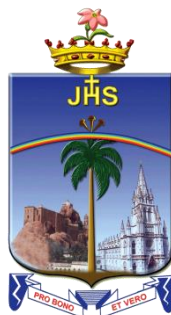


**B.Sc. COMPUTER SCIENCE
LOCF SYLLABUS – 2021**

**SCHOOLS OF EXCELLENCE
WITH CHOICE BASED CREDIT SYSTEM (CBCS)**



**DEPARTMENT OF COMPUTER SCIENCE
SCHOOL OF COMPUTING SCIENCES
ST. JOSEPH'S COLLEGE (AUTONOMOUS)**

Special Heritage Status Awarded by UGC
Accredited at A⁺⁺ Grade (IV Cycle) by NAAC
College with Potential for Excellence by UGC
DBT-STAR & DST-FIST Sponsored College
Tiruchirappalli - 620 002, Tamil Nadu, India

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

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

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

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

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

The existing curricular structure as specified by TANSCHÉ 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-2 is 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	K1	K2	K3	K4	K5	K6	Total Marks
SECTIONS							
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	K1	K2	K3	K4	K5	K6	Total Marks
SECTIONS							
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:

$GPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$	$WAM \text{ (Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$
<p>Where,</p> <p>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.</p>	

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 Programme.
- 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
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appearance

Credit based weighted Mark System 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 is done from the CO attainment of all curriculum components. The POs/PSOs are framed based on the guidelines of LOCF. There are five POs UG programme and five POs for PG programme framed by the college. PSOs are framed by the departments and they are five in numbers.

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

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

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

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

VISION

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

MISSION

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

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

PROGRAMME OUTCOMES (POs) UG

1. Graduates will be able to comprehend the concepts learnt and apply in real life situations with analytical skills.
2. Graduates with acquired skills and enhanced knowledge will be employable/ become entrepreneurs or will pursue higher Education.
3. Graduates with acquired knowledge of modern tools communicative skills and will be able to contribute effectively as team members.
4. Graduates are able to read the signs of the time analyze and provide practical solutions.
5. Graduates imbued with ethical values and social concern will be able to understand and appreciate social harmony, cultural diversity ensure sustainable environment.

Programme Specific Outcomes (PSOs)

After completing the BSc Computer Science Programme, the graduates would have

- PSO 1: acquired the required knowledge in the Hardware and Software aspects of Computer Science domain and the art of programming.
- PSO 2: understood the development methodologies of software systems and the ability to analyse, design and develop computer applications for real life problems.
- PSO 3: knowledge and skills to collaborate and communicate with peers for performance enhancement in IT / ITES industries.
- PSO 4: ability to understand, adjust and adapt with the dynamic technical environment for the growth of IT industry.
- PSO 5: capacity to transfer the skills gained, to provide innovative and novel solutions by maintaining ethical norms for the betterment of humane society.

B. Sc. COMPUTER SCIENCE						
PROGRAMME STRUCTURE						
Part	Sem.	Specification	No. of Courses	No. of Hours	Credits	Total Credits
I	1-IV	Languages (Tamil / Hindi/ French/ Sanskrit)	4	16	12	12
II	I-IV	General English	4	20	12	12
	I –VI	Core course : Theory	12	50	31	
	I –VI	Core course : Practical	7	21	14	
	I-IV	Core course- Allied /(Practical)	6	24	16	
	V-VI	Discipline Specific Elective	4	20	12	
	VI	Project Work	1	3	2	
	V	Self-paced learning	1	--	2	
	V	Field study/ Industrial visit/ Case study	1		1	
	V	Internship	1	-	2	
	VI	Comprehensive Exam	1	--	2	
III	II, III,V	Extra Credit courses (MOOC)	(3)	--	(6)	(6)
	V,VI	Generic Elective	2	8	6	
	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	
IV	1-V	Outreach Programme /NCC	-	-	4	4
		Total		180		130(6)

B. Sc. COMPUTER SCIENCE								
PROGRAMME PATTERN								
Course Details						Scheme of Exams		
Sem	Part	Course Code	Course Title	Hrs	Cr	CIA	SE	Final
I	1	21UTA11GL01	General Tamil - I	4	3	100	100	100
		21UFR11GL01	French-I					
		21UHI11GL01	Hindi-I					
		21USA11GL01	Sanskrit-I					
	2	21UEN12GE01	General English -I	5	3	100	100	100
	3	21UCS13CC01	Problem Solving using C	5	3	100	100	100
		21UCS13CC02	Digital Computer Fundamentals	5	3	100	100	100
		21UCS13CP01	Software Lab 1: Programming with C	3	2	100	100	100
		21UCS13AC01	Allied:Mathematics-1	6	4	100	100	100
	4	21UEN14AE01	AECC-1 : Communicative English	(6)	4	100	-	100
21UHE14VE01		Essentials of Humanity	2	1	50	50	50	
Total				30	23			
II	1	21UTA21GL02	General Tamil - II	4	3	100	100	100
		21UFR21GL02	French-II					
		21UHI21GL02	Hindi-II					
		21USA21GL02	Sanskrit-II					
	2	21UEN22GE02	General English -II	5	3	100	100	100
	3	21UCS23CC03	Object Oriented Programming with C++	4	3	100	100	100
		21UCS23CC04	Data Structures and Algorithms	4	2	100	100	100
		21UCS23CP02	Software Lab 2: C++ and Data Structures	3	2	100	100	100
		21UCS23AC02	Allied:Mathematics-2	6	4	100	100	100
	4	21UHE24AE02	AECC-2: Environmental Studies	2	2	50	50	50
21UHE24VE02		Techniques of Social Analysis: Fundamentals of Human Rights	2	1	50	50	50	
		Extra Credit Courses (MOOC)-1	-	(2)				
Total				30	20(2)			
III	1	21UTA31GL03	General Tamil - III	4	3	100	100	100
		21UFR31GL03	French-III					
		21UHI31GL03	Hindi-III					
		21USA31GL03	Sanskrit-III					
	2	21UEN32GE03	General English -III	5	3	100	100	100
	3	21UCS33CC05	Discrete Mathematics	4	3	100	100	100
		21UCS33CC06	Database Systems	4	2	100	100	100
		21UCS33CP03	Lab 3: Hardware	3	2	100	100	100
		21UCS33AO03A	Allied Optional : Applied Physics-I	4	3	100	100	100
		21UCS33AO03B	Allied Optional : Principles of Electronics					
		@	Applied Physics Practical	2	*	-	-	-
	@	Electronics Practical						
	4	21UCS34SE01	SEC -1 (WD): RDBMS	2	1	100	-	100
21UHE34VE03A		Professional Ethics-I: Social Ethics - I	2	1	50	50	50	
		21UHE34VE03B	Professional Ethics I: Religious Doctrine- I					
		Extra Credit Courses (MOOC)		(2)				
Total				30	18(2)			
1	21UTA41GL04B	Scientific Tamil (SBS, SPS,SCS)	4	3	100	100	100	
	21UFR41GL04	French- IV						
	21UHI41GL04	Hindi- IV						
	21USA41GL04	Sanskrit- IV						

IV	2	21UEN42GE04	General English - IV	5	3	100	100	100
	3	21UCS43CC07	Operations Research	4	3	100	100	100
		21UCS43CC08	Python Programming	4	2	100	100	100
		21UCS43CP04	Software Lab 4: Python Programming	3	2	100	100	100
		21UCS43AO04A	Allied Optional: Applied Physics-2	4	3	100	100	100
		21UCS43AO04B	Allied Optional: Communication Electronics					
		21UCS43AP01A	Applied Optional: Physics Practical	2	2	100	100	100
		21UCS43AP01B	Applied Optional: Electronics Practical					
	4	21UCS44SE02	SEC -2 (BS) : Data Analysis Using Spreadsheet	2	1	100	-	100
	4	21UHE44VE04A	Professional Ethics–II: Social Ethics - II	2	1	50	50	50
	21UHE44VE04B	Professional Ethics II: Religious Doctrine- II						
Total				30	20			
V	3	21UCS53CC09	Java Programming	4	2	100	100	100
		21UCS53CC10	Distributed Technology	4	2	100	100	100
		21UCS53CP05	Software Lab 5: Java Programming	3	2	100	100	100
		21UCS53CP06	Software Lab 6: Distributed Programming	3	2	100	100	100
		21UCS53ES01A	DSE -1: Operating Systems	5	3	100	100	100
		21UCS53ES01B	DSE-1: Digital Marketing					
		21UCS53ES02A	DSE -2: Computer Networks	5	3	100	100	100
		21UCS53ES02B	DSE -2: Security in Computing					
		21UCS53IS01	Internship	-	2	100	-	100
		21UCS53SP01	Self-paced Learning : Web Ethics	-	2	50	50	50
	21UCS53FV01	Field study/ Industrial visit/ Case study	-	1	100	-	100	
	4	21USS54SE03	SEC -3 : Soft Skills	2	1	100	-	100
	4	21UCS54EG01	GE-1: Ethical Hacking	4	3	100	100	100
		Extra Credit Courses (MOOC)-3	-	(2)				
Total				30	23(2)			
VI	3	21UCS63CC11	Software Engineering	4	3	100	100	100
		21UCS63CC12	Mobile Application Development using Android	4	3	100	100	100
		21UCS63CP07	Software Lab 7: Android Programming	3	2	100	100	100
		21UCS63ES03A	DSE -3: Big Data Analytics	5	3	100	100	100
		21UCS63ES03B	DSE -3: Cloud Computing					
		21UCS63ES04A	DSE -4: Internet of Things	5	3	100	100	100
		21UCS63ES04B	DSE-4: Artificial Intelligence and Machine Learning					
	21UCS63PW01	Project Work	3	2	100	100	100	
	21UCS63CE01	Comprehensive Examination	-	2	50	50	50	
4	21UCS64SE04	SEC -4 (WS): E-Services and Applications	2	1	100	-	100	
	21UCS64EG02	GE-2: 3D Printing and Design	4	3	100	100	100	
Total				30	22			
I-VI	5	21UCW65OR01	Outreach Programme (SHEPHERD)		4			
TOTAL (three years)				180	130(6)			

@ Practical Exam will be conducted at even semester

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

SEC-2: BETWEEN SCHOOL 4th Semester							
Between schools (BS)- Offered to students of other schools (Except the school offering the course)							
Course Details					Scheme of Exams		
Offering Department	Course Code	Course Title	Hr	Cr	CIA	SE	Final
SBS							
Botany	21UBO44SE02	Mushroom Technology	2	1	100	-	100
SCS							
Computer Science	21UCS44SE02	Data Analysis Using Spreadsheet	2	1	100	-	100
Mathematics	21UMA44SE02	Numerical Ability	2	1	100	-	100
Statistics	21UST44SE02	Quantitative Methods	2	1	100	-	100
Information Technology	21UBC44SE02	Digital Artwork	2	1	100	-	100
SLAC							
English	21UEN44SE02	English for Competitive Examinations	2	1	100	-	100
History	21UHS44SE02	Historical Monuments in Tiruchirappalli	2	1	100	-	100
Tamil	21UTA44SE02A	மேடைப் பேச்சுக்கலை	2	1	100	-	100
Tamil	21UTA44SE02	திரைப்படத் திறனாய்வும் 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 மனிதஉரிமைகள்	4	3	100	100	100
SMS							
Commerce	21UCO54EG01A	Computerised Accounting	4	3	100	100	100
Commerce	21UCO54EG01B	Basics of Excel	4	3	100	100	100
Commerce	21UCO54EG01C	Personal Investment Planning	4	3	100	100	100
Economics	21UEC54EG01	Principles of Economics	4	3	100	100	100
Commerce CA	21UCC54EG01	E-commerce and E Business Management	4	3	100	100	100
BBA	21UBU54EG01A	Global Supply Chain Management	4	3	100	100	100
BBA	21UBU54EG01B	Start – Ups and Small Business Management	4	3	100	100	100
SPS							
Chemistry	21UCH54EG01A	Chemistry for Competitive Examinations	4	3	100	100	100
Chemistry	21UCH54EG01B	Everyday Chemistry	4	3	100	100	100
Physics	21UPH54EG01A	Everyday Physics	4	3	100	100	100
Physics	21UPH54EG01B	Renewable Energy Physics	4	3	100	100	100
Electronics	21UEL54EG01A	Everyday Electronics	4	3	100	100	100
Electronics	21UEL54EG01B	Wireless Communication	4	3	100	100	100

GENERIC ELECTIVE -2: 6 th Semester							
Generic Elective Courses are designed for the students of other disciplines. (open to the students of other departments)							
Course Details					Scheme of Exams		
Offering Department	Course Code	Course Title	Hrs	Cr	CIA	SE	Final
SBS							
Botany	21UBO64EG02	Solid Waste Management	4	3	100	100	100
SCS							
Computer Science	21UCS64EG02	3D Printing and Design	4	3	100	100	100
Mathematics	21UMA64EG02	Analytical Skill for Competitive Examinations	4	3	100	100	100
Statistics	21UST64EG02	Applied Statistics	4	3	100	100	100
Information Technology	21UBC64EG02	Industry 4.0	4	3	100	100	100
SLAC							
English	21UEN64EG02	English for the Media	4	3	100	100	100
History	21UHS64EG02	Intellectual Revivalism in Tamil Nadu	4	3	100	100	100
Tamil	21UTA64EG02	சித்தமருத்துவம்	4	3	100	100	100
SMS							
Commerce	21UCO64EG02A	Rural Marketing	4	3	100	100	100
Commerce	21UCO64EG02B	Entrepreneurship Development	4	3	100	100	100
Commerce	21UCO64EG02C	Digital Marketing	4	3	100	100	100
Economics	21UEC64EG02	Economics for Competitive Exams	4	3	100	100	100
CommerceCA	21UCC64EG02	Total Quality Management	4	3	100	100	100
BBA	21UBU64EG02A	Personality Development	4	3	100	100	100
BBA	21UBU64EG02B	NGO Management	4	3	100	100	100
SPS							
Chemistry	21UCH64EG02A	Food And Nutrition	4	3	100	100	100
Chemistry	21UCH64EG02B	Waste Management	4	3	100	100	100
Physics	21UPH64EG02A	Laser Technology and its Application	4	3	100	100	100
Physics	21UPH64EG02B	Physics of Earth	4	3	100	100	100
Electronics	21UEL64EG02A	CCTV and Smart Security System	4	3	100	100	100
Electronics	21UEL64EG02B	Entrepreneurial Electronics	4	3	100	100	100

Semester	Course Code	Title of the Course	Hours	Credits
I	21UTA11GL01	General Tamil - I	4	3

CO No.	CO-Statements	Cognitive Levels (K -Levels)
	இப்பாடத்தின் நிறைவில் மாணவர்கள்	
CO-1	இக்கால இலக்கிய வகைகளைக் கண்டறிவர்	K1
CO-2	எழுத்து, சொல் இலக்கணங்களின் அடிப்படைகளைக் கண்டறிவர்	K1
CO-3	அயலகக் கவிதை வடிவங்களை விளங்கிக் கொள்வர்	K2
CO-4	மொழிபெயர்ப்புக் கவிதைகளின் வாயிலாக மொழிபெயர்ப்புத் திறனை வளர்த்தெடுப்பர்	K3
CO-5	புதுக்கவிதை வாயிலாக வெளிப்படும் சமூக, அரசியல் விழுமியங்களை மதிப்பிடுவர்	K4

அலகு - 1

(12 மணிநேரம்)

- பாரதியார் கவிதைகள் - குயில்பாட்டு (குயில் தன் பூர்வ ஜன்மக் கதை உரைத்தல்)
- பாரதிதாசன் கவிதைகள் - சஞ்சீவி பர்வதத்தின் சாரல்
- உரைநடை - முதல் மூன்று கட்டுரைகள்

அலகு - 2

(12 மணிநேரம்)

- வெ.இராமலிங்கனார் - சொல், தமிழன் இதயம்
- முடியரசனார் - உயிர் வெல்லமோ, மனத்தூய்மை
- பெருஞ்சித்திரனார் - அஞ்சாதீர், மொழி இனம் நாடு,
- பட்டுக்கோட்டை - வருங்காலம் உண்டு, உழைக்காமல் சேர்க்கும் பணம்.
- கல்யாணசுந்தரனார் - எழுத்து
- இலக்கணம் - மூன்றாம் பாகம் - தண்டமிழ்த் தொண்டர்கள்
- இலக்கிய வரலாறு

அலகு - 3

(12 மணிநேரம்)

- சுரதா - நல்ல தீர்ப்பு
- கண்ணதாசன் - ஒரு பாணையின் 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 செஞ்சரி 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 1^{er} 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 AI*, Didier, Paris 2016.

Books for Reference

1. J.Girardet and J.Pecheur, *Echo AI*, CLE International, 2^eedition, 2017
2. Régine Mérieux and Yves Loiseau, *Latitudes AI*, 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://français.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/exercices/exercice-french-2/exercice-french-3295.php>

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

Semester	Course code	Title of the Course									Hours	Credits
I	21UFR11GL01	FRENCH – I									4	3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	1	2	3	2	3	2	1	2	3	2.2	
CO-2	3	3	3	2	2	2	1	2	2	3	2.3	
CO-3	3	1	2	3	2	3	2	1	2	2	2.1	
CO-4	2	2	3	2	1	3	2	1	2	3	2.1	
CO-5	3	2	3	2	2	3	2	2	3	2	2.4	
Mean overall Score											2.22 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
I	21UHI11GL01	HINDI- I	4	3

CO No.	CO-Statements	Cognitive Levels (K –Levels)
	On successful completion of the course, students will be able to	
CO -1	list out the literary works in Hindi during the period of 12th century in India.	K1
CO -2	compare the vocabulary & expressions related to day-to-day conversation.	K2
CO -3	use simple Phrases from English to Hindi.	K3
CO -4	investigate the values of Indian society & summarize the duties of a citizen for his/her country.	K4
CO -5	identify the sentences in Hindi using basic grammar.	K4

Unit - I

(12 Hours)

Dr. Abdul Kalam
Ling
Kabir Ke Dohe
Baathcheeth - Aspathal mein
Adhikal - Namakarn

Unit - II

(12 Hours)

Vachan Badaliye
Thulasi ke Dohe
Adhikal - Samajik Paristhithiyam
Moun Hee Mantra Hai

Unit - III

(12 Hours)

Sangya
Soordas ke Pad
Baathcheeth - Hotel mein
Adhikal - Sahithyik Paristhithiyam

Unit - IV

(12 Hours)

Sarvanam
Rahim ke Dohe
Bathcheeth - Kaksha mein
Adhikal - Salient Features, Main Divisions

Unit - V**(12 Hours)**

Anuvad - 1
 Visheshan
 Bihari - Dohe
 Bathcheeth - Kariyalay mein
 Adhikal - Visheshathayem

Books for Study

1. M.kamathaprasad Gupth, *Hindi Vyakaran*, Anand Prakashan, Kolkatta,2020.
Unit-I Chapters 2 and 3
2. Viswanath Tripaty, *Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd, New Delhi,2018.
Unit-II, III and IV Chapters 4 and 5
3. Dr. Sanjeev Kumar Jain, *Anuwad: Siddhant Evam Vyavhar*, Kailash Pustak Sadan, Madhya Pradesh 2019.
Unit-V Chapter 1

Books for Reference

1. Dr.A.P.J.Abdul Kalam, *Mere sapnom ka Bharath*, Prabath Prakashan, Noida, 2020,
2. Lakshman prasad singh, *Kavya ke sopan*, Bharathy Bhavan Prakashan, 2017.
3. Aravind Kumar, *Sampoorna Hindi Vyakaran our Rachana*, Lucent publisher, 2019.
4. Adhunik Hindi Vyakaran our Rachana, bharati bhawan publishers & distributors, 2018.
5. Acharya ramchandra shukla, *Hindi Sahitya Ka Itihas*, Prabhat Prakashan, 2021.

Web Resources

1. <https://youtu.be/LrdrcP2oiyU>
2. <https://youtu.be/Cib2FNv8KyA>
3. <https://youtu.be/aXARykpYCxA>
4. <https://youtu.be/RUDFis-tdg4>
5. <https://youtu.be/upivTmLTPQA>

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

Semester	Course Code	Title of the Course									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	Cognitive Levels (K –Levels)
	On successful completion of the course, the student will be able to	
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 varathanakalaha

Unit - IV (12 Hours)
Shadha priyogaha aakaarnta ikaraantha ukarantha

Unit - V (12 Hours)
Subhashitani manoharani Dasaslokani

Book for Study

Shaptamanjari , K.M.,Sara Snakrit Balabodh , Bharathiya Vidya Bhavan , Munushimarg
Mumbai – 4000 007 2018, 2019

Books for Reference

1. Kulapathy , K.M.,Sara 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 I*. New Delhi, Trinity P, 2014.

Books for Reference

1. Ahrens, Sönke. *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking*. New York: Create Space, 2017.
2. Aspinall, Tricia. *Test Your Listening*. London: Pearson, 2002.

3. Bailey, Stephen. *Academic Writing: A Practical Guide for Students*. New York: Routledge, 2004.
4. Fitikides, T.J. *Common Mistakes in English* (6th ed.). London: Longman, 2002.
5. Wainwright, Gordon. *How to Read Faster and Recall More: Learn the Art of Speed Reading with Maximum Recall* (3rd ed.). Oxford: How to Books, 2007.

Web Resources

1. <https://learnenglish.britishcouncil.org/>
2. <https://oneminuteenglish.org/en/best-websites-learn-english/>
3. <https://www.dailywritingtips.com/best-websites-to-learn-english/>

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

Semester	Course Code	Title of the Course									Hours	Credit
I	21UEN12GE01	GENERAL ENGLISH – I									5	3
Course Outcome (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO -1	2	3	2	2	3	2	3	2	3	2	2.4	
CO -2	2	2	3	2	3	3	2	3	2	2	2.3	
CO -3	2	3	2	3	2	2	3	2	3	2	2.4	
CO -4	2	2	3	2	3	3	2	3	2	3	2.5	
CO -5	2	2	2	3	2	2	2	3	2	2	2.2	
Mean Overall Score											2.36 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13CC01	CORE – 1: PROBLEM SOLVING USING C	5	3

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

UNIT – I (15 Hours)

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

UNIT – II (15 Hours)

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

UNIT – III (15 Hours)

Arrays – Character Arrays and Strings – User defined functions.

