B Sc ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

LOCF SYLLABUS 2024

Department of Artificial Intelligence

School of Computing Sciences
St. Joseph's College (Autonomous)
Tiruchirappalli - 620002, Tamil Nadu, India

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

St. Joseph's College (Autonomous), an esteemed institution in the realm of higher education in India, has embarked on a journey to uphold and perpetuate academic excellence. One of the pivotal initiatives in this pursuit is the establishment of five Schools of Excellence commencing from the academic year 2014-15. These schools are strategically designed to confront and surpass the challenges posed by the 21st century.

Each School amalgamates correlated disciplines under a unified umbrella, fostering synergy and coherence. This integrated approach fosters the optimal utilization of both human expertise and infrastructural assets. Moreover, it facilitates academic fluidity and augments employability by nurturing a dynamic environment conducive to learning and innovation. Importantly, while promoting collaboration and interdisciplinary study, the Schools of Excellence also uphold the individual identity, autonomy, and distinctiveness of every department within.

The overarching objectives of these five schools are as follows:

1. Optimal Resource Utilization: Ensuring the efficient use of both human and material resources to foster academic flexibility and attain excellence across disciplines.

2. Horizontal Mobility for Students: Providing students with the freedom to choose courses aligning with their interests and facilitating credit transfers, thereby enhancing their academic mobility and enriching their learning experience.

3. Credit-Transfer Across Disciplines (CTAD): The existing curricular structure, in accordance with regulations from entities such as TANSCHE and other higher educational institutions, facilitates seamless credit transfers across diverse disciplines. This underscores the adaptability and uniqueness of the choice-based credit system.

4. Promotion of Human Excellence: Nurturing excellence in specialized areas through focused attention and resources, thus empowering individuals to excel in their respective fields.

5. Emphasis on Internships and Projects: Encouraging students to engage in internships and projects, serving as stepping stones toward research endeavors, thereby fostering a culture of inquiry and innovation.

6. Addressing Stakeholder Needs: The multi-disciplinary nature of the School System is tailored to meet the requirements of various stakeholders, particularly employers, by equipping students with versatile skills and competencies essential for success in the contemporary professional landscape.

In essence, the Schools of Excellence at St. Joseph's College (Autonomous) epitomize a holistic approach towards education, aiming not only to impart knowledge but also to cultivate critical thinking, creativity, and adaptability – qualities indispensable for thriving in the dynamic global arena of the 21st century.

Credit system

The credit system at St. Joseph's College (Autonomous) assigns weightage to courses based on the hours allocated to each course. Typically, one credit is equivalent to one hour of instruction per week. However, credits are awarded regardless of actual teaching hours to ensure consistency and adherence to guidelines.

The credits and hours allotted to each course within a programme are detailed in the Programme Pattern table. While the table provides a framework, there may be some flexibility due to practical sessions, field visits, tutorials, and the nature of project work.

For undergraduate (UG) courses, students are required to accumulate a minimum of 137 credits, as stipulated in the programme pattern table. The total number of courses offered by the department is outlined in the Programme Structure.

OUTCOME-BASED EDUCATION (OBE)

OBE is an educational approach that revolves around clearly defined goals or outcomes for every aspect of the educational system. The primary aim is for each student to successfully achieve these predetermined outcomes by the culmination of their educational journey. Unlike traditional methods, OBE does not prescribe a singular teaching style or assessment format. Instead, classes, activities, and evaluations are structured to support students in attaining the specified outcomes effectively.

In OBE, the emphasis lies on measurable outcomes, allowing educational institutions to establish their own set of objectives tailored to their unique context and priorities. The overarching objective of OBE is to establish a direct link between education and employability, ensuring that students acquire the necessary skills and competencies sought after by employers.

OBE fosters a student-centric approach to teaching and learning, where the delivery of courses and assessments are meticulously planned to align with the predetermined objectives and outcomes. It places significant emphasis on evaluating student performance at various levels to gauge their progress and proficiency in meeting the desired outcomes.

Here are some key aspects of Outcome-Based Education:

Course: A course refers to a theory, practical, or a combination of both that is done within a semester.

Course Outcomes (COs): These are statements that delineate the significant and essential learning outcomes that learners should have achieved and can reliably demonstrate by the conclusion of a course. Typically, three or more course outcomes are specified for each course, depending on its importance.

Programme: This term pertains to the specialization or discipline of a degree programme.

Programme Outcomes (POs): POs are statements that articulate what students are expected to be capable of by the time they graduate. These outcomes are closely aligned with Graduate Attributes.

Programme Specific Outcomes (PSOs): PSOs outline the specific skills and abilities that students should possess upon graduation within a particular discipline or specialization.

Programme Educational Objectives (PEOs): PEOs encapsulate the expected accomplishments of graduates in their careers, particularly highlighting what they are expected to achieve and perform during the initial years postgraduation.

LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

The Learning Outcomes-Centric Framework (LOCF) places the learning outcomes at the forefront of curriculum design and execution. It underscores the importance of ensuring that these outcomes are clear, measurable, and relevant. LOCF orchestrates teaching methodologies, evaluations, and activities in direct correlation with these outcomes. Furthermore, LOCF adopts a backward design approach, focusing on defining precise and attainable learning objectives. The goal is to create a cohesive framework where every educational element is in harmony with these outcomes.

Assessment practices within LOCF are intricately linked to the established learning objectives. Evaluations are crafted to gauge students' achievement of these outcomes accurately. Emphasis is often placed on employing authentic assessment methods, allowing students to showcase their learning in real-life scenarios. Additionally, LOCF frameworks emphasize flexibility and adaptability, enabling educators to tailor curriculum and instructional approaches to suit the diverse needs of students while ensuring alignment with the defined learning outcomes.

Some Important Terminologies

Core Course (CC): *Core Courses represent obligatory elements within an academic programme, imparting fundamental knowledge within the primary discipline while ensuring consistency and acknowledgment.*

Allied Course (AC): *Allied Courses complement primary disciplines by furnishing supplementary knowledge, enriching students' understanding and skill repertoire within their academic pursuit.*

Foundation Course (FC): *Foundation Courses serve to bridge the gap in knowledge and skills between secondary education and college-level studies, facilitating a smoother transition for students entering higher education.*

Skill Enhancement Course (SE): *Skill Enhancement Courses aim to nurture students' abilities and competencies through practical training, open to students across disciplines but particularly advantageous for those in programme-related fields.*

Value Education (VE): *Value education encompasses the teaching of moral, ethical, and social values to students, aiming to foster their holistic development. It instills virtues such as empathy, integrity, and responsibility, guiding students towards becoming morally upright and socially responsible members of society.*

Ability Enhancement Compulsory Course (AE): *Ability Enhancement Compulsory Course is designed to enhance students' knowledge and skills; examples include Communicative English and Environmental Science. These courses are obligatory for all disciplines.*

AE-1: Communicative English: This three-credit mandatory course, offered by the Department of English during the first semester of the degree programme, is conducted outside regular class hours.

AE-2: Environmental Science: This one-credit compulsory course, offered during the second semester by the Department of Human Excellence, emphasizes environmental awareness and stewardship.

Allied Optional (AO): *Allied optional course are elective modules that complement the primary disciplines by providing additional knowledge and skills. These courses allow students to explore areas of interest outside their major field of study, broadening their understanding and enhancing their skill set.*

Discipline Specific Elective (ES): *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. Four courses are offered, two courses each in semester V and VI*

Note: To offer one ES, a minimum of two courses of equal importance/weightage is a must. A department with two sections must offer two courses to the students.

Generic Elective (EG): *A course chosen from a different discipline or subject area, typically to gain exposure. Students pursuing specific disciplines must select Generic Elective courses from the options available across departments as per the college's course offerings. The breadth of Generic Elective (GE)*

Courses is directly linked to the diversity of disciplines offered by the college. Two GE Courses are available, one in each semester V and VI, and are open to students from other departments.

Self-paced Learning (SP): *It is a two-credit course designed to foster students' ability for independent and self-directed learning. With a syllabus structured to be completed within 45 hours, this course encourages learners to take control of their own educational journey. Notably, Self-paced Learning is conducted outside of regular class hours, emphasizing autonomy and self-motivation in students.*

Internship (IS): *Following the fourth semester, students are required to undertake an internship during the summer break. Subsequently, they must submit a comprehensive report detailing their internship experience along with requisite documentation. Additionally, students are expected to participate in a viva-voce examination during the fifth semester. Credits for the internship will be reflected in the mark statement for the fifth semester.*

Comprehensive Examination (CE): *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: *To support students in acquiring knowledge and skills through online platforms such as Massive Open Online Courses (MOOCs), additional credits are granted upon verification of course completion. These extra credits can be availed across five semesters (2 - 6). In line with UGC guidelines, students are encouraged to enhance their learning by enrolling in MOOCs offered by portals like SWAYAM, NPTEL, and others. Additionally, certificate courses provided by the college also qualify for these extra credits.*

Outreach Programme (OR): *It is a compulsory course to create a sense of social concern among all the students and to inspire them to dedicated service to the needy.*

Course Coding

The following code system (11 alphanumeric characters) is adopted for Under Graduate courses:

24	**UXX**	**0**	**0**	**XX**	**00/X**
Year of Revision	UG Department Code	Semester Number	Part Specification	Course Specific Initials	Running Number/with Choice

Course Specific Initials

GL - Languages (Tamil / Hindi / French / Sanskrit)
GE - General English
CC - Core Theory; CP- Core Practical
AC - Allied Course
AP - Allied Practical
FC - Foundation Course
SE - Skill Enhancement Course
VE - Value Education
WS - Workshop
AE - Ability Enhancement Course
AO - Allied Optional
OP - Allied Optional Practical
ES - Discipline Specific Elective
IS - Internship
SP - Self-paced Learning
EG - Generic Elective
PW - Project and Viva Voce
CE - Comprehensive Examination
OR - Outreach Programme

EVALUATION PATTERN

Continuous Internal Assessment (CIA)

Sl No	Component	Marks Allotted
1	Mid Semester Test	30
2	End Semester Test	30
3	Two Components (15 + 20)	35
4	Library Referencing (K3)	5
	Total	**100**

Passing minimum: 40 marks

Mark Distribution for K-levels

Component	Theory Courses up to K5	
	K levels	**Mark**
Component I	K1	7
	K2	8
Component II	K4	10
	K5	10
Mid Semester Test/ End Semester Test	K1	7
	K2	15
	K3	18
	K4	10
	K5	10

Blue Print of Question Paper for Mid/End Semester Test

Duration: 2.00 Hours						**Maximum Mark : 60**
K levels→ / **SECTIONS ↓**	**K1**	**K2**	**K3**	**K4**	**K5**	**Total Marks**
SECTION –A (1 Mark, No choice) (7 × 1 = 7)	7					7
SECTION-B (3 Marks, No choice) (5 × 3 = 15)		5				15
SECTION-C (6 Marks, Either/or) (3×6=18)			3			18
SECTION-D (10 Marks, 2 out of 3) (2×10=20)	*For Mid Semester Test*			1(2)	1*	20
	For End Semester Test			1*	1(2)	
Total Marks	7	15	18	20		60
Weightage for 100 %	12	25	30	33		100

** Compulsory*

Blue Print of Question Paper for Semester Examination (SE)

