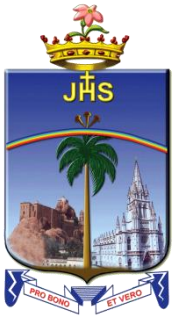
M.Sc. MATHEMATICS

LOCF SYLLABUS – 2021

SCHOOLS OF EXCELLENCE

WITH CHOICE BASED CREDIT SYSTEM (CBCS)



DEPARTMENT OF MATHEMATICS
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:

$GPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$	$WAM\,(Weighted\,Average\,Marks) = \frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$
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.

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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.

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		≥ 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)

1. Graduates will be able to apply assimilated knowledge to evolve tangible solutions 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 professionals and entrepreneurs upholding human values.
5. Graduates groomed with ethical values and social concern will be able to understand and appreciate cultural diversity, promote social harmony and ensure sustainable environment.

Programme Specific Outcomes (PSOs)

Graduate will be able to

1. Appreciate the emphasis given on teaching the fundamentals, the basic concepts, definitions with a variety of examples.
2. Realise the importance given to applications by applying the concepts studied for designing models to solve real life problems.
3. Develop the skill to solve problems which appear in the various examinations based on

   the concepts learned which in turn will hone the problem solving skills of students and help them to pass competitive examinations including CSIR-NET, SET, IAS, etc
4. Learn application oriented subjects which will impress upon them their responsibility to the society.
5. Get proper orientation that a research degree is not end of learning. They are encouraged

   to publish papers on a continual basis in the standard journals during and after Ph.D.,

M. Sc.MATHEMATICS					
PROGRAMME STRUCTURE					
Sem.	**Specification**	**No. of Courses**	**No. of Hours**	**Credits**	**Total Credits**
I-IV	Core Courses: Theory	**13**	**76**	**69**	**69**
II	Self - Paced Learning	1	-	**2**	**2**
IV	Comprehensive Examination	1	-	**2**	**2**
IV	Project Work & Viva Voce	1	8	**5**	**5**
I- IV	Discipline Specific Elective	4	20	**16**	**16**
III	AbilityEnhancement 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)**	**110(6)**

M. Sc. MATHEMATICS							
PROGRAMME PATTERN							
Course Details					**Scheme of Exams**		
Sem	**Course Code**	**Course Title**	**Hrs**	**Cr**	**CIA**	**SE**	**Final**
I	21PMA1CC01	Algebra	7	6	100	100	100
	21PMA1CC02	Real Analysis – I	6	5	100	100	100
	21PMA1CC03	Graph Theory	6	5	100	100	100
	21PMA1CC04	Classical Dynamics	6	5	100	100	100
	21PMA1ES01A	**DSE – 1:** Stochastic Processes	5	4	100	100	100
	21PMA1ES01B	**DSE – 1:** Differential Geometry					
		Total	**30**	**25**			
II	21PMA2CC05	Linear Algebra	6	5	100	100	100
	21PMA2CC06	Real Analysis – II	4	4	100	100	100
	21PMA2CC07	Complex Analysis	7	6	100	100	100
	21SCS2ES02	**DSE – 2:** Design and Analysis of Algorithms	5	4	100	100	100
	21PMA2SP01	**Self -Paced Learning:** History of Mathematics	-	2	50	50	50
	21PSS2SE01	**SEC:** Soft skills	4	3	100	-	100
	21PMA2EG01	**GE-1: (WS)** Mathematical Foundations	4	3	100	100	100
	21PCA2EG01	**GE-1: (WS)** Applied Statistics using R					
	21PCS2EG01	**GE-1: (WS)** Mobile Adhoc Networks (MANET)					
		Extra Credit Courses (MOOC)-1	-	(2)			
		Total	**30**	**27 (2)**			
III	21PMA3CC08	Measure and Integration	6	6	100	100	100
	21PMA3CC09	Topology	6	5	100	100	100
	21PMA3CC10	Ordinary Differential Equations	5	5	100	100	100
	21PMA3ES03A	**DSE -3:** Algebraic Number Theory	5	4	100	100	100
	21PMA3ES03B	**DSE- 3:** Optimization Techniques					
	21PMA3AE01	**AEC:** Problem solving in Advanced Mathematics	4	3	50	50	50
	21PMA3EG02	**GE-2: (BS)** Operations Research	4	3	100	100	100
		Extra Credit Courses (MOOC)-2		(2)			
		Total	**30**	**26 (2)**			
IV	21PMA4CC11	Functional Analysis	6	6	100	100	100
	21PMA4CC12	Partial Differential Equations	5	5	100	100	100
	21PMA4CC13	Calculus of Variations, Integral Equations and Integral Transforms	6	6	100	100	100
	21PMA4ES04A	**DSE – 4:** Automata Theory	5	4	100	100	100
	21PMA4ES04B	**DSE – 4:** Programming in C++					
	21PMA4PW01	Project work	8	5	100	100	100
	21PMA4CE01	Comprehensive Examination	-	2	50	50	50
		Extra Credit Courses (MOOC)-3	-	(2)			
		Total	**30**	**28 (2)**			
I-IV	21PCW4OR01	Outreach Programme (SHEPHERD)		4			
		Total	**120**	**110(6)**			

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

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	21PMA1CC01	CORE - 1: ALGEBRA	7	6

CONo.	CO - Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquaint with the fundamental algebraic structures, namely Rings, Fields and Vector spaces, essential for further study of Algebra.	K1
CO-2	understand definitions and statements of theorems, formulating conjectures and analyzing them critically.	K2
CO-3	design and implement the concepts of homomorphism and isomorphism between groups and rings for solving different types of problems	K3
CO-4	utilize the class equation and Sylow's theorems to solve different related problems.	K4
CO-5	demonstrate capacity of illustration for mathematical reasoning through analyzing, proving and explaining concepts from field extensions and Galois theory	K5 &K6

Unit-I **(21 Hours)**

Normal subgroups and Quotient groups – Homomorphism – Conjugacy – Sylow's Theorem.

Unit-II **(21Hours)**

Ideals and Quotient rings – More Ideals and Quotient rings – The field of quotients of an Integral Domain – Euclidean rings – A particular Euclidean ring.

Unit-III **(21Hours)**

Polynomial Rings-Polynomials over the Rational Field – Polynomial Rings over commutative rings.

Unit-IV **(21 Hours)**

Field Extension – Extension Fields – Roots of Polynomials – More about roots.

Unit-V **(21 Hours)**

The elements of Galois Theory – Finite Fields.

Book for Study

1. I. N. Herstein, *Topics in Algebra*, Wiley Eastern Limited, NewDelhi,1992.
   Unit – I *Chapter2 (Sec 2.6, 2.7, 2.11and2.12)*
   Unit –II *Chapter3(Sec3.4, 3.5, 3.6, 3.7and 3.8)*
   Unit – III *Chapter3(Sec3.9, 3.10 and 3.11)*
   Unit – IV *Chapter5 (Sec5.1, 5.3, 5.5)*
   Unit – V *Chapter5 (Sec5.6) and Chapter7(Sec 7.1)*

Books for Reference

1. Serge Lang, *Algebra*, Third Edition, Springer Graduate Texts in Mathematics, New York, 2002.

2. N. S. Gopala Krishnan, *University Algebra*, Second Edition, John Wiley & Sons (Asia) Pvt. Ltd., 1986.

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

Semester	**Course Code**		**Title of the Course**						**Hours**	**Credit**
I	**21PMA1CC01**		**CORE-1: ALGEBRA**						**7**	**6**
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	3	2	3	2.5
CO-2	2	3	3	2	2	2	3	2	1	3	2.3
CO-3	3	2	3	2	2	3	2	2	2	2	2.3
CO-4	3	3	2	2	2	3	3	3	2	3	2.6
CO-5	2	3	3	2	1	3	3	2	2	3	2.4
									Mean Overall Score		2.42(High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PMA1CC02	CORE-2: REAL ANALYSIS – I	6	5

CO.No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	gain knowledge of concepts of modern analysis such as convergence, continuity, completeness and compactness in the Euclidean space and more general metric spaces.	K1
CO-2	understand the limits and how they used in convergence properties of sequence and series, continuity and derivative of real functions.	K2
CO-3	apply the suitable tests to examine the convergent and divergent series.	K3
CO-4	analyze the properties of sets of real numbers (such as countable set and uncountable sets), sequence of real numbers, convergence, Cauchy's sequence limit theorem (such as monotone convergence theorem), the basic results associated with the continuity and differentiability of real valued functions.	K4
CO-5	evaluate the limits of functions, derivative of functions at a point and points of discontinuity.	K5 &K6

Unit-I **(18 Hours)**

Introduction – Ordered sets – Finite, Countable and Uncountable Sets - Metric Spaces - Compact Sets - Perfect Sets - Connected Sets.

Unit-II **(18 Hours)**

Convergent Sequences – Subsequences – Cauchy Sequences – Upper and Lower Limits – some Special sequences – Series – Series of non-negative terms – the number *e*.

Unit-III **(18 Hours)**

The Root and Ratio Tests – Power Series – Summation by parts – Absolute convergence.

Unit-IV **(18 Hours)**

Limits of Functions – Continuous functions – Continuity and compactness continuity and Connectedness – Discontinuities – Monotone functions – Infinite Limits and Limits at Infinity.

Unit-V **(18 Hours)**

The Derivative of a Real Functions – Mean Value Theorems – The Continuity of Derivatives – L'Hospital's Rule – Derivative of Higher Order – Taylor's Theorem.

Book for Study

1. Walter Rudin, *Principles of Mathematical Analysis,*Third Edition, McGraw-Hill International Book Company, NewYork, 1976.
   Unit – I *Chapter 1(Sec 1.0-1.11), Chapter 2.*
   Unit – II *Chapter 3(Sec 3.31-3.32)*
   Unit – III *Chapter 3(Sec 3.33-3.46)*

Unit – IV *Chapter 4*
Unit – V *Chapter 5 (Sec 5.1-5.15)*

Books for Reference

1. Tom M.Apostol, *Mathematical Analysis*, Addison-Wesley Publishing Company London, 1974.
2. Richard R. Goldberg, *Methods of Real Analysis*, Oxford & IBH Publishing Company, New Delhi, 1970.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credit**
I	**21PMA1CC02**			**CORE – 2: REAL ANALYSIS-I**				**6**		**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	2	1	2	3	3	2	2	3	2.3
CO-3	1	3	3	2	3	2	3	2	2	2	2.3
CO-4	3	1	2	3	2	2	3	2	2	3	2.3
CO-5	2	2	2	2	3	2	3	2	2	3	2.3
									Mean Overall Score		2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	**21PMA1CC03**	**CORE – 3: GRAPH THEORY**	**6**	**5**

CO No.	CO - Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire in depth knowledge on vital concepts in graph theory.	**K1**
CO-2	understand the graphs, its types and on the theory of connectivity, colorings and planarity.	**K2**
CO-3	apply the imbibed knowledge on the concepts to categorize graphs.	**K3**
CO-4	analyze and infer properties of graphs and its associated concepts.	**K4**
CO-5	evaluate connectivity, chromatic numbers etc., and construct graphs with specific properties.	**K5 & K6**

Unit-I **(18 Hours)**

Basic concepts – Subgraphs – Degrees of vertices – Paths and connectedness – Operations on graphs – Directed graphs: Basic concepts – Tournaments.

Unit-II **(18 Hours)**

Vertex cuts and Edge cuts – Connectivity and Edge–Connectivity – Trees: Definition, Characterization and Simple Properties – Counting the number of Spanning Trees – Cayley's formula.

Unit-III **(18 Hours)**

Vertex Independent sets and Vertex Coverings – Edge Independent sets – Matching's and Factors – Eulerian graphs – Hamiltonian graphs.

Unit-IV **(18 Hours)**

Vertex colorings – Critical graphs – Triangle-free graphs – Edge colorings of graphs – Chromatic polynomials.

Unit-V **(18 Hours)**

Planar and nonplanar graphs – Euler formula and its consequences – K_5 and $K_{3,3}$ are nonplanar Graphs – Dual of a plane Graph - The Four–Color theorem and the Heawood Five–Color Theorem – Kuratowski's Theorem.

Note: Theorems, propositions and results which are starred in the book are to be omitted.

Book for Study

1. R. Balakrishnan, K. Ranganathan, *ATextbook of Graph Theory*,Springer (India) Private Limited, New Delhi, 2013.
   Unit-I *Chapter I(Sec1.1 - 1.4, 1.7), Chapter II(Sec 2.1, 2.2)*
   Unit-II *Chapter III(Sec 3.1, 3.2), Chapter IV(Sec 4.1, 4.3, 4. 4)*

Unit-III *Chapter V(Sec 5.1 - 5.3), Chapter VI(Sec 6.1, 6.2)*
Unit-IV *Chapter VII(Sec 7.1 - 7.4, 7.7)*
Unit-V *Chapter VIII(Sec 8.1 - 8.6)*

Books for Reference

1. J. A. Bondy, U. S. R. Murty**,** *Graph Theory with Applications,* Macmillan Press Ltd.,1976.
2. F. Harary, *Graph Theory***,** Addison – Wesley Publishing Company, Inc. 1969.
3. Gary Chartrand, Linda Lesniak, Ping Zhang, *Graphs and Digraphs,* CRC press, 2010.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
I	**21PMA1CC03**			**CORE – 3: GRAPH THEORY**				**6**		**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	2	3	3	2	3	3	2	2	2	3	2.5
CO-2	3	2	3	3	2	2	3	2	2	3	2.5
CO-3	3	3	2	2	2	3	3	3	2	3	2.6
CO-4	2	2	3	3	2	2	2	3	3	3	2.5
CO-5	3	2	2	3	2	3	2	2	2	3	2.4
									Mean Overall Score		2.5 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	**21PMA1CC04**	**CORE – 4: CLASSICAL DYNAMICS**	**6**	**5**

CO No.	CO - Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire knowledge about the mechanical system of particles.	**K1**
CO-2	explain the theory of Variational principles.	**K2**
CO-3	classify Lagrange's equation, Hamilton equation and Hamilton Jacobi Theory.	**K3**
CO-4	examine the existence of solution to a problem.	**K4 & K5**
CO-5	convert a real-life problem to a practical problems.	**K6**

Unit-I **(18 Hours)**

The mechanical system - Generalized coordinates - Constraints- Virtual work - Energy and momentum.

Unit-II **(18 Hours)**

Derivation of Lagrange's equations - examples - Integrals of motion.

Unit-III **(18 Hours)**

Rayleigh's Dissipation function - Impulsive motion - Velocity dependent potentials.

Unit-IV **(18 Hours)**

Hamilton's principle, Hamilton equations, other variational principles.

Unit-V **(18 Hours)**

Hamilton's Principal function - The Hamilton - Jacobi equation, separability.

Book for Study

1. Donald T. Greenwood, *Classical Dynamics*, Prentice Hall of India Pvt. Ltd, New Delhi, 1985.
   Unit-I *Chapter I (Sec 1.1 - 1.5)*
   Unit-II *Chapter II (Sec 2.1 - 2.3)*
   Unit-III *Chapter III (Sec 3.1, 3.2, 3.4)*
   Unit-IV *Chapter IV (Sec 4.1 - 4.3)*
   Unit-V *Chapter V (Sec 5.1 - 5.3)*

Books for Reference

1. John L. Synge, Byron A. Griffith, *Principles of Mechanics*, Third Edition, McGraw-Hill Book, New York, 1959.
2. Herbert Goldstein, Charles P. Poole, John L. Safko, *Classical Mechanics*, Addison-Wesley Press Inc., 2002.

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

Semester	Course Code	Title of the Course	Hours	Credits
I	21PMA1CC04	CORE – 4: CLASSICAL DYNAMICS	6	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	2	3	3	2	3	3	2	2	2	3	2.5
CO-2	3	2	3	3	2	2	3	2	2	3	2.5
CO-3	3	3	2	2	2	3	3	3	2	3	2.6
CO-4	2	2	3	3	2	2	2	3	3	3	2.5
CO-5	3	2	2	3	2	3	2	2	2	3	2.4
										Mean Overall Score	2.5 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	**21PMA1ES01A**	**DSE-1: STOCHASTIC PROCESSES**	**5**	**4**

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	gain the knowledge of stochastic models.	**K1**
CO-2	understand the concepts of Markov chains, Transient and recurrent states, Poisson process, Renewal process and Queueing process.	**K2**
CO-3	apply the stochastic models in real life probabilistic situations.	**K3**
CO-4	investigate the states of Markov chain, the probabilities of birth-death process and behavior of queuing models.	**K4 & K5**
CO-5	create methodology to solve stochastic problems.	**K6**

Unit-I **(15 Hours)**

Stochastic processes – Specification of Stochastic processes – Stationary processes – Markov chain – Transition probabilities – Random walk – Higher transition probabilities.

Unit-II: **(15 Hours)**

Classification of states – Transient and recurrent states – Limiting behavior of finite irreducible chains.

Unit-III: **(15 Hours)**

Poisson process – Inter arrival time – Generalizations of Poisson process – Pure birth process – Yule – Furry process – Birth – Immigration process.

Unit-IV **(15 Hours)**

Renewal process in discrete time – Renewal process in continuous time – Renewal equation – Renewal theorems.

Unit-V: **(15 Hours)**

Queueing processes – Steady state behavior of M/M/1 queueing model – Non – Markovian queueing models – Queues with Poisson input (M/G/1).

Book for Study

1. J. Medhi, *Stochastic Processes*, New Age International Publishers, Second Edition, New Delhi, 1994.
   Unit-I *Chapter 2 (Sec 2.1 - 2.3) and Chapter 3 (Sec 3.1,3.2)*
   Unit-II *Chapter 3 (Sec 3.4, 3.6)*
   Unit-III *Chapter 4 (Sec4.1,4.2.1, 4.3(omit 4.3.5-4.3.7))*
   Unit-IV *Chapter 6 (Sec 6.1.1-6.1.3,6.2(omit example 2(b)),6.3,6.5(omit 6.5.2))*
   Unit-V *Chapter 10 (Sec10.1,10.2(omit10.2.3.1),10.7(omitexamples7(a), 7(b)and Sec 10.7.3, 10.7.4))*

Books for Reference

1. U.Narayan Bhat, *Elements of Applied Stochastic Processes*, Second Edition, John Wiley & Sons, New York, 1972.
2. N.V.Prabhu, *Stochastic Processes*, Mac-Millan, NewYork
3. Sheldon M. Ross, *Stochastic Processes*, Second Edition, John Wiley & Sons, New York,1996.

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

Semester	Course Code			Title of the Course				Hours	Credits
I	21PMA1ES01A			DSE – 1: STOCHASTIC PROCESSES				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	1	2	2	1	3	2	3	2	2	2.0
CO-2	2	2	1	2	1	3	3	3	2	3	2.2
CO-3	3	2	2	2	2	2	3	2	2	3	2.3
CO-4	3	2	2	2	1	3	2	3	2	3	2.3
CO-5	3	2	2	2	2	2	3	3	2	3	2.4
									Mean Overall Score		2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21PMA1ES01B	DSE – 1: DIFFERENTIAL GEOMETRY	5	4

CONo.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	have the knowledge of surfaces and their various properties.	K1
CO-2	observe the interrelation between derivatives and Geometry.	K2
CO-3	apply the concept learned from Differential geometry in mechanic	K3
CO-4	analysethe analytical representation of normal, tangent place and develop surfaces	K4
CO-5	design mathematical models for some real life problems	K5 &K6

Unit - l **(15 Hours)**

Analytical representation – Arc length – Tangent – Oscillating plane – Torsion – Formulae forFrenet contact.

Unit – II **(15 Hours)**

Natural equations – Helices – General solution of natural equations – Evolutes and involutes – Imaginary curves - Ovals.

Unit – III **(15 Hours)**

Analytical representation – First fundamental theorem - Normal, tangent plane –Develop able surfaces – Second fundamental form - Meusrier's theorem - Euler's theorem.

Unit - IV **(15 Hours)**

Dupin's indicatrix – Some surfaces –A geometrical interpretation of a symptotic and curvature lines conjugate directions – Triply orthogonal system of surfaces.

Unit – V **(15 Hours)**

Gauss – The equations of Gauss – Weingarten – The theorem of Gauss and the equations of Codazzi curvilinear coordinates in space – Some applications of the Gauss and the Codazzi equations – The fundamental theorem of surface theory.

Book for Study

1. Dirk J. Struik, *Lectures on Classical Differential Geometry*, Addison Wesley Publishing Company, 1950.

Unit - I *Chapter 1(Sec 1.1-1.7)*
Unit – II *Chapter 1(Sec 1.8-1.13)*
Unit – III *Chapter 2(Sec 2.1-2.6)*
Unit – IV *Chapter 2(Sec 2.7-2.11)*
Unit – V *Chapter 3(Sec.1-3.6)*

Books for Reference

1. T.J.Willmore, *An introduction to Differential Geometry*, Oxford University Press, NewYork, 1959.
2. Barrett O'Neill,*Elementary Differential Geometry*, Second Edition, Academic Press, 2006.

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

Semester	Course Code			Title of the Course				Hours	Credits
I	21PMA1ES01B			DSE - 1: DIFFERENTIAL GEOMETRY				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	2	3	2	3	2	2	2.3
CO-2	2	3	2	2	2	3	2	2	2	2	2.2
CO-3	3	2	2	3	2	3	3	2	2	2	2.4
CO-4	2	3	3	2	2	2	2	3	3	2	2.3
CO-5	2	2	3	3	2	2	2	3	3	2	2.4
									Mean Overall Score		2.32 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PMA2CC05**	**CORE – 5: LINEAR ALGEBRA**	**6**	**5**

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire knowledge about matrix elementary row operations, isomorphism of vector spaces, commutative rings, characteristic value and annihilating polynomials.	**K1**
CO-2	understand the Representations of Linear transformations by a matrix, echelon matrix, permutations and simultaneous triangulation, simultaneous diagonalization and Direct sum decompositions.	**K2**
CO-3	illustrate representation of linear transformation by matrices, prime factorization of polynomial and inverse of invertible matrix using determinants.	**K3**
CO-4	investigate the Properties of row reduced echelon matrices and inverse of matrix	**K4**
CO-5	evaluate the bases and dimensions of a vector spaces, characteristic values and construction of transpose of linear transformation.	**K5 & K6**

Unit-I **(18 Hours)**

Systems of linear Equations – Matrices and Elementary Row operations – Row–reduced echelon Matrices – Matrix Multiplication – Invertible Matrices – Basis and Dimension. (Only revision of Vector spaces and subspaces).

Unit-II **(18 Hours)**

The algebra of linear transformations – Isomorphism of Vector Spaces – Representations of Linear Transformations by Matrices – Linear Functionals – The Double Dual –The Transpose of a Linear Transformation.

Unit-III **(18 Hours)**

The algebra of polynomials – Lagrange Interpolation – Polynomial Ideals – The prime factorization of a polynomial – Commutative rings – Determinant functions.

Unit-IV **(18 Hours)**

Permutations and the uniqueness of determinants – Classical adjoint of a (square) matrix – Inverse of an invertible matrix using determinants – Characteristic values - Annihilating polynomials,

Unit-V **(18 Hours)**

Invariant subspaces – Simultaneous triangulation and simultaneous Diagonalization Direct – sum Decompositions – Invariant Direct sums – Primary Decomposition theorem.

Book for Study

1. Kenneth Hoffman and Ray Alden Kunze, *Linear Algebra*, Second Edition, Prentice Hall of India Private Limited, New Delhi,1975.
   Unit – I *Chapter 1(Sec 1.2-1.6) and Chapter 2(Sec 2.3)*

Unit – II *Chapter3*

Unit – III *Chapter 4(Sec 4.1-4.5) and Chapter 5(Sec 5.1-5.2)*

Unit – IV *Chapter5 (Sec 5.3, 5.4) and Chapter 6(Sec 6.1-6.3)*

Unit – V *Chapter 6 (Sec 6.4-6.8)*

Books for Reference

1. Kumaresan, *Linear Algebra*: *A Geometric Approach*, Prentice-Hall of India Ltd, 2004.
2. V.Krishnamurthy, V.P.Mainra, J.L.Arora, *Introduction to Linear Algebra*, East West Press Ltd, 1985.
3. A.R.Rao, P.Bhimashankaram,*LinearAlgebra*, Second Edition,Tata McGraw Hill, 2000
4. Charles W. Curtis, *Linear Algebra: An introductory approach*,Springer Verlag, 1984.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
II	**21PMA2CC05**			**CORE – 5: LINEAR ALGEBRA**				**6**		**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	1	1	3	3	3	2	2	2.2
CO-2	2	3	2	2	2	2	3	2	2	2	2.2
CO-3	3	2	2	2	1	3	3	2	3	2	2.3
CO-4	3	2	3	2	2	2	2	2	3	2	2.3
CO-5	3	2	3	2	1	3	2	3	2	2	2.3
									Mean Overall Score		2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PMA2CC06**	**CORE – 6: REAL ANALYSIS – II**	**4**	**4**

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire knowledge of Riemann-Stieltjes Integrals, continuity and uniform convergence of series of functions.	**K1**
CO-2	understand the properties of integration and some special functions	**K2**
CO-3	identify the applications of integration, linear transformation and power series.	**K3**
CO-4	analyze the abstract ideas and various methods in mathematical analysis and apply them to practical problems.	**K4**
CO-5	construct mathematical proofs for basic results and evaluate problems on the concepts learned.	**K5 &K6**

Unit-I **(12 Hours)**

Definition and Existence of the Integral-Properties of the integral-Integration and Differentiation-Integration of Vector-valued functions-Rectifiable curves.

Unit-II **(12 Hours)**

Discussion of Main Problem-Uniform Convergence-Uniform Convergence and Continuity-Uniform Convergence and Integration-Uniform Convergence and Differentiation

Unit-III **(12 Hours)**

Power series-The Exponential and Logarithmic Functions-The Trigonometric Functions-The Algebraic Completeness of the Complex Field.

Unit-IV **(12 Hours)**

Fourier series–Parseval's theorem-The Gamma function.

Unit-V **(12 Hours)**

Linear Transformations – Differentiation - The Contraction Principle-The Inverse Function Theorem- The Implicit Function Theorem.

Book for Study

1. Walter Rudin, *Principles of Mathematical Analysis*, Third Edition, McGraw-Hill International Book Company, New York, 1976.

Unit I *Chapter 6(Sec6.1-6.27)*
Unit II *Chapter 7(Sec7.1-7.18)*
Unit III *Chapter 8(Sec8.1- 8.8)*
Unit IV *Chapter 8 (Sec8.9 - 8.22)*
Unit V *Chapter 9(Sec9.1-9.29)*

Books for Reference

1. Tom M Apostol, *Mathematical Analysis*, Addison-Wesley Publishing Company, London, 1974.

2. Richard R Goldberg, *Methods of Real Analysis*, Oxford &IBH Publishing Company, New Delhi, 1970.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
II	**21PMA2CC06**			**CORE – 6: REAL ANALYSIS – 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	2	2	1	1	1	2	2	2	1	1	1.5
CO-2	3	2	2	1	1	3	2	2	1	1	1.8
CO-3	1	1	3	3	1	2	2	3	3	1	2
CO-4	2	3	2	2	1	2	2	2	2	1	1.9
CO-5	2	2	2	1	1	2	1	3	2	2	1.8
									Mean Overall Score		1.8(Medium)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21PMA2CC07**	**CORE – 7: COMPLEX ANALYSIS**	**7**	**6**

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	have the knowledge and skills to explain the fundamental concepts of Analyticity, Complex integration and Harmonic Functions.	**K1**
CO-2	understand the behavior of Analytic Functions, Taylor's and Laurent's Series expansions.	**K2**
CO-3	apply C-R equations, Residue Theorem in solving problems involving complex function theory.	**K3**
CO-4	demonstrate capacity for Mathematical reasoning through analyzing, proving and explaining concepts from Cauchy's Theorems.	**K4**
CO-5	evaluate integrals, region of convergence and contour integrals.	**K5 & K6**

Unit-I **(21 Hours)**

Concept of Analytic Function, Elementary Theory of Power Series: Limits and Continuity – Analytic Functions – Polynomials–Rational Functions –Power series -Abel's Limit Theorem.

Unit-II **(21 Hours)**

Complex Integration – Fundamental Theorems-Line Integrals – Rectifiable arcs-Line integrals as Functions of Arcs - Cauchy's Theorem for a Rectangle - Cauchy's Theorem in a Disk.

Unit-III **(21 Hours)**

Cauchy's Integral Formula & Local Properties of Analytical Functions –The index of a point with respect to a closed curve –The integral formula – Higher Derivatives-Removable Singularities Taylor's Theorem – Zeroes and Poles – The Local Mapping.

Unit-IV **(21 Hours)**

The Calculus of Residues – The Maximum principle – The Residue theorem –The Argument principle – Evaluation of Definite Integrals –Definitions and Basic prosperities of Harmonic functions –The Mean Value Property.

Unit-V **(21 Hours)**

Harmonic functions, Power Series expansion-Poisson's Formula - Schwarz's Theorem - Weierstrass's Theorem – The Taylor series – The Laurent series

Book for Study

1. Lars V. Ahlfors, *Complex Analysis: An Introduction to the Theory of Analytic Functions of One Complex Variable*, Third Edition, Mac Millan Publishers India, Delhi, 2013.
   UNIT-I *Chapter 2 (Sec 1.1-1.4, 2.4 & 2.5, Pages 21-33, 38-42)*
   UNIT-II *Chapter 4 (Sec 1.1-1.5, Pages101-114)*

UNIT-III *Chapter 4 (Sec 2.1-2.3, 3.1-3.3, Pages114–131)*
UNIT-IV *Chapter 4 (Sec 3.4, 5.1-5.3, 6.1 & 6.2, Pages133-137,148-166)*
UNIT-V *Chapter 4 (Sec 6.3& 6.4)*
Chapter 5(Sec1.1-1.3, Pages166-172,175-186)

Books for Reference

1. John B. Conway, *Functions of one Complex Variable,* Second Edition, Springer Graduate Texts in Mathematics, New York, 1978.
2. S. Ponnusamy, *Foundations of Complex Analysis*, Second Edition, Narosa Publishing
House, India, 2005.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
II	**21PMA2CC07**			**CORE – 7: COMPLEX ANALYSIS**				**7**		**6**
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	2	3	2	3	2.3
CO-2	3	2	2	2	2	3	2	2	2	2	2.2
CO-3	3	2	2	2	2	2	2	3	2	3	2.3
CO-4	2	2	2	2	2	2	2	2	2	3	2.1
CO-5	2	2	2	2	2	2	2	3	2	3	2.2
									Mean Overall Score		2.22 (High)

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

CO.No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge of data structures, design and analysis of algorithms	**K1**
CO-2	understand the data structures, design of computer algorithms with their complexity.	**K2**
CO-3	identify the complexity of algorithms and apply searching and sorting methods.	**K3**
CO-4	analyze the basic results of time complexity and space complexity in different types of algorithms.	**K4**
CO-5	evaluate the interpolation problems and create algorithms for data structures and computer algorithms using divide and conquer method, interpolation and sorting methods.	**K5 &K6**

Unit I (15 Hours)

Introduction-Algorithm - Algorithm specification: Pseudocode 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

Linkedlist (insertion and deletion only)- Tree- Binary tree representation – Binary tree traversals – Application of tree – Eight coins Decision tree.

UnitIV (15 Hours)

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

UnitV (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’s rule-Lagrange interpolation – Newtonian interpolation.

Books for Study

1. Ellis Horowitz, Sartaj Sahni and SanguthevarRajasekaran, *Fundamentals of Computer Algorithms*,Galgotia Publications Pvt.Ltd.,2004.
Unit I *Chapter 1(Sec1.1,1.2,1.3.1 - 1.3.3)*
Unit IV *Chapter 3(Sec3.1 - 3.5)*
Unit V*Chapter 4 (Sec 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(Sec2.2,2.4) and Chapter 3(Sec3.1,3.3)*
Unit III *Chapter4(Sec: 4.1,4.2,4.3,4.5, 4.8) and 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. Good man 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	Credits
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	**21PMA2SP01**	**SELF-PACED LEARNING: HISTORY OF MATHEMATICS**	**-**	**2**

CONo.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire knowledge in history of mathematics and understand theinterrelations among the various branches of mathematics.	**K1 & K2**
CO-2	predict the dynamic nature of mathematics including recent development in pure and applied mathematics.	**K3**
CO-3	identify the various prooftechniques used in theorems.	**K4**
CO-4	assess creative and flexible thinking by studying historical evidence that there are different ways to view a mathematical concept.	**K5**
CO-5	construct abstract characterization of ideas from known examples.	**K6**

Unit-I

The Ancient Greeks - Pythagoras - Introduction to Pythagorean Ideas - Euclid - Introduction to Euclid - Archimedes - The Genius of Archimedes-Zeno's Paradox and the Concept of Limit - The Context of the Paradox? - Consideration of the Paradoxes - Decimal Notation and Limits - Infinite Sums and Limits - Finite Geometric Series.

Unit-II

The Arabs and the Development of Algebra - The Development of Algebra Al-Khowarizmi and the Basics of Algebra - The Life of Al-Khwarizmi - Omar Khayyam and the Resolution of the Cubic - Cardano, Abel, Galois, and the Solving of Equations - A Particular Equation - The General Case - The Brief and Tragic Lives of Abel and Galois - The Work of Abel and Galois in Context - Rene Descartes and the Idea of Coordinates - Introductory Remarks -The Life of Rene Descartes - The Real Number Line - The Cartesian Plane -Coordinates in Three-Dimensional Space.

Unit-III

The Invention of Differential Calculus - The Life of Fermat - Fermat's Method-Fermat's Lemma and Maximum/Minimum Problems - Complex Numbers and Polynomials - Progenitors of the Complex Number System - Cardano - Argand - Cauchy - Riemann - Complex Number Basics - The Fundamental Theorem of Algebra - Finding the Roots of a Polynomial - Cauchy and the Foundations of Analysis - Why Do We Need the Real Numbers?

Unit-IV

The Prime Numbers - The Sieve of Eratosthenes - The Infinitude of the Primes - Dirichlet and How to Count - The Life of Dirichlet - The Pigeonhole Principle - Riemann and the Geometry of Surfaces - Introduction - Georg Cantor and the Orders of Infinity - Introductory

Remarks - An Uncountable Set - Countable and Uncountable - The Existence of Transcendental Numbers.

Unit-V

Henri Poincare, Child Prodigy - Introductory Remarks - Emmy Noether and Algebra - The Life of Emmy Noether - Emmy Noether and Abstract Algebra: Groups - Emmy Noether and Abstract Algebra: Rings - The Idea of an Ideal - Cryptography - What is Cryptography?