UNIT – IV (15 Hours)

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

UNIT – V (15 Hours)

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

Books for Study

1. S. Jaiswal, “Information Technology Today”, Galgotia Publications, New Delhi, Fourth Edition, 2009.

Unit-I Chapter 20 (Pages CL-3 to CL-26)

2. E. Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill, New Delhi, Seventh Edition, 2016.

Unit-II Chapter 1 (Sec:1.1-1.2,1.8), Chapter 2 (Sec:2.5 –2.7), Chapter 3, Chapter 5, Chapter 6

Unit-III Chapter 7, Chapter 8 (Sec: 8.2 – 8.8), Chapter 9

Unit-IV Chapter 11

Unit-V Chapter 10, Chapter 12 (Sec: 12.1 – 12.4)

Books for Reference

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

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

Semester	Course Code	Title of the Course									Hours	Credit
I	21UCS13CC01	CORE – 1: PROBLEM SOLVING USING C									5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	1	2	1	3	3	2	3	1	2.1	
CO-2	3	3	3	1	1	3	2	3	2	2	2.3	
CO-3	3	3	2	3	2	2	2	3	2	1	2.3	
CO-4	3	2	2	3	2	1	2	2	3	3	2.3	
CO-5	2	2	3	3	2	1	3	3	3	2	2.4	
Mean Overall Score											2.28 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13CC02	CORE – 2: DIGITAL COMPUTER FUNDAMENTALS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the fundamentals of digital logic and elements of a digital computer	K1
CO-2	demonstrate the logics of sequential and combinational circuits	K2
CO-3	solve the problems on logic circuits using digital logics	K3
CO-4	classify the digital logics of sequential and combinational circuits	K4
CO-5	interpret the functioning of logic circuits and memory elements	K5

UNIT- I (12 Hours)

Number Systems: Number systems - Decimal, Binary, Octal, Hexadecimal - conversion from one to another. Characters and codes: ASCII code, Excess3 code, gray code - binary addition, subtraction, multiplication and division - unsigned binary numbers - signed magnitude numbers - complements in number systems.

UNIT –II (12 Hours)

Logic Gates: AND, OR, NOT, NOR & NAND gates, EX-OR gates. Boolean Algebra and Boolean laws and theorems: De Morgan’s theorems - Duality theorem - simplification of sum of product and product of sum expressions - Karnaugh map and simplifications.

UNIT- III (12 Hours)

Simple Arithmetic Circuits: Half and Full adders - Binary adder/subtractor - BCD adder Data processing circuits: Multiplexers - Demultiplexers -Encoders and Decoders.

UNIT- IV (12 hours)

Sequential Logic Design: Flip-flops - RS, JK, D & T Flip flops - Master / Slave Flip flop - Shift Registers - Counters - Asynchronous and Synchronous Counters.

UNIT- V (12 hours)

Memory Elements: RAM - static RAM - Dynamic RAM - ROM - Magnetic Disk memories - Magnetic tape - Cache Memory.

Books for Study

1. Donald P. Leach, Albert Paul Malvino and Goutam Saha “Digital Principles and Application”, Seventh Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2010.
Unit I: Chapter 5, 6
Unit II: Chapter 2, 3
Unit III: Chapter 4
Unit IV: Chapter 8, 9, 10
2. Thomas C. Bartee, “Computer Architecture and Logic Design”, McGraw Hill International Edition, New Delhi, 2010.
Unit V: Chapter 6

Books for Reference

1. Virendra Kumar, “Digital Technology Principles and Practice”, New Age International, New Delhi, 2006.
2. Jaydeep Chakravorty, “Digital Electronics and Logic Design”, Universites Press, 2012.
3. John F. Wakerly, “Digital Design: Principles And Practices”, Pearson Publication, 2008

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

Semester	Course Code	Title of the Course									Hours	Credit
I	21UCS13CC02	CORE – 2: DIGITAL COMPUTER FUNDAMENTALS									5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	1	2	1	2	1	2	2	2	2	2	1.9	
CO-2	2	3	2	2	2	3	2	2	2	2	2.3	
CO-3	2	3	3	2	2	3	3	3	2	2	2.5	
CO-4	2	2	2	2	2	3	3	3	2	2	2.3	
CO-5	2	3	2	2	2	3	3	3	2	2	2.4	
Mean Overall Score											2.28 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13CP01	Software Lab 1: PROGRAMMING WITH C	3	2

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

List of Exercises

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

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

Semester	Course Code	Title of the Course									Hours	Credit
1	21UCS13CP01	Software Lab 1: PROGRAMMING WITH C									3	2
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	1	2	2	3	3	1	3	2	2.2	
CO-2	3	3	2	2	1	3	3	2	3	1	2.3	
CO-3	3	2	2	2	2	3	3	1	3	2	2.3	
CO-4	3	3	2	2	1	3	3	3	3	2	2.5	
CO-5	3	2	2	2	1	3	2	2	2	2	2.1	
Mean Overall Score											2.2 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
I	21UCS13AC01	ALLIED: MATHEMATICS I	6	4

CO No.	CO-Statements	Cognitive Levels (K-levels)
	On successful completion of this course, students will be able to	
CO-1	have knowledge of matrices, ordinary differential equations, standard forms of partial differential equations, properties of Laplace transform and Fourier series.	K1
CO-2	solve system of linear equations, matrices to find their eigen values and eigen vectors; ordinary differential equations to find their complex solutions and partial differential equations to find their complete as well as general solutions.	K2
CO-3	evaluate solution of a given problem using differential equations.	K3
CO-4	determine Fourier expansions of a functions in the given intervals.	K4
CO-5	realize the importance of Laplace transform and differential equations as a powerful tool in solving problems arising from physical sciences.	K5

Unit-I (18 hours)

Matrices – Rank of a matrix – Solving simultaneous linear equation in three unknowns using Elementary Operations method – Eigen values and Eigen vectors–Verification of Cayley Hamilton Theorem.

Unit-II (18 hours)

Differential equations of first order – variable separable – Homogeneous equations – Non-homogeneous equations – Linear equation – Bernoulli’s equation.

Unit-III (18 hours)

Derivation of partial differential equations – By Elimination of Arbitrary Functions – Different Integrals of partial differential equations – Standard type of First Order Equations – Lagrange’s Equation.

Unit-IV (18 hours)

Definition – properties – the inverse transforms – solving differential equations using Laplace transforms.

Unit-V (18 hours)

Fourier series – Even and odd functions – properties of odd and even functions – Half range Fourier series – Developments in cosine and sine series.

Books for Study

1. S. Narayanan, R. Hanumantha Rao, T.K. Manicavachagom Pillay, “**Ancillary Mathematics Volume-I**”, 2011 Edition.

Unit-I Chapter 3 : Sec 3.2 - 3.4, pages: 137-160.

2. S. Narayanan, R. Hanumantha Rao, T.K. Manicavachagom Pillay, “**Ancillary Mathematics Volume-II**”, 2011 edition.
Unit – II Chapter 4: Sec. 1 – 5, pages 205 – 218.
Unit – III Chapter 6: Sec. 1 – 6, pages: 252 – 274.
Unit – IV Chapter 7: Sec. 1 – 6, pages 289 – 312.
Unit – V Chapter 2: Sec. 1 – 5 pages 123 – 149.

Books for Reference

1. S. Narayanan & T.K. Manicavachagom Pillay, “Differential equation and its applications”, S. Viswanathan Pvt. Ltd. 2001.
2. S. Narayanan and T.K. Manicavachagom Pillay, “Ancillary Mathematics” Book II, S. Viswanathan Pvt. Ltd., Madras
3. Venkataraman, M.K., “Higher Mathematics for Engineering and Science”, Third Edition, The National Publishing Co., Madras, 1986.

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

Semester	Course Code	Title of the Course									Hours	Credit
I	21UCS13AC01	ALLIED: MATHEMATICS-I									6	4
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	2	2	2	2.3	
CO-2	3	2	2	2	2	2	3	2	2	2	2.2	
CO-3	2	3	3	2	1	2	3	3	2	2	2.3	
CO-4	3	2	2	3	2	3	2	3	2	2	2.4	
CO-5	2	2	2	3	2	3	2	3	3	2	2.4	
Mean Overall Score											2.32 (High)	

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

CO No.	CO – Statements	Cognitive Levels (K-levels)
	On completion of this course, the graduates will be able to:	
CO-1	recall the prescribed values and their dimensions	K1
CO-2	examine themselves by learning the developmental changes happening in the course of their life time	K2
CO-3	apply the trained values in their day today life	K3
CO-4	analyze themselves as responsible men and women	K4
CO-5	create a constructive approach to life	K5 & K6

Unit-I Principles of Value Education (6 Hours)

Introduction to values - Characteristics and Roots of Values - Value Education & Value Clarification - Moral Characters - Kinds of Values - Objectives of Values.

Unit-II The Development of Human Personality (6 Hours)

Personality: Introduction, Theories, Integration & Factors influencing the development of personality - SEL Series - Discovering self - Defense Mechanism - Power of positive thinking - Why worry?

Unit-III The Dimensions of Human Development (6 Hours)

Areas of Development: Physical, Intellectual, Emotional, Social Development, Moral & Spiritual development

Unit-IV Responsible Parenthood (6 Hours)

Human sexuality - Marriage and Family - Sex and Love - Characteristics of Responsible parent - Causes of Marriage disharmony - Art of wise parenting.

Unit-V Gender Equality and Empowerment (6 Hours)

Historical perspective - Women in Independence struggle - Women in Independent India - Education & Economic development - Crimes against Women - Women rights - Time-line of Women Achievements in India

Books for Study

Department of Human Excellence. *Essentials of Humanity*, St. Joseph's College, Tiruchirappali-02, 2021.

Books for Reference

1. Alphonse Xavier Dr SJ. *You Shall Overcome*, (6th Ed.) Chennai: ICRDCE Publication, 2012.
2. Alex K. *Soft Skills*, New Delhi: S. Chand, 2009.
3. Kalam Abdul APJ. *You Are Unique*, Bangalore: Punya Publishing, 2012.

Web Sources

- <http://livingvalues.net>. Accessed 05 Mar. 2021.
- <https://www.apa.org/topics/personality#>. Accessed 05 Mar. 2021.
- <https://www.peacecorps.gov/educators/resources/global-issues-gender-equality-and-womens-empowerment/>. Accessed 05 Mar. 2021.

Semester	Course Code	Title of the Course	Hours	Credits
II	21UTA21GL02	General Tamil - II	4	3

CO No.	CO- Statement	Cognitive Level (K- level)
இப்பாடத்தின் நிறைவில் மாணவர்கள்		
CO-1	தமிழிலக்கிய வரலாற்றில் சைவ, வைணவ இலக்கியங்கள் பெறும் இடத்தை அறிந்துகொள்வர்	K 1
CO-2	அகப்பொருள், புறப்பொருள் இலக்கணங்களின் அடிப்படை அறிவைப் பெறுவர்.	K 1
CO-3	காப்பியச் சுவையை மாணவர்கள் புரிந்துகொள்வர்	K 2
CO-4	இஸ்லாமிய இலக்கியச் சிந்தனைகளைப் பெறுவர்	K 3
CO-5	கிறித்தவ மதிப்பீடுகளைச் சிற்றிலக்கிய வகைகளின் வழியாகத் திறனாய்வார்.	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, and Programmes Specific Outcomes

Semester	Course Code	Title of the Course									Hours	Credit
II	21UTA21GL02	General Tamil - II									4	3
Course Outcomes (Cos)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5		
CO-1	2	2	1	2	3	2	2	2	3	2	2.1	
CO-2	2	1	2	2	3	3	2	2	3	2	2.2	
CO-3	2	1	2	2	3	3	2	2	3	2	2.2	
CO-4	1	1	2	2	3	3	2	2	3	2	2.1	
CO-5	1	1	2	2	3	2	2	3	3	2	2.1	
Mean Overall Score											2.14 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
II	21UFR21GL02	FRENCH – II	4	3

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of this course, students will be able to	
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 goûts 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 de paiement

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 : connaître 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 StudyP.Dauda,L.Giachino and C.Baracco, *Generation AI*, Didier, Paris 2016.**Books for Reference**

1. J.Girardet and J.Pecheur, *Echo AI*, CLE International, 2^eedition,2017
2. Régine Mérieux and Yves Loiseau, *Latitudes AI*, 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	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	remember the use of suitable punctuation marks in appropriate places	K1
CO-2	describe their pictures with appropriate expressions	K2
CO-3	infer meaning from the given context	K3
CO-4	analyse real-life situations and ask open-ended questions	K4 & K5
CO-5	use polite expressions in appropriate ways	K6

Unit-I

(15 Hours)

01. Education Word Grid
02. Reading Problems and Solutions
03. Syllabification
04. Forms for Expressing Quality
05. Expressing Comparison
06. Monosyllabic Comparison
07. Di/polysyllabic Comparison
08. The Best Monosyllabic Comparison
09. The Best Di/Polysyllabic Comparison
10. Practising Quality Words

Unit –II

(15 Hours)

11. Wh Words
12. Yes/No Recollection
13. Unscramble Wh Questions
14. Wh Practice
15. Education and the Poor
16. Controlled Role Play
17. Debate on Education
18. Education in the Future
19. Entertainment Word Grid
20. Classify Entertainment Wordlist
21. Guess the Missing Letter
22. Proverb-Visual Description
23. Supply Wh Words
24. Rearrange Questions
25. Information Gap Questions

Unit-III

(15 Hours)

26. Asking Questions
27. More about Actions
28. More about Actions and Uses
29. Crime Puzzle
30. Possessive Quiz
31. Humorous News Report
32. Debate on Media and Politics
33. Best Entertainment Source

Unit-IV

(15 Hours)

34. Career Word Grid
35. Job-Related Wordlist
36. Who's Who?
37. People at Work
38. Humour at Workplace
39. Profession in Context
40. Functions and Expressions
41. Transition Fill-in
42. Transition Word Selection
43. Professional Qualities
44. Job Procedures
45. Preparing a Resume
46. Interview Questions
47. Job Cover Letter Format
48. Emailing an Application
49. Mock Interview

Unit-V

(15 Hours)

50. Society Word Grid
51. Classify Society Wordlist
52. Rearrange the Story
53. Storytelling
54. Story Cluster
55. Words Denoting Time
56. Expressing Time
57. What Can You Buy?
58. Noise Pollution
59. Positive News Headlines
60. Negative News Headlines
61. Matching Conditions
62. What Would You Do?
63. If I were Elected
64. My Dream Country

Book for Study

Joy, J.L. & Peter, F.M. *Let's Communicate 2*, New Delhi: Trinity Press, 2014.

Books for Reference

1. Ahrens, Sönke. *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking*. New York: CreateSpace, 2017.

2. Aspinall, Tricia. *Test Your Listening*. London: Pearson, 2002.
3. Bailey, Stephen. *Academic Writing: A Practical Guide for Students*. New York: Routledge, 2004'
4. Fitikides, T.J. *Common Mistakes in English* (6th ed.). London: Longman, 2002
5. Wainwright, Gordon. *How to Read Faster and Recall More: Learn the Art of Speed Reading with Maximum Recall* (3rd ed.). Oxford: How to Books, 2007.

Web Resources

1. <https://learnenglish.britishcouncil.org/>
2. <https://oneminuteenglish.org/en/best-websites-learn-english/>
3. <https://www.dailywritingtips.com/best-websites-to-learn-english/>

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

Semester	Course Code	Title of the Course									Hours	Credits
II	21UEN22GE02	GENERAL ENGLISH - II									5	3
Course Outcomes (COs)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5		
CO-1	2	3	2	2	3	2	3	2	3	2	2.4	
CO-2	2	2	3	2	3	3	2	3	2	2	2.3	
CO-3	2	3	2	3	2	2	3	2	3	2	2.4	
CO-4	2	2	3	2	3	3	2	3	2	3	2.5	
CO-5	2	2	2	3	2	2	2	3	2	2	2.2	
Mean Overall Score											2.36 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
II	21UCS23CC03	CORE-3: OBJECT ORIENTED PROGRAMMING WITH C++	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define and understand the basic concepts in C++ Programming.	K1
CO-2	explain and execute C++ programs to explore the concepts of classes and objects.	K2
CO-3	apply the skills to write the C++ code using constructors and operator overloading.	K3
CO-4	analyze the concepts of OOPS such as Inheritance, Virtual base classes and Abstract classes	K4
CO-5	discover the concept of streams, file management, Template and Exception handling in C++	K4

UNIT- I (12 Hours)

Object Oriented Programming: Concepts – Benefits – Applications of OOP. Structure-Compiling and linking of C++ program. Functions: Function prototyping – Inline functions - Default arguments - Const Argument - Function Overloading.

UNIT –II (12 Hours)

Classes and objects: Specifying a class-Member functions- Private Member functions –Arrays within a class - Static Data Members – Static Member Functions – Array of objects –Object as function arguments – Friendly Functions-Returning objects.

UNIT- III (12 Hours)

Constructors and Destructors: Constructors - Parameterized Constructors -Multiple Constructors in a class - Constructors with default arguments – Dynamic Initialization of Object - Copy Constructor - Dynamic Constructors- Destructors - Operator Overloading: Defining Operator Overloading -Overloading unary and binary Operator - Overloading binary operators using friend functions.

UNIT- IV (12 hours)

Inheritance: Introduction – Defining Derived Classes – single Inheritance - Multilevel Inheritance – Multiple Inheritance – Hybrid Inheritance – Virtual base classes – abstract classes.

UNIT- V (12 hours)

Files and Streams: C++ stream classes – Unformatted I/O Operations – Formatted Console I/O operations- Files: Introduction-Classes for file Streams- Opening and Closing a File – File Modes - File Pointers and their Manipulations - Sequential Input and Output Operations - Command Line Arguments -Templates: Class Templates – Function Templates-Exception Handling.

Books for Study

1.E. Balagurusamy, “*Object Oriented Programming with C++*”, Tata McGraw Hill Education Private Limited, New Delhi, 6th edition, Seventh Reprint, 2016.

Unit-I Chapter 1: 1.5, 1.6, 1.8 Chapter 2: 2.6, 2.8 Chapter 4: 4.3, 4.6, 4.7, 4.8, 4.10

Unit-II Chapter 5: 5.3, 5.4, 5.8, 5.9, 5.11 – 5.16

Unit-III Chapter 6: 6.2 – 6.8, 6.11 Chapter 7: 7.2 – 7.5

Unit-IV Chapter 8: 8.1 – 8.3, 8.5, 8.6, 8.9, 8.10

Unit-V Chapter 10: 10.3 – 10.5 Chapter 11: 11.1 – 11.3, 11.5 – 11.7, 11.10

Chapter 12: 12.2, 12.4 Chapter 13.

Books for Reference

1. Robert Lafore, “*Object-Oriented Programming in C++*”, Pearson Education, New Delhi, Fourth Edition, Ninth Impression, 2012.

2. Bjarne Stroustrup, “*The C++ Programming Language*”, Pearson Education and Dorling Kindersley, Third Edition, Tenth Impression, 2012.

3. Herbert Schildt, “*The Complete Reference C++*”, Tata Mc-Graw Hill Edition, New Delhi, Fourth Edition, 25th Reprint, 2009.

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

Semester	Course Code	Title of the Course										Hours	Credits
II	21UCS230204	CORE-3: OBJECT ORIENTED PROGRAMMING WITH C++										4	3
Course Outcomes (COs)↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5			
CO-1	3	2	2	2	2	3	2	2	3	2	2.3		
CO-2	3	3	2	2	2	3	3	1	1	2	2.2		
CO-3	2	3	2	3	3	2	3	3	2	2	2.5		
CO-4	2	2	2	2	3	2	3	3	2	3	2.4		
CO-5	2	2	3	2	3	3	3	2	3	2	2.5		
Mean overall Score											2.38	(High)	

Semester	Course Code	Title of the Course	Hours	Credits
II	21UCS23CC04	CORE – 4 : DATA STRUCTURES AND ALGORITHMS	4	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define and understand various terms in data structures and algorithms.	K1
CO-2	outline various techniques in data structures and algorithms.	K2
CO-3	apply the data structures and algorithms to solve simple problems	K3
CO-4	compare various techniques used in data structures and algorithms	K4
CO-5	evaluate the importance of data structures and algorithms by developing real world applications.	K5

Unit-I (12 hours)

Arrays: Definition - Terminology - One dimensional array - multi dimensional arrays. Linked lists: Definition - Circular linked lists - Double linked lists - Circular double linked lists.

Unit-II (12 hours)

Stacks: Definition - Representation of a Stack - operations on Stacks - Evaluation of Arithmetic expressions. Queues: Definition – Representation of Queues - various queue structures.

Unit-III (12 hours)

Trees: Basic terminologies - Definition and concepts - representation of Binary tree - Binary tree traversal.

Unit-IV (12 hours)

Computer Sorting: Terminologies – Techniques – Bubble sort – insertion sort – quick sort – radix sort – Searching – Terminologies - Linear search with arrays – Binary Search.

Unit-V (12 hours)

Algorithms - Basic Steps. Algorithm Design Methods: Sub goals - Hill Climbing - Working Backward - Heuristics - Backtrack Programming - Recursion.

Books for Study

Units I, II, III & IV:

1. Debasis Samanta, “Classic Data Structures”, Second Edition, PHI Learning Pvt. Ltd., New Delhi, 2009.

Unit I: 2.1-2.3, 2.4.1, 2.4.3, 3.1-3.5

Unit II: 4.1-4. 4, 4.5.1, 5.1-5.4

Unit III: 7.1-7.3, 7.4.3

Unit IV: 10.1, 10.2, 10.3.1 (*Proofs for theorems are not preferred*)

Unit: V:

2. S.E. Goodman and S.T. Hedetniemi, “Introduction to the Design and Analysis of Algorithms”, McGraw Hill, International edition, 1988.

Unit V: 1.3, 3.1, 3.2, 3.3, 3.4

Books for Reference

1. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structure”, Galgotia Publications, New Delhi, 1985.
2. Tanenbaum A.M. and Augustein M.J., “Data structures with Pascal”, Prentice Hall of India Ltd, New Delhi, 1985.