Duration: 3.00 Hours						**Maximum Mark : 100**
K levels→ / **SECTIONS ↓**	**K1**	**K2**	**K3**	**K4**	**K5**	**Total Marks**
SECTION –A (1 Mark, No choice) (10 × 1 = 10)	10					10
SECTION-B (3 Marks, No choice) (10 × 3 = 30)		10				30
SECTION-C (6 Marks, Either/or) (5×6=30)			5			30
SECTION-D (10 Marks, 3 out of 5) (3×10=30)				2(3)	1(2)	30
						100

Evaluation Pattern for Part IV and One/Two-credit Courses

Title of the Course	CIA	SE	Total Marks
Skill Enhancement Course	100	-	100
Self-paced Learning Comprehensive Examination	25 + 25 = 50	50 *(CoE)*	100
Value Education Environmental Studies	50	50 *(CoE)*	100
Generic Elective	100	100 *(CoE)*	100
Project Work and Viva Voce	100	100	100

COMPUTATION OF GRADE AND GRADE POINTS

Grading of the Courses		
Mark Range	**Grade Point**	**Grade**
90 & above	10	O
80 & above but below 90	9	A+
70 & above but below 80	8	A
60 & above but below 70	7	B+
50 & above but below 60	6	B
40 & above but below 50	5	C
Below 40	0	RA

Grading of the Final Result		
Cumulative Grade Point Average	**Grade**	**Performance**
9.00 & 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

**The Candidates who have passed in the first appearance and within the prescribed duration of the UG programme are eligible. If the candidates Grade is O/A+ with more than one attempt, the Performance is fixed as "Very Good".*

Details of calculation

Final Marks = (CIA Marks + SE Marks) / 2
Weighted Marks = Final Marks × Credits
Weighted Average Marks = Total Weighted Marks / Total Credits

Formula for Cumulative Grade Point Average (CGPA)

$$CGPA = \frac{\sum_{i=1}^{n} C_i Gp_i}{\sum_{i=1}^{n} C_i}$$

Where,

Ci - credit earned for the Course i

Gpi - Grade Point obtained for the Course i

*n - Number of Courses **passed** in that semester*

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 (PEOs)

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

Programme Outcomes (POs)

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

Programme Specific Objectives (PSOs)

After completing the BSc Artificial Intelligence and Machine Learning Programme, the graduates will

1. mastered the foundations of AI and Machine Learning, showcasing advanced programming skills essential for developing intelligent systems.
2. applied agile development methodologies to create software solutions addressing real-world challenges in AI and Machine Learning domains.
3. demonstrated effective collaboration and communication skills, fostering enhanced performance and teamwork in dynamic AI and Machine Learning environments.
4. exhibited adaptability to the evolving AI and Machine Learning landscapes, contributing to industry growth through their capacity to navigate dynamic technological environments.
5. Innovated ethical, novel AI and Machine Learning solutions that positively impact society, reflecting a commitment to the responsible and socially beneficial application of their expertise.

PROGRAMME STRUCTURE					
Part	**Semester**	**Specification**	**No. of Courses**	**Hours**	**Credits**
1	1- 4	Languages (Tamil / Hindi/ French/ Sanskrit)	4	17	12
2	1 - 4	General English	4	20	12
3	1 - 6	Core Course	12	52	38
	1 - 6	Core Practical	7	21	14
	1 - 6	Allied Course	2	11	8
	3, 4	Allied Optional	2	8	6
	3, 4	Allied Optional Practical	1	4	2
	5, 6	Discipline Specific Elective	4	20	12
	5	Internship	1	-	2
	5	Self-paced Learning	1	-	2
	5	Project Work and Viva Voce	1	3	2
	5	Comprehensive Examination	1	-	2
4	1	Skill Enhancement Course (Non-Major Elective)	1	2	1
	5	Skill Enhancement Course	1	2	1
	6	Skill Enhancement Course (WS)	1	2	1
	1 - 4	Value Education	4	8	4
	1, 2	Ability Enhancement Compulsory Course	2	2(6)	4
	5, 6	Generic Elective	2	8	6
5	2 - 6	Outreach Programme (SHEPHERD)	-	-	4
	3 - 6	Extra Credit Courses (MOOC)/Certificate Courses	5	-	(15)
		Total	**56**	**180(6)**	**133(15)**

B Sc ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING								
PROGRAMME PATTERN								
Course Details						Scheme of Exams		
Sem	Part	Course Code	Title of the Course	Hours	Credits	CIA	SE	Final
1	1	23UTA11GL01A	General Tamil - 1	5	3	100	100	100
		23UFR11GL01	French - 1					
		23UHI11GL01	Hindi - 1					
		23USA11GL01	Sanskrit - 1					
	2	23UEN12GE01	General English - 1	5	3	100	100	100
	3	24UAI13CC01	**Core Course - 1:** Programming in C	4	3	100	100	100
		24UAI13CC02	**Core Course - 2:** Data Structures and Algorithms	4	3	100	100	100
		24UAI13CP01	**Core Practical - 1:** Programming in C	3	2	100	100	100
		23UAI13AC01	**Allied Course - 1:** Numerical Methods	5	4	100	100	100
	4	-	**Skill Enhancement Course - 1: (Non Major Elective):** Refer ANNEXURE 1	2	1	100	-	100
		23UHE14VE01	**Value Education - 1:** Essentials of Humanity*	2	1	50	50	50
		23UEN14AE01	**Ability Enhancement Compulsory Course - 1:** Communicative English	(6)	3	100	-	100
			Total	**30(6)**	**23**			
2	1	23UTA21GL02	General Tamil - 2	4	3	100	100	100
		23UFR21GL02	French - 2					
		23UHI21GL02	Hindi - 2					
		23USA21GL02	Sanskrit - 2					
	2	23UEN22GE02	General English - 2	5	3	100	100	100
	3	24UAI23CC03	**Core Course - 3:** Programming in Python	4	3	100	100	100
		24UAI23CC04	**Core Course - 4:** Digital Computer Fundamentals	4	3	100	100	100
		24UAI23CP02	**Core Practical - 2:** Programming in Python	3	2	100	100	100
		23UAI23AC02	**Allied Course - 2:** Statistical Methods	6	4	100	100	100
	4	23UHE24VE02	**Value Education - 2:** Fundamentals of Human Rights*	2	1	50	50	50
		23UHE24AE01	**Ability Enhancement Compulsory Course - 2:** Environmental studies*	2	1	50	50	50
		-	Extra Credit Courses (MOOC/Certificate Courses)-1	-	(3)			
			Total	**30**	**20**			
3	1	23UTA31GL03	General Tamil - 3	4	3	100	100	100
		23UFR31GL03	French - 3					
		23UHI31GL03	Hindi - 3					
		23USA31GL03	Sanskrit - 3					
	2	23UEN32GE03	General English - 3	5	3	100	100	100
	3	24UAI33CC05	**Core Course - 5:** R Programming	5	4	100	100	100
		24UAI33CC06	**Core Course - 6:** Database Systems: Relational and NoSQL	5	4	100	100	100
		24UAI33CP03	**Core Practical - 3:** R Programming	3	2	100	100	100
		23UAI33AO01A	**Allied Optional - 1**: Applied Physics - 1	4	3	100	100	100
		23UAI33AO01B	**Allied Optional - 1**: Principles of Electronics					
		@	**Allied Optional Practical:** Applied Physics	2	-	-	-	-
		@	**Allied Optional Practical:** Electronics					
	4	23UHE34VE03A	**Value Education - 3:** Social Ethics - 1*	2	1	50	50	50
		23UHE34VE03B	**Value Education - 3:** Religious Doctrine - 1*					
		-	Extra Credit Courses (MOOC/Certificate Courses)-2		(3)			
			Total	**30**	**20(3)**			

4	1	23UTA41GL04B	General Tamil - 4: *அறிவியல் தமிழ்* (Scientific Tamil)	4	3	100	100	100
		23UFR41GL04	French - 4					
		23UHI41GL04	Hindi - 4					
		23USA41GL04	Sanskrit - 4					
	2	23UEN42GE04	General English - 4	5	3	100	100	100
	3	24UAI43CC07	**Core Course - 7:** Introduction to Artificial Intelligence	5	4	100	100	100
		24UAI43CC08	**Core Course - 8:** Web Design and Development	5	4	100	100	100
		24UAI43CP04	**Core Practical - 4:** Artificial Intelligence	3	2	100	100	100
		23UAI43AO02A	**Allied Optional - 2:** Applied Physics-2	4	3	100	100	100
		23UAI43AO02B	**Allied Optional - 2:** Communication Electronics					
		23UAI43AP01A	**Allied Optional Practical:** Applied Physics	2	2	100	100	100
		23UAI43AP01B	**Allied Optional Practical:** Electronics					
	4	23UHE44VE04A	**Value Education - 4:** Social Ethics - 2*	2	1	50	50	50
		23UHE44VE04B	**Value Education - 4:** Religious Doctrine - 2*					
		-	Extra Credit Courses (MOOC/Certificate Courses)-3	-	(3)			
			Total	**30**	**22(3)**			
5	3	24UAI53CC09	**Core Course - 9:** Embedded Systems and IoT	4	2	100	100	100
		24UAI53CC10	**Core Course - 10:** Robotics	4	2	100	100	100
		24UAI53CP05	**Core Practical - 5:** IoT Programming	3	2	100	100	100
		24UAI53CP06	**Core Practical - 6:** Robotics	3	2	100	100	100
		24UAI53ES01A	**Discipline Specific Elective - 1:** Virtual Reality and Augmented Reality	5	3	100	100	100
		24UAI53ES01B	**Discipline Specific Elective - 1:** Digital Marketing					
		24UAI53ES02A	**Discipline Specific Elective - 2:** Computer Networks	5	3	100	100	100
		24UAI53ES02B	**Discipline Specific Elective - 2:** Security in Computing					
		24UAI53IS01	Internship	-	2	100	-	100
		24UAI53SP01	**Self-paced Learning:** Web Ethics*	-	2	50	50	50
	4	-	**Generic Elective - 1:** Refer ANNEXURE 2	4	3	100	100	100
		23USS54SE01	**Skill Enhancement Course - 2:** Soft Skills	2	1	100	-	100
		-	Extra Credit Courses (MOOC/Certificate Courses)-4	-	(3)			
			Total	**30**	**22(3)**			
6	3	24UAI63CC11	**Core Course - 11:** Machine Learning	4	3	100	100	100
		24UAI63CC12	**Core Course - 12:** Data Visualization Techniques	4	3	100	100	100
		24UAI63CP07	**Core Practical - 7:** Machine Learning and Data Visualization Techniques	3	2	100	100	100
		24UAI63ES03A	**Discipline Specific Elective - 3:** Big Data Fundamentals	5	3	100	100	100
		24UAI63ES03B	**Discipline Specific Elective - 3:** Human Computer Interaction					
		24UAI63ES04A	**Discipline Specific Elective - 4:** Deep Learning	5	3	100	100	100
		24UAI63ES04B	**Discipline Specific Elective - 4:** Natural Language Processing					
		24UAI63PW01	Project Work and Viva Voce	3	2	100	100	100
		24UAI63CE01	Comprehensive Examination*	-	2	50	50	50
	4	-	**Generic Elective - 2:** Refer ANNEXURE 3	4	3	100	100	100
		-	**Skill Enhancement Course - 3 (WS):** Refer ANNEXURE 4	2	1	100	-	100
		-	Extra Credit Courses (MOOC/Certificate Courses)-5	-	(3)			
			Total	**30**	**22(3)**			
2 – 6	5	24UCW65OR01	Outreach Programme (SHEPHERD)		4			
1 – 6			**Total (3 years)**	**180**	**133(15)**			

