the choice based credit system.
- Human excellence in specialized areas
- Thrust in internship and / or projects as a lead towards research and
- The multi-discipline nature of the newly evolved structure (School System) caters to the needs of stake-holders, especially the employers.

What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The following Table shows the correlation between credits and hours. However, there could be some flexibility because of practicals, field visits, tutorials and nature of project work.

For UG courses, a student must earn a minimum of 150 credits as mentioned in the table below. The total number of minimum courses offered by a department are given in the course pattern.

SUMMARY OF HOURS AND CREDITS
UG COURSES

Part	Semester	Specification	No. of Courses	Hours	Credits	Total Credits
I	I-IV	**Languages** (Tamil/Hindi/French/Sanskrit)	4	16	12	**12**
II	I-IV	**General English**	4	20	12	**12**
III	I-VI	**Core**				
		Theory	11-16			
		Practicals	3-6			
	V-VI	Project Work	1	90	60	
	IV-VI	**Core Electives**	3	12	12	
	V	Self-paced Learning (Partial Online Course)	1	-	2	
	VI	Comprehensive Examination	1	-	2	
	I-VI	**Allied**	4/6	24	20	
	III & V	**Extra Credit Courses**	**2**	**-**	**(4)**	
	VI	**Internship**	1	-	2	**98**
1V		**Skilled Based Electives:**				
	V	Between Schools (BS)	1	2	2	
	VI	Within School (WS)	1	2	2	
	V	**Inter Departmental Courses (IDC)**				
		Soft Skills / NCC	1	2	2	
		Non-Major Courses (NMC)				
	I	Communicative English	1	-	5	
	II	Computer Literacy	1	2	2	
	III	Environmental Studies (Partial Online Course)	1	2	2	
	I-IV	**Value Education**	4	8	8	**23**
V	I-V	**SHEPHERD & Gender Studies**	-	-		
	I-V	**AICUF, Fine Arts, Nature Club, NCC, NSS**	-	-	-	
	V	**Career Guidance & Training**	**-**	**-**	**-**	**5**
		TOTAL		**180**	**150**	**150 (+4 extra credits)**

Course Pattern

The Undergraduate degree course consists of five vital components. They are as follows:

Part -I : Languages (Tamil / Hindi / French / Sanskrit)
Part-II : General English
Part-III : Core Course (Theory, Practical, Core Electives, Allied, Project, Internship and Comprehensive Examinations)
Part-IV : SBE, NMC, Value Education, Soft Skills/National Cadet Corps and Environmental Studies (EVS)
Part-V : Community Service (SHEPHERD) and Gender Studies, AICUF, Fine Arts, Nature Club, NCC, NSS, etc.

Non-Major Courses (NMC)

There are three NMC's – Communicative English, Computer Literacy and Environmental Studies offered in the I, II & III Semesters respectively.

Extra Credit Courses

In order to facilitate the students gaining extra credits, the extra credit courses are given. There are two extra credit courses – Massive Open Online Courses (MOOC) and Skill-based Course – offered in the III and V Semesters respectively.

According to the guidelines of UGC, the students are encouraged to avail this option of enriching by enrolling themselves in the MOOC provided by various portals such as SWAYAM, NPTEL, etc. Skill based course is offered by the department apart from their regular class hours.

Value Education Courses

There are four courses offered in the first four semesters for the First & Second UG students.

Non-Major Elective / Skill Based Elective

These courses are offered in two perspectives as electives "Within School" (WS) and "Between School" (BS).

Subject Code Fixation

The following code system (11 characters) is adopted for Under Graduate courses:

Year of Revision	UG Code of the Dept	Semester	Specification of the Part	Subject Category	Running no. in that part
↓	↓	↓	↓	↓	↓
17	U##	*x*	*x*	*xx*	*xx*
17	**UCS**	**1**	**3**	**2**	**01**

For Example

I BSc Computer Science, first semester **Problem Solving using 'C'**
The code of the paper is 17UCS130201.
Thus, the subject code is fixed for other subjects.

Subject Category

00 - Languages (Tamil / Hindi / French / Sanskrit)
01 - General English
02 - Core (Theory, Practical, Comprehensive Exams, Internship and Project)
03 - Core Electives
04 - Allied
05 - Extra Credit Courses
06 - Skill Based Electives (BS) & (WS)
07 - Soft Skill
08 - NMC (Communicative English, Computer Literacy/SAP)
09 - EVS (Environmental Studies)
10 - Value Education
11 - Community Service (SHEPHERD) and Gender Studies
12 - AICUF / Nature Club / Fine Arts / NCC / NSS etc.

EXAMINATION: Continuous Internal Assessment (CIA)

UG - Distribution of CIA Marks	
Passing Minimum: 40 Marks	
Library Referencing	5
3 Components	35
Mid-Semester Test	30
End-Semester Test	30
CIA	**100**

MID-SEM & END–SEM TEST

Centralised – Conducted by the office of COE

1. Mid-Sem Test & End-Sem Test: (2 Hours each); will have Objective + Descriptive elements; with the existing question pattern PART-A, PART-B, and PART-C.
2. CIA Component III for UG & PG will be of 15 marks and compulsorily objective multiple choice question type.
3. The CIA Component III must be conducted by the department / faculty concerned at a suitable computer centres.
4. The 10 marks of Part-A of Mid-Sem and End-Sem Tests will comprise only: **Objective Multiple Choice Questions**; **True / False**; and **Fill-in the Blanks**.
5. The number of hours for the 5 marks allotted for Library Referencing work would be 30 hours per semester. The marks scored out of 5 will be given to all the courses of the semester.
6. English Composition once a fortnight will form one of the components for UG General English.

SEMESTER EXAMINATION

Testing with Objective and Descriptive questions

Part-A: Objective MCQs only (30 Marks)

Answers are to be marked on OMR score-sheet. The OMR score-sheets will be supplied along with the Main Answer Book. 40 minutes after the start of the examination the OMR score-sheets will be collected

Part-B & C: Descriptive (70 Marks)

Part-B: 5 x 5 = 25 marks (Inbuilt Choice);
Part-C: 3 x 15 = 45 marks; 3 out of 5 questions (Open Choice).

The Accounts Paper of Commerce will have
Part-A: Objective = 25
Part-B: Descriptive 3 x 25 = 75 marks.

Duration of Examination must be rational; proportional to teaching hours 90 minute-examination / 50 Marks for courses of 2/3 hours/week (all Part IV UG Courses) 3-hours examination for courses of 4-6 hours/week.

Grading System

1. Grading

The total marks will be calculated by adding both CIA and the end-semester examinations for each of the courses. The total marks thus obtained will then be graded as per details provided in the following Table-1.

From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by Semester **Grade Point Average (GPA)** and **Cumulative Grade Point Average (CGPA)** respectively. These two are calculated by the following formulae:

$$\text{GPA} = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}, \qquad \text{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$$

where, 'C_i' is the Credit earned for the Course-*i,*
'G_i' is the Grade Point obtained by the student for the Course '*i*',
'M' is the marks obtained for the course '*i*', and
'*n*' is the number of Courses **Passed** in that semester.

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

2. Classification of Final Results

i) For each of the three parts, there shall be separate classification on the basis of the CGPA, as indicated in the following Table-2.

ii) For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts/Science/Commerce/Management/Literature as Outstanding/Excellent/Very Good/Good/Above average/Average, the marks and the corresponding CGPA earned by the candidate in Part-III alone will be the criterion, provided he/she has secured the prescribed passing minimum in the LCs and the ELCs.

iii) Grade in Part-IV and Part-V shall be shown separately and it shall not be taken into account for classification.

iv) Absence from an examination shall not be taken as an attempt.

Table-1: Grading of the Courses

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above but below 90	9	A+
70 and above but below 80	8	A
60 and above but below 70	7	B+
50 and above but below 60	6	B
40 and above but below 50	5	C
Below 40	0	RA

Table-2: Final Result

CGPA	Classification of Final Results	Corresponding Grade
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appearance

Credit based weighted Mark System isadopted for individual semesters and cumulative semesters in the column 'Marks Secured' (for 100).
A Pass in SHEPHERD will continue to be mandatory although the marks will not count for the calculation of the CGPA.

Declaration of Result:

Mr./Ms. _____ has successfully completed the Under Grduate in _____ programme. The candidate's Cumulative Grade Point Average (CGPA) in Part-III is _____ and the class secured is _____ by completing the minimum of 150 credits. The candidate has acquired _____ (if any) more credits from SHEPHERD / AICUF/ Fine Arts / Sports & Games / NCC / NSS / Nature Club etc. The candidate has also acquired _____ (if any) extra credits offered by the parent department courses.

Bachelor of Computer Science
Course Pattern - 2017 Set

Sem	Part		Code	Course	Hr	Cr
I	I	Language	17UGT110001	Language – I (Tamil / Hindi / French / Sanskrit)	4	3
	II	English	17UGE120101	General English - I	5	3
	III	Core	17UCS130201	Problem Solving using C	5	3
			17UCS130202	Digital Computer Fundamentals	5	3
			17UCS130203	Software Lab-I (Problem Solving using C)	3	2
		Allied	17UCS130401	Allied I: Mathematics I	6	5
	IV	NMC	17UCE140801	Communicative English	-	5
		V. Edn.	17UFC141001	Essentials of Humanity	2	2
	Total for Semester I				**30**	**26**
II	I	Language	17UGT210002	Language – II (Tamil, Hindi, French, Sanskrit)	4	3
	II	English	17UGE220102	General English – II	5	3
	III	Core	17UCS230204	Programming in C++	4	3
			17UCS230205	Discrete Mathematics	4	3
			17UCS230206	Software Lab–II (C++)	3	2
		Allied	17UCS230402	Allied I: Mathematics II	6	5
	IV	NMC	17UCE240802A	Computer Literacy	2	2
		V. Edn.	17UFC241002	Fundamentals of Human Rights	2	2
	Total for Semester II				**30**	**23**
III	I	Language	17UGT310003	Language – III (Tamil / Hindi / French / Sanskrit)	4	3
	II	English	17UGE320103	General English – III	5	3
	III	Core	17UCS330207	Database Systems	4	3
			17UCS330208	Systems Analysis and Design	4	3
			17UCS330209	Software Lab–III(RDBMS)	3	2
		Extra Credit Course	17UCS330501	Massive Open Online Course	-	(2)
		Allied	17UCS330403A	Allied II: Applied Physics – I	6	4
			@	Applied Physics Practical – I / (or)		
			17UCS330403B	Allied II: Principles of Electronics	(6)	(4)
			@	Electronics Practical – I		
	IV	NMC/ EVS	17UCE340901	Environmental Studies (Partial Online Course)	2	2
		V. Edn.	17UFC341003A	Formation of Youth–I (For Non- Catholic) (or)	2	2
			17UFC341003B	Religious Doctrine- I (For Catholic)		
	Total for Semester III				**30**	**22+(2)**

IV	I	Language	17UGT410004	Language – IV (Tamil / Hindi / French/ Sanskrit)	4	3
	II	English	17UGE420104	General English – IV	5	3
	III	Core	17UCS430210	Data Structures and Algorithms	5	3
			17UCS430211	Software Lab – IV (Data Structures using C and C++)	4	3
		Core Elec. I (WD)	17UCS430301A	Micro Computer Architecture (or)	4	4
			17UCS430301B	Design and Analysis of Algorithms (or)		
			17UCS430301C	Business Process Outsourcing		
		Allied	17UCS430404A	Allied II: Applied Physics II (or)	4	4
			17UCS430404B	Allied II: Communication Electronics		
			17UCS430405A	Applied Physics Practical II (or)	2	2
			17UCS430405B	Electronics Practical II		
	IV	V. Edn.	17UFC441004A	Formation of Youth –II (for Non-Catholic) (or)	2	2
			17UFC441004B	Religious Doctrine-II (for Catholic)		
	Total for Semester IV				30	24
V	III	Core	17UCS530212	Programming in Java	4	3
			17UCS530213	Distributed Technologies	4	3
			17UCS530214	LAMP	5	4
			17UCS530215	Software Lab–V (Java)	3	2
			17UCS530216	Software Lab–VI (LAMP)	3	2
				Hardware Lab	3	*
		Extra Credit Course	17UCS530502	Extra Credit Course	-	(2)
		Core Ele.II (WS)	17UCS530302A	XML (or)	4	4
			17UCS530302B	Ruby on Rails		
		SPL (POC)	17UCS530217	Python Programming	-	2
	IV	SBE (BS)	17UCS540601A	Desktop Publishing Tools (or)	2	2
			17UCS540601B	Multimedia I		
		IDC	17USS540701A	Soft Skills (or)	2	2
			17USS540701B	National Cadet Corps (NCC)		
	Total for Semester V				30	24
VI	III	Core	17UCS630218	Computer Networks	5	3
			17UCS630219	Operating Systems	5	3
			17UCS630220	Operations Research	5	3
			17UCS630221	Software Lab-VII: Distributed Technologies	3	2
			17UCS630222	Hardware Lab (Electronics)	3	2
			17UCS630223	Comprehensive Examination	-	2
			17UCS630224	Internship	-	2
			17UCS630225	Project Work	3	3
		Core Elec. III (WS)	17UCS630303A	Computer Graphics (or)	4	4
			17UCS630303B	Web Graphics		
	IV	SBE (WS)	17UCS640602A	E-Commerce	2	2
			17UCS640602B	Multimedia II		
	Total for Semester VI				30	26
I-V	V	SHEPHERD	17UCW651101	SHEPHERD & Gender Studies		5
	Total for all semesters				**180**	**150+4**

Programme Outcomes (POs):

1. Undergraduate students are to be passionately engaged in initial learning with an aim to think differently as agents of new knowledge, understanding and applying new ideas in order to acquire employability/ self-employment.
2. Undergraduate students are encouraged to take up higher learning programmes.
3. Undergraduate students are made to be competent and socially responsible citizen of India.
4. Undergraduate students are to be exposed to technical, analytical and creative skills.
5. Undergraduate students are to be imparted with a broad conceptual background in the Biological sciences / Computing sciences / Languages and culture / Management studies / Physical sciences.

Programme Specific Outcomes (PSOs):

1. Possess basic knowledge on core concepts of Computer Science.
2. Ability to solve problems using programming languages and software tools.
3. Capable of analyzing, designing, developing, testing and implementing software systems.
4. Attain holistic knowledge in Mathematics, Electronics, Computer Science courses.
5. Possess social and ethical values.
6. Empowered with analytical mind and critical thinking.
7. Ability to communicate the technical aspects of systems with peers and customers.
8. Possess employability and entrepreneurship skills.

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பருவம்: 1 **மணி நேரம்: 4**

17UGT110001 **புள்ளிகள்: 3**

பொதுத்தமிழ்-I

பாடத்தின் விளைவு

- சமூக மாற்றச் சிந்தனைகளை உள்ளடக்கிய தற்கால இலக்கியப்பரப்பை அறிதல்
- புதுக்கவிதை, சிறுகதை, உரைநடை ஆகியவற்றின் இலக்கியத்திறன் கண்டறிதல்.
- சந்திப்பிழையின்றி எழுதும் திறன் பெறுதல்.
- வாழ்க்கை வரலாற்றுக் கட்டுரைகளை வாசிக்கும் திறன் பெறுதல்.
- அன்றாடப் பயன்பாட்டிலுள்ள ஆங்கிலச்சொற்களுக்குப் பொருத்தமான சொற்களை உருவாக்கச்செய்தல்
- அரசுப்போட்டித் தேர்வுகளுக்கேற்ப தமிழ்மொழியில் பயிற்சி அளித்தல்.

அலகு-1 மகாகவி பாரதியார் கவிதைகள்
பாரதிதாசன் கவிதைகள்
நாமக்கல் கவிஞர் கவிதைகள்
உரைநடை - முதல் மூன்று கட்டுரைகள் (12 மணி நேரம்)

அலகு-2 பாவலரேறு பெருஞ்சித்திரனார் பாடல்கள்
கண்ணதாசன் கவிதைகள்
இலக்கிய வரலாறு (பக். 239- 300)
இலக்கணம் -வலிமிகும் இடங்கள் (14 மணி நேரம்)

அலகு-3 சமூகக்கவிதைகள்
இலக்கிய வரலாறு (பக்.300 -362)
சிறுகதை - முதல் ஆறு சிறுகதைகள் (14 மணி நேரம்)

அலகு-4 அரசியல் கவிதைகள்
இலக்கணம் - வலி மிகா இடங்கள் (10 மணி நேரம்)

அலகு-5 மொழிபெயர்ப்புக்கவிதைகள்
சிறுகதை- 7 முதல் 12 முடிய உள்ள சிறுகதைகள்
உரைநடை- 4முதல் 6 முடிய உள்ள கட்டுரைகள்
(10 மணிநேரம்)

பாடநூல்

1. பொதுத்தமிழ்- செய்யுள் திரட்டு- தமிழாய்வுத்துறை வெளியீடு-2017-2020
2. சமூகவியல் நோக்கில் தமிழ் இலக்கிய வரலாறு, தமிழாய்வுத்துறை வெளியீடு, தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி-2
3. உரைநடை நூல் - தமிழாய்வுத்துறை வெளியீடு.
4. சிறுகதைத்தொகுப்பு : (நாட்டுடைமையாக்கப்பட்ட படைப்பாளர்களின் சிறுகதைகள்), தமிழாய்வுத்துறை வெளியீடு.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UGT110001					Title of the Paper பொதுத்தமிழ்-1								Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	5	4	3	5	5	4	4	4	3	3	4	5	4.2	
CO2	5	5	5	3	4	5	4	5	4	3	3	4	5	4.2	
CO3	4	4	5	4	3	4	3	5	4	3	3	4	5	3.9	
CO4	5	5	4	4	4	5	5	5	4	3	5	5	5	4.5	
CO5	5	5	5	4	4	4	4	5	4	3	4	5	5	4.0	
CO6	5	5	5	3	4	4	4	4	4	5	4	3	5	3.8	
													Mean Overall Score		4.1

Result: The Score for this Course is 4.1 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$ | **Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester: I **Hours/Week: 4**
17UGH110001 **Credits : 3**

HINDI-I

Course Outcomes

At the end of the course, a student should be able to demonstrate…

* Knowledge and understanding of Hindi Conversations
* Improvement of the writing skills.
* Knowledge of Grammar forms
* Effective communicative skills in Hindi.
* The introduction of socially relevant subjects in Modern Hindi Literature
* Appreciation the features of Modern Hindi Prose.

Unit- I **8 hours**

Dr Abdul Kalam, Ling Badaliye, Vachan Badaliye, Baathcheeth-Aspathal Mein

Unit-II **12 hours**

Hamara Rajchinha, Noun Ling, Kaarak Chinha, Chaar Baayee, Baathcheeth, Dookan Mein

Unit-III **12 hours**

Moun hee mantra hai, Vachan, Kaarak, Vishwamitra Ka yagna, Baathcheeth, Hotel mein

Unit-IV **14 hours**

Veer Shivaji, Pronoun, Danush Yagna, Baathcheeth-Maidaan mein

Unit-V **14 hours**

Rajatilak Kee Thaiyaree, Adjectives, Baathcheeth-Pareeksha ke baare mein

Books Recommended

1. Dakshina Bharathi Hindi Prachar Sabha, Thiagaraya Nagar, Chennai – 600 017, Subhodh Hindi Patamala-2, Bharath Milap, Bharath-1, 2016.
2. Ramdev, Vyakaran Pradeep, Hindi Bhavan, 63, Tagore Nagar, Allahabad 2, 2016.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UGH110001	Title of the Paper Hindi-I									Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	
CO1	4	4	4	3	4	2	2	2	3	4	4	3.2
CO2	3	3	2	3	2	4	4	4	3	3	2	3.0
CO3	3	2	2	3	4	2	2	2	3	4	4	2.8
CO4	3	2	2	3	2	4	4	4	4	2	2	2.9
CO5	3	3	3	3	3	3	4	4	3	3	3	3.2
CO6	4	4	4	4	3	4	3	2	4	3	3	3.4
											Mean Overall Score	3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester: I **Heures /Semaine: 4**
17UGF110001 **Credits: 3**

FRANÇAIS-I

Course Outcomes

* Introduire la langue et la culture française aux étudiants
* Comparer la culture de l'Inde et de la France
* Familiariser l'étudiant avec le vocabulaire
* La grammaire et les conversations se présenter
* Donner des informations en Français
* Conjuguer des verbes, Avoir Etre Aller Faire

Unit-I : Al'aéroport Kamaraj domestic de Chennai **(10 heures)**

Saluer, demander et dire le nom, présenter quelqu'un, se présenter, souhaiter la bienvenue a quelqu'un, demander et dire l'identité de quelqu'un.

Grammaire : Etre, s'appeler, pronoms sujets, interrogation

Unit-II : A l'Université **(10 heures)**

Demander comment on se porte, présenter quel qu'un, prendre congé, exprimer, l'appréciation.

Grammaire : Articles définis et indéfinis, genre des noms, adjectifs, présent de l'indicatif : verbes réguliers en er, être avoir, apprendre, prépositions a, en, au, aux.

Unit-III : Au café **(10 heures)**

Dire ce qu'on aime, donner des informations, exprimer l'admiration, demander des informations sur quelqu'un.

Grammaire : Adjectifs interrogatifs, présent de l'indicatif : avoir, verbes en er , savoir, qu'est ce que c'est?, adjectifs possessifs, négation ,adjectifs irréguliers

Unit-IV : A la plage **(15 heures)**

Proposer une sortie, accepter, refuser la proposition

Grammaire : phrases au singulier et au pluriel, pronom indéfini- on, il y a, adjectifs démonstratifs, négation, interrogation, présent de l'indicatif : faire, voir, aller, sortir, connaitre

Unit-V : Un concert et chez Nalli **(15 heures)**

Inviter, accepter, exprimer son incapacité d'accepter, complimenter, parlé au téléphone, demander le prix, protester contre le prix.

Grammaire : Présent de l'indicatif : verbes en er, venir, pouvoir, vouloir, articles contracte, avec, a chez, le futur, interrogation est ce que, adverbes

interrogatifs, adjectifs possessifs, accord de l'adjectif, adjectifs exclamatifs, très/trop, présent de l'indicatif : acheter-regarder, l'impératif.