Book for Study

1. Steven G. Krantz, *An Episodic History of Mathematics*, The Mathematical Association of America, 2010.
   Unit I *Sec: 1.1, 1.1.1, 1.2, 1.2.1, 1.3, 1.3.1, 2.1, 2.3, 2.4-2.6.*
   Unit II *Sec: 4.2, 4.2.1, 4.2.2, 4.2.4, 5.6, 5.7, 5.7.1, 5.7.2, 5.8.1, 5.9, 6.0-6.3, 6.5.*
   Unit III *Sec: 7.1, 7.2, 7.4, 8.2, 8.2.1-8.2.5, 8.3, 8.4, 8.5, 10.1, 10.2.*
   Unit IV *Sec: 11.1, 11.2, 12.1, 12.2, 13.0, 14.1, 14.2.1, 14.2.2, 14.3.*
   Unit V *Sec: 16.1, 18.1, 18.2, 18.3, 18.3.1, 20.3.*

Books for Reference

1. C.B. Boyer and U. Merzbach, *History of Mathematics*, John Wiley & Sons, 3rd edition, 2011.
2. E.T. Bell, *Men of Mathematics*, Published by Simon & Schuster, 1986.

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

Semester	Course Code			Title of the Course						Hours	Credits
II	21PMA2SP01			Self-Paced Learning: History of Mathematics						-	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	1	2	3	1	2	2	3	3	2	3	2.2
CO-2	2	3	3	1	1	3	1	3	2	3	2.2
CO-3	2	3	2	1	2	2	3	3	1	3	2.2
CO-4	2	2	2	1	2	2	3	3	3	3	2.3
CO-5	2	2	3	1	2	2	3	2	1	3	2.1
									Mean Overall Score		2.2 (High)

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

Course outcomes (COS)
Upon completionof thiscourse, students will:

- be exposedandtrainedinvariousnuancesofSoftSkillsinaProfessional manner responding to therequirements ofnational and international market
- beabletosynthesizetheknowledgeandpracticalskillslearnttobepersonal effectivein any managerial positions
- be equipped to construct plans and strategies to work for better human society
- beabletoillustratetheproblemsatworkandhomeanddesignsolutionsand maintaina balanceof workand home
- beabletoconnectonacontinuumandmaintaingrowthandsustainabilityand creativity in employment that increases inproductivity,profitforindividuals and the society.

Module 1: Effective Communication&Professionalcommunication

Effectivecommunication: Definition of communication, Process of Communication, Barriers of Communication, Non-verbal Communication. JOHARI Window asatoolof effective communication.

Professional Communication:TheArt ofListening,Thepassage, Kinesthetic, Production of Speech, Speech writing,Organization ofSpeech,Modes of delivery, Conversation Techniques, Good manners andEtiquettes, Different kinds ofEtiquettes, Politeness markers.

Module II. ResumeWriting&InterviewSkills

ResumeWriting: Meaning and Purpose. ResumeFormats. Types ofs Resume. Functional and Mixed Resume**,** Steps in preparation ofResume,Model resumes foranITprofessional Chronological, Types ofinterviews, Creativeresumes using online platforms

InterviewSkills: Common interview questions, Dos and Don'ts foran interview, Attitude, Emotions, Measurement,Body Language,Facial expressions,Different types of interviews, Telephonicinterviews, Behavioral interviews andMock interviews(Centralized).

Module III: GroupDiscussion &TeamBuilding

GroupDiscussion: Group Discussion Basics,GDasthe first criterion for selecting software testers, Essentials of GD,Factors that matter in GD, GD parametersfor evaluation,Points for GDTopics, GDTopicsfor Practice, Tipsfor GDparticipation. Video shooting ofGD presentation & Evaluation(Centralized)

TeamBuilding: Characteristics ofateam, Guidelines for effectiveteam membership, Pedagogy of team building, Team building skills.Team VsGroup – synergy, Typesof synergy, Synergy relates to leadership, Stages of TeamFormation,Broken Square-Exercise,Leadership, Leadership styles, Conflict styles, Conflict management strategies & Exercises

Module IV: PersonalEffectiveness

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

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, Symptomsof stress, Responding to Stress, Sources of stress, Coping with stressand Managing stress.

Module V:NumericalAbility

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

Module VI: Test ofReasoning

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

Non-Verbal Reasoning: Completionof Series**,** Classification, analogical,Pattern comparison, Deduction offigures out of series, Mirror Reflection Pattern, Hidden figures, Rotationpattern, Pattern completion and comparison, Senseof direction, Blood relations.

Text cumExercise book

1. MelchiasG,BalaiahJohn,JohnLoveJoy(Eds),2018.WinnersintheMaking:Aprimeronsoft skills. SJC, Trichy.

References

* Aggarwal, R.S.*QuantitativeAptitude, S.Chand& Sons*

*.Aggarwal,R.S. (2010). *A Modern Approach toVerbal and Non Verbal Reasoning*. S.Chand
&C0,RevisedEdition.

* Covey, Stephen. (2004). *7 Habits of Highly effectivepeople*,FreePress.

*Egan,Gerard.(1994).*TheSkilledHelper*(5thEd).PacificGrove,Brooks/Cole.

* Khera,Shiv(2003).*You Can Win.* Macmillan Books, Revised Edition.

OtherText Books

* Murphy, Raymond. (1998). *Essential English Grammar*. 2nded., CambridgeUniversity Press.

* Prasad, L. M. (*2000). OrganizationalBehaviour, S.Chand& Sons.*

*Sankaran,K., & Kumar, M.*Group Discussion and PublicSpeaking.* M.I. Pub, Agra, 5thed., Adams Media.

* Schuller, Robert. (2010) .*PositiveAttitudes*. Jaico Books.

* Trishna's (2006).*How to do wellin GDs & Interviews*, TrishnaKnowledgeSystems.

** 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	**21PMA2EG01**	**GE- 1: (WS) MATHEMATICAL FOUNDATIONS**	**4**	**3**

CONo.	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 onlyfor 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	GE- 1: (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	**21PMA3CC08**	**CORE – 8: MEASURE AND INTEGRATION**	**6**	**6**

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	have knowledge of integration using measures.	**K1**
CO-2	understand the analysis in abstract situations.	**K2**
CO-3	identify integral of derivative with differentiation of an integral.	**K3**
CO-4	analyze the basic results associated to Measurablefunctions, Integration Signedmeasure, decomposition theorems.	**K4**
CO-5	evaluate the Outer measure and Measurability byapplying Extensiontheorem, product measures, Fubini'stheorem and Tonelli's theorem.	**K5 & K6**

Unit-I **(18 Hours)**

Lebesgue Measure Outer measure - Measurable sets and Lebesgue Measure - Properties - A non-measurable set - Measurable Functions - Little Wood's three principles. (Proofs of Egoroff's theorem and Lusin's theorem to be omitted)

Unit-II: **(18 Hours)**

Lebesgue Integral of simple function - bounded measurable function - of a nonnegative function - Fatou's lemma - Monotone Convergence theorem - General Lebesgue integral - Lebesgue convergence theorem – Convergence in measure.

Unit-III: **(18 Hours)**

Differentiation of monotone functions - Vitali's lemma - Integral of derivative - Functions of bounded variation - Differentiation of an integral - absolute continuity-Convex functions-Jensen's inequality

Unit-IV **(18 Hours)**

Measure spaces - Measurable functions - Integration - Signed measure - Hahn decomposition theorem - Jordan decomposition theorem – Radon-Nikodhym theorem- Lebesgue decomposition theorem

Unit-V: **(18 Hours)**

Outer measure and Measurability - Extension theorem – product measures Fubini's theorem – Tonelli's theorem.

Book for Study

1. H.L. Royden, "*Real Analysis"*, Third Edition, Prentice Hall of India, New Delhi, 2007.

Unit-I *Chapter 3 (Sec. 1 – 6)*
Unit-II *Chapter 4 (Sec. 1 – 5)*
Unit-III *Chapter 5 (Sec. 1 – 5)*
Unit-IV *Chapter 11 (Sec.1- 6)*

Unit-V *Chapter 12 (Sec. 1, 2,4)*

Books for Reference

1. G. De Barra, *Measure Theory and Integration*,New Age International Publishers, New Delhi, 2008.
2. Walter Rudin, *Real and Complex Analysis*, Mc-Graw Hill Book Company, New York, 1970.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
III	**21PMA3CC08**			**CORE – 8: MEASURE AND INTEGRATION**				**6**		**6**
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	2	2	1	3	2	3	3	3	2.2
CO-2	2	2	2	2	2	3	3	3	2	2	2.3
CO-3	1	2	2	2	2	3	3	3	2	3	2.3
CO-4	2	2	2	2	1	3	3	3	2	3	2.3
CO-5	1	3	2	1	1	2	3	3	1	2	1.9
									Mean Overall Score		2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PMA3CC09**	**CORE – 9: TOPOLOGY**	**6**	**5**

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire knowledge about various types of topological spaces and their properties.	**K1**
CO-2	understandthe definitions and appropriate examples of fundamental concepts in general topology.	**K2**
CO-3	apply the properties of open sets, closed sets, interior points, accumulation points and derived sets in deriving the proofs of various theorems.	**K3**
CO-4	explain the basic concepts of topological spaces such as continuity, compactness, connectedness, regular spaces, normal spaces and the extension theorems.	**K4**
CO-5	discriminate the topological properties with proper justification.	**K5 & K6**

Unit-I **(18 Hours)**

Topological spaces – Basis for a topology – The order topology – The product topology on $X \times Y$ – The subspace topology – Closed sets and limit points – Continuous functions.

Unit-II **(18 Hours)**

The Product topology – The Metric Topology – Connected Spaces – Connected Subspaces of the Real line – Components and local connectedness.

Unit-III **(18 Hours)**

Compact spaces - Compact subspaces of the real line - Limit point compactness.

Unit-IV **(18 Hours)**

The Countability axioms – The Separation axioms – Normal spaces.

Unit-V **(18 Hours)**

The Urysohn lemma – The UrysohnMetrization Theorem – Tietz Extension theorem.

Book for Study

1. James R. Munkres, *Topology*, Second Edition, PHI Learning Pvt Ltd., New Delhi, 2009.
   Unit-I *Chapter 2 (Sec 12-18)*
   Unit-II *Chapter 2 (Sec 19-21) and Chapter 3 (Sec 23-25)*
   Unit-III *Chapter 3 (Sec 26-28)*
   Unit-IV *Chapter 4 (Sec 30-32)*
   Unit-V *Chapter 4 (Sec 33-35)*

Books for Reference

1. James Dugundji, *Topology*, Allyn & Bacon, 1966.

2. Sze-TsenHu, *Elements of General Topology*, Holden – Day Series in Mathematics, 1964.

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

Semester	Course Code	Title of the Course							Hours	Credits
III	21PMA3CC09	CORE – 9: TOPOLOGY							6	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	1	3	3	3	2	2	3	2.4
CO-2	2	3	2	3	1	3	3	2	2	2	2.3
CO-3	2	2	3	2	2	2	2	3	3	2	2.3
CO-4	3	2	1	2	1	3	3	2	1	3	2.2
CO-5	1	3	2	3	2	2	3	3	2	2	2.3
								Mean Overall Score			2.3(High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PMA3CC10**	**CORE – 10: ORDINARY DIFFERENTIAL EQUATIONS**	**5**	**5**

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	define linear, non-linear, homogeneous and autonomous system of ordinary differential equations.	**K1**
CO-2	understand the qualitative properties of solutions by Sturm separation and Sturm comparison theorems.	**K2**
CO-3	obtain power series solution for ordinary differential equations such as Legendre, Bessel and Gauss hyper geometric equations.	**K3**
CO-4	obtain and analyze the stability of the solutions for various methods.	**K4, K5**
CO-5	formulate various physical problems into ordinary differential equations.	**K6**

Unit - I **(15 Hours)**

The general solution of the homogeneous equation – The use of one known solution to find another – The method of variation of parameters – Power Series solutions. A review of power series – Series solutions of first order equations – Second order linear equations; Ordinary points.

Unit - II **(15 Hours)**

Regular Singular Points – Gauss's hyper geometric equation – The Point at infinity – Legendre Polynomials – Bessel functions – Properties of Legendre Polynomials and Bessel functions.

Unit - III **(15 Hours)**

Linear Systems of First Order Equations – Homogeneous equations with constant coefficients –The Existence and uniqueness of solutions of Initial Value Problems for First Order Ordinary Differential Equations –The method of solutions of successive approximations and Picard's theorem.

Unit - IV **(15 Hours)**

Oscillation Theory and Boundary Value Problems – Qualitative properties of solutions – Oscillations and the Sturm separation theorem - Sturm Comparison Theorems.

Unit-V **(15 Hours)**

Nonlinear equations: Autonomous Systems; the phase plane and its phenomena –Types of critical points; Stability – Critical points and stability for linear systems –Stability by Liapunov's direct method.

Books for Study

1. George F. Simmons, *Differential Equations with Applications and Historical Notes*, Tata McGraw Hill Publishing Company Limited, New Delhi, Second Edition 2003.

   Unit - I *Chapter3(Sec14, 15, 16, 19)and Chapter5(Sec26, 27, 28)*
   Unit - II *Chapter5(Sec 29,30,31,32)and Chapter8 (Sec44, 45, 46, 47)*
   Unit - III *Chapter10(Sec 55, 56)and Chapter13(Sec68, 69)*

Unit - IV *Chapter 4(Sec24, 25)*
Unit - V *Chapter11(Sec58, 59, 60, 61)*

Books for Reference

1. W. T. Reid, *Ordinary Differential Equations*, John Wiley & Sons, New York, 1971.
2. Earl A. Coddington, *An Introduction to Ordinary Differential Equations*, Prentice-Hall of India, New Delhi,1992.
3. William E. Boyce, Richard C. Di Prima, *Elementary Differential Equations and Boundary Value Problems*, 10th Edition, John Wiley and Sons, NY, 2012.

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

Semester	**Course Code**	**Title of the Course**								**Hours**	**Credits**
III	**21PMA3CC10**	**CORE – 10: ORDINARY DIFFERENTIAL EQUATIONS**								**5**	**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	1	2	2	2	2	3	3	2	2	3	2.2
CO-2	3	1	2	2	2	2	2	2	3	2	2.1
CO-3	3	2	1	2	2	2	2	3	2	2	2.1
CO-4	2	3	2	1	2	3	2	3	3	2	2.3
CO-5	2	3	3	3	3	3	3	2	2	2	2.3
										Mean Overall Score	2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PMA3ES03A**	**DSE – 3: ALGEBRAIC NUMBER THEORY**	**5**	**4**

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
CO – 1	have knowledge of divisibility, prime numbers, congruences, quadratic reciprocity and Diophantine equations.	**K1**
CO – 2	understand the concept of number theory to perform numerical and symbolic computations.	**K2**
CO – 3	solve problems and give short proofs associated with prime numbers, divisors, modulo arithmetic, primitive roots and quadratic residues.	**K3**
CO – 4	analyze the theory of congruences, Power Residues, The Jacobi Symbol, The Mobius Inversion Formula and linear Diophantine equations.	**K4**
CO – 5	evaluate and produce rigorous arguments centered on the material of number theory, most notably in the use of Mathematical Induction and/or the Well Ordering Principal in the proof of theorems.	**K5 & K6**

Unit – I **(15 Hours)**

Introduction – Divisibility – Primes – The Binomial Theorem – Congruences - Euler's totient - Fermat's, Euler's and Wilson's Theorems – Solutions of congruences – The Chinese Remainder theorem.

Unit – II **(15 Hours)**

Prime power Moduli – Primitive roots and Power Residues – Number theory from an Algebraic Viewpoint – Groups, rings and fields.

Unit – III **(15 Hours)**

Quadratic Residues – Quadratic Reciprocity – The Jacobi Symbol – Binary Quadratic Forms – Equivalence and Reduction of Binary Quadratic Forms – sum of two squares.

Unit – IV **(15 Hours)**

Greatest integer Function – Arithmetic Functions – The Mobius Inversion Formula - Recurrence Functions – Combinatorial number theory

Unit – V **(15 Hours)**

Diophantine Equations – The equation $ax+by = c$. Simultaneous Linear Diophantine Equations – Pythagorean Triangles – Assorted examples

Book for Study

1. Ivan Niven, Herbert S, Zuckerman and Hugh L, Montgomery, *An Introduction to the Theory of Numbers*,*Fifth Edition*, John Wiley & Sons Inc, 2004

Unit – I *Chapter 1 and Chapter 2 (Sec 2.1 - 2.3)*
Unit – II *Chapter 2 (Sec 2.6 - 2.11)*
Unit – III *Chapter 3(Sec 3.1 - 3.6*)
Unit – IV *Chapter 4*
Unit – V *Chapter 5 (Sec 5.1 to 5.4)*

Books for Reference

1. Gareth A. Jones and J. Mary Jones, *Elementary Number Theory*, Springer Verlag, Indian Reprint, 2005.
2. David M. Burton, *Elementary Number Theory*, 6th edition, McGraw Hill, 2007.
3. George Andrews, *Theory of Numbers*, Saunders, 1971.
4. J. William, *Fundamentals of Number Theory*, Leveque, Addison-Wesley Publishing Company, Philippines, 1977.

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

Semester	Course Code	Title of the Course	Hours	Credits
III	21PMA3ES03A	DSE – 3: ALGEBRAIC NUMBER 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	2	2	1	2	2	3	2	2	3	3	2.2
CO-2	2	1	2	1	2	2	3	3	3	2	2.1
CO-3	1	2	2	3	1	2	3	3	3	2	2.2
CO-4	3	2	1	2	3	2	3	3	2	1	2.2
CO-5	2	3	2	3	1	3	3	2	3	3	2.5
										Mean Overall Score	2.24 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21PMA3ES03B**	**DSE – 3: OPTIMIZATION TECHNIQUES**	**5**	**4**

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	relate the concepts of theory of optimization while solving the problem.	**K1**
CO-2	understand the theory behind optimization techniques.	**K2**
CO-3	apply suitable theory in the optimal problem.	**K3**
CO-4	compare the uses of different theories and methods available.	**K4**
CO-5	evaluate the optimal solution for the given function.	**K5 & K6**

Unit-I **(15 Hours)**

Optimization of functional – Gateaux and Frechet Differentials – Frechet derivatives – Extrema – Euler – Lagrange Equations – Problems with variable end points.

Unit-II **(15 Hours)**

Convex and concave functionals – Conjugate convex, concave functional – Dual optimization problems – Min – Max theorem of game theory.

Unit-III **(15 Hours)**

Lagrange multiplier theorem – Inverse function theorem – Equality and Inequality constraints – Kuhn – Tucker theorem.

Unit-IV **(15 Hours)**

Methods of solving equations – Successive approximation – Newton's method – Descent methods – Steepest descent.

Unit-V **(15 Hours)**

Conjugate gradient method – Methods for solving constrained problems – Projection method – The Primal – Dual method – Penalty Functions.

Book for Study

1. David G. Luenberger, "*Optimization by Vector Space Methods"*,Wiley Professional Paperback series, 1997.
   Unit – I *Sec7.1-7.6 (Pages169-184)*
   Unit – II *Sec7.8, 7.10-7.13 (Pages 190, 191,195-208)*
   Unit – III *Sec 9.1-9.4 (Pages 239-253)*
   Unit – IV *Sec10.1-10.5 (Pages 271-289)*
   Unit – V *Sec10.8-10.11 (Pages 294-307)*

Books for Reference

1. C. Nelson Dorny, *A Vector Space Approach to Models and Optimization*, Robert Krieger Publishing Co. 1986.
2. Chander Mohan and Kusum Deep, *Optimization Techniques,* New Age International, 2010
3. Hamley A and Taha, *Operations Research*: *An introduction*, Prentice Hall, New Delhi, Ninth Edition, 2011.

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

Semester	Course Code			Title of the Course				Hours		Credits
III	21PMA3ES03B			DSE – 3: OPTIMIZATION TECHNIQUES				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	1	2	3	2	2	2	2	2.1
CO-2	2	3	1	2	2	3	2	3	2	2	2.2
CO-3	3	3	2	2	2	3	2	3	1	2	2.3
CO-4	2	2	3	3	2	2	1	2	2	2	2.1
CO-5	3	2	2	2	1	3	2	3	2	3	2.3
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	21PMA3AE01	AEC: PROBLEM SOLVING IN ADVANCED MATHEMATICS	4	3

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire knowledge of fundamental concepts on Analysis, Algebra, and Differential Equations and Logical reasoning.	K1
CO-2	understand the nuances of problem-solving approach in Real Analysis Complex Analysis and Algebra and Quantitative aptitude.	K2
CO-3	identify and apply the relevant techniques to solve problems in pure mathematics, quantitative aptitude and logical reasoning.	K3
CO-4	analyze and evaluate the efficiency of a specific technique when solving a problem.	K4&K5
CO-5	develop new problem-solving methodology to tackle problems in Advanced Mathematics and quantitative aptitude.	K6

Unit-I **(12 Hours)**

Sets-open-closed-compact-connected-Sequences and series – Sequences and series of functions Continuity, uniform continuity, differentiability, mean value theorems. Analytic functions, Cauchy-Riemann equations., Harmonic functions, Complex integration, Cauchy's theorem, Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Schwarz lemma, classification of singularities and calculation of residues.

Unit-II **(12 Hours)**

Groups, subgroups, normal subgroups, quotient groups, homomorphisms, cyclicgroups, permutation groups, Cayley'stheorem, class equations, Sylow theorems. Rings, ideals, prime and maximal ideals, quotient rings, Vector spaces, subspaces, linear dependence, basis, dimension,

Unit-III **(12 Hours)**

Linear Transformations, Rank and nullity, Rank and determinant of matrices, systems of linear equations. Eigen values and eigen vectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Linear Differential Equations, Wronskian, singular and regular solutions Existence and uniqueness of solutions of initial value problems for first order ODE's.

Unit IV **(12 Hours)**

Problem Solving on Profit and Loss-Ages- Time and Work-Time and Distance-Trains-Area, Volume Surface- Problem Solving on Permutations and Combinations-Probability.

Unit V **(12 Hours)**

Logical Reasoning -Deductions-Statements-Assumptions-Conclusions.

Books for Study

1. A.P. Singh,*Info Study's Real Analysis*, Info study Publications 2017.
   Unit I *Chapter 1(Sec 1.24-1.40), Chapter 2 (Sec 2.1-2.3) and Chapter 3(Sec 3.1-3.4)*
2. A.P. Singh, *Info Study's Complex Analysis*, Info Study Publications 2017.

Unit- I *Chapter 2 (Sec 2.5-2.8) Chapter 3 (Sec3.1-3.6) and Chapter 5(5.1-5.5)*

3. A.P.Singh *Info Study's Modern Algebra*, Info study Publications 2017.
Unit-II *Chapter 1 (Sec 1.1-1.7,1.9,1.10,1.11) and Chapter 2 (Sec 2.1-2.7)*

4. A.P.Singh *Info Study's Linear Algebra*Info study Publications 2017.
Unit-II *Chapter 1 (1.1-1.6) and Chapter 2 (Sec 2.1-2.7)*
Unit -III *Chapter 3 (Sec 3.1-3.13, 3.16) and Chapter 4 (Sec 4.1-4.18)*

5. A.P.Singh *Info Study's Differential Equation*Info study Publications 2017.
Unit -III *Chapter 2(Sec 2.1-2.10,2.12, 2.13- Omit 2.11) and Chapter 3 (Sec 3.1)*

6. R. S. Agarwal *Quantitative Aptitude* S. Chand & Co. 2017.
Unit- IV *Chapters8, 12, 17, 18, 20, 24, 25, 30, 31*

7. R.S Agarwal,*A Modern Approach to Verbal &Non Verbal ReasoningRevised Edition*. S. Chand & Co. 2009.
Unit -V *Part I Section II Chapters 1, 3, 5.*

Books for Reference

1. Walter Rudin, Principles of Mathematical Analysis, Third Edition, Mc Graw-Hill International Book Company, New York, 1976
2. John B.Conway, Functions of one Complex Variable, Second Edition, Springer Graduate
Texts in Mathematics, New York, 1978
3. Seymour Lipschutz and Marc Lipson, Schaum's Outlines Linear Algebra Third Edition
4. Earl A.Coddington,An Introduction to Ordinary Differential Equations, Prentice-Hall of India, New Delhi,1992

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

Semester	Course Code	Title of the Course					Hours	Credits			
III	21PMA3AE01	AEC: PROBLEM SOLVING IN ADVANCED MATHEMATICS					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	1	2	2	1	3	2	3	3	3	2.2
CO-2	2	2	2	2	2	3	3	3	2	2	2.3
CO-3	1	2	2	2	2	3	3	3	2	3	2.3
CO-4	2	2	2	2	1	3	3	3	2	3	2.3
CO-5	1	3	2	1	1	2	3	3	1	2	1.9
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	21PMA3EG02	GE-2: (BS) OPERATIONS RESEARCH	4	3

CONo.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire knowledge of transportation problem, assignment problem, decision-making problem, replacement problem and network scheduling.	K1
CO-2	compare the basic feasible solution using various methods and predict suitable decision under uncertainty and best critical path.	K2
CO-3	differentiate balanced and unbalanced problem, feasible and optimum solution and PERT and CPM.	K3
CO-4	compute optimum solution of transportation problem, assignment problem, decision-making problem, replacement problem and network scheduling.	K4
CO-5	estimate best network scheduling and evaluate expected time for the completion of project.	K5 &K6

Unit - I **(12 Hours)**

Transportation Problem: Introduction - Finding an initial basic feasible solution: North-west corner method - Least cost or matrix minima method - Vogel's approximation method - Test for optimality - Transportation algorithm (MODI method) - Some exceptional Cases: Unbalanced transportation problem.

Unit - II **(12 Hours)**

Assignment Problem: Introduction -Solution methods of assignment problem: Hungarian Assignment Method - Linear programming problem - graphical solution: Graphical solution method

Unit - III **(12 Hours)**

Decision Analysis: Introduction - Decision-making problem - Decision-making environment - Decisions under uncertainty: the max-min or min-max criterion - the savage regret criterion - the Hurwitz criterion.

Unit - IV **(12 Hours)**

Replacement Problem: Introduction - Replacement of equipment/asset that deteriorates gradually - Replacement of equipment that fails suddenly.

Unit - V **(12 Hours)**

Network Scheduling by PERT/CPM: Introduction - Network: Basic components - Logical sequencing – Rules of network construction: numbering the events - Concurrent activities - Critical path Analysis - Probability considerations in PERT.

Book for Study

1. Kanti Swarup, P.K. Gupta and Man Mohan, *Operations Research*, Thirteenth Thoroughly Edition, Sultan Chand and Sons, New Delhi, 2007.

Unit-I *Chapter 10 (Sec 10.1, 10.9, 10.10, 10.13 and 10.15)*

Unit-II *Chapter 11(Sec 11.1, 11.3), Chapter 3 (Sec 3.1 to 3.3)*
Unit-III *Chapter 16 (Sec 16.1, 16.2, 16.4 and 16.5)*
Unit-IV *Chapter 18 (Sec 18.1 - 18.3) (problems only and no proof of theorems)*
Unit-V *Chapter 25 (Sec 25.1 - 25.7)*

Books for Reference

1. J. K. Sharma, *Operations Research Theory & Applications*, Macmillan India Ltd., Fourth Edition, 2009.
2. Sundaresan.V, Ganapathy Subramanian. K.S. and Ganesan.K, *Resource Management Techniques*, A.R. Publications, Chennai 2014.
3. Taha H.A., *Operations Research: An introduction*, Eighth Edition, Pearson Prentice Hall, 2007.

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

Semester	Course Code	Title of the Course							Hours	Credits
III	21PMA3EG02	GE 2 : (BS) 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	2	2	1	1	3	3	2	2	2	2.1
CO-2	2	3	2	2	1	3	2	2	2	2	2.1
CO-3	3	3	2	1	1	3	3	2	2	2	2.2
CO-4	3	3	2	2	1	3	3	2	2	2	2.3
CO-5	3	2	2	2	1	3	3	3	2	2	2.3
									Mean Overall Score		2.2(High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	**21PMA4CC11**	**CORE – 11: FUNCTIONAL ANALYSIS**	**6**	**6**

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	have knowledge of certain topological –algebraic structures such as normed linear spaces, Banach spaces, Hilbert spaces and inner product spaces.	**K1**
CO-2	understand the main properties of bounded operations between Banach and Hilbert spaces.	**K2**
CO-3	identify the duals of some normed linear spaces and the orthogonal sets by applying some specific techniques.	**K3**
CO-4	analyze the basic results associated to different types of convergence in normed linear spaces.	**K4**
CO-5	evaluate the extension of a given functional with norms, orthogonal complement and examine separability, reflexivity of normed linear spaces.	**K5 &K6**

Unit-I **(18 Hours)**

Normed Linear Spaces - Continuity of Linear Space Operations and Norm - Schauder Basis– Continuity and Boundedness of Linear Mappings - Equivalent Norms - Finite Dimensional Normed Linear Spaces – Spaces of Bounded Linear Maps - Dual Spaces.

Unit-II **(18 Hours)**

Hahn-Banach Theorem – General Form–Complex Form –Continuous Extension Form- Second Dual and Natural Embedding-Reflexive Spaces- Dual of $\mathcal{C}[0,1]$- The Conjugate of an Operator – Separation Form of Hahn-Banach Theorem.

Unit-III **(18 Hours)**

Uniform Boundedness Principle – Weak Convergence –The Open Mapping Theorem - The Closed Graph Theorem.

Unit-IV **(18 Hours)**

Inner Product Space and Hilbert Space – Parallelogram Law - Orthogonality - Orthonormal Sets- Complete Orthonormal Sets – Riesz Representation Theorem - Dual Spaces.

Unit-V **(18 Hours)**

Introduction to Banach Algebra – Adjoin to fan Operator-Isometric Operator - Unitary Operator - Self - Adjoint Operator - Normal Operator - Projection Operator and its Properties.

Book for Study

1. S. C. Bose, *Introduction to Functional Analysis*, MacMillan Publishers India, Delhi, 1992.
   Unit-I *Chapter 3*
   Unit-II *Chapter 4 (Sec: 1 - 7)*
   Unit-III *Chapter 5 (Sec: 1, 3) and Chapter 6 (Sec 1, 3)*
   Unit-IV *Chapter 7*

Unit-V *Chapter 8*

Books for Reference

1. D. Somasundaram, *A First Course in Functional Analysis*,Narosa Book Distributors Private Ltd., 2008.
2. G. F. Simmons, *Introduction to Topology and Modern Analysis*, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2006.
3. Walter Rudin, *Functional Analysis*, Tata McGraw-Hill publishing Co. Ltd., New Delhi, 2006.

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

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credits**
IV	**21PMA4CC11**			**CORE–11: FUNCTIONAL ANALYSIS**					**6**	**6**
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	1	3	2.5
CO-2	2	3	3	2	1	2	3	2	2	3	2.3
CO-3	3	2	3	2	2	3	2	2	1	2	2.2
CO-4	3	3	2	2	2	3	3	3	2	3	2.6
CO-5	2	3	3	2	1	3	3	2	2	3	2.4
Mean Overall Score											2.40 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PMA4CC12	CORE – 12: PARTIAL DIFFERENTIAL EQUATIONS	5	5

CONo.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	have knowledge to classify partial differential equations and solve linear and non-linear partial differential equations using various methods.	K1
CO-2	understand different methods of solving partial differential equations.	K2
CO-3	apply the first, second and higher order partial differential equations in mathematical physics.	K3
CO-4	formulate partial differential equations and analyze their solutions.	K4 & K5
CO-5	identify the three main classes of second order partial differential equations- elliptic, parabolic and hyperbolic and evaluating their solutions.	K6

Unit-I **(15 Hours)**

Partial differential equations – origins of first order partial differential equations – Cauchy's problem for first order equations – Linear equations of the first order Integral surfaces Passing through a given curve surfaces – Orthogonal to a given system of surfaces – Non linear partial differential equations of the first order.

Unit-II **(15 Hours)**

Cauchy's method of characteristics – compatible systems of first order equations – Charpit's method – Special types of first order equations – Solutions satisfying given condition – Jacobi's method.

Unit-III **(15 Hours)**

Partial differential equations of the second order. The origin of second order equations second order equations in Physics-Higher order equations in Physics-Linear partial differential equations with constant co-efficient-Equations with variable co-efficient-Characteristic curves of second order equations.

Unit-IV **(15 Hours)**

Characteristics of equations in three variables-The solution of Linear Hyperbolic equations-Separation of variables. The method of Integral Transforms-Non Linear equations of the second order

Unit-V **(15 Hours)**

Laplace equation: Elementary solutions of Laplace's equations-Families of equipotential Surfaces Boundary value problems-Separation of variables-Problems with Axial Symmetry.

Book for Study

1. Ian N. Sneddon, *Elements of Partial Differential Equations*, Dover Publication INC, NewYork, 2006.

Unit-I	*Chapter II (Sec 1-7)*
Unit-II	*Chapter II (Sec.8-13)*
Unit-III	*Chapter III (Sec.1-6)*
Unit-IV	*Chapter III (Sec.7-11)*
Unit-V	*Chapter IV (Sec.2-6)*

Books for Reference

1. M.D.Raisinghania, *Ordinary and Partial Differential Equations*, S. Chand & Co.2005.
2. E.T. Copson, *Partial Differential Equations*, Cambridge University Press, 1975.

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

Semester	**Course Code**	**Title of the Course**								**Hours**	**Credits**
IV	**21PMA4CC12**	**CORE – 12: PARTIAL DIFFERENTIAL EQUATIONS**								**5**	**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	3	3	3	3	3	2	3	2.8
CO-2	2	2	2	3	3	3	3	3	2	3	2.6
CO-3	2	2	3	3	3	3	3	3	3	3	2.8
CO-4	3	3	2	3	3	3	3	3	2	3	2.8
CO-5	2	2	3	2	3	2	3	3	2	3	2.5
Mean Overall Score											2.7 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PMA4CC13	CORE – 13: CALCULUS OF VARIATIONS, INTEGRAL EQUATIONS AND TRANSFORMS	6	6

CONo.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	describe the concepts viz, functional, variations, Integral equations and integral transforms.	K1
CO-2	identify various methods in variations, integral equations and integral transforms.	K2
CO-3	understand the real-life problem and find solution by applying suitable method.	K3
CO-4	examine the existence of solution to a problem.	K4 & K5
CO-5	formulate variational problem relevant to a real-life situation.	K6

Unit-I **(18 Hours)**

The calculus of Variations- Strong and Weak Variations-The variational notations and the first variations – Functional -Euler's equations – Commutative Character of the operations of variations and integrations – Other forms of Euler's Equation and their solutions Geodesics.

Unit-II **(18 Hours)**

Variational problems involving several unknown functions - Functionals dependent on higher order derivatives-Variational problems involving several independent variables-Constrains and Lagrange multipliers- Isoperimetric problems.

Unit-III **(18 Hours)**

The general variation of functional-Variational problems with moving boundaries-Hamilton's principle, Sturm – Liouville's problems and variational methods – Rayleigh's principle – Ritz method.

Unit-IV **(18 Hours)**

Integrals Equations - Introduction – Relation between differential and integral equations – Relationship between Linear differential equations and Volterra integral equations – The Green's function and its use in reducing boundary value problems to integral equations – Fredholm equations with separable kernels- Fredholm equations with symmetric kernals: Hilbert Schmidt theory– Iterative methods for the solution of integrals equations of the second kind– The Neumann series –orthogonal kernels.

Unit-V **(18 Hours)**

Fourier transform – The infinite Fourier transform – The finite Fourier transform – Fourier integral theorem – Different forms of Fourier integrals formula – Problems related to Fourier integral and finite transform.