@ - year end practical

*- for grade calculation 50 marks are converted into 100 in the mark statements

Passed by	***Board of Studies held on 25.09.2024***
Approved by	***49th Academic Council Meeting held on 10.10.2024***

ANNEXURE 1

Skill Enhancement Course - 1: (Non-Major Elective)*

Department	Course Code	Title of the Course
Botany	23UBO14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Organic Farming
Artificial Intelligence	24UAI14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Data Analysis Using Spreadsheet
Computer Science	23UCS14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Office Automation
BCA	23UBC14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Fundamentals of Information Technology
Mathematics	23UMA14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Mathematics for Competitive Examinations
Statistics	23UST14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Basics of Statistics
Vis Com	23UVC14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Digital Storytelling and Scriptwriting
English	23UEN14SE01	Skill Enhancement Course - 1: (Non-Major Elective): English for Communication
History	23UHS14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Introduction to Tourism
Tamil	23UTA14SE01	Skill Enhancement Course - 1: (Non-Major Elective): பேச்சுக்கலைத் திறன் (Oratory Skills)
BBA	23UBU14SE01A	Skill Enhancement Course - 1: (Non-Major Elective): Practical Advertising
	23UBU14SE01B	Skill Enhancement Course - 1: (Non-Major Elective): Digital Marketing
B. Com	23UCO14SE01A	Skill Enhancement Course - 1: (Non-Major Elective): Introduction to Accounting
	23UCO14SE01B	Skill Enhancement Course - 1: (Non-Major Elective): Consumer Protection and Rights
B. Com CA	23UCC14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Entrepreneurship Skills
Economics	23UEC14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Demography
Chemistry	23UCH14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Role of Chemistry in Daily Life
Electronics	23UEL14SE01	Skill Enhancement Course - 1: (Non-Major Elective): Consumer Electronics
Physics	23UPH14SE01A	Skill Enhancement Course - 1: (Non-Major Elective): Physics for Everyday Life
	23UPH14SE01B	Skill Enhancement Course - 1: (Non-Major Elective): Home Electrical Installation

**Offered to students from other Departments*

ANNEXURE 2

Generic Elective - 1*

Department	Course Code	Title of the Course
Botany	23UBO54EG01	Generic Elective - 1: Landscape designing
Artificial Intelligence	24UAI54EG01	Generic Elective - 1: Artificial Intelligence for Everyone
Computer Science	23UCS54EG01	Generic Elective - 1: Ethical Hacking
BCA	23UBC54EG01	Generic Elective - 1: Fundamentals of Data Science
Mathematics	23UMA54EG01	Generic Elective - 1: Numerical Ability
Statistics	23UST54EG01	Generic Elective - 1: Actuarial Statistics
Vis Com	23UVC54EG01	Generic Elective - 1: Media Education
English	23UEN54EG01	Generic Elective - 1: Film Studies
History	23UHS54EG01	Generic Elective-1: Tamil Heritage and Culture
Tamil	23UTA54EG01	Generic Elective - 1: தமிழிலக்கியத்தில் மனித உரிமைகள் (Human rights in Tamil literature)
BBA	23UBU54EG01A	Generic Elective - 1: Global Supply Chain Management
	23UBU54EG01B	Generic Elective - 1: Starts-ups and small Business Management
B.Com.	23UCO54EG01A	Generic Elective - 1: Computerised Accounting
	23UCO54EG01B	Generic Elective - 1: Basics of Excel
	23UCO54EG01C	Generic Elective - 1: Personal Investment Planning
B. Com CA	23UCC54EG01	Generic Elective - 1: E-commerce and E Business Management
Economics	23UEC54EG01	Generic Elective - 1: Principles of Economics
Chemistry	23UCH54EG01	Generic Elective - 1: Health Science
Electronics	23UEL54EG01A	Generic Elective - 1: Everyday Electronics
	23UEL54EG01B	Generic Elective - 1: Wireless Communication
Physics	23UPH54EG01A	Generic Elective-1: Everyday Physics
	23UPH54EG01B	Generic Elective-1: Renewable Energy Physics

**Offered to students from other Departments*

ANNEXURE 3

Generic Elective - 2*

Department	Course Code	Title of the Course
Botany	23UBO64EG02	Generic Elective - 2: Solid Waste Management
Artificial Intelligence	24UAI64EG02	Generic Elective - 2: Introduction to Cyber Security
Computer Science	23UCS64EG02	Generic Elective - 2: 3D Printing and Design
BCA	23UBC64EG02	Generic Elective - 2: Industry 4.0
Mathematics	23UMA64EG02	Generic Elective - 2: Quantitative Techniques
Statistics	23UST64EG02	Generic Elective - 2: Applied Statistics
Vis Com	23UVC64EG02	Generic Elective - 2: Digital Media Production
English	23UEN64EG02	Generic Elective - 2: English for the Media
History	23UHS64EG02	Generic Elective - 2: Intellectual Revivalism in Tamil Nadu
Tamil	23UTA64EG02	Generic Elective - 2: தமிழர் மருத்துவம் (Tamil Medicine)
BBA	23UBU64EG02A	Generic Elective - 2: Personality Development
	23UBU64EG02B	Generic Elective - 2: NGO Management
B. Com	23UCO64EG02A	Generic Elective - 2: Rural Marketing
	23UCO64EG02B	Generic Elective - 2: Entrepreneurship Development
	23UCO64EG02C	Generic Elective - 2: Digital Marketing
B. Com CA	23UCC64EG02	Generic Elective - 2: Total Quality Management
Economics	23UEC64EG02	Generic Elective - 2: Economics for Competitive Exams
Chemistry	23UCH64EG02	Generic Elective - 2: Solid Waste Management
Electronics	23UEL64EG02A	Generic Elective - 2: CCTV and Smart Security Systems
	23UEL64EG02B	Generic Elective - 2: Entrepreneurial Electronics
Physics	23UPH64EG02A	Generic Elective - 2: Laser Technology and its applications
	23UPH64EG02B	Generic Elective - 2: Physics of Earth

**Offered to students from other Departments*

ANNEXURE 4

Skill Enhancement Course - 3 (WS)*

School	Course Code	Title of the Course
SCS	24UAI64SE02	Skill Enhancement Course - 3 (WS): Gen AI Tools and Applications
	23UCS64SE02	Skill Enhancement Course - 3 (WS): E-Services and Applications
	23UBC64SE02A	Skill Enhancement Course - 3(WS): Web Design
	23UBC64SE02B	Skill Enhancement Course - 3(WS): 3DAnimation
	23UMA64SE02	Skill Enhancement Course - 3 (WS): MATLAB
	23UST64SE02	Skill Enhancement Course - 3 (WS): Official Statistics
	23UVC64SE02	Skill Enhancement Course - 3 (WS): Event Management

**Offered to students from other Departments within School*

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UTA11GL01A	General Tamil - 1	5	3

கற்றலின் நோக்கங்கள்
தமிழ்ச் செவ்வியல் இலக்கியங்களையும் காப்பியங்களையும் மாணவர்கள் அறிந்துகொள்ளல்
தமிழர் பேணி வளர்த்த அறம்சார் விழுமியங்களை மாணவர்கள் தம் வாழ்வில் பின்பற்றுதல்
தமிழில் பக்திஇயக்கப் பங்களிப்பையும் பகுத்தறிவுச் சிந்தனை மரபையும் உணர்தல்
மாணவர்கள் தம் எழுத்தாற்றலையும் மொழிப்புலமையையும் வளர்த்தெடுத்தல்
போட்டித்தேர்வுகளை எதிர்கொள்ளும் வகையில் இலக்கணம், இலக்கியம் கற்றல்

அலகு - 1 தமிழ் இலக்கிய, இலக்கண வரலாறு அறிமுகம். **(10 மணி நேரம்)**

1. இலக்கணம் :

அ.தொல்காப்பியம், இறையனார் களவியல் உரை , நம்பியகப் பொருள், புறப்பொருள் வெண்பா மாலை, நன்னூல், தண்டியலங்காரம், யாப்பருங்கலக்காரிகை- நூல்கள்

ஆ.மொழிப் பயிற்சி- ஒற்றுப்பிழை தவிர்த்தல்

- வல்லினம் மிகும் இடங்கள்
- வல்லினம் மிகா இடங்கள்
- ஈரொற்று வரும் இடங்கள்
- ஒரு, ஓர் வரும் இடங்கள்
- அது, அஃது வரும் இடங்கள்
- தான், தாம் வரும் இடங்கள்

பயிற்சி : வல்லினம் மிகும் இடங்கள், மிகா இடங்கள் தவறாக வரும்வகையில் ஒரு பத்தி கொடுத்து ஒற்றுப் பிழை திருத்தி எழுதச் செய்தல்.

2. சங்க இலக்கியம் - எட்டுத்தொகை, பத்துப்பாட்டு
3. அற இலக்கியம்-பதினெண்கீழ்கணக்கு நூல்கள்
4. காப்பிய இலக்கியம் - ஐம்பெருங் காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள், சமயக் காப்பியங்கள்
5. பக்தி இலக்கியமும் (பன்னிரு திருமுறைகள், நாலாயிர திவ்வியப் பிரபந்தம் -- பகுத்தறிவு இலக்கியமும் (சித்தர் இலக்கியங்கள், புலவர் குழந்தையின் இராவண காவியம்)

அலகு - 2 சங்க இலக்கியம் **(15 மணி நேரம்)**

எட்டுத்தொகை :

6. நற்றிணை-முதல் பாடல் -நின்ற சொல்லர்
7. குறுந்தொகை 3 ஆம் பாடல் -நிலத்தினும் பெரிதே
8. ஐங்குறுநூறு –நெல் பல பொலிக! பொன் பெரிது சிறக்க!' (முதல் பாடல்)-வேட்கைப் பத்து
9. கலித்தொகை- 51 - சுடர்த்தொடீஇக் கேளாய் -குறிஞ்சிக் கலி
10. புறநானூறு -189 தெண்கடல் வளாகம் பொதுமையின்றி, நாடா கொன்றோ -187

பத்துப்பாட்டு:

முல்லைப்பாட்டு (முழுவதும்)

அலகு - 3 அற இலக்கியம் **(10 மணி நேரம்)**

12. திருக்குறள் -அறன் வலியுறுத்தல் அதிகாரம்
13. நாலடியார்-பாடல்: 131 (குஞ்சியழகும்)
14. நான்மணிக்கடிகை-நிலத்துக்கு அணியென்ப
15. பழமொழி நானூறு- தம் நடை நோக்கார்
16. இனியவை நாற்பது- 37. இளமையை மூப்பு என்று

அலகு - 4 காப்பிய இலக்கியம் **(20 மணி நேரம்)**

17. சிலப்பதிகாரம் – வழக்குரைகாதை
18. மணிமேகலை- பாத்திரம் பெற்ற காதை

19. *பெரியபுராணம் - பூசலார் நாயனார்புராணம்*
20. *கம்பராமாயணம்- குகப் படலம்*
21. *சீறாப்புராணம் – மானுக்குப் பிணை நின்ற படலம்*
22. *இயேசு காவியம் -ஊதாரிப்பிள்ளை*