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

Semester	Course Code	Title of the Course									Hours	Credits
II	21UCS23CC04	CORE – 4 : DATA STRUCTURES AND ALGORITHMS									4	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	2	1	2	2.2	
CO-2	3	3	2	2	2	3	3	3	2	2	2.5	
CO-3	2	3	3	2	2	2	3	3	2	2	2.4	
CO-4	3	3	3	1	3	3	3	3	1	2	2.5	
CO-5	2	3	3	2	2	2	3	3	2	1	2.4	
Mean Overall Score											2.4 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
II	21UCS23CP02	Software Lab 2: C++ AND DATA STRUCTURES	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic concepts of data structures and C++.	K1
CO-2	demonstrate various features of C++ with data structures.	K2
CO-3	apply Oop's concepts to solve simple data structure problems.	K3
CO-4	examine various data structures using C++ programs.	K4
CO-5	determine the importance of data structures to solve real life problems.	K5

List of Exercises

1. Classes and Objects
2. Constructors
3. Inheritance
4. Function Overriding and Overloading
5. Operations on array
6. Operations on stack
7. Convert Infix to Postfix and evaluate Postfix using Stack class
8. Operations on Queue
9. Operations on Singly linked list
10. Binary Tree Creation and Traversals
11. Analyze Bubble Sort with number of passes, comparisons and data moves
12. Sequential and Binary Search
13. Merge two sorted data files

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

Semester	Course Code	Title of the Course									Hours	Credits
II	21UCS23CP02	Software Lab 2: C++ AND DATA STRUCTURES									3	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	2	1	2	2.2	
CO-2	3	3	2	2	2	3	3	3	2	2	2.5	
CO-3	2	3	3	2	2	2	3	3	2	2	2.4	
CO-4	3	3	3	1	3	3	3	3	1	2	2.5	
CO-5	2	3	3	2	2	2	3	3	2	1	2.4	
Mean Overall Score											2.4 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
II	21UCS23AC02	ALLIED: MATHEMATICS-II	6	4

CO No.	CO-Statements	Cognitive Levels (K-levels)
	On successful completion of this course, students will be able to	
CO-1	acquire knowledge of statistical and numerical methods.	K1
CO-2	understand direct and iterative methods of solving problems.	K2
CO-3	apply suitable approximation method to evaluate the real life problems.	K3
CO-4	analyse the error estimation of the numerical solution with the exact solution	K4
CO-5	compare the efficiency of different numerical methods.	K5

Unit-I (18 Hours)
Averages: Mean, Median, Mode - Measures of variation: Range, Standard deviation (Direct method only)

Unit-II (18 Hours)
Measures of Skewness - computation of Karl Pearson's coefficient of skewness - Correlation analysis - types of correlation - Karl Pearson's coefficient of correlation - rank correlation

Unit-III (18 Hours)
Curve fitting by least square methods - Fitting a straight line, Parabola and exponential curve - Solving algebraic and transcendental equations - Bisection method – Newton - Raphson method. (Problems only).

Unit-IV (18Hours)
Solving simultaneous equations - Gauss elimination method - Gauss-Seidel Method. Interpolation- Newton Gregory forward and backward interpolation formulae Lagrange's Interpolation formula. (Problems only)

Unit-V (18 Hours)
Numerical Integration - Trapezoidal rule and Simpson's 1/3rd rule - Solving differential equations (First order differential equation only). Solutions by Taylor's series - Euler's Method- Runge - Kutta 4th order method. (Problems only).

Books for Study:

1. R.S.N. Pillai and Bagavathi, "Statistics Theory and Practice 7thEdition", S. Chand and Company Ltd., New Delhi 2009.

Unit – I Chapter 9 (Pages 126-139,145-154,166-170,172),

Chapter 10 (Pages 245,259-268)

Unit – II Chapter 11 (Pages 341-348) Chapter 12 (Pages 397-410,417-421)

2. Venkataraman, M. K., "Numerical Methods in science and Engineering 5th Edition",

The National Publishing Company, Chennai. 2013

Unit-III Chapter 1 (Sec: 1.7, 1.8, 1.9), Chapter 3 (Sec 2, 5)

Unit-IV Chapter 4 (Sec: 2, 6.2), Chapter 6 (Sec 3, 4) Chapter 8 (Sec: 4)

Unit-V Chapter 9 (Sec: 8, 10), Chapter 11 (Sec 6, 10, 16)

Books for Reference

1. S.C.Gupta and V.K.Kapor, “Fundamentals of Mathematical Statistics”, 11th edition, Sultan Chand and Sons, 2002.
2. S.S. Sastry, “Introductory methods of Numerical Analysis”, PHI Learning Private Ltd, New Delhi 2009
3. P. Kandasamy, K.Thilagavathy, K.Gunavathi, “Numerical methods”, S. Chand & company Ltd-2008.

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

Semester	Course Code	Title of the Course									Hours	Credits
II	21UCS23AC02	ALLIED: MATHEMATICS-II									6	4
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	3	2	2	3	2	3	2	2	2.5	
CO-2	2	3	3	2	2	2	3	2	2	3	2.4	
CO-3	3	1	3	2	2	3	2	2	1	2	2.1	
CO-4	3	3	2	2	1	2	3	3	2	3	2.4	
CO-5	2	3	3	1	2	3	3	2	2	3	2.4	
Mean Overall Score											2.36 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
II	21UHE24AE02	AECC-2: Environmental Studies	2	2

CO No.	CO-Statements	Cognitive Levels (K-levels)
On Completion of this course, the graduates will be able to		
CO-1	Identify the concepts related to the environmental global scenario	K1
CO-2	Comprehend the natural resources and environmental organizations	K2
CO-3	Analyze the causes and changes in the structure of biodiversity	K4
CO-4	Apply the acquired knowledge to sensitize individuals and public about the environmental crisis	K3
CO-5	Enhance their skills in the society by solving the environmental problems and preserving nature by the acquired knowledge	K6

Unit I Introduction to Environmental Studies (6 Hours)

Introduction – Scope and Importance – Subsystems of Earth – Various recycling Methods – Environmental Movements in India – Eco- Feminism – Public awareness – Suggestions to conserve environment

Unit II Natural Resources (6 Hours)

Food Resources – Land Resources – Forest resources – Mineral Resources – Water Resources – Energy Resources

Unit III Ecosystems, Biodiversity and Conservation (6 Hours)

General structure of ecosystem - Functions of Ecosystem - Energy flow and Ecological pyramids – Levels of Biodiversity - Hot spots of Biodiversity - Endangered and Endemic Species - Value of Biodiversity - Threats to Biodiversity - Conservation of Biodiversity

Unit IV Environmental Pollution (6 Hours)

Air Pollution – Water Pollution – Oil Pollution – Soil Pollution – Marine Pollution – Noise Pollution - Thermal Pollution – Radiation Pollution

Unit V Environmental Organizations and Treatise (6 Hours)

United Nations Environment Program (UNEP) - International treaties on Environmental protection - Ministry of Environment, Forest and Climate Change - Important National Environmental Acts and rules– Environmental Impact assessment - Issues deals with Population growth.

Books for Study

Department of Foundation Course, *Environmental Studies*, St. Joseph's College, Tiruchirappali-2, 2015.

Books for Reference

Rathor, V.S. and Rathor B. S. *Management of Natural Resources for Sustainable Development*.

New Delhi: Daya Publishing House, 2013.

Sharma P.D, *Ecology and Environment*, 8 ed., Meerut: Rastogi Publications, 2010.

Agrawal, A and C.C. Gibson. *Introduction: The Role of Community in Natural Resource Conservation*. NJ: Rutgers University Press, 2001.

Web Sources:

UNEP- UN Environmental Program, <https://www.unep.org/>. Accessed 05 Mar. 2021.

The official website of ministry of environment, Forest and Climate change,

<http://moef.gov.in/en/> Accessed 05 Mar. 2021.

The International Panel on Climate Change, <https://www.ipcc.ch/reports/>. Accessed 05 Mar. 2021.

Semester	Course Code	Title of the Course	Hours	Credits
II	21UHE14VE02	TECHNIQUES OF SOCIAL ANALYSIS: FUNDAMENTALS OF HUMAN RIGHTS	2	1

CO No.	CO - Statements	Cognitive Levels (K- Levels)
	On completion of this course, the graduates will be able to:	
CO-1	identify the importance and the values of human rights	K1
CO-2	understand the historical background and the development of Human Rights and the related organizations	K2
CO-3	apply the provisions of National and International human rights to themselves and the society	K3
CO-4	analyse the violations of human rights to the marginalized section in the society	K4
CO-5	animate the people to involve in the struggles and activities of the human rights organizations	K5

Unit-I Human Rights - An Introduction (6-Hours)

Introduction- Classification of Human Rights- Scope of Human Rights-Characteristics of Human Rights-NHRC-SHRC- Challenges for Human Rights in the 21st Century.

Unit-II Historical Development of Human Rights (6-Hours)

Human Rights in Pre-World War Era- Human Rights in Post-World War Era- Evolution of International Human Rights Law - the General Assembly Proclamation- Institution Building, Implementation and the Post- Cold War Period. The ICC.

Unit-III India and Human Rights (6-Hours)

Introduction-Classification of Fundamental Rights-Salient Features of Fundamental Rights- and Fundamental Duties.

Unit-IV Human Rights of Women and Children (6-Hours)

Women's Human Rights- Issues related to women's rights - and Rights of Women's and Children

Unit-V Human Rights Violations and Organizations (6-Hours)

Human Rights Violations - Human Rights Violations in India - the Human Rights Watch Report, January 2012- Human Rights Organizations.

Books for Study

The Department of Human Excellence, *Techniques of Social Analysis: Fundamentals of Human Rights*, St. Joseph's college, Tiruchirappalli -02, 2021.

Books for Reference

1. Venkatachalem. Dr. *The Constitution of India, Salem: Giri Law House, 2005.*

2. NaikVarunand Mukesh Shany. *Human rights education and training*, New Delhi:crescent Publishing Corporation, 2011.
3. BhathokeNeera. *Human Rights content and extent*,New Delhi: swastika publications, 2011.

Web Sources:

<https://www.un.org/en/universal-declaration-human-rights/>. Accessed 05 Mar. 2021.

<https://www.ilo.org/global/lang--en/index.htm>. Accessed 05 Mar. 2021.

<https://www.amnesty.org/en/>. Accessed 05 Mar. 2021.

Semester	Course Code	Title of the Course	Hours	Credits
III	21UTA31GL03	General Tamil - III	4	3

CO No.	CO- Statement	Cognitive Level (K- level)
இப்பாடத்தின் நிறைவில் மாணவர்கள்		
CO-1	சங்க இலக்கிய வகைகளை நினைவுகூருவர்	K 1
CO-2	இலக்கியத்தினை நுட்பமாக அறிதலின் வழியாக ஆற்றுப்படுத்தும் திறன் பெறுவர்	K 2
CO-3	இலக்கிய அறநெறிகளைத் தற்கால வாழ்வியலில் பயன்படுத்தும் திறன் பெறுவர்	K 3
CO-4	அகம் மற்றும் புற இலக்கியத் திணை, துறைகளைப் பகுத்தாராய்வர்	K 4
CO-5	யாப்பு, அணி இலக்கண நுட்பங்களை இலக்கியங்களில் மதிப்பிடுவர்	K 5

அலகு - 1

(12 மணிநேரம்)

பொருநராற்றுப்படை (முழுமையும்)

அலகு - 2

(12 மணிநேரம்)

நற்றிணை - 5 பாடல்கள் - (1, 19, 21, 70, 148)

ஐங்குறுநூறு - அன்னாய் வாழிப்பத்து.

யாப்பிலக்கணம் - வெண்பா, ஆசிரியப்பா

அலகு - 3

(12 மணிநேரம்)

கலித்தொகை - (குறிஞ்சிக்கலி- 62, பாலைக்கலி -22, மருதக்கலி- 87, நெய்தற்கலி-149, முல்லைக்கலி - 116)

இலக்கிய வரலாறு - முதற்பாகம் ('தமிழ் மொழியின் தொன்மையும் சிறப்பும்' முதல் 'சங்க தொகை நூல்கள்' முடிய),

புதினம் - குடும்ப அட்டை (2022-2023)

அலகு - 4

(12 மணிநேரம்)

பதிற்றுப்பத்து - 3 பாடல்கள் (14, 32, 61)

புறநானூறு - 5 பாடல்கள் (95, 121, 130, 204, 279)

அணியிலக்கணம்

அலகு - 5

(12 மணிநேரம்)

திருக்குறள் - புறங்கூறாமை, பழமை, புலவி நுணுக்கம் ஆகிய அதிகாரங்கள்

திரிகடுகம் - 5 பாடல்கள் (2, 6, 12, 15, 42)

இலக்கிய வரலாறு - சங்க இலக்கியங்களின் தனித்தன்மைகள் முதல் இரட்டைக் காப்பியங்கள் முடிய

பாடநூல்கள் :

1. பொதுத்தமிழ் செய்யுள் திரட்டு, தமிழாய்வுத்துறை வெளியீடு, தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி-2, முதற்பதிப்பு, 2021
2. சமூகவியல் நோக்கில் தமிழிலக்கிய வரலாறு, தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, பத்தாம் பதிப்பு, 2017
3. புதினம் (ஒவ்வொரு கல்வியாண்டிற்கும் ஒவ்வொரு புதினம்)
2022 – 2023 கல்வியாண்டுக்கு மட்டும் : வீ.செந்தில் குமார், குடும்ப அட்டை, தாமரை பப்ளிகேஷன்ஸ் பிரைவேட் லிமிடெட், சென்னை, முதற்பதிப்பு, 2009

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

Semester	Course Code	Title of the Course									Hours	Credit
III	21UTA31GL03	General Tamil - III									4	3
Course Outcomes (COs)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5		
CO-1	3	2	2	3	2	3	2	3	3	2	2.5	
CO-2	2	2	2	3	3	2	2	3	3	2	2.4	
CO-3	3	3	2	3	3	2	2	3	3	3	2.7	
CO-4	3	2	2	3	2	3	2	3	2	3	2.5	
CO-5	2	3	2	3	2	3	2	3	2	3	2.5	
Mean Overall Score											2.52 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
III	21UFR31GL03	FRENCH – III	4	3

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of this course, students will be able to	
CO–1	relate colours, materials and shapes to the french clothing.	K1
CO–2	select appropriate prepositions in giving directions.	K2
CO–3	construct a text in present tense using different verbs.	K3
CO–4	examine the travel manners and celebrations of the French.	K4
CO–5	justify the usage of past tense in a biography.	K5

Unit – I (12 hours)

TITRE:VIVRE LAVILLE

GRAMMAIRE : la comparaison, les prépositions avec les noms géographiques, les pronoms personnels COI, le pronom y (le lieu)

LEXIQUE : se repérer sur un plan de ville, la ville, les lieux de la ville

PRODUCTION ORALE : demander et indiquer une direction dans un dialogue

PRODUCTION ECRITE : décrire votre ville natale, créez les affiches en appréciant votre ville

Unit - II (12 hours)

TITRE:VISITER UNE VILLE

GRAMMAIRE : la position des pronoms compléments, les verbes du premier groupe en – ger et – cer, les verbes ouvrir et accueillir

LEXIQUE : dire les informations sur une ville de votre choix, les transports, les points cardinaux, les prépositions de lieu

PRODUCTION ORALE : Indiquer le chemin

PRODUCTION ECRITE : Demander des renseignements touristiques

Unit - III (12 hours)

TITRE:ON VEND OU ON GARDE

GRAMMAIRE : la formation du pluriel, les adjectifs de couleurs, l'adjectif beau, nouveau,vieux

LEXIQUE : savoir comment s'habiller des grandes occasions, les couleurs, les formes, les matériaux

PRODUCTION ORALE : comprendre une présentation de catalogues vestimentaires en France

PRODUCTION ECRITE : adresser des souhaits à quelqu'un

Unit - IV (12 hours)

TITRE:VENTES D'AUTREFOIS, VENTES D'AUJOURD'HUI

GRAMMAIRE : les pronoms relatifs qui et que, l'imparfait, les verbes connaître, 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^eedition,2017
2. Régine Mérieux and Yves Loiseau, *Latitudes A2*, Didier, 2012.
3. Isabelle Fournier, *Talk French*, Goyal Publishers, 2011

Web Resources

1. <https://français.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	Cognitive Levels (K –Levels)
	On successful completion of the course, students will be able to	
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 khoon
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 Gupt, *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=EA1aIQobChMIrbeRtbP12AIVCYZpCh0-XwnvEAAYAiAAEgLcJvD_BwE
3. <https://eltlearningjourneys.com/2015/05/19/websites-for-learning-english/>

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

Semester	Course Code	Title of the Course									Hours	Credits
III	21UEN32GE03	GENERAL ENGLISH - III									5	3
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of COs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5		
CO-1	2	3	2	2	3	2	3	2	3	2	2.4	
CO-2	2	2	3	2	3	3	2	3	2	2	2.3	
CO-3	2	3	2	3	2	2	3	2	3	2	2.4	
CO-4	2	2	3	2	3	3	2	3	2	3	2.5	
CO-5	2	2	2	3	2	2	2	3	2	2	2.2	
Mean Overall Score											2.36	
											(High)	

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS33CC05	CORE – 5 : DISCRETE MATHEMATICS	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define various basic terms in graph theory and discrete mathematical structure	K1
CO-2	summarize various theories in graph theory and discrete mathematical structure	K2
CO-3	solve simple problems in graph theory and discrete mathematical structure	K3
CO-4	analyze and compare various methods in graph theory and discrete mathematical structure	K4
CO-5	explain and solve problems related graph theory, mathematical logic, set theory and Boolean	K5

UNIT- I

(12 Hours)

Graph: Introduction – paths and circuits – isomorphism – sub graphs- connectedness – Euler graph – operations – Hamiltonian paths and circuits – Traveling Salesman Problem.

UNIT –II

(12 Hours)

Trees: properties of trees – distance and centers – rooted and binary tree – spanning tree- matrix representations of graph: Incidence matrix – adjacency matrix – graph theoretic algorithms – shortest path between two vertices – shortest path between all pairs.

UNIT- III

(12 Hours)

Mathematical Logic: statements and notation – connectives – Well-formed formulas – tautologies – equivalence of formulas – duality law – Normal Forms: Disjunctive Normal Forms – Conjunctive Normal Forms- Principal Disjunctive-Principal Conjunctive Normal Forms.

UNIT- IV

(12 hours)

Basic concepts of set theory – notation – inclusion and equality – power set – operations – Venn Diagrams – identifiers – Cartesian products – relations and ordering – functions – composition – inverse- binary and n-ary operations.

UNIT- V

(12 hours)

Lattices as partially ordered sets: Definition – properties – special lattices: complete, complemented, distributive lattices – Boolean Algebra - properties of Boolean algebra.

Books for Study

- Narsing Deo, “*Graph Theory with Applications to Engineering and Computer Science*”, Prentice Hall, 2013,
Unit-I & II Chapters: 1,2, 3.1-3.7, 7.1, 7.9, 9.1, 9.2, 11.5
 - J.P.Tremblay, R. Manohar, “*Discrete Mathematical Structure with Applications to Computer Science*”, McGraw-Hill International Edition, 2008.
Unit -III: Chapters: 1.1, 1-.2.1 - 1-2.4, 1.2.6 – 1.2.10, 1-3.1-1-3.4.
Unit -IV: Chapters: 2.1.1 – 2.1.6, 2.1.8, 2.1.9, 2.3.1 – 2.3.7, 2.4.1 – 2.4.4
Unit -V: Chapters: 4.1.1, 4.1.2, 4.1.5, 4.2.1
- (Only definition and applications are expected and proof for theorems are not preferred)

Books for Reference

- Seymour Lipschutz and Mars Lipson, “*Discrete Mathematics*”, Second Edition, Schaum’s outline series, Tata McGraw-Hill publishing Company Limited, New Delhi, 1999.

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

Semester	Course Code	Title of the Course									Hours	Credits
III	21UCS33CC05	CORE – 5 : DISCRETE MATHEMATICS									4	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	3	3	1	3	3	3	2	1	2.5	
CO-2	3	3	3	3	1	3	3	3	3	1	2.6	
CO-3	3	2	3	3	1	2	2	3	3	1	2.3	
CO-4	3	3	3	2	1	3	3	2	3	1	2.4	
CO-5	3	2	3	3	2	2	2	3	3	2	2.5	
Mean Overall Score											2.46 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS33CC06	CORE – 6: DATABASE SYSTEMS	4	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic concepts of relational database management system and ER models	K1
CO-2	explain the architecture of Hierarchical DBMS and comparison of different Data models	K2
CO-3	apply the normalization procedure to design a suitable structure for a given situation	K3
CO-4	analyze processing logic in the form of PL/SQL routine like functions, procedures, packages and triggers.	K4
CO-5	evaluate and execute SQL queries to interact with the database	K5

Unit – I: (12 hours)

Introduction: Flat File - Database System - Database - Actionable for DBA. The Entity - Relationship Model: Introduction - The Entity Relationship Model. Data Models: Introduction - Relational Approach.

Unit – II: (12 hours)

Normalization: Introduction - Normalization - Definition of Functional Dependence (FD) – Normal Forms: 1NF, 2NF, 3NF and BCNF.

Unit – III: (12 hours)

Structured Query Language: Features of SQL - Select SQL Operations - Grouping the Output of the Query - Querying from Multiple Tables - Retrieval Using Set operators - Nested Queries. T-SQL

Unit – IV: (12 hours)

Procedural Language- SQL:PL/SQL Block Structure - PL/SQL Tables. Cursor Management and Advanced PL/SQL: Opening and Closing a Cursor - Processing Explicit Cursor - Implicit Cursor - Exception Handlers – Sub Programs in PL/SQL - Functions - Precaution While Using PL/SQL Functions - Stored Procedure –DB Triggers - Object Oriented Technology.

Unit – V: (12 hours)

Architecture of a Hierarchical DBMS: Introduction: Architecture-Data Structure of IMS- Hierarchical Sequence-Logical Databases/External View- Data Manipulation Language DL/1-Internal Level of IMS-HISAM. The Architecture of Network based DBTG System: Introduction: DBTG Data Structure-Network Involving Types of Entity-Data Structure and Network involving n Entities. – Network Data Model. Comparison Between Different Data Models: Introduction: Hierarchical Model-Network Model-Relational Model.

Book for Study

1. Rajesh Narang, “Database Management Systems”, PHI Learning Private Limited, New Delhi, 2010

Unit-I Chapter 1, Chapter 2, Chapter 3 (Pages: 39-41)

Unit-II Chapter 7(Pages: 92-114)

Unit-III Chapter 8(Pages: 115-147), Chapter 9(Pages:148-177)

Unit – IV Chapter 10(Pages: 178-190), Chapter11 (Pages:191-222)

Unit – V Chapter 18 (Pages:338-345), Chapter 19(Pages:351-357), Chapter 20(Pages:367-369)

Book for Reference

1. James Martin, “Principles of Database Management”, Prentice Hall 1976.

2. Abraham Silberschatz, Hendry F. Korth, S Sudharshan, ”Database System Concepts”, 6th Edition, McGraw Hill International,2019.