Books for Study

1. Dr. M.K.Venkatarman, *Higher Mathematics for Engineering and Sciences*, The National Publishing Company, 2001.

Unit-I *Chapter 9(Sec 1-10*)

Unit-II *Chapter 9(Sec 11-15)*

Unit-III *Chapter 9 (Sec 16-21)*
Unit- IV *Chapter 10 (Sec 1-11*)

2. J.K. Goyal and K.P. Gupta, *Integral Transforms*, K.K. Mittal for Pragati Prakashan, 20th Edition (2019).

Unit-V *Chapter 2 (Part 1 and Part 2)*

Books for Reference

1. Krasnov, Kiselu and Marenko, *Problems and Exercise in Integrals Equations*, MIR Publishers 1971.
2. Francis. B. Hildebrand, *Methods of Applied Mathematics*, Prentice - Hall of India Pvt. Ltd., New Delhi, Second Edition 1968.
3. Ram. P. Kanwal, *Linear Integral Equations* – Theory and Techniques, Academic press, New York, 1971.

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

Semester	**Course Code**	**Title of the Course**	**Hours**	**Credits**
IV	**21PMA4CC13**	**CORE – 13: CALCULUS OF VARIATIONS, INTEGRAL EQUATIONS AND TRANSFORMS**	**6**	**6**

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	2	2	3	2.4
CO-2	2	3	2	1	2	3	3	2	2	3	2.3
CO-3	2	1	3	2	3	1	3	3	2	3	2.3
CO-4	2	3	2	3	3	2	3	1	3	2	2.4
CO-5	1	2	3	2	3	1	3	2	2	3	2.2
Mean Overall Score											2.32 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PMA4ES04A	DSE – 4: AUTOMATA THEORY	5	4

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	enhance their knowledge in mathematical notions of computation, such as computability, decidability and reducibility of the theory of formal languages and automata.	K1
CO-2	perceive the techniques of computations including finite state automata, grammars and regular expressions and their relations.	K2
CO-3	design and explain finite automata without ε-moves, derivation trees, pushdown automata and the lexical analyzer to the compilers.	K3
CO-4	analyze and recognize the patterns of automata and grammars using regular expressions.	K4
CO-5	state and explain Chomsky Normal Form and Parsing techniques and implement the stack applications and evaluate them in arithmetic manner.	K5& K6

Unit-I **(15 Hours)**

Finite Automata and Regular expressions – Definitions and examples – Deterministic and Non deterministic finite Automata – Finite Automata with ε-moves.

Unit-II **(15 Hours)**

Context free grammar – Regular expressions and their relationship with automation – Grammar – Ambiguous and unambiguous grammars – Derivation trees – Chomsky Normal form.

Unit-III **(15 Hours)**

Pushdown Automata – Definition and examples – Relation with Context free languages.

Unit-IV **(15 Hours)**

Finite Automata and lexical analysis – Role of a lexical analyzer – Minimizing the number of states of a DFA – Implementation of a lexical analyzer.

Unit-V **(15 Hours)**

Basic parsing techniques – Parsers – Bottom up Parsers – Shift reduce – operator precedence – Top down Parsers – Recursive descent – Predictive parsers.

Books for Study

1. John E. Hopcroft and Jeffrey D.Ullman, *Introduction to Automata theory, Languages and Computations*,Narosa Publishing House, Chennai, 2000.

Unit – I *Chapter2 (Sec 2.1 - 2.4)*

Unit – II *Chapter2 (Sec 2.5) and Chapter 4 (Sec 4.1 - 4.3, 4.5)*

Unit - III *Chapter 5 (Sec 5.2, 5.3)*

2. A.V.Aho and Jeffrey D.Ullman, *Principles of Compiler Design*,Narosa Publishing House, Chennai, 2002.

Unit – IV *Chapter 3 (Sec 3.1 - 3.8)*
Unit – V *Chapter 5 (Sec 5.1 - 5.5)*

Books for Reference

1. Harry R. Lewis and Christos H.Papadimitriou, *Elements of the Theory of Computation*, Second Edition, Prentice Hall, 1997.
2. A.V.Aho, Monica S.Lam, R.Sethi, J.D.Ullman, *Compilers: Principles, Techniques, and Tools*,Second Edition, Addison-Wesley,2007.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
IV	**21PMA4ES04A**			**DSE – 4: 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	2	3	2	1	2	3	3	2	2	3	2.3
CO-2	1	2	3	2	3	2	3	2	3	2	2.3
CO-3	1	2	2	3	1	2	3	2	2	3	2.1
CO-4	3	2	2	2	1	3	3	2	2	3	2.2
CO-5	1	2	2	2	3	1	3	2	2	3	2.1
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	**21PMA4ES04B**	**DSE – 4: C++ PROGRAMMING**	**5**	**4**

CONo.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	recognize the concepts of object-oriented programming	**K1**
CO-2	summarize various types of operations, functions, constructors, overloading and inheritance	**K2**
CO-3	practice codes in C++ for solving problems	**K3**
CO-4	analysis the complexity of C++ programs using different techniques	**K4**
CO-5	apply the knowledge of C++ to design programs for solving problems	**K5 &K6**

Unit-I **(15 Hours)**

Introduction to C++-Applications of C++ statements-structure of C++ programs -Tokens, keywords, identifiers, data types - symbolic constants -type compatibility- defining variables.

Unit-II **(15 Hours)**

Operators in C++ - Manipulators -Type cast operator- Expressions – Operator Overloading-control structures -Main function-Function prototyping-call by reference-return by reference-inline functions-default arguments-constant arguments-Recursion-Function overloading.

Unit-III **(15 Hours)**

Specifying a class – Defining member functions –Making an outside function inline – Nesting of member functions – Arrays within a class – Memory allocation for objects-Constructors –Parameterized constructors –Multiple constructors in a class – Constructors with default arguments

Unit-IV **(15 Hours)**

Dynamic initialization of objects – Copy constructor –Dynamic constructor - Destructors-Defining operator overloading – Overloading unary, binary operators.

Unit-V **(15 Hours)**

Binary operators overloading using friends – Manipulation of strings using operators - Rules for overloading operators –Defining derived classes – Single Inheritance – Making a private member inheritable – Multilevel, Multiple, Hierarchical and Hybrid inheritance.

Book for Study

1. E. Balagurusamy,*Object Oriented Programming with C++*, TATA MCGRAW HILL. Sixth edition 2014.

Unit- I *Chapter 2 (Sec 2.1 -2.6) and Chapter 3 (Sec 3.1 -3.13)*
Unit- II *Chapter 3 (Sec 3.14 -3.25) and Chapter 4 (Sec 4.1 - 4.10)*
Unit -III *Chapter 5 (Sec 5.1 – 5.10) and Chapter 6(Sec 6.1 – 6.5)*
Unit- IV *Chapter 6(Sec6.6 – 6.8, 6.11) and Chapter 7 (Sec 7.1 – 7.4)*
Unit -V *Chapter 7 (Sec 7.5 – 7.8) andChapter 8 (Sec 8.1 – 8.8)*

Books for Reference

1. M.A.Jayaram and D.S. Rajendra Prasad,*Object Oriented Programming With C++*, Mumbai, Himalaya Publishing, 2002.
2. D.Ravichandran,*Programming With C++*,New York, McGraw Hill,1999.
3. Maria Litvin and Gary Litvin,*Programming In C++*,New Delhi,Vikas Publishing House Pvt. Ltd., 2001.

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

Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
IV	**21PMA4ES04B**			**DSE – 4: C++ 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	2	2	1	2	2	3	2	2	3	3	2.2
CO-2	2	1	2	1	2	2	3	3	3	2	2.1
CO-3	1	2	2	3	1	2	3	3	3	2	2.2
CO-4	3	2	1	2	3	2	3	3	2	1	2.2
CO-5	2	3	2	3	1	3	3	2	3	3	2.5
Mean Overall Score											2.24 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21PMA4CE01	COMPREHENSIVE EXAMINATION	-	2

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge on basic concepts, definitions and ideas with examples in Algebra, Analysis, and Topology	K1
CO-2	understand basic mathematical concepts and computational skills	K2
CO-3	articulate mathematical concepts and use it in solving problems in Algebra, Analysis, and Topology	K3
CO-4	Compare the concepts of various subjects in Mathematics	K4
CO-5	Develop creativity in communicating and solving mathematical problems	K5 & K6

Unit I: Algebra

Groups – A Counting Principle-Homomorphism- Another Counting Principle -Sylow's theorem - Idealsand Quotient rings - Polynomial Rings - The elements of Galois Theory

Unit II: Real Analysis

Countable and Uncountable Sets - Metric Spaces -Cauchy Sequences –Series -Continuous functions - Infinite Limits and Limits at Infinity - Mean Value Theorems - Uniform Convergence - Power series

Unit III: Complex Analysis

Analytic Functions - Complex Integration - The integral formula - Zeroes and Poles - The Residue theorem - Evaluation of Definite Integrals - Power Series expansion

Unit IV: Topology

Basis for a topology - Continuous functions - The Metric Topology – Connectedness and Compactness -The Countability axioms – The Separation axioms -The Urysohn lemma

Unit V: Functional Analysis

Normed Linear Spaces - Continuity and Boundedness of Linear Mappings - Dual Spaces - Hahn-Banach Theorem -Dual of C[0,1] -The Open Mapping Theorem -Inner Product Space and Hilbert Space - Riesz Representation Theorem

Books for Study

1. I. N. Herstein, "*Topics in Algebra*", Wiley Eastern Limited, NewDelhi,1992.
2. Walter Rudin, "*Principles of Mathematical Analysis*", Third Edition, McGraw-Hill International Book Company, New York, 1976.
3. Lars V. Ahlfors, "*Complex Analysis: An Introduction to the Theory of Analytic Functions of One Complex Variable*", Third Edition, Mac Millan Publishers India,

Delhi, 2013.
4. James R. Munkres, "*Topology*", Second Edition, PHI Learning Pvt Ltd., New Delhi, 2009.
5. SS. C. Bose, Introduction to Functional Analysis, MacMillan Publishers India, Delhi, 1992.

Books for Reference

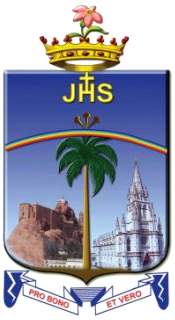
1. Serge Lang, "*Algebra*", Third Edition, Springer Graduate Texts in Mathematics, New York, 2002.
2. Tom M.Apostol, "*Mathematical Analysis*", Addison-Wesley Publishing Company London, 1974.
3. S. Ponnusamy, "*Foundations of Complex Analysis",* Second Edition, Narosa Publishing
   House, India, 2005.
4. James Dugundji, "*Topology*", Allyn & Bacon, 1966.
5. G. F. Simmons, *Introduction to Topology and Modern Analysis*, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2006

B.Sc. MATHEMATICS

LOCF SYLLABUS – 2021

SCHOOLS OF EXCELLENCE

WITH CHOICE BASED CREDIT SYSTEM (CBCS)



DEPARTMENT OF MATHEMATICS
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:

$GPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$	$WAM\,(\text{Weighted Average Marks}) = \frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$
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) 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)

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 (PSO)

Graduates will be able to

1. Acquire a systematic understanding of the fundamental concepts and theories of mathematics.
2. Adopt changing scientific environment in the process of sustainable development by using mathematical tools.
3. Hone problem solving skills to succeed in various competitive examinations including JAM, NBHM, CAT, UPSC.
4. Understand and appreciate integrated learning to create mathematical models, practice ethical values and realize societal responsibilities.
5. Strengthen the mathematical ability, abstract intelligence and orient themselves towards higher mathematics and research.

B.Sc MATHEMATICS						
PROGRAMME STRUCTURE						
Part	**Sem.**	**Specification**	**No. of Courses**	**No. of 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
	I –VI	Core course : Theory	12	72	44	82
III	I –VI	Core course : Practical	1	2	1	
	I-IV	Core course- Allied/(Practical)	4	24	16	
	V-VI	Discipline Specific Elective	4	20	12	
	VI	Project Work	1		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	14
	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
		Total		180		130(6)

B.Sc. MATHEMATICS								
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	21UMA13CC01	Basic Mathematics	7	4	100	100	100
	3	21UMA13CC02	Integral Calculus	6	4	100	100	100
	3	21UMA13AC01	**Allied:** Statistics- I	6	4	100	100	100
	4	21UHE14VE01	Essentials of Humanity	2	1	50	50	50
	4	21UEN14AE01	**AECC-1:** Communicative English	(6)	4	100	-	100
			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	21UMA23CC03	Analytical Geometry and Vector Calculus	6	4	100	100	100
	3	21UMA23CC04	Differential Equations	5	3	100	100	100
	3	21UMA23AC02	**Allied:** Statistics-II	6	4	100	100	100
	4	21UHE24VE02	Techniques of Social Analysis: Fundamentals of Human Rights	2	1	50	50	50
	4	21UHE24AE02	**AECC-2**: Environmental studies	2	2	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	21UMA33CC05	Classical Algebra	6	4	100	100	100
	3	21UMA33CC06	Sequences and Series	5	3	100	100	100
		21UMA33AO03A	**Allied Optional:** Physics-1	4	3	100	100	100
	3	@	**Allied Optional:** Physics Practical	2	*	-	-	-
		21UMA33AO03B	**Allied Optional:** Accounts - I	(6)	(4)	100	100	100
	4	21UMA34SE01	**SEC -1 (WD):** Quantitative Techniques	2	1	100	-	100
	4	21UHE34VE03A	Professional Ethics–I: Social Ethics - I	2	1	50	50	50
		21UHE34VE03B	Professional Ethics I: Religious Doctrine- I					
			Extra Credit courses (MOOC)-2		(2)			
			Total	**30**	**18/19 (2)**			

IV	1	21UTA41GL04B	Scientific Tamil (SBS, SPS,SCS)	4	3	100	100	100
		21UFR41GL04	French- IV					
		21UHI41GL04	Hindi- IV					
		21USA41GL04	Sanskrit- IV					
	2	21UEN42GE04	General English - IV	5	3	100	100	100
	3	21UMA43CC07	Mechanics	7	4	100	100	100
	3	21UMA43CC08	Graph Theory	4	3	100	100	100
		21UMA43AO04A	**Allied Optional:** Physics-II	4	3	100	100	100
	3	21UMA43AP01A	**Allied Optional:** Physics Practical	2	2	100	100	100
		21UMA43AO04B	**Allied Optional:** Accounts - II	(6)	(4)	100	100	100
	4	21UMA44SE02	**SEC -2 :** (BS) Numerical Ability	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**	**20/19**			
V	3	21UMA53CC09	Modern Algebra	**7**	4	100	100	100
	3	21UMA53CC10	Real Analysis	7	4	100	100	100
	3	21UMA53ES01A	**DSE-1:** Automata Theory	5	3	100	100	100
		21UMA53ES01B	**DSE-1:** Number Theory					
	3	21UMA53ES02A	**DSE-2:** Operations Research	5	3	100	100	100
		21UMA53ES02B	**DSE-2:** Mathematical Modeling					
	3	21UMA53IS01	Internship	-	2	100		100
	3	21UMA53SP01	**Self-paced Learning:** History of Mathematics	-	2	50	50	50
	3	21UMA53FV01	Field study/ Industrial visit/ Case study	-	1	100	-	100
		21UMA53PW01	Project work		2	100	100	100
	4	21USS54SE03	**SEC -3 :** Soft Skills	2	1	100	-	100
	4	21UMA54EG01	**GE-1:** Mathematics for Competitive Examinations	4	3	100	100	100
			Extra Credit courses (MOOC)-3		(2)			
			Total	**30**	**25(2)**			
VI	3	21UMA63CC11	Linear Algebra	6	3	100	100	100
	3	21UMA63CC12	Complex Analysis	6	4	100	100	100
	3	21UMA63CP01	'C' Language	2	1	100	100	100
	3	21UMA63ES03A	**DSE-3:** Computer Oriented Numerical Methods	5	3	100	100	100
		21UMA63ES03B	**DSE-3:** Optimization Techniques					
	3	21UMA63ES04A	**DSE-4:** Astronomy	5	3	100	100	100
		21UMA63ES04B	**DSE-4:** Fuzzy Theory					
	3	21UMA63CE01	Comprehensive Examinations	-	2	50	50	50
	4	21UMA64SE04	**SEC -4 (WS) :** MATLAB	2	1	100	-	100
	4	21UMA64EG02	**GE-2:** Analytical Skill for Competitive Examinations	4	3	100	100	100
			Total	**30**	**20**			
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 school (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 குறும்பட உருவாக்கம்	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 மனித உரிமைகள்	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	சித்த மருத்துவம்	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

(12 மணிநேரம்)

அலகு - 1

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 On successful completion of the course, students will be able to	Cognitive Levels (K –Levels)
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				Hours		Credits
I	21UHI11GL01			HINDI - 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	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	21UMA13CC01	CORE-1: BASIC MATHEMATICS	7	4

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge of successive differentiation, Exponential series, Binomial, Trigonometric expansions and Polar equations.	K1
CO-2	understand radius of curvature, graphs of some standard functions, series expansions and polar form.	K2
CO-3	apply Binomial theorem and derivative to radius of curvature and apply polar equation to circle, chord and conic	K3
CO-4	able to evaluate the sum of infinite series and logarithm of complex quantities.	K4
CO-5	illustrate with suitable examples.	K5

Unit I **(21-Hours)**

Successive differentiation - Envelopes – Curvature - Cartesian formula for the radius of curvature- Drawing the graphs $e^x, sinx, cosx, tanx$, Parabola, Ellipse, Hyperbola.

Unit II **(21 Hours)**

Binomial theorem for rational index- some important particular cases of the Binomial expansion - Numerically greatest term - Partial fraction - Application of the Binomial theorem to the summation of series (Proof of the theorem not required).

Unit III **(21 Hours)**

Exponential series expansion - Logarithmic series expansion (Proofs of the theorems not required).

Unit IV **(21 Hours)**

Expansions of $sinn\theta, cosn\theta, tann\theta$, $sin^n\theta$, $cos^n\theta$, $sin\theta, cos\theta, tan\theta$ - Hyperbolic functions

- Logarithm of complex quantities.

Unit V **(21 Hours)**

Polar equation of a straight line – Polar equation of a circle – Polar equation of Conic- Equation of chord - Asymptotes of the conic.

Books for Study

1. S. Narayanan and T.K.Manicavachagam Pillay, *Calculus Volume 1*, S.Viswanathan Printers & Publishers, 2008.

Unit I: *Chap III (full), Chap X (Sec 2. 1 and 2.3).*

2. T. K. Manicavachagam Pillay,T.Natarajan and K.S.Ganapathy, *Algebra volume I,* S. Viswanathan Printers & Publishers, 2008
   Unit II: *Chap III: (Sec 5-6, 8-10)*
   Unit III: *Chap IV: (Sec 3, 5 – 7)*
3. S. Narayanan and T.K. Manicavachagam Pillay,*Trigonometry,*S.Viswanathan Printers & Publishers, 2001
   Unit IV: *Chap III (full),Chap IV (full),ChapV (Sec 5)*
4. T. K. Manicavachagam Pillay and T.Natarajan, *A Textbook of Analytical geometry – Part I - Two Dimension,* S. Viswanathan Printers & Publishers, 2002.
   Unit V: *Chap IX (Sec 1– 12)*

Books for References

1. P.R.Vittal and V.Malini,*Algebra, Calculus and Trigonometry*, Margham Publications, Chennai,1997.
2. P.R.Vittal and V.Malini, *Vector Analysis,* Margham Publications, Chennai, 1997
3. P.R.Vittal and V.Malini, *Calculus,* 3rd Edition (For Polar co-ordinates only) Margham Publications, Chennai, 1997.

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

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credits**
I	**21UMA13CC01**			**CORE- 1: BASIC MATHEMATICS**					**7**	**4**
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	2	1	2	3	3	2	2	3	2.3
CO-3	2	2	3	2	1	2	3	2	3	2	2.2
CO-4	2	2	2	3	1	2	3	2	3	3	2.3
CO-5	2	2	2	2	2	1	3	2	3	3	2.2
									Mean Overall Score		2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	**21UMA13CC02**	**CORE – 2: INTEGRAL CALCULUS**	**6**	**4**

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the basic knowledge of all integral models and methods.	**K1**
CO-2	understand the concepts of reduction formulae, length of curve, surface areas as integrals and Beta, Gamma functions.	**K2**
CO-3	apply integrals to solve problems in a range of mathematical applications.	**K3**
CO-4	analyze improper integrals and identify infinite summation as an appropriate definite integral.	**K4**
CO-5	evaluate areas, length of a curve and surface of revolution occurring in real life problems using multiple integrals and Gamma functions	**K5**

UNIT I **(18 Hours)**

Revision of Integral formulae - All Integral models including Integration of Rational and Irrational Functions.

UNIT II **(18 Hours)**

Integration Models (continued) - Properties of Definite integrals - Integration by Parts.

UNIT III **(18 Hours)**

Reduction Formulae for $x^n e^{ax}$, $\sin^n x$, $\cos^n x$, $\sin^m x \cos^n x$, $\tan^n x$, $\cot^n x$, $\sec^n x$, $\operatorname{cosec}^n x$, $x^m (\log x)^n$, $e^{ax} \cos bx$ - Bernoulli's Formula - Integration as summation.

UNIT IV **(18 Hours)**

Area Under Plane Curves - Area of a Closed Curves - Length of a Curve - Area of Surface of revolution – Multiple Integrals - Evaluation of Double and Triple Integrals (Cartesian Co-Ordinates only).

UNIT V **(18 Hours)**

Improper Integrals- Beta and Gamma Functions- Recurrence formula of Gamma Functions - Properties of Beta Functions - Relation between Beta and Gamma Functions - Evaluation of Definite Integrals Using Gamma Functions.

Book for Study

1. S. Narayanan and T. K. ManicavachagamPillay, *Calculus (Major), Volume – II,* S.Viswanathan Printers & Publishers, 2013.
   - **Unit I :** *Chapter 1* (*Sec 1-8*)
   - **Unit II:** *Chapter 1* (*Sec 9-12*)
   - **Unit III:** *Chapter 1* (*Sec 13,14,15*)
   - **Unit IV:** *Chapter 2* (*Sec 1,4,5*) *Chapter 5* (*Sec 1-4*)
   - **Unit V :** *Chapter 7* (*Sec 2-5)*

Books for Reference

1. Dr. M.K Venkataraman, *Engineering Mathematics, Vol 2*, The National Publishing Company, Madras, 1988.
2. Thomas and Finney, *Calculus*, Pearson Education, 9th Edition, 2006.

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

Semester	Course Code			Title of the Course						Hours	Credits
I	21UMA13CC02			CORE – 2: INTEGRAL CALCULUS						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	2	1	2	2	2	3	3	2	2	3	2.2
CO-2	2	3	2	1	2	3	3	2	2	3	2.3
CO-3	1	2	3	2	3	2	3	2	3	2	2.3
CO-4	1	2	2	3	1	2	3	2	2	3	2.1
CO-5	1	2	2	2	3	1	3	2	2	3	2.1
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UMA13AC01	ALLIED – 1: STATISTICS - I	6	4

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge of basic probability and probability distributions.	K1
CO-2	be able to understand various theorems on probability and their use in solving problems in various diversified situations.	K2
CO-3	calculate moments, cumulants, moment generating function and various constants of probability distributions.	K3
CO-4	illustrate the theory of probability, random variables, distribution functions and probability distributions with suitable example.	K3
CO-5	be able to find solution of real life problems under the concept of probability and probability distributions.	K4

Unit I **(18 Hours)**

Short History - Basic Terminology -Mathematical Probability - Statistical Probability - Axiomatic approach to probability – Some Theorems on Probability - Mathematical Notion - Conditional probability- Multiplication Theorem of Probability - Independent Events- Pairwise Independent Events.

Unit II **(18 Hours)**

Baye's theorem - Random variables: Distribution function - Discrete random variable - Continuous random variable - Two-dimensional random variable.

Unit III **(18 Hours)**

Mathematical expectation - Expected value of function of a random variable - Properties of expectation - Properties of variance - Covariance - Moment generating function - Cumulants - Chebychev's inequality.

Unit IV **(18 Hours)**

Binomial distribution- Poisson distribution - Geometric distribution

Unit V **(18 Hours)**

Normal distribution - Gamma distribution - Exponential distribution

Book for Study

1. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, Eleventh thoroughly edition, Sultan Chand and Sons, New Delhi, 2003.
   Unit I: *Chapter 3 (Sec 3.2-3.5, 3.8 (Omit 3.8.3, 3.8.4), 3.9 (Omit 3.9.2), 3.10-3.12, 3.15)*
   Unit II: *Chapter 4 (Sec 4.2 (Omit 4.2.1)), Chapter 5 (Sec 5.1-5.5 (Omit 5.5.6-5.5.7))*
   Unit III: *Chapter 6 (Sec 6.1 - 6.6) Chapter 7 (Sec 7.1, 7.2, 7.5)*

Unit IV: *Chapter 8 (Sec 8.4(Omit 8.4.3, 8.4.10-8.4.12), 8.5, 8.7)*
Unit V: *Chapter 9 (Sec 9.2 (Omit 9.2.11-9.2.15), 9.5, 9.8)*

Books for Reference

1. P.R. Vittal, *Mathematical Statistics,* Margham Publications, Chennai, 2004.
2. J.N. Kapur and H.C. Saxena, *Mathematical Statistics,* 20th Edition, S.Chand & Co Ltd. New Delhi, 2010.

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

Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
I	**21UMA13AC01**			**ALLIED – 1: STATISTICS - 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	2	1	3	3	2	1	2	2.2
CO-2	3	3	2	2	1	3	3	2	1	2	2.2
CO-3	3	2	2	2	1	3	3	2	1	2	2.1
CO-4	3	3	2	2	1	3	3	2	1	2	2.2
CO-5	3	3	3	2	1	3	3	2	1	2	2.3
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
I	21UHE14VE01	ESSENTIALS OF HUMANITY	2	1

CO.No	CO – Statements	Cognitive Level
	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
உரைநடை - *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/ 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	Cognitive Levels (K –Levels)
	On successful completion of the course, students will be able to	
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	Cognitive Levels (K –Levels)
	On successful completion of the course, the student will be able to	
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 On successful completion of this course, students will be able to	Cognitive Levels (K- Levels)
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	**21UMA23CC03**	**CORE- 3: ANALYTICAL GEOMETRY AND VECTOR CALCULUS**	**6**	**4**

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge about the basic concepts of analytical geometry (3D) and vector calculus.	**K1**
CO-2	be able to understand the properties of planes, spheres, divergent and curl of a vector.	**K2**
CO-3	apply the concepts of analytical geometry and vector calculus in real life problems.	**K3**
CO-4	evaluate the equations of lines, planes, spheres, volume and surface integral.	**K4**
CO-5	be able to illustrate the importance of angle between planes, shortest distance between skew lines, divergence and curl of vector field, surface integral and volume integral.	**K5**

Unit I **(18 Hours)**

Coordinates in space – Direction cosines of a line in space - angle between lines in space - equation of a plane in normal form – Angle between planes – Distance of a plane from a point.

Unit II **(18 Hours)**

Straight lines in space - line of intersection of planes - plane containing a line - Coplanar lines - skew lines and Shortest distance between skew lines - Length of the perpendicular from a point to a line.

Unit III **(18 Hours)**

General equation of a sphere - Section of a sphere by a plane - tangent planes - condition of tangency - system of spheres generated by two spheres - system of spheres generated by a sphere and a plane.

Unit IV **(18 Hours)**

Gradient, Divergence and Curl - Definitions, identities and simple problems - Directional derivative and Laplacian - Definition and simple problems.

Unit V **(18 Hours)**

The line integral - Volume integral - Surface integral - Gauss divergence theorem - Stoke's theorem - Green's theorem (2D only) (Omit proofs of these three theorems & problems only).

Books for Study

1. Shanthi Narayanan and Mittal P.K, *Analytical Solid Geometry*,17th Edition, S.Chand & Co, New Delhi

Unit I: *Chapter 1 (Sec 1.5-1.9), Chapter 2 (Sec 2.1-2.8, Pages 09-35)*

Unit II: *Chapter 3 (Sec 3.1-3.7, Pages 56-88)*
Unit III: *Chapter 6 (Sec 6.1-6.6, Pages 98-122)*

2. Narayanan and Manickavasagam Pillay, *Vector Algebra and Analysis*, S.Viswanathan Printers & Publishers Pvt.Ltd. 1994.
Unit IV: *Chapter 4 (Sec 6-12, Pages 98-122)*
Unit V: *Chapter 6 (Sec 2-6, Pages 136-158; Sec 9-10, Pages 163-177)*

Books for Reference

1. P. Duraipandian, *Analytical Geometry 3 Dimensional*, Emerald Student Edition, 1970.
2. S.Arumugam and A. Thangapandi Issac, *AnalyticalGeometry(3D) and Vector Calculus,* New Gamma Publishing House.

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

Semester	Course Code	Title of the Course	Hours	Credits
II	21UMA23CC03	CORE- 3: ANALYTICAL GEOMETRY AND VECTOR CALCULUS	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	2	2	2	1	3	2	3	2	3	2.3
CO-2	1	3	2	2	2	3	3	2	3	2	2.3
CO-3	2	1	3	2	3	2	3	3	2	2	2.3
CO-4	2	3	2	3	1	3	2	3	2	3	2.4
CO-5	1	2	3	2	3	2	3	2	1	3	2.2
Mean Overall Score											2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UMA23CC04**	**CORE – 4: DIFFERENTIAL EQUATIONS**	**5**	**3**

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge on basic concepts of ordinary and partial differential equations, Laplace transforms and Fourier series.	**K1**
CO-2	understand the classification of differential equations and its solutions, properties of Laplace transforms and Fourier series.	**K2**
CO-3	apply differential equations, Laplace Transforms and Fourier series to solve problems in a range of mathematical applications.	**K3**
CO-4	identify a suitable technique to obtain solution of a given differential equation.	**K3**
CO-5	analyze and characterize solutions of differential equations and periodic functions in terms of its Fourier series expansions.	**K4**

Unit I **(15 Hours)**

Variables separable - Homogeneous equations - Non- Homogeneous equations of the first degree in x and y- Linear equations - Bernoulli's equation - Exact differential equations - First order DE of higher degree.

Unit II **(15 Hours)**

Linear DE with constant coefficients - particular integrals - General method of finding P.I - Special methods for finding P.I when X is of the form x^m, $e^{ax}x^m$, e^{ax}sinmx, e^{ax}cosmx - Equations reducible to the linear equations.

Unit III **(15 Hours)**

Laplace transform - Properties of Laplace transform - Laplace transform of periodic functions- some general Theorems - The inverse transform - solving linear DE using Laplace transforms.

Unit IV **(15 Hours)**

Fourier series - Fourier series for even and odd functions - Half range expansions.

Unit V **(15 Hours)**

Formation of Partial Differential Equations - solution of simple types - First order PDE - Charpit's method - Homogeneous and Non - Homogeneous equations - linear PDE with constant coefficients.

Books for Study

1. S. Narayanan & T.K. Manichavasagam Pillay, *Differential equations and its applications*, Viswanathan Pvt Ltd 2013.

Unit I *Chapter II (Sec 1 – 6), Chapter IV(Full).*

Unit II *Chapter V (Sec 1 – 6)* .

Unit III *Chapter IX (Sec 1 – 8).*

2. M.K. Venkatraman, *Engineering Mathematics – III-year part B,* National Publishing company, Chennai.
   Unit IV Chapter I: Sections – 1,2,6,8,9,10
   (omit change of interval, Proofs and derivations).
   Unit V Chapter II (omit sections 10, 11, numerical problems only).

Books for Reference

1. M.K. Venkatraman, *Engineering Mathematics – Volume II,* National Publishing Company, Chennai.
2. M.K. Venkatraman, *Engineering Mathematics – III-year part A,* National Publishing Company, Chennai.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
II	**21UMA23CC04**			**CORE – 4: DIFFERENTIAL EQUATIONS**				**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	2	2	1	2	3	2	2	2	2.1
CO-2	2	3	2	1	2	3	3	2	2	3	2.3
CO-3	1	2	3	2	3	2	3	2	3	2	2.3
CO-4	1	2	2	3	2	2	3	2	2	3	2.2
CO-5	1	2	2	2	3	1	3	2	2	3	2.1
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	**21UMA23AC02**	**ALLIED – 2: STATISTICS-II**	**6**	**4**

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	Recognize the parameters and statistics to test the significance of sampling	**K1**
CO-2	Examine the characteristics of estimators such as unbiasedness, consistency, efficiency and sufficiency.	**K2**
CO-3	Derive the various measures of Chi-square, t and F distributions	**K3**
CO-4	Illustrate the statistical distributions Chi-square, t and F with examples	**K4**
CO-5	Analyse the data statistically by one way and two way classifications	**K4**

Unit-I **(18 Hours)**

Introduction - Types of Sampling - Parameter and Statistic - Tests of significance - Procedure for testing of hypothesis - Test of significance for large samples - Sampling of attributes - Sampling of variables.

Unit II **(18 Hours)**

Introduction - Derivation of the Chi-square distribution - MGF of Chi-square distribution - Applications of Chi-square distribution.

Unit III **(18 Hours)**

Introduction - Student's t - distribution - Applications of t-distribution - F-distribution - Applications of F-distribution.

Unit IV **(18 Hours)**

Introduction - Characteristics of estimators - Unbiasedness - Consistency - Efficient and Most Efficient Estimators - Sufficiency (Definition only) - Methods of Estimation – Method of Maximum Likelihood Estimation - Method of moments.

Unit V **(18 Hours)**

Introduction - One-Way classification- Statistical analysis of the model - Two-Way classification- Statistical analysis of the model.

Books for Study

1. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics,* 11th thoroughly Revised edition, Sultan Chand and Sons, 2002.

Unit I : *Ch 14 (Full)*

Unit II: *Ch 15 (Sec 15.1- 15.3, 15.6 (Omit 15.6.4-15.6.7))*

Unit III : *Ch 16 (Sec 16.1-16.3, 16.5-16.6)*

Unit IV: *Ch17 (Sec -17.1, 17.2 (Omit MVU Estimators and theorems on MVU Estimators), 17.6 (Omit 17.6.2 and 17.6.4))*

2. S.C. Gupta and V.K. Kapoor, *Fundamentals of Applied Statistics,* 3rd edition, Sultan Chand and Sons, 2001.

Unit V: *Ch.5 (Sec 5.1-5.3)*

Books for Reference

1. P. R. Vittal, *Mathematical Statistics,* Margham Publications, Chennai, 2004.
2. J.N. Kapur and H.C. Saxena, *Mathematical Statistics,* 20 Edition, S.Chand & Co Ltd. New Delhi, 2010.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
II	**21UMA23AC02**			**ALLIED – 2: STATISTICS-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	1	2	2	2	2	3	3	2	2	2	2.1
CO-2	2	3	1	2	2	2	2	3	3	2	2.2
CO-3	2	3	2	1	3	2	2	3	2	2	2.2
CO-4	3	2	3	3	1	2	2	2	3	2	2.3
CO-5	3	1	2	2	2	2	3	2	2	3	2.2
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
II	21UHE24AE02	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	apply the acquired knowledge to sensitize individuals and public about the environmental crisis	K3
CO-4	analyze the causes and changes in the structure of biodiversity	K4
CO-5	enhance their skills in the society by solving the environmental problems and preserving nature by the acquired knowledge	K5

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.