அலகு - 5 பக்தி இலக்கியமும், பகுத்தறிவு இலக்கியமும் **(15 மணி நேரம்)**

23. **பக்தி இலக்கியம்:**

- *திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லேம் எனத் தொடங்கும் பாடல் மட்டும்*
- *மாணிக்கவாசகர் திருவாசகம் - நமச்சிவாய வாஅழ்க நாதன்தாள் வாழ்க முதல் சிரம்குவிவார் ஓங்குவிக்கும் சீரோன் கழல் வெல்க வரை*
- *பொய்கையாழ்வார்-வையந் தகளியா வார்கடலே*
- *பூதத்தாழ்வார்-அன்பே தகளியா*
- *பேயாழ்வார்-திருக்கண்டேன் பொன்மேனி கண்டேன்*
- *ஆண்டாள் – திருப்பாவை மார்கழித் திங்கள்* (முதல் பாடல்)

24. **பகுத்தறிவு இலக்கியம் :**

- *திருமூலர் – திருமந்திரம்* (270,271, 274, 275 285)
- *பட்டினத்தார் -திருவிடை மருதூர்* (*காடே திரிந்து – எனத் தொடங்கும் பாடல்*
- *பா.எண்.*279, 280)
- *கடுவெளி சித்தர் - பாபஞ்செய் யாதிரு மனமே* (பாடல் முழுவதும்)
- *இராவண காவியம் –* ***தாய்மொழிப் படலம்*** - 18. (*ஏடுகை யில்லா ரில்லை முதல்* - 22. *செந்தமிழ் வளர்த்தார் வரை*)

கற்பித்தல் முறை	***விரிவுரை*** *(Lecture),* ***காணொளிக் காட்சி*** *(Videos),* ***விளக்கக் காட்சி*** *(PPT presentation)*

பாடநூல்

1. ***பொதுத்தமிழ்****-1 (* ***தமிழ் இலக்கிய வரலாறு****-1),* ***தமிழாய்வுத்துறை****,* ***தூய வளனார் தன்னாட்சிக் கல்லூரி****,* ***திருச்சிராப்பள்ளி*** *– 620 002,* ***முதற்பதிப்பு*** *- 2023*
2. ***பார்வை நூல்கள்***
3. *வரதராசன், மு. (2021). தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதெமி.*
4. *விமலானந்தன், மது. ச. (2022). தமிழ் இலக்கிய வரலாறு, முல்லை நிலையம்.*
5. *தமிழண்ணல். (2022). புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, பாரி நிலையம்.*
6. *சிற்பி பாலசுப்பிரமணியன் & சேதுபதி, சொ. (2015). தமிழ் இலக்கிய வரலாறு, கவிதா வெளியீடு.*
7. *சிற்பி பாலசுப்ரமணியம், & பத்மநாபன், நீல. (2013). புதிய தமிழ் இலக்கிய வரலாறு (3 தொகுதிகள்), சாகித்ய அக்காதெமி.*
8. *பெருமாள். அ.கா. (2014). தமிழ் இலக்கிய வரலாறு, சுதர்சன் புக்ஸ்.*
9. *ஏசுதாசன், ப.ச. (2015). தமிழ் இலக்கிய வரலாறு, நியூ செஞ்சுரி புக் ஹவுஸ்.*
10. *ஸ்ரீகுமார், எஸ். (2014). தமிழ் இலக்கிய வரலாறு, ஸ்ரீசெண்பகா பதிப்பகம்.*
11. *பாக்கியமேரி, எஃப்.* (2022). *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, பூவேந்தன் பதிப்பகம்.*
12. *சுப்புரெட்டியார், ந. (1980). தமிழ் பயிற்றும் முறை, மணிவாசகர் நூலகம்.*

Websites and eLearning Sources

1. https://www.chennailibrary.com/
2. https://www.sirukathaigal.com
3. https://www.tamilvirtualuniversity.org
4. https://www.noolulagam.com
5. https://www.katuraitamilblogspot.com

Course Outcomes		
CO No.	**CO-Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K - Level)**
CO1	*சங்க இலக்கியங்கள்வழி பண்டைத்தமிழரின் வாழ்வியலையும் பண்பாட்டையும் அறிந்து கொள்வர்*	**K1**
CO2	*அற இலக்கியங்கள், காப்பியங்கள் வெளிப்படுத்தும் அறம்சார் விழுமியங்களைத் தம் வாழ்வில் பின்பற்றுவர்*	**K2**
CO3	*இலக்கணக் கோட்பாடுகளை இக்கால வாழ்வியலோடு பொருத்திப் பார்ப்பர்*	**K3**
CO4	*மொழியறிவோடு பெறுவர் திறன் பகுத்தாராயும் இலக்கியங்களைப்*	**K4**
CO5	*பக்தி இயக்கங்களின் செல்வாக்கையும், தமிழரின் பகுத்தறிவு மரபையும் மதிப்பிடுவர்*	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
1	**23UTA11GL01A**			General Tamil - 1						**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO 1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	1	2	3	2	2	3	3	2	2	2	**2.2**
CO2	2	2	3	2	2	2	3	2	3	2	**2.3**
CO3	1	2	2	3	2	2	2	3	3	3	**2.3**
CO4	2	2	3	2	2	3	2	3	3	2	**2.4**
CO5	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/Week	Credits
1	**23UFR11GL01**	French - 1	**5**	**3**

Course Objectives
Identify the basic French sentence structure
Define and describe the various grammatical tenses and use them to communicate in French
Examine the various documents presented and discuss and reply to the questions asked on it
Analyze and interpret expressions used to convey the cause, the effect, the purpose, and the opposition in French
Evaluate the grammatical nature present in passages

UNIT I **(15 Hours)**

- Salut ! Enchanté

UNIT II **(15 Hours)**

- J'adore

UNIT III **(15 Hours)**

- Tu veux bien ?

UNIT IV **(15 Hours)**

- On se voit quand ?

UNIT V **(15 Hours)**

- Bonne idée

Teaching Methodology	Videos, Audios, PPT presentation, Role-play, Quiz

Book for Study

1. Mérieux, R. & Loiseau, Y. (2017). *Latitudes* -1- (A1 /A2), méthode de français, Didier. (Units 1 - 6 only)

Books for Reference

1. Dauda, P., Giachino, L. & Baracco, C. (2020). *Generation A1*, Didier.
2. Girardet, J. & Pecheur, J. (2017). *Echo A1*, (2nd Ed.). CLE International.
3. Fournier, I. (2011). *Talk French*, Goyal Publishers.

Websites and eLearning Sources

1. https://www.wikihow.com/Pronounce-the-Letters-of-the-French-Alphabet
2. https://francais.lingolia.com/en/grammar/tenses/le-present
3. https://www.lawlessfrench.com/grammar/articles/
4. https://www.frenchpod101.com/french-vocabulary-lists/10-lines-you-need-for-introducing-yourself
5. https://www.tolearnfrench.com/exercises/exercise-french-2/exercise-french-3295.php

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	recall and remember the usage of grammatical tenses in constructing sentences in a dialogue.	**K1**
CO2	apply the learnt grammar rules in practice exercises to improve their understanding	**K2**
CO3	explain the nuances in the usage of various grammatical tenses and their aspects	**K3**
CO4	demonstrate knowledge of various expressions used to express opinions, emotions, cause, effect, purpose, and hypothesis in French	**K4**
CO5	communicate in French and summarize a given text	**K5**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**							**Hours**		**Credits**
1	**23UFR11GL01**	French - 1							**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	1	3	1	3	3	2	3	2	**2.4**
CO2	2	3	3	2	1	3	3	3	3	2	**2.5**
CO3	1	3	2	1	2	2	2	2	3	2	**2.0**
CO4	3	3	3	3	3	3	3	2	3	2	**2.8**
CO5	3	3	3	3	2	3	3	3	3	2	**2.8**
Mean Overall Score											**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UHI11GL01	Hindi - 1	5	3

Course Objectives
To understand the basics of Hindi Language
To make the students to be familiar with the Hindi words
To enable the students to develop their effective communicative skills in Hindi.
To introduce the socially relevant subjects in Modern Hindu Literature
To empower the students with globally employable soft skills

UNIT I: Buniyadi Hindi **(15 Hours)**

- Swar
- Vyanjan
- Barah Khadi
- Shabd aur
- Vakya Rachna

UNIT II: Hindi Shabdavali **(15 Hours)**

- Rishto ke Naam
- Gharelu padartho ke Naam

UNIT III: Vyakaran **(15 Hours)**

- Sadharan Vakya aur Sangya
- Sarvanam
- Visheshan
- Kriya aadi shabdo ka prayog

UNIT IV: Chote Gadyansh ka pattan **(15 Hours)**

- Bacho ki Kahaniya
- Patra-Patrikao mein prakashit Gadyansho ka Pathan

UNIT V: Nibandh **(15 Hours)**

- Sant Tiruvalluvar
- E.V.R Thandai Periyar
- Naari Sashaktikaran
- Paryavaran Sanrakshan
- Vibhinna pratiyogi parikshao ke bare mein jaankari dena
- Pratiyogi priksha par adharit nibandho dwara bhasha ki kshamta badhane vale prashikshan kary.

Teaching Methodology	Videos, PPT, Quiz, Group Discussion, Project Work.

Books for Study

1. Gupth, M. K. (2020). *Hindi Vyakaran,* Anand Prakashan.
2. Tripaty, V. (2018). *Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd.
3. Jain, S. K. (2019). *Anuwad: Siddhant Evam Vyavhar*, Kailash Pustak Sadan.

Books for Reference

1. Kalam, A. A. P.J. (2020). *Mere sapnom ka Bharath*, Prabath Prakashan.
2. Singh, L. P. (2017). *Kavya ke sopan*, Bharathy Bhavan Prakashan.
3. Kumar, A. (2019). *Sampoorna Hindi Vyakaran our Rachana*, Lucent publisher.

4. (2018). *Adhunik Hindi Vyakaran our Rachana,* Bharati Bhavan Publishers & Distributors.
5. Shukla, A. R. (2022). *Hindi Sahitya Ka Itihas,* Prabhat Prakashan.

Websites and e-Learning Sources

1. https://learningmole.com/hindi-alphabet-letters-pronunciation-guide/
2. https://www.careerpower.in/hindi-alphabet-varnamala.html
3. https://www.youtube.com/watch?v=b0UvXnIC8qc
4. https://www.importanceoflanguages.com/learn-hindi-language-guide/
5. https://parikshapoint.com/hindi-sahitya/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will be able to	**Cognitive Levels (K - Level)**
CO1	introduction to Hindi sounds	**K1**
CO2	acquisition of Hindi Vocabulary	**K2**
CO3	sentence formation in Hindi	**K3**
CO4	reading of stories and other passages	**K4**
CO5	modules to increase language ability through general essays based on competitive exams	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
1	**23UHI11GL01**			Hindi - 1					**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	1	3	3	3	1	3	2	**2.3**
CO2	2	3	2	3	1	2	3	3	3	2	**2.4**
CO3	3	2	2	2	1	3	2	3	2	3	**2.3**
CO4	3	1	2	3	2	3	2	3	3	2	**2.4**
CO5	2	3	3	2	3	2	3	3	1	3	**2.5**
										Mean Overall Score	**2.38 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	**23USA11GL01**	Sanskrit - 1	**5**	**3**

Course Objectives
To help the students learn the alphabets of Sanskrit.
To understand the Sanskrit grammar and sabdas.
To have an idea of the epics.
To closely understand the literary works in Sanskrit with special reference to Pancamahakavyas.
To understand the Raghuvasa Mahakava and Kalidasa.