Manuel:

1. K.Madanagobalane, **Synchronie-1**, Samhitâ Publication, 2011.

Livre de référence:

1. Annie Berthet /B_atrix Sampsonis/ Catherine Hugot /V_ronnique M Kizirian / Monique Waendendries, **Alter Ego A1**, Hachette, 2006.
2. Yves Loiseau/R_gineM_rieux, Connexions 1, Didier, 2011.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester 1	Course Code 17UGF110001					Title of the Paper French-I						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	2	3	4	4	4	2	2	3	3		3.2
CO2	3	3	3	3	4	4	4	3	3	3	2		3.2
CO3	3	2	3	2	4	3	2	4	4	3	3		3.0
CO4	3	3	4	3	4	2	2	3	3	2	2		2.8
CO5	3	3	4	3	4	3	3	3	4	5	2		3.4
CO6	3	4	3	3	3	3	3	3	2	4	3		3.1
										Mean Overall Score			3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: I **Hours/Week: 4**
17UGS110001 **Credits : 3**

SANSKRIT-I

Course Outcomes

At the end of the course, a student should be able to demonstrate…

* Knowledge and understanding of basic Sanskrit grammar
* Knowledge and understanding of essential Sanskrit vocabulary
* Introduction of the writing skills
* Introduction of Sanskrit Aksharas.
* Introduction of Present tense forms
* Implementation of good thoughts from Subashitani

Unit-I **8 hours**

Akharavivaranam – Svaras & Vyanjanaani – Samyukta Aksharani.

Unit-II **12 hours**

Shabdadayah – Aakaaraanta, ikaar aantah. ukaaraantah.

Shabdadayah – Aakaaraanta, iikaar aantah. uukaaraantah.

Unit-III **12 hours**

Anuvaada Prayogah.

Unit- IV **14 hours**

Lat Lakarh – Parasmai – Pada Prayogah = Vakyarupah.

Unit-V **14 hours**

Subhaashitaani

Books Recommended

1. Kulapathy, K. M., Saral Sanskrit Balabodh, Bharathiya Vidya Bhavan, Munshimarg, Mumbai-400 007, 2014
2. R.S. Vadhyar & Sons, Book-Sellers and Publishers, Kalpathi, Palghat-678003, Kerala, SOuth India, Shabdha Manjari, 2014
3. Balasubramaniam R., Samskrita Akshara Siksha, Vangals Publication, 14th Main Road, JP Nagar, Bangalore -78, 2015.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UGS110001					Title of the Paper Sanskrit-I						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	5	3	5	4	4	3	3	3	3	3	4		3.1
CO2	4	3	4	4	4	4	4	4	4	3	4		3.3
CO3	4	3	3	4	4	3	4	4	3	3	4		3.1
CO4	4	3	3	4	3	3	4	4	3	3	4		3.0
CO5	4	4	4	3	4	4	3	3	3	4	4		3.1
CO6	5	4	4	4	4	3	3	3	3	3	4		3.1
									Mean Overall Score				3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: I **Hours/Week: 5**
17UGE120101 **Credits: 3**

GENERAL ENGLISH-I

Course Outcome

* Introduce themselves to the others
* Narrate simple experiences in a coherent manner
* Understand the underlying meaning in the text
* Describe accurately what he/she observes and experiences
* Converse with friends about their likes and dislikes
* Write leave letters using the appropriate format and language

Unit-I:

01. Personal Details
02. Positive Qualities
03. Listening to Positive Qualities
04. Relating and Grading Qualities
05. My Ambition
06. Abilities and Skills
07. Self-Improvement Word Grid
08. What am I doing?
09. What was I doing?
10. Unscramble the Past Actions
11. What did I do yesterday?

Unit-II:

12. Body Parts
13. Actions and Body Parts
14. Value of Life
15. Describing Self
16. Home Word Grid
17. Unscramble Building Types
18. Plural Form of Naming Words
19. Irregular Plural Forms
20. Plural Naming Words Practice
21. Whose Words?

Unit-III:

22. Plural Forms of Action Words

23. Present Positive Actions
24. Present Negative Actions
25. Un/Countable Naming Words
26. Recognition of Vowel Sounds
27. Indefinite Articles
28. Un/Countable Practice
29. Listen and Match the Visual
30. Letter Spell - Check
31. Drafting Letter

Non-Detailed:

"The Merchant of Venice" from *Six Tales From Shakespeare*

Unit-IV:

32. Friendship Word Grid
33. Friends' Details
34. Guess the Favourites
35. Guess Your Friend
36. Friends as Guests
37. Introducing Friends
38. What are We Doing?
39. What is (s)he / are they Doing?
40. Yes / No Question
41. What was s/he doing?
42. Names and Actions
43. True Friendship
44. Know your Friends
45. Giving Advice/Suggestions
46. Discussion on Friendship
47. My Best Friend

Non-Detailed:

"The Taming of the Shrew" from *Six Tales From Shakespeare*

Unit-V:

48. Kinship Words
49. The Odd One Out
50. My Family Tree
51. Little Boy's Request

52. Occasions for Message
53. Words denoting Place
54. Words denoting Movement
55. Phrases for Giving Directions
56. Find the Destination
57. Giving Directions Practice
58. SMS Language
59. Converting SMS
60. Writing Short Messages
61. Sending SMS
62. The family debate
63. Family Today

Non-Detailed: **"The Tempest" from *Six Tales From Shakespeare***

Textbook

1. Joy, J.L. & Peter, F.M. *Let's Communicate 1*, New Delhi, Trinity Press, 2014. Print.

Non-Detailed Text

1. Dodd, E F. *Six Tales From Shakespeare*. London: Macmillan, 1987. Print. (First three tales)

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UGE120101						Title of the Paper General English-I								Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	3	4	4	4		5	4	4	4	3	3	4	4		3.80
CO2	4	3	4	4	4		5	5	4	4	4	4	4	4		4.10
CO3	4	3	4	4	4		3	3	4	4	3	3	4	4		3.60
CO4	4	3	2	4	4		4	4	3	3	5	5	4	4		3.80
CO5	4	3	4	4	4		4	4	3	3	4	4	5	5		3.90
CO6	5	4	4	3	3		4	4	3	4	4	5	4	4		3.90
													Mean Overall Score			3.85

Result: The Score for this Course is 3.85 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester I **Hours/Week: 5**
17UCS130201 **Credits: 3**

PROBLEM SOLVING USING C

Course Outcomes

After learning this course, the learner would have acquired

* Knowledge on problem solving using the computer
* Knowledge on constructs of C Language
* Skills in writing C programmes
* Ability to use the functions efficiently
* Skill on memory management and use of printers
* Ability to design and use structures

Unit-I **(15 hours)**

Algorithms - Flow charts - Developing algorithms and flowcharts for solving simple problems using sequential, selection and iterative programming Structures.

Unit-II **(15 hours)**

Structure of a C program - Data Types – Constants and Variables – Operators and Expressions - Control structures - Looping structures.

Unit-III **(15 hours)**

Arrays - Functions - Built-in-functions - User defined functions - Scope of Variables - Passing Arrays to function - Strings.

Unit-IV **(15 hours)**

Pointers: Introduction - Pointer Array - Pointer Arithmetic - Pointer of Pointer - Functions and Pointers - Call by value and call by reference - Structures and Pointers - Dynamic Allocation - Function pointer.

Unit-V **(15 hours)**

Type modifiers and storage class specifiers - Structures – Basics of structures – Declaration of structure – Referencing Structures elements - Array of Structures – Nesting of structures - Passing Structures to function – Union.

Books for Study

Unit I

1. S. Jaiswal, “Information Technology Today”, Galgotia Publications, New Delhi.

Unit II, III, IV, V

2. E.Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill, New Delhi, Seventh Edition, 2016.

Books for Reference

1. Byron S. Gottfried, “Programming with C”, Schaum’s Outline Series, Tata-McGraw Hill Edition, New Delhi, 1991.
2. Yashavant Kanetkar, “Let us C”, BPB Publications, Tenth Edition, New Delhi: 2010.
3. Brian W. Kernighan, Dennis M. Ritchie, “The C Programming Language”, Prentice Hall of India Pvt. ltd., New Delhi, 1989.
4. E. Karthikeyan, “A Textbook on C Fundamentals, Data Structures and Problem Solving”, Prentice-Hall of India Private Limited, New Delhi, 2008.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UCS130201					Title of the Paper: PROBLEM SOLVING USING 'C'								Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	4	3	4	4	3	4	4	3	3	4	3	3	3.5	
CO2	3	4	3	4	3	4	4	3	3	3	4	3	2	3.3	
CO3	4	4	3	4	4	3	4	3	3	3	4	2	3	3.2	
CO4	3	4	3	3	3	4	3	4	3	3	4	2	2	3.1	
CO5	4	4	3	3	4	3	3	3	3	3	3	2	2	3.0	
CO6	4	4	3	4	4	4	3	4	3	2	3	3	2	3.3	
													Mean Overall Score		3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester I **Hours/Week: 5**
17UCS130202 **Credits: 3**

DIGITAL COMPUTER FUNDAMENTALS

Course Outcomes:

After learning this course, the learner will be able to

* Understand the Digital number system and their conversions
* Identify the operations of logic Gates and simplify the Boolean expressions using K-Map
* Comprehend the fundamental principles of simple Arithmetic Circuits
* Know the design and operations of Data Processing Circuits
* Realize the design of sequential logic circuits such as Flip Flops, Registers and Counters and its applications
* Gain the knowledge about the memory elements like RAM, ROM, and Magnetic Disk memories.

Unit-I **(15 hours)**

Number Systems: Number systems - Decimal, Binary, Octal, Hexadecimal - conversion from one to another. Characters and codes: ASCII code, Excess-3 code, gray code - binary addition, subtraction, multiplication and division - unsigned binary numbers - signed magnitude numbers - complements in number systems

Unit-II **(15 hours)**

Logic Gates: AND, OR, NOT, NOR & NAND gates, EX-OR gates. Boolean Algebra and Boolean laws and theorems: De Morgan's theorems - Duality theorem - simplification of sum of product and product of sum expressions - Karnaugh map and simplifications.

Unit-III **(15 hours)**

Simple arithmetic circuits: Half and Full adders - Binary adder/subtracter - BCD adder Data processing circuits: Multiplexers - Demultiplexers -Encoders and Decoders.

Unit-IV **(15 hours)**

Sequential Logic Design: Flip-flops - RS, JK, D & T Flip flops - Master / Slave Flip flop - Shift Registers - Counters - Asynchronous and Synchronous Counters.

Unit-V **(15 hours)**

Memory Elements: RAM - static RAM - Dynamic RAM - ROM - Magnetic Disk memories - Magnetic tape - Cache Memory.

Books for Study

1. Donald P. Leach and Albert Paul Malvino, "Digital Principles and Application", Fifth Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2003. (Units: I-IV)
2. Thomas C. Bartee, "Computer Architecture and Logic Design", McGraw Hill International Edition, New Delhi, 1991. (Unit: V)

Books for Reference

1. Virendra Kumar, "Digital Technology Principles and Practice", New Age International, New Delhi, 2006.
2. Jaydeep Chakravorty, "Digital Electronics and Logic Design", Universites Press, 2012, ISBN : 8173717613

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UCS130202	Title of the Paper: DIGITAL COMPUTER FUNDAMENTALS											Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	5	4	4	1	5	2	1	4	1	2	4	2	3.0
CO2	4	5	4	4	1	4	2	1	4	1	4	3	2	3.0
CO3	4	5	4	4	1	4	2	1	4	1	4	3	2	3.0
CO4	4	5	4	4	1	4	2	1	4	1	4	3	2	3.0
CO5	4	5	4	4	2	4	2	1	4	1	4	4	2	3.1
CO6	4	5	4	4	3	4	2	1	4	3	4	5	3	3.5
											Mean Overall Score			3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester I **Hours/Week: 3**
17UCS130203 **Credit: 2**

Software Lab - I

PROBLEM SOLVING USING C

Course Outcomes

1. To develop good understanding of the C language and the art of development in an environment, such as Turbo C.

Detailed Study:

1. Simple problems using Operators
2. Problems using Branching structures (If, switch, goto)
3. Problems using looping structures (for, while, do-while)
4. Problems on operations on single dimensional array
5. Problems using Matrix operations
6. Problems using String manipulations (Using Array)
7. Problems on Working with functions
8. Problems on Working with Recursive Functions
9. Problems on Working with Pointers
10. Problems on Working with Structures

Semester I **Hours/Week: 6**
17UCS130401 **Credits: 5**

Allied:

MATHEMATICS-I

Course Outcomes

* Solving simultaneous linear equations using matrices.
* Understanding the importance of solving differential equations in industry related problems.
* Ability to solve the problems in series.
* Understand the application of Laplace transform.
* Apply Fourier series to express a continuous functions.

Unit I: Matrices and Determinants **(18 hours)**

Solutions of system of linear equations - Using Cramer's rule- Rank of a matrix using linear independence and dependence - Eigen values and Eigen vectors of a matrix - Cayley Hamilton's Theorem (Without proof). (Chapter I, Section 1.20-1.23, Chapter III, Section 3.1- 3.5 and Chapter V, Section 5.1- 5.4, 6.3)

Unit II: Differential Equations **(18 hours)**

Second order differential equations - all the types of equations with constant coefficients. (Chapter V, Sections 47-60s). Partial Differential Equation: Formation- General, singular, particular integrals- standard forms-Lagrange's formPp + Qq = R. (Chapter VI Section 1-6)

Unit III: Series **(18 hours)**

Concept of limit of a function - simple problems- convergence, divergence and oscillation of a series- geometric series - test of convergence and divergence, comparisons ratio and root test (without proof). (Chapter VI, Section 1-14)

Unit IV: Laplace Transforms **(18 hours)**

Definition- properties- the inverse transforms- solving differential equations using Laplace transforms (Chapter IV Section 1-5)

Unit V: Fourier Series **(18 hours)**

Fourier series - Even and odd functions - properties of odd and even functions - Half range Fourier series (Omitting general interval). (Chapter IV, Sections 1-5.2)

Textbooks

1. Venkataraman, M.K., "Engineering Mathematics" (Vol II) Third Edition, The National Publishing Co., Madras, 1988. (Full for Unit I & II)
2. Venkataraman, M.K., "Higher Mathematics for Engineering and Science", Third Edition, The National Publishing Co., Madras, 1986. (For Unit III)
3. Narayanan and ManickavachagamPillai, " Ancillary Mathematics" Book II, S. Viswanathan Pvt. Ltd., Madras (For unit IV & V).

References

1. S.Narayanan, R.Hanumantha Rao, T.K.Manicavachagom pillay,"Ancillary Mathematics" Volume-I-2009 edition.
2. S.Narayanan & T.K.Manichavachagom Pillay,"Differential equation and its applications", S.Viswanathan pvt.Ltd.2001.
3. S.Narayanan, R.Hanumantha Rao, T.K.Manicavachagom Pillay, "Ancillary Mathematics", Volume-II, 2010 edition.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UCS130401					Title of the Paper: Allied: MATHEMATICS-I								Hours 6	Credits 5
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
CO2	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
CO3	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
CO4	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
CO5	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
CO6	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
CO7	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
CO8	5	4	1	4	5	5	5	4	2	2	4	4	2	3.6	
													Mean Overall Score	3.6	

Result: The Score for this Course is 3.6 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester I **Hours/Week:2**
17UFC141001 **Credits: 2**

ESSENTIALS OF HUMANITY

Course Outcome

1. To ensure creating awareness among the youth on human values.
2. To ensure educating the youth, the basic principles of value education.
3. To ensure the process of analyzing, appreciating and personalizing values as our own.
4. To ensure that students develop various dimensions of human personality.
5. To ensure the youth empowering the gender sensitization, gender differences and gender roles.
6. To ensure preparing the students for the smooth transfer from the stage of teenage to earlier adulthood.

Unit-I

Principles of Value Education - Introduction - Value Education- Characteristics of Values – Kinds of Values

Unit-II

Development of Human Personality - Personality traits - Theories of Personality - Discovering self- Defense mechanism - Power of positive thinking

Unit-III

Dimensions of Human Development - Physical development – Intellectual development - Emotional development - Social Development – Moral development - Spiritual development

Unit-IV

Responsible Parenthood - Human sexuality - Sex and love - Becoming a spouse - Responsible Parenthood

Unit-V

Gender Equality and Empowerment - Historical perspective - Education & economic development -Crimes against Women-Women's rights

Text Book:

Essentials of Humanity, Department of Foundation course, St.Joseph's College, Tiruchirappalli-2, 2016.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UFC141001					Title of the Paper ESSENTIALS OF HUMANITY								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	3	1	5	4	3	5	4	5	5	5	5	4	3	4.0	
CO2	2	1	5	5	3	5	4	5	5	5	5	4	3	4.0	
CO3	2	1	5	5	4	5	4	4	5	5	5	5	3	4.1	
CO4	2	2	5	4	2	5	4	4	5	4	5	5	5	4.0	
CO5	5	2	5	5	2	5	4	4	5	5	4	4	4	4.2	
CO6	2	1	5	5	4	4	4	5	5	4	4	4	3	3.8	
												Mean Overall Score		4.0	

Result: The Score for this Course is 4.0 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

பருவம்: 2 **மணி நேரம்: 4**

17UGT210002 **புள்ளிகள்: 3**

பொதுத்தமிழ்-II

பாடத்தின் விளைவு

- சமூக மாற்றச் சிந்தனைகளை உள்ளடக்கிய தற்கால இலக்கியப்பரப்பை அறிதல்
- பக்தி இலக்கியங்களின் வழி இறையியல் கோட்பாடுகளை அறிதல்
- உரைநடைக் கட்டுரை எழுதும் திறன் பெறுதல்- இலக்கணமரபுகளை அறிதல்
- பல்வேறு சமயங்களின் வாழ்வியல் கருத்துக்களை அறிந்து பின்பற்றுதல்
- காப்பியங்களில் உள்ள சமுதாயக் கருத்துக்களை அறிந்துகொள்ளுதல்.
- இதிகாசங்கள் உணர்த்தும் நீதிகளை அறியச்செய்தல்.
  அரசுப்போட்டித் தேர்வுகளுக்கேற்ப பொதுக்கட்டுரைகளும் மொழிப்பயிற்சியும் மாணவர்களுக்கு அளித்தல்.

அலகு: 1 **(12 மணி நேரம்)**

சிலப்பதிகாரம் - அந்திமாலைச் சிறப்பு செய்காதை
இலக்கிய வரலாறு - சைவம் வளர்த்த தமிழ் முதல் புராணங்கள் முடிய.
இலக்கணம் - எழுத்திலக்கணம்

அலகு: 2 **(12 மணி நேரம்)**

மணிமேகலை - உலக அறவி புக்க காதை
பெரியபுராணம் - தடுத்தாட்கொண்ட புராணம்

அலகு: 3 **(12 மணி நேரம்)**

கம்பராமாயணம் - கும்பகர்ணன் வதைப்படலம்
உரைநடை - 7 முதல் 9 முடிய உள்ள கட்டுரைகள்

அலகு: 4 **(12 மணி நேரம்)**

சீறாப்புராணம் - மானுக்குப் பிணை நின்ற படலம்
இலக்கணம் - சொல்லிலக்கணம்
இலக்கிய வரலாறு - தமிழ் இலக்கண நூல்கள் முதல் சிற்றிலக்கியங்கள் முடிய.

அலகு: 5 **(12 மணி நேரம்)**

இரட்சணிய யாத்திரிகம் - மரணப்படலம்
உரைநடை - 10 முதல் 12 வரையிலான கட்டுரைகள்

பாடநூல்:

1. செய்யுள் திரட்டு, தமிழாய்வுத்துறை வெளியீடு, 2017-10
2. சமூகவியல் நோக்கில் தமிழ் இலக்கிய வரலாறு, தமிழாய்வுத்துறை வெளியீடு, தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி-2
3. உரைநடை நூல் - தமிழாய்வுத்துறை வெளியீடு.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UGT210002					Title of the Paper பொதுத்தமிழ்-II								Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	4	4	4	4	5	5	5	4	4	2	4	4	4.2	
CO2	4	5	5	4	5	5	5	5	5	4	3	4	3	4.4	
CO3	5	5	4	4	5	5	5	5	4	3	3	4	3	4.3	
CO4	5	5	4	3	4	5	5	5	4	3	3	4	3	4.1	
CO5	5	5	4	3	4	5	5	5	4	3	3	4	3	4.1	
CO6	5	5	5	5	4	5	5	5	4	3	3	4	3	4.1	
													Mean Overall Score		4.2

Result: The Score for this Course is 4.2 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: II **Hours/Week: 4**
17UGH210002 **Credits : 3**

HINDI-II

Course Outcomes

At the end of the course, a student should be able to demonstrate…

- their effective communicative skills in Hindi
- the introduction of socially relevant subjects in Modern Hindi Literature
- to appreciate the features of Modern Hindi one act plays and short stories
- the ability to fill in application forms Hindi
- use Hindi vocabulary and grammar patterns in a culturally proper ways.
- the ability to write about famous Hindi authors .

Unit-I **8 hours**

Paeeksha, Lekak Parichaya, Khani kee Basha – Shyli, Verb, Dhathu, Artha likiye ulte Shabda likiye.

Unit- II **12 hours**

Lekak Parichaya Ekanki kee, Basha Shyli, Ander Nagaree, Sankalan Traya, Pareek shaka Khani ke paatra, Kal, Vachya.

Unit-III **12 hours**

Chief Kee daavath, Ekanki ke Paatra, Ekankikaar, Ne ka Prayog, Adverb

Unit- IV **14 hours**

Do Kalakar, Bahoo kee Vidha, Kahaanikaar, Prepositions, conjunctions

Unit-V **14 hours**

Kahani ke paatra, Ekanke ke paatra, lekak parichaya, Interjunctions, Avikari Shabda

Books Recommended

1. Dakshina Bharath Hindi Prachara Sabha, Thiagaraya Nagar, Chennai - 600 017, Subodh Hindi Patamala-2, Ekanki, Hindi, 2016.
2. Ram Dev Hindi Bhavan, Vyakaran Pradeep, 63, Tagore Nagar, Alahabad, 2, 2013.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UGH210002					Title of the Paper Hindi-II						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	3	4	3	2	3	4	4	4		3.5
CO2	3	3	2	3	2	4	4	3	3	2	2		2.8
CO3	3	2	2	3	4	2	4	4	2	3	4		3.0
CO4	3	2	2	3	3	4	3	3	4	3	3		3.0
CO5	3	3	3	3	3	3	3	4	3	4	3		3.1
CO6	4	4	4	4	3	4	3	3	3	3	2		3.3
										Mean Overall Score			3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semestre: II **Heures /Semaine: 4**
17UGF210002 **Points : 3**

FRANÇAIS-I

Course Outcomes

* Faire connaissance des journaux, des courriels, des lettres
* Comprendre les conversations téléphoniques.
* Décrire quelque chose
* Demander son chemin
* Parler des activités du week-end
* Accepter, refuser, exprimer la certitude.