Books for Study:

1. Department of Human Excellence, *Environmental Studies*, St. Joseph's College, Tiruchirappali-02, 2021.

Books for Reference:

1. Rathor, V.S. and Rathor B. S. *Management of Natural Resources for Sustainable Development*. New Delhi: Daya Publishing House, 2013.
2. Sharma P.D,*Ecology and Environment*, 8 ed., Meerut: Rastogi Publications, 2010.
3. Agrawal, A and C.C. Gibson. *Introduction: The Role of Community in Natural Resource*
4. *Conservation.* NJ: Rutgers University Press, 2001.

Web Sources:

https://www.unep.org/. Accessed 05 Mar. 2021.
http://moef.gov.in/en/ Accessed 05 Mar. 2021.
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:
1. 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/ 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	Cognitive Levels (K –Levels)
	On successful completion of the course, the student will be able to	
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	**21UMA33CC05**	**CORE – 5: CLASSICAL ALGEBRA**	**6**	**4**

CO No.	CO- Statement	Cognitive Level (K- level)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge of equations and the suitable method to solve it.	**K1**
CO-2	understand the nature of the roots of the given equation.	**K2**
CO-3	apply a suitable method to solve the equation.	**K3**
CO-4	analyze the roots of the equation on considering the coefficients of the equation.	**K4**
CO-5	summarize the theory of the equation with suitable examples.	**K5**

Unit I **(18 Hours)**

Theory of equations - Introduction - Remainder theorem – Roots occurring in pairs- Relations between the roots and coefficients of equations.

Unit II **(18 Hours)**

Symmetric function of the roots - Sum of the r^{th} powers of the roots of an equation - Newton's theorem on the sum of the powers of the roots- Transformations of equations.

Unit III **(18 Hours)**

Reciprocal equation - To increase or decrease the roots of an equation by a given quantity - Form of the quotient and remainder when a polynomial is divided by a polynomial - Removal of terms - To form an equation whose roots are any powers of the roots of a given equation.

Unit IV **(18 Hours)**

Transformation in general – Descartes' rule of signs -Rolle's Theorem - Multiple roots.

Unit V **(18Hours)**

Sturm's theorem - Newton's method of divisors - General solution of the cubic equation- Solution of biquadratic equations.

Note: Proof is not included for any theorem.

Book for Study

1. T.K.ManicavachagomPillai, T Natarajan, K S Ganapathy, *Algebra, Volume- I,* S.Viswanathan Printers and publishers Pvt. Ltd., 2013.
   Unit I: Chap-6 (Sec1-11 pages 282-303)
   Unit II: Chap-6 (Sec 12- 15 pages 303- 321)
   Unit III: Chap-6 (Sec 16-20 pages 321-340)
   Unit IV: Chap-6 (Sec 21-26 pages 340-362)
   Unit V: Chap-6 (Sec 27-29 pages 362-376, Sec 34-35 pages 389-398)

Books for Reference

1. William J Gilbert and Scott A Vanstone, *Classical Algebra*, Third Edition, Waterloo Mathematics Foundation,1993.
2. P.KandasamyandK. Thilagavathy, *Mathematics VolumeI,* S. Chand & Co,2004.

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

Semester	Course Code			Title of the Course				Hours		Credits
III	21UMA33CC05			CORE – 5: CLASSICAL ALGEBRA				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	2	2	3	1	3	2	2	1	2	2.1
CO-2	3	2	2	3	1	3	2	3	2	3	2.4
CO-3	3	1	2	3	1	3	1	3	1	3	2.1
CO-4	2	2	3	2	2	3	2	3	3	2	2.4
CO-5	2	2	2	2	1	2	2	2	2	3	2.0
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UMA33CC06**	**CORE – 6: SEQUENCES AND SERIES**	**5**	**3**

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge in **s**equences and series.	**K1**
CO-2	understand the behavior of sequences and series.	**K2**
CO-3	determine the convergence of sequences and series.	**K3**
CO-4	contrast between notions of absolute and conditional convergence.	**K4**
CO-5	evaluate the limits of the sequences and series.	**K5**

Unit I **(15 Hours)**

Sequences - Bounded sequences - Monotonic Sequences - Convergent sequences - Divergent sequences - Oscillating sequences.

Unit II **(15 Hours)**

Algebra of limits – Behavior of Monotonic functions.

Unit III **(15 Hours)**

Some theorems on limits - Subsequences - Limit points - Cauchy sequences.

UnitIV **(15 Hours)**

Series - Infinite series - Cauchy's general principle of convergence - Comparison test theorem and test of convergences using comparison test.

Unit V **(15 Hours)**

Test of convergence using D'Alembert's ratio test - Cauchy's root test - Alternating Series - Absolute Convergence.

Book for Study

1. S. Arumugam, A.Thangapandi and Isaac, *Sequences and Series*, New Gamma Publishing House, 2002.
   - **Unit I:** *Chapter 3 (Sec 3.0 - 3.6; Pages 39 – 55)*
   - **Unit II:** *Chapter 3 (Sec 3.6 & 3.7; Pages 56 – 82)*
   - **Unit III:** *Chapter 3 (Sec 3.8 - 3.11; Pages 82 – 102)*
   - **Unit IV:** *Chapter 4 (Sec 4.1 & 4.2; Pages 112 – 128)*
   - **Unit V:** *Chapter 4 (Relevant sections only, Pages 131,132,135-140,145 & 147-150), Chapter 5 (Sec 5.l & 5.2; Pages157 – 167)*

Books for Reference

1. Konrad Knopp, *Infinite Sequences and Series,* Dover Publications,1956.
2. S.C. Malik, Savita Arora,*Mathematical Analysis,* 4th Edition, New Age International Publishers.

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

Semester	Course Code			Title of the Course				Hours		Credits
III	21UMA33CC06			CORE – 6: SEQUENCES AND SERIES				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	2	2	1	3	3	2	2	3	2.2
CO-2	1	2	2	3	1	2	3	2	2	3	2.1
CO-3	1	2	3	2	3	2	3	2	3	2	2.3
CO-4	2	3	2	1	2	3	3	2	2	3	2.3
CO-5	1	2	2	2	3	1	3	2	2	3	2.1
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credit
III	21UMA33AO03A	ALLIED: PHYSICS – I	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 of physics fundamentals involved in waves, and oscillation, properties of materials, Thermal physics, electricity and magnetism, ray optics.	K1
CO-2	Understand the different properties of a physical matter and apply the longitudinal and transverse laws of vibration in strings and sonometer.	K2, K3
CO-3	Describe the theories explaining thermal properties of gases, electric and magnetic induced effects, dispersive power of a prism.	K2
CO-4	Apply the concepts of ray optics and electricity and magnetism, wave oscillations in real life problems like defects in images, aberration in lenses, electrical circuits and acoustics of buildings.	K3
CO-5	Examine the physics knowledge learned from class room with real life problems.	K4

UNIT - I: WAVES AND OSCILLATIONS (12 Hrs)

Simple harmonic motion and circular motion - composition of two simple harmonic motions at right angles (periods in the ratio 1:1) - Lissajou's figures - uses - Laws of transverse vibrations of strings - verification of Melde's string - transverse and longitudinal modes - determination of a.c. frequency using sonometer (steel and brass wires) - Ultrasonics - production - application and uses - Acoustics of buildings - reverberation - Absorption coefficient - Requirements for a good auditorium.

UNIT - II: PROPERTIES OF MATTER (12 Hrs)

Elasticity: Elastic constants - energy stored in a stretched wire - bending of beams - expression for bending moment - Young's modulus by non-uniform bending - torsion in a wire - determination of rigidity modulus by torsional pendulum.

Viscosity: Streamline flow and turbulent flow- Coefficient of viscosity - Poissuelle's formula - Comparison of Viscosities - burette method - Stoke's law - terminal velocity - viscosity of highly viscous liquids.

Surface tension: Molecular theory of surface tension - excess pressure inside a drop and bubble - variation of surface tension with temperature.

UNIT - III: THERMAL PHYSICS (12 Hrs)

Postulates of kinetic theory of gases - Joule-Kelvin effect - Porous plug experiment - theory of Porous plug Experiment - Liquefaction of gases - Linde's process - adiabatic demagnetization - Helium I and II - Thermodynamic equilibrium - laws of thermodynamics - entropy - change of entropy in reversible and irreversible processes.

UNIT - IV: ELECTRICITY AND MAGNETISM (12 Hrs)

Capacitor - energy of charged capacitors - loss of energy due to sharing of charges – Biot - Savart's law - magnetic induction at a point on the axis of a circular coil carrying current - EMF induced in a coil rotating in a magnetic filed - Mean value of alternating current - RMS

values of a ac current and voltage - Electric circuit - switch and its types - fuses - circuit breaker – Relays - P.O. Box: measurement of resistance - Potentiometer: calibration of ammeter.

UNIT - V: GEOMETRICAL OPTICS (12 Hrs)

Refraction - Normal refraction - Refractive index by microscopy - air cell method - refraction through a prism and thin prism - Spectrometer - determination of refractive index - combination of two small angled prisms to produce dispersion without deviation and deviation without dispersion - direct vision spectroscope - defects of images - coma, Distortion - Aberrations - spherical aberration in lenses - methods of minimizing spherical aberration - Chromatic aberration in lenses - Expression for longitudinal chromatic aberrations.

Book for Study

1. R. Murugesan, Allied Physics, S Chand and Co. Publications, New Delhi, Reprint, 2015.

UNIT	BOOK	CHAPTER	SECTION
I	1	1	1.1, 1.3, 1.4, 1.7,1.8, 1.9, 1.10, 1.11, 1.12,1.13, 1.14, 1.15, 1.16, 1.17
II	1	2	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.12, 2.13, 2.14, 2.15, 2.17, 2.19, 2.20, 2.21, 2.22, 2.24, 2.25, 2.27, 2.28, 2.30
III	1	3	3.1, 3.4, 3.5, 3.6, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.15, 3.16, 3.17, 3.18, 3.20, 3.21, 3.22
IV	1	4	4.1, 4.2, 4.3, 4.5, 4.6, 4.7, 4.8, 4.9, 4.11, 4.12, 4.16, 4.17, 4.18, 4.19, 4.20
V	1	5	5.1, 5.2, 5.3, 5.5, 5.6, 5.10, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.22, 5.23, 5.24

Books for Reference

1. D. Halliday, R. Resnick, J. Walker, Fundamental of Physics, 9th Edition, John Wiley & Sons, 2010.
2. M.E. Schaltz, Grob's Basic Electronics, 11th Edition, McGraw Hill, 2011.
3. D.S. Mathur, "Elements of Properties of Matter", S.Chand and Co. publications, New Delhi, Reprint 2016.
4. S. G. Garg, R.M. Bansal and C.K. Gosh, "Thermal Physics", Tata-McGraw Hill Publications, 2012.

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

Semester	Course code			Title of the Course						Hours	Credit
III	21UMA33AO03A			ALLIED: PHYSICS- I						4	4
Course outcome	Programme Outcome (PO)					Programme specific outcome(PSO)					Mean Scores of CO
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	1	3	2	2	1	1	2.1
CO2	3	2	3	3	2	2	3	2	2	1	2.3
CO3	3	2	3	2	2	3	2	2	2	2	2.3
CO4	3	3	2	3	2	3	3	3	2	2	2.6
CO5	3	3	3	3	2	3	3	3	2	2	2.7
	Over all marks										2.4
	Results										High

Semester	Course Code	Title of the Course	Hours	Credits
III	21UMA33AO03B	ALLIED: ACCOUNTS – I	6	4

CO No.	CO-Statements	Cognitive Level (K Level)
On successful completion of this course, students will be able to		
CO-1	Describe the accounting concepts, conventions and rules used in journalizing business transactions	K1
CO-2	Prepare Trial Balance, Final Accounts and Bank Reconciliation Statement	K2
CO-3	Calculate surplus / deficit of Non-Profit Organizations through Income and Expenditure Account	K3
CO-4	Differentiate Single Entry from Double Entry system of Accounting	K4
CO-5	Classify and rectify errors by applying accounting rules	K4

Unit-I

Accounting- Different types – Financial accounting - Book Keeping –Meaning – objectives - Principles, Concepts and Conventions – Type ofaccounts – Golden rules of recording – Journal Subsidiary Books (purchasebook, sales book, purchase return book, sale return book & Cash book –Ledger.

Unit-II

Trial balance–Trading, Profit and Loss Accounts, Balance Sheet of Sole Trader (closing stock, outstanding expenses, prepaid expenses, income receivable, income received inadvance, depreciation and provision for bad debts.

Unit-III

Accounts for Non-trading concerns- Receipts and payment account Vs Income and Expenditure account- Preparation of Income and Expenditure Account from Receipts and Payment Accounts (simple adjustments).

Unit-IV

Single Entrysystem-Defects ofsingle-entrysystem– Double entrysystemVssingleentrysystem – Calculationofprofit/loss-net worth method conversionmethod

Unit-V:

Errors –Classification- Rectification- Suspense Account- - Preparation of BankReconciliationStatement.

Book for Study

1. R.L. Gupta & M. Radhaswamy, “Financial Accounting”, Sultan Chand & Sons, New Delhi, 2017

Books for Reference

1. SP. Jain & K.L. Narang, “Advanced Accountancy”, Volume I, Kalyani Publishers, New Delhi, 2015

2. Reddy TS and Murthy, Financial Accounting (2020), Margham Publications, Chennai, 2020

Relationship matrix for Course Outcomes, Programme Outcomes /Programme Specific Outcomes											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
III	**21UMA33AO03B**			**ALLIED: ACCOUNTS – 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	2	2	3	2	2	2	2	2	2	2.2
CO-2	3	2	2	2	2	2	3	2	3	3	2.4
CO-3	2	3	2	3	2	3	2	3	3	3	2.6
CO-4	2	2	2	1	2	2	2	1	2	2	1.8
CO-5	3	2	3	3	1	3	1	3	2	1	2.2
Mean Overall Score											**2.2**
Result											**High**

Semester	Course Code	Title of the Course	Hours	Credits
III	**21UMA34SE01**	**SEC – 1: QUANTITATIVE TECHNIQUES**	**2**	**1**

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquirethe knowledge on various techniques of quantitative aptitude.	**K1**
CO-2	understand the basics of probability, areas, calendar, clocks, permutations and combinations.	**K2**
CO-3	apply the concepts in solving mathematical problems to succeed in various competitive examinations.	**K3**
CO-4	analyze real life problems and find solutions.	**K4**
CO-5	evaluate areas and volumes of two and three dimensional objects, finding probability, solving problems on calendar, clocks, permutations and combinations.	**K5**

Unit I **(6 Hours)**
Area: Triangle - rectangle - circle.

Unit II **(6 Hours)**
Volume and Surface area: cube - cylinder- cone and sphere.

Unit III **(6 Hours)**
Calendar and Clocks.

UnitIV **(6 Hours)**
Permutations and Combinations.

Unit V **(6 Hours)**
Probability.

Book for Study

1. R.S.Aggarwal, "**Quantitative Aptitude for Competitive Examinations (Fully Solved)",** RevisedEdition, NewDelhi, S. Chand & Co.,2008.
   Unit I: Chapter 24 (Pages: 499-548)
   Unit II: Chapter 25 (Pages: 549-587)
   Unit III: Chapter 27 (Pages: 593-604)
   Unit IV: Chapter 30 (Pages: 613-620)
   Unit V: Chapter 31 (Pages: 621-631)

Books for Reference

1. AbhijitGuha,"**QuantitativeAptitudeforCompetitiveExamination"**,Mc GrawHillEducationSeries,5th Edition.
2. RakeshYadav, "**Advanced Maths for General Competitions**", KD Publication (2016).

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

1. https://cybercrime.gov.in/
2. https://open.lib.umn.edu/sociology/chapter/14-2-types-of-political-systems/
3. https://www.esv.org/resources/esv-global-study-bible/social-ethics/
4. 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 /Programme 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 On successful completion of the course, the student will be able to	Cognitive Levels (K –Levels)
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	21UMA43CC07	CORE – 7: MECHANICS	7	4

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge of Statical and Dynamic forces.	K1
CO-2	understand the nature of forces, their resultants and resolutions.	K2
CO-3	list and discuss the various forces acting on a body both in static and dynamic positions.	K2
CO-4	apply the acquired knowledge in solving real life problems on friction, catenary and projectile.	K3
CO-5	able to analyse the impact of forces on the equilibrium of a body while varying magnitude and direction of forces.	K4

Unit I **(21 Hours)**

Law of parallelogram of forces - Law of triangle of forces - Lami's theorem - Resolution of forces.

Unit II **(21 Hours)**

Forces of friction - Laws of friction - Limiting Friction - Limiting equilibrium - Cone of friction - Angle of friction.

Unit III **(21 Hours)**

Equation to common catenary - Tension at any point - Geometrical properties of common Catenary.

Unit IV **(21 Hours)**

Motion in a plane without air resistance – path of a projectile – Time of flight - Horizontal range - Motion of a projectile up an inclined plane.

Unit V **(21 Hours)**

Fundamental laws of impact – Impact of a smooth sphere on a fixed smooth plane- Direct impact of smooth elastic spheres – oblique impact of smooth elastic spheres.

Note: 50% of the question paper shall be book works and 50% of the questions may be problems.

Books for Study

1. Dr. M.K. Venkataraman, *Statics,* Agasthiar Pubishers, Eleventh Edition, July 2005.
   Unit I: *Chapter 2, (Sec 2.1- 2.4, 2.6 - 2.12)*
   Unit II: *Chapter 7, (Sec 7.1 - 7.13)*
   Unit III: *Chapter 11, (Sec 11.1 - 11.6)*
2. Dr. M.K.Venkataraman, *Dynamics,* Agasthiar Publications, 12th Edition 2006.
   Unit IV: *Chapter 6,(Sec 6.1 - 6.10, 6.12 - 6.16)*

Unit V: *Chapter 8, (Sec 8.1 - 8.11)*

Book for Reference

1. A. V. Dharmapadham, *Statics*, S. Viswanathan Printers & Publishers PVT. Ltd.
2. S. Narayanan, *Statics*, S. Chand & Company Ltd, New Delhi, 1985
3. A.V.Dharmapadham, *Dynamics*,S.Viswanathan Printers & Publishers Pvt Ltd 2006.
4. M.L.Khanna, *Dynamics*, Jai Prakash Nath and Company, 2004.

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

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UMA43CC07	CORE – 7 MECHANICS	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	2	2	2	1	3	3	2	2	2	2.1
CO-2	3	2	2	2	2	3	2	2	3	3	2.4
CO-3	3	2	2	2	2	3	3	2	2	3	2.4
CO-4	2	3	2	3	2	3	3	2	3	2	2.5
CO-5	2	3	2	3	2	2	2	3	2	2	2.3
Mean Overall Score											2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UMA43CC08	CORE – 8: GRAPH THEORY	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 on fundamental concepts in graph theory.	K1
CO-2	have in-depth understanding of various types of graphs and their properties.	K2
CO-3	apply the concepts to classify and construct graphs.	K3
CO-4	analyze inter-related concepts of graphs and infer their characterization.	K4
CO-5	evaluate the nature of graphs and estimate its various parameters.	K5

UNIT I **(12 Hours)**

Introduction – The Konigsberg Bridge Problem – Definition and Examples – Degrees – Subgraphs - Isomorphism.

UNIT II **(12 Hours)**

Matrices – Operations on Graphs - Walks – Trails and Paths - Connectedness and Components – Eulerian Graphs.

UNIT III **(12 Hours)**

Hamiltonian Graphs (Omit Chavatal Theorem) – Characterization of Trees – Centre of Tree.

UNIT IV **(12 Hours)**

Introduction – Definition and Properties – Characterization of Planar Graphs.

UNIT V **(12 Hours)**

Definitions and Basic Properties – Some Applications: Connector Problem - Kruskal's algorithm - Shortest Path Problem - Dijkstra's algorithm.

Book for Study

1. S.ArumugamandS.Ramachandran, *Invitation to Graph Theory*, SciTech Publications (India) Pvt. Ltd., Chennai, 2006.

   Unit I (Sec 1.0,1.1,2.0,2.1,2.2,2.3,2.4)

   Unit II (Sec 2.8,2.9,4.1,4.2, 5.0,5.1)

   Unit III (Sec 5.2,6.1,6.2)

   Unit IV (Sec 8.0, 8.1,8.2)

Unit V (Sec 10.0, 10.1, 11.1, 11.2)

Books for Reference

1. NarsinghDeo, *Graph Theory with applications to Engineering and Computer Science*, Prentice Hall of India, 2004.
2. GaryChartrand and Ping Zhang, *Introduction to Graph Theory*, Tata McGraw-Hill Edition, 2004.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
IV	**21UMA43CC08**			**CORE – 8: GRAPH THEORY**				**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	2	3	2	3	1	3	2	3	2.4
CO-2	3	2	2	1	3	2	2	3	2	3	2.3
CO-3	3	3	3	2	3	1	2	3	3	2	2.5
CO-4	3	2	3	3	1	2	3	2	3	2	2.4
CO-5	3	2	1	2	3	2	2	3	2	3	2.3
Mean Overall Score											2.38 (High)

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UMA43AO04A	ALLIED: PHYSICS – II	4	3

CO No.	CO- Statements	Cognitive Levels (K-Levels)
	On the successful completion of the course, student will be able to	
CO1	acquire knowledge about the fundamentals of physics discipline such as optics, atomic and nuclear physics, elements of relativity, quantum mechanics and electronics	K1
CO 2	Understand the concepts of interference, diffraction, polarization, structure of atom, nucleus and its properties.	K2
CO 3	Understand the significance of relativistic phenomena, quantum wavefunction and electrical circuits.	K2
CO 4	Apply the optical, electrical, atomic and nuclear concepts learned in the classroom for problem solving	K3
CO 5	Analyze the physics knowledge learned from class room with real life problems	K4

UNIT - I: PHYSICAL OPTICS (12 Hrs)

Velocity of light - Michelson's method - Interference: colours of thin films - Air wedge - Determination of diameter of a thin wire by air wedge - test for Optical flatness. Diffraction - Fresnel's explanation of rectilinear propagation of light - theory of diffraction and specific rotating power of transmission grating - Normal incidence - polarization - Brewster's law - double Refraction - optical activity - polarimeter.

UNIT - II: ATOMIC PHYSICS (12 Hrs)

Atom model - vector Atom model - quantum numbers associated with vector atom model - coupling schemes - Pauli's exclusive principle - magnetic dipole moment of electron due to orbital and spin motion - Bohr magneton - spatial quantization - Stern Gerlach experiment.

UNIT - III: NUCLEAR PHYSICS (12 Hrs)

Nuclear model - liquid drop model - magic numbers, shell model - nuclear Energy - mass defect - binding energy - Radiation detectors - ionization chambers - GM counter - nuclear fission - Bohr and wheeler theory - chain Reaction - atom bombs - nuclear fusion - calculation of energy released in a fusion - nuclear reactor - Source of solar energy: proton -proton cycle - Carbon-nitrogen cycle.

UNIT - IV: ELEMENTS OF RELATIVITY AND QUANTUM MECHANICS (12 Hrs)

Frame of reference - Galilean transformation - Postulates of theory of relativity - Lorentz transformation equations - derivation - length contraction - time dilation - uncertainty principle - postulates of wave mechanics - wave nature of matter - types of operators - Schrodinger's time dependent and time independent equation - Eigen functions and Eigen values - The particle in a box (infinite Square well potential).

UNIT - V: ELECTRONICS (12 Hrs)

Basic Electronics: Semiconductors, *pn* junction diode - Zener diode and characteristics - voltage regulator - LED - Common emitter transistor amplifier (principle) - Transistor RC coupled amplifier

Digital electronics: Logic gates - NAND and NOR gates - Universal building blocks - Boolean algebra – De Morgan's theorem - verification.

Book for Study

1. R. Murugesan, Allied Physics", S Chand and Co. Publications, New Delhi, Reprint, 2015.

UNIT	BOOK	CHAPTER	SECTION
I	1	6	6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.17, 6.19, 6.20
II	1	7	7.1, 7.2, 7.3, 7.4, 7.7.6, 7.7, 7.8
III	1	8	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.10, 8.11, 8.12, 8.13, 8.14, 8.16, 8.17,8.18
IV	1	9	9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.10, 9.12, 9.13, 9.14, 9.15, 9.18, 9.19
V	1	10	10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.11, 10.12, 10.13, 10.14, 10.15, 10.16, 10.17, 10.18, 10.19, 10.21

Books for References

1. D. Halliday, R. Resnick, J. Walker, "Fundamental of Physics", 9th Edition, John Wiley & Sons, 2010.
2. M.E. Schaltz, "Grob's Basic Electronics", 11th Edition, McGraw Hill, 2011.
3. Arthur Beiser, "Concepts of Modern Physics", Special Indian Edition, Tata McGraw Hill, 2009.
4. R.Murugeshan and Kiruthiga Sivaprasath, "Modern Physics", 14th Edition, S Chand and Co, 2009.

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

Semester	Course code			Title of the Course					Hours	Credit
IV	21UMA33AO03A			ALLIED: PHYSICS II					4	4
Course outcome	Programme Outcome (PO)					Programme Specific Outcome (PSO)				Mean Scores of CO
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	1	2	3	2	1	2	2	2.0
CO2	3	3	2	2	2	3	2	2	2	2	2.3
CO3	3	3	2	3	2	3	3	3	2	2	2.6
CO4	3	3	3	3	2	3	3	3	2	2	2.7
CO5	3	3	3	2	2	3	3	3	2	2	2.6
	Over all marks										2.44
	Results										High

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UMA43AP01A	ALLIED: PHYSICS PRACTICAL	2	2

Any 16 of the following

1. Young's modulus – Non uniform bending – cantilever
2. Young's modulus – cantilever
3. S. T. – Method of drops
4. S. T. – Capillary rise
5. Viscosity – variable pressure head
6. Concave lens – f, R, μ
7. Air wedge – Thickness of wire
8. Newton's Rings R
9. Spectrometer – solid prism
10. Spectrometer – Grating (Normal Incidence)
11. M1/M2 – Tan A and Tan B simultaneous method
12. Absolute determination of M and H
13. P.O. Box – Temp. Coefficient
14. Potentiometer – Ammeter calibration
15. Potentiometer – R and ρ
16. Field along the axis of the coil
17. Sonometer – Frequency of tuning fork
18. Junction diode characteristics
19. Zener diode characteristics
20. Logic gates – ICs
21. Jolly's bulb

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UMA43AO04B	ALLIED: ACCOUNTS – II	6	4

CO No.	CO-Statements	Cognitive Level (K Level)
On successful completion of this course, students will be able to		
CO-1	Understand and define the basic principles of cost sheet, cash flow statement, working capital management, marginal costing and budgetary control	K1 &K2
CO-2	Explain and Prepare cash flow statement as per AS3	K2 &K3
CO-3	Apply Marginal costing techniques in decision making	K3
CO-4	Construct different Kinds of Functional Budgets	K4
CO-5	Plan Working Capital requirements of Business organizations	K5

UNIT-I **(18 hours)**

Cost Accounting – Components of cost – Methods and techniques of Costing -Preparation of cost sheet – various stages in cost sheet –WIP - valuation of closing stock of finished goods - tender & quotation.

UNIT-II **(18 hours)**

Cash flow Statement – meaning – cash flow from operating activities, investment activities and financing activities - preparation of cash flow statement As per AS3 (simple problems)

UNIT-III **(18 hours)**

Working capital management- meaning- Types of working capital - components of working capital - Calculation of working capital

UNIT-IV **(18 hours)**

Marginal costing – Marginal cost- Contribution – PV Ratio – BEP – Margin of safety – CVP - decision making (simple problems)

UNIT-V **(18 hours)**

Budgeting control- preparation of cash budget- sales budget- production budget- production cost budget- flexible budget

Book for Study

1. Reddy TS & Murthy A, Cost Accounting, Margham Publications, Chennai, 2012. (Unit-1)
2. Reddy TS and Murthy A, Management Accounting, Margham Publications, Chennai, 2017. (Units-II, III, IV & V)

Books for References

1. S.N. Maheswari, Cost Accounting, S.Chand & Co, New Delhi, 2017.

2. Jain SP &Narang KL, Cost Accounting Principles and Practice, Kalyani Publishers, New Delhi, 2018.

Relationship matrix for Course Outcomes, Programme Outcomes /Programme Specific Outcomes											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
IV	**21UMA43AO04B**			**ALLIED: ACCOUNTS – 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	2	2	2	2	3	3	2	2	2	2.3
CO-2	3	2	2	2	2	3	2	2	2	2	2.2
CO-3	3	3	3	2	2	3	3	3	2	2	2.6
CO-4	3	3	3	2	2	3	3	3	2	2	2.6
CO-5	3	3	3	2	2	3	3	2	2	2	2.5
Mean Overall Score											**2.4**
Result											**High**

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UMA44SE02	SEC – 2: (BS) NUMERICAL ABILITY	2	1

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire knowledge of problem on numbers, ages, ratio and proportion, partnership, time and work, pipes and cisterns, time and distance, trains, true discount and discount of banker.	K1
CO-2	understand different methods or techniques in problem solving of numbers and ages, ratio and proportion, partnership, time and work, pipes and cisterns, time and distance, trains, true discount and discount of banker.	K2
CO-3	apply different methods or techniques on numbers and ages, ratio and proportion, partnership, time and work, pipes and cisterns, time and distance, trains, true discount and discount of banker in real life problems and various competitive examinations.	K3
CO-4	analyze real life problems related to numbers and ages, ratio and proportion, partnership, time and work, pipes and cisterns, time and distance, trains, true discount and discount of banker and find solutions.	K4
CO-5	evaluate relations between numbers and ages, ratio and proportion, time and work, pipes and cisterns, time and distance and true discount and discount of banker.	K5

Unit I **(6 Hours)**

Problems on Numbers - Problems on Ages

Unit II **(6 Hours)**

Ratio and Proportion - Partnership

Unit III **(6 Hours)**

Time and Work - Pipes and Cisterns

Unit IV **(6 Hours)**

Time and Distance - Problems on Trains

Unit V **(6 Hours)**

True Discount- Banker's Discount

Book for Study

1. R.S Agarwal, *Quantitative Aptitude for competitive examinations (Fully solved)* Revised Edition. S. Chand & Co.
   UNIT I: *Chapter 7 and Chapter 8*
   UNIT II: *Chapter 12 and Chapter 13*
   UNIT III: *Chapter 15 and Chapter 16*
   UNIT IV: *Chapter 17 and Chapter 18*
   UNIT V: *Chapter 32 and Chapter 33*

Books for Reference

1. Dinesh Khattar, *Quantitative Aptitude for Competitive Examination*, Pearson India.
2. Abhiji Guha, *Quantitative Aptitude for Competitive Examination*, McGraw Hill Education Series,5th Edition.
3. RakeshYaav, *Advanced Maths for General Competitions*, KD Publication

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UHE44VE04A	PROFESSIONAL ETHICS–II: SOCIAL ETHICS - II	2	1

CO. No.	CO-Statements	Cognitive Level (K- level)
	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	Apply the plans of disaster management in the society.	K3
CO-3	Analyse the importance and differences of science and religion.	K3
CO-4	Comprehend the importance of a healthy life.	K2
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, 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 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, Technology and 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 - 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-IV Disaster Management (6-Hours)

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-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 Foundation Course: *Formation of Youth*, St Joseph's College (Autonomous), Tiruchirappali 2, 2015.

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

1. https://en.wikipedia.org/wiki/Disaster_management_in_India
2. https://ndma.gov.in/
3. https://talkitover.in/services/child-adolescent-counselling/
4. 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	Credits
V	21UMA53CC09	CORE – 9: MODERN ALGEBRA	7	4

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge of basic theories Groups and Rings.	K1
CO-2	understand the basic properties of Groups and Rings.	K2
CO-3	apply the fundamental ideas of Groups and Rings to diverse situation in Physics, Chemistry, Computer Science, Engineering and other mathematical Contexts.	K3
CO-4	demonstrate capacity for mathematical reasoning through analyzing, proving and explaining concepts from Group and Ring theory.	K4
CO-5	locate and use theorems relating to Groups and Rings to solve real life problems.	K5

UNIT I **(21 Hours)**

Groups -Introduction - Definition and Examples - Elementary Properties of a Group - Equivalent Definitions of a Group - Permutation Groups.

UNIT II **(21 Hours)**

Subgroups - Cyclic Groups - Order of an Element - Cosets and Lagrange's Theorem.

UNIT III **(21 Hours)**

Normal Subgroups and Quotient Groups - Isomorphism - Homomorphism.

UNIT IV **(21 Hours)**

Rings - Definition and Examples - Elementary Properties of Rings - Isomorphism - Types of Rings - Subrings.

UNIT V **(21 Hours)**

Ideals - Quotient rings - Maximal and Prime Ideals - Homomorphism of Rings - Polynomial Rings.

Book for Study

1. S. Arumugam and A .Thangapandi Isaac, *Modern Algebra,* SciTech Publications (India) Private Ltd., Chennai, Reprint 2016.
   UNIT I: *Chapter 3 (Sec 3.0 -3.4)*
   UNIT II: *Chapter 3 (Sec 3.5 -3.8)*
   UNIT III: *Chapter 3 (Sec 3.9 -3.11)*
   UNIT IV: *Chapter 4 (Sec 4.1 -4.4, 4.6)*
   UNIT V: *Chapter 4 (Sec 4.7-4.10, 4.16)*

Books for Reference

1. N.Herstein, *Topics in Algebra,* JohnWiley & Sons, Student 2nd edition,1975.
2. M.L.Santiago, *Modern Algebra,* Tata McGraw-Hill Publishing Co. Ltd., 2001

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

Semester	Course Code			Title of the Course						Hours	Credits
V	21UMA53CC09			CORE – 9: MODERN ALGEBRA						7	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	3	1	3	3	3	3	3	2.8
CO-2	3	3	2	2	2	3	2	3	2	3	2.5
CO-3	2	2	3	3	2	3	3	3	2	3	2.6
CO-4	2	2	2	3	2	2	2	2	2	3	2.2
CO-5	2	2	2	2	2	1	3	2	2	2	2.0
Mean Overall Score											2.42 High

Semester	Course Code	Title of the Course	Hours	Credits
V	21UMA53CC10	CORE – 10: REAL ANALYSIS	7	4

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge of set theory, functions and limits.	K1
CO-2	have in-depth understanding on the concepts of continuity, derivability and Riemann integrability.	K2
CO-3	apply the concepts to test continuity, derivability and Riemann integrability of functions.	K3
CO-4	analyze, infer and conceptualize the theory and properties of metric spaces.	K4
CO-5	evaluate limits of functions, integrals and derivatives.	K5

Unit I **(21 Hours)**

Functions - Real-valued functions - Equivalence - Countability – Real numbers - Least upper bounds - Limit superior and limit inferior – Cauchy sequences.

Unit II **(21 Hours)**

Limit of a function on the real line - Metric spaces - Limits in metric spaces – Functions continuous at a point on the real line - Reformulation.