UNIT I **(15 Hours)**

Introduction to Sanskrit (Alphabets, Two letter words and three letter words)

Grammar:

akārāntaḥpuṁliṅgaḥśabda-s - 1. बाल (*Bāla*) and 2. देव (*Deva*) *ākārāntaḥstrīliṅgaḥśabda-s* - 1. बाला (*Bālā*) and 2. लता (*Latā*)*akārāntaḥnapuṁsakaliṅgaḥśabda-s* -

1. फल (*Phala*) and 2. वन (*Vana*)

UNIT II **(15 Hours)**

Introduction to *Rāmāyana,Kālidāsa* and his poetic works

Text: *Raghuvaṁśa* (Canto I) Verses 1-15

UNIT III **(15 Hours)**

Introduction to the works of *Bhāravi* -

Text: *Raghuvaṁśa* (canto I) Verses 16-30

UNIT IV **(15 Hours)**

Introduction to the works of *ŚrīHarṣha* -

Text: *Raghuvaṁśa* (Canto I) Verses 31-45

UNIT V **(15 Hours)**

Grammar:

Conjugations -*Laṭlakāra-s* – (Present tense)

(i) गच्छतत (*Gacchati*) (ii) ततष्ठतत (*Tiṣṭhati*) (iii) पठतत (*Paṭhati*)

(iv) नृत्यतत (*Nṛtyati*) (v) कुप्यतत (*Kupyati*) (vi) कथयतत (*Kathayati*)

(vii) गणयतत (*Gaṇayati*) (viii) अततत (*Asti*)

(ix) करोतत (*Karoti*) (x) शृणोतत (*Śṛṇoti*)

Indeclinables (Avyayaani) - अतप (*api*), कदा (*kadā*), च (*ca*), अद्य (*adya*), तवना (*vinā*),सह (*saha*), तत्र (*tatra*), ककम् (*kim*), यकद (*yadi*) - तर्ह (*tarhi*), यथा (*yathā*) - तथा (*tathā*) Prefixes (*Upasargas*) - आङ् (*āṅ*), तव (*vi*), परर (*pari*), अनु (*anu*),

अति (*adhi*), उत् (*ut*), प्रतत (*prati*), उप (*upa*), प्र (*pra*) तनर् (*nir*)

Teaching Methodology	Videos, PPT, demonstration.

Book for Study

1. Murugan, C., et al. (eds.). (2022). *Kalasala Samskrta Sukha Bodhini I* (for under graduate foundation course) Published by University of Madras.

Book for Reference

1. Vadhyar, R. S. (2017). *Shabdha manjari*, R.S. Vadyar & Sons.

Websites and e-Learning Sources

1. https://www.arlingtoncenter.org/Sanskrit%20Alphabet.pdf
2. https://courses.lumenlearning.com/suny-hccc-worldcivilization/chapter/sanskrit/

3. https://www.newworldencyclopedia.org/entry/Sanskrit_literature
4. https://archive.org/details/AShortHistoryOfsanskritLiterarure
5. https://archive.org/details/raghuvamsha_with_sanjivini_edited_by_mr_kale

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	remember the usage of grammatical tenses inconstructing sentences in dialogue.	**K1**
CO2	apply the rules of usage in practice exercises and identify errors	**K2**
CO3	explain the nuances in the usage of various grammatical tenses and aspects	**K3**
CO4	demonstrate knowledge of various expressions of opinion, emotions, cause, effect, purpose, and hypothesisin French	**K4**
CO5	communicate in French and summarize the given text	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
1	**23USA11GL01**			Sanskrit - 1						**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**	
CO1	1	3	2	3	1	3	2	3	2	2	**2.1**
CO2	2	3	2	3	1	2	2	3	2	3	**2.5**
CO3	3	2	2	2	2	2	3	2	3	2	**2.1**
CO4	3	2	3	2	2	3	3	2	3	2	**2.4**
CO5	3	2	3	3	2	2	3	2	3	3	**2.3**
									Mean Overall Score		**2.34 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UEN12GE01	General English - 1	5	3

Course Objectives
To enable learners to acquire self awareness and positive thinking required in various life situations
To help them acquire the attribute of empathy
To assist them in acquiring creative and critical thinking abilities
To enable them to learn the basic grammar
To assist them in developing LSRW skills

UNIT I: Self-awareness ELF-A (WHO) & Positive Thinking (UNICEF) (15 Hours)

Life Story

1. Chapter 1 from Malala Yousafzai, I am Malala
2. An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K. Gandhi

Poem

3. Where the Mind is Without Fear – Gitanjali 35 – Rabindranath Tagore
4. Love Cycle – Chinua Achebe

UNIT II: Empathy (15 Hours)

Poem

5. Nine Gold Medals – David Roth
6. Alice Fell or poverty – William Wordsworth

Short Story

7. The School for Sympathy – E.V. Lucas
8. Barn Burning – William Faulkner

UNIT III: Parts of Speech (15 Hours)

9. Articles
10. Noun
11. Pronoun
12. Verb
13. Adverb
14. Adjective
15. Preposition

UNIT IV: Critical & Creative Thinking. (15 Hours)

Poem

16. The Things That Haven't Been Done Before – Edgar Guest
17. Stopping by the Woods on a Snowy Evening – Robert Frost

Readers Theatre

18. The Magic Brocade – A Tale of China
19. Stories on Stage – Aaron Shepard (Three Sideway Stories from Wayside School" by Louis Sachar)

Unit V: Paragraph and Essay Writing (15 Hours)

20. Descriptive
21. Expository
22. Persuasive
23. Narrative
24. Reading Comprehension

Teaching Methodology	Interactive methods, and multimedia presentations

Books for Study

1. Yousafzai, M. (2013). *I am Malala, Little.* Brown and Company.
2. Gandhi, M. K. (2011). *An Autobiography or The Story of My Experiments with Truth (Chapter - I).* Rupa Publications.
3. Tagore, R. (1913). *"Gitanjali 35" from Gitanjali (Song Offerings): A Collection of Prose Translations Made by the Author from the Original Bengali.* MacMillan.
4. Shepard, A. (2017). *Stories on Stage.* Shepard Publications.

Books for Reference

1. Krishnasamy, N. (1975). *Modern English: A Book of Grammar, Usage and Composition.* Macmillan.
2. Nesfield, J. C. (2019). *English Grammar Composition and Usage.* Macmillan.

Websites and eLearning Sources

1. https://archive.org/details/i-am-malala
2. https://www.indiastudychannel.com/resources/146521- Book-Review-An- Autobiography-or-The-story-of-my-experiments-with-Truth.aspx
3. https://www.poetryfoundation.org/poems/45668/gitanjali-35
4. https://amzn.eu/d/9rVzlNv
5. https://archive.org/details/in.ernet.dli.2015.44179

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	discover self awareness and positive thinking required in various life situations	**K1**
CO2	classify the attributes of empathy	**K2**
CO3	apply creative and critical thinking skills	**K3**
CO4	focus on grammar for functional purposes	**K4**
CO5	integrate the LSRW skills for effective communication	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
1	**23UEN12GE01**		General English - 1						**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	3	3	3	3	3	3	**3**
CO2	2	3	3	3	2	3	3	3	3	3	**2.5**
CO3	3	3	3	2	3	3	3	3	3	2	**2.8**
CO4	3	3	3	3	3	3	3	3	3	3	**3**
CO5	3	2	3	3	3	3	3	3	3	3	**2.8**
										Mean Overall Score	**2.82 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	24UAI13CC01	**Core Course - 1:** Programming in C	4	3

Course Objectives
To learn C's history, structure, data types, variables, operators, expressions, and decision statements.
To understand various types of loops, arrays and functions.
To explore basic of pointers, array of pointers and function pointers.
To learn string processing, standard library functions, pointers to structures, functions involving structures, enums, and unions.
To know the concept of file modes, file operations and handling structures.

UNIT I: Basics of C **(12 Hours)**

History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Order of Precedence, Evaluating of Arithmetic Expressions – Type Conversion- Decision Statements: if, if-else, and nested if statements.

UNIT II: Looping Structures **(12 Hours)**

For Loop, While, Do-while loop – Arrays: - One Dimensional Array, Two-dimensional Arrays, Character Arrays and Strings – Functions: Function with arrays- Function with decision and looping statements - Recursion**.**

UNIT III: Pointers **(12 Hours)**

Introduction – Pointer Expressions – Chain of Pointers – Pointers and Arrays – Array of Pointers – Pointers as Function Arguments – Functions returning Pointers – Pointers to Functions – Function Pointer.

UNIT IV: Strings, Structures and Union **(12 Hours)**

Standard String Library Functions – Structures - Declaration, Initialization, Array of Structures – Pointer to Structures, Structures and Functions – Enumerated Data Types - Unions.

UNIT V: Files **(12 Hours)**

Introduction and Files Functions – Writing and Reading in Text mode –Simple Application: Display the Contents of a File. Writing Data to a file. Append Data to an existing file – File IO – Reading and Writing Structures

Teaching Methodology	Videos, PPT, Demonstration, Hands on Session and Lecture Methods.

Book for Study

1. Balagurusamy, E. (2016). *Programming in ANSI C*, (7th Ed.). Tata McGraw Hill.

Books for Reference

1. Kanetka, Y. (2010). *Let Us C*, (10th Ed.). BPB Publications.
2. Jeff, S. (2020). *Learn C Programming: A Beginner's Guide to Learning C Programming the Easy and Disciplined Way*. Packt Publishing.
3. Jena, S. K. (2021). *C Programming: Learn to Code*, CRC Press.

Website and eLearning Sources

1. https://www.geeksforgeeks.org/c-programming-language/
2. http://learn-c.org/
3. https://www.cprogramming.com/

Course Outcomes (COs)		
CO No.	**CO-Statements** On successful completion of this course, the students will be able to	**Cognitive Levels (K-Level)**
CO1	define and understand the basic concepts in C Programming.	**K1**
CO2	explain and execute programs to explore the concepts ofloops and functions	**K2**
CO3	apply the skills to write the C code using Pointers and function pointers	**K3**
CO4	analyze the concepts of OOPS such as Strings, Structures and enumerated data types	**K4**
CO5	discover the concept of File IO and Perform File Manipulation	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
1	**24UAI13CC01**			**Core Course - 1:** Programming in C					**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	2	2	3	2	2	3	2	**2.3**
CO2	3	3	2	2	2	3	3	1	1	2	**2.2**
CO3	2	3	2	3	3	2	3	3	2	2	**2.5**
CO4	2	2	2	2	3	2	3	3	2	3	**2.4**
CO5	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/Week	Credits
1	24UAI13CC02	**Core Course - 2:** Data Structures and Algorithms	4	3

Course Objectives
To study arrays and linked lists, covering their definitions and types.
To learn about stacks and queues, including their definitions, representations, operations.
To study trees, focusing on key terms, binary tree representation, and traversal techniques.
To learn sorting and searching methods, including various sorts and linear and binary searches.
To learn algorithm design methods and basic steps.

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)**

Sorting: Terminologies – Techniques – Bubble sort – Insertion sort – Quick sort – Radix sort – Searching – Terminologies - Linear search with arrays – Binary Search.

UNIT V **(12 Hours)**

Algorithm Development: Basic Steps. Algorithm Design Methods: Sub goals - Hill Climbing - Working Backward - Heuristics - Backtrack Programming – Branch and Bound – Recursion.

Teaching Methodology	Videos, PPT, Demonstration, Hands on Session and Lecture Methods.