Unit-I: Nouvelles de L'inde **(10 heures)**

Montrer son inquiétude, s'excuser, exprimer son appréciation, décrire quelqu'un, décrire quelque chose

Grammaire: Présent : verbes en er,-ir, le futur, interrogation totale, féminin d'autres adjectifs.

Unit-II: A la gare Central station **(10 heures)**

Réserver des billets, demander des renseignements, donner des renseignements

Grammaire: pronoms compléments d'objet direct, présent l'impératif :payer ,partir/sortir, l'impératif, expression du temps, construction avec infinitif

Unit-III : Un lit dans la Cuisine **(10 heures)**

Donner des ordres, localiser, bire qu'une proposition est stupide ou bizarre

Grammaire : Verbes en er-ranger, mettre impératif, il faut, devoir +infinitif, prépositions de lieu

Unit-IV: Pierre apprend a conduire et mangez –vous correctement ? **(15 heures)**

Rassurer, exprimer l'indirection exprimer l'autorisation, avertir, demander des informations sur les habitudes de quelqu'un, offrir a manger ou a boire, accepter, refuser, exprimer la certitude.

Grammaire: impératif-être, avoir, savoir, pronoms compléments d'objet indirect, le passe compose avec avoir expression de la quantité-articles partitifs, adverbes, pronoms directs et indirects, pronom en, présent des verbes –manger, boire ,offrir ,prendre, la condition avec si.

Unit-V: Ils ont eu tort tous les deux !et Comment as-tu passe le weekend **(10 heures)**

Demander son chemin, indiquer le cheminin a quelqu'un, reprocher / conseiller, parler des activités du week-end, demander a quelqu'un de se taire

Grammaire: le passe compose, adverbes mots interrogatifs, le passe compose avec être, faire du….pouvoir, vouloir.

Manuel:

1. K. Madanagobalane, **Synchronie -1**, Samhitâ publication, 2011.

Livre de référence:

1. Annie Berthet / B_atrix Sampsonis / Catherine Hugot / V_ronnique M kizirian / Monique Waendendries, **Alter Ego A1**, Hachette, 2006
2. Yves Loiseau / R_gine M-rieux, Connexions 1, Didier ,2011

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UGF210002					Title of the Paper French-II						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	2	3	4	3	3	2	2	3	3		3.0
CO2	3	3	3	3	4	3	3	2	2	2	3		2.8
CO3	3	2	3	2	4	3	3	2	2	3	3		2.7
CO4	3	3	4	3	4	3	3	3	3	3	3		3.2
CO5	3	3	4	3	4	2	4	4	4	4	5		3.6
CO6	3	4	3	3	3	3	4	4	3	4	4		3.5
											Mean Overall Score		3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: II **Hours/Week: 4**
17UGS210002 **Credits : 3**

SANSKRIT-II

Course Outcomes

At the end of the course, a student should be able to demonstrate…

* knowledge and understanding of basic Sanskrit grammar
* knowledge and understanding of essential Sanskrit vocabulary
* knowledge and understanding of the appropriateness of basic Sanskrit structures and expressions in a given context
* the ability to understand short passages in written Sanskrit on everyday topics
* the ability to produce short passages in written Sanskrit on everyday topics
* introduction of basic grammar (Avyaya Imperfect tense and Sandirules. Samasah.)

Unit-I **8 hours**

Visheshanaah
Saravanaama shabdas.

Unit-II **12 hours**

Sandhi Niyamaah Abhyaasah.(Guna, Visarga, Dirgha, Vrddhi)

Unit-III **12 hours**

Lang lakaarah. Kriyapadaani

Unit-IV **14 hours**

Gopala Vimshathi. (1-10) slokas.

Unit-V **14 hours**

Avyayas, Tatpurusha, Karma dhaaraya samaasah.

Books Recommended

1. Paundrapuram Ashram, Srirangam -620 006. Gopalavimshathi, 2014
2. R.S. Vadhyar & Sons, book – Sellers and Publishers, Kalpathi, Palghat-678 003, Kerala, Southe India, Shabdha Manjari, 2014
3. Kulapthy, K. M., Saral Sanskrit Balabodh, Bharathiya Vidya Bhavan, Munshimarg, Mumbai - 400007, 2014

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UGS210002	Title of the Paper Sanskrit-II									Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	Mean Score of COs
CO1	5	3	5	4	4	3	3	3	4	4	3	3.2
CO2	4	3	4	4	4	3	3	3	3	4	3	3.0
CO3	4	3	3	4	4	3	3	3	4	4	3	3.0
CO4	4	3	3	4	3	3	3	4	4	4	3	3.0
CO5	4	4	4	3	4	3	4	4	4	3	4	3.2
CO6	5	4	4	4	4	3	3	3	4	4	3	3.2
											Mean Overall Score	3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester: II **Hours/Week: 5**
17UGE220102 **Credits: 3**

GENERAL ENGLISH-II

Course Outcome

* Ask open-ended questions in real-life situations
* Use polite expressions in appropriate ways
* Use correct punctuation marks and capital letters
* Use appropriate vocabulary
* Put ideas into a cohesive paragraph
* Develop positive self-esteem and thereby communicate effectively

Unit-I

01. Education Word Grid
02. Reading Problems and Solutions
03. Syllabification
04. Forms for Expressing Quality
05. Expressing Comparison
06. Monosyllabic Comparison
07. Di/polysyllabic Comparison
08. The best monosyllablic Comparison
09. The best di/polysyllabic Comparison
10. Practising Quality Words

Non-Detailed:

"Julius Caesar" from *Six Tales From Shakespeare*

Unit–II:

11. Wh Words
12. Yes/No Recollection
13. Unscramble Wh Questions
14. Wh Practice
15. Education and the Poor
16. Controlled Role play
17. Debate on Education
18. Education in the Future
19. Entertainment Word Grid
20. Classify Entertainment Wordlist
21. Guess the Missing Letter

22. Proverb-Visual Description
23. Supply Wh Words
24. Rearrange Questions
25. Information Gap Questions

Unit-III:

26. Asking Questions
27. More about Actions
28. More about Actions and Uses
29. Crime Puzzle
30. Possessive Quiz
31. Humourous News Report
32. Debate on Media and Politics
33. Best Entertainment Source

Unit-IV:

34. Career Word Grid
35. Job-Related Wordlist
36. Who's Who?
37. People at Work
38. Humour at Workplace
39. Profession in Context
40. Functions and Expressions
41. Transition Fill-in
42. Transition Sord Selection
43. Professional Qualities
44. Job Procedures
45. Preparing a Resume
46. Interview Questions
47. Job Cover Letter Format
49. E-mailing an Application
50. Mock Interview

Non-Detailed:

"King Lear" from *Six Tales From Shakespeare*

Unit-V:

51. Society Word Grid
52. Classify Society Wordlist

53. Rearrange the Story
54. Storytelling
55. Story Cluster
56. Words Denoting Time
57. Expressing Time
58. What Can You Buy?
59. Noise Pollution
60. Positive News Headlines
61. Negative News Headlines
62. Matching Conditions
63. What Whould You Do?
64. If I were the Prime Minister
65. My Dream Country

Non-Detailed: "Macbeth" from *Six Tales From Shakespeare*

Textbook

1. Joy, J.L. & Peter, F.M. *Let's Communicate 2*, New Delhi: Trinity Press, 2014. Print.

Non-Detailed Text

1. Dodd, E F. *Six Tales From Shakespeare*. London: Macmillan, 1987. Print. (Last three tales)

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UGE120102					Title of the Paper General English-II								Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	4	4	4	4	5	4	4	3	3	3	4	4		3.9
CO2	4	3	4	4	4	5	5	4	4	4	4	4	3		4.0
CO3	4	3	4	4	4	3	3	4	4	3	3	4	4		3.6
CO4	4	3	3	4	4	4	4	3	3	5	5	4	4		3.8
CO5	4	3	4	4	4	4	4	3	3	4	4	5	5		3.9
CO6	5	4	4	3	3	4	4	3	4	4	5	4	4		3.9
													Mean Overall Score		3.8

Result: The Score for this Course is 3.8 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester II **Hours/Week: 4**
17UCS230204 **Credit: 3**

PROGRAMMING IN C++

Course Outcomes

After learning this course, the learner will be able to

* Learn the basic concepts in C++ Programming
* Understand the principles of Object Oriented Concepts
* Be skillful in writing C++ code using classes objects and functions
* Know the Core concepts of OOPS such as Constructors and Inheritance
* Understand the concept of streams and file management in C++
* Be skillful in writing small projects in C++ Programming

Unit-I: **(12 hours)**

Object Oriented Programming Concepts– Benefits of OOP – Characteristics of OOP-Structure of C++ program – Functions: Simple Functions – Call by value – Call by reference – Inline functions- Default arguments-Const Argument - Function Overloading.

Unit-II: **(12 hours)**

Classes and objects: Member functions- Nesting of member functions-private Member functions - Memory allocation of Objects- Static Data Members – Static Member Functions – Array of objects –Object as function arguments – Friendly Function– Pointers to members.

Unit-III: **(12 hours)**

Constructors and Destructors: Constructors - Parameterized Constructors - Multiple Constructors in a class - Constructors with default arguments – Dynamic Initialization of Object-Copy Constructor - Dynamic Constructors - Destructors - Operator Overloading: Defining Operator Overloading - Overloading unary and binary Operator – Overloading binary operators using friend functions.

Unit-IV: **(12 hours)**

Inheritance: Introduction – Defining Derived Classes – single Inheritance-Multilevel Inheritance – Multiple Inheritance – Hybrid Inheritance – Virtual base classes – abstract classes.

Unit-V: **(12 hours)**

Files and Streams : C++ stream classes –Unformatted I/O Operations – Formatted Console I/O operations- Managing Output with Manipulators. Files: Introduction-Classes for file Streams- Opening and Closing a File –

File Modes- File Pointers and their Manipulations- Sequential Input and Output Operations – Command Line Arguments -Templates: Class Templates – Function Templates-Exception Handling.

Book for Study:

1. E. Balagurusamy, " Object Oriented Programming with C++", Tata McGraw Hill, New Delhi, 6th edition, 2014.

Books for References:

1. Robert Lafore, "Object-Oriented Programming in Microsoft C++", Galgotia Publications, New Delhi, 2000.
2. Bjarne Stroustrup, "The C++ Programming Language", Addison-Wesley, New York, 1999.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UCS230204					Title of the Paper: PROGRAMMING IN C++								Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	3	4	2	5	4	4	4	3	3	2	4	2	4	3.3	
CO2	5	4	2	4	4	5	3	3	3	2	3	2	4	3.3	
CO3	3	4	2	3	4	3	3	3	3	2	3	2	4	3.0	
CO4	4	4	3	4	4	3	3	3	3	2	3	2	4	3.2	
CO5	5	4	3	3	3	5	3	3	3	3	3	2	4	3.3	
CO6	3	4	2	4	4	3	4	3	3	2	4	3	3	3.2	
													Mean Overall Score		3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester II **Hours/Week: 4**
17UCS230205 **Credits: 3**

DISCRETE MATHEMATICS

Course Outcomes

After learning this course, the learner will be able to

* understand the various definitions and operations of graphs
* learn the computer representations of graph
* know the applications of graph theory
* understand the various algorithms on graph problems
* be aware of the concepts of mathematical logic
* understand discrete structures

Unit-I **(12 hours)**

Graph: Introduction - paths and circuits - isomorphism – subgraphs - connectedness - Euler graph - operations - Hamiltonian paths and circuits - Traveling Salesman Problem.

Unit-II **(12 hours)**

Trees: properties of trees - distance and centers - rooted and binary trees - spanning tree. Matrix representations of graph: Incidence matrix – adjacency matrix - graph theoretic algorithms - shortest path between two vertices - shortest path between all pairs.

Unit-III **(12 hours)**

Mathematical Logic: statements and notations - connectives – well-formed formulas - tautologies - equivalence of formulas - duality law.

Unit-IV **(12 hours)**

Mathematical Logic: Normal forms: Disjunctive-Conjunctive - Principal disjunctive - Principal Conjunctive normal forms. Sets: Basic concepts of set theory - operations on sets - Venn Diagrams - Basic set identities – ordered pairs and tuples - Cartesian products.

Unit-V **(12 hours)**

Relation and orderings: Relations-properties - relation matrix and graph - partition and covering - equivalence, compatibility relations - composition of binary relations. Function: Definition - composition of functions - Inverse functions - Binary and n-ary operations - Boolean algebra.

Books for Study

Units I, II

1. Narsing Deo, "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall, 2013, Chapters: 1, 2, 3.1-3.7, 7.1, 7.9, 9.1, 9.2, 11.5

Units III, IV and V

2. J. P. Tremblay, R. Manohar, "Discrete Mathematical Structure with Applications to Computer Science", McGraw-Hill International Edition, 2008.

Unit III: Chapters: 1-1, 1- 2.1 - 1-2.4, 1-2.6 - 1-2.10.

Unit IV: Chapters: 1.3, 2-1.1 - 2-1.6, 2-1.8, 2-1.9.

Unit V: Chapters: 2-3.1 - 2-3.7,2-4.1 - 2-4.4, 4-2.1

(only definition and applications are expected and proof for theorems are not preferred)

Books for Reference

1. Seymour Lipschutz and Mars Lipson, "Discrete Mathematics", Second Edition, Schaum's outline series, Tata McGraw-Hill Publishing Company Limited, New Delhi, 1999.
2. Bernard Kolman & Robert C. Busby, "Discrete Mathematical Structure for Computer Science", Second Edition, Prentice Hall of India, New Delhi, 1987

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UCS230205			Title of the Paper: DISCRETE MATHEMATICS									Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	5	4	3	4	2	3	4	3	3	2	4	3	4	3.4
CO2	4	4	2	3	3	4	3	4	3	2	4	3	4	3.3
CO3	4	4	4	4	3	3	3	3	3	3	4	3	4	3.5
CO4	4	4	3	4	3	3	2	3	3	3	3	2	3	3.1
CO5	3	3	2	4	3	3	3	3	3	2	4	3	3	3.0
CO6	3	4	3	3	3	4	2	4	3	2	4	3	3	3.2
											Mean Overall Score			3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No.of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester II **Hours/Week: 3**
17UCS230206 **Credit: 2**

Software Lab-II:
PROGRAMMING IN C++

Course Outcomes:

1. To provide a sound understanding of the basic concepts of OOPs.
2. To equip the students with the knowledge of classes and objects

Detailed Study:

1. Programs using Operators
2. Functions and Function Overloading
3. Classes and Objects
4. Array of Objects
5. Constructors
6. Operator Overloading
7. Inheritance
8. Function Overriding
9. Virtual Functions
10. Pure virtual Function and Abstract class
11. I/O streams with text file and data file
12. Templates

Semester II **Hours/Week: 6**
17UCS230402 **Credits: 5**

Allied:

MATHEMATICS-II

Course Outcomes

* Solving algebraic equations using different methods.
* Apply the techniques of forward and backward interpolation in industry related problems.
* Solving differential equations application of this technique in competitive exams.
* Solving real life problems using probability.
* Compare the data values and finding the correlation.

Unit I **(18 hours)**

Solving algebraic and transcendental equations- Bisection method - Newton-Raphson method.Solving simultaneous equations - Gauss elimination - Iteration methods - Gauss-Seidel Methods. (problems only). (Chapter III, Section 2,5, Chapter IV, Section 1, 2, & 6.2)

Unit II **(18 hours)**

Interpolation- Newton Gregory forward and backward interpolation formulaeLagrange's Interpolation formula. Numerical Integration - Trapezoidal rule and Simpson's 1/3rd rule(problems only) (Chapter VI, Section1, 2, 3 & 4, Chapter VIII, Section 4 and Chapter IX Section 7, 8, 10)

Unit III **(18 hours)**

Solving differential equations (First order differential equation only). Solutions by Taylor's series - Euler's Method- Runge-Kutta 2nd and 4th order method Miline's predictor corrector methods - (problems only). (Chapter XI, Section 6, 7, 10, 13, 14, 15,19,20)

Unit IV **(18 hours)**

Probability - Conditional probability - Baye's theorem - Applications of Binomial Poisson, Normal distributions. (Problems only) (Book 2: Chapter 18, Pages 702-734 & Chapter 19, Pages 734-776).

Unit V **(18 hours)**

Correlation coefficient- Rank correlation - curve fitting by least square methods - Fitting a straight line, Parabola and exponential curve. (No derivation, Numerical problems only) (Book 2: Chapter 12, Pages 369-381, 389-393, Book 1: Chapter 1, sec 1.6, 1.7, 1.8, 1.9 (Pages 24-42))

Textbooks

1. Venkataraman, M.K., "Numerical Methods in science and Engineering", 2nd Edition, National Publishing Co., Madras 1987 (For Units I & II, III).
2. R.S.N. Pillai and Bagavathi, "Statistics", S. Chand and Co. Ltd., New Delhi 1984. (Relevant portions only) (For Units IV & V).

References

1. A.Singaravelu,"Numerical methods", Meenakshi publications, 1992
2. P. Kandasamy, K.Thilagavathy, K.Gunavathi,"Numerical methods", S. Chand & company Ltd-2008.
3. S. C. Gupta and V. K. Kapor,"Fundamentals of Mathematical Statistics", 11th edition,Sultan Chand and Sons,2002.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UCS230402				Title of the Paper: Allied: MATHEMATICS-II								Hours 6	Credits 5
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
CO2	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
CO3	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
CO4	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
CO5	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
CO6	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
CO7	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
CO8	5	5	1	4	3	4	5	4	2	2	4	4	3	3.5
											Mean Overall Score			3.5

Result: The Score for this Course is 3.5 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester II **Hours/Week: 2**
17UCE240802A **Credit: 2**

COMPUTER LITERACY

Course Outcomes

1. Understand the basics of Computer Systems
2. Familiar with the applications of MS-Office / HTML & CSS
3. Know the statistical data analysis using R
4. Aware the latest trends and technologies such as Mobile Computing, Big Data and Analytics, Cloud Computing.
5. Understand the concepts of social networking sites.
6. Knowledge in Cyber Crime and Cyber Ethics.

Unit-I: Computer System

Computer - An Introduction - Hardware Components - Input and Output Technologies - Computer Hierarchy- Software Fundamentals - Systems Software and Os- Application Software- Software Licensing - Open Systems- Open Source Software- Programming Languages- Information Systems- General It Trends.

Unit-II: (For Non-CS)

Microsoft Word: Introduction - Word Environment - Opening and Creating a New Document - Saving Documents - Proofing Features - Printing a Document - Formatting Text - Working with Shapes and Lists - Line and Paragraph Spacing- Working with Tables - Columns and Ordering- Working with Pictures- Working with Headers and Footers - Using Indents and Tabs - Using Mail Merge.

Microsoft Excel: Introduction - Document Creation - Renaming a worksheet - Office user interface - Open a New Workbook - Columns, Rows, and Cells - Selecting a cell - - Basic data entry, fill handle - - Insert columns - Arithmetic Calculations & Formulas - Excel Formulas- Calculate with Functions - Function Library - Graphs and Charts - Printing the Document.

Microsoft Powerpoint: Starting PowerPoint - Working with Slides - Applying Theme - Animation- Transitions – Views.

Unit-II: (For CS)

HTML: Introduction - HTML generations – HTML Tags – Headings – Paragraphs – Comments – Line Breaks – Formatting Tags – Hyperlinks – Images – Lists – Tables – Frames – Forms.

CSS: Introduction – Use of External Style Sheet – Defining Styles – Use Relative Sizing – Use Numbered Value for Color.

Unit-III: Statistical Data Analysis

Introduction - R Programming Language - Basic R Commands - Univariate and Bivariate Statistical Measures - Graphic Representation of Statistical Data - Lab Exercise.

Unit-IV: SMAC

Introduction - Understanding the Enterprise of Tomorrow - Social Networking - Mobile Computing - Big Data and Analytics - Cloud Computing

Unit-V: Cyber Crime

Definition - List of Cyber Crimes - Cyber Ethics- Unethical Behaviour - Securing information privacy and confidentiality - Internet Ethics - Indian Information Technology Act - Advantages of Cyber Laws - National e-Governance Plan (NeGP) - eCommerce - Electronic Fund Transfer (EFT)

Book for Study

1. Department of Foundation Course, "Computer Literacy", St. Joseph's College, 2017.

Books for Reference

1. Alexis Leon, "Introduction to computers", Vikas Publishing House Pvt. Ltd., New Delhi, 2008.
2. Alexis Leon and Mathew Leon, "Introduction to computers with Ms Office 2000", Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2005.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UCE240802A					Title of the Paper COMPUTER LITERACY								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	5	4	4	5	5	4	3	4	3	4	4	4		4.15
CO2	5	5	4	4	4	4	4	4	4	3	4	4	4		4.08
CO3	4	3	3	4	4	4	4	4	4	3	4	4	4		3.77
CO4	5	5	4	4	4	5	4	4	4	3	4	4	4		4.15
CO5	4	4	3	4	4	4	4	4	4	3	4	4	4		4.15
CO6	5	5	5	4	4	5	4	4	4	4	4	4	4		4.31
													Mean Overall Score		4.10

Result: The Score for this Course is 4.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester II **Hours/Week: 2**
17UFC241002 **Credits: 2**

FUNDAMENTALS OF HUMAN RIGHTS

Course Outcome

1. To ensure acquiring the knowledge about the historical background of human rights.
2. To ensure sensitizing the young the values of human rights.
3. To ensure the importance of human rights in the Indian context.
4. To ensure learning the fundamental duties in the constitution of India.
5. To ensure educating the youth in respecting and protecting the rights of every other human being.
6. To ensure teaching the youth on the vulnerabilities of women and children.

Unit-I

Introduction, Classification of Human Rights, Scope of Human Rights, Characteristics of Human Rights, and Challenges for Human Rights in the 21st Century.

Unit-II

Human Rights in Pre-World War Era, Human Rights in Post-World War Era, Evolution of International Human Rights Law - the General Assembly Proclamation, Institution Building, Implementation and the Post Cold War Period. The ICC.

Unit-III

Introduction, Classification of Fundamental Rights, Salient Features of Fundamental Rights, and Fundamental Duties

Unit-IV

Women's Human Rights, Issues related to women's rights, and Rights of Women's and Children

Unit-V

Human Rights Violations, Human Rights Violations in India - the Human Rights Watch Report, January 2012, Human Rights Organizations.