3. C.J. Date, “An Introduction to Database Systems” Addison Wesley, 2000

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

Semester	Course Code	Title of the Course									Hours	Credit
III	21UCS33CC06	CORE – 6: DATABASE SYSTEMS									4	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	3	3	1	3	3	2	3	2	2.6	
CO-2	3	2	3	3	2	2	3	2	3	2	2.5	
CO-3	3	3	3	3	1	3	3	3	2	1	2.5	
CO-4	3	2	3	3	1	2	2	3	3	1	2.3	
CO-5	3	3	3	2	1	3	3	3	2	1	2.4	
Mean Overall Score											2.46 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS33CP03	Lab 3: Hardware	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the application of combinational circuits, 8085 ALP and IoT	K1
CO-2	understand the techniques of logic circuits, 8085 ALP and IoT	K2
CO-3	apply the concepts of combinational circuits, 8085 ALP and IoT for various applications	K3
CO-4	analyze the impact of digital experiments, 8085 ALP and IoT.	K4
CO-5	evaluate the usage of combinational circuits, 8085 ALP and IoT for various real time applications	K5

List of Experiments

1. Design of Basic Logic Gates using Universal Gates (NAND, NOR)
2. Design of Half and Full Adders and Subtractors
3. Design of Multiplexers, De-Multiplexers, Encoders and Decoders
4. Verify the truth table of one bit and two bit comparators
5. Verify Binary to Gray and Gray to Binary conversion using NAND gates.
6. Design of Flip-Flops
7. 8085 Microprogramming – 1
8. 8085 Microprogramming – 2
9. 8085 Microprogramming - 3
10. IoT Experiment – 1
11. IoT Experiment – 2
12. IoT Experiment – 3

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

Semester	Course Code	Title of the Course									Hours	Credit
III	21UCS33CP03	Lab 3: Hardware									3	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	3	1	1	2.2	
CO-2	3	3	3	2	1	3	3	3	2	1	2.4	
CO-3	2	3	3	2	2	3	3	3	1	1	2.3	
CO-4	3	3	3	1	1	3	3	3	1	1	2.2	
CO-5	3	3	3	1	1	3	3	3	2	1	2.3	
Mean Overall Score											2.28 (High)	

Semester	Course Code	Title of the Course	Hours	Credit
III	21UCS33AO03A	ALLIED: APPLIED PHYSICS – I	4	3

(Offered to Department of Computer Science)

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On the successful completion of the course, student will be able to:	
CO-1	Acquire Basic knowledge and Understand the concepts of Electrostatics, Electromagnetic induction, Magnetic properties, LASER and Opticalfibre.	K1, K2
CO-2	Apply and Analyse problems on Electrostatics and Electromagnetic induction with moderate complexity by adopting the basic concepts	K3, K4
CO-3	Apply and Solve different problems using mathematical methods involving vectors, differential and integral calculus.	K3
CO-4	Account the importance of LASER and Optical Fibre in society especially on technological applications.	K4
CO-5	Understand and Explain the concepts and methods related to sustainable development and various components of environment	K2, K3

UNIT - I: ELECTROSTATICS

(12 Hours)

Electric charge: Its elemental unit, its quantization and conservation - point charges and charges at rest - charge distributions - Coulomb's law - Electric Field - Electric dipole: Dipole moment - Electric field due to a dipole - Lines of force - lines of force of the electric field of a point charge - current - direction of a current - current density - equation of continuity - electromotive force - resistance - Ohm's law - electrical resistivity - combination of resistance - star delta transformation - Definition of electrostatic potential - potential difference - potential due to a point charge - Potentiometer - uses of potentiometer - Capacitance and its units - the two-body system: the capacitor - calculation of capacitance - types of capacitors - uses of the capacitor

UNIT - II: ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS

(12 Hours)

Biot and Savart law and its application - field on the axis of the coil - magnetic field due to a solenoid - characteristics of the magnetic field of a solenoid - force on a moving charged particle in a magnetic field definition of B - Lorentz force - magnetic field intensity - Hall effect - Electromagnetic induction - faraday's law - Lenz's law - Fleming right hand rule - induced current and charge - self-induction of a long straight solenoid - mutual inductance - Alternating current: Alternating currents - sinusoidal alternating voltages and current - basic definition - the effective or RMS value - The transformers

UNIT - III: MAGNETIC PROPERTIES AND MAGNETIC CIRCUITS

(12 Hours)

Magnetization - Magnetic susceptibility and relative permeability - classification of magnetic materials - properties - energy loss due to hysteresis - magnetomotive force - the value of the

reluctance - comparison of electric and magnetic circuits - Applications of the concepts of magnetic circuits

UNIT - IV: LASERS AND HOLOGRAPHY (12 Hours)

Properties - Induced absorption, spontaneous emission and stimulated emission - Principle of Laser - Population inversion - pumping - Ruby Laser - He-Ne Laser- Semiconductor Laser - Carbon di oxide Laser - dye laser - Nd:YAG Laser - Argon Ion Laser - Free electron Laser - Applications of Laser - Holography - Principle - Applications of Holography.

UNIT - V: FIBRE OPTICS (12 Hours)

Fibre construction - light propagation in fibre - Communication system - advantages - Graded index fibre - single mode fibres - fibre opticsensor - fibre materials - single mode fibres - multimode step index fibres - multimode graded index fibre - comparison - plastic clad fibres - all plastic fibres - Optical fibres as an opticalwave guide - propagation modes in single mode fibres - monomode and multimode step index fibres - attenuation on optical fibres - Analog and Digital fibre communication system.

Books for Study

1. D.L. Sehgal, K.L. Chopra and N.K. Sehgal, Electricity and Magnetism, 6th Edition, Sultan Chand & Sons, 2004.
2. R. Murugesan and KiruthigaSivaprasath, Optics and Spectroscopy, 9th Edition, S. Chand & Company Ltd., 2016.

UNIT	BOOK	CHAPTER	SECTION
I	1	3, 4, 5, 6, 12 & 15	3.6, 3.8, 3.9, 3.10, 4.2, 4.4, 4.9, 4.11, 4.14, 4.15,
			12.1, 12.2, 12.3, 12.4, 12.5, 12.6,
			12.8, 12.9, 12.13, 5.4, 5.5, 5.6, 5.10, 15.9, 15.10, 6.7-6.10, 6.13, 6.14
II	1	13, 19 & 21	13.3, 13.8-13.10, 13.19-13.21, 13.23,
			19.3-19.5, 19.17, 19.9, 19.22,
			21.2, 21.3, 21.4, 21.6, 21.31
III	1	24 & 25	24.3, 24.6, 24.8, 24.9, 24.16, 25.2, 25.3,
			25.4, 25.5
IV	2	5, 9, 12, 23 & 46	23.8, 5.13-5.19, 46.10, 12.1, 12.2,
			12.5, 9.1, 9.3
V	2	8, 42, 43, 44 & 46	8.2, 8.3, 8.5, 8.6, 8.8, 8.9, 8.10,
			42.1, 42.3-42.8,
			43.1, 43.11, 43.12, 44.1, 46.1, 46.4

BOOK FOR REFERENCE

1. K. K. Tewari, Electricity and magnetism, Revised Edition S. Chand & Co Ltd., New Delhi, Reprint 2003.
2. Introduction to electrodynamics David J Griffiths, 3rd Edition, Prentice Hall of India Pvt. Ltd., New Delhi.
3. Fundamentals of Physics, David Halliday, Robert Resnick and Jearl Walker, 10th Edition, Wiley 2015.

WEB RESOURCES*

1. <https://nptel.ac.in/courses/122/101/122101002/>
2. <https://nptel.ac.in/courses/108/104/108104087/>
3. https://physics.iitd.ac.in/assets/uploads/teaching-labs/Study_of_EMI.pdf
4. <https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cy13/>
5. <https://nptel.ac.in/courses/108/106/108106167/>

(* subject to availability - not to be used for exam purpose)

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

Semester	Course Code	Title of the Course									Hours	Credit
III	21UCS33AO03A	ALLIED: APPLIED PHYSICS – I									4	4
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	2	3	1	3	3	3	2	1	2.3	
CO-2	3	3	2	2	1	3	3	2	2	1	2.2	
CO-3	3	3	2	2	1	3	3	3	2	1	2.3	
CO-4	3	3	2	2	1	3	3	3	2	1	2.3	
CO-5	3	2	2	2	1	3	3	3	2	1	2.2	
Mean Overall Score											2.26	
Result											High	

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS33AO03B	Allied-II PRINCIPLES OF ELECTRONICS	4	3

CO No.	CO statements	Cognitive Levels (K- levels)
	On completion of this course, students would be able to	
CO-1	Classify and interpret the semiconductor devices	K2
CO-2	Demonstrate and analyze the functionalities of various Electronic circuits	K3
CO-3	Distinguish and evaluate various sensors	K4
CO-4	Compare and estimate the operations of integrated sensors	K5
CO-5	Design and develop Electronic circuits for different applications	K6

UNIT I: SEMICONDUCTOR DEVICES (12 Hours)

Introduction to semiconductor devices-diode-Bipolar Junction Transistor- Field effect Transistor-Applications-Metal oxide Semiconductor - Enhancement mode- Depletion mode-MOSFET -Silicon controlled Rectifier- Laser diode- Photo diode-Optocoupler-Applications.

UNIT II: ELECTRONIC CIRCUITS (12 Hours)

Introduction to Linear Power supply- Voltage regulators-Relays-types-switching applications using relay-solid state relay - Opto-SCR and Opto-triac based switching for high power applications-Switch mode power supply-Block diagram-Applications- UPS - Capacitive power supply.

UNIT III: SENSORS (12 Hours)

Sensors and Transducers - Transducers-Resistive transducers-capacitive transducers- Inductive transducers- LVDT principle and applications. Measurement of non electrical quantity: humidity-flow rate-pH –pressure-thermal conductivity.

UNIT IV: INTEGRATED SENSORS (12 Hours)

Basic sensor signal conditioning networks for interfacing with PC- Integrated sensors overview- temperature module based on LM35-Hall effect sensor module-TSOP17 photo module-MOC 3042 opto-isolator module-kmz51 magnetic field module- ICM105A VGA CMOS sensor-MPXV5004G pressure sensor- 3 axis accelerometer module: MPU 6050 IMU sensor-wearable sensors.

UNIT V: PSPICE SIMULATION FOR ANALOG CIRCUITS (12 Hours)

Introduction to PSPICE-small circuit simulation-circuit examples for worst case design-DC sweep -plotting output-Sources and polynomially controlled sources- Transfer function analysis (one example).

Book for study

1. Albert Malvino, David Bates and Patrick Hoppe, “Electronic Principles” 9th edition ,2015
2. N. Mathivanan, “PC-BASED INSTRUMENTATION: CONCEPTS AND PRACTICE” 2007
3. Paul W. Tuinenga“SPICE- A guide to circuit simulation and Analysis using PSPICE” 2015.
4. Material Prepared by the Department.

Book(s) for Reference

1. Allen Mottershead, "Electronic Devices and Circuits: An Introduction" 1979.
2. Ian Sinclair, "Sensors and Transducers" 2000.
3. Rahid, "Introduction to Pspice Using Orcad for Circuits and Electronics", 2005

Unit	Book	Chapter	Sections
I	1	3,5,6,12	3.1,6.1,6.2,6.3,12.1,12.3,12.4,13.2,5.9
II	1,4	22	22.1,22.7
III	2	3	3.1.3,3.2.2,3.3,3.4,3.5
IV	2,4	3,4	3.1.4, Material prepared by the department
V	3,4	1,2,3,5,6	1.1,1.2.2.1-2.4,3.3,5.1,5.6,5.7

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

Semester	Course Code	Title of the Course									Hours	Credits
III	21UCS33AO03B	Allied-II PRINCIPLES OF ELECTRONICS									4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5		
CO 1	2	2	1	2	2	2	3	3	2	2	2.1	
CO 2	3	3	2	3	2	3	3	3	2	2	2.6	
CO 3	2	3	2	2	2	3	2	3	2	3	2.4	
CO 4	3	3	2	3	2	3	3	2	2	3	2.6	
CO 5	3	3	2	3	2	3	3	2	2	3	2.6	
Mean Overall Score											2.5	
Result											High	

Semester	Course Code	Title of the Course	Hours	Credits
III	21UCS34SE01	SEC -1 (WD): RDBMS	2	1

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basics of SQL and PL/SQL.	K1
CO-2	classify and demonstrate SQL and PL/SQL to manipulate data.	K2
CO-3	construct solutions to solve simple problems in database.	K3
CO-4	examine the use of queries/ blocks for handling the data in database.	K4
CO-5	criticize and develop procedures/ queries to interact with database.	K5, K6

List of Exercises

SQL

1. Table Creation, Data Insertion, Deletion, Updating and Selection.
2. DML: Operators (Arithmetic, Relational, Logical)
3. SQL Functions: Single Row Function & Group Functions
4. DML: Set operations, Join operations
5. Nested Queries
6. Creation and manipulation of Views.

PL/SQL

7. PL/SQL- block
8. Cursors
9. Functions & Procedures
10. Triggers and Packages

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

Semester	Course Code	Title of the Course									Hours	Credits
III	21UCS34SE01	SEC -1 (WD):RDBMS									2	1
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	2	1	2	2.2	
CO-2	3	3	2	2	2	3	3	3	2	2	2.5	
CO-3	2	3	3	2	2	2	3	3	2	2	2.4	
CO-4	3	3	3	1	3	3	3	3	1	2	2.5	
CO-5	2	3	3	2	2	2	3	3	2	1	2.4	
Mean Overall Score											2.4 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
III	21UHE24VE03A	PROFESSIONAL ETHICS-I: SOCIAL ETHICS - I	2	1

CO No.	Co- Statements	Cognitive Levels (K- Levels)
	On completion of this course the graduates will be able to	
CO-1	know the responsibility of the educated youth.	K1
CO-2	understand the values prescribed under social ethics.	K2
CO-3	apply their minds critically to the various types of cyber crime.	K3
CO-4	analyse the various kinds of political systems.	K4
CO-5	analyse the behaviour of the elected representatives.	K4

Unit-I Introduction to Social Ethics (6-Hours)

Introduction to social ethics and social responsibility, important role of Social ethics on the various areas, religion influences social changes - secularism. Social ethics and corporate dynamics, forms of social ethics.

Unit-II The Economic and Political System of Today (6-Hours)

Planned economy and communism – market economy and capitalism- socialism - mixed economy -the emerging market economy - political system- totalitarian system- oligarchic system.

Unit-III Integrity in Public Life National Integration (6-Hours)

What is Integrity, Public Life, Integrity and Public Life, Integrity in a Democratic State, India as Democratic State, Behavior of a elected representative of India , Noticeable degradation acts of elected Representatives, Suggestions to stem this rot, Types of integrity, Transparency can be a guarantee for integrity.

Unit-IV Cyber Crime (6-Hours)

Business Ethics, Business ethics permeates the whole organization, Measuring business ethics , The Vital factors highlighting the importance of business ethics , Cyber crime, Strategies in committing Cyber Crimes, Factors aiding Cyber Crime, computer Hacking, Cyber Bullying, Telecommunications piracy, Counter Measures to Cyber Crime, Ethical Hacking.

Unit-V Social Integration (6-Hours)

Global challenges, The future is with the Educational Youth, Cost of the Sacrifice, Crusaders against corruption, Responsibility of the Educated Youth, Positive Global Scenario, Right to Education, Eradicating gender inequality, Sustainable Human Development , Social Integration, Elimination Crime, Integration with Global Market

Books for Study

Department of Human Excellence, *Formation of Youth*, St Joseph's College(Autonomous), Tiruchirappali -02, 2021

Books for Reference

1. Ramesh K. Arora, *Ethics, Integrity and Values* by Public Service Paperback ,– 1 January 2014
2. Cunningham, D. *There's something happening here: The new left, the Klan, and FBI counterintelligence*. Berkeley: University of California Press, 2004.
3. Adv. Prashant Mali, *Cyber law & Cyber Crimes simplified* by Cyber Info media Paperback – 1 January 2017.
4. Matthew Richardson, *Cyber Crime: Law and Practice Hardcover – Import*, Wildy publications, 29 November 2019

Web Sources:

<https://cybercrime.gov.in/>

<https://open.lib.umn.edu/sociology/chapter/14-2-types-of-political-systems/>

<https://www.esv.org/resources/esv-global-study-bible/social-ethics/>

https://en.wikipedia.org/wiki/Political_system

Semester	Course Code	Title of the Course	Hours	Credits
III	21UHE34VE03B	PROFESSIONAL ETHICS I: RELIGIOUS DOCTRINE- I	2	1

CO No.	Co – Statements	Cognitive Levels (K- Levels)
	On completion of this course, the graduates will be able to:	
CO-1	understand the history of the Catholic Church	K1
CO-2	examine and grasp the Sacraments of the Catholic Church	K2
CO-3	apply the Christian Prayer to their everyday life	K3
CO-4	analyze themselves in the light of Sacraments & Christian Prayer	K4
CO-5	create a harmonious society learning values from all religions	K5 & K6

Unit-I	God of salvation	(6 Hours)
Unit-II	Life & Mission of Jesus Christ	(6 Hours)
Unit-III	The Holy Spirit	(6 Hours)
Unit-IV	Biblical Values	(6 Hours)
Unit-V	Mother Mary	(6 Hours)

Books for Study

Department of Human Excellence, *Life in the Lord: Religious Doctrine*. St. Joseph's College, Trichirappalli-02, 2021.

Books for Reference

1. *Compendium: Catechism of the Catholic Church*. Bengaluru: Theological Publications in India, 1994.
2. Holy Bible (NRSV).

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UTA41GL04B	Scientific Tamil (SBS, SPS,SCS)	4	3

CO No.	CO- Statement	Cognitive Level (K- level)
இப்பாடத்தின் நிறைவில் மாணவர்கள்		
CO-1	பண்டைத் தமிழர்களின் அறிவியலறிவை அறிந்துகொள்வர்.	K 1
CO-2	பண்டைத் தமிழிலக்கியங்களுள் காணலாகும் அறிவியல் சிந்தனைகளைப் புரிந்துகொள்வர்.	K 2
CO-3	தமிழரின் அறிவியல் மருத்துவத்தையும், நீர் மேலாண்மை அறிவையும் அறிந்துகொள்வர்.	K 3
CO-4	இக்கால இலக்கியங்களுள் அறிவியல்துறை பெற்றுள்ள செல்வாக்கை அறிந்துகொள்வர்.	K 4
CO-5	அறிவியல் கலைச்சொற்களைத் தமிழில் கற்றுக் கொண்டு அறிவியல் தமிழ் வளரத் துணைபுரிவர்.	K 5

அலகு – 1

(12 மணிநேரம்)

தொல்காப்பியம் :

நிலம் தீ நீர் வளி விசும்போடு (தொல்.பொருள் 635)

ஒன்றறிவதுவே (தொல்.பொருள் 571)

புறநானூறு

மண் திணிந்த நிலனும் (புறம்.2)

செஞ்ஞா யிற்றுச் செலவும் (புறம். 30)

அகநானூறு

அம்ம வாழி, தோழி (அகம்.141)

பதிற்றுப்பத்து

நிலம் நீர் வளி விசும்பு என்ற நான்கின் (பதிற்று.14)

நெடுவயின் ஒளிறு மின்னுப் பரந்தாங்கு (பதிற்று.24)

உரைநடைக்கட்டுரை : வியக்க வைக்கும் தமிழரின் அறிவியல்

அலகு- 2

(12 மணிநேரம்)

சித்தர் பாடல்கள்

பதார்த்த குண சிந்தாமணி

குளத்து சலந்தானே கொடிதான (27)

ஏரிசலம் வாதமிகு மதுவே (31)

அருவிநீர் மேக மகற்றுங் (39)

மேவிய சீவன் வடிவது சொல்லிடல் (திருமூலர்)

அணுவில் அணுவினை ஆதிபிராணை (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 மீதமிழ்நாடு நம்பிக்கை**, புவலகின் நண்பர்கள் வெளியீடு, சென்னை, முதற்பதிப்பு, 2017

3. பரிமேலழகர்(உரை.), திருக்குறள், பாரதி பதிப்பகம், சென்னை-17, ஏழாவது பதிப்பு, 2000.
4. வையாபுரிப்பிள்ளை, பாட்டும் தொகையும், பாரி நிலையம், சென்னை, இரண்டாம் பதிப்பு, 1967.

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

Semester	Course Code	Title of the Course									Hours	Credit
IV	21UTA41GL04B	Scientific Tamil (SBS, SPS,SCS)									4	3
Course Outcomes (COs)	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO-1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5		
CO-1	1	2	3	2	2	3	3	2	2	2	2.2	
CO-2	2	2	3	2	2	2	3	2	3	2	2.3	
CO-3	1	2	2	3	2	2	2	3	3	3	2.3	
CO-4	2	2	3	2	2	3	2	3	3	2	2.4	
CO-5	3	1	2	2	2	2	3	2	3	3	2.3	
Mean Overall Score											2.3 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UFR41GL04	FRENCH – IV	4	3

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of this course, students will be able to	
CO–1	recall the vocabulary pertaining to dwelling place.	K1
CO–2	outline crisis management in France.	K2
CO–3	develop a travel diary of your own.	K3
CO–4	simplify the French education system.	K4
CO–5	interpret past tenses in a text.	K5

Unit- I (12 hours)

TITRE:ON FAIT LE MELANGE!

GRAMMAIRE : le présent progressif, les pronoms possessifs, la phrase négative

LEXIQUE : décrire les étapes d'une action, la maison, les tâches 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 événements du passés, 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 remèdes, 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 StudyP.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^eedition,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	Cognitive Levels (K –Levels)
	On successful completion of the course, students will be able to	
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 Gupt, *Hindi Vyakaran*, Anand Prakashan, Kolkatta, 2020.
Unit-II, III and IV Chapter 2
3. Dr. Sanjeev Kumar Jain, *Anuwad: Siddhant Evam Vyavhar*, Kailash Pustak Sadan, MadhyaPradesh, 2019 **Unit-V** Chapter 2

Books for Reference

1. Hindi Niband Sangrah, V&S Publishers, 2015.
2. Rajeswar Prasad Chaturvedi, Hindi vyakarana, Upakar prakashan, 2015.
3. Ramdev, Vyakaran Pradeep, Hindi Bhavan, 2016.
4. Krishnakumar Gosamy, Anuvad vigyan ki Bhumika, Rajkamal Prakashan, 2016.
5. Acharya ramchandra shukla, Hindi Sahitya Ka Itihas, Prabhat Prakashan, 2021.