Unit III **(21 Hours)**

Functions continuous on a metric space - Open sets - Closed sets - Discontinuous functions on R^1.

Unit IV **(21 Hours)**

Definition of the Riemann integral - Properties of Riemann integral - Derivatives.

Unit V **(21 Hours)**

Rolle's Theorem - The law of the mean - Fundamental theorems of calculus - Improper integrals - Taylor's theorem.

Book for Study

1. Richard. R. Goldberg, *Methods of Real Analysis*, Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi. 1970.
   - **Unit I:** *Chapter 1(Sec 1.3 - 1.7); Chapter 2 (Sec 2.9, 2.10)*
   - **Unit II:** *Chapter 4 (Sec 4.1 - 4.3 [Omit examples 4&5 in sec 4.2C]); Chapter 5 (Sec 5.1, 5.2)*
   - **Unit III:** *Chapter 5 (Sec 5.3 - 5.6)*
   - **Unit IV:** *Chapter 7 (Sec 7.2, 7.4, 7.5)*
   - **Unit V:** *Chapter 7 (Sec 7.6 - 7.9); Chapter 8 (Sec 8.5)*

Books for Reference

1. S.C. Malikand Savita Arora, *Mathematical Analysis,* New Age International (P) Limited Publishers, New Delhi. 2009.

2. Shanti Narayan, *Elements of Real Analysis,* S. Chand &Company Pvt. Ltd, New Delhi. 1974.
3. Robert G. Bartle, Donald R. Sherbert, *Introduction to Real Analysis,* John Wiley & Sons , Inc., Fourth edition, 2014.

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

Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
V	**21UMA53CC10**			**CORE – 10: REAL ANALYSIS**						7	**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	3	3	2	2	2	3	2.4
CO-2	3	2	3	3	2	2	3	2	2	3	2.5
CO-3	3	3	2	2	2	3	3	3	2	2	2.5
CO-4	2	2	3	2	2	2	2	3	3	2	2.3
CO-5	3	2	2	3	2	3	2	2	2	3	2.4
Mean Overall Score											2.42 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UMA53ES01A	DSE-1: AUTOMATA THEORY	5	3

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge in mathematical notions of computation, such as computability, decidability and reducibility of the theory of formal languages and automata.	K1
CO-2	perceive the techniques of computations including finite state automata, grammars and regular expressions and their relations.	K2
CO-3	design and explain finite state automata, context free grammars, derivation trees.	K3
CO-4	apply mathematical foundations, algorithmic principles and computer science theory to the modelling and design of computer based systems in a way that demonstrates.	K4
CO-5	evaluate different computational models using combinatorial methods.	K5

UNIT I **(15 Hours)**

Definition of an Automaton - Description of Finite Automaton - Transition systems - Properties of transition functions - acceptability of a string by a finite Automaton-Non deterministic finite automaton -The equivalence of DFA and NFA.

UNIT II **(15 Hours)**

Formal Languages – Basic Definitions and examples- Chomsky classification of Languages - Languages and their relation - Recursive and Recursively Enumerable sets- Operations on Languages.

UNIT III **(15 Hours)**

Regular expressions - Finite Automata and Regular expressions

UNIT IV **(15 Hours)**

Pumping Lemma for Regular sets - Applications of Pumping Lemma - Closure Property of Regular sets - Regular sets and Regular grammars.

UNIT V **(15 Hours)**

Context free Languages and Derivation trees - Ambiguity in Context free grammars - Simplification of Context Free grammars (Examples only).

Book for Study

1. K L P Mishra and N Chandrasekaran, *Theory of Computer Science Automata,* Languages and Computation, Third Edition, Prentice Hall India, New Delhi, 2006.
   UNIT I: *Chapter 2 (Sec 2.1 - 2.7)*
   UNIT II: *Chapter 3 (Sec 3. 1- 3.5)*
   UNIT III: *Chapter 4 (Sec 4. 1 - 4.2)*
   UNIT IV: *Chapter 4 (Sec 4.3 - 4.6)*

UNIT V: *Chapter 5 (Sec 5.1- 5.3)*

Books for Reference

1. John E. Hopcroft and J.D. Ullman, *Introduction to Automata Theory Languages and Computation*, Third Edition, Prentice Hall, 2006.
2. A.V.Ahoand , J.D.Ullman, *Principles of Compiler Design***,** Pearson Education, 2012.

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

Semester	**Course Code**			**Title of the Course**					**Hours**	**Credits**
V	**21UMA53ES01A**			**DSE-1: AUTOMATA THEORY**					**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	2	1	3	3	1	3	3	2.4
CO-2	3	3	2	1	2	3	3	2	2	2	2.3
CO-3	3	2	3	2	2	2	3	1	3	2	2.3
CO-4	3	2	3	1	2	3	2	1	3	3	2.3
CO-5	2	3	3	2	2	2	3	1	2	3	2.3
Mean Overall Score											2.32 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UMA53ES01B	DSE-1: NUMBER THEORY	5	3

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On Completion of this course, the students will be able to	
CO-1	acquire the knowledge of the basic concepts of number theory.	K1
CO-2	understand the concepts of permutation, combinations, polynomial congruence, primitive roots, Legendre symbol and signum function.	K2
CO-3	find measures and parameter in number theory.	K3
CO-4	illustrate the concepts of number theory with example	K4
CO-5	solve system of congruences, Diophantine equation and some problems in combinatorics.	K5

Unit I **(15 Hours)**

Euclid's Division Lemma-Divisibility - The Linear Diophantine Equation - The Fundamental Theorem of Arithmetic.

Unit II **(15 Hours)**

Permutation, Combinations - Basic Properties of congruence - Residue Systems - Linear Congruence- The Theorems of Fermat and Wilson Revisited.

Unit III **(15 Hours)**

The Chinese Remainder Theorem - Polynomial congruence - Combinatorial Study of $\varphi(n)$ - Formulae for $d(n)$ and $\sigma(n)$.

UnitIV **(15 Hours)**

Multiplicative Arithmetic Function - The Mobius Inversion Formula - Properties of Reduced Residue Systems- Primitive roots Modulo p.

Unit V **(15 Hours)**

Euler's criterion - The Legendre Symbol - The Quadratic Reciprocity Law.

Book for Study

1. George E. Andrews, *Number Theory*, Hindustan Publishing Corporation, 1984.
   - **Unit I:** *Chapter 2 (Sec 2.1-2.4 Pages 12-29)*
   - **Unit II:** *Chapter 3 (Sec 3.1 Pages 30-35), Chapter 4 (Sec 4.1-4.2 Pages 49-55) Chapter 5 (Sec 5.1-5.2 Pages 58-65)*
   - **Unit III:** *Chapter 5 (Sec 5.3-5.4 Pages 66-74), Chapter 6 (Sec 6.1 -6.2 Pages 75-84)*
   - **Unit IV:** *Chapter 6 (Sec 6.3-6.4, Pages 85-92), Chapter 7 (Sec 7.1-7.2, Pages 93-99)*
   - **Unit V:** *Chapter 9 (Sec 9.1-9.3 Pages 115-124*

Books for Reference

1. S.B.Malik, *Basic Number Theory,* Vikas Publishing House Private Limited, 1998.
2. K.C.Chowdhury, *A First Course Theory of Numbers,* Asian Books Private Limited, 2007.
3. Ivan Niven, *An Introduction to the Theory of Numbers,* Wiley Publishers, Fifth Edition, 2008.
4.

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

Semester	Course Code			Title of the Course				Hours	Credits	
V	21UMA53ES01B			DSE-1: NUMBERTHEORY				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	1	2	3	2	2	3	3	2.2
CO-2	2	2	1	2	2	2	3	3	3	3	2.3
CO-3	1	2	1	2	1	3	2	3	3	2	2.0
CO-4	2	1	2	2	2	2	3	3	3	3	2.4
CO-5	2	1	2	3	2	3	2	2	3	3	2.3
Mean Overall Score											2.24 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UMA53ES02A	DSE – 1: OPERATIONS RESEARCH	5	3

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge of LPP, Transportation problems, Queuing and network.	K1
CO-2	understand the quantitative approach of solving optimization problems.	K2
CO-3	apply the concept of OR in real life problems.	K3
CO-4	analyze complex real life problems.	K4
CO-5	evaluate the solution of LPP, Transportation problems and measures of Queuing and network models .	K5

UNIT I **(15 Hours)**

Linear programming problem - Mathematical formulation - Illustrations on Mathematical formulation on Linear Programming Problems Graphical solution method - some exceptional cases - Canonical and standard forms of Linear Programming Problem - simplex method.

UNIT II **(15 Hours)**

Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal - dual pair - Formulating a Dual problem – Primal - dual pair in matrix form - Dual simplex method.

UNIT III **(15 Hours)**

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM - LCM -VAM) Degeneracy in TP - Transportation Algorithm (MODI Method) - Assignment problem - Solution methods of assignment problem - special cases in assignment problem.

UNIT IV **(15 Hours)**

Queuing theory - Queuing system - Classification of Queuing models - Poisson Queuing systems Model I (M/M/l)(∞/FIFO) only - Games and Strategies -Two person zero sum - Some basic terms - the maximin-minimax principle - Games without saddle points - Mixed strategies - graphic solution of 2xn and mx2 games.

UNIT V **(15 Hours)**

PERT and CPM – Basic components – logical sequencing – Rules of Network construction- Critical Path analysis – Probabiliy consideration in PERT.

Book for Study

1. Kanti Swarup, P.K. Gupta and ManMohan, *Operations Research,* 13th edition, Sultan Chand and Sons, 2007.
   UNIT I: *Chapter 2 (Sec 2.1 - 2.4), Chapter 3 (Sec 3. l - 3.5)*
   Chapter 4 (Sec 4. 1 , 4.3)

UNIT II: *Chapter 4 (Sec 4.4), Chapter 5 (Sec 5.1 - 5.4, 5.9)*
UNIT III: *Chapter10 (Sec 10.1, 10.2, 10.8, 10.9, 10.12, 10.13)*
Chapter11 (Sec 11.1-11.4)
UNIT IV: *Chapter 21 (Sec 21.1, 21.2, 21.7 - 21.9) Chapter 17 (Sec 17.1 - 17.6)*
UNIT V: *Chapter 25 (Sec 25.1 - 25.4, 25.6, 25.7)*

Books for Reference

1. Sundaresn. V, Ganapathy Subramanian.K.S. and Ganesan.K, *Resource Management Techinques*, A.R. Publications, 2002.
2. Taha H.A., *Operation Research: An introduction*, 7th edition, Pearson Prentice Hall, 2002.

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

Semester	Course Code			Title of the Course				Hours		Credits
V	21UMA53ES02A			DSE – 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	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
V	21UMA53ES02B	DSE – 2: MATHEMATICAL MODELLING	5	3

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	Acquire knowledge on basic principles of mathematical modelling.	K1
CO-2	Understand the importance of mathematical modelling in the fields of Linear and Nonlinear growth, Dynamics, Epidemics and Economics.	K2
CO-3	Apply the concepts of differential equations to study Decay models, Population dynamics, Modelling of Geometric problems and Investment model.	K3
CO-4	Identify and appreciate the unifying influence of mathematical modelling in different disciplines	K3
CO-5	Analyze and translate a real-world problem into a mathematical problem.	K4

Unit I **(15 hours)**

Linear Growth and Decay Models - Nonlinear Growth and Decay Models - Spread of infectious diseases - Compartment Models

Unit II **(15 hours)**

Mathematical Modelling in Dynamics - Motion of a rocket - Mathematical Modelling of Geometrical Problems through ODE - Orthogonal Trajectories.

Unit III **(15 hours)**

Mathematical Modeling in Population Dynamics - Mathematical Modeling of Epidemics - Compartment models through systems of ODE.

Unit IV **(15 hours)**

Modeling in Economics - Debt Model - Open and Closed Dynamical Systems - Investment Model - Market Equilibrium - Medicine Arms Race - International Trade Model - modeling through systems of ODE.

Unit V **(15 hours)**

Mathematical modeling through Linear Differential Equations of Second Order - Electrical Circuit - Stabilization Model for Closed Economy - The Catenary - Curve of Pursuit.

Book for Study

1. J. N. Kapur, *Mathematical Modelling*, New Age International Publishers, Second Edition, 2015
   Unit I *Chapter 2 (Sec 2.2, 2.3, 2.4)*
   Unit II *Chapter 2 (Sec 2.5, 2.6)*
   Unit III *Chapter 3 (Sec 3.1, 3.2, 3.3)*
   Unit IV *Chapter 3 (Sec 3.4, 3.5, 3.6)*
   Unit V *Chapter 4 (Sec 4.3, 4.4)*

Books for Reference

1. C. A. Bender, *An Introduction to Mathematical Modelling*, Wiley Inter science (1978) New York.
2. J. N. Kapur, *Mathematical Models in Biology and Medicine*, Affiliated East-West Press,(1985) New Delhi.

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

Semester	Course Code			Title of the Course				Hours		Credits
V	21UMA53ES02B			DSE – 2: MATHEMATICAL MODELLING				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	1	2	2	2	3	3	2	3	3	2.3
CO-2	2	3	2	1	2	3	3	2	3	3	2.4
CO-3	1	2	3	2	3	2	3	2	3	3	2.4
CO-4	1	2	2	3	1	2	3	2	3	3	2.2
CO-5	1	2	2	2	3	1	3	2	3	3	2.2
Mean Overall Score											2.3 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21UMA53SP01	SELF-PACED LEARNING: HISTORY OF MATHEMATICS	-	2

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	Acquire the knowledge in history of mathematics.	K1
CO-2	understand how the ancient mathematicians worked together as a team to develop mathematical research.	K2
CO-3	classify the history of mathematics through the time of its invention.	K3
CO-4	identify significant role of mathematician in human development and promoting social harmony and analyze how the mathematical research was developed over the period of time .	K4
CO-5	assess creative and flexible thinking by studying historical evidence that there are different ways to view a mathematical concept.	K5

UNIT I

Isaac (Sir) Newton 1642-1727) England- Archimedes of Syracuse (287-212 BC) Greek domain- Johann Carl Friedrich Gauss (1777-1855) Germany - Leonhard Euler (1707-1783) Switzerland- Georg Friedrich Bernhard Riemann (1826-1866) Germany- Joseph-Louis (Comte de) Lagrange (1736-1813) Italy, France - Euclid of Alexandria (ca 322-275 BC) Greece/Egypt- David Hilbert (1862-1943) Prussia, Germany- Gottfried Wilhelm von Leibniz (1646-1716) Germany.

UNIT II

Pierre de Fermat (1601-1665) France- Évariste Galois (1811-1832) France-René Descartes (1596-1650) France- Johann Peter Gustav Lejeune Dirichlet (1805-1859) Germany- SrinivasaRamanujanIyengar (1887-1920) India- Carl G. J. Jacobi (1804-1851) Germany- Brahmagupta 'Bhillamalacarya' (589-668) Rajasthan (India).

UNIT III

Georg Cantor (1845-1918) Russia, Germany -Augustin-Louis Cauchy (1789-1857) France - Arthur Cayley (1821-1895) England – Pythagoras of Samos (ca 578-505 BC) Greek domain - Aryabhata (476-550) Ashmaka&Kusumapura (India) - Leonardo 'Bigollo' Pisano (Fibonacci) (ca 1170-1245) Italy - William Rowan (Sir) Hamilton (1805-1865) Ireland - Diophantus of Alexandria (ca 250) Greece, Egypt.

UNIT IV

Bháscara Áchárya (1114-1185) India - Jean-Baptiste le Rondd' Alembert (1717-1783) France - Joseph Liouville (1809-1882) France - Ferdinand Gotthold Max Eisenstein (1823-1852) Germany - Jacob Bernoulli (1654-1705) Switzerland - Johannes Kepler (1571-1630) Germany - Jacques Salomon Hadamard (1865-1963) France - Jean Baptiste Joseph Fourier (1768-1830) France.

UNIT V

Albert Einstein (1879-1955) Germany, Switzerland, U.S.A. - Galileo Galilei (1564-1642) Italy - Henri Léon Lebesgue (1875-1941) France - Johann Bernoulli (1667-1748) Switzerland – Felix Hausdorff (1868-1942) Germany - George Pólya (1887-1985) Hungary -Siméon Denis Poisson (1781-1840) France -Adrien Marie Legendre (1752-1833) France.

Book for Study

1. http://fabpedigree.com/james/mathmen.htm#

Books for Reference

1. C.B. Boyer and U. Merzbach, *History of Mathematics*, John Wiley & Sons, 3rd edition, 2011.
2. E.T. Bell, *Men of Mathematics*, Published by Simon & Schuster, 1986.

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

Semester	Course Code	Title of the Course	Hours	Credits
V	21UMA53SP01	SELF-PACED LEARNING: HISTORY OF MATHEMATICS	-	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	1	3	2	3	2	3	1	2	3	3	2.3
CO-2	2	2	3	1	2	3	2	2	2	3	2.2
CO-3	2	2	2	1	3	1	3	2	3	3	2.2
CO-4	2	3	2	1	1	3	2	3	3	3	2.3
CO-5	1	2	2	1	2	3	2	2	2	3	2.0
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
V	21USS54SE03	SEC-3: SOFT SKILLS	2	1

COs

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**

Book for Study

1. Melchias G, Balaiah John, John Love Joy (Eds), 2018. Straight from the Traits: Securing Soft Skills, SJC, Trichy.

References

1. Aggarwal, R.S. 2010, *A Modern Approach to Verbal and Non Verbal Reasoning*, S.Chand, New Delhi.
2. Covey, Stephen. 2004. *7 Habits of Highly effective people,* Free Press.
3. Egan, Gerard. (1994), *The Skilled Helper* (5th Ed). Pacific Grove, Brooks/Cole.
4. Khera ,Shiv 2003, *You Can Win,* Macmillan Books , Revised Edition.
5. Melchias G, Balaiah John, John Love Joy (Eds), 2018. Winners in the Making: A primer on soft skills. SJC, Trichy.

Other books

1. 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.
2. Trishna's 2006. *How to do well in GDs & Interviews*, Trishna Knowledge Systems.
3. 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	21UMA54EG01	GENERIC ELECTIVE-1: MATHEMATICS FOR COMPETITIVE EXAMINATIONS	4	3

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge on the various techniques of quantitative aptitude	K1
CO-2	understand the basics of Numbers, percentage, profit & Loss, interest calculation and charts	K2
CO-3	apply the concepts in solving mathematical problems to succeed in various competitive examinations	K3
CO-4	analyze real life problems and find solutions	K5
CO-5	evaluate H.C.F, L.C.M, Square and cubic roots of the Numbers, percentage, profit & Loss, interest calculation and charts	K4

UNIT I **(12 Hours)**

Numbers - H.C.F & L.C.M of Numbers - Decimal Fractions -Simplification

UNIT II **(12 Hours)**

Square roots and cube roots - Average - Surds & Indices - Logarithms.

UNIT III **(12 Hours)**

Percentage - Profit & loss- Chain Rule - Boats & Streams.

UNIT IV **(12 Hours)**

Simple Interest - Compound Interest- Heights & Distances - Odd Man out & Series.

UNIT V **(12 Hours)**

Tabulation- Bar Graphs- Pie Charts - Line Graphs.

Book for Study

1. R.S Agarwal, *Quantitative Aptitude for competitive examinations* (Fully solved) *Revised Edition*, S. Chand & Co.
   Unit I: *Chapter 1, 2, 3, 4.*
   Unit II: *Chapter 5, 6, 9, 23.*
   Unit III: *Chapter 10, 11, 14, 19.*
   Unit IV: *Chapter 21, 22, 34, 35.*
   Unit V: *Chapter 36, 37, 38, 39.*

Books for Reference

1. Dinesh Khattar, *Quantitative Aptitude for competitive examinations*, Pearson India,
2. Abhijit Guha, *Quantitative Aptitude for Competitive Examination*, McGraw Hill Education Series, 5th Edition.
3. Rakesh Yaav, *Advanced Maths for General Competitions*, KD Publication (2016).

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63CC11	CORE – 11: LINEAR ALGEBRA	6	3

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge of basic concepts in vector spaces	K1
CO-2	understand the concepts of linear transformations, Dimension of vector spaces, inner product spaces and matrix representation of linear transformations.	K2
CO-3	explain the basic concepts of vector spaces with suitable examples.	K3
CO-4	evaluate basis, orthogonal complements, characteristic equations and bilinear forms	K5
CO-5	illustrate with suitable examples.	K4

Unit I **(18 Hours)**

LinearTransformation - Definition and examples - Subspaces - Span of a set.

Unit II **(18 Hours)**

Linear Independence – Basis and Dimension -Rank and Nullity.

Unit III **(18 Hours)**

Matrix of a linear transformation - Inner product space –Definition and examples - Orthogonality-Orthogonal Complement.

Unit IV **(18 Hours)**

Algebra of Matrices - Types of Matrices - The Inverse of a Matrix -Elementary Transformations -Rank of a matrix.

Unit V **(18 Hours)**

Characteristic equation and Cayley Hamilton Theorem - Eigenvalues and Eigenvectors – Bilinear forms - Quadratic forms.

Book for Study

1. Arumugam S and Thangapandi Isaac A, *Modern Algebra*, SciTech Publications (India) Ltd., Chennai, Edition 2012.
   Unit I: *Chapter 5 (Sec 5. 1 - 5.4)*
   Unit II: *Chapter 5 (Sec 5.5 - 5.7)*
   Unit III: *Chapter 5 (Sec 5.8), Chapter 6 (Sec 6.1 - 6.3)*
   Unit IV: *Chapter 7 (Sec 7. l - 7.5)*
   Unit V: *Chapter7 (Sec 7.7, 7.8) Chapter 8 (Sec 8.1, 8.2)*

Books for Reference

1. I.N Herstein, *Topics in algebra*, Second Edition, John Wiley & Sons (Asia), 1975.
2. S. Kumaresan, *Linear Algebra* – A Geometric Approach.

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

Semester	Course Code			Title of the Course					Hours	Credits
VI	21UMA63CC11			CORE – 11: LINEAR ALGEBRA					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	2	2	2	1	3	3	2	2	3	2.2
CO-2	2	3	2	1	2	3	3	2	2	3	2.3
CO-3	1	2	3	2	3	2	3	2	3	2	2.3
CO-4	1	2	2	3	2	2	3	2	2	3	2.2
CO-5	1	2	2	2	3	1	3	2	2	3	2.1
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	**21UMA63CC12**	**CORE – 12: COMPLEX ANALYSIS**	**6**	**4**

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge of complex-valued functions, Analytic function, Harmonic functions and Bilinear Transformations.	**K1**
CO-2	understand Series Expansions, singularities, Cauchy's theorem and its consequences	**K2**
CO-3	identify types of singularities, poles and residues.	**K3**
CO-4	Analyze the results associated to Definite Integrals and Cauchy's Integral formulae.	**K4**
CO-5	evaluate the region of convergence by applying Taylor's Series - Laurent's Series.	**K5**

Unit I **(18 Hours)**

Continuous Functions - Differentiability - Cauchy-Riemann Equations - Analytic Functions - Harmonic Functions.

Unit II **(18 Hours)**

Bilinear Transformations - Cross ratio - Fixed Points of Bilinear Transformations.

Unit III **(18 Hours)**

Definite Integral - Cauchy's Theorem - Cauchy's Integral Formula - Higher Derivatives.

Unit IV **(18 Hours)**

Taylor's Series - Laurent's Series - Zeros of Analytic Functions - Singularities.

Unit V **(18 Hours)**

Residues - Cauchy's Residue Theorem - Evaluation of Definite Integrals (poles not lying on the real axis)

Book for Study

1. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram, *Complex Analysis,* Sci Tech Publications (India) Pvt.Ltd, 2002.
   Unit I: *Chapter II, (Sec 2.4-2.8, pp. 30-67)*
   Unit II: *Chapter III, (Sec 3.2 - 3.4, pp. 67-75, 82-94)*
   Unit III: *Chapter VI, (Sec 6.0 -6.4, pp.132-172)*
   Unit IV: *Chapter VII, (Sec 7.0-7.4, pp.173-208)*
   Unit-V: *Chapter VIII, (Sec 8.0-8.3, pp. 209-255)*

Books for Reference

1. S. Narayanan and T.K.Manickavasagam Pillai, *Complex Analysis*, S.Viswanatha printers and publishers Pvt.Ltd., 2007.
2. P. Duraipandian, Laxmi Duraipandian, D. Muhilan, *Complex Analysis*, Emerald Publishers, Revised Edition, 2001.

3. Murray R. Spiegel, *Theory and Problems of Complex Variables,* Schaum's Outline Series, McGraw Hill book Company, 1964.

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

Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
VI	**21UMA63CC12**			**CORE – 12: COMPLEX ANALYSIS**						**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	2	1	2	2	1	3	2	3	3	3	2.2
CO-2	2	2	2	2	2	3	3	3	2	2	2.3
CO-3	1	2	2	2	2	3	3	3	2	3	2.3
CO-4	2	2	2	2	1	3	3	3	2	3	2.3
CO-5	1	3	2	1	1	2	3	3	1	2	1.9
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63CP01	COMPUTER LAB: 'C' LANGUAGE	2	1

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge to write a C program.	K1
CO-2	understand functions of various keywords involved in a C program.	K2
CO-3	apply user defined functions and loops while writing a C program.	K3
CO-4	analyze and evaluate the exact solution of a problem with output of a C program.	K4
CO-5	evaluate and create a C program and write solution for real life problems.	K5

LIST OF PRACTICALS:

1. Finding the mean and S.D. of *n* values.
2. Finding Correlation coefficients.
3. Arranging *n* numbers in ascending order and finding the median value.
4. L.C.M. and G.C.D. of two numbers.
5. Prime number checking.
6. *nCr* and *nPr* using function subprogram.
7. Fibonacci series.
8. Finding cos*x* and sin *x* from series expansions.
9. Arranging the names in alphabetical order.
10. Matrix addition, subtraction and multiplication.
11. Palindrome verification.
12. Solving quadratic equations.
13. Newton – Raphson method - Bisection method - False position method of solving equations.
14. Gauss elimination method - Gauss-Seidel method of solving simultaneous equations.
15. Trapezoidal rule and Simpson's rule of integration.
16. Runge- Kutta Fourth order method of solving differential equations.
17. Lagrange's method of interpolation.

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

Semester	Course Code			Title of the Course						Hours	Credits
VI	21UMA63CP01			COMPUTER LAB: 'C' PROGRAMMING						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	1	2	1	3	3	1	2	2	2.1
CO-2	3	2	2	1	2	3	3	1	2	2	2.1
CO-3	3	2	3	2	1	3	3	2	2	2	2.3
CO-4	3	2	3	2	1	3	3	1	2	2	2.2
CO-5	3	3	2	2	1	3	3	1	2	3	2.3
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63ES03A	DSE – 3: COMPUTER ORIENTED NUMERICAL METHODS	5	3

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge of basic structure of C-program and Numerical methods.	K1
CO-2	understand the different types of C-tokens, 'if statements', loops, arrays and handling of character strings; Numerical methods such as curve fitting, bijection, Newton-Raphson, Gauss elimination, Gauss seidel methods, interpolation methods, Trapezoidal , Simpson one third rule, Euler and Runge-Kutta method for solving problems.	K2
CO-3	apply appropriate numerical methods and C-program to solve the given problems and evaluate their solutions.	K3
CO-4	analyze the best approximated value of the root of the given function using various numerical methods.	K4
CO-5	develop programming skills using the fundamental and basics of C-program to solve numerical problems.	K5

Unit I **(15 Hours)**

Structure of C programs - Constants, Variables and Data types - Operators and Expressions - Mathematical functions - Input and output operators -*Temperature conversion.*

Unit II **(15 Hours)**

Decision making and Branching - IF statements GOTO statement - Solving Quadratic equations - Decision making and looping- WHILE, DO, FOR statements - *Prime number Checking* - Arrays- *series expansions of cos x and sin x- Fibonacci series - numbers in ascending order* - L.C.M ,G.C.D. - *Mean and S.D. - Matrix addition, subtraction and multiplication*

Unit III **(15 Hours)**

Handling of character strings - Arithmetic operations on characters- *Palindrome verification* - String handling functions - *Names in alphabetical order* - User defined functions -Recursion - *nCr, and nPr.*

Unit IV **(15 Hours)**

Curve fitting-Linear and parabolic curves by the method of least squares principle - Solving algebraic and transcendental equations - Bisection method, false position method and Newton Raphson method - Solving simultaneous algebraic equations - Gauss elimination method- Gauss seidel method.

Unit V **(15 Hours)**

Interpolation - Newton's forward and backward difference formulae - Lagrange's interpolation formula - Numerical integration using Trapezoidal and Simpson's one-third rules - Solution of ODE s - Euler method and Runge-Kutta fourth order method

Note:

l) For Numerical methods: Problems and Programs only.

2) For topics in italics- programs only.

Books for Study

1. E. Balagurusamy, *Programming in ANSI C*, Sixth edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 2012.
   - **Unit I:** *Chapters 1-4*
   - **Unit II:** *Chapters 5-7*
   - **Unit III:** *Chapters 8-9*

2. M.K.Venkatraman, *Numerical methods in Science and Engineering*, National Publisher Company, Fifth Edition, 2001.
   - **Unit IV:** *Chapter 1 (Sec 1.7, 1.8) Chapter 3 (Sec 2, 4, 5) Chapter 4 (Sec 2, 6) Chapters 4 (omit Gauss Jordan method in section 2 and omit Gauss Jacobi method in section 6).*
   - **Unit V:** *Chapter 6 (Sec 3, 4) Chapter 8 (Sec 4) Chapter 9 (Sec 8, 10) Chapter 11 (Sec 10, 16)*

Books for Reference

1. Yashavant.P Kanetkar, *Let us 'C'*, BPB Publications, 2002.
2. Rajaraman, *Computer oriented numerical methods*, Prentice-Hall of India, 1971.

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

Semester	Course Code			Title of the Course				Hours	Credits	
VI	21UMA63ES03A			DSE – 3: COMPUTER ORIENTED NUMERICAL METHODS				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	2	2	3	2	3	2	2	2.4
CO-2	3	3	2	2	2	3	2	2	2	2	2.3
CO-3	3	2	2	3	2	3	3	2	2	2	2.4
CO-4	2	3	2	3	2	3	2	2	3	2	2.3
CO-5	2	2	3	3	2	2	2	3	3	2	2.4
Mean Overall Score											2.36 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63ES03B	DSE – 3: OPTIMIZATION TECHNIQUES	5	3

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge optimization techniques such as sequencing problems, Dynamic programming, decision analysis, replacement problems and nonlinear programming problems.	K1
CO-2	understand basic terms used in sequencing problems, processing n jobs through two machines and processing n jobs through k machines; characteristics of dynamic programming and dynamic programming algorithm; decision making process and decision under uncertainty; replacement of asset that deteriorates gradually; Kuhn-Tucker conditions with non-negative constraints.	K2
CO-3	apply the suitable optimization technique to solve the given problem.	K3
CO-4	analyse the optimal solution for the given problem	K4
CO-5	design mathematical model for some industrial problems	K5

Unit I **(15 Hours)**

Introduction - Problem of Sequencing – Basic Terms Used in Sequencing - Processing n jobs through Two Machines - Processing n jobs through k Machines - Processing 2 jobs through k Machines.

Unit II **(15 Hours)**

Introduction - The Recursive Equation Approach — Characteristics of Dynamic Programming - Dynamic Programming Algorithm.

Unit III **(15 Hours)**

Introduction - Decision making Problem – Decision making Process - Decision–making Environment - Decision under Uncertainty

Unit IV **(15 Hours)**

Introduction – Replacement of Equipment/Asset That Deteriorates Gradually

- Replacement of Equipment that fails suddenly

Unit V **(15 Hours)**

Introduction Graphical solution - Kuhn-Tucker conditions with non- negative constraints— Quadratic programming.

Book for Study

1. Kanthi Swarup, P.K. Gupta, Man Mohan, *Operations Research*, Sixteen Thoroughly Revised Edition, Sultan Chand & Sons, Educational Publishers, New Delhi.
   Unit I: *Chapter 12, (Sec 12.1 -12.6)*

Unit II: *Chapter 13, (Sec 13.1 - 13.4)*
Unit III: *Chapter16, (Sec 16.1 - 16.5)*
Unit IV: *Chapter18, (Sec 18.1 - 18.3)*
Unit V: *Chapter28, (Sec 28.1 - 28.4)*

Books for Reference

1. Hamely A Taha, *Operations Research: An introduction*, Ninth Edition, Prentice Hall, New Delhi, 2011.
2. V. Sundaresan, K.S. Subramaniyan, K. Ganesan, *Resource Management Techniques*, New Revised Edition, A.R. Publications, Sirkali, 2002.

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

Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**
VI	**21UMA63ES03B**			**DSE – 3: OPTIMIZATION TECHNIQUES**				**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	2	2	3	2	3	2	2	2.4
CO-2	3	2	3	2	2	3	3	2	2	2	2.4
CO-3	3	2	2	3	2	3	3	2	2	2	2.4
CO-4	3	3	2	2	2	2	2	3	3	2	2.3
CO-5	2	2	3	3	2	2	2	3	3	2	2.4
Mean Overall Score											2.38 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63ES04A	DSE – 4: ASTRONOMY	5	3

CO No.	CO- Statements On successful completion of this course, students will be able to	Cognitive Levels (K- levels)
CO-1	acquire the knowledge of Celestial co-ordinates and Celestial Objects, Stars, Calender and Moon.	K1
CO-2	understand the main properties of Sidereal time, Perpetual day, Law of refraction, Kepler's equation, Eclipses.	K2
CO-3	identify the properties Zones of earth, Geocentric, Horizontal parallaxes and the different Phases of moon.	K3
CO-4	analyze the basic aspects associated with Celestical Objects.	K4
CO-5	Evaluate the extension of the Celestial Sphere and Diurnal motion, Twilight, Maximum and Minimum number of Eclipses in a year.	K5

UNIT I **(15 Hours)**

Celestial sphere and diurnal motion – Celestial coordinates - Sidereal time.

UNIT II **(15 Hours)**

Morning and evening stars – circumpolar stars - zones of earth - perpetual day -twilight.

UNIT III **(15 Hours)**

Refraction – laws of refraction – tangent formula - horizontal refraction - geocentric parallax – horizontal parallax

UNIT IV **(15 Hours)**

Kepler's laws - Anomalies –Kepler's equation - Calendar.

UNIT V **(15 Hours)**

Moon - sidereal and synodic months – elongation – phase of moon – eclipses - umbra and penumbra – lunar and solar eclipses – maximum and minimum number of eclipses in a year.

Book for study:

1. S. Kumaravelu and Susheela Kumaravelu, *Astronomy*, SKV Publications, 2004.

UNIT I: ***Art. 39 – 76.***
UNIT II: ***Art. 80 – 83, 87 – 89, 111 - 116.***
UNIT III: ***Art. 117 – 128, 135 - 144.***
UNITIV: ***Art. 146 – 149, 156 – 159, 175 – 179.***
UNIT V: ***Art. 229 – 241, 256 – 263, 267, 268, 271 - 275.***

Books for Reference

1. G V Ramachandran, *Text Book of Astronomy*, Mission Press, Palayamkottai, 1965.
2. Michael Seeds, *Foundations of Astronomy*, Third Edition, Wadsworth Publishing Company, California, 1992.