Text Book:

1. **Techniques of social Analysis: Fundamentals of Human Rights,** Department of Foundation course, St.Joseph's College, Tiruchirappalli, 2015.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UFC241002					Title of the Paper FUNDAMENTALS OF HUMAN RIGHTS								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	1	5	5	2	4	4	5	5	4	4	5	5	4.2	
CO2	4	1	5	4	2	4	4	4	4	5	5	5	5	4.0	
CO3	5	1	5	5	2	5	5	4	4	4	5	5	5	4.2	
CO4	4	1	5	5	2	2	4	3	5	5	4	4	5	3.8	
CO5	5	1	5	4	1	5	5	5	5	5	4	4	4	4.1	
CO6	3	1	5	4	1	4	3	5	5	3	4	4	5	3.6	
												Mean Overall Score		3.9	

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

பருவம்: 3 **மணி நேரம்: 4**

17UGT310003 **புள்ளிகள்: 3**

பொதுத்தமிழ்-III

பாடத்தின் விளைவு

- செம்மொழியாம் தமிழ் மொழியின் சிறப்பை அறிதல்.
- பண்டை இலக்கியங்கள் உணர்த்தும் அறக்கருத்துகளை அறிதல்
- புதினம் வாயிலாகத் தற்காலச் சமுதாயச் சிக்கல்களையும், அதற்கான தீர்வுகளையும் ஆராயும் திறன் பெறுதல்
- மானுட வாழ்வில் அகம், புறம் பற்றிய பாகுபாட்டை தமிழ்ச்செய்யுள் வாயிலாக அறிதல்.
- தமிழர்களின் ஈகையும் வீரமும் எடுத்துரைக்கும் புறச்செய்திகளை அறிதல்
- நீதிநூல்கள் மனித வாழ்வை செம்மைப்படுத்தும் பாங்கினை உணர்த்துதல்.

அலகு: 1 **(12 மணி நேரம்)**

நெடுநல்வாடை (முழுமையும்)

அலகு: 2 **(12 மணி நேரம்)**

குறுந்தொகை - பாடல்கள் - (32, 323, 305, 290, 168)
யாப்பிலக்கணம் (வெண்பா, ஆசிரியப்பா)

அலகு: 3 **(12 மணி நேரம்)**

கலித்தொகை - பாடல்கள் - (குறிஞ்சிக்கலி-15, பாலைக்கலி-9, மருதக்கலி-15, நெய்தற்கலி-22, முல்லைக்கலி-07)
இலக்கிய வரலாறு - முதற்பாகம் ('தமிழ் மொழியின் தொன்மையும சிறப்பும்' முதல் 'சங்க தொகை நூல்கள்' முடிய) புதினம்.

அலகு: 4 **(12 மணி நேரம்)**

பதிற்றுப்பத்து - பாடல்கள் (12, 24,)
புறநானூறு - பாடல்கள் (46, 86, 122, 214, 246)
அணியிலக்கணம்

அலகு: 5 **(12 மணி நேரம்)**

திருக்குறள் - ஈகை, ஆள்வினை உடைமை, நிறை அழிதல் ஆகிய அதிகாரங்கள்
நாலடியார் - இளமை நிலையாமை(11), பிறன்மனை நயவாமை(82), பெருமை(185), அறிவின்மை(254), காமநுதலியல்.(391).
இலக்கிய வரலாறு - சங்க இலக்கியங்களின் தனித்தன்மைகள் முதல் இரட்டைக் காப்பியங்கள் முடிய

பாடநூல்கள்:

1. செய்யுள் திரட்டு, தமிழாய்வுத் துறை வெளியீடு (2017-2020).
2. சமூகவியல் நோக்கில் தமிழிலக்கிய வரலாறு, தமிழாய்வுத்துறை வெளியீடு, 2014.
3. புதினம் (ஒவ்வொரு கல்வியாண்டும் ஒவ்வொரு புதினம்). காணாமல் போன கவிதை (2017-18).

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UGT310003					Title of the Paper பொதுத்தமிழ்-III								Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	5	5	4	5	5	4	5	5	5	4	4	5	4.6	
CO2	5	5	4	3	4	5	4	5	5	5	4	4	5	4.4	
CO3	5	5	5	3	4	5	5	5	5	5	4	3	5	4.5	
CO4	5	5	5	5	4	5	5	5	5	5	4	5	5	4.8	
CO5	5	4	4	4	4	5	5	5	5	5	3	3	5	4.3	
CO6	5	5	5	3	4	5	5	5	5	5	4	3	5	4.5	
													Mean Overall Score		4.5

Result: The Score for this Course is 4.5 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: III **Hours/Week: 4**
17UGH310003 **Credits: 3**

HINDI-III

Course Outcomes

At the end of the course, a student should be able to demonstrate…

* the ability to enable the students to complete the pre-reading task to comprehend the local and global issues in the lessons.
* the ability to enable the students to complete the post-reading task centering on Grammar and Skill Development.
* the relevance of Bhakthi Movement in Hindi Literature.
* the ability to imagine and write poems.
* the ability to quote poetry in Speeches.
* the ability to write friendly and formal letters.

Unit-I **8 hours**

Tera Sneh Na Kho oon, Kavi Parichaya, Patra Likne ke Kaaran, Patra Kee Avashyakatha, Sandhi keeiye, Vigrah Keejiye

Unit-II **12 hours**

Ek boondh, Tera Sneh Na Kho oon kavitha kee manovygnaik stiti, Chutti Patra, Sandhi

Unit-III **12 hours**

Ekloondh Kavitha Ka Uddeshya, Kabir Ke Dohe, Nagar Palika ko Patra, Samas

Unit-IV **14 hours**

Vimal Indu Kee Vishal Kiranen, Rahim Ke Dohe, Naukari Keliye Avedan Patra, Upasarga

Unit-V **14 hours**

Thulasi ke Dohe, Kitab Maangne Keliye Patra, Pratyaya, Kaviparichaya

Books Recommended

1. Dakshina Bharath Hindi Prachara Sabha, Thiagaraya Nagar, Subodh Hindi, Paatamala-3, Chennai-600 017, Hindi, 2016.
2. DBHP Sabha, T.Nagar, Chennai-600 017, Abihav Patralekhan, 2016
3. Ram Dev, Vyakaran Pradeep, Hindi Bhavan, 63 Tagore Nagar, Alahabad 2, 2016.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UGH310003					Title of the Paper Hindi-III						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	3	4	3	3	3	4	4	4		3.6
CO2	3	3	2	3	2	3	3	3	5	3	5		3.0
CO3	3	3	3	3	4	3	3	4	3	3	3		3.2
CO4	3	2	2	3	3	3	3	3	3	3	4		2.9
CO5	3	3	3	3	3	3	4	3	3	3	4		3.2
CO6	4	4	4	4	3	3	3	3	3	3	3		3.3
									Mean Overall Score				3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semestre: III **Heures /Semaine: 4**
17UGF310003 **Credits: 3**

FRANÇAIS-III

Course Outcomes

* Comparer la culture de l'Inde et de la France
* Familiariser l'étudiant avec le vocabulaire, la grammaire et les conversations
* Connaître des journaux, des courriels, des lettres
* Parler des projets de vacances
* Exprimer l'étonnement
* Parler de ses projets d'avenir, exprimer l'opposition.

Unit-I: Un entretien et Au restaurant (10 heures)

Demander des informations personnelles à quelqu'un, donner des informations, répondre à une proposition. Réserver une table, demander la carte, commander, apprécier les plats, demander l'addition.

Grammaire: Imparfait, Imparfait et passé composé, expression du temps, expression de la conséquence.Le futur, présent des verbes peser, rejoindre, le passé récent, le présent progressif, le futur proche, Restriction-ne…que, moi aussi…

Unit-II : Enfin les vacances ! et Un autre institut (10 heures)

Raconter son emploi du temps quotidien, parler des projets de vacances, exprimer l'étonnement. Rassurer/consoler, s'indigner

Grammaire: Verbes pronominaux, pronom y, quelqu'un/ne…personne, quelque chose/ne…rien, ne…jamais, Déjà/ne…pas encore, chacun, adjectifs indéfinis.Pronoms relatifs, impératif, indicateurs de temps : de…a, a partir de….jusqu'a, depuis, pendant.

Unit-III : Un Indien célèbre visite la France et Qui dépense plus? (10 heures)

Demander des informations sur quelqu'un, demander une opinion, donner son opinion. Dire à quelqu'un d'être prudent, faire des reproches à quelqu'un, se justifier.

Grammaire: Pronoms relatifs composés, pronoms compléments d'objet directs et indirectes, opposition savoir/Connaitre, connecteurs chronologiques, nombre ordinaux.Le comparatif, c'est+ nom+ qui, il reste, encore, il y a, souvent.

Unit-IV: Penser à son avenir - (15 heures)

Parler de ses projets d'avenir, exprimer l'opposition.

Grammaire : Style direct/indirect, proposition introduite par que, mots d'enchaînement – donc, pourtant.

Unit-V: L'astrologie (15 heures)

Exprimer des conditions, dire quelque chose n'a pas d'importance, proposer quelque chose.

Grammaire: Le conditionnel – la condition.

Manuel:

1. K.Madanagobalane, **Synchronie-II**, Samhitâ Publication, 2011.

Livre de référence :

1. Annie Berthet /B_atrix Sampsonis/ Catherine Hugot /V_ronnique M Kizirian / Monique Waendendries, **Alter Ego A1**, Hachette, 2006.
2. Yves Loiseau/R_gineM_rieux, Connexions 1, Didier, 2011.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UGF310003					Title of the Paper French-III						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	2	3	4	4	2	3	3	2	2		3.0
CO2	3	3	3	3	4	4	2	3	4	2	3		3.1
CO3	3	2	3	2	4	3	4	3	3	3	3		3.0
CO4	3	3	4	3	4	2	3	3	3	4	4		3.3
CO5	3	3	4	3	4	2	3	3	4	4	4		3.4
CO6	3	4	3	3	3	3	3	3	4	4	4		3.4
											Mean Overall Score		3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$ | **Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester: III **Hours/Week: 4**

17UGS310001 **Credits : 3**

SANSKRIT-III

Course Outcomes

At the end of the course, a student should be able to demonstrate…

* Knowledge and understanding of essential Sanskrit vocabulary in a given topic
* Knowledge and understanding of the appropriateness of basic Sanskrit structures in Slokas
* Knowledge of the basic Sanskrit poetry.
* An idea on Epics and Puranas.
* The usage of – Upasargas.
* The familiarization the history of Sankrit literature Vedas – Puranas and Natakas.

Unit-I **8 hours**

Romodantam. Balakandam. 1-15

Unit-II **12 hours**

Romodantam. Balakandam. 15-30

Unit-III **12 hours**

Vedas – Vedangas. vivaranam.

Unit-IV **14 hours**

Puranas. Upanishads.

Unit-V **14 hours**

Upasargas. Bhavishyat Kaalah

Books recommended:

1. Parameshwara, Ramodantam, LIFCO, Chaennai, 2015.
2. R.S. Vadhyar & Sons, Book-Sellers and Publishers, Kalpathi, Palghat-678003, Kerala, South India, History of Sanskrit Literature, 2015.
3. Kulapathy, K.M., Saral Sanskrit Balabodh, Bharathiya Vidya Bhavan, Munshimarg, Mumbai-400 007, 2015.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UGS310003				Title of the Paper Sanskrit-III						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	
CO1	5	3	5	4	4	3	3	3	3	3	4	3.1
CO2	4	3	4	4	4	4	3	3	3	4	4	3.1
CO3	4	3	3	4	4	4	4	4	3	3	4	3.1
CO4	4	3	3	4	3	4	4	4	3	4	4	3.1
CO5	4	4	4	3	4	3	3	4	3	4	4	3.1
CO6	5	4	4	4	4	3	3	3	3	4	3	3.1
										Mean Overall Score		3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: III **Hours/Week: 5**
17UGE320103 **Credits: 3**

GENERAL ENGLISH-III

Course Outcome

* Comprehend the local and global issues through the lessons
* Do the tasks centering on skill development and enhance their Grammar Using and Writing Skills
* Use interactive skills
* Train and develop the Listening and Reading Skills of the learners through teacher-led reading practice
* Enhance their Listening, Reading, Speaking, and Writing Skills
* Develop their Creative and Critical Thinking and Speaking Skills

Unit-I: *Suggestions to Develop Your Reading Habit

1.0 Introduction
1.1 Objectives
1.2 Listening and Reading Skills through Teacher-led Reading Practice
1.3 Glossary
1.3.1 Words
1.3.2 Phrases
1.4 Reading Comprehension
1.5 Critical Analysis
1.6 Creative Task
1.7 General Writing Skill: Letter Writing: Informal
1.8 Grammar: Simple Present Tense
1.9 **Non-Detailed Text:** Dickens, Charles. *Hard Times.*

Unit-II: *The Secret of Success: An Anecdote

2.0 Introduction
2.1 Objectives
2.2 Listening and Reading Skills through Teacher-led Reading Practice
2.3 Glossary
2.3.1 Words
2.3.2 Phrases
2.4 Reading Comprehension
2.5 Critical Analysis
2.6 Creative Task
2.7 General Writing Skills: Letter Writing: Formal

2.8 Grammar: Present Continuous Tense
2.9 **Non-Detailed Text:** Dickens, Charles. *Hard Times.*

Unit-III: ***The Impact of Liquor Consumption on the Society**
3.0 Introduction
3.1 Objectives
3.2 Listening and Reading Skills through Teacher-led Reading Practice
3.3 Glossary
3.3.1 Words
3.3.2 Phrases
3.4 Reading Comprehension
3.5 Critical Analysis
3.6 Creative Task
3.7 General Writing Skills: Letter to Newspaper
3.8 Grammar: Simple Past Tense
3.9 **Non-Detailed Text:** Dickens, Charles. *Hard Times.*

Unit-IV: * Dr. A.P.J. Abdul Kalam: A Short Biography
4.0 Introduction
4.1 Objectives
4.2 Listening and Reading Skills through Teacher-led Reading Practice
4.3 Glossary
4.3.1 Words
4.3.2 Phrases
4.4 Reading Comprehension
4.5 Critical Analysis
4.6 Creative Task
4.7 General Writing Skill: Write a letter applying for a job
4.8 Grammar: Past Continuous Tense
4.9 **Non-Detailed Text:** Dickens, Charles. *Hard Times.*

Unit-V: *Golden Rule: A Poem
5.0 Introduction
5.1 Objectives
5.2 Listening and Reading Skills through Teacher-led Reading Practice
5.3 Glossary
5.3.1 Words
5.3.2 Phrases

5.4 Reading Comprehension
5.5 Critical Analysis
5.6 Creative Task
5.7 Grammar: Simple Future Tense
5.8 General Writing Skill: Circular-Writing
5.9 **Non-Detailed Text: Dickens, Charles. *Hard Times.***

Unit-VI: *Hygiene
6.0 Introduction
6.1 Objectives
6.2 Listening and Reading Skills through Teacher-led Reading Practice
6.3 Glossary
6.3.1 Words
6.3.2 Phrases
6.4 Reading Comprehension
6.5 Critical Analysis
6.6 Creative Task
6.7 General Writing Skill: Writing an Agenda for a Meeting
6.8 Grammar: Future Continuous Tense
6.9 **Non-Detailed Text: Dickens, Charles. *Hard Times.***

Textbook

1. Jayraj, S. Joseph Arul et al. *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*. New Delhi: Trinity, 2016. Print.

Non-Detailed Text:

1. Dickens, Charles. *Hard Times.* Wordsworth: Printing Press, 1854. Print.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UGE320103					Title of the Paper General English-III								Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	5	5	5	4	5	5	5	5	5	5	5	4		4.84
CO2	5	5	5	5	5	5	5	5	5	5	5	5	4		4.92
CO3	5	5	5	5	5	5	5	5	5	5	5	5	4		4.92
CO4	5	5	5	5	4	5	5	5	5	5	5	5	4		4.84
CO5	5	5	5	5	4	5	5	5	5	5	5	5	4		4.84
CO6	5	5	5	5	4	5	5	5	5	5	5	5	4		4.84
													Mean Overall Score		4.86

Result: The Score for this Course is 4.86 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester III **Hours/Week: 4**
17UCS330207 **Credits: 3**

DATABASE SYSTEMS

Course Outcomes

After learning this course, the learner would have

* Understood the fundamental concepts of database systems & use the features available in a DBMS package
* Known the organization of File and its addressing schemes
* Analyzed database requirements and determine the entities involved in the system and their relationship to one another.
* Acquired knowledge on Normalization
* Developed the logical design of the database using data modeling concepts such as Entity Relationship diagrams.
* Familiarity on SQL queries, functions, cursors and triggers

Unit-I (12 hours)

Introduction: Flat File - Database System - Database - Actionable for DBA. The Entity - Relationship Model: Introduction - The Entity Relationship Model. Data Models: Introduction - Relational Approach -The Hierarchical Approach - The Network Approach.

Unit-II (12 hours)

Storage Structure: Introduction - File Organization and Addressing Schemes. Relational Data Structure: Introduction - Relations - Domains.

Unit-III (12 hours)

Normalization: Introduction - Normalization - Definition of Functional Dependence (FD) - Normal Forms: 1NF, 2NF, 3NF and BCNF.

Unit-IV (12 hours)

Structured Query Language: Features of SQL - Select SQL Operations - Grouping the Output of the Query - Querying from Multiple Tables - Retrieval Using Set operators - Nested Queries. T-SQL

Unit-V (12 hours)

Procedural Language- SQL: PL/SQL Block Structure - PL/SQL Tables. Cursor Management and Advanced PL/SQL: Opening and Closing a Cursor - Processing Explicit Cursor - Implicit Cursor - Exception Handlers – Sub Programs in PL/SQL - Functions - Precaution While Using PL/SQL Functions - Stored Procedure –DB Triggers-Object Oriented Technology.

Book for Study

1. Rajesh Narang, "Database Management Systems", PHI Learning Private Limited, New Delhi, sixth printing, 2010.

Book for Reference

1. S.K. Singh, "Database Systems - Concept, Design and Applications", Dorling Kindersley (India) Pvt. Ltd., Second Impression, 2008.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UCS330207					Title of the Paper: DATABASE SYSTEMS								Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	4	4	2	2	4	3	4	2	1	4	3	4		3.1
CO2	4	4	4	3	3	3	3	4	3	2	3	3	3		3.2
CO3	4	4	2	3	3	3	3	4	3	1	3	3	4		3.0
CO4	4	4	4	2	2	4	3	4	3	3	4	3	4		3.3
CO5	4	4	4	4	4	4	3	4	3	3	3	4	3		3.6
CO6	4	4	4	4	4	4	3	4	3	4	3	4	4		3.7
													Mean Overall Score		3.3

Result: The Score for this Course is 3.3 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester III **Hours/Week: 4**
17UCS330208 **Credits: 3**

SYSTEMS ANALYSIS AND DESIGN

Course Outcomes:

After learning this course, the learner will able to

1. Describe different life cycle models and explain the contribution of the system
2. Discuss various approaches to systems analysis and design and explain their strengths and weaknesses
3. Evaluate the tools and techniques of systems analysis and design that may be used in a given context
4. Use appropriate methods and techniques to produce a system design for an given scenario
5. Understand the various file organizations
6. Acquire a clear view about post implementation and maintenance of a system.

Unit-I **(12 hours)**

System concept and the information system environment: Introduction - The System Concept - Characteristics of a system - Elements of a system - Types of systems. The System Development Life Cycle - Consideration for Candidate Systems. Role of the Systems Analyst: The Multifaceted Role of the Analyst – The Place of the Analyst in the MIS Organization - Rising Positions in System Development.

Unit-II **(12 hours)**

System Planning and the Initial Investigation: Introduction- Bases for Planning in Systems Analysis: Dimensions of Planning - Initial Investigation: Need identification – Determining the user's information requirements- Background Analysis -Information Gathering: Introduction - Information Gathering Tools.

Unit-III **(12 hours)**

Feasibility Study: Introduction -System Performance Definition - Feasibility Study considerations-Steps in feasibility study- Feasibility Report - Cost/ Benefit Analysis: Introduction - Cost / Benefit Analysis- Cost/Benefit categories- Procedure for Cost/Benefit Determination.

Unit-IV **(12 hours)**

Process and Stages of Systems Design: Process of Design – Design Methodologies - Major Development Activities - Audit Considerations. Input / Output and Forms Design: Input Design - Forms Design.

Unit-V **(12 hours)**

File Organization and Database Design: Introduction - File Organization - Data Base Design. System .Testing and Quality Assurance: The Test Plan - Quality Assurance- Role of the Data Processing Auditor. Implementation and Software Maintenance: Conversion – Software maintenance.

Book for Study

1. Elias M. Awad, "Systems Analysis and Design", Galgotia Publications, New Delhi, Second Edition, 2010.

Books for Reference

1. Hawryczkiewycz I.T, "Introduction to System Analysis and Design", PHI, New Delhi, 1994.
2. S.A. Kelkar, "Structures Systems Analysis and Design: A Concise Study", PHI Learning Private Limited, New Delhi, 2009.
3. B. Lee, "Introduction to System Analysis and Design", John Wiley & Sons, 1983.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UCS330208			Title of the Paper: SYSTEMS ANALYSIS AND DESIGN									Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	3	3	4	4	4	4	3	5	3	1	3	2	2	3.15
CO2	4	4	4	5	4	4	4	4	2	2	3	3	3	3.53
CO3	4	4	2	4	4	4	4	3	3	2	4	4	3	3.46
CO4	4	3	3	4	4	4	3	4	3	2	2	2	5	3.30
CO5	4	3	3	2	3	3	3	3	3	2	4	3	4	3.07
CO6	5	4	2	3	3	3	3	3	3	3	3	4	4	3.30
												Mean Overall Score		3.30

Result: The Score for this Course is 3.3 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No.of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester III **Hours/Week: 3**
17UCS330209 **Credits: 2**

Software Lab-III:
RDBMS

Course Outcomes:

1. Apply PL/SQL for query processing.
2. Use PL/SQL stored procedure, stored functions, cursors and packages to query the database.

SQL

1. Table Creation, data Insertion, Deletion, Updating and Selection.
2. DML: Operators (Arithmetic, Relational, Logical), SQL Functions (Single Row Function, Group Functions).
3. DML: Set operations, Join operations
4. Nested queries
5. Creation of Synonym, Sequence & Index, Creation and manipulation of Views.