Web Resources

1. <https://youtu.be/xmr-DaQ3LhA>
2. <https://youtu.be/xIm-VEmgEg0>
3. <https://youtu.be/ZHuqxWbMtas>
4. <https://youtu.be/HGS63OJuHto>
5. <https://youtu.be/r-i3autqPug>

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

Semester	Course Code	Title of the Course									Hours	Credits
IV	21UHI41GL04	HINDI - IV									4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	3	2	3	3	2	3	2	3	1	2.4	
CO-2	3	2	3	3	2	3	2	3	1	2	2.4	
CO-3	3	2	2	3	2	2	1	3	2	3	2.3	
CO-4	3	2	3	1	3	3	2	3	3	2	2.5	
CO-5	3	2	2	3	3	2	3	2	3	3	2.6	
Mean Overall Score											2.44 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
IV	21USA41GL04	SANSKRIT - IV	4	3

CO No.	CO–Statements	Cognitive Levels (K –Levels)
	On successful completion of the course, the student will be able to	
CO-1	remember and identifying Mahabharatha characters and events.	K1
CO-2	understand human behaviors by studying dramas.	K2
CO-3	apply the morals learnt in day to day life.	K3
CO-4	create new conversational sentences and to Improve self-character (Personality Development).	K4
CO-5	appreciate ancient Sanskrit dramas.	K5

Unit - I (12 Hours)
Samskrita Vyavahara sahasri vakiya Prayogaha

Unit - II (12 Hours)
Lot Lakaarah , Prqayaogh Kartari Vaakyaani

Unit - III (12 Hours)
Naatakasya Itihaasah Vivaranam, Thuva and Tum Prathiyaha

Unit - IV (12 Hours)
Karnabhaaram , Naatakasya Visistyam

Unit - V (12 Hours)
Samskrita Rachanani priyogaha

Book for Study

Karnabhavam & Literature Language, 2019 , K.M Saral Sanskrit Balabodh , Bharathita vidya bhavan , Munshimarg Mumbai – 400 007

Books for Reference

1. R.S.Vadhyar & Sons , Book – sellers and publishers , Kalpathu ,Palghat – 678003 , Kerala , south India , History of Sanskrit Literature 2019
2. Kulapathy , K.M Saral Sanskrit Balabodh , Bharathita vidya bhavan , Munshimarg Mumbai – 400 007 2018
3. Samskrita Bharathi , Aksharam 8 th cross , 2nd phase Giri nagar Bangalore Vadatu sanskritam – Samaskara Binduhu 2019

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

Semester	Course Code	Title of the Course									Hours	Credit
IV	21USA41GL04	SANSKRIT-IV									4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	2	2	3	2	3	2	3	3	2	2.5	
CO-2	2	2	3	2	3	3	3	3	3	2	2.4	
CO-3	3	3	2	3	2	1	1	3	3	3	2.4	
CO-4	2	3	3	3	2	1	3	3	3	2	2.5	
CO-5	2	2	3	2	3	3	3	3	2	3	2.6	
Mean Overall Score											2.48	
Result											# High	

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UEN42GE04	GENERAL ENGLISH - IV	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	identify different local and global issues in given passages	K1
CO-2	understand explicit and implicit information given in written texts	K2
CO-3	use appropriate words and punctuations in writing	K3
CO-4	analyse written texts and modify them for better clarity	K4
CO-5	assess the coherence and cohesion of written texts and rewrite them	K5 & K6

Unit-I (15 Hours)

1. Women through the Eyes of Media
2. General Writing Skill: Writing Minutes of a Meeting
3. Grammar: Present Perfect Tense

Unit-II (15 Hours)

4. Effects of Tobacco Smoking
5. General Writing Skill: Note-Taking
6. Grammar: Present Perfect Continuous Tense

Unit-III (15 Hours)

7. Short Message Service (SMS)
8. General Writing Skill: Note-Making
9. Grammar: Past Perfect Tense

Unit-IV (15 Hours)

10. An Engineer Kills Self as Crow Sat on his Head: A Newspaper Report
11. General Writing Skill: Précis Writing
12. Grammar: Past Perfect Continuous Tense

Unit-V (15 Hours)

13. Traffic Rules
14. General Writing Skill: Paragraph Writing
15. Grammar: Future Perfect Tense and Future Perfect Continuous Tense

Book for Study

Jayraj, S. Joseph Arul et al. *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*. Trinity, 2016.

Books for Reference

1. Clark Peter, Roy. *Writing Tools: 50 Essential Strategies for Every writer*. USA: Little, Brown Spark Publishers, 2008.
2. Carnegie, Dale. *The Quick and Easy Way to Effective Speaking*. India: Fingerprint Publishers, 2018.
3. Vaughn, Steck. *Reading Comprehension*. USA: Steck-Vaughn Co, 2014.
4. Birkett, Julian. *Word Power: A Guide to Creative writing*. India: Bloomsburry Academic, 2016.
5. Knight, Dudley. *Speaking with Skill: An Introduction to Knight-Thompson Speechwork*. USA: Methuen Drama, 2016.

Web Resources

1. <https://blog.lingoda.com/en/10-news-sites-to-practice-your-english-reading-skills/>
2. <https://www.espressoenglish.net/how-to-learn-english-for-free-50-websites-for-free-english-lessons/>
3. <https://www.ef.com/wwen/english-resources/>

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

Semester	Course Code	Title of the Course									Hours	Credits
IV	21UEN42GE04	GENERAL ENGLISH - IV									5	3
Course Outcome (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	3	2	2	3	2	3	2	3	2	2.4	
CO-2	2	2	3	2	3	3	2	3	2	2	2.3	
CO-3	2	3	2	3	2	2	3	2	3	2	2.4	
CO-4	2	2	3	2	3	3	2	3	2	3	2.5	
CO-5	2	2	2	3	2	2	2	3	2	2	2.2	
Mean Overall Score											2.36 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43CC07	CORE - 7 : OPERATIONS RESEARCH	4	3

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

Unit – I:

(15 hours)

Linear Programming - General formulation of the LP Model and its Graphical solution. The Simplex Method - Computational Procedure. Artificial Variable Techniques - the Two Phase Technique – Special cases in Simplex Method.

Unit – II:

(15 hours)

Duality in Linear Programming - The Dual Problems - Primal Dual Relationships, Primal - Dual Computations - Dual Simplex Method.

Unit – III:

(15 hours)

Transportation Problems - Transportation Model - Determining the starting solution of Transportation Model, North - West Corner Rule, Least – Cost Method and Vogel’s Approximation Method. Determining the optimum solution of Transportation Problems - Assignment Problems and its solution by Hungarian method.

Unit – IV:

(15 hours)

Project Scheduling by PERT-CPM - Network diagram representations – Critical path calculations - Probability considerations in Project Scheduling.

Unit – V:

(15 hours)

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

(Note: Stress may be on the working of numerical problems)

Book for Study

1. Kanti Swarup, P K Gupta and Manmohan, “Operations Research”, Sultan Chand & Sons, New Delhi, 2013.

Unit-I: Chapter 1 (Sec: 1.1-1:6, 1:10), Chapter 2, Chapter 3(Sec:3:1-3:5), Chapter 4(Sec:4:1,4:3,4:4(only Two-Phase Method),4:5)

Unit-II: Chapter 5 (Sec: 5:1-5:5,5:7,5:9)

Unit-III: Chapter 10 (Sec: 10:1,10:5-10:6,10:8-10:10,10:12-10:13,10:15), Chapter 11 (Sec 11:1-11:2,11:3(Pages:298-307))

Unit – IV Chapter 25 (Sec 25:1-25:7)

Unit – V Chapter 19 (Sec: 19:1-19:2, 19:6-19:10(Case 1&2 only),19:15)

Books for Reference

1. Rathindra P. Sen, “Operations Research Algorithms and Applications”, PHI, New Delhi, 2010.
2. R. Panneer Selvam, “Operations Research”, PHI, NewDelhi, 2nd Ed.,2010.
3. S.Kalavathy, “Operations Research”, Vikas Publishing House Pvt Ltd, Noida India-2013.

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

Semester	Course Code	Title of the Course									Hours	Credit
IV	21UCS43CC07	CORE - 7 : OPERATIONS RESEARCH									4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	3	2	3	3	2	2	3	2.6	
CO-2	3	3	3	2	2	3	3	2	2	2	2.5	
CO-3	3	3	2	3	2	3	3	3	3	2	2.7	
CO-4	3	3	2	2	3	3	2	3	2	3	2.7	
CO-5	3	2	2	3	2	3	2	3	2	3	2.5	
Mean Overall Score											2.6 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
1V	21UCS43CC08	CORE – 8: PYTHON PROGRAMMING	4	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall and understand the features of python programming language	K1
CO-2	illustrate various programming mechanism used in python	K2
CO-3	apply various language construct to write simple programs in python	K3
CO-4	examine the application of object oriented concept in python	K4
CO-5	distinguish the various constructs used in python	K4

Unit-I: (12 Hours)

Introduction to Python: Features of Python - How to Run Python - Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python -Multi-Line Statements - Multiple Statement Group (Suite) - Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers – Strings – List – Tuple – Set – Dictionary – Data type conversion.

Unit-II: (12 Hours)

Flow Control: Decision Making – Loops – Nested Loops – Types of Loops. Functions: Function Definition – Function Calling - Function Arguments - Recursive Functions - Function with more than one return value.

Unit-III: (12 Hours)

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling- Directories in Python.

Unit- IV: (12 Hours)

Object Oriented Programming: Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes- Destructors in Python – Encapsulation - Data Hiding – Inheritance - Method Overriding- Polymorphism.

Unit- V: (12 hours)

Exception Handling: Built-in Exceptions-Handling Exceptions-Exception with Arguments - Raising Exception - User-defined Exception - Assertions in Python. Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags-Regular Expression Patterns-Character Classes-Special Character Classes - Repetition Cases - findall() method - compile() method.

Books for Study

1. Jeeva Jose and P. Sojan Lal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publishing Co, 2016.

Unit-I Chapter 3, 4

Unit-II Chapter 5, 6

Unit-III Chapter 7, 8

Unit -IV Chapter 9

Unit-V Chapter 10, 11

Books for Reference

1. Wesley J. Chun, "Core Python Programming", Prentice Hall Publication, 2006.

2. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, 2011

3. Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly Media, 2016.

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

Semester	Course Code	Title of the Course									Hours	Credit
1V	21UCS43CC08	CORE – 8 : PYTHON PROGRAMMING									4	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	1	2	1	3	2	2	3	2	2.2	
CO-2	3	3	1	3	2	3	3	2	3	2	2.5	
CO-3	3	3	3	2	1	3	3	2	2	3	2.5	
CO-4	3	3	2	3	2	2	3	2	2	2	2.4	
CO-5	2	3	2	3	1	3	2	2	3	2	2.3	
Mean Overall Score											2.3 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43CP04	Software Lab 4: Python Programming	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall and relate the features of python programming language	K1
CO-2	compare various programming mechanism used in python	K2
CO-3	construct simple programs in python using various language features	K3
CO-4	distinguish the various constructs used in python	K4
CO-5	apprise the application of object oriented concept in python	K5

List of Exercises

1. Flow controls, Functions and String Manipulation
2. Operations on Tuples and Lists
3. Operations on Sets
4. Operations on Dictionary
5. Simple OOP – Constructors
6. Method Overloading
7. Inheritance
8. Files – Reading and Writing
9. Regular Expressions
10. Modules
11. Packages
12. Exception Handling

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

Semester	Course Code	Title of the Course									Hours	Credit
IV	21UCS43CP04	Software Lab 4: Python Programming									3	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	2	2	1	3	3	2	2	3	2.3	
CO-2	2	3	2	1	2	3	3	2	2	2	2.2	
CO-3	1	2	3	2	1	2	3	2	3	2	2.1	
CO-4	2	2	2	3	1	2	3	2	2	2	2.2	
CO-5	2	2	2	2	3	1	3	2	2	3	2.2	
Mean Overall Score											2.2 (High)	

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS43AO04A	ALLIED: APPLIED PHYSICS – II	4	3

CO No.	CO- Statements	COGNITIVE LEVELS (K-Levels)
	On the successful completion of the course, student will be able to:	
CO-1	Acquire knowledge and conceptual understanding of fundamental electronics.	K1, K2
CO-2	Apply the knowledge of microprocessor to write assembly language program for simple applications.	K3, K4
CO-3	Implement the knowledge of s/w, h/w structures of microprocessor and principles of electronics to develop technologies with IT tools to benefit the real world.	K4
CO-4	Describe and understand the basics of modulation and applications of electronic devices in radio communication.	K2, K3
CO-5	Apply and Manage mini projects based on electronic devices.	K3

UNIT - I: DIODE AND TRANSISTOR

(12 Hours)

pn junction - properties - biasing - VI characteristics - rectifier - Zener diode- Voltage stabiliser - Transistor - transistor action - symbols - transistor connections - switching action of a transistor - JFET - principle and working - difference between JFET and Bipolar transistor - output characteristics of JFET.

UNIT - II: AMPLIFIERS AND OSCILLATORS

(12 Hours)

Transistor as an amplifier in CE arrangement - transistor load line analysis - operating point - performance of transistor amplifier - cut off and saturation points - transistor biasing - feedback. Sinusoidal oscillator - types - oscillatory circuit - Barkhausen criterion - Hartley and Colpitt's oscillator - crystal oscillator.

UNIT - III: OPERATIONAL AMPLIFIER

(12 Hours)

Operational amplifier - basic circuit of differential amplifier - operation - CMRR - Applications - Inverting amplifier - noninverting amplifier - voltage follower - summing amplifiers - integrator - differentiator.

UNIT - IV: MODULATION AND DEMODULATION

(12 Hours)

Radio Broadcasting, Transmission and Reception - Modulation - types - Amplitude modulation - modulation factor - analysis of Amplitude modulated wave - transistor AM Modulator - power and limitations in AM - Frequency modulation - theory - comparison - Demodulation - essentials - AM Diode detector - AM Radio receivers - types - FM receiver.

UNIT - V: MICROPROCESSOR INTEL 8085

(12 Hours)

Architecture of Intel 8085 - Block Diagram - Buses - Registers - ALU - Memory - Stack Memory - Interfacing Devices - Timing and Control Circuitry - Pin-out Diagram - Instruction

Cycle - Input / Output - Machine Language - Assembly Language - Instruction Set and Format - addition, subtraction, multiplication and division program

Books for Study

1. V.K. Mehta Rohit Mehta, Principles of Electronics, 11th Edition, S. Chand & company 2009.
2. B. Ram, Fundamentals of microprocessor and microcomputers, 7th revised edition, Dhanapat Rai Publications, 2011.

UNIT	BOOK	CHAPTER	SECTION
1	1	5, 6, 8, 18 & 19	5.14, 5.15, 5.16, 5.19, 6.25, 6.27, 6.7, 8.1, 8.4, 8.5, 8.7, 8.12, 18.9, 19.2, 19.3, 19.6, 19.8, 19.10
2	1	8,9,13,14&18	8.16, 18.7, 18.8, 18.21, 18.22, 9.2, 9.4, 13.1, 14.1, 14.2, 14.3, 14.7, 14.11, 14.10, 14.20
3	1	25	25.1-25.8, 25.23, 25.24, 25.26, 25.27, 25.32, 25.33, 25.35, 25.37
4	1	16	16.1-16.22
5	2	3,4,5 & 7	3.1-3.3, 4.1-4.4, 4.6, 5.2, 5.5, 7.1-7.3, 7.5, 7.6

Books for Reference

1. Bhargava N.N, Kulshreshtha D.C and S.C Gupta, Basic electronics and linear circuits, 2nd Edition, Tata McGraw Hill Publishing Company Limited, 2013.
2. Ramesh S. Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition, Prentice Hall, 2002.
3. William A. Rountt, Microprocessor Architecture, Programming, and Systems featuring the 8085, 1st Edition, Thomson Delmar Learning, 2006.

WEB RESOURCES*

1. <https://nptel.ac.in/courses/117/103/117103063/>
2. <https://nptel.ac.in/courses/115/102/115102014/>
3. <https://ict.iitk.ac.in/courses/working-with-op-amps/>
4. <https://nptel.ac.in/content/storage2/courses/106105080/pdf/M2L5.pdf>
5. <https://nptel.ac.in/courses/108/107/108107029/>

(* subject to availability - not to be used for exam purpose)

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

Semester	Course Code	Title of the Course									Hours	Credit
IV	21UCS43AO04A	ALLIED: APPLIED PHYSICS II									4	4
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	3	2	3	2	2	2	1	2.3	
CO-2	3	3	2	2	1	3	2	3	2	1	2.2	
CO-3	3	2	3	2	1	3	3	1	2	1	2.2	
CO-4	3	2	3	2	1	3	2	2		2	2.3	
CO-5	3	2	2	2	2	2	3	3	2	1	2.2	
Mean Overall Score											2.24	
Result											High	

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS43AP01A	ALLIED: PHYSICS PRACTICAL	4	4

(Offered to Department of Computer Science)

Any 16 Experiments

1. Junction diode – V I characteristics
2. Zener diode – V I characteristics
3. Transistor characteristics – CE mode
4. FET characteristics
5. Single stage R-C coupled amplifier – Frequency response
6. Operational amplifier – Basic circuits
7. Basic Logic Gates - Using IC's
8. Logic Gates Using IC's -The study of universal gates & De Morgan's Theorem
9. Encoders using Diodes
10. Encoders using OR gates.
11. Shift register using IC7495.
12. R-S, J-K, D, T Flip-flops using Logic gates IC's
13. Potentiometer - Calibration of Ammeter
14. Potentiometer - Calibration of Voltmeter
15. Field along the axis of a coil
16. Resistance of a Thermistor- Multimeter
17. EMF of a Thermocouple – Multimeter
18. Bridge Rectifier - pi filter circuit
19. Hartley / Colpitt's Oscillator
20. Hysteresis
21. Microprocessor I (Data Transfer)
22. Microprocessor II (Addition, subtraction, multiplication & division)

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43AO04B	Allied-II COMMUNICATION ELECTRONICS	4	2

CO No.	CO statements	Cognitive Levels (K- levels)
	On completion of this course, students would be able to	
CO-1	Understand serial and parallel Communication	K2
CO-2	Infer and Elaborate Optical Communication	K2
CO-3	Experiment and Perceive various optical sources and detectors	K2,K3
CO-4	Appraise various Wireless Networks	K4
CO-5	Apply and Analyze wireless networking using ESP 8266	K6

UNIT I: SERIAL AND PARALLEL PORT COMMUNICATION (12 Hours)

Basics of digital communication- Parallel port interfacing for simple I/O operations-Serial communication-UART-USART-Data transfer using serial port- USB port specifications-HID device –USB for data transfer applications-Communication protocols-SPI-IIC-Applications.

UNIT II: OPTICAL COMMUNICATION (12 Hours)

Basics of optical communication-Block diagram of Optical fibre communication-advantages, disadvantages, and applications of optical fiber communication, optical fiber waveguides, Ray theory, single mode fiber, cutoff wave length, fiber alignment and joint loss, single mode fiber joints, fiber splices, fiber connectors and fiber couplers.

UNIT III: OPTICAL COMMUNICATION SOURCES AND DETECTORS (12 Hours)

Introduction, LEDs, Phototransistor characteristics- Photo detector noise, Response time, double hetero junction structure, comparison of photo detectors -LM393 light sensor module TCS3200 color sensor module.

UNIT IV: WIRELESS COMMUNICATION (12 Hours)

Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication-Third generation Cellular Networks- Fourth Generation, fifth generation wireless networks- Wireless Local Loop (WLL)-Wireless Local Area network(WLAN)- Bluetooth and Personal Area Networks.

UNIT V BASIC NETWORKING WITH ESP8266 (12 Hours)

Introduction to ESP8266 Wi-Fi Module- Wi-Fi library-Web server- installation- configuration- Posting sensor(s) data to web server-ThingSpeak API and MQTT.

Book(s) for Study

1. N. Mathivanan, "PC-BASED INSTRUMENTATION: CONCEPTS AND PRACTICE" 2007
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002
3. Manoj R. Thakur,"NodeMCU ESP8266 Communication Methods and Protocols : Programming with Arduino IDE"
4. Material prepared by the Department.

Book(s) for Reference

1. John Axelson, "USB Complete: The Developer's Guide", 4th Edition, 2012
2. Anita Gehlot, Rajesh singh, Praveen Kumar Malik, Lovi Raj Gupta, Bhupendra Singh, "Internet of things with 8051 and ESP8266", 2020

Unit	Book	Chapter	Sections
I	1	6	6.1,6.2,9.2,9.3,9.4,9.5
II	2	1,2,3,5	1.2,1.3,2.1,2.2,3.6,5.3
III	2	7,8	7.2,8.1.8.3,8.5,8.6,8.8
IV	4		Material prepared by the department.
V	3	4,5,21	4.1,4.2,4.3,5.2,21.1-21.3

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

Semester	Course Code	Title of the Course									Hours	Credits
IV	21UCS43AO04B	Allied-II COMMUNICATION ELECTRONICS									4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5		
CO-1	2	2	3	2	1	2	3	3	2	2	2.2	
CO-2	3	3	2	2	2	3	3	2	2	3	2.5	
CO-3	3	3	2	3	2	2	3	3	2	2	2.5	
CO-4	3	3	3	3	2	2	3	3	3	2	2.7	
CO-5	3	3	3	3	2	3	3	3	3	3	2.9	
Mean Overall Score											2.6	
Result											High	

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UCS43AP01B	Allied-II ELECTRONICS PRACTICAL	2	2

ALLIED ELECTRONICS PRACTICALS (ANY 16 EXPERIMENTS)

1. Study of Opto-coupler characteristics and application.
2. Study of Photodiode and phototransistor characteristics
3. Study of Transducers for temperature measurements.
4. Study of MOSFET characteristics.
5. Study on Integrated sensors
6. Construction and study of Linear power supply
7. Construction of voltage regulators.
8. Pspice simulation of basic circuits with resistors and node voltage and branch current calculation.
9. Study on magnetic and solid state relay.
10. Study of SCR characteristics
11. DC to DC switching circuits using MOSFET
12. Pspice simulation of active devices.
13. Configuring ESP8266 based Web-server for data acquisition applications.
14. Digitizing temperature sensor data and uploading in thingspeak API.
15. Study of USB communication (HID device).
16. Study of software serial communication in ESP8266.
17. Study of fibre optic communication.
18. Hall effect sensor for current measurement
19. ESP 8266 I/O operations
20. Interfacing RFID module using Arduino.
21. Interfacing IIC memory module using Arduino.
22. Interfacing HC-05 bluetooth module with arduino
23. Study of Parallel port for I/O operations
24. Study of Serial port data transfer to hyper-terminal.
25. Study of Colour sensing using TCS3200.