Books for Study

1. Samanta, D. (2009). *Classic Data Structures*, (2nd Ed.). PHI Learning Pvt. Ltd.
   Unit I: Chapters 2.1-2.3, 2.4.1, 2.4.3, 3.1-3.5
   Unit II: Chapters 4.1-4. 4, 4.5.1, 5.1-5.4
   Unit III: Chapters 7.1-7.3, 7.4.3
   Unit IV: Chapters 10.1, 10.2, 10.3.1, 10.4.1, 10.5.1, 10.5.4, 10.6.1, 11.1, 11.2.1, 11.2.4
2. Goodman, S. E. & Hedetniemi, S. T. (1988). *Introduction to the Design and Analysis of Algorithms*, McGraw Hill International Edition.
   Unit V: Chapter 1.3, 3.1, 3.2, 3.3, 3.4, 3.5

Books for Reference

1. Ellis Horowitz, E. & Sahni, S. (1985). *Fundamentals of Data Structure*, Galgotia Publications.
2. Tanenbaum, A. M. & Augustein, M. J. (1985). *Data structures with Pascal*, PHI India Ltd.

Website and eLearning Sources

1. https://www.programiz.com/dsa
2. https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will be able to	**Cognitive Levels (K-Level)**
CO1	define and understand various terms in data structures and algorithms.	**K1**
CO2	outline various techniques in data structures and algorithms.	**K2**
CO3	apply the data structures and algorithms to solve simple problems.	**K3**
CO4	compare various techniques used in data structures and algorithms.	**K4**
CO5	evaluate the importance of data structures and algorithms by developing real world applications.	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
1	**24UAI13CC02**		**Core Course - 2:** Data Structures and Algorithms						4		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	2	1	2	3	3	2	1	2	**2.2**
CO2	3	3	2	2	2	3	3	3	2	2	**2.5**
CO3	2	3	3	2	2	2	3	3	2	2	**2.4**
CO4	3	3	3	1	3	3	3	3	1	2	**2.5**
CO5	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/ Week	Credits
1	24UAI13CP01	**Core Practical - 1:** Programming in C	3	2

List of Exercises

1. Simple Programs
2. Simple programs using control structures
3. Array Programs
4. Functions
5. Recursion
6. Programs using Structure and Union
7. File Handling
8. Implement a stack using Array
9. Implement Queue using Array
10. Singly Linked List

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UAI13AC01	**Allied Course 1:** Numerical Methods	5	4

Course Objectives
To introduce the various topics in Numerical methods.
To make understand the fundamentals of algebraic equations
To apply interpolation and approximation on examples
To solve problems using numerical differentiation and integration
To solve linear systems, numerical solution of ordinary differential equations

UNIT I **(15 Hours)**

Fundamentals of Algebraic Equation: Solution of algebraic and transcendental equations-Bisection method - Method of successive Approximations or iteration method - Newton Raphson

UNIT II **(15 Hours)**

Simultaneous linear algebraic equations - Gauss elimination method - Gauss Jordan method Iterative methods - Gauss Jacobi method - Gauss Seidel method

UNIT III **(15 Hours)**

Interpolation with Equal and Unequal Interval: Interpolation with equal intervals - Newton's forward and backward: difference formulae- Approximation of derivatives using interpolation polynomials- Interpolation with unequal intervals- Newton's divided difference interpolation Lagrange's interpolation.

UNIT IV **(15 Hours)**

Numerical Integration: Trapezoidal rule - Romberg's Method - Simpson's 1/3 rule

UNIT V **(15 Hours)**

Initial Value Problems for Ordinary Differential Equations: Single step methods - Taylor's series method - Euler's method - Modified Euler's method - RungeKutta method for solving equations

Teaching Methodology	Chalk and Talk, PPT

Book for Study

1. Venkataraman, M. K. (2000). *Numerical methods in science and engineering,* (5th Ed.). National Publishing Company.
   Unit I: *Chapter 3 (Sec: 2, 3, 5)*
   Unit II: *Chapter 4 (Sec: 2, 6)*
   Unit III: *Chapter 6 (Sec: 3, 4), Chapter 8 (Sec: 4)*
   Unit IV: *Chapter 9 (Sec: 7, 8, 9, 10)*
   Unit V**:** *Chapter 11 (Sec 6, 10, 12, 13)*

Books for Reference

1. Singaravelu, A. (1992). *Numerical methods*. Meenakshi Publications.
2. Kandasamy, P., Thilagavathy, K. & Gunavathi, K. (2008). *Numerical methods*. S. Chand & Company Ltd.
3. Jain, M K., Iyengar, S. R. K. & Jain, R. K. (2007). *Numerical methods for scientific and engineering computation*. New Age Pvt. Publishers.

Website and eLearning Source

1. https://onlinecourses.nptel.ac.in/noc23_ma94/preview

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will be able to	**Cognitive Levels (K-Level)**
CO1	acquire the knowledge on various problems on numerical methods	**K1**
CO2	understand to solve numerical related problems	**K2**
CO3	apply appropriate numerical methods to solve the given problems and evaluate their solutions	**K3**
CO4	analyze the best approximated value of the root of the given function using various numerical methods	**K4**
CO5	evaluate various numerical problems using of ordinary differential equations and integration	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
1	**23UAI13AC01**			**Allied Course 1:** Numerical Methods					**5**		**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	2	2	3	2	3	2	2	**2.5**
CO2	2	3	3	2	2	2	3	2	2	3	**2.4**
CO3	3	1	3	2	2	3	2	2	1	2	**2.1**
CO4	3	2	2	1	2	3	3	3	2	3	**2.4**
CO5	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/Week	Credits
1	23UHE14VE01	**Value Education - 1:** Essentials of Humanity	2	1

Course Objectives
To identify one's own potentials, strengths and weaknesses
To identify various challenges (physical, emotional, and social) in adolescence
To consciously overcome one's challenges and move towards self-esteem
To maximize one's own potential in enabling a holistic development
To assimilate human values comprehensively

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: Development of Human Personality **(6 Hours)**

Personality: Introduction, Theories, Integration & Factors influencing the development of personality - SEL Series - Discovering self - Defence 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 - Crimens against Women - Women rights - Time-line of Women achievements in India

Teaching Methodology	Chalk and Talk, Power point

Book for Study

1. Department of Human Excellence. (2021). *Essentials of Humanity.* St. Joseph's College.

Books for Reference

1. Xavier, A. (2012). *You Shall Overcome,* (6th Ed.). ICRDE Publication.
2. Alex, K. (2009). *Soft Skills.* S. Chand.
3. Kalam, A.A. P. J. (2012). *You Are Unique.* Punya Publishing.

Websites and eLearning Sources

1. http://livingvalues.net. Accessed 05 March 2021.
2. http://www.apa.org/topics/personality#. Accessed 05 March 2021.
3. http://www.peacecorps.gov/educators/resources/global-issues-gender-equaligy-and-womens-empowerment/. Accessed 05 March 2021.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	recall the prescribed values and their dimensions.	**K1**
CO2	examine themselves by learning the developmental changes happening in the course of their lifetime.	**K2**
CO3	apply the trained values in the day-to-day life.	**K3**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**								**Hours**	**Credits**
1	**23UHE14VE01**	**Value Education - 1:** Essentials of Humanity								**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO 4**	**PSO5**	
CO1	3	3	3	3	2	3	3	2	3	3	**2.8**
CO2	3	2	2	3	3	2	3	3	2	2	**2.5**
CO3	2	3	3	3	2	3	3	3	3	3	**2.8**
										Mean Overall Score	**2.7 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UEN14AE01	**Ability Enhancement Compulsory Course - 1:** Communicative English	6	3

Course Objectives
To recognize and identify the components of a formal letter.
To summarize the main points of a given letter and identify the intended meaning.
To use appropriate grammatical structures in context within their own writing.
To compare and contrast the elements of successful and unsuccessful letters.
To create well-structured letters with clear purpose and effectively evaluate and revise their own writing.

Basic Level

UNIT I **(18 Hours)**

1) A letter to avail college hostel
2) A requisition letter to provide fee concession
3) A requisition letter to provide Bonafide certificate
4) A letter to avail resources in college library
5) An On Duty Permission Letter
6) Nouns
7) Pronouns
8) Adjectives
9) Verbs
10) Adverbs

UNIT II **(18 Hours)**

11) A letter to provide conduct certificate
12) A letter to provide new ID card
13) A Permission letter for Name Correction in Mark sheet
14) A permission letter for Sports Events
15) A letter to avail permission for the Shepherd programme
16) Prepositions
17) Conjunctions
18) Articles
19) Conjugation of present form ‘Be’ verbs
20) Conjugation of past form ‘Be’ verbs

UNIT III **(18 Hours)**

21) A letter to avail the College Hostel
22) A permission letter to join the sport team
23) A request letter to access college Wi-Fi
24) A letter to vice principal requesting to change Elective course
25) A permission letter for project extension
26) Conjugation of future form ‘Be’ verbs
27) Conjugation of present continuous ‘Be’ verbs
28) Conjugation of Past continuous ‘Be’ verbs
29) Conjugation of Future continuous ‘Be’ verbs
30) Conjugation of Present Perfect ‘Be’ verbs

UNIT IV **(18 Hours)**

31) An apology letter to Dean for using mobile phone
32) A request letter to repair fan and tube light
33) A letter to invite Chief guest for Bibliophile Club meeting

34) A requisition Letter to issue the Transfer certificate
35) A permission letter for group exam coaching class
36) Conjugation of Past Perfect ‘Be’ verbs
37) Conjugation of Future Perfect ‘Be’ verbs
38) Conjugation of Present Perfect Continuous ‘Be’ verbs
39) Conjugation of Past Perfect Continuous ‘Be’ verbs
40) Conjugation of Future Perfect Continuous ‘Be’ verbs

UNIT V **(18 Hours)**

41) A letter seeking help to find the missing laptop
42) A letter to the editor regarding frequent power cut
43) A medical leave letter
44) A requesting OD Letter to issue invitation to other colleges
45) A requisition letter to change Shift
46) Conjugation of present form ‘Action’ verbs
47) Conjugation of past form ‘Action’ verbs
48) Conjugation of Present form ‘do verbs
49) Conjugation of Past form ‘do’ verbs
50) Conjugation of Future form ‘have’ verbs

Teaching Methodology	Chalk and Talk, discussion, Training

Book for Study

1. Jayapaul, V. L. (2023). *Begin to Learn English.* St. Joseph’s College (Autonomous), Tiruchirappalli.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	compose various types of letters (request, permission, and apology) demonstrating clarity, coherence, and correctness.	**K1**
CO2	exhibit a sound understanding of nouns, pronouns, adjectives, verbs, and adverbs, utilizing them accurately in written and spoken English.	**K2**
CO3	apply language skills in real-life college scenarios, gaining confidence in communicating effectively with peers, faculty, and administrative staff.	**K3**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**						**Hours**			**Credits**
1	**23UEN14AE01**	**Ability Enhancement Compulsory Course - 1:** Communicative English						**6**			**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
									Mean Overall Score		**2.37 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UEN14AE01	**Ability Enhancement Compulsory Course - 1:** Communicative English	6	3

Course Objectives
To recognize and identify common punctuation marks and their usage in paragraphs.
To summarize the main topics introduced in a paragraph and demonstrate understanding.
To apply the learned concepts to construct paragraphs that convey ideas effectively.
To analyze paragraphs to identify the role of prefixes, suffixes, and noun types in enhancing meaning.
To synthesize information to create paragraphs, evaluate their own writing, and engage in role-playing scenarios to demonstrate understanding.