PL/SQL

6. PL/SQL- block
7. Cursors
8. Functions & Procedure
9. Packages
10. Triggers

Semester III **Hours/Week: 6**
17UCS330403A **Credits: 4**

Allied:

APPLIED PHYSICS - I

Course Outcomes

* To acquire the knowledge of current electricity an types of resistors and capacitors.
* To understand the basic principles of electromagnet ism an magnetic materials and circuits
* To study the basic principles of Lasers an optical fibres.
* To understand the Principle and application of Holography.
* To learn about alternating currents and principle of a *transformer.*

Unit-I: Current Electricity Resistors and Capacitors (12 hours)

Electric Current and its units – Definitions of important parameters – Ohm's law and its verification – Effect of temperature on resistance – Electric power and Electric energy and their units – Resistances in Series – Resistances in Parallel – Grouping of Cells – Kirchhoff's Law – Principle of a Capacitor – Capacity of a capacitor – Capacity of a parallel plate capacitor – Grouping of capacitors – Energy of a charged capacitor.

Unit-II: Electromagnetism (12 hours)

Magnetic lines of force – Magnetic field and magnetic induction – Hall effect – Magnetic flux – Magnetic field around a current carrying conductor – Direction of Magnetic field and electric current – Magnetic field due to a current carrying circular loop – Magnetic field due to a solenoid – Biot-Savart's law - Magnetic field inside a solenoid – Force experienced by a current carrying conductor in a magnetic field – Fleming's left hand rule – Force between two long parallel conductors – Galvanometer – shunt – conversion of a galvanometer into an ammeter and voltmeter.

Unit III: Magnetic Properties of Materials and Circuits (12 hours)

Force between magnetic poles – Permeability, Susceptibility, Magnetic field intensity and Intensity of Magnetisation – Magnetic Shell – Para, Dia, Ferro-magnetic Substances – Magnetic Circuits, Magneto-Motive Force – Reluctance – Permeance – Ohm's law of magnetic circuits –Reluctances in series and parallel – Comparison between Magnetic and electric circuits – Relation between MMF and magnetizing force – Magnetic circuit due to a solenoid - Hysteresis loop – Energy loss due to Hysteresis.

Unit-IV: Lasers and Optical Fibres (12 hours)

Spontaneous and Stimulated Emission – Population Inversion, Pumping and Active System – The Ruby Laser – Gas Laser – Semiconductor Laser – CO2 Laser – Uses Of Lasers. Principle of a optical fiber – structure and classification of optical fibers – The numerical aperture – fibre optics communication system

Unit-V: Alternating Current and Transformers (12 hours)

Laws of Electro-Magnetic induction- Induced EMF in a conductor – Alternating Currents – Basic Definitions – Effective value, R.M.S. value and Average value of AC – Generation of Alternating Currents and Voltages – Transformers – Principle of a transformer - step up and step down transformers

Books for Study:

Unit	Book	Ch	Sections
I	1	44	44.1, 44.4 – 44.6, 44.11 - 44.12, 46 46.1 - 46.7, 46.10- .19
II	1	47	47.1 – 47.4, 47.7 – 47.14, 47.17,18. 47.21,22, 47.23 – 47.28
III	1	48	48.1–48.5, 48.10, 48.12, 48.17, 48.18 – 48.29
IV	I		31, 32, 31.2–31.8 32.1–32.12
V	I		49, 50, 49.2-49.9 50.1–50.13

Books for Reference:

1. Electricity & Magnetism - Sehgal, Chopra, Sehgal, S. Chand & Sons, New Delhi, 2012.
2. Electricity & Magnetism - R. Murugesan, S. Chand & Company Ltd., New Delhi, 7th Revised Edition, 2012.
3. Applied Physics for Engineers - V. Rajendran, A. Marikani, Second Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UCS330403A				Title of the Paper: APPLIED PHYSICS-I						Hours 6	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	
CO1	5	3	2	3	5	5	2	5	2	2	3	3.364
CO2	5	3	3	2	5	5	3	3	3	2	3	3.364
CO3	4	4	2	4	5	5	3	4	3	2	5	3.545
CO4	4	4	3	3	5	5	3	3	2	3	3	3.273
CO5	5	3	2	3	5	5	3	3	2	3	3	3.364
										Mean Overall Score		3.394

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$$

$$\text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester III **Hours/Week: 2**
17UFC340901 **Credits: 2**

ENVIRONMENTAL STUDIES

Course Outcome

1. To ensure understanding the significance of environment in which we live.
2. To ensure imparting knowledge on the recent issues associated with environment.
3. To ensure educating the youth the causes and consequences of various types of pollutions.
4. To ensure sensitizing the youth the increasing threats to nature and the misery mankind faces.
5. To ensure the limitations of the available natural resources and the need to sustain them.
6. To ensure imparting the knowledge on the concept of biodiversity and its advantages.

Unit-I:

Environmental Studies

Environment - Scope and Importance - Environmental Movements in India - Eco-feminism - Public Awareness.

Unit-II:

Natural Resources

Food Resources - L and Resources - Forest Resources - Mineral Resources - Water Resources - Energy Resources

Unit-III:

Ecosystems, Biodiversity and Conservation

General structure - Functions of ecosystem - Energy flow and ecological pyramids - Biodiversity and conservation - Hot spots of Biodiversity - Endangered and Endemic Species - Value of Biodiversity - Threats to Biodiversity - Conservation of Biodiversity

Unit-IV:

Environmental Pollution

Air pollution - Water pollution - Oil pollution - Soil pollution - Marine pollution - Noise pollution - Thermal pollution – Radiation pollution

Unit-V:

Environment, Human Population & Social Issues

Human population growth - Urgent steps required for sustainable development - Conserving water - Current Environmental Issues

Text Book:

1. **Environmental studies,** Department of Foundation course, St.Joseph's College, Tiruchirappalli-2, 2015.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UFC340901					Title of the Paper ENVIRONMENTAL STUDIES								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	5	5	5	3	5	4	4	4	5	3	4	3		4.0
CO2	5	4	5	5	4	4	5	5	5	4	4	4	4		4.5
CO3	5	4	5	5	3	5	4	4	5	3	3	4	2		4.0
CO4	5	4	4	4	4	4	4	5	4	5	4	4	3		4.2
CO5	5	5	4	5	4	3	5	5	4	4	5	3	4		4.3
CO6	5	5	4	4	3	4	4	3	3	4	3	2	4		3.7
												Mean Overall Score			4.1

Result: The Score for this Course is 4.1 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester III **Hours/Week: 2**
17UFC341003A **Credits: 2**

FORMATION OF YOUTH-I

Course Outcome

1. To expose the students to the presence of unjust structures in society
2. To ensure that students to acquire social ethics and social responsibility.
3. To ensure the students learn to face the global challenges with determination.
4. To ensure living with integrity in personal life and the responsibilities in public life.
5. To ensure preparing the students to seek amicable solutions to common problems.
6. To ensure training the students to inculcate business ethics.

Unit-I:

Introduction to Social Ethics

Social ethics, Social ethics and Social responsibility, Social ethics play an important role of the areas, Religion influences social changes and vice versa, Social ethics and corporate dynamics, Forms of social ethics

Unit-II:

The Economic and Political Systems of Today

Planned Economy and Communism, Feudalism, Market Economy and Capitalism, Socialism, Mixed Economy, The Emerging Market Economy, Political System, Totalitarian System, Oligarchic System

Unit-III:

Characteristics of a New World

Global Challenges, The Future is with the Educated Youth, Cost of the Sacrifice, Crusaders against corruption, Responsibility of the Educated Youth, Positive Global Scenario, The right to education, Eradicating gender inequality, Sustainable human development, Social Integration, Elimination of crime, Integration with global markets

Unit-IV:

Integrity in Public Life and National Integration

What is integrity, Public Life, Integrity and Public Life, Integrity in a Democratic State, India as a Democratic State, Behaviour of an Elected Representative of India, Noticeable degradation acts of Elected Representatives, Suggestions to stem this rot, Types of integrity, Transparency can be a guarantee for integrity

Unit-V:

Business Ethics and Cyber Crime

Business Ethics, Business ethics permeates the whole organisation, Measuring business ethics, The Vital factors highlighting the importance of business ethics, Cyber Crime, Strategies in Committing Cyber Crimes, Factors aiding Cyber Crime, Computer Hacking, Cyber-Bullying, Telecommunications Piracy, Countermeasures to Cyber Crime, Ethical Hacking

Text Book:

1. **Formation of Youth,** Department of Foundation course, St.Joseph's College, Tiruchirappalli-2, 2016.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UFC441004A				Title of the Paper FORMATION OF YOUTH-II								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	4	5	4	5	5	3	4	5	5	4	5	4	4.4
CO2	4	4	4	4	4	5	4	3	4	4	4	5	5	4.2
CO3	5	3	5	4	5	4	4	3	4	4	4	5	5	4.2
CO4	3	4	5	4	4	5	4	4	4	4	4	3	4	4.0
CO5	2	4	4	4	5	5	4	4	5	5	5	4	5	4.3
CO6	4	3	4	4	5	3	4	5	5	4	5	5	4	4.2
												Mean Overall Score		4.2

Result: The Score for this Course is 4.2 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester- III **Hours/Week: 2**
17UFC341003B **Credits: 2**

RELIGIOUS DOCTRINE-I

Course Outcome

1. To ensure the understanding of the salvation history and experience the God.
2. To ensure enrichment of the young minds with catholic teachings.
3. To ensure the understanding the spiritual truth that human hearts depend on God.
4. To ensure the knowledge of the person of Jesus and follow his footsteps.
5. To ensure the understanding the hand of God in establishing justice and love.
6. To ensure the edification of the youth in faith and love to transcend all human barriers.

Unit: I -Salvation History

Recognizing God - Human Beings: Their worth &Gifts - The Fall - Hope of Salvation - Prophets' Promises

Unit: II-The Gospel of Jesus Christ

Introduction - According to: St. Mathew - St. Mark - St.Luke-St. John-Symbols

Unit: III-The Holy Spirit

Introduction - Holy Spirit in the Old Testament- Holy Spirit in the New Testament- Holy Spirit in Tradition-Biblical Images of the Spirit—Gifts & Fruits of the Holy Spirit

Unit: IV- Social Justice in the Prophets

Introduction-Prophet and Prophecy-Role of Prophets

Unit: V-The Catholic Church

Mystical Body of Christ-Visible Church on Earth-The Marks or Identifying Characteristics of the Church - Hierarchical Constitution of the Church - The Magisterium or Teaching of the Church - The Church and Salvation

Text Book:

1. **Life in the Lord,** Department of Foundation course, St.Joseph's College, Tiruchirappalli-2, 2011.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UFC441004B				Title of the Paper RELIGIOUS DOCTRINE-II								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	1	4	3	3	4	4	4	5	4	5	5	5	3.9
CO2	4	1	4	3	3	4	4	4	5	4	5	5	5	3.9
CO3	4	3	4	4	3	4	4	5	4	4	5	5	5	4.2
CO4	4	1	4	3	3	4	4	4	5	4	5	5	5	3.9
CO5	4	1	4	3	3	4	4	4	5	4	4	4	5	3.8
CO6	4	1	4	3	3	5	5	5	5	4	5	4	4	4.0
													Mean Overall Score	3.9

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

பருவம்: 4 **மணி நேரம்: 4**

17UGT410004 **புள்ளிகள்: 3**

பொதுத்தமிழ்-IV

பாடத்தின் விளைவு

- நாடகத்தின் போக்குகள், உத்திகள், பாத்திரப்படைப்பு, உரையாடல் முறை, கற்பனைத்திறம் போன்றவற்றை அறிந்துகொள்ளுதல்.
- புதிய நாடகங்களைப் படைக்கும் திறனைப் பெறுதல்.
- நாடகங்களை நடிக்கும் திறன் பெறுதல்
- கிரேக்க, ஆங்கில நாடகங்களை அடியொற்றி தமிழ்நாடகம் தோன்றிய வரலாறு அறியச் செய்தல்.
- சங்ககாலம் தொட்டு இக்காலம் வரை காதல் பற்றிய உணர்வுகளை எடுத்துரைத்தல்.
- தமிழ் வரலாற்றின் மன்னர்களின் ஆட்சியின் சிறப்புகளையும் வீழ்ச்சிகளையும் எடுத்துக்காட்டுதல்.

அலகு-1 **(12 மணி நேரம்)**

மனோன்மணீயம், பாயிரம், அங்கம் - 1, களம் 1 - 5 வரை.

அலகு-2 **(12 மணி நேரம்)**

மனோன்மணீயம், அங்கம் - 2, களம் 1 - 3 வரை.

இலக்கிய வரலாறு நான்காம் பாகம் - தமிழும் பிற துறைகளும் பக்கம் (365-387).

அலகு-3 **(12 மணி நேரம்)**

மனோன்மணீயம், அங்கம் - 3, களம் 1 - 4 வரை.

உரைநடை நாடகம் (கௌதம புத்தர்)

அலகு-4 **(12 மணி நேரம்)**

மனோன்மணீயம், அங்கம் - 4, களம் 1 - 5 வரை.

இலக்கிய வரலாறு நான்காம் பாகம் - சமயத்தவரின் தமிழ்ப்பணி (பக்கம் 391-402)

அலகு-5 **(12 மணி நேரம்)**

மனோன்மணீயம், அங்கம் - 5, களம் 1 - 3 வரை.

இலக்கிய வரலாறு நான்காம் பாகம் - வெளிநாடுகள் தந்த தமிழ் இலக்கியம் (பக்கம் 410-435)

பாடநூல்கள் :

1. சுந்தரனார், மனோன்மணீயம், தமிழாய்வுத்துறை (பதிப்பு), தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி-2. (அங்கம் : 3 களம் : 4 நீங்கலாக)
2. பாலசுப்பிரமணியம். கு.வெ, கௌதம புத்தர், அய்யா நிலையம், தஞ்சாவூர்
3. சமூகவியல் நோக்கில் தமிழிலக்கிய வரலாறு, தமிழாய்வுத்துறை வெளியீடு, 2014.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UGT410004					Title of the Paper பொதுத்தமிழ்-IV								Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	3	4	5	5	5	5	5	4	4	5	5	5	4.5	
CO2	5	4	3	5	4	5	5	4	4	3	4	5	5	4.3	
CO3	4	3	3	5	4	3	3	4	3	3	4	5	5	3.7	
CO4	5	5	4	5	5	5	5	5	5	4	5	5	5	4.8	
CO5	3	4	4	5	5	4	4	4	5	4	4	4	4	4.1	
CO6	4	3	4	5	5	4	3	3	4	3	2	2	3	3.4	
													Mean Overall Score		4.1

Result: The Score for this Course is 4.1 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semestre: IV **Hours/Week: 4**
17UGH410004 **Credits: 3**

HINDI-IV

Course Outcomes

At the end of the course, a student should be able to demonstrate…

* the ability to empower the students with globally employable soft skills
* the ability to translate Hindi passages to English
* the ideas on human values
* the ability to instruct the moral values given by the Bhakthi Saints
* the knowledge of Indian festivals .
* the knowledge of culture and tradition

Unit-I **8 hours**

Vidyarthi, Banking Shabda, Anuvad, Anuvad Lesson – 1, Adhikal, Premchand

Unit-II **12 hours**

Pusthakalaya, Nemikaryalaya Tippaniyan, Anuvadak, Anuvad lesson-2, Bakthikal-Gyan Marg, Mahadevivarma

Unit-III **12 hours**

Thyohar, Anuvad Ke Gun, Anuvad lesson – 3, Bakthi, Tippaniyaan, Prem Marg, Pant

Unit-IV **14 hours**

Yugpuresh Gandhi, Anuvadak Ke Gun, Anuvad Lesson – 4 Bakthikal, Bakthikal – Ram Bakthi Kal - Krishna Bakthi, Dinkar

Unit-V **14 hours**

Braman, Anuvad ek kala, Swarnayug Bakthikal, Anuvad Lesson - 5, Reetikal, Chayavad

Books Recommended

1. Kendriya Sachivalaya, Hindi Parishad New Delhi, Karyalaya Sahayika, 2016.
2. Dakshin Bharat Hindi Prachar Sabha Chennai-17, Niband Radhana, Hindi, 2016.
3. DBHP Sabha, Chennai-17, Anuvad Abyas-3, Hindi, 2016
4. Rajnath Sharma, Hindi Sahitya ka Itihas, Vinkod Pustak Mandir, Agra-2, 2016.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UGH410004					Title of the Paper Hindi-IV						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	4	3	4	3	3	4	5	4	4		3.5
CO2	3	3	2	3	3	3	5	3	4	3	3		3.1
CO3	3	3	3	3	4	3	3	3	4	3	3		3.1
CO4	3	2	2	3	2	3	3	3	3	3	3		2.7
CO5	3	3	3	3	3	3	5	3	3	4	4		3.3
CO6	4	4	4	4	3	5	3	5	4	4	3		3.9
											Mean Overall Score		3.3

Result: The Score for this Course is 3.3 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semestre: IV **Heures /Semaine: 4**
17UGF410004 **Points : 3**

FRANÇAIS-IV

Course Outcomes

* Comparer la culture de l'Inde et de la France
* Familiariser l'étudiant avec le vocabulaire, la grammaire et les conversations
* Connaître les auteurs français (20 auteurs) et leurs œuvres
* Dire qu'on aime quelqu'un/ quelque chose
* Demander des informations
* Exprimer une opinion personnelle et Justifier son opinion.

Unit-I : Prières du Nouvel An (10 heures)

Exprimer l'inquiétude, le regret, le souhait, l'obligation, la sympathie.

Grammaire : Le subjonctif, verbe craindre

Unit-II : Retrouvailles (10 heures)

Marquer la surprise

Grammaire : Le subjonctif, pronoms possessifs.

Unit-III : C'est lui le meilleur ! (10 heures)

Dire qu'on aime quelqu'un/ quelque chose, donner son opinion, insister.

Grammaire : Le superlatif, les pronoms démonstratif.

Unit-IV Sauvons notre Terre ! (15 heures)

Enchaînement de cause et d'effet, demander à quelqu'un de tenir compté de quelque chose.

Grammaire : Le plus-que-parfait, il y a.

Unit-V : Le jour des élections s'approche et les auteurs français (20 auteurs) et leurs œuvres (15 heures)

Demander des informations, dire qu'une action n'est pas utile, exprimer une opinion personnelle, Justifier son opinion.

Grammaire : Le participe présent – le gérondif, la voix passive.

Manuel:

1. K.Madanagobalane, **Synchronie-II**, Samhitâ Publication, 2011.

Livre de référence:

1. Annie Berthet /B_atrix Sampsonis/ Catherine Hugot /V_ronnique M Kizirian / Monique Waendendries, **Alter Ego A1**, Hachette, 2006.
2. Yves Loiseau/R_gineM_rieux, Connexions 1, Didier, 2011.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UGF410004					Title of the Paper French-IV						Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	2	3	4	4	2	3	2	2	3		3.0
CO2	3	3	3	3	4	4	2	4	3	2	3		3.1
CO3	3	2	3	2	4	3	4	3	3	3	4		3.1
CO4	3	3	4	3	4	1	2	2	4	3	3		2.9
CO5	3	3	4	3	4	3	2	2	4	4	5		3.4
CO6	3	4	3	3	3	4	4	2	4	3	4		3.4
											Mean Overall Score		3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: IV **Hours/Week: 4**
17UGS410004 **Credits : 3**

SANSKRIT-IV

Course Outcomes

At the end of the course, a student should be able to demonstrate…

* knowledge and understanding of the history of Sanskrit Drama.
* knowledge and understanding of the Nataka vivaranam.
* the introduction of Functional - Sanskrit conversation Letter writing.
* the ability to apply relevant theoretical perspectives to topics within the field of study
* the competence in academic writing and oral presentation skills.
* the ability to work both independently and in groups on presentations and/or development of Projects.

Unit-I **8 hours**

Paataah – Asta, Nava Dasha, Sankhya prayogah.

Unit-II **12 hours**

Lot lakaarah. Prqayaogah. Kartari Vaakyaani

Unit-III **12 hours**

Naatakasya Itihaasah.

Unit-IV **14 hours**

Karnabhaaram. Naatakam.

Unit-V **14 hours**

Kathaapaatra Vailaksharnyam.