Semester	Course Code	Title of the Course	Hours	Credit
IV	21UCS44SE02	SEC -2 (BS): DATA ANALYSIS USING SPREADSHEET	2	1

CO No.	CO – Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, student will be able to	
CO-1	recall and describe the fundamental ideas of data analysis	K1
CO-2	summarize the functions used for data analysis	K2
CO-3	apply the learned skills to analyze various kinds of data	K3
CO-4	analyze advanced spreadsheet functions for data analysis	K4
CO-5	formulate the results to visualize the outcome of data analysis using advanced charts	K5

List of Exercises

1. Data Analysis Fundamentals
2. Basic Mathematical, Statistical and Financial Functions
 - a) Mathematical → SUM, AVERAGE, MAX, MIN, COUNT
 - b) Statistical → STDDEV, MEAN, MEDIAN, MODE, NORM, SKEW
 - c) **Financial** → PMT, RATE, NPER, PV
3. Advanced Excel Functions for Analysis
IF, SUMIF, COUNTIF, COUNTA, VLOOKUP, HLOOKUP, IFERROR, COUNTIFS, LEFT/RIGHT, RANK, MINIFS, MAXIFS, SUMPRODUCT, FIND/SEARCH
4. Sorting, Filtering, Data Validation, Subtotal
 - a) Custom Sorting, Filtering
 - b) Validations on Date and Time, Numbers, Strings
 - c) Sub Total, Sub Total using Functions
5. What If Analysis, Goal Seek
 - a) Analysis with Goal Seek, What If
 - b) Break Even Analysis
6. Pivot Table
 - a) Construction of Pivot Table
 - b) Pivot Chart.
7. Basic Charting Bar Chart, Column Chart, Pie Chart, Line Chart, Scatter Chart
8. Advanced Charts
 - a) Actual vs Target Charts
 - b) Bell Curve

- c) Funnel Chart
- d) Pareto Chart

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

Semester	Course Code	Title of the Course									Hours	Credit
IV	21UCS44SE02	SEC -2 (BS): DATA ANALYSIS USING SPREADSHEET									2	1
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	3	2	1	3	3	3	2	2	2.4	
CO-2	3	3	3	2	1	3	3	3	2	2	2.5	
CO-3	3	3	3	2	1	3	3	2	3	2	2.5	
CO-4	3	3	3	2	1	3	3	3	3	2	2.6	
CO-5	3	3	3	2	1	3	3	3	3	2	2.6	
Mean Overall Score											2.52 (High)	

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

Co. No.	CO – Statements	Cognitive Levels (K- Levels)
	On completion of this course the graduates will be able to	
CO-1	know the value of natural recourses and to live in a harmony with nature.	K1
CO-2	comprehend the importance of a healthy life.	K2
CO-3	apply the plans of disaster management in the society.	K3
CO-4	analyse the importance and differences of science and religion.	K3
CO-5	apply counseling skills and solve their problems.	K4

Unit-I Harmony with Nature

(6-Hours)

What is environment, Why should we think of harmony, Principles to conserve environmental resources, Causes of disharmony, The fruits of harmony with nature, Natural Resources, Fruits of disharmony, Economic values and growth, Environmental Ethics, Guidelines to live in harmony with nature, Towards life-centered system for better quality of life. Harmony with animal kingdom.

Unit-II Issues Dealing with Science and Religion

(6-Hours)

What is Science, Science and Religion, Social Relevance of Science and Technology, Science and technology for social justice, Difference caused by Science and Technology, Need for indigenous technology, Science and Technology Innovation Policy of India.

Unit-III Public Health

(6-Hours)

Health related issues, Health Care in India vs Developed Countries, Health and Heredity, Public Health - Objectives of public health in India, Public Health System in India, Failure on the public health front, Role of the central government, Hospitals Services in India, Health and Abortion, Drug Addiction and Drug abuse

Unit-IV Disaster Management

(6-Hours)

Disaster Management, Types of disaster, Plans of disaster management, Technology to manage natural disasters and catastrophes, Rehabilitation and Reconstruction, Human-induced disaster, First Aid, The importance of First-aid.

Unit-V Counselling for Adolescents

(6-Hours)

High Risk Behaviours, Developmental Changes in Adolescents, Key Issues of the Adolescents, Need for Counselling, Nature of Counselling, Counselling Goals, Does helping help? The Good and the Bad news. Importance of Career Guidance Counselling.

Books for Study

Department of Human Excellence, *Formation of Youth*, St Joseph's College (Autonomous), Tiruchirappali 02, 2021.

Books for Reference

1. Albert, D. and Steinberg, L, *Judgment and decision making in adolescence: Journal of Research on Adolescence*, page no: 211-224. 2011

2. Larry R. Collins, *Disaster Management and Preparedness*, Lewis Publications, 22 November 2000.
3. Elizabeth B. Hurlock, *Developmental Psychology: A: Life-Span Approach*, New Delhi: Tata McGraw-Hill, 1981, 5th Edition, August 18, 2001.
4. Sangha, Kamaljit. *Ways to Live in Harmony with Nature: Living Sustainably and Working with Passion*. Australia, Woodslane Pty Limited, 2015.

Web Sources

https://en.wikipedia.org/wiki/Disaster_management_in_India

<https://ndma.gov.in/>

<https://talkitover.in/services/child-adolescent-counselling/>

<https://www.nipccd.nic.in/schemes/adolescent-guidance-centre-19#gsc.tab=0>

Semester	Course Code	Title of the Course	Hours	Credits
IV	21UHE44VE04B	PROFESSIONAL ETHICS II: RELIGIOUS DOCTRINE - II	2	1

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On completion of this course, the graduates will be able to	
CO-1	Understand the history of the Catholic Church	K1
CO-2	Examine and grasp the Sacraments of the Catholic Church	K2
CO-3	Apply the Christian Prayer to their everyday life	K3
CO-4	Analyze themselves in the light of Sacraments & Christian Prayer	K4
CO-5	Create a harmonious society learning values from all religions	K5 & K6

Unit-I	The Catholic Church	(6 Hours)
Unit-II	Sacraments of Initiation	(6 Hours)
Unit-III	Sacraments of Healing & at the Service of Community	(6 Hours)
Unit-IV	Christian Prayer	(6 Hours)
Unit-V	Harmony of Religions	(6 Hours)

Books for Study

Department of Human Excellence, *Life in the Lord: Religious Doctrine*. St. Joseph's College, Trichirappalli 02, 2021.

Books for Reference

1. *Compendium: Catechism of the Catholic Church*. Bengaluru: Theological Publications in India, 1994.
2. Holy Bible (NRSV).

Semester	Course Code	Title of the Course	Hours	Credit
V	21UCS53CC09	CORE – 9: JAVA PROGRAMMING	4	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	remember the basic programming skills in java	K1
CO-2	understand the use of inheritance concepts in java programs	K2
CO-3	apply and build simple packages and to handle Exceptions	K3
CO-4	analyse and interpret the use of Multithreading, storage of data in files	K4
CO-5	examine and classify programs using GUI environment	K4

Unit-I

(12 hours)

The Java Language: How Java Impacted the Internet. Java Buzz Words-An Overview of Java: The Three OOP Principles-A first Simple Program-The Java Keywords-The Java Class Libraries.-Operators-Control Statements.

Unit-II

(12 hours)

Introducing Classes: Class Fundamentals-Declaring Objects-Introducing Methods-Constructors-The 'this' Keyword. Overloading Methods-Overloading Constructors-Using Nested and Inner Class-Recursion-Arrays Revisited-Using Command Line Arguments. **Inheritance:** Inheritance Basics- Using Super- Creating a Multilevel Hierarchy- Method Overriding- Using Abstract Class- Using final with Inheritance.

Unit-III

(12 hours)

Packages and Interfaces: Packages-Defining a Package-Packages and member Access-Importing Packages- Interface: Defining an Interface-Implementing Interfaces-Nested Interfaces-Exception Handling- Exception Handling Fundamentals-Exception Types-Using Try and Catch-Uncaught Exceptions-Multiple catch Statements-throw-finally-Using Exceptions.

Unit-IV

(12 hours)

Multithreading: The Java Thread Model-The Mail Thread-Creating a Thread-Creating Multiple Threads-Using is Alive() and Join()-Thread Priorities-Synchronization-Thread Priorities-Suspending, Resuming and Stopping Threads using Multithreading. Input/Output: File-The Stream Classes-The Byte Streams-The Character Streams.

Unit-V

(12 hours)

Event Handling: Two Event Handling Mechanisms-The Delegation Event Model-Event Classes-The Key Event Classes-Event Listener Interfaces-Introducing the AWT: AWT Classes-Window Fundamentals-Introducing Graphics-Working with Color: Color Methods-Using AWT Controls, Layouts Managers: Labels-Using Buttons-Applying Check Boxes-Checkbox Group-Choice Controls-Handling Choice-Handling Lists-Managing Scroll Bars-Using a Text Field-Using a Text Area-Understanding Layout Managers-Dialog Boxes.

Book for Study

1. Schildt Herbert, Java: *“The Complete Reference”*, New York: McGraw-Hill Education Tenth Edition, 2017.

Unit I

Chapter 1 (Sec: 1.3, 1.8, 2.1.3, 2.2, 2.7), Chapter 4, Chapter 5

Unit II

Chapter 6 (Sec: 6.1, 6.2, 6.4- 6.6), Chapter 7 (Sec 7.1, 7.10, 7.12) Chapter 8(8.1-8.3, 8.5, 8.7, 8.8)

Unit III

Chapter 1 (Sec: 9.1.1, 9.2, 9.3, 9.4.1 - 9.4.3), Chapter 10(Sec 10.1-10.5, 10.7, 10.9, 10.14)

Unit IV

Chapter 11 (Sec: 11.1- 11.7, 11.9, 11.12), Chapter 21(Sec: 21.2, 21.6 - 21.8)

Unit V

Chapter 24 (Sec: 24.1-24.4, 24.6), Chapter 26(Sec 26.2-26.11, 26.13)

Books for Reference

1. E. Balagurusamy, *“Programming with JAVA”*, Tata McGraw Hill, New Delhi, 2019.
2. C. Muthu, *“Programming with JAVA”*, Vijay Nicole Imprints Private Limited, Chennai, Second Edition, 2011.
3. Bruce Eckel, Chuck Allison, *“Thinking in Java”*, Prentice Hall Publications, 2006

Semester	Course Code	Title of the Course									Hours	Credit
V	21UCS53CC09	CORE – 9: JAVA PROGRAMMING									4	2
Course Outcomes ↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	2	2	1	3	3	2	3	3	2.4	
CO-2	3	3	3	2	2	3	3	3	3	3	2.8	
CO-3	3	3	3	3	3	3	3	2	3	1	2.7	
CO-4	3	2	2	3	2	2	3	3	2	2	2.4	
CO-5	2	3	3	3	1	2	3	3	2	3	2.5	
Mean Overall Score											2.56 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53CC10	CORE – 10: DISTRIBUTED TECHNOLOGY	4	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define the elements of distributed systems.	K1
CO-2	understand the ASP.NET development environment.	K2
CO-3	apply various server and client-side controls to create web applications.	K3
CO-4	examine and use the different components in ASP.NET applications.	K3
CO-5	analyze and evaluate the development of web applications with disconnected data access technologies.	K4,K5

Unit-I: (12 hours)

Client server computing: clients - server- networks - Distributed Systems: Distributed applications-Distributed Processing –web technology - Understanding the .NET Framework: Benefits of the .NET Framework- Elements of the .NET Framework- ASP.NET.

Unit-II: (12 hours)

Getting Started with ASP.NET: Introducing the .NET Framework - Introducing ASP.NET- Setting up the Development Environment- Creating an ASP.NET Application- Deploying an ASP.NET Web Application.

Unit-III: (12 hours)

Building Forms with Web Controls: Introducing ASP.NET Web Forms- Creating Web Forms Application Projects- Using Web Controls- Working with Events.

Unit-IV : (12 hours)

Using Rich Web Controls: Using the Ad Rotator Control- Using the Calendar Control- Using the Tree View Control- Validating User Input - Understanding Validation Controls- Introduction to Custom Controls- Basic Structure of Web Forms Controls- Creating Custom Controls- Creating a user control

Unit-V : (12 hours)

ASP.NET Database Programming: Introducing ADO.NET- ADO.NET Basics- ADO.NET Object Model- Managed Providers- DataSet class.

Books for Study

1. Rajesh, Eswara Kumar, Balasubramanian, “Computer Networks, Fundamentals and Applications”, Vikas Publishing House Pvt. Ltd., 2002.

Unit-I Chapter 10 (Sec:10.1, 10.2, 10.3), Chapter 11 (Sec:11.1, 11.2,)

2. Mridula Parihar, “ASP.NET Bible”, Hungry Minds © 2002, Inc. 909 Third Avenue New York, NY 10022.

Unit- I Chapter 1

Unit-II Chapter 2

Unit-III Chapter 3

Unit -IV Chapter 4, Chapter 5

Unit -V Chapter 8

Books for Reference

1. Bill Evjenet, “Professional ASP.NET 2.0 Special Edition”, Published by Wrox Press 2006.
2. Stephen Walther, “ASP.NET 2.0 Unleashed”, Sams Publications, 2006.
3. Matthew Macdonald and Mario Szpuszta, “ProASP.NET 3.5 in C# 2008”, second edition, Apress, 2007.

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

Semester	Course Code	Title of the Course									Hours	Credits
V	21UCS53CC10	CORE – 10 : DISTRIBUTED TECHNOLOGY									4	2
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	3	3	1	3	3	2	2	2	2.4	
CO-2	3	2	2	3	2	2	2	3	3	2	2.4	
CO-3	2	3	2	3	2	3	3	3	2	2	2.5	
CO-4	3	2	2	2	1	3	2	2	3	1	2.1	
CO-5	3	2	3	2	1	3	2	3	2	1	2.2	
Mean Overall Score											2.32 (High)	

Semester	Course Code	Title of the Course	Hours	Credit
V	21UCS53CP05	Software Lab 5: JAVA PROGRAMMING	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	Remember the concepts of java classes and objects	K1
CO-2	understand the OOP concepts in java	K2
CO-3	develop simple programs with multiple threads	K3
CO-4	analyze and classify programs using AWT	K4
CO-5	compare and examine java programs using GUI environment	K4

List of Exercises

1. Classes and Objects
2. Constructors
3. Inheritance
4. Method Overloading
5. Method Overriding
6. Interfaces
7. Packages
8. Multithreading
9. Input / Output streams
10. AWT Controls

Semester	Course Code	Title of the Course									Hours	Credit
V	21UCS53CP05	Software Lab 5: JAVA PROGRAMMING									3	2
Course Outcomes ↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	2	2	1	3	3	2	2	3	2.3	
CO-2	2	3	3	2	2	3	3	3	2	3	2.6	
CO-3	2	2	3	3	3	3	3	3	3	2	2.7	
CO-4	2	2	2	3	1	2	3	3	2	3	2.3	
CO-5	2	3	2	3	3	1	3	3	3	3	2.6	
Mean Overall Score											2.5 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53CP06	Software Lab 6: DISTRIBUTED PROGRAMMING	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the HTML tags and design simple web pages	K1
CO-2	illustrate the procedure of deploying ASP.Net web applications.	K2
CO-3	apply the web server controls to create web applications	K3
CO-4	analyze and use web user controls.	K4
CO-5	develop and evaluate applications using ADO.NET.	K5, K6

List of Exercises:

1. Simple Webpage creation using HTML.
2. HTML form validation using VB Script / Java Script
3. Design a Simple Calculator
4. Request and Response Objects
5. Server-side controls.
6. Working with Toolbox Controls.
7. Validation Controls.
8. AdRotator Control
9. Calendar Control
10. Database Access - ADO.NET

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

Semester	Course Code	Title of the Course					Hours	Credit			
V	21UCS53CP06	Lab- 6 (Software): DISTRIBUTED PROGRAMMING					3	2			
Course Outcomes ↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	
CO-1	3	3	2	1	2	3	3	2	1	2	2.2
CO-2	3	3	3	2	1	3	3	3	2	2	2.5
CO-3	2	3	3	2	2	2	3	3	2	2	2.4
CO-4	3	3	3	1	2	3	3	3	1	2	2.4
CO-5	2	3	3	1	2	2	3	3	2	1	2.3
Mean Overall Score											2.36
Result											# High

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES01 A	DSE - 1: OPERATING SYSTEMS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic principles and importance of the operating system in a computer	K1
CO-2	illustrate the objectives and functions of the operating system components	K2
CO-3	identify the various operating system techniques and security	K3
CO-4	analyze the issues and challenges of the operating system and security mechanisms	K4
CO-5	evaluate the functions and features of modern operating systems	K5

UNIT- I (15 Hours)

Operating Systems: Computer-System Organization - Computer-System Architecture - Operating System Structure - Operating-System Operations – Process Management - Memory Management - Storage Management - Protection and Security.

UNIT –II (15 Hours)

Process Concept: Process Scheduling-Operations on Processes –Inter process Communication - CPU Scheduling - Basic Concepts - Scheduling Criteria - Scheduling Algorithms. Deadlocks: System Model - Deadlock Characterization - Methods for Handling Deadlocks.

UNIT- III (15 Hours)

Main Memory: Swapping - Contiguous Memory Allocation - Segmentation - Paging - Structure of the Page Table. Virtual Memory: Demand Paging.

UNIT- IV (15 hours)

File Concept - Access Methods - Directory and Disk Structure - File-System Mounting File Sharing – Protection.

UNIT- V (15 hours)

Protection: Goals of Protection - Principles of Protection - Domain of Protection – Access Matrix - Implementation of the Access Matrix - Access Control. Security: The Security Problem - Cryptography as a Security Tool - User Authentication.

Book for Study

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne “*Operating Systems Concepts*”, 9th Edition, Wiley Publications, 2013.

Unit- I Chapter 1 (Sec: 1.2 -1.9)

Unit – II Chapter 2 (Sec: 3.1-3.4) Chapter 6(6.1-6.3) Chapter 7(7.1 -7.3)

Unit –III Chapter 8(Sec: 8.2-8.6) Chapter 9 (9.2)

Unit –IV Chapter 11(11.1 -11.6)

Unit –V Chapter 14(14.1-14.6) Chapter 15(15.1, 15.4, 15.5)

Books for Reference

1. William Stallings, Operating Systems, PHI, Second Edition, 2001.
2. William Stallings, “Operating Systems –Internals and Design Principles”, 8/E, Pearson Publications, 2014
3. Andrew S. Tanenbaum, “Modern Operating Systems”, 4/E, Pearson Publications, 2014.

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

Semester	Course Code	Title of the Course									Hours	Credit
V	21UCS53ES01A	DSE- 1: OPERATING SYSTEMS									5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	2	2	2	3	2	2	2	3	3	2.3	
CO-2	2	2	2	3	3	2	2	2	3	3	2.4	
CO-3	2	2	3	3	3	2	2	3	3	3	2.6	
CO-4	2	2	2	3	3	2	2	2	3	3	2.4	
CO-5	2	3	3	3	3	3	1	2	2	2	2.4	
Mean Overall Score											2.42 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES01B	DSE- 1: DIGITAL MARKETING	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic elements and factors of digital marketing	K1
CO-2	classify the technology and frameworks in which digital marketing operates	K2
CO-3	choose the key internal analysis elements for the relevant applications of underlying frameworks of digital marketing	K3
CO-4	analyze different digital marketing strategies for the real time business applications	K4
CO-5	determine technical specifications and to develop site/portal to promote digital marketing	K5, K6

UNIT- I

(15 Hours)

Introduction to Digital Marketing: Evolution of Digital Marketing - From Traditional to Modern Marketing – Growth of ‘E’ Concepts: from E-Business to Advanced E-Commerce – Digital, The next wave of marketing – Digital Marketing: Emergence of Digital Marketing as a Tool – Digital Marketing Channels – Types and Business Models – Digital Marketing Applications and Benefits. Internet Marketing: Underlying Technology and Frameworks – Digital Marketing Framework.

UNIT –II

(15 Hours)

Digital Marketing Models Creation: Factors Impacting Digital Marketplace – Value Chain Digitization- Digital Marketing Business Models, Understanding Digital Value Elements – Digital Value – Led Marketing Approach – Digital Marketing Models Creation – Application of Digital Marketing Models. Consumer for Digital Marketing: Consumer Behaviour on the Internet – Evolution of Consumer Behaviour Models – Brand Building on the Web – Web Tracking Audits and Forecasting – Integrated Marketing Communications – Basics of Integrated Marketing Communications – Four Pillers of IMC Construct – Impact of Digital Channels on IMC.

UNIT- III

(15 Hours)

Digital Marketing Assessment Phase: Elements of the Assessment Phase – Marketing Strategy and its Digital Shifts – The assessment Phase Elements – Macro-Micro Environment Analysis – Marketing Situation Analysis – Digital Marketing Internal Assessment – Analyzing Present Offerings Mix – Marketing Mix Analysis – Internal Resource Mapping – Core Competencies Analysis – Digital Marketing Objectives Planning – Digital Presence Analysis – Digital Presence Analysis Matrix – Digital Marketing Objectives Development – Digital Marketing Objectives Review.

UNIT- IV

(15 hours)

Digital Marketing Strategy: Groundwork – Understanding Digital Business Strategy – Emerging Digital Business Structures – Digital Core Competency Alignment – Customer Development Strategy – Defining the Digital Marketing Mix – Offering Mix for Digital – Digital Pricing Models – Channels of purchasing, Reaching the E-consumer – Managing Promotional Channels – Digital Marketing Strategy Roadmap – The 6S Digital Marketing Implementation Strategy – PLC Concept.

UNIT- V

(15 hours)

Digital Marketing Operations Set-up : Understanding Digital Marketing Conversion – Basics of Lead Generation and Conversion Marketing – Setting up for conversion – Lead Management across Channels – Basics of Web Development and Management – Pre Planning for Web Development – Website Development Stages – Developing Site Diagrams and Wireframes – Website Content Development and Management – User Experience, Usability and Service Quality Elements – Understanding Elements of User Experience – Implementation of Interaction Design – Understanding Web Usability and Evaluation – Measuring Service Quality Elements- Introduction to Search Engine Optimization.

Book for Study

1. Puneet Bhatia, “Fundamentals of Digital Marketing, 2/e”, Pearson India Publications, New York, 2019.
Unit I - Chapter 1
Unit II - Chapter 2, 3
Unit III - Chapter 4
Unit IV - Chapter 5
Unit V - Chapter 7

Books for Reference

1. Vandana Ahuja “Digital Marketing”, Oxford University Press, 2015.
2. Marjolein Visser, Berend Sikkenga, Mike Berry, “Digital Marketing Fundamentals: From Strategy to ROI”, Noordhoff Groningen / Utrecht, Netherlands, 2018.
3. Jeremy Kagan, Siddharth Shekhar Singh, “Digital Marketing: Strategy & Tactics”, Wiley Publications, 2020.