Intermediate Level

UNIT I **(18 Hours)**

1) Paragraph Punctuation
2) Introducing a Topic
3) Rhyming Words
4) Word Association
5) Going To
6) What Will Happen

UNIT II **(18 Hours)**

7) Every Drop Counts
8) Prefix
9) Suffix
10) Comprehending Characters
11) Complimenting & Thanking
12) Proper & Common Nouns

UNIT III **(18 Hours)**

13) Noun Substitution Table
14) A, Some
15) Visual Comprehension
16) Singular to Plural
17) Making & Responding
18) Pronoun Classification

UNIT IV **(18 Hours)**

19) Pronoun I, Me, He, Him, She, Her, We.
20) Singular to Plural
21) Responding
22) Pronoun Classification
23) Using Preposition of Movement
24) Preposition: Visual Talk

UNIT V **(18 Hours)**

25) Prepositional Phrases
26) Storytelling
27) Asking For Opinion
28) Using Things Creatively
29) Transition Sequencing
30) Role Play

Book for Study

1. Joy, J. L. (2020). *Learning to Communicate*. St. Joseph's College (Autonomous), Tiruchirappalli.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	demonstrate proficiency in paragraph construction, rhyming words, and the use of prefixes and suffixes.	**K1**
CO2	apply advanced grammar rules, including proper/common nouns and pronoun usage, in both written and spoken communication.	**K2**
CO3	express opinions, compliments, and gratitude effectively, showcasing an enhanced ability to articulate thoughts and emotions.	**K3**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**							**Hours**		**Credits**
1	**23UEN14AE01**	**Ability Enhancement Compulsory Course - 1:** Communicative English							**6**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
										Mean Overall Score	**2.37 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UEN14AE01	**Ability Enhancement Compulsory Course - 1:** Communicative English	6	3

Course Objectives
To recognize and demonstrate basic self-introduction strategies.
To summarize information from listening and reading exercises, demonstrating understanding.
To apply learned concepts to construct essays, actively contribute to group discussions, and create coherent narratives.
To analyze reviews to understand how different elements contribute to a comprehensive evaluation.
To synthesize information to create compelling presentations, actively participate in debates, interviews, and assess their own communication proficiency.

Advance Level

UNIT I **(18 Hours)**

1) Self Introduction
2) Listening
3) Reading

UNIT II **(18 Hours)**

4) Essay Writing
5) Group Discussion
6) Story Building, Story Writing & Story Narration

UNIT III **(18 Hours)**

7) Book Review
8) Film Review

UNIT IV **(18 Hours)**

9) News Paper Reading and Analysis
10) Public speaking: Drafting and Speaking

UNIT V **(18 Hours)**

11) Debate
12) Interview Skills

Websites and eLearning Resources

1. https://ielts-up.com/listening/ielts-listening-practice.html
2. https://www.bestmytest.com/ielts/speaking
3. https://ielts-up.com/speaking/ielts-speaking-practice.html
4. https://learnenglishteens.britishcouncil.org/skills/writing/a2-writing/film-review

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	exhibit high-level language skills in self-introduction, listening, reading, and diverse writing tasks such as essay writing and storytelling.	**K1**
CO2	critically evaluate and analyze literature through book reviews, film reviews, and newspaper reading, demonstrating an ability to articulate informed opinions.	**K2**
CO3	showcase proficiency in public speaking, group discussions, debates, and interviews, reflecting a comprehensive mastery of advanced communication skills.	**K3**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
1	**23UEN14AE01**		**Ability Enhancement Compulsory Course - 1:** Communicative English						**6**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
Mean Overall Score											**2.37 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UTA21GL02	General Tamil - 2	4	3

கற்றலின் நோக்கங்கள்
தமிழ் இலக்கிய வரலாற்றை அறிதல்.
எழுத்து, சொல் இலக்கணங்களின் அடிப்படைகளைக் கண்டறிதல்.
அயலகக் கவிதை வடிவங்களை விளங்கிக் கொள்ளுதல்.
மொழிபெயர்ப்புக் கவிதைகளின் வாயிலாக மொழிபெயர்ப்புத் திறனை வளர்த்தெடுத்தல்.
போட்டித் தேர்வுகளை எதிர்கொள்வதற்கான இலக்கண அறிவு பெறுதல்.

அலகு – 1 ***(12 மணிநேரம்)***

பாரதியார் கவிதைகள் – குயில்பாட்டு (குயில் தன் பூர்வ ஜென்மக் கதை உரைத்தல்)
பாரதிதாசன் கவிதைகள் – சஞ்சீவி பர்வதத்தின் சாரல்
நற்றமிழ்க்கோவை – முதல் மூன்று கட்டுரைகள்

அலகு - 2 ***(12 மணிநேரம்)***

வெ.இராமலிங்கனார் – சொல், தமிழன் இதயம்
முடியரசனார் – உயிர் வெல்லமோ, மனத்தூய்மை
பெருஞ்சித்திரனார் – அஞ்சாதீர், மொழி,இனம்,நாடு
பட்டுக்கோட்டை கலியாண சுந்தரனார் – வருங்காலம் உண்டு, உழைக்காமல் சேர்க்கும் பணம்
இலக்கணம் – எழுத்து
இலக்கிய வரலாறு – புதுக்கவிதை, தமிழில் புதிய கவிதை வடிவங்கள்

அலகு–3 ***(12 மணி நேரம்)***

சுரதா - நல்ல தீர்ப்பு
கண்ணதாசன் - ஒரு பானையின் கதை
அப்துல் ரகுமான்- வீடு
மேத்தா - ஒரேகுரல்
இலக்கிய வரலாறு – தமிழ்ச்சிறுகதைகள், இருபதாம் நூற்றாண்டு உரைநடை வளர்ச்சி
சிறுகதை – முதல் மூன்று சிறுகதைகள்

அலகு – 4 ***(12 மணிநேரம்)***

அரசியல் கவிதைகள்
ஈரோடு தமிழன்பன்- அகல் விளக்காக இரு
ஆதவன் தீட்சண்யா– இன்னும் இருக்கும் சுவர்களின் பொருட்டு
சுகிர்தராணி– என் கண்மணியே இசைப்பிரியா
சக்தி ஜோதி – யுகாந்திர உறக்கம்
பழநி பாரதி- வெள்ளைக்காகிதம்
லிவிங்ஸ்மைல் வித்யா – நினைவில் பால்யம் அழுத்தம்
இலக்கணம் - சொல்

அலகு – 5 ***(12 மணிநேரம்)***

அயலகக் கவிதைகள்
ஓசேரிசால் (தமிழில் நெய்தல்)- விடைகொடு என்தாய் மண்ணே
ஹைபுன் கவிதைகள்
சிறுகதை – நான்கு முதல் ஆறு சிறுகதைகள்
நற்றமிழ்க் கோவை – நான்கு முதல்ஆறு கட்டுரைகள்

கற்பித்தல் முறை **(Teaching Methodology)**	***விரிவுரை*** (Lecture), ***காணொளிக் காட்சி*** (Videos), ***விளக்கக் காட்சி*** (PPT presentation)

பாடநூல்கள்

1. *தமிழாய்வுத்துறை* (2023). *பொதுத்தமிழ் -2, தூய வளனார் தன்னாட்சிக் கல்லூரி.*
2. *தமிழாய்வுத்துறை* (2021). *நற்றமிழ்க் கோவை, தூய வளனார் தன்னாட்சிக் கல்லூரி.*

Websites and eLearning Sources

1. https://www.chennailibrary.com/bharathiyar/kuyilpattu.html

2. www.tamildigitallibrary.in
3. https://eluthu.com/kavithai
4. https://podhutamizh.blogspot.com/2017/09/blog-post_42.html
5. https://thamizhsudar.com
6. https://ta.wikipedia.org/wiki

Course Outcomes		
CO No.	**CO-Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K - Level)**
CO1	***தமிழ் இலக்கிய நூல்கள் பற்றிய அறிவைப் பெறுவர்.***	**K1**
CO2	***தமிழ் இலக்கண வளர்ச்சியைப் புரிந்து கொள்வர்.***	**K2**
CO3	***பிழையின்றி எழுதும் திறன் பெறுவதோடு கற்றல் திறனையும் வளர்த்துக்கொள்வர்.***	**K3**
CO4	***பிற கவிதை வடிவங்களைக் கையாளும் திறன் பெறுவர்.***	**K4**
CO5	***போட்டித் தேர்வுகளை எதிர்கொள்ளும் திறனைப் பெறுவர்.***	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UTA21GL02**			General Tamil - 2						**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO 1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	1	2	2	3	3	3	2	3	2	**2.3**
CO2	2	1	2	2	2	3	2	2	2	2	**2.0**
CO3	2	1	2	2	3	3	3	2	3	2	**2.3**
CO4	1	2	1	2	2	3	2	2	3	2	**2.0**
CO5	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/Week	Credits
2	**23UFR21GL02**	French - 2	**4**	**3**

Course Objectives
To construct simple phrases with pronominal verbs
To apply the different types of articles
To understand the usage of pronouns
To analyse the French culture through French culinary art
To evaluate and compare the French fashion in current scenario

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: Où 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: Découvrez et Dégustez
- 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

Teaching Methodology	Chalk and talk, visual cues like flashcards, one to one conversation

Book for Study

1. Dauda, P., Giachino, L. & Baracco, C. (2016). *Generation A1*. Didier.

Books for Reference

1. Girardet, J. & Pecheur, J. (2017). *Echo A1*. CLE International, (2nd Ed.).
2. Mérieux, R. & Loiseau, Y. (2012). *Latitudes A1*. Didier.
3. Fournier, I. (2011). *Talk French.* Goyal Publishers.

Websites and eLearning Sources

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/

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	relate pronominal verbs in expressing one's day today activity	**K1**
CO2	compare the different types of articles – article partitif and contracte	**K2**
CO3	construct texts using pronouns – passages and dialogues	**K3**
CO4	discover the food habits of the French culture	**K4**
CO5	appraise the French fashion	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
2	**23UFR21GL02**		French - 2						**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	1	3	1	2	2	2	**2.2**
CO2	2	1	2	3	2	3	1	2	2	2	**2.0**
CO3	3	2	3	2	2	3	3	1	3	2	**2.4**
CO4	3	2	2	1	3	3	3	1	1	3	**2.2**
CO5	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/Week	Credits
2	23UHI21GL02	Hindi - 2	4	3

Course Objectives
To understand the basics of Hindi Language
To make the students to be familiar with the Hindi words
To enable the students to develop their effective communicative skills in Hindi
To introduce the socially relevant subjects in Modern Hindi Literature
To empower the students with globally employable soft skills

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
- Sandhi
- Letter Writing - Nagarpalika Ko Patra
- Bakthikal - Visheshathayem

Teaching Methodology	Peer Instruction Exercise, Videos, PPT, Quiz, Group Discussion

Books for Study

1. Tripaty, V. (2018). *Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd.
2. Gupth, K. M. (2020). *Hindi Vyakaran*. Anand Prakashan.
3. Bosalae, S. (2020). *kavya sarang*, Rajkamal Prakashan.

Books for Reference

1. Shukla, A. R. (2021). *Hindi Sahitya Ka Itihas*. Prabhat Prakashan.
2. Krishnakumar, G. (2016). *Anuvad vigyan ki Bhumika*. Rajkamal Prakashan.
3. Kumar, A. (2019). *Sampoorna Hindi Vyakaran our Rachana*, Lucent publisher.
4. Singh, L. P. (2017). *Kavya ke sopan*. Bharathy Bhavan Prakashan.