Books recommended:

1. R.S.Vadhyar & Sons, Book-Sellers and Publishers, Kalpathi, Palghat 678003, Kerala, South India, History of Sanskrit Literature, 2014.
2. Samskritha Bharathi, Aksharam 8th Cross, 2nd Phase, Giri Nagar, Bangalore. Vadatu Sanskritam – Samskara Binduhu, 2014.
3. R.S. Vadhyar & Sons, Book-Sellers and Publishers, Kalpathi, Palghat 678003, Kerala, Soth India. Karnabharam, 2014.
4. Kulapathy, K.M., Saral Sanskrit Balabodh, Bharathiya vidya Bhavan, Munshimarg, Mumbai 400007, 2014.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UGS410004	Title of the Paper Sanskrit-IV									Hours 4	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	Mean Score of COs
CO1	5	3	5	4	4	3	3	3	3	3	4	3.1
CO2	4	3	4	4	4	3	3	4	3	4	3	3.1
CO3	4	3	3	4	4	3	4	4	4	4	4	3.2
CO4	4	3	3	4	3	3	3	4	4	4	4	3.1
CO5	4	4	4	3	4	3	4	3	4	4	4	3.0
CO6	5	4	4	4	4	3	3	3	3	3	4	3.2
											Mean Overall Score	3.1

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester: IV **Hours/Week: 5**
17UGE420104 **Credits: 3**

GENERAL ENGLISH-IV

Course Outcome

* Comprehend the local and global issues through the lessons
* Do the tasks centering on skill development and enhance their Grammar Using and Writing Skills
* Use interactive skills
* Train and develop the Listening and Reading Skills of the learners through teacher-led reading practice
* Improve their General Writing Skills such as Note-Taking, Note-Making, Précis Writing, Paragraph Writing, and Writing Short Essays on Current Issues/General Topics
* Understanding the social background and human character of the period

Unit-VII:

***Women through the Eyes of Media**

7.0 Introduction
7.1 Objectives
7.2 Listening and Reading Skills through Teacher-led Reading Practice
7.3 Glossary
7.3.1 Words
7.3.2 Phrases
7.4 Reading Comprehension
7.5 Critical Analysis
7.6 Creative Task
7.7 General Writing Skill: Writing Minutes of a Meeting
7.8 Grammar: Present Perfect Tense
7.9 **Non -Detailed Poem:** Thomas Hood (1799–1845): "Silence"

Unit-VIII:

***Effects of Tobacco Smoking**

8.0 Introduction
8.1 Objectives
8.2 Listening and Reading Skills through Teacher-led Reading Practice
8.3 Glossary
8.3.1 Words
8.3.2 Phrases

8.4 Reading Comprehension
8.5 Critical Analysis
8.6 Creative Task
8.7 General Writing Skill: Note-Taking
8.8 Grammar: Present Perfect Continuous Tense
8.9 **Non -Detailed Poem:** Coventry Patmore (1823-1896): "The Toys"

Unit-IX:

*** Short Message Service (SMS)**

9.0 Introduction
9.1 Objectives
9.2 Listening and Reading Skills through Teacher-led Reading Practice
9.3 Glossary
9.3.1 Words
9.3.2 Phrases
9.4 Reading Comprehension
9.5 Critical Analysis
9.6 Creative Task
9.7 General Writing Skill: Note-Making
9.8 Grammar: Past Perfect Tense
9.9 **Non -Detailed Poem:** Stephen Spender (1909-1995): "Daybreak"

Unit-X:

***An Engineer Kills Self as Crow Sat on his Head: A News Paper Report**

10.0 Introduction
10.1 Objectives
10.2 Listening and Reading Skills through Teacher-led Reading Practice
10.3 Glossary
10.3.1 Words
10.3.2 Phrases
10.4 Reading Comprehension
10.5. Critical Analysis
10.6. Creative Task
10.7 General Writing Skill: Précis Writing
10.8 Grammar: Past Perfect Continuous Tense
10.9 **Non -Detailed Poem:** Gabriel Imomotimi Okara (1921): "Once Upon a Time"

Unit-XI:

***Traffic Rules**

11.0 Introduction
11.1 Objectives
11.2 Listening and Reading Skills through Teacher-led Reading Practice
11.3 Glossary
11.3.1 Words
11.3.2 Phrases
11.4 Reading Comprehension
11.5 Critical Analysis
11.6 Creative Task
11.7 General Writing Skill: Paragraph Writing
11.8 Grammar: Future Perfect Tense
11.9 **Non -Detailed Poem:** Robert Winner (1930-1986): "Opportunity"

Unit-XII:

***A Handful of Answers: A Zen Tale**

12.0 Introduction
12.1 Objectives
12.2 Listening and Reading Skills through Teacher-led Reading Practice
12.3 Glossary
12.3.1 Words
12.3.2 Phrases
12.4 Reading Comprehension
12.5 Critical Analysis
12.6 Creative Task
12.7 General Writing Skill: Writing Short Essays on Current Issues/General Topics
12.8 Grammar: Future Perfect Continuous Tense
12.9 **Non -Detailed Poem:** Ted Hughes (1930–1998): "The Harvest Moon"

Textbook

1. Jayraj, S. Joseph Arul et al. *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*. New Delhi: Trinity, 2016. Print.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UGE420104					Title of the Paper General English-IV								Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	4	5	5	4	4	4	5	5	5	4	5	5		4.61
CO2	5	4	5	5	3	4	5	5	5	5	5	5	5		4.69
CO3	4	4	5	4	4	3	4	4	5	5	4	4	5		4.23
CO4	4	4	5	4	4	3	4	5	5	5	4	4	5		4.30
CO5	5	4	5	4	4	4	4	4	5	5	4	4	5		4.38
CO6	5	5	5	5	4	4	4	5	5	5	4	4	5		4.61
													Mean Overall Score		4.47

Result: The Score for this Course is 4.47 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 5**
17UCS430210 **Credits: 3**

DATA STRUCTURES AND ALGORITHMS

Course Outcomes

After learning this course, the learner will able to

* Have fundamental knowledge on data structures.
* Perform various operations on stack
* represent queue and its structures.
* Work with Trees and Tree Traversals
* Work with various standard algorithms.
* Develop an application using data structures.

Unit-I (15 hours)

Arrays: Definition - Terminology - One dimensional array - multi dimensional arrays. Linked lists: Definition - Circular linked lists - Double linked lists - Circular double linked lists.

Unit-II (15 hours)

Stacks: Definition - Representation of a Stack - operations on Stacks - Evaluation of Arithmetic expressions. Queues: Definition - Representation of Queues - various queue structures.

Unit-III (15 hours)

Trees: Basic terminologies - Definition and concepts - representation of Binary tree - Binary tree traversal.

Unit-IV (15 hours)

The Complete Development of an Algorithm; Algorithms - Basic Steps. Algorithm Design Methods: Sub goals - Hill Climbing - Working Backward - Heuristics - Backtrack Programming - Recursion.

Unit-V (15 hours)

Computer Science Algorithms: Sorting - Searching - Parallelism. Mathematical Algorithms: Magic Squares.

Books for Study

Units I, II and III

1. Debasis Samanta, “Classic Data Structures”, Second Edition, PHI Learning Pvt. Ltd., New Delhi, 2009. Unit I : 2.1-2.3, 2.4.1, 2.4.3, 3.1-3.5 Unit II: 4.1-4. 4, 4.5.1, 5.1-5.4 Unit III: 7.1-7.3, 7.4.3

Units IV and V

2. S.E. Goodman and S.T. Hedetniemi, "Introduction to the Design and analysis of algorithms", McGraw Hill, International edition, 1988.

Books for Reference

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structure", Galgotia Publications, New Delhi,1985.
2. Tanenbaum A.M. and Augustein M.J., "Data structures with Pascal", Prentice Hall of India Ltd, New Delhi, 1985.
3. Ellis Horowitz and Sartaj Sahni, "Fundamentals of computer algorithms", Galgotia Publications, New Delhi, 1985.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UCS430210	Title of the Paper: DATA STRUCTURES AND ALGORITHMS											Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	5	4	2	4	4	4	4	4	3	2	4	2	4	3.5
CO2	4	4	3	4	3	4	4	4	3	2	4	3	4	3.5
CO3	4	4	3	4	3	4	4	2	3	2	4	3	4	3.3
CO4	4	4	2	4	3	3	4	4	3	2	4	4	4	3.4
CO5	4	4	3	4	3	4	4	2	3	2	4	3	4	3.3
CO6	4	4	2	4	3	3	4	4	3	2	4	4	4	3.4
Mean Overall Score														3.4

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No.of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 4**
17UCS430211 **Credits: 3**

Software Lab-IV:
DATA STRUCTURES USING C & C++

Course Outcomes

1. To learn the nuances of programming for data structures using C and C++ languages. Students are expected to master the operations of data structures using a procedural and OO language.

'C++' Practicals

1. Create a class Array and test the operations of an array
2. Create a class Stack and test the operations of a stack
3. Convert Infix to Postfix and evaluate Postfix using Stack class
4. Create classes for a Queue and a Circular Queue.

'C' Practicals

5. Operations on Singly linked list
6. Operations on Doubly linked list
7. Binary Tree Creation and Traversals
8. Analyze Bubble Sort with number of passes, comparisons and data moves
9. Sequential and Binary Search
10. Merge two sorted data files

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Semester IV **Hours/Week: 4**
17UCS430301A **Credits: 4**

Core Elective-I (WD):
MICRO COMPUTER ARCHITECTURE

Course Outcomes

After learning this course, the learner would have

1. Collected knowledge on Intel 8085 architecture and its addressing modes
2. Understood and the concepts of 8-bit processors
3. Got the fundamental knowledge of 16-bit processors.
4. Familiarity on interfaces and interrupts of Intel 8085
5. Acquired knowledge on assembly programming
6. Known the architecture and functionalities of 8086

Unit-I **(12 hours)**

Microprocessor Architecture: Intel 8085 - Instruction Cycle - Timing diagram- Instruction Format - Addressing modes - Intel 8085 Instructions.

Unit-II **(12 hours)**

Programming using 8085: Simple examples - 8-bit addition and subtraction - 16-bit addition - 8-bit decimal subtraction - complements of 8-bit and 16-bitnumber - shifting bits - - finding largest of two numbers - finding largest and smallest in an array - sum of series of numbers - 8-bit multiplication and division.

Unit-III **(12 hours)**

Peripheral Devices and Their Interfacing-I: Address Space Partitioning - Memory and I/O Interfacing - Interrupts of Intel 8085 - Interfacing Devices and I/O Devices/8255-Programmable peripheral Interface.

Unit-IV **(12 hours)**

Peripheral Devices and Their Interfacing-II: 8253- Programmable Interval Timer, 8259- Priority Interrupt Controller, 8279-Programmable Keyboard/ Display Interface, 8251- USART, 8237/8257- Programmable DMA Controller.

Unit-V **(12 hours)**

8086 Architecture and assembly language Programming: Basic 8086 Configuration - minimum mode and maximum mode - CPU Architecture Internal Operation – Machine language Instructions – instruction Execution timing – Assembler instruction format.

Books for Study

1. B. Ram, "Fundamentals of Microprocessors and Microcomputers", Dhanpat Rai Publications Pvt. Ltd., 1998.Unit I : Chapter 3, 4; Unit II: Chapter 6; Unit III : Chapter 7
2. Y.C. Liu and G.A. Gibson, "Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design", Prentice Hall of India, New Delhi, 1986.Unit IV: Ch 2; Unit V: Ch 3.1 - 3.9, 4.1.

Books for Reference

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085/8080A", Wiley Eastern Ltd, New Delhi, 1989
2. Barry B Brey, "The Intel Microprocessors 8086/8088, 80186, 80286, 80386, 80486, Pentium and Pentium Pro processors Architecture, Programming and Interfacing", Prentice Hall of India, New Delhi, 2002.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UCS430301A					Additional Course: MICROCOMPUTER ARCHITECTURE								Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	5	4	3	3	4	5	4	3	2	3	2	4	3.2	
CO2	5	3	4	4	4	4	3	5	2	1	4	3	5	3.6	
CO3	4	5	3	4	4	5	4	5	3	2	4	3	4	3.8	
CO4	4	3	4	5	3	5	4	3	4	2	4	3	5	3.7	
CO5	5	4	4	4	4	5	4	3	4	2	3	4	4	3.8	
CO6	5	4	3	3	4	5	4	4	4	1	3	3	5	3.6	
													Mean Overall Score		3.6

Result: The Score for this Course is 3.6 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 4**
17UCS430301B **Credits: 4**

Core Elective-I (WD): DESIGN AND ANALYSIS OF ALGORITHMS

Course Outcomes

After learning this course, the learner would have

1. To give the basis for the core of computer science.
2. To understanding the fundamental concepts in data structure
3. To learnt the basic knowledge of linked lists concepts in data structure and simplification of expressions and trees.
4. To give importance to finding the complexity (order) of algorithms.
5. To work with assured ability to have knowledge of linked list and tree concepts.
6. To have working knowledge of backtracking and algebraic problems.

Unit-I **(12 hours)**

Algorithms: Introduction- Algorithm - Algorithm specification: Pseudo code Conventions, Recursive algorithms - Performance analysis: Space - Complexity, Time Complexity, Asymptotic Notation, Practical Complexities. (Sections: 1.1, 1.2, 1.3.1 to 1.3.4)

Unit-II **(12 hours)**

Data structures and Queues: Arrays – ordered lists- Representation of Arrays- Stack and Queues – Fundamentals-Evaluation of Expressions. (Sections: 2.2,2.4,3.1,3.3)

Unit-III **(12 hours)**

Linked lists and trees: Linked Lists - Singly Linked Lists- Linked Stacks and Queues-More - on Linked Lists-Simple algorithms of Doubly Linked Lists (insertion and deletion only).Trees- Binary Trees- Binary Tree - Representations- Binary Tree Traversal. (Sections: 4.1,4.2,4.5,4.8,5.2,5.3,5.4).

Unit-IV **(12 hours)**

Search and Sort: Divide and conquer - General method - Binary search - Finding the maximum and minimum in a set of items - Merge sort - Quick sort - Selection sort. Basic Traversal and Search Techniques for graphs: Breadth First Search - Depth First Search. (Sections: 3.1 to 3.5,6.2)

Unit-V **(12 hours)**

Interpolations: Backtracking - The 8-Queens problem - Algebraic problems – The general method - Evaluation and interpolation - Horner's rule - Lagrange interpolation - Newtonian interpolation. (Sections: 7.1,7.2,9.1,9.2)

Books for Study

Unit I, IV, V

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Galgotia Publications Pvt. Ltd., 2004.

Unit II, III

2. Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structures, Galgotia Book Source, New Delhi, 1981.

Books for References

1. A.V. Aho, J.E. Hopcroft, J.D. Ullman, The Design and Analysis of Computer Algorithms, Addison-Wesley Publ. Comp., 1974.
2. Seymour E. Goodman and S.T. Hedetniemi, Introduction to the design and analysis of algorithms, McGraw Hill International Edition, 2002.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UCS430301B	Additional Course: DESIGN AND ANALYSIS OF ALGORITHMS										Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	3	4	3	3	4	3	2	4	3	4	3	4	3.3
CO2	3	4	3	4	4	4	4	3	3	4	3	2	4	3.4
CO3	3	4	5	4	3	3	4	3	4	3	3	4	3	3.5
CO4	3	5	4	3	4	4	4	4	3	4	2	3	4	3.6
CO5	4	5	4	3	3	4	4	3	4	3	4	2	4	3.6
CO6	3	4	3	4	2	3	4	3	4	4	3	4	3	3.3
												Mean Overall Score		3.4

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 4**
17UCS430301C **Credits: 4**

Core Elective-I (WD): BUSINESS PROCESS OUTSOURCING

Course Outcomes

After learning this course, the learner would have

1. Essential knowledge on Business Process Outsourcing industry
2. Learnt the working environmentfunctions for BPO business models and its governance
3. Learnt about the legal issues of Outsourcing Industry
4. Acquired an idea about service level agreement and value chain
5. Identified the service quality issues in Business Outsourcing industry
6. Understood the challenges and dynamics of each BPO process component to help better manage operations

Unit-I **(12 hours)**

Search For Competitiveness - Need For Outsourcing - BPOs: Beyond Call Centres

Unit-II **(12 hours)**

Transition Management - BPO Business Models - BPO Governance

Unit-III **(12 hours)**

Legal Issues in BPO Contracts - BPO—Regulatory Issues - Service Supplier Selection

Unit-IV **(12 hours)**

Service Level Agreement - BPO Legal Contract - BPO to KPO: Up In The Value Chain

Unit-V **(12 hours)**

HR Challenges in BPO Industry - Performance Evaluation In BPO – BPO - Prerequisites and Precautions - Service Quality Issues in BPO

Book for Study

1. Business Process Outsourcing: A Supply Chain of Expertises, Vinod V. Sople, Prentice Hall of India, 2011

Book for Reference

1. Business Process Outsourcing, Dr. Sarika Kulkarni, Jaico Publishing House, Delhi, 2005

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UCS43030IC				Additional Course: BUSINESS PROCESS OUTSOURCING							Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	3	4	3	4	3	4	3	4	4	4	4	3	3.6
CO2	4	5	3	3	2	3	4	3	4	3	5	3	4	3.5
CO3	4	3	4	4	3	4	3	4	4	3	4	3	4	3.6
CO4	3	4	4	4	3	3	4	3	4	3	4	3	4	3.5
CO5	3	4	4	4	3	3	4	3	4	3	4	3	4	3.5
CO6	4	3	4	3	4	3	4	3	4	3	4	4	4	3.6
												Mean Overall Score		3.5

Result: The Score for this Course is 3.5 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No.of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 4**
17UCS430404A **Credits: 4**

Allied:
APPLIED PHYSICS - II

Course Outomes

* To understand the different switches and the supporting devices of a computer.
* To acquire knowledge of semiconductor diodes and transistors.
* To understand various communication systems.

Unit I: Semiconductor Diodes and Transistors (12 hours)

Semiconductors – P type and N type semiconductors – Junction diode – Junction diode characteristics – semiconducting diode as a rectifier – light emitting diode - Transistor as a current amplifier – Transistor as a switch – Transistor as a voltage amplifier – JFET

Unit II: Switches and Devices (12 hours)

Introduction – Types of switches - Microphones – Digital Displays – Loud Speakers, head phones and earpieces – Cathode Ray tube – Pick-ups – Heat and light sensors – relays and reed switches – Electric Motors

Unit III: Power Supplies, Safety and Measuring Instruments (12 hours)

Electricity in the home – Dangers of electricity: safety precautions – Generating Electricity – Sources of EMF – Rectifier Circuits – Smoothing Circuits – Stabilizing Circuits – Multimeters – Oscilloscopes – Signal generators

Unit IV: Analog Electronics (12 hours)

Transistor Voltage Amplifier I, II and III – FET Voltage Amplifier – Amplifiers and Feedback – Amplifiers and Matching – Impedance Matching Circuits – (Transistor Oscillators) – Operational Amplifier – Op-Amp voltage amplifier – Op-amp summing amplifier – Op-Amp Comparator – Op-Amp Integrators – Op-Amp Oscillators

Unit V: Communication Systems (12 hours)

Audio Systems _ Sound recording – audio amplifier – complete hi-fi system - Radio and Television - Radio Waves, Radio systems – Black and White television – Colour Television – Cable and Satellite TV - Telephone Systems_ Simple telephone circuits - Telephone dial and keypad – Telephone exchange – Telephone links – other telephone services

Book for Study

1. Tom Duncan, Electronics – For Today And Tomorrow, BPB Publications 3rd edition.

Unit	*Chapter*	*Sections*
I	2	26 – 35
II	1	17 – 25
III	3	36 – 48
IV	4	49 – 65
V	5	82 – 97

Books for Reference

1. A.S. Vasudeva - Modern Engineering Physics, S. Chand and Company Ltd., 2004.
2. R.S. Sedhu, A Text Book of Applied Electronics, S. Chand & Company, New Delhi, 2011.
3. Salevahavan, Electronic Devices and Circuits, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2011.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UEL430404A					Title of the Paper Allied: APPLIED PHYSICS-II								Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	4	1	3	3	5	3	3	2	3	1	2	2		3.23
CO2	5	4	2	4	4	4	4	2	3	2	1	2	2		3.31
CO3	5	4	2	4	3	4	4	3	3	3	1	2	2		3.07
CO4	5	4	1	3	4	4	4	2	2	3	1	2	3		2.92
CO5	5	4	1	3	4	4	4	3	2	2	1	2	3		2.92
CO6	5	5	2	3	3	4	5	4	2	3	2	2	2		3.23
													Mean Overall Score		3.11

Result: The Score for this Course is 3.1 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 2**
17UCS430405A **Credits: 2**

Practical:
APPLIED PHYSICS

Course Outcomes

1. To acquire knowledge of semiconductor diodes and transistors.
2. To understand various communication systems

Any 16 Experiments:

1. Resistance of a Thermistor- Multimeter
2. EMF of a Thermocouple - Multimeter
3. Temperature Co-efficient of Thermistor
4. Potentiometer - Calibration of Ammeter
5. Potentiometer - Calibration of Voltmeter
6. Field along the axis of a coil
7. Junction Diode - V-I characteristics
8. Zener Diode -V-I Characteristics
9. Bridge Rectifier - p filter circuit
10. Regulated Power supply Using Zener Diode
11. Transistor Characteristics - CE Mode
12. FET Characteristics -CG Mode
13. Ballistic Galvanometer - Figure of Merit
14. Single Stage R-C coupled amplifier - Frequency Response
15. Operational- Amplifier - adder, subtractor, comparator,
16. Basic Logic Gates - Using IC's
17. Logic gates using IC's to solve Boolean expressions.
18. Logic Gates Using IC's -The study of universal gates & Demorgan's Theorem
19. Encoders using Diodes
20. Encoders using OR gates.
21. Shift register using IC7495.
22. R-S, J-K , D,T Flip-flops using Logic gates IC's

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Semester IV **Hours/Week: 2**
17UFC441004A **Credits: 2**

FORMATION OF YOUTH-II

Course Outcome

1. To ensure preparing the students to live in harmony with nature.
2. To ensure the youth the significance of public health and the related issues.
3. To ensure sensitizing the youth about addictions and their consequences.
4. To ensure educating the youth on disaster management and First-Aid.
5. To ensure enlightening on the developmental issues and challenges of youth today.
6. To ensure the value of counselling for attaining positive mental health.

Unit-I: Harmony with Nature

What is environment, Why should we think of harmony, Longing for human well-being, Principles to conserve environmental resources, Causes of disharmony, The fruits of harmony with nature, Forest resources, Water resources, Mineral resources, Food resources, Fruits of dishormony, Economic values and growth, Environmental Ethics, Guidelines to live in harmony with nature, Towards life-centered system for better quality of life

Unit-II: Public Health

Health related issues, Health Care in India vs Developed Countries, Health and Heredity, Public Health - The Indian Scenario, Objectives of public health in India, Public Health System in India, Failure on the public health front, Role of the central government, Hospitals Services in India, Health and Abortion, Health and Drug Addiction, Drug abuse

Unit-III: Disaster Management and First-Aid

Disaster Management, Types of disaster, Plans of disaster management, Technology to manage natural disasters and catastrophes, Disaster Management, Rehabilitation and Reconstruction, Human-induced disaster, First Aid, The importance of First-aid, Disaster Declaration and Response

Unit-IV: Issues Dealing with Science

What is Science, Science and Religion, Social Relevance of Science and Technology, Science and technology for social justice, Difference caused by Science and Technology, Need for indigenous technology, Science,

Technology and Innovation Policy of India, Harnessing the forces of science and technology for the future

Unit-V: Counselling for the Adolescents

High Risk Behaviours, Developmental Changes in Adolescents, Key Issues of the Adolescents, Need for Counselling, Nature of Counselling, Counselling Goals, Does helping help? The Good and the Bad news.

Text Book:

1. **Formation of Youth,** Department of Foundation course, St.Joseph's College, Tiruchirappalli-2, 2016.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UFC441004A					Title of the Paper FORMATION OF YOUTH-II								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	4	5	4	5	5	3	4	5	5	4	5	4		4.4
CO2	4	4	4	4	4	5	4	3	4	4	4	5	5		4.2
CO3	5	3	5	4	5	4	4	3	4	4	4	5	5		4.2
CO4	3	4	5	4	4	5	4	4	4	4	4	3	4		4.0
CO5	2	4	4	4	5	5	4	4	5	5	5	4	5		4.3
CO6	4	3	4	4	5	3	4	5	5	4	5	5	4		4.2
													Mean Overall Score		4.2

Result: The Score for this Course is 4.2 (Very High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 2**
17UFC441004B **Credits: 2**

RELIGIOUS DOCTRINE-II

Course Outcome

1. To ensure appreciation of the harmony of religion.
2. To ensure training the youth in the power of prayer.
3. To ensure the understanding of Mary's role in salvation history and Marian Dogmas.
4. To ensure enlightening the graces and invisible effects of the sacraments.
5. To ensure the youth with the promise that God forgives failings on repentance.
6. To ensure understanding the concept of salvation and the promise of eternal life.