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

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63ES04A	DSE – 4: ASTRONOMY	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	3	2	1	3	2	3	2	3	2.5
CO-2	2	3	3	2	2	2	3	2	1	3	2.3
CO-3	3	2	3	2	2	3	2	2	2	2	2.3
CO-4	3	3	2	2	2	3	3	3	2	3	2.6
CO-5	2	3	3	2	1	3	3	2	2	3	2.4
Mean Overall Score											2.42 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63ES04B	DSE - 4: FUZZY THEORY	5	3

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge in basic concepts of fuzzy theory	K1
CO-2	understand various concepts of fuzzy theory	K2
CO-3	evaluate fuzzy operations, fuzzy relations like projections, composition, etc	K3
CO-4	illustrate fuzzy operations and fuzzy relations with examples	K4
CO-5	make decisions on real life problems through MCDM, Multi person Decision Making and fuzzy linear programming methods	K5

Unit I **(15 Hours)**

Fuzzy sets - definition - Different Types of Fuzzy sets - General Definitions and Properties of Fuzzy Sets - Other Important Operations - General Properties: Fuzzy vs. Crisp.

Unit II **(15 Hours)**

Introduction - Some Important Theorems - Extension Principle for Fuzzy Sets - Fuzzy Compliments - Further Operations on Fuzzy Sets.

Unit III **(15 Hours)**

Fuzzy numbers - Algebraic Operations with fuzzy numbers-Binary Operation of two Fuzzy Numbers-special extended operations - fuzzy arithmetic - arithmetic operation on fuzzy numbers in the form of α- cut sets - fuzzy equations.

UnitIV **(15 Hours)**

Introduction - Projections and Cylindrical Fuzzy Relations - Composition - Properties of Min-Max Composition - Binary Relations on a Single Set - Compatibility Relation.

Unit-V **(15 Hours)**

Introduction - Individual Decision Making - Multi person Decision Making- Multi criteria Decision Making - Fuzzy Ranking Method - Fuzzy Linear Programming.

Book for Study

1. Sudhir K Pundir and Rimple Pundir, *Fuzzy sets and their Applications,* Pragati Edition, Prakashan Educational Publishers, Third Edition, 2010.
   Unit I: *Chapter 1 (Sec 1.16 - 1.21)*
   Unit II: *Chapter 2 (Sec 2. 1 - 2.5)*
   Unit III: *Chapter 3 (Sec 3.1 - 3.9)*
   Unit IV: *Chapter 4 (Sec 4. 1 - 4.6)*
   Unit V: *Chapter 9 (Sec 9.1 - 9.6)*

Books for Reference

1. H. J. Zimmermann, *Fuzzy set theory and its applications,* Springer Fourth Edition, 2001.

2. Timothy J. Ross, *Fuzzy logic with engineering Applications*, McGraw Hill Inc. New Delhi, 2004
3. George J. Klir and Bo Yuan, *Fuzzy sets and fuzzy logic theory and Applications*, Prentice Hall of India, New Delhi, 1995.

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

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63ES04B	DSE4: FUZZY THEORY	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	1	2	2	2	3	2	2	2	3	2.1
CO-2	2	2	1	2	2	3	3	2	2	2	2.1
CO-3	1	2	2	2	2	2	3	2	3	2	2.1
CO-4	2	1	2	2	1	3	2	3	2	3	2.1
CO-5	2	2	1	2	1	2	2	3	3	3	2.1
Mean Overall Score											2.1 (Medium)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA64SE04	SEC -4 (WS): MATLAB	2	1

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	Acquire the knowledge of the basics of MATLAB and and to write and compile simple programs and graphics.	K1
CO-2	understand the main features of MATLAB program development environment to enable their usuage in the higher learning.	K2
CO-3	apply MATLAB built in functions provided to solve all types of mathematical and scientific problems and to use the graphics.	K3
CO-4	analyse the program for correctness, determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.	K4
CO-5	evaluate the file operations and write programs to handle the data using files and create graphical images to represent the mathematical or scientific phenomena. .	K5

UNIT I **(6 Hours)**

Basics of MATLAB - MATLAB windows - Online help – Input- output File Types - Platform dependence - General commands.

UNIT II **(6 Hours)**

Interactive Computation: Matrices and Vectors - Matrices and Array Operations - Character Strings - A Special note on array Operators.

UNIT III **(6 Hours)**

Command line functions - Using built in functions and online help - Saving and loading data - plotting Simple graphs - Programming in MATLAB: Scripts and functions - Script files - Function files.

UNIT IV **(6 Hours)**

Applications: Linear Algebra - Curve fitting and interpolation - Data Analysis and Statistics - Numerical Integration - Ordinary Differential Equations.

UNIT V **(6 Hours)**

Graphics: Basic 2-D plots - Using subplot to layout multiple graphs - 3-D plots - View-Rotate view - Mesh and surface plots.

Books for Study

1. RudraPratap**,** *Getting started with MATLAB 7,* Oxford Uni. Press, 2008.
   Unit I : *Chapter I (Sec 1.6(ONLY))*
   Unit II: *Chapter III (Sec 3.1- 3.4.)*
   Unit III: *Chapter III (Sec 3.5- 3.6) & Chapter IV (Sec4.1- 4.2)*
   Unit IV: *Chapter V (Sec 5.1- 5.5.2)*
   Unit V: *Chapter VI (Sec 6.1-6.3.3)*

Books for Reference

1. Brain R Hunt, Ronald L Lipsman and Jonathan M Rosenberg, *A Guide to MATLAB for Beginners and Experienced Users*, Cambridge University Press, 2003
2. MATLAB, *An Introduction with Applications,* Amos Gilat, John Wiley & Sons 2009.

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

Semester	Course Code			Title of the Course				Hours		Credits
VI	21UMA64SE04			SEC -4 Within School (WS): MATLAB				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	2	2	1	3	3	2	2	3	2.2
CO-2	2	3	2	1	2	3	3	2	2	3	2.3
CO-3	1	2	3	2	3	2	3	2	3	2	2.3
CO-4	1	2	2	3	1	2	3	2	2	3	2.1
CO-5	1	2	2	2	3	1	3	2	2	3	2.1
Mean Overall Score											2.2 (High)

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63EG02	Generic Elective-2: Analytical Skills for Competitive Examinations	4	3

CO No.	CO- Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO – 1	acquire the knowledge of verbal and nonverbal reasoning.	K1
CO – 2	understand the concepts of coding – decoding, direction sense, arithmetical reasoning, assertion and mirror images.	K2
CO – 3	solve the real life problems by reasoning techniques.	K3
CO – 4	enhance the analytical thinking.	K4
CO – 5	prepare for the competitive and professional examinations.	K6

UNIT – I **(12 Hours)**

Coding - Decoding - Blood Relations - Puzzle Test.

UNIT – II **(12 Hours)**

Direction Sense Test - Logical Venn Diagrams - Alpha-Numeric Sequence Puzzle.

UNIT – III **(12 Hours)**

Number, Ranking & Time Sequence Test - Mathematical operations - Arithmetical Reasoning.

UNIT – IV **(12 Hours)**

Inserting the Missing Character - Data Sufficiency - Assertion and Reason.

UNIT – V **(12 Hours)**

Analytical Reasoning - Mirror images - Completion of incomplete pattern

Book for Study

1. R.S Agarwal, *A Modern Approach to Verbal & Non Verbal Reasoning Revised Edition,* S. Chand & Co. 2009.
   UNIT I: *Part I Section I Chapter 4, 5, 6.*
   UNIT II: *Part I Section I Chapter 8, 9, 11.*
   UNITIII: *Part I Section I Chapter 12, 13, 15.*
   UNITIV: *Part I Section I Chapter 16, 17, 19.*
   UNIT V: *Part II Chapter 4, 5, 8.*

Books for Reference:

1. B.S. Sijwalii and Indu Sijwali,*A New Approach to Reasoning Verbal & Non-Verbal,* Arihant Publications India Limited, 2014.
2. Vijay Shankar Srivastava, *Non-Verbal Reasoning,* S. Chand & Co. 2017.

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UMA63CE01	Comprehensive Examination	-	2

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	acquire the knowledge on basic concepts, definitions and ideas with examples in Algebra, Analysis, and Topology	K1
CO-2	understand basic mathematical concepts and computational skills	K2
CO-3	articulate mathematical concepts and use it in solving problems in Algebra, Analysis, and Topology	K3
CO-4	Compare the concepts of various subjects in Mathematics	K4
CO-5	Develop creativity in communicating and solving mathematical problems	K5

Unit I: Algebra

Groups - Permutation Groups- Lagrange's Theorem - Normal Subgroups and Quotient Groups - Rings - Ideals - Quotient rings - Maximal and Prime Ideals - Polynomial Rings.

Unit II: Linear Algebra

Linear Transformation - Basis and Dimension -Rank and Nullity- Matrix of a linear transformation - Inner product space - Algebra of Matrices - Rank of a matrix- Eigenvalues and Eigenvectors-Bilinear forms-Quadratic forms.

Unit III: Real Analysis

Functions –Countability – Cauchy sequences- Limit of a function on the real line - Metric spaces - Functions continuous at a point on the real line - Discontinuous functions on R^1- Derivatives- Rolle's Theorem - Fundamental theorems of calculus - Taylor's theorem.

Unit IV: Complex Analysis

Continuous Functions -Differentiability - Cauchy-Riemann Equations - Analytic Functions - Bilinear Transformations - Definite Integral - Cauchy's Theorem - Cauchy's Integral Formula - Higher Derivatives-Taylor's Series - Laurent's Series - Zeros of Analytic Functions – Singularities - Cauchy's Residue Theorem - Evaluation of Definite Integrals (poles not lying on the real axis).

Unit V: Differential Equations

ODE: Variables Separable - Homogeneous equations - Non- Homogeneous equations of the first degree in *x* and *y*- Linear equations - Bernoulli's equation - Exact differential equations - First order DE of higher degree- Linear DE with constant coefficients - particular integrals - General method of finding P.I -Special methods for finding P.I when X is of the form x^m, $e^{ax}x^m$, e^{ax}sinmx, e^{ax}cosmx.

Books for Study

1. S. Arumugam and A .Thangapandi Isaac, *"Modern Algebra",* SciTech Publications (India) Private Ltd., Chennai, Reprint 2016. **(Unit I)**

2. Arumugam S and Thangapandi Isaac A, *"Modern Algebra",* Sci Tech Publications (India) Ltd., Chennai, Edition 2012. **(Unit II)**
3. Richard. R. Goldberg, *"Methods of Real Analysis",* Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi. 1970. **(Unit III)**
4. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram, *"Complex Analysis",* SciTech Publications (India) Pvt. Ltd, 2002. **(Unit IV)**
5. S. Narayanan & T.K. Manichavasagam Pillay, *"Differential equations and its applications"*, Viswanathan Pvt Ltd 2013. **(Unit V)**

Books for Reference

1. N. Herstein*, "Topics in Algebra",* John Wiley & Sons, Student 2nd edition,1975.
2. S. Kumaresan, *"Linear Algebra"* – A Geometric Approach
3. S.C. Malikand Savita Arora*, "Mathematical Analysis",*New Age International (P) Limited Publishers, New Delhi. 2009.
4. S. Narayanan and T.K.Manickavasagam Pillai, "*Complex Analysis*",, S.Viswanatha printers and publishers Pvt.Ltd., 2007.

B.Sc. MATHEMATICS

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	**UMA**	**1**	**3**	**2**	**01**

For Example :

I B.Sc. Mathematics, first semester **Basic Mathematics**
The code of the paper is 17UMA130201.
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.

B. Sc. Mathematics

Course Pattern - 2017 Set

Sem	Part		CODE	Title of the paper	Hrs	Cr
I	I	Language	17UGT110001	Language-I	4	3
	II	English	17UGE120101	General English-I	5	3
	III	Core	17UMA130201	Basic Mathematics	7	4
			17UMA130202	Integral Calculus	6	4
		Allied	17UMA130401	Allied :Statistics-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	4	3
	II	English	17UGE220102	General English-II	5	3
	III	Core	17UMA230203	Analytical Geometry	6	4
			17UMA230204	Differential Equations	5	3
		Allied	17UMA230402	Allied: Statistics-II	6	5
	IV	NMC	17UCE240802	Computer Literacy	2	2
		V. Edn	17UFC241002	Fundamentals of human rights	2	2
				Total for Semester II	**30**	**22**
III	I	Language	17UGT310003	Language-III	4	3
	II	English	17UGE320103	General English-III	5	3
	III	Core	17UMA330205	Statics	6	4
			17UMA330206	Sequence and Series	5	4
		Extra Credit Course	17UMA330501	Massive Open Online Course	-	(2)
		Allied	17UMA330403A	Allied: Physics-I/or	6	4/
			17UMA330403B	Allied: Accounts I		5
	IV	NMC/EVS	17UCE340901	Environmental Studies (Partial online course)	2	2
		V. Edn	17UFC341003A	Formation of youth- I (or)	2	2
			17UFC341003B	Religious Doctrine-I		
				Total for Semester III	**30**	**22/23 +(2)**
IV	I	Language	17UGT410004	Language-IV	4	3
	II	English	17UGE420104	General English-IV	5	3
	III	Core	17UMA430207	Classical Algebra	4	3
			17UMA430208	Algebra I	5	3
		Core Elective I (WD)	17UMA430301A	Automata Theory (or)	4	4
			17UMA430301B	Astronomy		
	III	Allied	17UMA430404A 17UMA430405	Allied: Physics–II + Allied: Physics Practicals (or)	4+2	4+2/
			17UMA430404B	Allied: Accounts- II	6	5
	IV	V. Edn	17UFC441004A	Formation of youth- II (or)	2	2
			17UFC441004B	Religious Doctrine-II		
				Total for Semester IV	**30**	**24/23**

Sem	Part		Code	Title of the paper	Hr	Cr
V	III	Core	17UMA530209	Real Analysis	6	4
			17UMA530210	Dynamics	6	4
			17UMA530211	Algebra II	5	4
			17UMA530212	Operations Research	5	4
		Extra Credit Course	17UMA530502	Extra Credit Course	-	(2)
		Core Elective II (WS)	17UMA530302A	Number Theory	4	4
			17UMA530302B	Logic and Boolean Algebra		
		Self-Paced Learning	17UMA530213	History of Mathematics - Online partial course	-	2
	IV	SBE(BS)	17UMA540601A	Mathematics for Competitive Examinations (Ordinary)	2	2
			17UMA540601B	MATLAB Applications		
		IDC	17USS540701A	Soft Skills	2	2
			17USS540701B	National Cadet Corps		
				Total for Semester-V	**30**	**26+(2)**
VI	III	Core	17UMA630214	Complex Analysis	7	4
			17UMA630215	Computer Oriented Numerical Methods in 'C' Programming	5	3
			17UMA630216	Computer Lab ('C' Programming)	2	1
			17UMA630217	Linear Algebra	6	4
			17UMA630218	Graph Theory	4	3
			17UMA630219	Comprehensive Exam	-	2
			17UMA630220	Internship	-	2
		Core Elective III (WS)	17UMA630303A	Fuzzy Theory	4	4
			17UMA630303B	Optimization Techniques		
	IV	SBE (WS)	17UMA640602A	Mathematics for Competitive Examinations (Advanced)	2	2
			17UMA640602B	LaTeX		
				Total for Semester-VI	**30**	**25**
	V	Shepherd	17UCW651101	Community Service Work (SHEPHERD) and Gender Studies		5
				Total Credit 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 trained 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. Critical and Analytical Thinking Skills
2. Problem Skills
3. Communication and Presentation Skills
4. Teamwork Skills
5. Knowledge
6. Information Technology/Techniques
7. Ethics and Social Responsibility
8. Entrepreneurial 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** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Semestre: 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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semestre: 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: 7**
17UMA130201 **Credits: 4**

BASIC MATHEMATICS

Course Outcomes:

1. Knowledge of polar equations.
2. Basic knowledge of differentiation, expansion of functions and their applications.
3. Notion of envelopes, curvatures and polar co-ordinates.
4. Application of binomial theorem.
5. Expansion of exponential and logarithmic series.
6. Knowledge of trigonometric functions.

Unit I

Successive differentiation-envelopes- Curvature-Cartesian formula for the radius of curvature - Drawing the graphs e^x,sin x, cos x ,tan x, parabola, ellipse, hyperbola.

Book 1, Chap III (full), Chap X - Sec 2.1 and 2.3.

Unit II

Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$, $\sin^{n\theta}$, $\cos^{n\theta}$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ - Hyperbolic functions - Logarithm of complex quantities.

Book 2, Chap III (full), Chap IV (full), Chap V Sec: 5(only).

Unit III

Binomial theorem for rational index – some important particular cases of the Binomial expansion – Numerically greatest term – Partial fraction – Application of the Binomial theorem to the summation of series (Proof of the theorem not required).

Book 3, Chap 3: Sec: 5-6, 8-10.

Unit IV

Exponential series expansion – Logarithmic series expansion (Proofs of the theorems not required).

Book 3, Chap II (full),Chap 4: Sec: 3, 5 - 7.

Unit V

Polar equation of a straight line - Polar equation of a circle-Polar equation of Conic-Equation of chord-Asymptotes of the conic.

Book 4, Chap IX Sec: 1 - 12.

Textbooks:

1. S.Narayanan and T.K.Manicavachagam Pillay, Calculus Volume I, S.Viswanathan Printers & Publishers, 2008.
2. S.Narayanan and T.K.Manicavachagam Pillay, Trigonometry, S.Viswanathan Printers & Publishers, 2001.
3. T.K.Manicavachagam Pillay, T.Natarajan and K.S.Ganapathy, Algebra volume I, S.Viswanathan Printers & Publishers, 2008.
4. T.K.Manicavachagam Pillay and T.Natarajan, A Text book of Analytical geometry – Part I – Two Dimension, S.Viswanathan Printers & Publishers, 2002.

References:

1. P.R.Vittal and V. Malini, Algebra, Calculus and Trigonometry, Margham Publications, Chennai, 1997.
2. P.R.Vittal and V.Malini,Vector Analysis, Margham Publications, Chennai, 1997.
3. P.R.Vittal and V.Malini, Calculus, 3rd Edition (For Polar co-ordinates only) Margham Publications, Chennai, 1997.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UMA130201					Title of the Paper: BASIC MATHEMATICS								Hours 7	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	1	5	5	3	2	1	2	2	2	4	4	4	4	3.0	
CO2	3	5	5	5	4	5	4	4	2	3	1	1	1	3.3	
CO3	3	4	4	4	4	4	4	2	4	4	4	1	1	3.3	
CO4	4	5	5	5	2	2	2	3	3	4	3	1	1	3.1	
CO5	5	5	5	5	1	3	4	4	2	2	2	1	1	3.1	
CO6	5	5	5	5	1	2	2	2	3	3	5	4	4	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 I **Hours/Week: 6**
17UMA130202 **Credits: 4**

INTEGRAL CALCULUS

Course Outcomes

* Various techniques of integration.
* Applications of definite integrals.
* Applications of integration.
* Applications of improper integrals .
* Techniques of Beta, Gamma integrals.
* Various integration formulae

UNIT I

Revision of all Integral models including Integration of Rational and Irrational Functions (Articles 1- 9 of Chapter 1)

UNIT II

Properties of Definite integrals – Integration by Parts – Bernoulli's Formula – Integration as Summation (Articles 10-11, 15 of Chapter 1)

UNIT III

Reduction Formulae for $x^n e^{ax}$, $\sin^n x$, $\cos^n x$, $\sin^m x \cos^n x$, $\tan^n x$, $\cot^n x$, $\sec^n x$, $\text{cosec}^n x$, $x^m (\log x)^n$, $e^{ax} \cos bx$ (Articles 13-14 of Chapter 1)

UNIT IV

Area Under Plane Curves – Area of a Closed Curves – Length of a Curve – Area of Surface of revolution – Multiple Integrals – Evaluation of Double and Triple Integrals (Cartesian Co-Ordinates only; Articles 1,4,5 of Chapter 2; Articles 1-4 of Chapter 5)

UNIT V

Improper Integrals– Beta and Gamma Functions– Recurrence formula of Gamma Functions – Properties of Beta Functions – Relation between Beta and Gamma Functions – Evaluation of Definite Integrals Using Gamma Functions (Articles 2-5 of Chapter 7)

TEXTBOOK:

1. S. Narayanan and T.K.Manicavachagam Pillay, Calculus (Major), Vol. II, S.Viswanathan Printers & Publishers, 2007.

REFERENCES

1. Dr. M. K Venkataraman, Engineering Mathematics, Volume -2, The National Publishing Company, Madras, 1988.
2. Calculus, Thomas and Finney, Pearson Education, 9th Edition, 2006.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UMA130202					Title of the Paper: INTEGRAL CALCULUS								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	PSO7	PSO8		
CO1	3	4	2	4	5	4	4	2	3	4	2	2	3		3.2
CO2	4	4	2	4	4	4	4	2	3	4	3	2	2		3.2
CO3	3	4	2	4	5	4	4	2	3	4	3	2	3		3.3
CO4	4	3	2	4	4	4	4	3	2	4	3	2	2		3.2
CO5	4	3	3	5	4	4	4	3	2	4	3	2	2		3.3
CO6	3	3	3	4	4	3	3	3	3	4	3	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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester I **Hours/Week: 6**

17UMA130401 **Credits: 5**

Allied: STATISTICS-I

Course Outcomes

* History and Introduction of Probability.
* Concepts of Random Variables and Distributions
* Properties of Mathematical Expectations
* Standard Distributions
* Knowledge of moment generating functions
* Applications to real life problems.
* Basic Concepts of Expectation
* Knowledge of continuous and discrete distribution

Unit-I: Short History –Basic Terminology - Axiomatic approach to probability – Some Theorems on Probability - Mathematical Notion - Conditional probability- Multiplication Theorem of Probability –Independent Events- Pairwise Independent Events - Baye's theorem.

Ch. 3: Sec 3.2-3.5, 3.8 (Omit 3.8.3, 3.8.4), 3.9 (Omit 3.9.2), 3.10-3.12, 3.15 Ch 4: Sec 4.2 (Omit 4.2.1)

Unit-II: Random variable - Distribution function - Discrete random variable - Continuous random variable – Two-dimensional random variable. Ch 5 Sec 5.1-5.5 (Omit 5.5.6-5.5.7)

Unit-III: Mathematical expectation – Expected value of function of a random variable – Properties of expectation – Properties of variance - Covariance - Moment generating function – Cumulants - Chebychev's inequality.

Ch 6: Sec 6.1 - 6.6. Ch 7: Sec 7.1 – 7.2.

Unit-IV: Binomial distribution- Poisson distribution – Geometric distribution

Ch 8: Sec 8.4(Omit 8.4.3, 8.4.10-8.4.12), 8.5 and 8.7

Unit-V: Normal distribution - Gamma distribution – Beta distributions of first and second kind - Exponential distribution (Ch 9: Sec 9.2 (Omit 9.2.11-9.2.15), 9.5 -9.8.

Textbook:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand and Sons, 1982.

References:

1. P.R. Vittal, Mathematical Statistics,Margham Publications, Chennai, 2004.
2. J.N. Kapur and H.C. Saxena. Mathematical Statistics 20th Edition, S.Chand & Co Ltd. New Delhi, 2010.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester I	Course Code 17UMA130401					Title of the Paper: Allied: STATISTICS-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	PSO7	PSO8		
CO1	4	3	4	4	3	3	4	4	3	4	3	3	3	3.5	
CO2	3	4	3	4	4	3	4	3	3	4	4	3	3	3.5	
CO3	3	4	3	3	3	3	3	4	4	3	3	3	3	3.4	
CO4	4	4	3	4	3	3	4	3	3	4	3	3	3	3.4	
CO5	3	4	3	3	3	3	4	3	3	4	3	3	4	3.3	
CO6	3	4	3	4	3	4	4	4	3	4	4	3	4	3.6	
CO7	3	3	3	4	3	2	4	3	2	3	3	3	4	3.1	
CO8	4	3	4	3	3	3	2	3	3	4	3	3	2	3.1	
												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 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 1	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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semestre: 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 **Credits: 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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: II **Hours/Week: 4**

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)							Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: II **Hours/Week: 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: 6**
17UMA230203 **Credits: 4**

ANALYTICALGEOMETRY

Course Outcomes

* Introduction of direction cosines of a line, and its properties.
* Concepts of a plane, its various forms, determination of planes under given conditions .
* The students are introduced to the concept of a line, sphere and its properties, circles and tangent planes.
* Concepts of gradient, divergence curl and their properties.
* Evaluation of line, volume and surface integrals and apply them to verify the Gauss divergence and stokes theorem.
* Application of line, volume, and surface integrals

Unit I

Coordinates in space-Direction cosines of a line in space-angle between lines in space-equation of a plane in normal form. (Chapter I, Sec 1.5 to 1.9, Chapter II Sec 2.1 to 2.3, Pages: 09-31) Angle between planes-Distance of a plane from a point.

(Chapter II Sec 2.4 to 2.8 pages: 32-45)

Unit II

Straight lines in space-line of intersection of planes-plane containing a line. Coplanar lines-skew lines and Shortest distance between skew lines-Length of the perpendicular from a point to a line.

(Chapter III Sec 3.1 to 3.3 pages: 56-68, Chapter III Sec 3.4 to 3.7 pages: 69-88)

Unit III

General equation of a sphere-Section of a sphere by a plane-tangent planes-condition of tangency-system of spheres generated by two spheres- system of spheres generated by a sphere and a plane.

(Chapter VI Sec 6.1 to 6.6 pages: 127-149)

Unit IV

Gradient, Divergence and Curl-Definitions, identities and simple problems-Directional derivative and Laplacian-Definition and simple problems.

(Chapter IV, pages 98-122)

Unit V

The line integral-Volume integral-Surface integral-Gauss divergence theorem-Stoke's theorem (Omit proofs of these two theorems)

(Chapter VI, page 136-177)

Textbooks:

1. Shanthi Narayanan and Mittal P.K, Analytical Solid Geometry, 17th Edition, S.Chand & Co, New Delhi. (For units I to III)
2. Narayanan and Manickavasagam Pillay, Vector Algebra and Analysis, S.Viswanathan Printers & Publishers Pvt.Ltd. 1994.(For unit IV &V),

References:

1. P.Duraipandian, Analytical Geometry 3 Dimensional, Emerald Student Edition, 1970.
2. S.Arumugam and A. Thangapandi Issac, Analaytical Geometry(3D) and Vector Calculus, New Gamma Publishing House.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UMA230203				Title of the Paper: ANALYTICAL GEOMETRY								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	PSO7	PSO8	
CO1	3	2	2	5	4	5	5	3	2	5	4	2	2	3.38
CO2	4	3	2	5	5	5	5	3	3	5	5	2	4	3.92
CO3	5	4	2	5	5	5	5	3	4	5	5	2	4	4.15
CO4	2	3	2	3	4	3	5	3	3	4	3	2	3	3.08
CO5	5	5	2	5	5	5	5	5	5	5	5	2	4	4.46
CO6	3	4	2	5	5	5	5	5	5	5	5	2	3	4.15
													Mean Overall Score	3.85

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 II **Hours/Week: 5**

17UMA230204 **Credits: 3**

DIFFERENTIAL EQUATIONS

Course Outcomes

1. Developing the skills of solving DE.
2. Solving PDEs of first and second order.
3. Understanding the Laplace Transform and its inverse.
4. Constructing the Fourier Series Expansion.
5. Solving DE using Laplace Transforms.
6. Application of DE in the field of Science.

Unit-I: Variables separable, Homogeneous equations, Non- Homogeneous equations of the first degree in x and y- Linear equations - Bernoulli's equation – Exact differential equations – First order DE of higher degree. [Chapter II: Sections 1 - 6.3 & Chapter IV: Fully]

Unit-II: Linear DE with constant coefficients – particular integrals – General method of finding P.I -Special methods for finding P.I-When X is of the form x^m,$e^{ax}x^m$,e^{ax}sinmx, e^{ax}cosmx - Equations reducible to the linear equations [Chapter V: Sections 1 – 6]

Unit-III: Definition of "The Laplace transform" – Properties of Laplace transform – Laplace transform of periodic functions- some general Theorems – The inverse transform – solving linear DE using Laplace transforms. [Chapter IX: Sections 1 – 8]

Unit-IV: Fourier series – Fourier series for even and odd functions – Half range expansions [Chapter I: Sections – 1,2,6,8,9,10 (omit change of interval, Proofs and derivations)]

Unit-V: Formation of partial Differential Equations – solution of simple types – First order PDE - Charpit's method – Homogeneous and non Homogeneous equations – linear PDE with constant coefficients [Chapter II, omit sections 10, 11, numerical problems only]

Textbooks:

1. S.Narayanan & T.K. Manichavasagam Pillay, Differential equations and its applications, S.Viswanathan Pvt Ltd 2001. (For units I, II, III)
2. M.K. Venkatraman, Engineering Mathematics – III year part B, National Publishing company, Chennai. (For units IV & V)

References:

1. M.K.Venkatraman, Engineering Mathematics – Volume II, , National Publishing Company, Chennai (for units I & II)
2. M.K.Venkatraman, Engineering Mathematics – III year part A, National Publishing Company, Chennai (for unit III).

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UMA230204					Title of the Paper: DIFFERENTIAL EQUATIONS								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	5	4	5	3	4	4	3	4	5	3	4	4		3.92
CO2	4	3	5	4	4	3	5	4	3	4	5	3	5		4.00
CO3	4	5	3	4	3	4	4	5	4	3	4	4	3		3.85
CO4	4	4	3	5	4	3	5	4	3	4	4	3	5		3.92
CO5	3	4	4	3	4	5	3	4	4	3	3	4	5		3.77
CO6	5	4	4	4	3	4	5	3	3	4	4	3	4		3.85
													Mean Overall Score		3.88

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 II **Hours/Week: 6**
17UMA230402 **Credits: 5**

Allied: STATISTICS-II

Course Outcomes

* Basic concepts of Sampling and testing of Hypothesis.
* Testing of Hypothesis for real life problems.
* Testing of Hypothesis for small samples
* Knowledge about various types of Estimators
* Concepts of Correlation and rank correlation coefficient
* Practical Knowledge of Correlation and Rank Correlation Coefficient
* Knowledge t-distribution and F-distribution
* Application of Estimation Theory

Unit-I: Introduction - Types of Sampling - Parameter and Statistic - Tests of significance - Test of significance – Procedure for testing of hypothesis - Test of significance for large samples - Sampling of attributes – Sampling of variables. Ch 14 Full

Unit-II: Introduction – Derivation of the chi-square distribution – MGF of chi-square distribution - Application of chi-square distribution. Ch 15: Sec 15.1- 15.3, 15.6 (Omit 15.6.4-15.6.7)

Unit-III: Introduction – Student's t- distribution - Applications of t-distribution – Distribution of sample correlation coefficient when population correlation coefficient is zero- F-distribution - Applications of F-distribution. Ch 16: Sec 16.1-16.6

Unit-IV: Introduction - Characteristics of estimators - Consistency – Unbiasedness- Efficient and Most Efficient Estimators – Sufficiency (Definition only) – Methods of Estimation - MLE (statement of properties and direct simple problems, no theorems) - method of moments. Ch15: Sec 17.1-17.2 (Omit MVU Estimators and Factorisation Theorem), 17.6 (Omit 17.6.2, 17.24)

Unit-V: Introduction – Meaning of Correlation – Scatter diagram – Karl Pearson's Coefficient of Correlation – Rank Correlation. Ch 10: Sec 10.1 - 10.4, 10.7.

Textbook:

1. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics,11th edition, Sultan Chand and Sons, 1982.

References:

1. P. R. Vittal, Mathematical Statistics, Margham Publications, Chennai, 2004.
2. J.N. Kapur and H.C. Saxena. Mathematical Statistics 20th Edition, S.Chand & Co Ltd. New Delhi, 2010.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester II	Course Code 17UMA230402				Title of the Paper: Allied: STATISTICS-II								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	PSO7	PSO8	
CO1	3	5	5	4	3	4	3	5	3	4	5	3	3	3.8
CO2	5	4	5	3	5	4	5	3	3	4	4	5	4	4.1
CO3	4	3	5	4	3	5	4	3	4	4	4	5	3	3.9
CO4	5	4	3	4	5	5	4	3	4	3	4	4	4	4.0
CO5	3	4	5	4	4	3	5	4	3	5	5	4	3	4.0
CO6	5	3	4	3	3	4	5	5	4	3	5	4	5	4.0
CO7	4	4	3	3	4	3	3	3	4	4	3	3	3	3.3
CO8	3	4	4	4	3	3	4	3	3	3	4	4	4	3.5
											Mean Overall Score			3.8

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 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 சிறப்பும' 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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semestre: 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.

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)							
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		Mean Score of COs
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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: III **Hours/Week: 4**
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: 6**
17UMA330205 **Credits: 4**

STATICS

Course Outcomes:

* Laws of Forces and their properties.
* Concepts of Moments and Couples.
* Equilibrium of Forces
* Friction laws and its properties
* Application to real life problems
* Catenary and its properties

Unit I

Law of parallelogram of forces - Lami's theorem - Resolution of forces. (Chapter 2 Sections 1-4 & 6-12 pp: 9 to 16 & 17 to 51)

Unit II

Like Parallel forces-Unlike Parallel forces-Moments-Varignon's theorem of Moments-Generalized theorem of Moments-Couples-Definition-equilibrium of couples-resultant of coplanar couples. (Chapter 3 Sections 1-13; Chapter 4 Sections 1-10 pp: 52-78 & 84-97)

Unit III

Equilibrium of three forces acting on a rigid body-three coplanar forces-conditions of equilibrium-Coplanar forces-Reduction of coplanar forces-Equation to the line of action of the resultant. (Chapter 5 Sections 1-6; Chapter 6 Sections 1-9 pp: 98 to 122 &143-167)

Unit IV

Forces of Friction-Laws of Friction-Limiting Friction-Limiting equilibrium-Cone of Friction-Angle of Friction. (Chapter 7 Sections 1-13 pp: 206-234)

Unit V

Equation to Common Catenary-Tension at any point-Geometrical properties of Common Catenary. (Chapter 11 Sections1-6 pp: 375-391)

Textbook:

1. Venkataraman M.K., Statics, Agasthiar Publishers, Eleventh Edition, July 2005.

References:

1. A.V.Dharmapadham, Statics, S. Viswanathan Printers & Publishers Pvt. Ltd
2. S.Narayanan, Statics, *S*.Chand & Company Ltd, New Delhi, 1985.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UMA330205				Title of the Paper: STATICS								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	PSO7	PSO8	
CO1	5	4	3	4	3	5	4	3	2	4	3	2	3	3.46
CO2	5	5	3	4	4	5	5	2	3	4	3	4	3	3.85
CO3	4	4	3	4	3	4	5	3	2	5	4	3	3	3.61
CO4	5	4	3	4	4	5	5	2	3	4	3	4	4	3.85
CO5	5	5	4	4	3	4	5	2	3	4	4	2	4	3.77
CO6	4	5	3	4	5	5	4	3	4	5	4	3	4	4.07
													Mean Overall Score	3.76

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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester III **Hours/Week: 5**

17UMA330206 **Credits: 4**

SEQUENCE AND SERIES

Course Outcomes:

* Getting a good foundation for classical analysis.
* Understanding the behavior of monotonic functions.
* Knowing limits and Cauchy sequences.
* Studying the behavior of convergence of series by using tests.
* Solving the problems related to sequence and series.
* Behaviour of divergent sequences

Unit-I

Sequences-Bounded sequences - Monotonic Sequences - Convergent sequences - Divergent sequences - Oscillating sequences.