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

Semester	Course Code	Title of the Course									Hours	Credits
V	21UCS53ES01B	DSE- 1: DIGITAL MARKETING									5	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	3	3	2	3	3	3	2	2	2.7	
CO-2	2	3	3	3	2	2	3	3	3	2	2.6	
CO-3	3	3	2	3	2	3	3	3	2	2	2.6	
CO-4	2	3	3	2	2	2	3	3	2	2	2.4	
CO-5	3	3	3	2	1	3	3	3	3	2	2.6	
Mean Overall Score											2.58 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES02A	DSE- 2: COMPUTER NETWORKS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basic concepts of computer networks	K1
CO-2	summarize the technical specifications of various layers of OSI model for network	K2
CO-3	identify the appropriate protocols and standards for computer networks	K3
CO-4	classify technical factors of cellular networks and satellite communication	K4
CO-5	evaluate the applications of computer networks and communication	K5

UNIT- I (15 Hours)

Data Communication – Networks – The Internet – Protocols and Standards – OSI Model- Layers in OSI Model - TCP/IP Protocol Suite – Addressing.

UNIT –II (15 Hours)

Analog and Digital – Digital Signals – Transmission Impairment – Performance – Multiplexing – Guided Media – Unguided Media. Switching: Circuit Switched Networks – Datagram Networks – Virtual Circuit Networks.

UNIT- III (15 Hours)

Data Link Layer: Error Detection and Correction -Introduction – Block Coding: Error detection, Error correction – Data Link Control: Framing – Flow and Error Control – Protocols – Noiseless Channels – Noisy channels – HDLC – Point to Point Protocol.

UNIT- IV (15 hours)

Wired LAN: IEEE Standards – Standard Ethernet. Wireless LAN: IEEE 802.11 – Bluetooth. Connecting LANs: Connecting Devices – Virtual LANs. Wireless WAN: Cellular Telephony – Satellite Networks. Network Layer-Logical Addressing: IPv4 Addresses – IPv6 Addresses

UNIT- V (15 hours)

Transport Layer: Process to Process Delivery – User Datagram Protocol - TCP. Application Layer: Domain Name Space – DNS in the Internet – Electronic Mail – File Transfer. WWW: Architecture – HTTP.

Book for Study

1. Behrouz A. Forouzan, “Data Communications and Networking”, McGraw-Hill Companies, New York, 4th Edition, 2007.

- UNIT I** – Chapters 1,2
UNIT II – Chapters 3,6,7,8
UNIT III – Chapters 10,11
UNIT IV – Chapters 13,14
UNIT V – Chapters 23,25,27

Book for Reference

1. William Stallings “Data and computer communications”, Prentice Hall of India, 7th Edition, 2004.
2. Andrew S Tanenbaum, “Computer Networks”, Prentice Hall of India, New Delhi, 2013.
3. Nasib Singh Gill, “Essential of Computer and Network Technology”, Khanna Book Publishing Company (P) Limited, New Delhi, 2014.

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

Semester	Course Code	Title of the Course									Hours	Credits
V	21UCS53ES02A	DSE- 2: COMPUTER NETWORKS									5	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	2	2	2	1	3	2	3	2	2	2.2	
CO-2	2	3	3	2	1	3	3	2	2	2	2.3	
CO-3	2	3	2	2	1	3	3	2	2	2	2.2	
CO-4	3	2	3	2	2	3	3	3	2	2	2.5	
CO-5	3	2	3	3	2	3	3	3	3	2	2.7	
Mean Overall Score											2.38 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53ES02B	DSE-2: SECURITY IN COMPUTING	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define and relate the concepts and terms of security	K1
CO-2	classify and outline existing attacks and security measures.	K2
CO-3	identify the techniques used to materialize threats into attacks.	K3
CO-4	analyse the recent threats, vulnerabilities and attacks and discover their effects.	K4
CO-5	criticize and propose solutions for protecting the system from being exposed to the threats and attacks.	K5, K6

UNIT I

(15 hours)

Introduction: Computer Security - Threats -Harm - Vulnerabilities - Controls - Authentication - Access Control – Cryptography. Web User Side - Browser Attacks - Web Attacks Targeting Users - Obtaining User or Website Data - Email Attacks.

UNIT II

(15 hours)

Security: Security in Operating Systems - Security in the Design of Operating Systems -Rootkit - Network security attack- Threats to Network Communications - Wireless Network Security - Denial of Service - Distributed Denial-of-Service.

UNIT III

(15 hours)

Security Countermeasures: Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management - Databases - Security Requirements of Databases - Reliability and Integrity - Database Disclosure.

UNIT IV

(15 hours)

Privacy: Privacy Concepts - Privacy Principles and Policies - Authentication and Privacy – Governing Data Mining – Privacy Preserving - Privacy on the Web - Email Security - Privacy Impacts of Emerging Technologies.

UNIT V

(15 hours)

Management and Incidents: Security Planning - Handling Incidents - Risk Analysis - Protecting Programs and Data – Information and law – Rights of Employees and Employers – Ethical Issues – Cryptography - Cyber Warfare.

Book for Study

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies, “Security in Computing”, 5th Edition, Pearson Education, 2015.
Unit I: Ch1, Ch2, Ch3
Unit II: Ch5, Ch6 [6.2, 6.4, 6.5]
Unit III: Ch 6 [6.6, 6.7, 6.8, 6.9], Ch 7

Unit IV: Ch 9
Unit V: Ch 10, 11, 13

Book(s) for Reference

1. George K. Kostopoulous, “Cyber Space and Cyber Security”, CRC Press, 2013.
2. Martti Lehto, Pekka Neittaanmaki, “Cyber Security: Analytics, Technology and Automation”, Springer International Publishing, Switzerland, 2015.
3. Nelson Phillips, Enfinger Steuart, “Computer Forensics and Investigations”, Cengage Learning, New Delhi, 2009.

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

Semester	Course Code	Title of the Course									Hours	Credits
V	21UCS53ES02B	DSE-2: SECURITY IN COMPUTING									5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	2	1	2	2.2	
CO-2	3	3	2	2	2	3	3	3	2	2	2.5	
CO-3	2	3	3	2	2	2	3	3	2	2	2.4	
CO-4	3	3	3	1	3	3	3	3	1	2	2.5	
CO-5	2	3	3	2	2	2	3	3	2	1	2.4	
Mean Overall Score											2.4 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS53SP01	SELF PACED LEARNING: WEB ETHICS	-	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define the basic concepts of cyber ethics, virtues and values	K1
CO-2	Summarize the overall understanding of cyber laws and regulations in information society	K2
CO-3	Utilize international conventions for cyber space and international treaties	K3
CO-4	Categorize and explore the different types of cyber crimes and offenses	K4
CO-5	determine web ethics to protect children through education for digital literacy	K5

UNIT –I

Cyber Ethics: Ethics in Cyber Society: Core Values and Virtues: Definitions, Specificities of Cyberspace, Dimensions of Cyber Ethics in Cyber Society, Core Values and Virtues, Cyber Ethics by norms, Laws and Relations, Artificial Intelligence Ethics: “AI for Good”. Cyber Ethics as Business Ethics.

UNIT –II

Cyber Law and Cyber Ethics: Importance of Cyber Law, The Significance of Cyber Ethics, and Cyber Crime is Unethical and Illegal, The need for Cyber Regulation. Ethics in the Information Society, Technologies Need Standards, Rules and Regulations, Technology Ethics, Legal Ethics, the Nine P’s of Ethics in Information Society.

UNIT- III

International Convention for Cyber Space:The Significance of International Cyber Ethics, Bilateral Agreements, From Bilateral to International Convention, Fast Growing Cybercrime, International Cyber Legal Treaty. Republican Net Neutrality: Introduction, The Relevance of the Net and its Neutrality, two sets of values underlying “Neutrality”, Republican Net Neutrality.

UNIT- IV

Cyber Crime: Cybercrime offences, Computer Related Offences, Content Related offences, Government Efforts in Cybersecurity, Cybersecurity in the Academic world. Critical Thinking of Citizens: Ethics in Digital Age, Acting Responsibly in the Digital World, Three Dilemmas: Ethical Intelligence in Practice.

UNIT- V

Cyber Bullying: Introduction – Cyber Bullying, Peoples in Cyber Bullying, Signs of Cyber Bullying, Suicidal Tendencies, Role of Children and Duty of parents, Limiting Access of Technology, Child Bullying. Child Protection Online: Prevention through Education for Digital Literacy and Safety, Recommendations of Priority Inventions, Cyber Ethics Research Centres and Networks.

Book for Study

1. Christoph Stackelberger, Pavan Duggal, “*Cyber Ethics 4.0: Serving Humanity with Values*” Globethics.net Global series no 17, 2018.

Unit - I : Chapter 1 (Sec: 1.1 -1.6, 1.8, 1.10, 1.11)

Unit - II: Chapter 2 (Sec: 2.1-2.3,2.5) Chapter 3 (3.1)

Unit - III: Chapter 16(Sec: 16.1-16.5) Chapter 17(17.2 -17.4)

Unit – IV: Chapter 19(19.2 -19.6) Chapter 22(22.3, 22.4)

Unit – V: Chapter 23(23.1 -23.7) Chapter 24(24.1, 24.2)

Books for Reference

1. Diane Bailey, “Cyber Citizenship and Cyber Safety: Cyber Ethics”, The Rosen Publishing group, USA, 2008
2. Kizza, Joseph Migga,” Ethical and Social Issues in the Information Age” 5th edition, Springer, 2015
3. Bynum, Terrel Ward & Rogerson, Simon, eds “Computer Ethics & Professional Responsibility: Introductory Text & Readings”, Blackwell, 2004

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

Semester	Course Code	Title of the Course									Hours	Credit
V	21UCS53SP01	SELF PACED LEARNING: WEB ETHICS									-	2
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	1	2	1	3	3	2	2	1	2.0	
CO-2	3	3	3	1	1	3	3	3	2	2	2.4	
CO-3	3	3	2	3	2	3	3	1	1	1	2.2	
CO-4	3	2	2	3	2	3	3	1	2	2	2.3	
CO-5	2	2	3	3	2	3	3	3	2	2	2.4	
Mean Overall Score											2.29	(High)

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

POs (Programme outcomes)

- To provide a focused training on soft skills for students in colleges for better job prospects
- To create and interface between industries and educational institutions in order to match the expectations of employers and abilities of the employees
- To bring a transformation in interpersonal and societal living guided by value laden principals
- To explore and analyze personal attributes that enhance the individual's Interactions, Job Performance and Career Prospects
- To foster teamwork (synergy) that increases productivity and brings benefits to the individuals and the society

PSOs (Programme Specific Outcomes)

After the successful completion of the course, students will learn:

- the various concepts of communication skills as job seekers
- to write a Professional resume as required by the employers
- to demonstrate interview skills and actively participate in GD preparations and presentations in peer groups
- to discover various aspects of self and set short tem and long term goals for successful career and creates a congenial atmosphere
- to have access to solve simple and day to day Arithmetic problems and Verbal and Non-verbal reasoning formulas

Cos (Course Outcomes)

Upon completion of the course, Students will:

- be keen on developing and sustaining Soft Skills required of an educated youth
- be trained to present the best of themselves as job seekers to deal with any problem and conflict situations
- be able to transfer the skills learnt for concrete outcomes and increased productivity of companies
- be able to develop people skills, life skills that are required to be a good human in the long run and set a living standard
- be embedded with Employability skills such as "communication", "teamwork" , "initiative", "enterprise", the attributes of "reliability", "balance between work -life", "commitment" and continuous learning

Module 1: Effective Communication

Definition of communication, Barriers of Communication, Verbal and Non-verbal Communication; Self introduction matrix, Conversation Techniques, Good manners and Etiquettes, Introduction to Professional Communication, Professional Grooming and Presentation Skills and exercises

Module II: Resume Writing & Interview skills

Resume Writing: Basic Resume Formats. Types of Resume - Chronological, Functional and Mixed Resume, Steps in preparation of Resume, Sample objectives, Model Resumes.
Interview Skills: Preparation for interview, Common interview questions, Attitude, Body Language, Mock interviews and Practicum, Figuring out common interview questions and answers

Module III: **Group Discussion:** Definition of GD. The salient features of GD, Factors that influence GD, Outcome of GD, Tips for success in GD, Parameters of GD, Essential Points for GD preparation, GD Topics, Model GD and Practicum.

Module IV: **Personal Effectiveness:** Self Discovery: Personality, Traits of Personality; Personality Tests; Intelligence and Skill Assessment Form. **Goal Setting:** Goal setting Process, Questionnaires & Presentations

Module V: **Numerical Ability:** Average, Percentage; Profit and Loss, Area, Volume and Surface Area. (Simple Interest, Compound Interest; Time and Work, Pipes and Cisterns; Time and Distance, Problems on Trains, Illustrations, Boats and Streams; Illustrations-Optional)

Module VI: **Test of Reasoning - Verbal Reasoning:** Series Completion, Analogy. **Non-Verbal Reasoning**

Text Book

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

References

Aggarwal, R.S. 2010. *A Modern Approach to Verbal and Non Verbal Reasoning*. S.Chand, New Delhi. Covey, Stephen. 2004. *7 Habits of Highly effective people*, Free Press. Egan, Gerard. (1994).

The Skilled Helper (5th Ed). Pacific Grove, Brooks/Cole.

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

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

Other books

Murphy, Raymond. 1998. *Essential English Grammar*. 2nd ed., Cambridge University Press. Sankaran, K., & Kumar, M. *Group Discussion and Public Speaking*. M.I. Pub, Agra, 5th ed., Adams, Media.

Trishna's 2006. *How to do well in GDs & Interviews*, Trishna Knowledge Systems.

Yate, Martin. 2005. *Hiring the Best: A Manager's Guide to Effective Interviewing and Recruiting**

Semester	Course Code	Title of the Course	Hours	Credits
V	21UCS54EG01	GE- 1: ETHICAL HACKING	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO-1	identify various security threats and attacks	K1
CO-2	Interpret various system hacking attacks	K2
CO-3	Model Network Hacking attacks	K3
CO-4	Dissect defending mechanism using Hackers Toolkit	K4
CO-5	appraise and use Penetration testing tools for securing systems	K5

Unit I (12 hours)

Introduction to Hacking – Importance of Security – Elements of Security – Phases of an Attack – Types of Hacker Attacks – Hacktivism – Footprinting – Footprinting Tools – WHOIS Tools - DNS Information Tools - Locating the Network Range – Scanning – Scanning Methodology – Scanning Tools - Enumeration – Enumeration Techniques – Enumeration Tools.

Unit II (12 hours)

Introduction to System Hacking – Cracking Passwords – Password Cracking Web Sites - Password Guessing - Password Cracking Tools - Password Cracking Counter measures – Escalating Privileges – Executing Applications – Keyloggers And Spyware - Keyloggers And Spyware Counter measures – Hiding Files – Rootkits - Steganography - Covering Tracks.

Unit III (12 hours)

Web Application (In) security - Core Defense Mechanisms - Web Application Technologies - Mapping the Application - Bypassing Client-Side Controls - Attacking Authentication - Attacking Session Management - Attacking Access Controls.

Unit IV (12 hours)

Attacking Native Compiled Applications - Attacking Application Architecture - Attacking the Application Server - Finding Vulnerabilities in Source Code - A Web Application Hacker’s Toolkit - A Web Application Hacker’s Methodology

Unit V (12 hours)

Introduction to Penetration Testing – Types of Penetration Testing- Phases of Penetration Testing - Penetration-Testing Tools.

Books for Study

1. EC Council, “Ethical Hacking and counter measure attack Phases”, 2010.
Unit 1 – Chapter 1 - 4
Unit 2 – Chapter 5
Unit 5 – Chapter 6

2. Dafydd Stuttard, Marcus Pinto, “The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws”, 2nd Edition, 2011.

Unit 3 – Chapter 1 - 8

Unit 4 – Chapter 16 - 21

Books for Reference

1. Michael Gregg, “CEH Certified Ethical Hacker Version 9: Cert Guide”, Second Edition, Pearson, 2017

2. Kenneth C.Brancik “Insider Computer Fraud”, Auerbach Publications Taylor & Francis Group–2008.

3. Gary Hall and Erin Watson, “Hacking”, 2016.

4. Joe Grant, “Ethical Hacking”, 2020

5. Stuart McClure, “Hacking Exposed 7: Network Security Secrets and solutions”, McGraw Hill, Seventh Edition, 2012.

6. John Erickson, “Hacking: The Art of Exploitation”, No Starch Press; 2nd edition, 2008.

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

Semester	Course Code	Title of the Course									Hours	Credits
V	21UCS54EG01	GE– 1: ETHICAL HACKING									4	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	2	2	1	3	2	3	3	1	2.4	
CO-2	2	3	2	1	2	3	3	2	3	3	2.8	
CO-3	1	2	3	2	3	3	3	2	3	3	2.8	
CO-4	1	2	2	3	1	3	3	1	2	3	2.4	
CO-5	1	2	2	2	3	2	3	1	2	3	2.2	
Mean Overall score											2.5	

Semester	Course Code	Title of the Course	Hours	Credit
VI	21UCS63CC11	CORE – 11 : SOFTWARE ENGINEERING	4	3

CO No.	CO- Statements	Cognitive Levels (K- level)
	On successful completion of this course, students will be able to	
CO-1	recall the various techniques of software process models	K1
CO-2	understand the requirements for a software project	K2
CO-3	develop models for software projects	K3
CO-4	apply the knowledge, techniques, and skills in the development of a software product.	K3
CO-5	compare different software development process models and distinguish the appropriate models for real time project	K4

Unit-I:

(12 hours)

Introduction to Software Engineering: Introduction - Professional Software Development - Software Processes - Software Process Models - Process Activities - Agile Software Development - Agile methods - Agile development techniques - Agile project management

Unit-II:

(12 hours)

Requirements Engineering – Functional and non-functional Requirements - Requirements Engineering processes - Requirements elicitation - Requirements Specification - Requirements validation - Requirements Change.

Unit-III:

(12 hours)

System Modeling: Context Models - Interaction models-Structural Models - Behavioral - Model Driven Architecture - Architectural Design - Design and implementation

Unit-IV:

(12 hours)

Software Testing: Developmental Testing - Test Driven Development - Release Testing - User Testing - Software Evolution: Legacy systems - Software Maintenance.

Unit-V:

(12 hours)

System Dependability and Security: Dependable systems - Reliability Engineering - Safety Engineering - Security Engineering. Software Management - Project Management - Project planning - Quality Management.

Book for Study

1. Ian Sommerville, “Software Engineering”, Pearson, 10th Edition, 2017.

Unit-I Chapter 1 (Sec: 1.1, 1.2), Chapter 2 (Sec 2.1, 2.2), Chapter 3 (Sec 3.1-3.3)

Unit-II Chapter 4

Unit-III Chapter 5, Chapter 6, Chapter 7

Unit- IV Chapter 8, Chapter 9 (Sec 9.2, 9.3)

Unit- V Chapter 10, Chapter 11, Chapter 12, Chapter 13, Chapter 22, Chapter 24

Book for Reference

1. Roger S. Pressman, “Software Engineering A Practitioner's Approach”, McGraw Hill, International, 8th Edition, New York, 2019.

2. Richard Fairley, “Software Engineering Concepts”, McGraw Hill, International Edition 2014.

3. Rajib Mall, “Fundamentals of Software Engineering”, PHI, New Delhi, 2014.

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

Semester	Course Code	Title of the Course									Hours	Credit
VI	21UCS63CC11	CORE – 11 :SOFTWARE ENGINEERING									4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	3	3	2	3	3	3	3	2	2.8	
CO-2	2	3	2	3	2	2	3	2	3	3	2.5	
CO-3	3	3	3	3	2	2	3	3	2	2	2.6	
CO-4	3	2	2	2	2	3	2	2	2	2	2.2	
CO-5	2	3	2	3	2	3	3	3	3	3	2.7	
Mean Overall Score											2.56 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CC12	CORE – 12: MOBILE APPLICATION DEVELOPMENT USING ANDROID	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the elements of software development platform to build android programming.	K1
CO-2	understand the UI-component layouts, event handling, and screen orientations to develop mobile applications.	K2
CO-3	apply the Screen Layout and UI Design in Android Framework to implement the android apps.	K3
CO-4	Organize the various resources and examine the parameter passing mechanism among them.	K4
CO-5	design and evaluate the user interfaces to support mobile application development.	K5, K6

Unit-I

(12 hours)

Introducing the Android Software Development Platform: Understanding Java SE and the Dalvik Virtual Machine-The Directory Structure of an Android Project-Common Default Resources Folders-The Values Folder- Leveraging Android XML- Screen Sizes-Desktop Clocks- Using Android Application Resources-Launching Application: The Android Manifest.xml File - Creating Your First Android Application-Running the App-Adding an Application Icon-Adding Transparency.

Unit-II

(12 hours)

Android Framework Overview: The Foundation of OOP: The Object-The Blue print for an Object: The Class-Providing Structure for Classes: Inheritance-Defining an Interface-Bundling Classes-An overview of XML- The APK File-Android Application Components-Android Activities- Android Services - Broad cast Receivers - Content Providers – Android Manifest XML.

Unit-III

(12 hours)

Screen Layout Design- Android View Hierarchies – Nesting Views-Defining Screen Layouts-Editing the main.xml File-Using Relative Layouts- Sliding Drawers-Using Padding and Margins with Views and Layouts.

Unit-IV

(12 hours)

UI Design: Buttons, Menus, and Dialogs: Using Common UI Elements- Adding an Image Button to Your Layout-Defining Multistate Image Button - Graphics in XML –Editing the main.xml File-Replacing the Default Background- Adding a Text to Your Layout- Adding an Image-Using Menus in Android-Creating the Menu Structure with XML- Running the Application in the Android Emulator- Making the Menu Work-Adding Dialogs.

Unit–V**(12 hours)**

An Introduction to Graphics Resources in Android: Introducing the Drawables-Implementing Images – Creating Animation in Android- Tween Animation in Android-Using Transitions- Creating 9-Patch Custom Scalable Images-Playing Video in Android Apps- SQLite based simple applications

Books for Study

- Wallace Jackson, “Android Apps for Absolute Beginners”, Apress, 2011.