Unit: I Harmony of Religions

Introduction - Religions of India - Buddhism - Jainism - Sikhism - Judaism - Confucianism - Christianity - Zoroastrianism - Islam

Unit: II The Christian Prayer

Prayer Defined - Reasons to pray - The Way to Pray - Types of Prayer - Obstacles for Prayer - Prayer in Old -The Lord's Prayer

Unit: III Mary, the Blessed Virgin, Mother of God

Introduction - Marian Dogmas - Mary in need of Redemption - Mary in the New Testament - Apparitions of Mary - Devotion to Mary

Unit: IV Sacraments of Initiation

Introduction - An Overview - Baptism - Confirmation - Holy Eucharist

Unit: V Sacraments of Healing & at the Service of the Community

Reconciliation - Anointing of the Sick - Holy Orders – Matrimony

Text Book:

1. **Life in the Lord,** Department of Foundation course, St. Joseph's College, Tiruchirappalli-2, 2011.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UFC441004B					Title of the Paper RELIGIOUS DOCTRINE-II								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	1	4	3	3	4	4	4	5	4	5	5	5	3.9	
CO2	4	1	4	3	3	4	4	4	5	4	5	5	5	3.9	
CO3	4	3	4	4	3	4	4	5	4	4	5	5	5	4.2	
CO4	4	1	4	3	3	4	4	4	5	4	5	5	5	3.9	
CO5	4	1	4	3	3	4	4	4	5	4	4	4	5	3.8	
CO6	4	1	4	3	3	5	5	5	5	4	5	4	4	4.0	
												Mean Overall Score		3.9	

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester V **Hours/Week: 5**
17UCS530212 **Credits: 4**

PROGRAMMING IN JAVA

Course Outcomes

After learning this course, the learner would have

* gained ability to develop basic programming skills in Java
* acquired fundamental knowledge in Object Oriented Programming
* ability to generate simple packages and to design Thread.
* attained knowledge in various File Handling Techniques.
* acquired ability to design and execute simple Applets.
* developed skills in designing Abstract Window Toolkit.

Unit-I **(15 hours)**

Introduction: Benefits of OOPS- Java History-Java Features- Java Environment- Java Tokens- Constants- Variables- Data Types - Operators and Expressions-Decision Making and Branching- Decision Making and Looping.

Unit-II **(15 hours)**

Classes, Objects and Methods: Classes and Objects - Constructors- 'Method Overloading- Static Members-Inheritance- Overriding Methods- Final Variables, Final Methods and Final Classes - Finalize Method- Abstract Methods and Abstract Classes –Visibility Control - Arrays - Strings.

Unit-III **(15 hours)**

Interfaces, Packages and Thread: Defining Interface- Extending Interfaces- Implementing Interfaces – Packages-Multithreaded Programming: Thread Life Cycle - Thread Exceptions – Thread Priority-Synchronization.

Unit-IV **(15 hours)**

File Handling: Types of Errors – Exceptions- Syntax of Exception Handling Code-Multiple Catch Statements- Using Finally Statements- Managing Input / Output Files in Java: Concept of Streams- Stream Classes- Character Stream Classes-Reading / Writing Characters- Reading / Writing Bytes- Handling Primitive Data Types- Random Access files.

Unit-V **(15 hours)**

AWT and Applet: Event Handling Methods- Labels- Button Control- Check Box Control- Radio Button Control- Choice Control- List Control-Flow Layout- Border Layout-Grid Layout – Menus- Mouse Events-Applets: Life cycle of an Applet-Development and Execution of a Simple Applet.

Books for Study

Units-I, II, III and IV

1. E. Balagurusamy, "Programming with JAVA", Tata McGraw Hill, New Delhi.

Unit-V

2. C. Muthu, "Programming with JAVA", Vijay Nicole Imprints Private Limited, Chennai, Second Edition, 2011.

Books for Reference

1. Herbert Schildt, Complete Reference Java 2, Tata McGraw-Hill Publishing Company Limited, Fifth Edition, 2009.
2. P. Radha Krishna, "Object Oriented Programming through Java", Universities Press, 2006, ISBN : 8173715726.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UCS530212					Title of the Paper: PROGRAMMING IN JAVA								Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	2	3	3	4	4	3	4	4	3	3	4	4	4	3.46	
CO2	3	4	3	4	3	4	4	3	3	3	4	4	4	3.53	
CO3	4	4	3	3	4	4	3	3	3	3	3	3	4	3.38	
CO4	2	4	3	3	3	4	3	3	3	3	3	4	4	3.23	
CO5	4	4	3	3	3	4	3	3	3	3	3	4	4	3.38	
CO6	4	4	4	3	3	3	3	4	3	3	3	4	4	3.46	
											Mean Overall Score			3.40	

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester V **Hours/Week: 5**
17UCS530213 **Credits: 4**

DISTRIBUTED TECHNOLOGIES

Course Outcomes

After learning this course, the learner would have

1. Ability to appreciate the features of .NET framework.
2. Ability to setup the ASP.NET development environment.
3. Ability to create ASP.NET applications.
4. Ability to appreciate the features of ADO.NET.
5. Ability to handle disconnected data access technologies in ADO.NET objects for data manipulations.
6. Ability to develop modular applications by using object oriented methodologies.

Unit-I **(15 hours)**

Client server architecture: 2-tier model – 3-tier model – n-tier model- Understanding the .NET Framework: Benefits of the .NET Framework- Elements of the .NET Framework- ASP.NET.

Unit-II **(15 hours)**

Getting Started with ASP.NET: Introducing the .NET Framework - Introducing ASP.NET- Setting up the Development Environment- Creating an ASP.NET Application- Deploying an ASP.NET Web Application.

Unit-III **(15 hours)**

Building Forms with Web Controls: Introducing ASP.NET Web Forms- Creating Web Forms Application Projects- Using Web Controls- Working with Events.

Unit-IV **(15 hours)**

Using Rich Web Controls: Using the Ad Rotator Control- Using the Calendar Control- Using the Tree View Control- Using the Tab Strip and Multi Page Controls- Using the Toolbar Control.

Unit-V **(15 hours)**

ASP.NET Database Programming: Introducing ADO.NET- ADO.NET Basics- ADO.NET Object Model- Managed Providers- Data Set class.

Books for Study

Unit-I

1. Rajesh, Eswarakumar and Balasubramanian, "Computer Networks, Fundamentals and Applications", Vikas Publishing House Pvt. Ltd., 2002.

Units-II, III, IV and V

2. Mridula Parihar, "ASP.NET Bible", Published by Hungry Minds © 2002, Inc. 909 Third Avenue New York, NY 10022,ISBN: 0-7645-4816-6.

Books for Reference

1. Bill Evjenet, "Professional ASP.NET 2.0 Special Edition", Published by Wrox Press 2006 (1585 pages), ISBN:9780470041789.
2. Stephen Walther, "ASP.NET 2.0 Unleashed", Sams Publications, 2006, Print ISBN-10: 0-672-32823-2, Print ISBN-13: 978-0-672-32823-7

Web Reference

1. http://social.msdn.microsoft.com

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UCS530213					Title of the Paper: DISTRIBUTED TECHNOLOGIES								Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	3	3	1	3	3	4	2	4	3	1	4	4	4	3.0	
CO2	3	4	1	4	4	5	4	4	4	1	4	3	5	3.5	
CO3	4	4	2	3	3	4	2	3	3	3	3	4	4	3.2	
CO4	4	4	2	5	5	4	5	3	4	1	3	4	5	3.8	
CO5	5	4	2	5	4	5	4	4	3	3	4	3	5	3.9	
CO6	4	5	3	5	5	4	4	3	4	2	5	3	5	4.0	
												Mean Overall Score		3.6	

Result: The Score for this Course is 3.5 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester V **Hours/Week: 5**
17UCS530214 **Credits: 4**

LAMP

Course Outcomes

After learning this course, the learner would have

1. Knowledge to install Linux Operating System
2. Idea about basic administration activities on Linux environment
3. Developed and Tested simple PHP programs and Understood PHP built-in-functions
4. Learnt to create database and tables and perform database operations
5. Hosted a website in the Web Server
6. Familiarity to create web application using LAMP

Unit-I **(15 hours)**

Linux: Introduction - Download and Install - Decisions, Decisions – Linux Partition Sizes - Accounts - Security - Basic

UNIX: Shell - Owner, Groups, Permissions, Ownership - Processes - PATH and Environment – Commands Basic File System Essentials – Useful Programs.

Unit-II **(15 hours)**

Apache Web server: Starting and Stopping and Restarting Apache - Configuration - Securing Apache - Create the Web Site - Apache Log Files.

Unit -III **(15 hours)**

My SQL: Commands - Database Independent Interface - Tables – Loading and Dumping Database.

Unit-IV **(15 hours)**

PHP: Embedding PHP into HTML - Configuration - Language

Syntax: Variables - Data Types - Web variables - Operators - Flow Control Constructs- Writing PHP Papers.

Unit-V **(15 hours)**

Built in PHP functions - Important Functions - Array Functions – String Functions - Other Functions

PHP and MySQL: MySQL Functions.

Book for Study

1. James Lee and Brent Lee “Open Source Development with LAMP Using Linux, Apache, MySQL, Perl and PHP”, Pearson Education, 2009.

Book for Reference

1. Json Gerner, Elizabeth Naramore, Morgan Owens and Matt Warden, ”Professional LAMP - Using Linux , Apache, My SQL and PHP5 Web development”, Wiley Publisher, 2006.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UCS530214			Title of the Paper: LAMP									Hours 5	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	4	3	4	4	4	2	5	4	3	2	4	4	3.6
CO2	4	4	3	4	4	3	2	3	3	2	2	4	5	3.3
CO3	3	3	2	3	3	5	5	5	3	3	4	2	4	3.4
CO4	3	3	3	4	4	4	4	3	4	4	3	3	3	3.4
CO5	3	2	2	4	3	4	4	5	4	4	3	4	4	3.5
CO6	4	4	3	4	4	4	2	3	3	3	2	2	4	3.2
												Mean Overall Score		3.4

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No.of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester V **Hours/Week: 4**
17UCS530215 **Credits: 2**

Software Lab-V:
JAVA

Course Outcomes:

1. To generate ability to generate simple packages and to design Thread.
2. To acquire skills and knowledge in various File Handling Techniques.

Exercises

1. Classes, Objects and Constructors
2. Inheritance, Method Overloading and Method Overriding
3. Interfaces and Packages
4. Multithreading
5. Input / Output streams
6. AWT Controls and Applet

Semester V **Hours/Week: 3**
17UCS530216 **Credit: 2**

Software Lab-VI: LAMP

Course Outcomes:

1. Knowledge to install Linux Operating System
2. Idea about basic administration activities on Linux environment
3. Developed and Tested simple PHP programs and Understood PHP built-in-functions
4. Learnt to create database and tables and perform database operations
5. Hosted a website in the Web Server
6. Familiarity to create web application using LAMP

Exercises

1. Usage of Linux Commands
2. Develop a PHP program using controls and functions
3. Develop a PHP program and check message passing mechanism between pages.
4. Develop a PHP program using String function and Arrays.
5. Develop a PHP program using parsing functions (use Tokenizing)
6. Develop a PHP program and check Regular Expression, HTML functions, Hashing functions.
7. Develop a PHP program and check File System functions, Network functions, Date and time functions.
8. Develop the PHP programs to use Regular Expressions
9. Develop a PHP program to display student information using MYSQL table.
10. Develop a college application form using MYSQL table.

Semester V **Hours/Week: 4**
17UCS530302A **Credits: 4**

Core Elective-II (WS): XML

Course Outcomes

After learning this course, the learner will be able to

1. Understand the Style sheet creation and its applications
2. Identify the exact uniform resource locator for proper communication throughout web
3. Recognize exact path and location to develop the web site for communication.
4. Know the concepts and design with respect to the requirement.
5. Realize the design of sequential development and its applications.
6. Gain the knowledge about the enough commercial benefits by using XML

Unit-I **(12 hours)**

Introduction to XML - XML Document structure - elements and attributes - Well-Formed XML Document.

Unit-II **(12 hours)**

Formatting Languages: CSS - XSL documents - XSL Basics - linking XSL with XML - XSL Tags.

Unit-III **(12 hours)**

Validity - Document Type Declaration - Document Type Definitions (DTDs) - DTD Syntax: Element and Attribute Declarations - Entity Declaration.

Unit-IV **(12 hours)**

Xlink: Simple and extended links - Xpath - Xpointers - XML namespaces.

Unit-V **(12 hours)**

XML Applications: Mathematical markup languages - chemical markup languages - wireless markup languages - Data interchange.

Book for Study

1. Elliotte Rusty Harold, "XML Bible", John Wiley & Sons, 2nd Edition, 2001.

Books for Reference

1. Erik T. Ray, "Learning XML", O'Reilly Media, First Edition, 2001.
2. Sandra Eddy & John E. Schnyder, "Teach yourself XML", Hungry minds, 1999.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UCS530302A					Additional Course: XML								Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	2	3	3	4	4	3	4	4	3	3	4	4	4	3.46	
CO2	3	4	3	4	3	4	4	3	3	3	4	4	4	3.53	
CO3	4	4	3	3	4	4	3	3	3	3	3	3	4	3.38	
CO4	2	4	3	3	3	4	3	3	3	3	3	4	4	3.23	
CO5	4	4	3	3	3	4	3	3	3	3	3	4	4	3.38	
CO6	4	4	4	3	3	3	3	4	3	3	3	4	4	3.46	
											Mean Overall Score			3.40	

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester V **Hours/Week: 4**
17UCS530302B **Credit: 4**

Core Elective-II (WS): RUBY ON RAILS

Course Outcomes:

After learning this course, the learner would have

* Learnt the syntax and semantics of Ruby programming language
* Knowledge on expressions and operators
* Understood methods, objects and classes
* Known how closure and meta-programming techniques are used
* Acquired idea on Ruby platform, environment and its security
* Learnt how to build quality web application

Unit-I: **(12 hours)**

Introduction - A Tour of Ruby, Try Ruby, A Sudoku Solver in Ruby. The Structure and Execution of Ruby Programs - Lexical Structure, Syntactic Structure, File Structure, Program Encoding, Program Execution. Data types and Objects - Numbers, Text, Arrays, Hashes, Ranges, Symbols, True, False, and Nil, Objects.

Unit-II: **(12 hours)**

Expressions and Operators - Literals and Keyword Literals, Variable References, Constant References, Method Invocations, Assignments, Operators. Statements and Control Structures - Conditionals, Loops, Iterators and Enumerable Objects, Blocks, Altering Control Flow, Exceptions and Exception Handling, BEGIN and END, Threads, Fibers, and Continuations.

Unit-III: **(12 hours)**

Methods, Procs, Lambdas, and Closures - Defining Simple Methods, Method Names, Methods and Parentheses, Method Arguments, Procs and Lambdas, Closures, Method Objects, Functional Programming. Classes and Modules - Defining a Simple Class, Method Visibility: Public, Protected, Private, Sub classing and Inheritance, Object Creation and Initialization, Modules, Loading and Requiring Modules, Singleton Methods and the Eigenclass, Method Lookup, Constant Lookup.

Unit-IV: **(12 hours)**

Reflection and Meta programming - Types, Classes, and Modules, Evaluating Strings and Blocks, Variables and Constants, Methods, Hooks, Tracing, Object Space and GC, Custom Control Structure, Missing Methods and

Missing Constants, Dynamically Creating Methods, Alias Chaining, Domain-Specific Languages.

Unit-V: **(12 hours)**

The Ruby Platform – Strings, Regular Expressions, Numbers and Math, Dates and Times, Collections, Files and Directories, Input / Output, Networking, Threads and Concurrency. The Ruby Environment - Invoking the Ruby Interpreter, The Top-Level Environment, Practical Extraction and Reporting Shortcuts, Calling the OS, Security.

Books for Study

1. David Flanagan, Yukihiro Matsumoto, The Ruby Programming language, O'Reilly.

Books for Reference:

1. Noel Rappin, Professional Ruby on Rails, Wrox.
2. Michael Fitzgerald, Ruby - Pocket Reference, O'Reilly.
3. Timothy Fisher, Ruby on Rails - Bible, Wrox.
4. Daniel Kehoe, Learn Ruby on Rails, Book One.
5. Michael Hartl, Ruby on Rail Tutorial, Practical List of Ruby on Rail.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UCS530302B					Additional Course: ROBY ON RAILS								Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	3	4	4	3	4	3	2	2	2	4	2	3		3.1
CO2	4	3	2	3	2	4	3	3	4	2	4	4	4		3.2
CO3	4	3	2	4	2	3	4	2	4	4	4	4	4		3.4
CO4	4	3	2	3	4	2	3	4	2	4	3	4	4		3.2
CO5	4	3	3	2	3	4	2	3	4	2	4	4	4		3.2
CO6	3	4	3	3	2	2	4	3	3	3	2	4	4		3.1
												Mean Overall Score			3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester V **Hours/Week: -**
17UCS530217 **Credits: 2**

SPL (POC): PYTHON PROGRAMMING

Course Outcomes

After learning this course, the learner would have

1. acquired the fundamental knowledge on Python programming
2. understood the nuances of this language and hence the learner becomes skillful in python programming
3. known the usage of modules and packages in python
4. familiarity with the file concept in python
5. been skillful experimenting the concepts of OOPs with python language
6. become capable of solving problems using Python

Unit-I

Introduction to Python: Features of Python - How to Run Python - Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) - Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers – Strings – List – Tuple – Set – Dictionary – Data type conversion.

Unit-II

Flow Control: Decision Making – Loops – Nested Loops – Types of Loops. Functions: Function Definition – Function Calling - Function Arguments - Recursive Functions - Function with more than one return value.

Unit-III

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling: Opening a File - Closing a File - Writing to a File - Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python.

Unit-IV

File Handling: Opening a File - Closing a File - Writing to a File - Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python. Object Oriented Programming: Class Definition - Creating Objects -Built-in Attribute Methods - Built-in Class Attributes - Destructors in

Python – Encapsulation - Data Hiding – Inheritance - Method Overriding- Polymorphism.

Unit-V

Exception Handling: Built-in Exceptions - Handling Exceptions - Exception with Arguments - Raising an Exception - User-defined Exception - Assertion in Python. Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - Character Classes - Special Character Classes - Repetition Cases – find all() method - compile() method.

Book for Study

1. Jeeva Jose and P. SojanLal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publising Co. (P) Ltd., 2016.

Book for Reference

1. Wesley J. Chun, "Core Python Programming", Second Edition, Prentice Hall Publication, 2006.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UCS530217					Title of the Paper: PYTHON PROGRAMMING								Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	3	3	2	3	3	3	4	4	3	3	4	3	3	3.1	
CO2	3	4	2	3	4	3	3	4	2	2	4	4	2	3.1	
CO3	3	4	3	3	3	3	3	2	2	4	3	3	3	3.0	
CO4	3	4	4	4	3	4	3	4	3	4	3	4	3	3.5	
CO5	3	4	3	3	4	3	3	4	3	3	4	4	3	3.3	
CO6	3	4	4	4	3	4	3	4	3	4	3	4	3	3.5	
													Mean Overall Score		3.2

Result: The Score for this Course is 3.2 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester V **Hours/Week: 2**
17UCS540601A **Credits: 2**

Skill-Based Elective (BS):
DESKTOP PUBLISHING TOOLS

Course Outcomes

After learning this course, the learner would have

1. Learnt about DTP and Word Processing concepts
2. Knowledge on creating simple designs
3. Gained knowledge about the Desktop Publishing Tools (equivalent to) PageMaker and CorelDraw
4. Identified the templates for business designs
5. Become familiar in designing Brochures and Invitations.
6. Become capable of designing print graphics for Press Media.

List of Practical Exercises to develop creativity

S. No.	Name of the Exercise	Skill Acquired
1.	Design Invitations	Designing Invitations
2.	Design Pamphlets	Print Designing
3.	Design Advertisements	Business Designing
4.	Designing Business Cards	Card Designing
5.	Designing Graphics For Media	Media Designing
6.	Design Logo	Designing Artistic Words
7.	Designing Photo	Designing Editing Photo

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UCS540601A			Skill Based Elective: DESKTOP PUBLISHING TOOLS									Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	3	4	3	3	4	3	2	4	3	4	3	4	3.3
CO2	3	4	3	4	4	4	4	3	3	4	3	2	4	3.4
CO3	3	4	5	4	3	3	4	3	4	3	3	4	3	3.5
CO4	3	5	4	3	4	4	4	4	3	4	2	3	4	3.6
CO5	3	2	4	3	3	4	3	4	3	4	3	4	4	3.3
CO6	4	5	4	3	3	4	4	3	4	3	4	2	4	3.6
												Mean Overall Score		3.4

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semester V **Hours/Week: 2**
17UCS540601B **Credits: 2**

Skill-Based Elective (BS):
MULTIMEDIA-I

Course Outcomes

1. To offer the knowledge of creating and working with digital images and to manipulate them and to develop a presentation package using multimedia tools.

GIMP (Photoshop Equivalent)

1. Cropping images using Lasso Tools
2. Designing Pictures using Paint Tools
3. Designing Text using Text Tools
4. Applying Layer Effects to Images and Texts
5. Designing an Employee or Student ID card
6. Designing a seasonal greetings
7. Design a photograph applying Filter effects
8. Design an invitation for a conference
9. Design a brochure or poster for a technical symposium
10. Designing a Flexible banner for your college
11. Create your own wallpaper for your Desktop/Laptop/Mobile
12. Design a Web banner for a website

Semester V **Hours/Week:2**
17USS540701A **Credits:2**

Inter Departmental Course (IDC): SOFT SKILLS

Course Outcome

This course aims at introducing the students to the nuances of developing the basic soft skills required today and training them to present the best of themselves as job seekers.

Module I

Basics of Communication: Definition of communication, Barriers of Communication, Grooming, Presentations & Practicum.

Module II

Resume Writing & Interview Skills: Resume Writing: What is resume? Types of Resume - Chronological, Functional and Mixed Resume**,** Steps in preparation of Resume. **Interview Skills:** Preparation

Module III

Group Discussion: Basics of Group Discussion, Parameters of GD, Essential Points for GD preparation, and GD Topics and Practicum.

Module IV

Personal Effectiveness: Self Discovery; and Goal Setting; Questioneers & Presentations for interview, Common interview questions, Attitude, Body Language, The mock interviews and Practicum

Module V

Numerical Ability: Calendar, Average, Percentage; Profit and Loss**,** Simple Interest, Compound Interest; Time and Work, Pipes and Cisterns; Time and Distance**,** Problems on Trains**,** Boats and Streams; Ratios and Proportions.