(Chap-3: Sec 3.0-3.6 pg 39-55)

Unit-II

Algebra of limits –Behavior of Monotonic functions

(Chap3: Sec3.6, 3.7 pg 56-82)

Unit-III

Some theorems on limits- subsequences –limit points: Cauchy sequences.
(Chap3: Sec-3.8-3.11, pg 82-102)

Unit- IV

Series-Infinite series –Cauchy's general principle of convergence - Comparison test theorem and test of convergence using comparison test.
(Chap4: Sec (4.1& 4.2) pg 112-128.

Unit-V

Test of convergence using D' Alembert's ratio test- Cauchy's root test- Alternating Series –Absolute Convergence

(Relevant part of Chap – 4: pages 131,132,135-140,145,147-150 and Chap 5: sec 5.1&5.2 pg 157-167)

Textbook:

1. S.Arumugam, A.Thangapandi and Isaac, Sequences and Series, New Gamma Publishing House, 2002.

References:

1. Konrad Knopp,Infinite Sequences and Series, Dover Publications, 1956.
2. S.C.Malik, Savita Arora, Mathematical Analysis (4th edition) New Age International Publishers

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UMA330206					Title of the Paper: SEQUENCES AND SERIES								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	4	4	3	4	4	3	5	4	3	3	4		3.8
CO2	4	5	4	5	4	4	5	3	4	4	3	4	4		4.1
CO3	5	4	3	5	4	5	4	4	4	5	4	4	3		4.2
CO4	4	5	4	4	4	4	4	4	4	5	3	3	2		4.0
CO5	5	4	4	5	3	4	5	3	4	5	4	3	2		3.9
CO6	4	4	3	4	4	5	4	3	4	4	3	3	4		3.7
													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 III **Hours/Week: 4**
17UPH330403A **Credits: 4**

Allied:
PHYSICS-I

Course Outcomes

* Students learn the nomenclature, hybridization, isomerism and intermediates of organic compounds
* Students study the preparation, properties and mechanisms of alkanes and alkenes
* Students understand the chemistry of hydrogen, some boron, silicon compounds, halogens and inter-halogen compounds
* Students understand the principles of chemical kinetics
* Students understand the principles of photochemistry
* Students learn the laws of photochemistry derived by Beer, Lambert and Einstein.

Unit I: Hydrocarbons and Isomerism (12 Hours)

Nomenclature of simple hydrocarbons. Hybridization – sp, sp^2, sp^3 (examples: acetylene, ethylene and methane). Bond length, bond angle, dipole moment, inductive effect, mesomeric effect and hyperconjugation effect. Solubility – protic and aprotic solvents. Isomerism – geometrical and optical isomerism, asymmetry, (R, S notation not necessary). Reactive intermediates – carbocation, carbanion and carbon free radicals (generation, structure and stability).

Unit II: Alkanes and Alkenes (12 Hours)

Methods of preparation of alkanes (Wurtz method, Kolbe's method, using Grignard reagent, Using HI/P), Chemical properties of alkanes - substitution reaction only (example: only halogenation of alkanes with free radical mechanism), conformation analysis of ethane, n-butane and cyclohexane.

Methods of preparations of alkenes (Kolbe's method, Hoffman degradation, using Lindlar's catalyst, Dehydration of alcohols, Dehydrohalogenation of alkyl halides), stereochemistry of dehydrohalogenation (E_1, E_2, E_1CB mechanisms), Chemical properties of alkenes – electrophilic addition mechanism (example: only mechanisms of bromination of alkenes, hydrohalogenation of alkenes, hydration of alkenes and addition of diborane to alkenes)

Unit III: Chemistry of Hydrogen, Halogen, Silicon and metals (12 Hours)

Occurrence, extraction and chemical properties of iron, cobalt, nickel and copper. Electrochemical theory of rusting. Position of hydrogen in periodic

table, atomic hydrogen and isotopes of hydrogen. Preparation and structure of borozole, SiO_2, SiC and $SiCl_4$. General characteristics of halogens. Structures of inter halogens (XY, XY_3, XY_5, XY_7 type).

Unit IV: Chemical Kinetics (12 Hours)

Rate of reaction, factors affecting rate of the reaction, average and instantaneous rate, order, molecularity, pseudo first order reaction. Rate expression for first order and second order reactions. Expression of rate constant and half-life period for first order, second order (two molecules of same reactant), zero order reactions. Arrhenius and collision theories – assumption, derivation, demerits – experimental determination of order of reactions.

Unit V: Photochemistry (12 Hours)

Difference between photochemical reactions and dark reactions. Laws of photochemistry – Beer - Lambert's Law – Derivation and applications. Einstein law of photochemical equivalence - quantum yield. Kinetics of Hydrogen-chlorine reaction, Hydrogen-bromine reaction and decomposition of HI. Fluorescence, phosphorescence and chemi-luminescence.

TEXT BOOK:

1. Bahl B. R and ArunBahl. Organic Chemistry (12th edition), New Delhi, Sultan Chand & Co (1997)
2. Puri B. R.; Sharma L. R and Kalia K. K. Principles of Inorganic Chemistry, (23rd edition), New Delhi, ShobanLalNagin Chand & Co (1993)
3. Puri B. R.; Sharma L. R and Pathania M. S. Principles of Physical Chemistry, (23rd edition), New Delhi, ShobanLalNagin Chand & Co (1993)

REFERENCES:

1. Atkins P.W., Physical Chemistry, (7th edition) Oxford University Press, London (2009).
2. FinarI.L,Organic Chemistry, Vol 1&2, (6thedition) England, Addison WesleyLongmanLtd.(1996).
3. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UPH/UMA330403A					Title of the Paper Allied: PHYSICS-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	5	3	2	3	5	5	3	3	3	3	1	2	3		3.15
CO2	4	3	3	2	5	4	4	3	3	4	1	2	3		3.15
CO3	4	3	1	3	5	5	4	3	3	4	1	2	3		3.15
CO4	5	3	2	2	5	5	5	3	3	4	1	2	3		3.31
CO5	4	3	2	3	5	5	5	3	3	3	1	2	4		3.31
CO6	5	3	2	3	5	4	5	4	3	4	2	2	3		3.46
												Mean Overall Score			3.25

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 III **Hours/Week: 6**
17UMA330403B **Credits: 5**

Allied:

ACCOUNTS-I

Course Outcomes

After completing the course, the student will be able to

* Understand the basic concepts of accounting.
* Prepare final accounts and balance sheet.
* Prepare final accounts and balance sheet of non trading concerns.
* Calculate profit for concerns with single entry system through net worth method and conversion method.
* Rectify errors in the books of accounts and prepare Bank Reconciliation Statement.
* Prepare Income & Expenditure account from Receipts.

Unit-I: **(18 Hours)**

Accounting- Different types – Financial accounting - Book Keeping – Meaning – objectives - Principles, Concepts and Conventions – Type of accounts – Golden rules of recording – Journal Subsidiary Books (purchase book, sales book, purchase return book, sale return book & Cash book – Ledger.

Unit-II: **(18 Hours)**

Trial balance – Trading, Profit and Loss Accounts – Balance Sheet of a Sole Trader(closing stock, outstanding expenses, prepaid expenses, income receivable, received in advance, depreciation and provision for bad debts.

Unit-III: **(18 Hours)**

Accounts for Non-trading concerns- Receipts and payment account Vs Income and Expenditure account- Preparation of Income and Expenditure Account from Receipts and Payment Accounts (simple adjustments).

Unit-IV: **(18 Hours)**

Single Entry system- Defects of single entry system – Double entry system Vs single entry system – Calculation of profit/loss- net worth method-conversion method

Unit-V: **(18 Hours)**

Errors –classification- rectification- suspense account- - preparation of bank reconciliation statement.

TEXT BOOK

1. Reddy TS and Murthy A, (2016), Financial Accounting, MarghamPublications, Chennai.

BOOKS FOR REFERENCES

1. Shukla MC, Grewal TS and Gupta SC, (2016), Advanced Accounts Volume I, S.Chand and Company Ltd, New Delhi.
2. Gupta RL and Gupta VK, (2014), Financial Accounting, Sultan Chand and Sons, New Delhi.
3. Gupta RL and Radhaswamy, (2016), Advanced Accountancy, Volume I, Sultan Chand and Sons, New Delhi.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester III	Course Code 17UMA330403B				Title of the Paper: Allied: ACCOUNTS-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	4	3	4	1	2	4	3	4	1	4	2	4	1	2.84
CO2	5	4	5	3	2	5	3	5	3	3	5	2	3	3.69
CO3	4	5	3	2	5	2	1	2	5	3	2	4	1	3.00
CO4	3	5	2	4	2	5	2	4	3	2	4	5	4	3.46
CO5	5	2	5	2	4	4	5	3	2	5	4	5	4	3.85
CO6	5	4	5	4	2	4	4	5	3	5	4	4	5	4.15
												Mean Overall Score		3.49

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 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.

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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 2**
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.

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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 **Credits: 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.

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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)						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	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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester: IV **Hours/Week: 5**
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: 4**
17UMA430207 **Credits: 3**

CLASSICALALGBRA

Course Outcomes:

* Foundations for the study of Pure Mathematics.
* Relations between the roots and coefficients of equations
* Transformations of equations
* Formation of equations.
* Important Methods in finding roots.
* Knowledge in Operative Algebra

Unit-I

Theory of equations -Introduction –Remainder theorem –Roots occurring in pairs. (Chap-6: Sec 1-10 pg282-292)

Unit-II

Relations between the roots and coefficients of equations -Sum of the rth powers of the roots –Newton's theorem on the sum of the powers of the roots. (Chap-6: Sec11- 14 pg292- 317)

Unit III

Transformations of equations – Reciprocal equations. To increase or decrease the roots of an equation by a quantity (Chap-6: Sec-15-18 pg 318-334)

Unit IV

Removal of terms – To form an equation whose roots are any power of the roots of a given equation - Transformation in general.
(Chap-6: Sec 19-23 pg 334-351)

Unit V

Descarte's rule of signs –Rolle's theorem–Sturms theorem –Newton's method of divisors. (Chap-6: Sec 24, 25 (pg 351-358) & Sec 27 – 29 (pg362- 375))
Note: Proof is not included for any theorem.

Textbook:

1. T.K.Manicavachagom Pillai, T Natarajan, K S Ganapathy, Algebra, Volume I, S.Viswanathan Printers and publishers Pvt. Ltd., 2003.

References:

1. William J Gilbert and Scott A Vanstone, Classical Algebra, Third Edition, Waterloo Mathematics Foundation, 1993.
2. P. Kandasamy and K.Thilagavathy, Mathematics Volume I, S.Chand & Co, 2004.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UMA430207					Title of the Paper: CLASSICAL ALGEBRA								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	5	4	5	5	4	3	5	4	3	3		4.1
CO2	4	5	4	4	5	4	4	4	4	4	4	3	4		4.1
CO3	4	5	4	4	4	4	5	4	4	4	3	4	3		4.0
CO4	3	5	4	5	4	4	5	3	3	5	4	3	3		3.9
CO5	4	5	3	5	4	4	5	4	4	5	4	3	3		4.1
CO6	4	5	4	4	3	5	5	3	4	3	4	3	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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester IV **Hours/Week: 5**
17UMA430208 **Credits: 3**

ALGEBRA-I

Course Outcomes:

* Acquiring knowledge of basic abstract systems of Mathematics.
* Present concepts and properties of various algebraic structures.
* Develop the ability to form and evaluate conjectures in graphs.
* Discuss the importance of cyclic groups.
* Present concepts of the relationships between subgroups and normal subgroups.
* Demonstrate understanding of the importance of homomorphism and isomorphism in groups.

(70 percent theory and 30 percent problems)

UNIT – I

Relations – Equivalence Relations-Partial Order – Functions – BinaryOperations. (Chapter 2 Sections 2.1-2.5)

UNIT - II

Groups – Definition and Examples – Elementary Properties of a Group– Equivalent –Definitions of a Group. (Chapter 3 Sections 3.1-3.3)

UNIT - III

Permutation Groups - Subgroups - Cyclic Groups. (Chapter 3 Sections3.4-3.6)

UNIT - IV

Order of an Element – Cosets and Lagrange's Theorem – NormalSubgroups and Quotient Groups. (Chapter 3 Sections 3.7-3.9)

UNIT – V

Homomorphism and Isomorphism of Groups - Cayley's Theorem - Fundamental theorem of homomorphism. (Chapter 3 Sections 3.10, 3.11)

Textbook:

1. S Arumugam and A Thangapandi Isaac, Modern Algebra, SciTech Publications, Chennai, 2003.

References:

1. N. Herstein, Topics in Algebra,John Wiley & Sons, Student 2nd edition, 1975.
2. M.L.Santiago, Modern Algebra, Tata McGraw-Hill Publishing Co.Ltd., 2001.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UMA430208					Title of the Paper: ALGEBRA-I								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	5	5	4	4	4	5	3	4	3		4.2
CO2	4	5	5	3	4	5	4	4	4	5	4	3	3		4.1
CO3	4	5	4	3	5	4	3	4	3	5	3	3	3		3.8
CO4	5	4	3	4	5	3	4	3	5	5	4	4	3		4.0
CO5	5	4	3	3	4	5	4	4	3	4	3	3	4		3.8
CO6	4	5	3	4	5	4	5	4	3	4	3	3	3		3.8
											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 IV **Hours/Week: 4**

17UMA430301A **Credits: 4**

Core Elective (WD): AUTOMATA THEORY

Course Outcomes:

* Understanding the definition of Automation.
* Introducing the different types of Grammar.
* Constructing the Regular Expressions.
* Trained to know the normal forms.
* Studying Pumping lemma for regular sets.
* Simplifying context free grammars.

UNIT – I

Definition of an Automaton - Description of Finite Automaton – Transition systems - Properties of transition functions - Acceptability of a string by a finite Automaton - Non deterministic finite automaton - The equivalence of DFA and NDFA. Chapter 2: Sections 2.1 to 2.7

UNIT – II

Formal Languages - Basic Definitions and examples - Chomsky classification of Languages - Languages and their relation - Recursive and Recursively Enumerable sets- Operations on Languages.
Chapter 3: Sections 3.1 to 3.5

UNIT – III

Regular expressions - Finite Automata and Regular expressions.
Chapter 4: Sections 4.1 and 4.2

UNIT – IV

Pumping Lemma for Regular sets - Applications of Pumping Lemma - Closure Property of Regular sets - Regular sets and Regular grammars. Chapter 4: Sections 4.3 to 4.6

UNIT – V

Context free Languages and Derivation trees - Ambiguity in Context free grammars - Simplification of Context free grammars (examples only) Chapter 5: Sections 5.1 to 5.3

Textbook:

1. K L P Mishra and N Chandrasekaran, Theory of Computer Science: Automata, Languagesand Computation, Third Edition, Prentice Hall of India, New Delhi, 2006.

References:

1. John E. Hopcroft and J.D. Ullman, Introduction to Automata theory, Languages and Computation, Third Edition, Prentice Hall, 2006.
2. A.V. Aho and J.D. Ullman, Principles of compiler design, Pearson Education, 2012.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UMA430301A					Title of the Paper: Core Elective (WD): AUTOMATA THEORY								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	4	2	4	5	4	3	5	3	4	5	3	3		3.7
CO2	4	4	2	4	4	4	5	3	3	4	4	5	4		3.9
CO3	3	4	2	4	5	5	4	3	4	4	4	5	3		3.9
CO4	4	3	2	4	4	5	4	3	4	3	4	4	4		3.7
CO5	4	3	3	5	4	3	5	4	3	5	5	4	3		3.9
CO6	3	3	3	4	4	4	5	5	4	3	5	4	5		4.0
											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 IV **Hours/Week: 4**
17UMA430301B **Credits: 4**

Core Elective (WD): ASTRONOMY

Course Outcomes:

* Introducing the exciting world of astronomy to the students.
* Helping the students to study about the celestial objects.
* Understanding the effects of refractions geocentric parallax.
* Compiling solar and lunar ellipses.
* Understanding Kepler's laws of planetary motion.
* Understanding the variation in duration of day and night in various zones of earth.

UNIT I

Celestial sphere and diurnal motion – Celestial coordinates - Sidereal time. Art. 39 – 76.

UNIT II

Morning and evening stars – circumpolar stars - zones of earth - perpetual day -twilight. Art. 80 – 83, 87 – 89, 111 - 116.

UNIT III

Refraction – laws of refraction – tangent formula - horizontal refraction - geocentric parallax – horizontal parallax. Art. 117 – 128, 135 - 144.

UNIT IV

Kepler's laws - Anomalies – Kepler's equation - Calendar.
Art. 146 – 149, 156 – 159, 175 – 179.

UNIT V

Moon - sidereal and synodic months – elongation – phase of moon – eclipses -umbra and penumbra – lunar and solar eclipses – maximum and minimum number of eclipses in a year. Art. 229 – 241, 256 – 263, 267, 268, 271 - 275.

Textbook:

1. S. Kumaravelu and Susheela Kumaravelu, Astronomy, SKV Publications, 2004.

References:

1. G V Ramachandran, Text Book of Astronomy, Mission Press, Palayamkottai, 1965.
2. Michael Seeds, Foundations of Astronomy, Third Edition, Wadsworth Publishing Company, California,1992.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UMA430301B					Title of the Paper: Core Elective (WD): ASTRONOMY								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	4	2	5	4	4	4	2	3	4	1	2	4		3.23
CO2	3	3	2	4	4	4	3	2	3	3	2	1	3		2.85
CO3	3	3	2	5	3	4	4	2	2	3	2	2	4		3.00
CO4	5	4	2	3	4	3	4	3	3	5	4	2	5		3.61
CO5	5	4	1	3	4	3	3	4	3	5	4	2	5		3.54
CO6	4	4	2	3	4	3	3	4	3	4	4	2	3		3.31
												Mean Overall Score			3.25

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**
17UPH430404A **Credit: 4**

Allied:

PHYSICS-II

Course Outcomes:

* To understand the theoretical and experimental concepts of interference, diffraction and propagation of light.
* To study the structure, behavior and properties of atoms based on vibrational modes.
* To study different nuclear models, nuclear properties and its applications.
* To study the fundamental principles of relativity and quantum mechanics.
* To study the basic electronics of LED, Transistor and Oscillator.
* To study the working of logic gates for application in digital electronics.

Unit-I: PHYSICAL OPTICS (12 Hrs)

Velocity of light – Michelson's method – Interference: colours of thin films – air wedge – determination of diameter of a thin wire by air wedge – test for optical flatness. Diffraction – Fresnel's explanation of rectilinear propagation of light – theory of diffraction and specific rotating power of transmission grating – Normal incidence – polarization – Brewster's law –double refraction,– optical activity – polarimeter.

Unit-II: ATOMIC PHYSICS (12 Hrs)

Atom model – vector Atom model – quantum numbers associated with vector atom model – coupling schemes – Pauli's exclusive principle – magnetic dipole moment of electron due to orbital and spin motion – Bohr magneton – spatial quantisation – Stern Gerlach experiment.

Unit-III: NUCLEAR PHYSICS (12 Hrs)

Nuclear model – liquid drop model – magic numbers, shell model – nuclear energy – mass defect – binding energy Radiation detectors – ionization chambers – GM counter – nuclear fission – Bohr and wheeler theory – chain reaction – atom bombs –nuclear fusion – nuclear reactor.

Unit-IV: ELEMENTS OF RELATIVITY AND QUANTUM MECHANICS (12 Hrs)

Frame of reference – Galilean transformation – Postulates of theory of relativity – Lorentz transformation equations – derivation – length contraction – time dilation – Michelson Morley experiment - mass energy equivalence – uncertainty principle – postulates of wave mechanics –wave nature of

matter– types of operators – Schrodinger's time dependent and time independent equation

Unit-V: ELECTRONICS (12 Hrs)

Basic Electronics: LED – Zener diode and characteristics – voltage regulator – Transistor RC coupled amplifier – condition for oscillation – phase shift oscillator .

Digital electronics: Logic gates – Nand and NOR gates – Universal building blocks – Boolean algebra – Demorgan's theorem – verification – Half adder, full adder, Half subtractor and Full subtractor.

BOOK FOR STUDY:

1. R.Murugesan (2005), Applied Physics, First edition, S. Chand and Co., New Delhi – 110005.

BOOKS FOR REFERENCES:

1. D.Halliday, R. Resnick, J. Walker, Fundamental of Physics, 9th edition, John Wiley & Sons, 2010
2. M.E. Schaltz, Groh's Basic Electronics, McGrawhill, 11th edition, 2011.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UPH430404A					Title of the Paper ALLIED PHYSICS - 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	2	4	4	5	3	3	4	3	1	2	2	3.23	
CO2	5	4	1	5	5	4	4	3	3	4	1	2	2	3.31	
CO3	5	4	2	4	5	5	4	3	3	4	1	2	2	3.38	
CO4	5	4	1	4	4	5	5	3	3	4	1	2	3	3.38	
CO5	5	4	1	5	4	5	5	3	3	4	1	2	3	3.46	
CO6	5	4	2	5	5	4	5	4	3	4	2	2	2	3.62	
													Mean Overall Score	3.39	

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 IV **Hours/Week: 2**
17UPH430405A **Credit: 2**

Allied:

PHYSICS PRACTICALS

Course Outcomes:

1. Practical knowledge of instruments
2. Knowledge of correlating experimental results

Any 16 Experiments

1. Young's modulus – Non uniform bending – cantilever
2. Young's modulus – Cantilever
3. S .T. – Method of drops
4. S.T. – Capillary rise.
5. Viscosity – variable pressure head
6. Concave lens – f, R, ì.
7. Air wedge – Thickness of wire.
8. Newton' Rings R
9. Spectrometer – Solid prism
10. Spectrometer – Grating (Normal Incidence)
11. M1/M2 – Tan A and Tan B simultaneous method
12. Absolute determination of M and H.
13. P.O. Box – Temp. Coefficient
14. Potentiometer – Ammeter calibration
15. Potentiometer – R and ñ
16. Field along the axis of the coil
17. Sonometer – Frequency of turning fork
18. Junction diode characteristics
19. Zener diode characteristics.
20. Logic gates – IC's
21. Jolly's bulb

Semester IV **Hours/Week: 6**

17UMA430404B **Credits: 5**

Allied: ACCOUNTS-II

Course Outcomes:

* Understand the basic principles of cost accounting
* Knowledge of preparing cost sheet.
* Understand cash flow from Operating, investment and financing activities
* Prepare cash flow statement as per AS3.
* Determine working capital of a business organisation.
* Apply Marginal costing principles in decision making.
* Draft different kinds of budgets for a business organization.
* Know about Cash Budget, Sales Budget and Flexible budget

Unit-I: **(18 hours)**

Cost Accounting – Components of cost – Methods and techniques of Costing -Preparation of cost sheet – various stages in cost sheet –WIP - valuation of closing stock of finished goods - tender & quotation.

Unit-II: **(18 hours)**

Cash flow Statement – meaning – cash flow from operating activities, investment activities and financing activities - preparation of cash flow statement As per AS3 (simple problems

Unit-III: **(18 hours)**

Working capital management-Working capital meaning- Types of working capital - components of working capital - Calculation of working capital

Unit-IV: **(18 hours)**

Marginal costing – Marginal cost- Contribution – PV Ratio – BEP – Margin of safety – CVP - decision making (simple problems)

Unit-V: **(18 hours)**

Budgeting control- preparation of cash budget- sales budget- production budget- production cost budget- flexible budget

TEXT BOOK:

1. Reddy TS and Murthy A, Cost Accounting (2012), Margham Publications, Chennai (Unit-I).
2. Reddy TS and Murthy A, Management Accounting (2012), Margham Publications, Chennai.(Unit-II, III, IV & V)

BOOKS FOR REFERENCES

1. S.N. Maheswari, (2007), Cost Accounting, S.Chand& Co, New Delhi.
2. Jain SP & Narang KL, (2014), Cost Accounting Principles and Practice, Kalyani Publishers, New Delhi.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester IV	Course Code 17UMA430404B					Title of the Paper: Allied: ACCOUNTS-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	4	3	4	2	2	4	3	4	1	4	2	4	3	3.08	
CO2	5	4	5	3	2	5	3	5	3	3	5	2	3	3.69	
CO3	4	5	3	2	5	3	1	2	5	3	2	4	3	3.23	
CO4	3	4	2	4	2	5	2	4	3	2	4	5	4	3.38	
CO5	5	2	5	2	4	4	5	3	2	5	4	5	4	3.84	
CO6	5	3	5	2	4	4	4	5	3	5	4	4	5	4.08	
CO7	3	5	3	4	3	1	1	3	5	2	3	5	4	3.23	
CO8	5	4	5	4	2	4	4	5	3	5	4	4	5	4.15	
												Mean Overall Score		3.58	

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: 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: 6**
17UMA530209 **Credits: 4**

REALANALYSIS

Course Outcomes:

* Basic Concepts of Functions and real number system
* Concepts of Limits
* Concepts of Metric Spaces.
* Understanding of Continuous functions in Metric Spaces
* Introduction and Properties of Riemann Integral
* Derivatives and their properties

Unit I: Functions and Real Numbers

Equivalence , Countability – Real numbers – Least upper bounds-Limit superior and limit inferior – Cauchy sequences Sec 1.3-1.7, 2.9,2.10

Unit 2: Limits and Metric Spaces

Limit of a function on a real line- Metric spaces- Limits in metric spaces- Functions continuous at a point on the real line, Reformulation, Sec 4.1, 4.2 (In 4.2C examples 4 and 5 are omitted), 4.3, 5.1,5.2

Unit 3: Continuous functions on Metric Spaces

Continuous functions on a metric space, Open sets, Closed sets, Discontinuous functions on the real line Sec 5.3,5.4,5.5,5.6

Unit 4: Riemann Integration

Definition of the Riemann integral, Existence of the Riemann integral – Properties of Riemann integral Sec ,7.2,7.3,7.4

Unit 5: Derivatives

Derivatives, Rolle's theorem, Law of mean, Fundamental theorems of calculus, Taylor's theorem Sec 7.5-7.8, 8.5

Text Book

1. Methods of Real Analysis, Richard R. Goldberg, Oxford and IBH Publishing Co., 1970.

References

1. S C Malik and Savita Arora, Mathematical Analysis, New Age Science Ltd., 2009.
2. Shanti Narayan, Elements of Real Analysis, S.Chand & Company Ltd, New Delhi, 1974.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA530209					Title of the Paper: REAL ANALYSIS								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	PSO7	PSO8		
CO1	4	4	3	4	5	4	4	4	3	5	4	3	3		3.8
CO2	5	4	3	4	5	4	4	3	3	4	3	3	4		3.8
CO3	4	5	3	5	5	4	4	4	4	5	3	3	3		4.0
CO4	4	4	3	5	4	5	5	3	3	4	3	4	3		3.8
CO5	4	4	4	4	4	5	4	4	3	4	3	3	3		3.8
CO6	5	5	4	3	4	4	5	3	3	5	4	3	4	4	4.0
													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 V **Hours/Week: 6**
17UMA530210 **Credits: 4**

DYNAMICS

Course Outcomes:

* Behavior of motion of objects.
* Applications of Projectile in practical problems.
* Behaviour of elastic bodies in real life problems.
* Simple Harmonic Motion and its Applications.
* Law of forces in central orbit.
* Laws of compound pendulum.

Unit-I

Motion in a plane without air resistance - path of a projectile - Time of flight -Horizontal range - Motion of a projectile up an inclined plane. [Sections 6.1 to 6.10, 6.12 to 6.16]

Unit II

Fundamental laws of impact - Impact of a smooth sphere on a fixed smooth plane – Direct impact of smooth elastic spheres - oblique impact of smooth elastic spheres. [Sections 8.1 to 8.11]

Unit III

Definition - Geometrical representation of S.H.M.-Composition of S.H.M.'S of the same period and in the same line - Composition of S.H.M.'S of the same period and in two perpendicular directions. [Sections 10.1 to 10.8]

Unit IV

Radial and transverse components of velocity and acceleration – Differential equation of a central orbit- Given the orbit to find the law of force - Given the law of force to find the orbit. [Sections 11.1 to 11.13]

Unit V

Kinetic Energy – Angular momentum – Equation of motion – Conservation of angular momentum – Principle of energy – Compound pendulum – Centers of suspension and oscillation. [Sections 13.1 to 13.8]

Note: 50% of the question paper shall be book works and 50% of the questions may be problems.

Textbook:

1. Dr.M.K.Venkataraman, Dynamics, Agasthiar Publications, 12th Edition 2006. Unit 1 – Chapter 6, Unit 2 – Chapter 8, Unit 3 – Chapter 10, Unit 4 – Chapter 11, Unit 5 – Chapter 13.

References:

1. A.V.Dharmapadham, Dynamics, S. ViswanathanPrinters & Publishers Pvt Ltd 2006.
2. M.L. Khanna, Dynamics, Jai Prakash Nath And Company, 2004.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA530210					Title of the Paper: DYNAMICS								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	PSO7	PSO8		
CO1	4	4	3	5	4	5	4	2	3	4	3	3	4		3.69
CO2	4	5	3	4	4	5	5	3	4	4	3	2	3		3.77
CO3	5	5	4	5	4	5	5	3	4	4	3	4	4		4.23
CO4	4	4	3	4	5	4	4	3	4	5	4	3	3		3.84
CO5	4	4	3	5	4	4	5	2	3	4	3	3	3		3.61
CO6	5	5	3	4	4	4	5	3	3	4	3	3	4		3.84
												Mean Overall Score			3.83

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 V **Hours/Week: 5**
17UMA530211 **Credits: 4**

ALGEBRA-II

Course Outcomes:

* Study of algebraic systems with two binary operations.
* All the basic concepts and definitions are motivated with concrete examples.
* Abstract ideas of Ideals-Prime Ideals and study their properties.
* Present the concept of Homomorphism of rings and their properties.
* Learn the properties of UFD and ED
* Understanding of polynomial rings over U.F.D.

UNIT-I

Rings-Definitions and Examples - Elementary properties of rings – Isomorphism - Types of rings. (Chapter 4 Sections 4.1-4.4)

UNIT-II

Characteristic of a ring – subrings – Ideals - Quotient rings - Maximal and Prime Ideals. (Chapter 4 Sections 4.5-4.9)

UNIT-III

Homomorphism of rings – Field of quotients of an integral domain . (Chapter 4 Sections 4.10, 4.11)

UNIT-IV

Uniquefactorization domain-Euclidean domain - Every P.I.D is U.F.D. (Chapter 4 Sections 4.13-15)

UNIT-V

Polynomial rings – Polynomial rings over U.F.D – Polynomials over Q. (Chapter 4 Sections 4.16 - 4.18)

Textbook

1. Arumugam S and Thangapandi Isaac A, Modern Algebra, SciTech Publications (India) Ltd., Chennai, Edition 2003.

References

1. I. N. Herstein, Topics in Algebra, Second Edition, John Wiley & Sons (Asia), 1975.
2. S. L. Santiago , Modern Algebra ,Tata McGraw-Hill publishing company Ltd, New Delhi, 2001.

(*70 percent theory and 30 percent problems*)

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA530211					Title of the Paper: ALGEBRA-II								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	5	3	5	2	5	4	2	2	5	2	2	3		3.46
CO2	3	4	3	4	5	4	3	3	3	4	3	2	3		3.61
CO3	4	5	2	4	4	5	4	4	3	5	2	3	3		3.69
CO4	4	5	3	5	3	4	3	5	4	4	3	2	2		3.61
CO5	3	5	4	5	2	5	4	3	4	5	2	3	3		3.69
CO6	5	4	3	4	2	4	4	3	4	4	3	2	2		3.38
													Mean Overall Score		3.57

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**
17UMA530212 **Credits: 4**

OPERATIONS RESEARCH

Course Outcomes:

* Learning Linear Programming Problems.
* Obtaining Optimal Solutions.
* Increasing the effectiveness of Management decisions
* Implementing Long Range Plans to solve problems
* Quantitative Analysis of decisions
* Learning Logical Analysis

UNIT-I

Linear programming problem - Mathematical formulation – Illustrations on Mathematical formulation on Linear Programming Problems – Graphical solution method - some exceptional cases - Canonical and standard forms of Linear Programming Problem - simplex method.

(Chapter 2 Sec 2.1 to 2.4, Chapter 3 Sec 3.1 to 3.5, Chapter 4 Sec 4.1 , 4.3)

UNIT-II

Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form -Dual simplex method.

(Chapter 4 Sec 4.4, Chapter 5 Sec 5.1 to 5.4, 5.9)

UNIT-III

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM - LCM -VAM) – Degeneracy in TP - Transportation Algorithm (MODI Method) - Assignment problem - Solution methods of assignment problem – special cases in assignment problem.

(Chapter 10 Sec 10.1, 10.2, 10.8, 10.9, 10.12, 10.13, Chapter 11 Sec 11.1to 11.4)

UNIT-IV

Queuing theory - Queuing system - Classification of Queuing models - Poisson Queuing systems Model I (M/M/1)(¥/FIFO) only - Games and Strategies – Two person zero sum - Some basic terms - the maximin-minimax principle -Games without saddle points-Mixed strategies - graphic solution 2xn and mx2 games.

