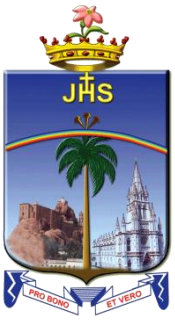
B.Sc. MATHEMATICS

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.