Module VI

Test of Reasoning - Verbal Reasoning: Series Completion, Analogy; Data Sufficiency, Assertion and Reasoning; and Logical Deduction. **Non-Verbal Reasoning:** Series; and Classification

Textbook

1. JASS, 2016. Straight from the traits: Securing the soft skills. St.Joseph's College, Trichy

References

1. Aggarwal, R.S. 2010. *A Modern Approach to Verbal and Non Verbal Reasoning*. S.Chand, New Delhi.
2. Aggarwal, R.S. 2001. Quantitative Aptitude. S.Chand. New Delhi
3. Covey, Stephen. 2004. *7 Habits of Highly effective people,* Free Press. Egan, Gerard. (1994). *The Skilled Helper* (5th Ed). Pacific Grove, Brooks/ Cole.
4. Khera ,Shiv 2003. *You Can Win.* Macmillan Books , Revised Edition.
5. Murphy, Raymond. 1998. *Essential English Grammar*. 2nd ed., Cambridge University Press. Sankaran, K., & Kumar, M. *Group Discussion and Public Speaking*. M.I. Pub, Agra, 5th ed., Adams, Media.
6. Trishna's 2006. *How to do well in GDs & Interviews*, Trishna Knowledge Systems.
7. Yate, Martin. 2005. H*iring the Best: A Manager's Guide to Effective Interviewing and Recruiting*.

Evaluation Pattern

Modules	Topic	Examination Pattern	
		CIA	Online
I	Basics of Communication	15	5
II	Resume Writing & Interview Skills	15	5
III	Group Discussion	10	10
IV	Personal Effectiveness	10	10
V	Numerical Ability (Common Session)	-	10
VI	Test of Reasoning (Common Session)	-	10
	Total	**50**	**50**

Semester V **Hours/Week: 2**
17USS540701B **Credits: 2**

Inter Departmental Courses (IDC):
NATIONAL CADET CORPS

Course Outcomes

1. NCC 'C' and 'B" certificates are very much useful and increase credit marks in UPSC and SSB examinations..
2. They learnt discipline punctual and leadership quality.
3. They got physical fitness for Army and Police selection.
4. They learnt general knowledge find political issue.
5. They got trained for social service and volunteers for disaster.
6. They will be the best citizens of India.

Unit-I: About NCC - Personality Developmet - Self Awareness (6 hours)

NCC Aims and objectives of NCC - Organization and training and NCC song Incentives for cadets in NCC - NCC ranks Religion, culture , traditions and customs of India.- National integration – importance and necessity - Freedom struggle and nationalist movement in India - Personality development - Introduction to personality development - Factors influencing / shaping personality – Physical , social, psychological and philosophical Self awareness – know yourself / insight . - Change your mindset.

Unit-II: Interpersonal Relationship and Communication - NDMA (6 hours)

Interpersonal relationship and communication - Communication skills Leadership traits - Types of leadership Attitude – assertiveness and negotiation - Time management - Effects of leadership with historical examples - Stress management skills - Interview skills - Conflict motives.- Importance of group – team work - Disaster Management - Civil defence organization and its duties – NDMA Types of emergencies / natural disasters- Assistance during natural / other calamities / floods / cyclone / earth quake / accident - Setting up of relief camp during disaster Management - Collection and distribution of aid material .

Unit-III: Social Awareness and Community Development - Hygiene and Sanitation (6 hours)

Social awareness and community development - Basics of social service-weaker sections of our society and their needs - Health and Hygiene Structure and functioning of the human body - Hygiene and sanitation- Physical and

mental health - Infectious and contagious diseases and its prevention - Basic of home nursing and first aid in common medical emergencies - Wounds and fractures - Introduction to yoga and exercises

Unit-IV: AIR-WING (6 hours)

Principles of flight – Elementary Mechanics – Atmosphere - Venturi effect and Bernauli's theorem - Glossary of terms; Aero engines – Aero-engine components; Aircraft components – Airframe structure; Metereology – Importance of Metereology in Aviation; Air Navigation – Why a pilot should study Navigation; Airmanship – Airmanship; Aeromodelling – History of Aeromodelling – Materials used in Aeromodelling – Types of Aeromodels.

Unit-V: NAVAL (6 hours)

Naval orientation - history of Indian Navy – Navy head quarters commands fleets- ships shore establishment war ships and their role - induction to Anti submarine warfare.- Types of war ships - types anchor parts of anchor - GPS RACON RADAR - types of firewater making in the ships- NBCD organization and structure - Damage flooding.

Text Book

1. Cadet's hand book published by the Directorate General, National Cadet Corps, Ministry of Defence, R. K. Puram, New Delhi 110022, 2008.

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Semester VI **Hours/Week: 5**
17UCS630218 **Credits: 3**

COMPUTER NETWORKS

Course Outcomes

After learning this course, the learner would have

* understand the basic concepts of computer networks and know the fundamentals of data communication
* identify the functionalities of OSI reference model and compare with TCP/ IP model
* comprehend the protocols and standards of ethernet, SNA model and digital network architecture
* learn the fundamental principles of LAN and WLAN
* realize the design of client / server computing and explain the architecture and protocols of different networks.
* understand web technology and practice in distributed applications

Unit-I **(15 hours)**

Introduction to Computer Networks and Data Communications: Need for Computer Networks - Evolution of Computer Networks - Data Communication Fundamentals - Data Transmission - Transmission Media - Classification of Computer Networks - Switching and Routing - Routing - Multiplexing and Concentration - Concentrator - Terminal Handling - Components of Computer Network.

Unit-II **(15 hours)**

OSI Reference Model - The Physical Layer - Data Link Layer - Network Layer - Transport Layer - Session Layer - Presentation Layer - Application Layer. Transmission Control Protocol: Network layer - Transport Layer - Application layer.

Unit-III **(15 hours)**

IEEE Standards - The Ethernet - Token Bus - Token Ring - The X.25 Protocol - SNA Model Digital Network Architecture.

Unit-IV **(15 hours)**

Local Area Network : LAN Architecture - LAN Advantages and Services - Characteristics of a LAN - LAN Topologies. Wireless LANs - Components of Wireless LANs - Working of Wireless LANs - Transmission Media - Wireless LAN Types - Protocol for Wireless LAN - Uses of Wireless LAN.

Unit-V **(15 hours)**

Client / Server Computing : Clients - Server. Distributed Applications: Web technology - HTTP- Web Client - Web Server - HTML. Distributed Processing: Three Tier Architecture.

Book for Study

1. Rajesh, Eswarakumar, Balasubramanian, "Computer Networks, Fundamentals and Applications", Vikas Publishing House Pvt. Ltd., 2002.

Books for Reference

1. Behrouz A Fourouzan, "Data Communications and Networking", McGraw Hill, Fourth Edison, 2006.
2. William Stallings, " Data and Computer Communications", Prentice Hall of India, Seventh Edition, 2004.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UCS630218					Title of the Paper: COMPUTER NETWORKS								Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	5	4	3	4	2	5	2	2	4	4	3	4	3		3.4
CO2	4	4	4	4	2	5	2	3	4	3	4	3	3		3.4
CO3	4	4	3	4	2	4	2	3	4	3	4	3	3		3.3
CO4	4	3	4	4	2	4	2	2	4	3	4	3	4		3.3
CO5	4	3	4	4	3	4	2	2	4	3	4	4	3		3.3
CO6	4	5	4	4	3	5	4	4	3	3	4	5	3		3.9
													Mean Overall Score		3.4

Result: The Score for this Course is 3.4 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester VI **Hours/Week: 5**
17UCS630219 **Credits: 3**

OPERATING SYSTEMS

Course Outcomes

1. To understand the services provided by the OS and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand the different approaches to memory management.
5. Demonstrate an understanding of different I/O techniques in operating system.
6. Students should be able to use system calls for managing processes, memory and the file system.

Unit-I **(15 hours)**

Operating system Overview -Basic concepts and terminologies operating system Resource manager - process view point - Hierarchical and extended machine view -I/O programming and interrupt programming - I/O programming - Interrupt Structure and processing.

Unit-II **(15 hours)**

Memory Management -Single Contiguous allocation - multiprogramming - partitioned allocation - relocatable partitioned memory management – paged memory management - page removal algorithms – thrashing – segmented memory management - segmented and demand paged memory management.

Unit-III **(15 hours)**

Processor management - Process State Model - job scheduling – Process scheduling - Multiprocessor systems - Process synchronization – resolving dead locks.

Unit-IV **(15 hours)**

Device management - Techniques - Device characteristics - I/O traffic controller -I/O scheduler and device handlers - virtual devices - spooling.

Unit-V **(15 hours)**

Information Management: File system model -Symbolic, basic file system - Access Control verification - Logical, Physical file system –Allocation strategy, Device Strategy Modules.

Book for Study

1. S.E Madnick and J J Donovan "Operating Systems" McGraw Hill International Book Co., New Delhi, 2013.

Books for Reference

1. Harvey M Deitel, "An Introduction to Operating System" Addison - Wesley Publishing Co., New York, 1984.
2. James L. Peterson & Abraham Silbertschatz, "An Introduction to Operating System", Addison - Wesley Publishing Co., New York, 1987.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UCS630219					Title of the Paper: OPERATING SYSTEMS								Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	4	4	2	5	4	4	4	4	3	5	4	4	2	3.8	
CO2	4	4	2	5	4	4	4	4	3	4	4	4	2	3.7	
CO3	4	4	3	4	4	4	3	3	4	4	4	4	3	3.7	
CO4	4	4	2	4	3	3	4	3	4	4	3	3	2	3.3	
CO5	4	4	3	3	4	3	4	4	3	4	3	3	2	3.4	
CO6	3	4	2	3	4	3	3	4	4	3	3	4	2	3.2	
													Mean Overall Score		3.5

Result: The Score for this Course is 3.5 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester VI **Hours/Week: 5**
17UCS630220 **Credits: 3**

OPERATIONS RESEARCH

Course Outcomes

After learning this course, the learner will be able to

1. formulate real life problems as LP model and finding an optimized solution
2. know the concept of solving transportation problems and assignment problem with business solutions
3. know the primal dual relationship as producer and consumer relationship in business
4. identify the activities, schedule the project and finding time of completion.
5. understand the need of inventory and models for different products
6. perform inventory analysis in selected product methods.

Unit-I **(15 hours)**

Linear Programming - General formulation of the LP Model and its Graphical solution. The Simplex Method - Computational Procedure. Artificial Variable Techniques - the Two Phase Technique – Special cases in Simplex Method.

Unit-II **(15 hours)**

Duality in Linear Programming - The Dual Problems - Primal Dual Relationships, Primal - Dual Computations - Dual Simplex Method.

Unit-III **(15 hours)**

Transportation Problems - Transportation Model - Determining the starting solution of Transportation Model, North - West Corner Rule, Least – Cost Method and Vogel's Approximation Method. Determining the optimum solution of Transportation Problems - Assignment Problems and its solution by Hungarian method.

Unit-IV **(15 hours)**

Project Scheduling by PERT-CPM - Network diagram representations – Critical path calculations - Probability considerations in Project Scheduling.

Unit-V **(15 hours)**

Inventory Management: Inventory Control - ABC analysis - Economic Lost size problems - EOQ with uniform demand and shortages - Limitations of Inventories - Buffer stock - Determination of Buffer stocks. (Note: Stress may be on the working of numerical problems)

Book for Study

1. Kanti Swarup, P K Guptha & Manmohan, "Operations Research", Sultan Chand & Sons, New Delhi, 1984 .

Books for Reference

1. Rathindra P. Sen, "Operations Research Algorithms and Applications", PHI, New Delhi, 2010.
2. R. PanneerSelvam, "Operations Research", PHI, New Delhi, 2nd Ed., 2010.
3. Nita H. Shah, Ravi M. Gor & Hardik Soni," Operations Research", PHI, New Delhi, 2010.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UCS630220	Title of the Paper: OPERATIONS RESEARCH										Hours 5	Credits 3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	4	5	2	3	3	4	5	3	4	2	3	2	4	3.9
CO2	4	4	2	4	3	3	2	3	4	2	4	3	3	3.2
CO3	4	4	2	4	4	3	2	2	4	2	4	4	3	3.2
CO4	4	4	2	4	4	3	2	2	4	2	4	4	3	3.2
CO5	4	4	2	4	4	3	2	2	4	2	4	4	3	3.2
CO6	4	4	2	4	4	3	3	3	4	2	4	4	3	3.4
												Mean Overall Score		3.3

Result: The Score for this Course is 3.3 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester VI **Hours/Week: 3**
17UCS630221 **Credits: 2**

Software Lab-VII: DISTRIBUTED TECHNOLOGIES

Course Outcomes

1. Ability to create ASP.NET applications.
2. Ability to appreciate the features of ADO.NET.
3. Ability to handle disconnected data access technologies in ADO.NET objects for data manipulations

Detailed study:

1. Simple web page creation using HTML
2. HTML form validation using VB script
3. Simulating a Calculator
4. Testing Request and Response Objects
5. Testing Application and Session Objects
6. Testing Validation Controls
7. Database Access - ADO.NET
8. Components Creation and Usage
9. Use of Data Grid and Data List Viewer
10. File Accessing
11. Creating and Accessing Web Services

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Semester V & VI **Hours/Week: 3**
17UCS630222 **Credits: 2**

Hardware Lab:
ELECTRONICS

Non-Clocked Experiments

1. Multiplexers and De-Multiplexers
2. ALU

Clocked Experiments

3. Memory Devices
4. Flip-Flops

Arithmetic Experiments

5. Adders and Subtractors
6. 4-bit Adder and BCD adder

Arithmetic Experiments

7. 8085 Progrmming-1
8. 8085Programming-2
9. Hardware Assembling & Diagnostics
10. OS Installation and CMOS Setup
11. Networking Creaming/Hub/Switch
12. Wi-Fi Bridging, Routing

Semester VI **Hours/Week: -**
17UCS630223 **Credit: 2**

COMPREHENSIVE EXAMINATION

Course Outcomes

1. To recall everything studied and to appreciate the interlinks between various topics learnt make the students ready for IT industry or higher studies.

Detailed Study:

Unit-I

Discrete Mathematics and Applications of Operations Research.

Unit-II

Programming concepts in C, C++, JAVA.

Unit-III

Concepts of Database Systems.

Unit-IV

Computer Networks and Operating system Concepts.

Unit-V

Software Engineering: Analysis, Design, Implementation and Testing.

Semester VI **Hours/Week: -**
17UCS630224 **Credits: 1**

INTERNSHIP

Course Outcomes

1. To know and experience the real world beyond the academic campus
2. To make oneself suitable for the society's changing needs

Detailed Study

* Develop new technical skills with respect to industry standards.
* Ability to Acquire, Evaluate, Organize and Maintain Information.
* Improving problem-solving and critical thinking skills.
* Learn to manage time and other resources effectively.
* Develop appropriate workplace attitudes, behaving ethically and professionally.
* Demonstrate Effective utilization of new software tools to complete tasks.

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Semester VI **Hours/Week: 4**
17UCS630303A **Credits: 4**

Core Elective-III (WS): COMPUTER GRAPHICS

Course Outcomes

After learning this course, the learner will be able to

1. formulate the design process and principles.
2. assimilate the graphics and their transformations.
3. generate primitives, interactive graphics and raster graphics.
4. work with the concepts of Graphic packages and Geometric models.
5. create applications for interactive graphics
6. design the three-dimensional graphics

Unit-I **(12 hours)**

Introduction: point plotting systems: Coordinate system - line and circle drawing algorithms. Display devices: storage-tube display - refresh line drawing display - two-dimensional transformation: principles – concatenation - matrix representation. Clipping and windowing: line clipping algorithm - polygon clipping algorithm - viewing transformation - windowing transformation.

Unit-II **(12 hours)**

Graphic packages: simple graphics package: ground rules - graphic primitives - windowing and miscellaneous functions - display code generator. Segmented display files: segments - posting and unposting segments - appending segments. Display file compilation: free storage allocation - display file compilation. Geometric models: simple modelling example - geometric modelling - symbols and instances. Picture structure: Defining symbols - display procedures - structured display file.

Unit-III **(12 hours)**

Interactive Graphics: graphical input devices: pointing and positioning devices - mouse - tablets - light pen - three dimensional input devices - comparators. Graphical input techniques: positioning techniques – pointing and selection - inking and painting - online character recognition. Event handling: polling - interrupts - event queue - functions for handling events - polling design light pen interrupts. Input functions: Dragging and fixing - hit detection - online character recognition.

Unit-IV **(12 hours)**

Raster Graphics: Raster graphics fundamentals - frame buffer display - representing raster image - scan conversion - displaying characters – speed of scan conversion - natural images. Solid-area scan conversion: Geometric representation of areas - scan converting polygons - priority - X-Y algorithms-properties of scan conversion algorithms. Interactive Raster Graphics: updating the display - the painting model - moving parts of an image. Raster graphic systems: representation - raster manipulation functions – raster display hardware.

Unit-V **(12 hours)**

Three-dimensional graphics: Realism in three-dimensional graphics - techniques for achieving realism - modelling and realism. Curves and surfaces :parametric functions - Bezier and B-Spline methods. Three-dimensional transformations and perspectives: transformation - modelling - viewing - clipping. Perspective depth: Screen, Homogeneous coordinate systems - perspective transformation. Hidden-surface elimination: Depth-buffer algorithm - area and scan-line coherence algorithms - sorting and coherence: Shading: shading model - special effects - applying shading model.

Book for Study

1. William M. Newman and Robert F. Sproull, "Principles of Interactive Computer Graphics", Second edition, TMH Edition, New Delhi, 1997.

Book for Reference

1. Malay K. Pakhira, "Computer Graphics, Multimedia and Animation", Second Edition, PHI edition, 2010.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UCS630303A					Title of the Paper: Elective-III: COMPUTER GRAPHICS								Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	3	3	2	3	3	4	4	4	3	1	4	4	4	3.2	
CO2	3	4	2	4	4	5	4	4	4	1	4	3	5	3.6	
CO3	4	5	2	4	4	5	3	4	5	1	3	3	4	3.8	
CO4	4	4	3	5	5	4	5	5	4	1	3	4	5	4.0	
CO5	5	4	5	5	4	5	4	4	3	3	4	3	5	4.1	
CO6	4	5	3	4	5	4	4	3	5	2	5	3	5	4.0	
Mean Overall Score														3.9	

Result: The Score for this Course is 3.9 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester VI **Hours/Week: 4**
17UCS630303B **Credits: 4**

Core Elective-III (WS): WEB GRAPHICS

Course Outcomes

After learning this course, the learner will be able to

1. appreciate the concepts of multimedia.
2. work with animations, tweening and interactive elements.
3. design shapes in multimedia.
4. adopt skills to make multimedia applications.
5. produce a presentation using multimedia tools.
6. develop animations with various multimedia packages.

Unit-I **(12 hours)**

Introduction to multimedia -GIMP: Environment - layers and work path - Image editing - channels, masks and actions - filters - rollovers and animations.

Unit-II **(12 hours)**

Synfig: introduction - drawing and colouring tools.

Unit-III **(12 hours)**

Synfig (contd) : drawing and colouring tools

Unit-IV **(12 hours)**

Synfig: animation - tweening - interactive elements.

Unit-V **(12 hours)**

Inkscape: interface - working with shapes - layers - blend, path and mask.

Books for Study

1. Fazreil Amreen, "Instant GIMP Starter", Packet Publishing Limited, ISBN-10: 1782160345, ISBN-13: 978-1782160342
2. http://wiki.synfig.org/Category:Manual
3. Bethany Hiitola, Packt Publishing Limited, "Inkscape Starter", ISBN-10: 1849517568, ISBN-13: 978-1849517560

Books for Reference

1. Manuals available in websites corresponding to the software

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UCS630303B					Title of the Paper: Core Elective-III: WEB GRAPHICS								Hours 4	Credits 4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO1	3	3	3	5	4	4	3	3	3	1	3	4	3	3.2	
CO2	5	4	3	5	4	4	3	4	4	3	4	4	5	4.0	
CO3	4	4	4	5	4	4	5	4	4	2	4	3	4	3.9	
CO4	4	4	4	5	5	4	4	3	4	4	4	4	5	4.1	
CO5	4	3	5	4	5	4	4	3	4	4	3	3	5	3.9	
CO6	4	4	5	3	5	4	5	3	3	3	3	3	5	3.8	
												Mean Overall Score		3.8	

Result: The Score for this Course is 3.8 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester VI **Hours/Week: 2**
17UCS640602A **Credits: 2**

Skill-Based Elective (WS):
E-COMMERCE

Course Outcomes

After learning this course, the learner would

* have gained good amount of the concepts of E-Commerce & Internet based Business applications
* be able to develop an e-commerce oriented skill.
* be able to create blogs, websites and maintain.
* be able to develop Purchase products through online
* be able to create and display advertisements through online
* have mastered online registration methods for various purposes.

Exercises List

1. Blog creation / Web site creation
2. Railway ticket reservation
3. E-Mailing to the Agency/official Business people
4. Purchase products through online
5. Online Passport Registration
6. Online Fund transfer
7. Electricity Bill Payment
8. Create and display advertisement through online

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Semester VI **Hours/Week: 2**
17UCS640602B **Credits: 2**

Skill-Based Elective (WS):
MULTIMEDIA-II

Course Outcomes

1. To learn animations, create web pages with graphics, simple UIs and blogs.

Synfig (wiki.synfig.org / Category: Tutorials) (Flash equivalent)

1. Create an animation for bouncing a ball
2. Create brushed outlines for an image
3. Build a magnifying glass
4. Develop a slide show of photos with transitions

Aptana (http://content.aptana.com/aptana/tutorials/)(Dreamweaver equivalent)

1. Developing a simple webpage with images and links
2. Develop a webpage displaying the timetable of the Department
3. Design an application form for Student Admission
4. Create your own web blog for college events

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UCS640602A			Title of the Paper: Skill-based Elective (BS): E-COMMERCE									Hours 2	Credits 2
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)								Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	
CO1	3	3	3	5	4	4	3	3	3	1	3	4	3	3.2
CO2	4	4	4	4	4	4	4	4	3	2	3	4	4	3.7
CO3	5	4	3	5	4	4	3	4	4	3	4	4	5	4.0
CO4	4	4	4	5	4	4	5	4	4	2	4	3	4	3.9
CO5	4	4	4	5	5	4	4	3	4	4	4	4	5	4.1
CO6	4	4	3	4	5	3	4	4	3	2	3	4	4	3.6
													Mean Overall Score	3.7

Result: The Score for this Course is 3.7 (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

***Values Scaling*:**

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Notes

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