(Chapter 21 Sec 21.1, 21.2, 21.7 to 21.9, Chapter 17 Sec 17.1 to 17.6)

UNIT-V

PERT and CPM – Basic components – logical sequencing - Rules of network construction- Critical path analysis - Probability considerations in PERT. (Chapter 25 Sec 25.1 to 25.4, 25.6, 25.7)

Textbook:

1. Kanti Swarup, P.K. Gupta and ManMohan,Operations Research, 13th edition, Sultan Chand and Sons, 2007.

References:

1. Sundaresan.V, Ganapathy Subramanian.K.S. and Ganesan.K, Resource ManagementTechniques,A.R. Publications, 2002.
2. Taha H.A., Operations Research: An introduction, 7th edition, Pearson Prentice Hall, 2002.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA530212					Title of the Paper: OPERATIONS RESEARCH								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	5	4	3	5	4	5	5	1	4	4	4	2	3		3.7
CO2	3	5	2	5	4	5	5	1	2	4	3	1	3		3.3
CO3	5	5	2	4	5	5	4	1	3	3	2	2	3		3.3
CO4	4	5	2	5	3	5	3	1	4	4	3	2	2		3.3
CO5	4	3	1	5	3	5	5	2	3	4	3	1	2		3.1
CO6	5	4	3	4	3	5	5	1	2	4	4	1	3		3.3
													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 V **Hours/Week: 4**
17UMA530302A **Credits: 4**

Core Elective (WS):
NUMBER THEORY

Course Outcomes:

* Learning Diophantine Equation.
* Coding through congruences.
* Chinese Remainder theorem.
* Properties of congruences.
* Fermat's theorem and Wilson's theorem.
* Mobius Inversion formula

Unit-I

Euclid's Division Lemma-Divisibility - The Linear Diophantine Equation - The Fundamental Theorem of Arithmetic.
(Sec 2.1-2.4 Pages 12-29)

Unit-II

Permutations and Combinations - Fermat's Little Theorem - Wilson's Theorem-Generating Functions. (Sec 3.1-3.4 Pages 30-44)

Unit-III

Basic Properties of Congruences - Residue Systems. Linear Congruences-The Theorems of Fermat and Wilson Revisited.
(Sec 4.1-4.2 Pages 49-55; Sec 5.1-5.2 Pages 58-65)

Unit-IV

The Chinese Remainder Theorem-Polynomial Congruences-Combinatorial Study of F(n). (Sec 5.3-5.4 Pages 66-74, Sec 6.1 Pages 75-81)

Unit-V

Formulae for d(n) and s(n)-Multiplicative Arithmetic Function-The Mobius Inversion Formula. (Sec 6.2-6.3 Pages 82-92)

Textbook:

1. George E. Andrews, Number Theory, Hindustan Publishing Corporation, 1984.

References:

1. S.B.Malik, Basic Number Theory, Vikas Publishing House Private Limited, 1998.
2. K.C.Chowdhury, A First Course Theory of Numbers, Asian Books Private Limited, 2007.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA530302A					Title of the Paper: Core Elective (WS): NUMBER THEORY								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	4	3	3	3	4	3	4	4	3	3	3		3.3
CO2	4	4	3	3	3	4	3	4	3	3	4	3	4		3.5
CO3	3	3	3	4	3	4	3	3	3	4	3	3	4		3.3
CO4	3	3	3	4	3	3	3	4	3	4	3	3	3		3.3
CO5	4	4	3	3	3	4	3	3	4	3	3	4	4		3.5
CO6	3	3	4	4	3	3	4	3	4	3	4	3	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 V **Hours/Week: 4**
17UMA530302B **Credits: 4**

Core Elective (WS): LOGIC AND BOOLEAN ALGEBRA

Course Outcomes:

* Basic Concepts of True and False logical statements.
* Finding Tautology statements.
* Knowledge in Theory of inferences.
* Knowledge in Lattices and its properties.
* Ideas of Partially ordered sets and lattices
* Ideas of Boolean Algebra

Unit-I: Logic

Introduction-TF-Statements-Connectives-Truth table.
(Chapter IX - Sections 1, 2, 3, 6).

Unit-II: Normal forms

Tautology-Tautological Implications and Equivalence of formulae-Normal forms. (Chapter IX - Sections 7, 8, 11).

Unit-III: Theory of Inference

Principal Normal Forms-Theory of Inference-Quantifiers.
(Chapter IX - Sections 12, 13, 15).

Unit-IV: Relations and Lattices

Relations-Equivalence Relation-Lattices-Some Properties of Lattices.
(Chapter II - Sections 2, 5) and(Chapter X - Sections 1, 2).

Unit-V: Boolean Algebra

New Lattices-Modular and Distributive Lattices- Boolean Algebras.
(Chapter X - Sections 3, 4, 5).

Text Book:

1. M. K.Venkataraman, N. Sridharan and N. Chandrasekaran, Discrete Mathematics, The National Publishing Company-2000.

Reference Book:

1. C.L.Liu, Elements of Discrete Mathematics, McGraw-Hill Book Company second edition, 1977.
2. "Discrete Mathematical Structures": Tremblay and Manohar, Tata McGraw Hill.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA530302B				Core Elective (WS): LOGIC AND BOOLEAN ALGEBRA								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	3	3	4	3	3	4	2	3	3	4	4	3	3.38
CO2	4	3	3	5	4	4	3	3	2	2	4	5	2	3.38
CO3	4	5	3	4	5	3	3	2	3	2	2	3	2	3.15
CO4	4	3	3	5	3	2	4	5	2	4	2	3	3	3.30
CO5	5	4	2	3	4	5	3	3	3	5	4	3	3	3.62
CO6	4	5	3	4	5	2	3	3	3	2	2	3	4	3.31
												Mean Overall Score		3.35

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 V **Hours/Week: -**
17UMA530213 **Credits: 2**

Self-Paced Learning:
HISTORY OF MATHEMATICS
(On-line Partial Course)

Course Outcomes:

* Life of Newton, Gauss,Riemann and Euler..
* Acquaintance with the development of Algebra.
* Familiarity of Invention of Differential Calculus.
* The life of Eratosthenes and Dirichlet .
* The life of Henri Poincare, Emmy Noether.
* Learning the great achievements of Mathematicians

UNIT – I

Isaac (Sir) Newton 1642-1727) England- Archimedes of Syracuse (287-212 BC) Greek domain- Johann Carl Friedrich Gauss (1777-1855) Germany – Leonhard Euler (1707-1783) Switzerland- Georg Friedrich Bernhard Riemann (1826-1866) Germany- Joseph-Louis (Comte de) Lagrange (1736-1813) Italy, France – Euclid of Alexandria (ca 322-275 BC) Greece/Egypt- David Hilbert (1862-1943) Prussia, Germany- Gottfried Wilhelm von Leibniz (1646-1716) Germany

UNIT- II

Pierre de Fermat (1601-1665) France- Évariste Galois (1811-1832) France- René Descartes (1596-1650) France- Johann Peter Gustav Lejeune Dirichlet (1805-1859) Germany- Srinivasa Ramanujan Iyengar (1887-1920) India- Carl G. J. Jacobi (1804-1851) Germany- Brahmagupta 'Bhillamalacarya' (589-668) Rajasthan (India)

UNIT- III

Georg Cantor (1845-1918) Russia, Germany – Augustin-Louis Cauchy (1789-1857) France – Arthur Cayley (1821-1895) England – Pythagoras of Samos (ca 578-505 BC) Greek domain – Aryabhata (476-550) Ashmaka & Kusumapura (India) – Leonardo 'Bigollo' Pisano (Fibonacci) (ca 1170-1245) Italy – William Rowan (Sir) Hamilton (1805-1865) Ireland – Diophantus of Alexandria (ca 250) Greece, Egypt

UNIT –IV

Bháscara Áchárya (1114-1185) India – Jean-Baptiste le Rond d' Alembert (1717-1783) France – Joseph Liouville (1809-1882) France – Ferdinand Gotthold Max Eisenstein (1823-1852) Germany – Jacob Bernoulli (1654-

1705) Switzerland – Johannes Kepler (1571-1630) Germany – Jacques Salomon Hadamard (1865-1963) France – Jean Baptiste Joseph Fourier (1768-1830) France

UNIT- V

Albert Einstein (1879-1955) Germany, Switzerland, U.S.A. – Galileo Galilei (1564-1642) Italy – Henri Léon Lebesgue (1875-1941) France – Johann Bernoulli (1667-1748) Switzerland – Felix Hausdorff (1868-1942) Germany – George Pólya (1887-1985) Hungary – Siméon Denis Poisson (1781-1840) France – Adrien Marie Legendre (1752-1833) France

Text Book

1. http://fabpedigree.com/james/mathmen.htm#

References

1. C.B. Boyer and U. Merzbach, History of Mathematics, John Wiley & Sons, New York, 1988.
2. E.T. Bell, Men of Mathematics, Penguin Books Ltd., Hardmondsworth, Middlesex, UK, 1953.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA530213	Title of the Paper: Self-Paced Learning; HISTORY OF MATHEMATIS (On-line Partial Course)											Hours -	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	4	5	5	1	5	4	3	4	4	4	2	3	3.7
CO2	5	4	5	5	1	3	5	2	2	4	3	1	3	3.3
CO3	4	5	5	4	1	5	5	2	3	3	2	2	3	3.3
CO4	5	3	5	3	1	4	5	2	4	4	3	2	2	3.3
CO5	5	3	5	5	2	4	3	1	3	4	3	1	2	3.1
CO6	4	3	5	5	1	5	4	3	2	4	4	1	3	3.3
												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 V **Hours/Week: 2**
17UMA540601A **Credits: 2**

MATHEMATICS FOR COMPETITIVE EXAMINATIONS

Course Outcomes:

* Problem solving techniques for aptitude problems.
* Prepare themselves for various competitive examinations.
* Applications of simple formulae
* Acquaintance to various elementary concepts
* Acquaintance to shortcut methods
* To improve and learn basic mathematics skills.

UNIT-I

Simplification-Introduction-Solved problems-Exercise.

UNIT-II

Average – Problems on Ages-Introduction-Worked Problems-Test Problems.

UNIT-III

Percentage – Profit & Loss-Introduction-Formula-Solved Problems.

UNIT-IV

Ratio & Proportion – Partnership-Introduction-Worked Problems-Practice Problems.

UNIT-V

Simple interest –Compound interest-Introduction-Formula-Solved Problems-Test Questions.

Text Book:

1. Quantitative Aptitude For Competitive Examinations (Fully Solved), R.S. Aggarwal Chapters:4, 6, 8, 10, 11, 12, 13, 21, 22.

Reference Books:

1. Abhijit Guha, Quantitative Aptitude For Competitive Examination, Mc Graw Hill Education Series, 5th Edition.
2. Rakesh Yadav, Advanced Maths for General Competetions, KD Publication (2016)

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA540601A			Title of the Paper: MATHEMATICS FOR COMPETITIVE EXAMINATIONS								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	4	3	4	4	4	3	4	3	4	4	4	3.77
CO2	4	4	4	5	3	4	4	3	4	4	4	4	4	3.92
CO3	4	4	4	3	5	4	3	3	4	4	3	3	3	3.38
CO4	4	4	3	3	5	3	3	4	3	4	4	4	4	3.69
CO5	4	4	4	4	5	3	3	3	3	4	4	4	4	3.77
CO6	4	4	4	4	5	3	3	3	4	4	4	4	4	3.85
												Mean Overall Score		3.73

Result: The Score for this Course is 3.73 (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**
17UMA540601B **Credits: 2**

MATLAB APPLICATIONS

Course Outcomes:

* The Mathematical software MATLAB for high-performance numerical computations and visualization.
* MATLAB built-in functions provided to solve all types of scientific problems.
* Knowledge and writing Program in MATLAB.
* Knowledge in Applications of MATLAB in numerical integration.
* Knowledge in graphical applications using MATLAB.
* Applications of MATLAB in Data Analysis

Unit-I:

Introduction: Basic of MATLAB- MATLAB Windows-Online help-Input-Output, Files types-Plat for Dependence-General commands.
Chapter I Section 1.6.

Unit-II:

Interactive Computation: Matrices and Vectors-Matrices and Array Operations-Character Strings-A Special note on array Operators-Command line functions-Using built in fuctions and online help-Saving and loading data-plotting Simple graphs.
Chapter III Section: 3.1-3.8.

Unit-III:

Programming in MATLAB: Scripts and functions-Script files-Function files-Language Specific features—Advanced Data objects.
Chapter IV. Section 4.1-4.4.

Unit-IV:

Applications: Linear Algebra-Curve fitting and interpolation-Data Analysis and Statistics-Numerical Integration-Ordinary Differential Equations-Non linear Algebraic Equations.
Chapter V. Section 5.1_5.6.

Unit V:

Graphics: Basic 2-D plots-Using subplot to layout multiple graphs-3-D plots-Handle graphs-Saving and Printing graphs-Errors.
Chapter VI. Section l 6.1-6.6 and 7.

Textbook:

1. Rudra Pratap, Getting started with MATLAB 7, Oxford Uni. Press, 2008.

References:

1. Brain R Hunt, Ronald L Lipsman and Jonathan M Rosenberg, A Guide to MATLAB for Beginners and Experienced Users, Cambridge University Press, 2003
2. MATLAB, An Introduction with Applications, Amos Gilat, John Wiley & Sons 2009.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester V	Course Code 17UMA540601B					Title of the Paper: MATLAB APPLICATIONS								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	3	5	4	5	4	3	4	4	4	2	4		3.8
CO2	4	5	2	5	4	5	4	3	2	4	3	1	4		3.5
CO3	4	5	3	4	4	5	4	3	3	3	2	2	4		3.5
CO4	4	5	2	5	3	5	4	3	4	4	3	2	4		3.7
CO5	4	3	2	5	3	5	5	3	3	4	3	1	4		3.5
CO6	4	4	3	4	3	5	5	3	2	4	4	1	4		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:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester V **L P C**
17USS540701A **2 - 2**

Inter Departmental Courses (IDC):
SOFT SKILLS

Course Outcomes

1. To augment the level of confidence in articulation oif the students in their communication.
2. To ensure that the students learn to speak and interact with one another as social beings
3. To equip them and train to present the best of themselves as job seekers.
4. To equip with conversation techniques, presentation skills and grooming
5. To prepare them write their own resume and enhance their interview skills required by employers
6. To ensure that the students learn the parameters of group dynamics a key component of conversation

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**

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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: 7**
17UMA630214 **Credits: 4**

COMPLEX ANALYSIS

Course Outcomes:

* Behavior of complex-valued functions.
* Properties of Bilinear Transformations.
* Cauchy's theorem and its consequences
* Series Expansions and singularities
* Evaluation of Definite Integrals
* Foundations of Complex Analysis

UNIT-I

Continuous Functions – Differentiability – Cauchy-Riemann Equations – Analytic Functions - Harmonic Functions. (Chapter II, Sections 2.4-2.8, pp. 30-67)

UNIT-II

Conformal Mapping - Bilinear Transformations - Cross ratio – Fixed Points of Bilinear Transformations. (Chapter II, Section 2.9, Chapter III, Section 3.2 - 3.4, pp. 67-75, 82-94)

UNIT-III

Definite Integral-Cauchy's Theorem - Cauchy's Integral Formula - Higher Derivatives. (Chapter VI, Section 6.0 -6.4, pp.132-172)

UNIT-IV

Taylor's Series - Laurent's Series - Zeros of Analytic Functions - Singularities. (Chapter VII, Section 7.0-7.4, pp.173-208)

UNIT-V

Residues - Cauchy's Residue Theorem - Evaluation of Definite Integrals (poles not lying on the real axis) (Chapter VIII, Section 8.0-8.3, pp. 209-255)

Textbook:

1. S.Arumugam, A.Thangapandi Isaac and A.Somasundaram, Complex Analysis, SciTech Publications (India) Pvt.Ltd, 2002.

References:

1. S. *Narayanan* and T.K.Manickavasagam *Pillai*, Complex Analysis, S.Viswanatha printers and publishers Pvt.Ltd., 2007.
2. P.Duraipandian, Laxmi Duraipandian, D.Muhilan, Complex Analysis, Emerald Publishers, Revised Edition, 2001.
3. Murray R.Spiegel, Theory and Problems of Complex Variables, Schaum's Outline Series, McGraw Hill book Company, 1964.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA630214					Title of the Paper: COMPLEX ANALYSIS								Hours 7	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	5	3	4	4	4	4	3	3	5	3	2	2		3.5
CO2	4	4	3	4	4	4	4	3	2	4	3	2	2		3.3
CO3	3	5	3	4	4	5	4	3	2	4	2	2	2		3.3
CO4	4	4	3	5	4	4	5	2	2	4	3	2	2		3.4
CO5	4	4	3	4	4	5	5	3	2	4	3	2	2		3.5
CO6	5	4	3	4	4	4	4	4	3	4	3	3	2		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:

$$\text{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \text{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester VI **Hours/Week: 5**
17UMA630215 **Credits: 3**

COMPUTER ORIENTED NUMERICAL METHODS WITH 'C' PROGRAMMING

Course Outcomes:

* Basics of C programming and various data types and operators in C language.
* Knowledge on Decision making-branching and looping statements in C programming and the concept of arrays.
* Learn to handle character strings and the concept of user define functions.
* Concepts of curve fitting, finding solution to numerical, algebraic and transcendental equations and to solve simultaneous linear equations.
* Solution of Ordinary Differential Equations using numerical methods and gets introduced to interpolation and numerical Integration.
* Creating simple 'C' Programmes for solving problems in numerical methods,

Unit I

Structure of C programs - Constants, Variables and Data types - Operators and Expressions - Mathematical functions - Input and output operators– *Temperature conversion*. (Chapters 1-4)

Unit II

Decision making and Branching - IF statements – GOTO statement - *Solving Quadratic equations* - Decision making and looping- WHILE, DO, FOR statements - *Prime numberChecking* -Arrays- *series expansions of cos x and sin x- Fibonacci series - numbers inascending order - L.C.M. , G.C.D. - Mean and S.D. - Matrix addition, subtraction andmultiplication* (Chapters 5-7)

Unit III

Handling of character strings - Arithmetic operations on characters- *Palindrome verification* -String handling functions - *Names in alphabetical order* - User defined functions -Recursion - nC_r *and* nP_r. (Chapters 8-9).

Unit IV

Curve fitting-Linear and parabolic curves by the method of least squares principle - Solving algebraic and transcendental equations - Bisection method, false position method and Newton Raphson method - Solving simultaneous algebraic equations - Gauss elimination method- Gauss seidel method. (Chapter 1 Sections 1.7,1.8,

Chapter 3 Sections 2, 4 and 5, Chapter 4 Sections 2 and 6. In Chapter 4 omit Gauss Jordan method in section 2 and omit Gauss Jacobi method in section 6).

Unit V

Interpolation - Newton's forward and backward difference formulae - Lagrange's interpolation formula – Numerical intergration using Trapezoidal and Simpson's one-third rules - Solution of ODE s - Euler method and Runge-Kutta fourth order method (Chapter 6 Sections 3,4, Chapter 8 Section 4, Chapter 9 Sections 8,10, Chapter 11 Sections 10,16)

Note:

1) For Numerical methods: Problems and Programs only.
2) For topics in italics- programs only.

Textbooks:

1. E. Balagurusamy, Programming in ANSI C, Sixth edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 2012. (For Units I, II and III).
2. M.K.Venkatraman, Numerical methods in Science and Engineering, National Publisher Company, Fifth Edition, 2001. (For Units IV and V).

References:

1. Yashavant.P.Kanetkar, Let us 'C', BPB Publications, 2002.
2. Rajaraman, Computer oriented numerical methods, Prentice-Hall of India, 1971.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA630215	Title of the Paper: COMPUTER ORIENTED NUMERICAL METHODS WITH 'C' PROGRAMMING											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	2	3	3	4	4	4	3	4	3	2	4	4	1	3.2
CO2	2	2	2	5	3	4	4	4	4	3	5	4	2	3.4
CO3	3	3	3	4	3	4	5	5	5	4	5	4	2	3.8
CO4	2	2	4	3	4	2	5	5	3	3	5	2	2	3.2
CO5	2	2	3	3	3	2	5	5	4	4	5	2	3	3.3
CO6	3	3	4	4	4	3	5	5	5	5	5	3	3	4.0
												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: 2**
17UMA630216 **Credits: 1**

COMPUTER LAB: 'C' PROGRAMMING

Course Outcomes:

* The students learn to write C programs to solve quadratic equations, generating Fibonacci series, Prime numbers checking, finding mean, S.D and median, sorting numbers, series expansion of sinx and cosx etc.,
* The students learn to write C programs for matrix manipulations, palindrome verification, computing nC_r , nP_r using function subprograms.
* The students learn to write C programs to solve numerical, algebraic and transecendental equations and to solve simultaneous linear equations using numerical methods.
* The students learn to write C programs for numerical Integration.
* The students learn to write C programs to solve Ordinary Differential Equations numerically and Interpolation.
* Learning to rectify the errors in 'C' Programming.

LIST OF PRACTICALS:

1. Finding the mean and S.D. of n values.
2. Finding Correlation coefficients.
3. Arranging n numbers in ascending order and finding the median value.
4. L.C.M. and G.C.D. of two numbers.
5. Prime number Checking.
6. nC_r and nP_r using function subprogram.
7. Fibonacci series.
8. Finding cos x and sin x from series expansions.
9. Arranging the names in alphabetical order.
10. Matrix addition, subtraction and multiplication.
11. Palindrome verification.
12. Solving quadratic equations.
13. Newton – Raphson method - Bisection method - False position method of solving equations.
14. Gauss elimination method - Gauss-Seidel method of solving simultaneous equations.
15. Trapezoidal rule and Simpson's rule of integration.
16. R.K.Fourth order method of solving differential equations.
17. Lagrange's method of interpolation.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA630216					Title of the Paper: COMPUTER LAB (C-PROGRAMMING)								Hours 2	Credits 1
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	5	5	4	3	4	4	2	3	4	2	2	3	3.4	
CO2	5	4	5	3	5	4	4	2	3	4	3	2	2	3.5	
CO3	4	3	5	4	3	4	4	2	3	4	3	2	3	3.4	
CO4	5	4	3	4	5	4	4	3	2	4	3	2	2	3.5	
CO5	3	4	5	4	4	4	4	3	2	4	3	2	2	3.4	
CO6	5	3	4	3	3	3	3	3	3	4	3	3	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 VI **Hours/Week: 6**
17UMA630217 **Credits: 4**

LINEARALGEBRA

Course Outcomes

* Introduction to vector spaces.
* Concept of the dimension of the vector space.
* Basic Concepts of matrix theory.
* Introduction and properties of inner product spaces.
* Cayley Hamilton Theorem, Eigen values and eigen vectors.
* Concepts of Eigen Values and Eigen Vectors

Unit I:

Vector spaces:

Linear Transformation – Definition and examples – Subspaces - Span of a set.

(Chapter 5, Sec 5.1 to 5.4)

Unit II:

Basis and Dimension:

Linear Independence – Basis and Dimension – Rank and Nullity.

(Chapter 5, Sec 5.5 to 5.7)

Unit III:

Matrix and Inner product space:

Matrix of a linear transformation – Inner product space – Definition and examples – Orthogonality - Orthogonal Complement.

(Chapter 5, Sec 5.8, Chapter 6, Sec 6.1 to 6.3)

Unit IV:

Theory of Matrices:

Algebra of Matrices - Types of Matrices – The Inverse of a Matrix – Elementary Transformations – Rank of a matrix.

(Chapter 7 Sec 7.1 to 7.5)

Unit V:

Characteristic equation and bilinear forms:

Characteristic equation and Cayley Hamilton theorem – Eigen values and Eigen vectors – Bilinear forms – Quadratic forms. (Chapter 7, Sec 7.7, 7.8 Chapter 8, Sec 8.1, 8.2)

Textbook:

1. Arumugam S and Thangapandi Isaac A, Modern Algebra, SciTech Publications (India) Ltd., Chennai, Edition 2012.

References:

1. I. N. Herstein,Topics in Algebra, Second Edition, John Wiley & Sons (Asia), 1975.
2. S.Kumaresan, Linear Algebra-A Goemetric Approach.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA630217					Title of the Paper: LINEAR ALGEBRA								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	PSO7	PSO8		
CO1	4	4	3	4	3	3	4	3	3	3	3	2	3		3.2
CO2	4	4	3	4	2	3	4	3	3	4	3	3	2		3.2
CO3	4	4	4	4	3	4	3	3	3	4	3	2	3		3.4
CO4	4	4	3	4	3	4	4	3	3	4	3	3	2		3.4
CO5	3	4	3	4	3	4	4	3	2	4	3	3	2		3.2
CO6	4	4	3	4	2	4	4	3	3	4	3	2	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:

$$\textbf{Mean Score of COs} = \frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}} \qquad \textbf{Mean Overall Score for COs} = \frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$$

Semester VI **Hours/Week: 4**
17UMA630218 **Credits: 3**

GRAPH THEORY

Course Outcomes:

* Introduction to Graphs.
* Concept of Eulerian graphs
* Concept of Hamiltonian graphs
* Planar graph concept is learned.
* Applications of graph theory.
* Relation between Matrices and Graph Theory.

UNIT-I: Graphs:

Introduction - The Konigsberg Bridge Problem - Definition and Examples - Degrees - Subgraphs - Isomorphism. (Sec 1.0, 1.1, 2.0, 2.1, 2.2, 2.3, 2.4)

UNIT-II: Matrices and Eulerian graphs:

Matrices - Operations on Graphs - Walks, Trails and Paths - Connectedness and Components - Eulerian Graphs. (Sec 2.8, 2.9, 4.1, 4.2, 5.0, 5.1)

UNIT-III: Hamiltonian graphs and Trees:

Hamiltonian Graphs (Omit Chavatal Theorem) - Characterization of Trees - Centre of Tree. (Sec 5.2, 6.1, 6.2)

UNIT-IV: Planar graphs:

Introduction - Definition and Properties - Characterization of Planar Graphs. (Sec 8.0, 8.1, 8.2)

UNIT-V: Directed Graphs and Applications:

Definitions and Basic Properties - Some Applications: Connector Problem - Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm. (Sec 10.0, 10.1, 11.1, 11.2)

Textbook:

1. S. Arumugam and S. Ramachandran,Invitation to Graph Theory, SciTech Publications (India) Pvt. Ltd., Chennai, 2006.

References:

1. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India, 2004.
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory,Tata McGraw-Hill Edition, 2004

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA630218					Title of the Paper: GRAPH THEORY								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	3	4	3	5	3	5	4	5	2	3	2		3.54
CO2	4	4	2	2	4	4	4	3	2	4	2	2	3		3.08
CO3	5	4	3	2	3	4	2	3	2	4	3	2	3		3.07
CO4	4	4	2	4	4	3	2	3	3	4	2	2	3		3.08
CO5	5	4	3	3	5	4	3	3	4	3	5	2	3		3.62
CO6	5	4	2	4	4	4	4	4	4	3	4	2	5		3.77
												Mean Overall Score			3.36

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: 4**
17UMA630303A **Credits: 4**

FUZZY THEORY

Course Outcomes:

* Fuzzy knowledge in decision making process.
* The concepts of Fuzzy Sets and operations on these sets.
* Knowledge of applications of Fuzzy Sets and relations to real life systems.
* Knowledge of fuzzy graphs.
* Applications of fuzzy theory in probability.
* Ranking of Fuzzy numbers and its applications.

Unit-I:

Fuzzy Set Theory: Fuzzy sets - Fuzzy set: definition - Different Types of Fuzzy sets - General Definitions and Properties of Fuzzy Sets – Other Important Operations - General Properties: Fuzzy Vs Crisp.

(Chapter 1: Sections 1.16 to 1.21)

Unit-II:

Operations on Fuzzy Sets: Introduction - Some Important Theorems - Extension Principle for Fuzzy Sets - Fuzzy Compliments – Further Operations on Fuzzy Sets. (Chapter 2: Sections 2.1 to 2.5)

Unit-III:

Fuzzy Relations and Fuzzy Graphs: Introduction - Projections and Cylindrical Fuzzy Relations - Composition - Properties of Min-Max Composition - Binary Relations on a Single Set - Compatibility Relation. (Chapter 4: Sections 4.1 to 4.6)

Unit-IV:

Possibility Theory: Introduction - Fuzzy Measures - Evidence Theory – Probability Assignment – Combined Evidence - Probability Measure - Possibility and Necessity Measures. (Chapter 5: Sec. 5.1 to 5.8)

Unit-V:

Decision Making in Fuzzy Environment: Introduction- Individual Decision Making – Multi person Decision Making – Multi criteria Decision Making - Fuzzy Ranking Method - Fuzzy Linear Programming. (Chapter 9: Sections 9.1 to 9.6)

Textbook:

1. Pundir and Pundir, Fuzzy sets and their Applications, A Pragati Edition, 2006.

References:

1. H. J. Zimmermann, Fuzzy set theory and its applications, Springer Fourth Edition, 2001.
2. Timothy J. Ross, Fuzzy logic with engineering Applications, McGraw Hill Inc. New Delhi, 2004.
3. George J. Klir and Bo Yuan, Fuzzy sets and fuzzy logic theory and Applications, PrenticeHall of India, New Delhi, 1995.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA630303A					Title of the Paper: FUZZY THEORY								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	5	2	3	4	4	4	3	2	4	3	2	4		3.30
CO2	4	5	2	4	4	4	4	2	2	3	2	1	3		3.07
CO3	4	4	2	5	3	4	4	2	2	4	4	2	4		3.23
CO4	4	4	2	4	4	3	4	3	3	5	4	2	4		3.53
CO5	3	4	1	3	4	4	4	3	2	5	3	2	4		3.23
CO6	4	4	2	4	4	3	5	2	2	4	3	2	3		3.23
													Mean Overall Score		3.26

Result: The Score for this Course is 3.26 (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: 4**
17UMA630303B **Credits: 4**

OPTIMIZATION TECHNIQUES

Course Outcomes

* Understanding sequencing problems and its applications.
* Studying the dynamic programming with different approaches.
* Using optimization techniques in decision making.
* Solving replacement problems of different types.
* Understanding nonlinear programming problems and its applications.
* Applications to solve real life problems

Unit-I:

SEQUENCING PROBLEMS

Introduction - Problem of Sequencing – Basic Terms Used in Sequencing – Processing n jobs through Two Machines - Processing n jobs through k Machines - Processing 2 jobs through k Machines (Chapter 12, Sections 12.1 to 12.6).

Unit-II:

DYNAMIC PROGRAMMING

Introduction – The Recursive Equation Approach –Characteristics of Dynamic Programming - Dynamic Programming Algorithm (Chapter 13, Sections 13.1 to 13.4).

Unit-III:

DECISION ANALYSIS

Introduction – Decision – making Problem - Decision – making Process - Decision – making Environment - Decision underUncertainty (Chapter 16, Sections 16.1 to 16.5).

Unit-V:

REPLACEMENT PROBLEMS

Introduction – Replacement of Equipment/Asset That Deteriorates Gradually - Replacement of Equipment That fails suddenly (Chapter 18, Sections 18.1 to 18.3).

Unit-V:

NON LINEAR PROGRAMMING PROBLEMS

Introduction – Graphical solution–Kuhn-Tucker conditions with non-negative constraints –Quadratic programming (Chapter 28, Sections 28.1 to 28.4).

Text Book:

1. Operations Research by Kanti Swarup, P.K. Gupta, Man Mohan, Sixteenth Thoroughly Revised Edition, Sultan Chand & Sons, Educational Publishers,New Delhi.

References:

1. Operation Research: An introduction by Hamely A Taha, Ninth Edition, Prentice Hall, New Delhi, 2011.
2. Resource Management Techniques, by V. Sundaresan, K.S. Subramaniyan, K. Ganesan, New Revised Edition, A.R. Publications, Sirkali, 2002.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA630303B					Title of the Paper: OPTIMIZATION TECHNIQUES								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	4	4	3	4	4	4	3	3	4	3	3	4		3.6
CO2	4	4	3	4	4	4	4	4	3	5	4	3	4		3.8
CO3	5	4	4	4	4	5	4	3	4	4	3	4	4		4.0
CO4	4	4	3	4	4	4	4	3	4	4	4	3	4		3.6
CO5	4	5	3	5	4	4	5	4	4	5	4	3	4		4.2
CO6	5	4	4	4	4	5	4	4	4	5	3	3	4		4.4
											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 VI **Hours/Week: 2**
17UMA640602A **Credits: 2**

MATHEMATICS FOR COMPETITIVE EXAMINATIONS (ADVANCED)

Course Outcomes:

* Problem solving techniques for aptitude problems.
* Prepare themselves for various competitive examinations.
* Applications of simple formulae
* Acquaintance to various elementary concepts
* Acquaintance to shortcut methods
* Applying the techniques in real life problems

UNIT-I

Time & work : Introduction – Solved Problems – Practice Problems.

Unit-II

Pipes & cisterns : Introduction – Worked Examples – Exercise.

UNIT-III

Time & distance : Introduction – Formula – Solved Problems – Exercises.

UNIT-IV

Problems on Trains : Introduction – Solved Problems – Test Questions.

UNIT-V

Boats & streams : Introduction – Formula – Practice Problems.

Text Book::

1. Quantitative Aptitude For Competitive Examinations (Fully Solved), R. S. Aggarwal, Chapters: 15, 16, 17, 18, 19.

Reference Books:

1. Abhijit Guha, Quantitative Aptitude For Competitive Examination, Mc Graw Hill Education Series, 5th Edition.
2. Rakesh Yadav, Advanced Maths for General Competetions, KD Publication. (2016)

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA640602A					Title of the Paper: MATHEMATICS FOR COMPETITIVE EXAMINATIONS (Skill-based Electives)								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	2	4	4	3	1	4	2	2	3	3	
CO2	4	4	4	4	3	3	3	2	2	4	2	2	2	3	
CO3	2	3	2	3	3	2	4	2	2	3	2	2	3	3	
CO4	3	4	2	3	3	3	4	3	2	4	2	2	3	3	
CO5	4	3	2	3	3	4	4	2	2	4	2	2	2	3	
CO6	4	4	3	4	4	4	4	2	2	4	3	3	3	3	
													Mean Overall Score		3

Result: The Score for this Course is 3 (Moderate 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**
17UMA640602B **Credits: 2**

LaTeX

Course Outcomes:

* Introductory Concepts of LaTeX software for documentation.
* LaTeX programming skills.
* Latex Commands
* Various Page Styles
* Designing Books and Slides
* Drawing Pictures

Unit-I:

Getting Acquainted : How to Avoid Reading This Book - How to Read This Book - The Game of the Name - Turning Typing into Typography - Why LaTeX? - Turning Ideas into Input - Trying It Out - Getting Started : Preparing an Input File - The Input - The Document - Running LaTeX - Helpful Hints

Unit-II :

Carrying On : Changing the Type Style - Symbols from Other Languages - Mathematical Formulas - Defining Commands and Environments - Figures and Other Floating Bodies Lining It Up in Columns - Simulating Typed Text

Unit-III :

Moving Information Around : The Table of Contents - Cross-References - Bibliography and Citation - Splitting Your Input - Making an Index or Glossary - Keyboard Input and Screen Output - Sending Your Document - Other Document Classes - Books - Slides - Letters

Unit-IV :

Designing It Yourself : Document and Page Styles - Line and Page Breaking - Numbering - Length, Spaces, and Boxes - Centering and Flushing - List-Making Environments - Fonts

Unit-V:

Pictures and Colors : Pictures - The picture Environment - Picture Objects - Curves - Grids - Reusing Objects - Repeated Patterns - Some Hints on Drawing Pictures - The graphics Package - Color

Textbook:

1. Leslie Lamport, LaTeX : A Document Preparation System, Addison-Wesley Publishing, Second edition, 1994.

References:

1. H. Kopka and P.W. Daly, A Guide to LaTeX, Addison-Wesley, 2003
2. Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle, Chris Rowley, The LaTeX Companion Addison-Wesley Professional 2004.

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Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

Semester VI	Course Code 17UMA640602B			Title of the Paper: LaTeX (Skill-based Electives)									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	2	5	4	5	4	3	4	4	4	1	4	3.7
CO2	4	4	2	5	4	5	4	3	2	4	3	1	4	3.5
CO3	4	4	2	4	4	5	4	3	3	3	2	1	4	3.3
CO4	4	4	2	5	3	5	4	3	4	4	3	1	4	3.5
CO5	4	3	2	5	3	5	5	3	3	4	3	1	4	3.5
CO6	4	4	2	4	3	5	5	3	2	4	4	1	4	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:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	**Mean Overall Score for COs** = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

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