Unit-I Chapter 4 (Pages 41 to 65)

Unit-II Chapter 5 (Pages 67 to 87)

Unit-III Chapter 6 (Pages 67 to 112)

Unit –IV Chapter 7 (Pages 115 to 145)

Unit - V Chapter 8 (Pages 147 to 181)

Books for Reference

- Dave Smith and Jeff Friesen, “Android Recipes: A Problem –Solution Approach”, Rakmo Press (P) Ltd., New Delhi, 2011.
- J. F. DiMarzio, “Android A Programmers Guide”, Tata Mcgraw Hill, New Delhi, 2010.
- Mark L. Murphy, “The Busy Coder’s Guide to Android Development ”, Copyright 2008-2010 Commons Ware, LLC. Version 3.0, Feb 2010..

Web Reference:

Android Developer’s Guide – available at: <http://developer.android.com/>

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

Semester	Course Code	Title of the Course									Hours	Credits
VI	21UCS63CC12	CORE – 12: MOBILE APPLICATION DEVELOPMENT USING ANDROID									4	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	3	3	1	3	2	2	3	1	2.4	
CO-2	3	2	3	3	2	3	2	3	3	2	2.6	
CO-3	3	3	1	3	2	2	3	3	1	2	2.3	
CO-4	3	2	3	3	3	3	3	1	2	2	2.5	
CO-5	2	3	2	2	1	2	2	3	2	2	2.1	
Mean Overall Score											2.38 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CP07	Software Lab 7: ANDROID PROGRAMMING	3	2

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	remember the different layout design to create mobile apps.	K1
CO-2	understand and explore Android applications related to data storage.	K2
CO-3	design and analyze User Interfaces and Layouts of Android App.	K3
CO-4	experiment on Integrated Development Environment for Android Application Development.	K4
CO-5	appraise the different elements of android programming to build multimedia based mobile applications.	K5, K6

List of Exercises

1. Different Layout design including nested layout
2. Arithmetic Operations
3. Business Calculator
4. Animation: Bouncing of a ball
5. Intent
6. Prepare Student Bio-data using Database SQLite
7. Fragments-Tablet Programming
8. Media Player

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

Semester	Course Code	Title of the Course									Hours	Credits
VI	21UCS63CP07	Software Lab 7: ANDROID PROGRAMMING									3	2
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	3	2	1	3	3	2	2	1	1	2.2	
CO-2	2	2	2	2	2	3	2	3	1	3	2.4	
CO-3	3	3	2	2	1	1	3	2	3	3	2.3	
CO-4	3	3	3	2	2	2	2	3	2	2	2.4	
CO-5	3	2	2	3	3	2	3	1	1	1	2.1	
Mean Overall Score											2.28 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES03A	DSE -3: BIG DATA ANALYTICS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the basics of BigData and its applications	K1
CO-2	Outline big data planning, processing, Storage Techniques and Technologies	K2
CO-3	apply the cutting-edge tools and technologies to analyze Big Data	K3, K4
CO-4	examine various big data tools and techniques	K4
CO-5	evaluate various storage and analytical techniques	K5

UNIT – I (15 Hours)

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

UNIT – II (15 Hours)

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

UNIT – III (15 Hours)

Enterprise Technologies and Big Data Business Intelligence: Online Transaction and Processing (OLTP) – Online Analytical Processing (OLAP) – Extract Transform Load (ETL) – Data Warehouses – Data Marts.

UNIT – IV (15 hours)

Big Data Processing Concepts: Introduction – Parallel Data Processing – Distributed Data Processing – Hadoop – Processing Workloads – Cluster – Processing in Batch Mode – Map – Combine – Partition – Shuffle and Sort.

UNIT – V (15 hours)

Big Data Storage Technology: On-Disk Storage Devices – NoSQL Database – In-Memory Storage Device – Big Data Analytics Techniques – Quantitative Analysis – Qualitative Analysis –

Book for Study

1. Paul Buhler, Wajid Khattak and Thomas Erl, “*Big Data Fundamentals: Concepts, Drivers & Techniques*”, Prentice Hall Publications, 1st Edition, January 2016.

Unit I Chapter 1 and Chapter 2

Unit II Chapter 3

Unit III Chapter 4 and Chapter 5

Unit IV Chapter 6

Unit V Chapter 7 and Chapter 8

Books for Reference

1. DT Editorial Services, “Big Data (Hadoop 2, Map Reduce, Hive, YARN, Pig, R and Data Visualization) Black Book”, 1st Edition, Dreamtech Press, 2016.
2. Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, “Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics”, Apress Media, 2013.
3. Tom White, “Hadoop: The Definitive Guide”, Third Edition, O’Reilly Media, 2012.

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

Semester	Course Code	Title of the Course									Hours	Credit
VI	21UCS63ES03A	DSE- 3: BIG DATA ANALYTICS									5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	1	3	3	2	1	1	2.0	
CO-2	3	3	3	2	1	3	3	3	1	1	2.2	
CO-3	2	2	3	2	2	2	3	2	2	1	2.1	
CO-4	3	3	3	1	2	3	2	3	1	1	2.2	
CO-5	2	3	3	3	3	2	3	3	3	1	2.6	
Mean Overall Score											2.22 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES03B	DSE- 3: CLOUD COMPUTING	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the fundamental concepts of cloud computing technology.	K1
CO-2	compare and interpret the various cloud services	K2
CO-3	identify and experiment the virtual machine services and infrastructures.	K3
CO-4	analyze cloud architecture and examine the applications.	K4
CO-5	assess and elaborate the cloud security considerations and models.	K5,K6

UNIT- I

(15 Hours)

Cloud Computing -Roots of Cloud Computing-Layers-Types of Clouds-Features of a Cloud-Cloud Infrastructure Management - Platform as a Service Providers-Challenges and Risks-Migrating into a Cloud-Broad Approaches to Migrating into the Cloud- Seven-Step Model of Migration into a Cloud.

UNIT –II

(15 Hours)

Evolution of SaaS- Challenges of SaaS Paradigm-Approaching the SaaS Integration- New Integration Scenarios-Integration Methodologies- SaaS Integration Methodologies- SaaS Integration Products and Platforms-SaaS Integration Services-Business to Business Integration(B2Bi) Services-A Framework of Sensor-Cloud Integration-SaaS Integration Appliances-The Enterprise Cloud Computing Paradigm-Issues for Enterprise Applications on Cloud-Transition Challenges-Cloud Supply Chain

UNIT- III

(15 Hours)

Introduction and Inspiration-Virtual Machines Provisioning and Manageability-Virtual Machine Migration Services- VM Provisioning and Migration in Action- Provisioning in the cloud Context-Future Research Directions-Virtual machines for cloud infrastructure-Anatomy of cloud Infrastructure-Distributed management of Virtual Infrastructure- Enhancing cloud computing environments using cloud as a service-RVWS Design-Cluster as service.

UNIT- IV

(15 hours)

The Best Principles of Cloud Computing-A Model for Federated Cloud Computing-Security Considerations-Traditional Approaches to SLO Management- Types of SLA-Life Cycle of SLA-SLA Management in Cloud-Automated Policy-based Management-Best Practices in Architecture Cloud Applications in the AWS Cloud-Cloud Concepts-Cloud Best Practices-Grep TheWeb.

UNIT- V

(15 hours)

Data Security Considerations – The current state of Data Security in the cloud-Homo Sapiens and Digital Information- Cloud computing and Data Security Risk-Cloud computing and Identity- The cloud, Digital identity and Data Security- Content Level Security-Pros and Cons-Legal issues in Cloud Computing- Data Privacy and Security Issues-Cloud Contracting Models-Virtualization and Data Location-Cloud User’s Point.

Books for Study

1. Buyya, James Broberg and AndrzejGoscinski, “Cloud Computing Principles and Paradigms”, Wiley Publication, 2011.

Unit I: Chapter 1 and Chapter 2.

Unit II: Chapter 3 and Chapter 4.

Unit III: Chapter 5,6 and 7.

Unit IV: Chapter 15 and Chapter 16.

Unit V: Chapter 23 and Chapter 24

Books for Reference

1. Buyya, Vecciola and Selvi, “Mastering Cloud Computing: Foundations and Applications Programming”, Tata McGraw Hill, 2013

2. Joseph Ingeno , “Software Architect's Handbook”, Packt Publishing,2018.

3.Scott Goessling , Kevin L. Jackson, “Architecting Cloud Computing Solutions”, Packt Publishing, 2018.

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

Semester	Course Code	Title of the Course									Hours	Credit
VI	21UCS63ES03B	DSE- 3: CLOUD COMPUTING									5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	2	1	2	2.2	
CO-2	3	3	3	2	1	3	3	3	2	2	2.5	
CO-3	2	3	3	2	2	2	3	3	2	2	2.4	
CO-4	3	3	3	1	2	3	3	3	1	2	2.4	
CO-5	2	3	3	1	2	2	3	3	2	1	2.3	
Mean Overall Score											2.36	
Result											# High	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES04A	DSE- 4: INTERNET OF THINGS	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	find the characteristics and enabling technologies of IoT	K1
CO-2	Classify the sensors and other necessary hardware for deploying IoT applications	K2
CO-3	select appropriate transport protocols, addressing and identification techniques suitable for IoT Domain	K3
CO-4	analyze the apt cloud services and cloud service providers for IoT based Smart services	K4
CO-5	select appropriate IoT based smart services for real time applications	K5

UNIT- I

(15 Hours)

Introduction to Internet of Things: Definition of Internet of Things – Application Areas of IoT – Characteristics of IoT – Things in IoT – IoT Stack – Enabling Technologies – IoT Challenges.

UNIT –II

(15 Hours)

Sensors, Microcontrollers and their interfacing: Introduction to sensor interfacing – Types of Sensors – Controlling sensors through Webpage – Microcontrollers: a quick walkthrough.

UNIT- III

(15 Hours)

Protocols for IoT: Introduction- Messaging Protocols – XMPP and DDS Protocols – Transport Protocols – Addressing and Identification: Internet Protocol Version 4 – Internet Protocol Version 4 – IPv6 vs IPv4 – Legacy of IPv4 devices – Switching over to IPv6.

UNIT- IV

(15 hours)

Cloud for IoT: Introduction – IoT with Cloud – challenges – Selection of cloud service provider – Introduction to Fog computing – Cloud computing: Security aspects. Data Analytics: Introduction – Data Analysis.

UNIT- V

(15 hours)

Application Building with IoT: Introduction – Smart Perishable tracking with IoT and Sensors –

Smart Healthcare – IoT based Application to Monitor Water Quality – Smart Warehouse Monitoring – Smart Retail – IoT based Smart Driver Assistance System – System to measure Collision impact in an accident with IoT – Integrated Vehicle Health Management.

Book for Study

1. Shriram K Vasudevan, Abhishek S. Nagarajan, R.M.D., Sundaran, “Internet of Things”, Wiley Publication, United States, 2nd Edition, 2020.

Unit I – Chapter 1

Unit II - Chapter 2

Unit III –Chapter 3, 4

Unit IV -Chapters5, 6

Unit V - Chapter 7

Books for Reference:

1. Arshdeep Bahga and Vijay Madiseti, “Internet of Things- A Hands-on Approach”, Universities Press Private Limited, India, 2015

2. Hanes, David, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton and Jerome Henry, “IoT fundamentals: Networking technologies, protocols, and use cases for the Internet of Things”. Cisco Press, 2017.

3. Qusay F. Hassan, “Internet of Things A to Z: Technologies and Applications”, Wiley Publication, IEEE Press, 2018.

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

Semester	Course Code	Title of the Course									Hours	Credit
VI	21UCS63ES04A	DSE- 4: INTERNET OF THINGS									5	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	3	2	2	2	3	2	3	2	2	2.3	
CO-2	3	3	3	3	2	3	3	3	2	2	2.7	
CO-3	2	2	2	2	2	3	2	2	2	2	2.1	
CO-4	3	3	3	2	2	3	3	3	3	2	2.7	
CO-5	3	3	3	3	2	3	3	3	3	2	2.8	
Mean Overall Score											2.52 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63ES04B	DSE-4: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	5	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the fundamentals of artificial intelligence and Machine Learning	K1
CO-2	understand the techniques used for AI and ML applications	K2
CO-3	apply the various AI and ML techniques to real time applications	K3
CO-4	analyze the skills to use the appropriate techniques in AI and ML applications	K4
CO-5	evaluate the design of new artificial intelligence and machine learning applications	K5

UNIT-I (15 hours)

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

UNIT-II (15 hours)

Heuristic Search Techniques: General and Test – Hill Climbing – Search Techniques – Problem Reduction – Constraints Satisfaction – Means-ends Analysis – Game Playing.

UNIT-III (15 hours)

Knowledge Representation: Knowledge Management – Types of Knowledge – Knowledge representation – Approaches to Knowledge Representation – Issues in Knowledge Representation – Knowledge base – First order Logic – Frames – Conceptual Dependency – Scripts – Semantic Network.

UNIT-IV (15 hours)

Reasoning: Types of Reasoning – Non-monotonic Inference Methods – Non-monotonic Reasoning – Truth Maintenance Systems – Reasoning with Fuzzy Logic – Rule based Reasoning – Diagnosis Reasoning.

UNIT-V (15 hours)

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

Book for Study

1. Vinod Chandra S. S. and Anand Hareendran S. “Artificial Intelligence and Machine Learning”, PHI Learning Pvt Ltd, 2014.

Unit I – Chapter 1

- Unit II** – Chapter 2, 3
Unit III – Chapter 4, 5
Unit IV – Chapter 7
Unit V – Chapter 8

Book for Reference

1. Stuart J. Russell and Peter Norvit, “Artificial Intelligence A Modern Approach”, Third Edition, Pearson Education Limited 2016.
2. Tom M. Mitchell, “Machine Learning”, McGraw-Hill Education, 2017.
3. Dr. Dheeraj Mehrotra, “ Basics of Artificial Intelligence & Machine Learning”, Notion Press, 2019.

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

Semester	Course Code	Title of the Course									Hours	Credit
VI	21UCS63ES04B	DSE-4: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING									5	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	3	3	2	1	2	2	2	2	1	2.0	
CO-2	2	3	3	3	1	2	3	3	2	1	2.3	
CO-3	2	3	3	3	1	2	3	3	3	1	2.4	
CO-4	2	3	3	3	1	2	3	3	3	1	2.4	
CO-5	2	3	3	3	1	2	3	3	3	1	2.4	
Mean Overall Score											2.3 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63PW01	PROJECT WORK	3	2

All the B.Sc(CS) students should take up a project work in their sixth semester which needs to apply the knowledge they have gathered in the first five semesters. This could be an application development or system oriented development.

A project guide will approve the project work after going through the synopsis submitted by the student. The project guide will be allotted by the Class-in-charge or the Head of the Department. The synopsis should contain the following.

1. System Analysis
2. System requirements in terms of software and hardware
3. Feasibility Analysis

After the approval from the guide, the students are expected to carry out the project work in the Computer Labs of our college. They should get approval from the guide before start doing the next project work lab by getting the signature of the guide at least a day before the Project work lab.

After the completion of the project work, the students are expected to compile a project work report which will be approved by the guide and it should contain the following.

1. System Analysis.
2. System requirements in terms of software and hardware.
3. Feasibility Analysis.
4. DFD, E-R diagrams, Object-oriented model diagrams, Circuit diagrams, whatever applicable to their project.
5. Tables of Data, Data Dictionary, if applicable.
6. Output models
7. Implementation details.
8. Future enhancements, if any.
9. References / Bibliography, Web references, whatever applicable to their project.

Each volume should be appended with

- A. Source Code.
- B. Screen shots of model outputs.

Finally, the students should submit the project work in the form of bound volumes of books of A4 size, the number of volumes will be normally two and it may be three depending on the requirements of the Department from time to time, bearing the certificate of bonafide of the work by the guide and of the Head of the Department.

The evaluation of the project work will be done for 100 marks, of which 75 marks for the Internal examiner. The remaining 25 marks for the viva-voce will be jointly evaluated by project guide and an external examiner. The viva-voce will be conducted tentatively during the last week of the semester.

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS63CE01	COMPREHENSIVE EXAMINATION	-	2

CO No.	CO- Statements	Cognitive Levels (K- levels)
	On successful completion of this course, students will be able to	
CO-1	recall and explore the concepts and terms related to the subject	K1
CO-2	relate the technical specifications and factors of the subject matter	K2
CO-3	build and classify the various techniques and find the uses of them in each core papers	K3
CO-4	appraise and interpret subject specific concepts	K4
CO-5	synthesize the learned skills.	K5

Unit-I:

DIGITAL COMPUTER FUNDAMENTALS: Number systems - Logic Gates - Arithmetic Circuits - Multiplexers - Demultiplexers - Encoders and Decoders - Sequential Logic Design - Memory Elements

Unit-II:

DATA STRUCTURES AND ALGORITHMS: Arrays – Stacks – Trees - Algorithms: Sorting - Searching - Algorithm Design Methods: Sub goals - Hill Climbing - Working Backward - Heuristics - Backtrack Programming - Recursion. **DATABASE SYSTEMS:** Database - Actionable for DBA. The Entity-Relationship Model – **Normalization - Structured - Query Language** - Procedural Language - Exception Handlers - **Architecture of a Hierarchical DBMS.**

Unit-III:

Programming in C – Control structures – Arrays – Functions- **Object Oriented Programming** – Constructors and Destructors – Inheritance - **Discrete Mathematics** – **Graphs and Trees** – **Logic- Operations Research: Introduction to LPP** – **Transportation and Assignment Problem** – **Project Scheduling.**

Unit-IV:

OPERATING SYSTEMS: Operating Systems: Computer-System Organization - Computer-System Architecture - Operating System Structure – Operating System - Process Concept: Process Scheduling - Operations on Processes – CPU Scheduling - Main Memory: Contiguous Memory Allocation - Segmentation - Paging. Virtual Memory: Demand Paging - File Concept - Directory and Disk Structure - File-System – Protection

Unit-V:

COMPUTER NETWORKS: Data Communication – Networks – Analog and Digital – Digital Signals – Transmission Impairment - Data Link Layer: Error Detection and Correction -

Wired LAN: IEEE Standards – Standard Ethernet. Wireless LAN - Transport Layer - Application Layer - DNS in the Internet - HTTP.

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

Semester	Course Code	Title of the Course									Hours	Credit
VI	21UCS63CE01	COMPREHENSIVE EXAMINATION									-	2
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	2	3	2	1	3	3	3	2	2	2.4	
CO-2	3	3	3	2	1	3	3	3	2	2	2.5	
CO-3	3	3	3	2	1	3	3	2	3	2	2.5	
CO-4	3	3	3	2	1	3	3	3	3	2	2.6	
CO-5	3	3	3	2	1	3	3	3	3	2	2.6	
Mean Overall Score											2.52	
											High	

Semester	Course Code	Title of the Course	Hours	Credit
VI	21UCS64SE04	SEC-4: (WS): E-Services and Applications	2	1

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	recall the fundamentals of e-services and applications	K1
CO-2	understand the methods of e-services and application	K2
CO-3	apply e-services for various types of applications	K3
CO-4	analyze and use e-services in various applications	K4
CO-5	explore the possibility of applying various e-services	K5

List of Experiments

1. Blog creation
2. Web site creation
3. Railway ticket reservation
4. E-Mailing to the Agency/official Business people
5. Purchase products through online
6. Online Passport Registration
7. Online Fund transfer
8. Electricity Bill Payment
9. Create and display advertisement through online

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

Semester	Course Code	Title of the Course									Hours	Credit
VI	21UCS64SE04	SEC-4: (WS): E-Services and Applications									2	1
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	3	3	2	1	2	3	3	3	1	2	2.3	
CO-2	3	3	3	2	1	3	3	3	2	2	2.5	
CO-3	2	3	3	2	2	2	3	3	1	2	2.3	
CO-4	3	3	3	1	2	3	3	3	1	2	2.4	
CO-5	2	2	3	1	2	2	3	3	2	2	2.2	
Mean Overall Score											2.34 (High)	

Semester	Course Code	Title of the Course	Hours	Credits
VI	21UCS64EG02	GE-2: 3D PRINTING AND DESIGN	4	3

CO No.	CO-Statements	Cognitive Levels (K- Levels)
	On successful completion of this course, students will be able to	
CO -1	define the fundamental aspects of 3D Printing and Design	K1
CO-2	classify the appropriate applications of 3D Printing	K2
CO-3	identify the necessary materials needed for the 3D Printing	K3
CO-4	compare different techniques and necessary objects for 3D Printing	K4
CO-5	choose the appropriate design and create 3D Printing model	K5, K6

UNIT- I

(12 Hours)

3D Printers for Modern Manufacturing: Embracing additive manufacturing – Exploring Applications of 3D Printing. Exploring the types of 3D Printing: Exploring Basic forms of Additive Manufacturing – Understanding the limitations of Current Technologies.

UNIT –II

(12 Hours)

Exploring Applications of 3D Printing: Current uses of 3D Printing – Designing for the future with 3D Printing – Examining Moulding and Casting through 3D Printing – Applying Artistic Touches and Personalization – Customizing Designs on the fly.

UNIT- III

(12 Hours)

Identifying Available Materials for 3D Printing: Exploring Extruded Materials – Identifying Granular Materials – Exploring Photo cured resins – Understanding Bioprinting – Identifying Other Uses for Materials.

UNIT- IV

(12 hours)

Identifying Sources for 3D Printable objects: Exploring object repositories – Designing in the Computer – Scanning Objects – Capturing Structure from Photographs – Preparing Models for Printing.

UNIT- V

(12 hours)

Identifying Software and Calibrating your 3D Printer: Finding 3D Design Software and Models – Working with slic3r – Calibrating your 3D Printer – Printing Objects.

Book for Study

1. Richard Horne, Kalani Kirk Hausman, “3D Printing for Dummies”, Wiley publications, United States, 2nd Edition, 2017.

Unit I – Chapters 1, 2

Unit II – Chapter 3

Unit III – Chapter 4

Unit IV – Chapter 5,

Unit V – Chapter 15

Books for Reference

1. Dr Sabrie Soloman, “3D Printing and Design”, Khanna Book Publishing Co. (P) Ltd, 2020.
2. John M Jordan, “3D Printing”, MIT Press, London, 2018
3. James Floyd Kelly, “3D Printing – Build your own 3D printer and Build your own 3D objects”, Que Publishing, USA, 2014.

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

Semester	Course Code	Title of the Course									Hours	Credits
VI	21UCS64EG02	GE-2: 3D PRINTING AND DESIGN									4	3
Course Outcomes↓	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO-1	2	3	3	2	1	3	3	3	2	1	2.3	
CO-2	2	3	3	2	1	3	3	3	3	2	2.5	
CO-3	2	3	3	3	1	3	3	3	2	1	2.4	
CO-4	2	3	3	2	1	3	3	3	2	1	2.3	
CO-5	3	3	3	2	1	3	3	3	3	1	2.5	
Mean Overall Score											2.4 (High)	