Websites and e-Learning Sources

1. https://hindigrammar.in/sandhi.html
2. https://www.successcds.net/class10/hindi/samas-in-hindi
3. https://mycoaching.in/kriya-ke-bhed-verb-in-hindi
4. https://namastesensei.in/adverb-in-hindi-examples/
5. https://viahindi.in/hindi-vyakaran/sandhi-paribhasha-prakar-or-udaharan

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will be able to	**Cognitive Levels (K - Level)**
CO1	Find out the Terms & Expressions related to letter writing.	**K1**
CO2	Explain the works of Hindi writers.	**K2**
CO3	Complete the sentences in Hindi using basic grammar.	**K3**
CO4	Analyze the social & political conditions of Devotional period in Hindi Literature.	**K4**
CO5	Justify the human values stressed on the works of the following authors “Premchand, Nirala, etc.”.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**	
2	**23UHI21GL02**			Hindi - 2				**4**		**3**	
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	3	2	2	3	3	3	2	2	**2.5**
CO2	1	3	1	2	2	3	3	3	2	3	**2.3**
CO3	3	2	3	2	2	3	2	3	2	2	**2.4**
CO4	2	3	3	1	3	2	3	2	1	2	**2.2**
CO5	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/Week	Credits
2	23USA21GL02	Sanskrit - 2	4	3

Course Objectives
To bring out the salient aspects of classical Sanskrit poetry
To introduce court epics in Sanskrit
To train students in declensions of pronouns in Sanskrit
To coach the students in the conjugation patterns of verbs in Sanskrit
To offer coaching in morpho-phonemic rules and their applications in Sanskrit

UNIT I **(12 Hours)**

Asmathi usmath tat kim (MFN) sarvanaam asabdaha

UNIT II **(12 Hours)**

Sandhi Niyamaah Abhyaash (Guna , Visarga , Dirgha , Vrddhi)

UNIT III **(12 Hours)**

Lang lakaarah Kriyapadaani Prayoga Vivaranam

UNIT IV **(12 Hours)**

Raguvamsaha Pratama sargaha (1 -15 slokas)

UNIT V **(12 Hours)**

Suvacanani Vakya Prayoga Vivaranam

Teaching Methodology	Videos, PPT, Blackboard, Demonstration, Exercises

Books for Study

1. Saralasamkritham Skisha. (2021).
2. Dhaatu Manjari. (2021).

Books for Reference

1. Paindrapuram Ashram, Srirangam. (2019).
2. Vadhyar, R. S., & Sons, Book - Seller and Publishers. (2021).
3. Kulapthy, K. M. (2018). *Saral Sanskrit Balabodh*. Bharathiys Vidya Bhavan.

Websites and eLearning Sources

1. https://www.meritnation.com
2. https://www.aplustopper.com
3. https://mycoaching.in/lang-lakar
4. https://sanskritdocuments.org/sites/giirvaani/giirvaani/rv/sargas/01_rv.htm
5. https://resanskrit.com/blogs/blog-post/sanskrit-shlok-popular-quotes-meaning-hindi-english

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Remembering names of different objects, remembering different verbal forms and sandhi	**K1**
CO2	Contrast different verbal forms Explain good sayings, Relate good saying to life.	**K2**
CO3	Apply and build small sentences	**K3**
CO4	Analyze different forms of Verbs and nouns	**K4**
CO5	Appreciate subhashitas and Sanskrit poetry	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23USA21GL02**			Sanskrit - 2						**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**	
CO1	2	1	3	2	2	2	3	3	2	1	**2.1**
CO2	3	2	3	2	2	3	2	3	3	2	**2.5**
CO3	2	2	3	2	2	2	2	3	3	1	**2.1**
CO4	3	2	3	3	1	2	3	3	3	1	**2.4**
CO5	3	2	2	2	3	2	2	3	3	1	**2.3**
Mean Overall Score											**2.28 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UEN22GE02	General English - 2	5	3

Course Objectives
To develop an expanded and specialised vocabulary related to diverse themes such as education, entertainment, career, and society through activities like word grids, reading, and discussions.
To enhance problem-solving abilities through activities like debates, role-playing, and scenario analysis.
To enable students to express ideas with precision and clarity by practising different forms of expressing quality, comparison, and actions in various contexts.
To equip students with language skills relevant to professional settings.
To encourage students to explore language as a tool for creative expression and communication.

UNIT I **(15 Hours)**

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

UNIT II **(15 Hours)**

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

UNIT III **(15 Hours)**

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

UNIT IV **(15 Hours)**

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

UNIT V **(15 Hours)**

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

Teaching Methodology	Lecture Method, Use of ICT Tools and Interactive method

Book for Study

1. Joy, J. L. & Peter, F. M. (2014). *Let's Communicate 2*, Trinity Press.

Books for Reference

1. Ahrens, S. (2017). *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking*. Create Space.
2. Aspinall, T. (2002). *Test Your Listening.* Pearson.
3. Bailey, S. (2004). *Academic Writing: A Practical Guide for Students*. Routledge.
4. Fitikides, T. J. (2002). *Common Mistakes in English,* (6th Ed.). Longman
5. Wainwright., G. R. (2007). *How to Read Faster and Recall More: Learn the Art of Speed Reading with Maximum Recall,* (3rd Ed.). How to Books.

Websites and eLearning Sources

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

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	write paragraphs with apt punctuation marks	**K1**
CO2	discuss basic issues with friends, relatives and members of the family	**K2**
CO3	use polite expressions in appropriate ways	**K3**
CO4	evaluate the language and communication aspects of the topics	**K4**
CO5	create and produce various forms of communication, including professional documents like resumes and cover letters, debates	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UEN22GE02**			General English - 2						**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
CO4	2	2	3	2	3	3	2	3	2	3	**2.5**
CO5	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/Week	Credits
2	24UAI23CC03	**Core Course - 3:** Programming in Python	4	3

Course Objectives
To introduce Python's core concepts, including its features, syntax, data types, and basic operations.
To master flow control and functions in Python, including decision-making, loops, arguments, and recursion.
To comprehend Python modules, packages, namespaces, and file handling, including creation, importation, and directory management.
To grasp Python's object-oriented programming, including classes, objects, encapsulation, inheritance, and polymorphism.
To understand Python exception handling and master regular expressions for pattern matching and manipulation.

UNIT I: Introduction to Python **(12 Hours)**

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

UNIT II: Flow Control **(12 Hours)**

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

UNIT III: Modules and Packages **(12 Hours)**

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: Object-Oriented Programming **(12 Hours)**

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

UNIT V: Exception Handling **(12 Hours)**

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.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Book for Study

1. Josef, J. & Lal, S. P. (2016). *Introduction to Computing and Problem Solving with PYTHON*, Khanna Book Publishing Co.

Books for Reference

1. Vanderplas, J. (2016). *Python Data Science Handbook: Essential Tools for Working with Data*, O'Reilly Media.
2. Downey, A. B. *Think Python: How to Think Like a Computer Scientist*, (2nd Ed.). Updated for Python 3, Shroff/ O'Reilly Publishers.
3. van Rossum, G. & Drake, F. L. (2011). Jr, *An Introduction to Python – Revised and updated for Python 3.2*, Network Theory Ltd.

Websites and eLearning Sources

1. https://docs.python.org/3/tutorial
2. https://www.datacamp.com/community/tutorials/python-ooptutorial

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K- Level)**
CO1	recall the advanced features of Python.	**K1**
CO2	explain the Flow control, loops and recursive functions.	**K2**
CO3	make use of the modules and packages, including file handling.	**K3**
CO4	analyse data and perform Object oriented programming tasks.	**K4**
CO5	determine and build various Customization techniques using exception handling and utilize various inbuilt functions.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**24UAI23CC03**			**Core Course - 3:** Programming in Python					**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO5**	**PSO5**	
CO1	3	1	3	3	1	3	3	3	2	3	**2.5**
CO2	3	2	3	1	3	3	2	2	3	3	**2.5**
CO3	2	1	2	2	2	3	2	3	3	3	**2.3**
CO4	3	2	3	1	2	3	3	3	3	3	**2.6**
CO5	1	2	3	3	2	3	2	3	2	3	**2.4**
Mean Overall Score											**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	24UAI23CC04	**Core Course - 4:** Digital Computer Fundamentals	4	3

Course Objectives
To understand number systems, conversions, character codes and binary arithmetic operations.
To master and apply logic gates, Boolean algebra, and Karnaugh maps for simplification.
To grasp simple arithmetic and data processing circuits.
To master sequential logic design, including flip-flops, shift registers, and counters.
To understand various memory elements like RAM, ROM, magnetic storage, and cache.

UNIT I: Number Systems **(12 Hours)**

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: Logic Gates **(12 Hours)**

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: Simple Arithmetic Circuits **(12 Hours)**

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

UNIT IV: Sequential Logic Design **(12 Hours)**

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

UNIT V: Memory Elements **(12 Hours)**

RAM - static RAM - Dynamic RAM - ROM - Magnetic Disk memories - Magnetic tape - Cache Memory, Virtual Memory.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Books for Study

1. Leach, D. P., Malvino, A. P. & Saha, G. (2010). *Digital Principles and Application*, (7th Ed.). Tata McGraw-Hill Publishing Company Ltd.
   Unit I: Chapter 5 (5.1-5.8). Chapter 6 (6.1-6.6);
   Unit II: Chapter 2 (2.1- 2.3), Chapter 3(3.1-3.8);
   Unit III: Chapter 4 (4.1-4.6); Chapter 6 (6.7,6.8)
   Unit IV: Chapters 8 (8.1-8.5, 8.8), Chapter 9 (9.1-9.6), Chapter 10(10.1,10.3)
2. Bartee, T. C. (2010). *Computer Architecture and Logic Design*, McGraw Hill International Edition.
   Unit I: Chapter 2 (2.4, 2.5)
   Unit V: Chapter 6 (6.1, 6.6 - 6.9, 6.11, 6.17, 6.18)

Books for Reference

1. Kumar, V. (2006). *Digital Technology Principles and Practice*, New Age International.
2. Chakravorty, J. (2012). *Digital Electronics and Logic Design,* Universities Press.
3. John F Wakerly, J. F. (2008). *Digital Design: Principles and Practices*, Pearson Publication.

Website and eLearning Sources

1. https://onlinecourses.swayam2.ac.in/cec19_cs06/preview
2. https://onlinecourses.swayam2.ac.in/cec21_cs17/preview

Course Outcomes		
CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K - Level)
CO1	recall the fundamentals of digital logic and elements of a digital computer.	K1
CO2	demonstrate the logics of sequential and combinational circuits.	K2
CO3	solve the problems on logic circuits using digital logics.	K3
CO4	classify the digital logics of sequential and combinational circuits.	K4
CO5	interpret the functioning of logic circuits and memory elements.	K5

Relationship Matrix											
Semester	Course Code			Title of the Course					Hours		Credits
2	24UAI23CC04			Core Course - 4: Digital Computer Fundamentals					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	
CO1	3	3	2	1	2	3	3	2	1	2	2.2
CO2	3	3	2	2	2	3	3	3	2	2	2.5
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	3	3	3	1	3	3	3	3	1	2	2.5
CO5	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/Week	Credits
2	24UAI23CP02	**Core Practical - 2:** Programming in Python	3	2

List of Exercises

1. Variables, Constants, I/O statements
2. Operators
3. Conditional Statements, Loops and Jump Statements
4. Functions and Recursion
5. Lists, Tuples, Set, Dictionaries
6. Arrays and Strings
7. Modules and Packages
8. File Handling
9. Object Oriented Programming
10. Exception Handling

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UAI23AC02	**Allied Course - 2:** Statistical Methods	6	4

Course Objectives
To make students understand the concepts of probability, statistical measures and theoretical Distributions.
To apply probability and statistical measures concepts in real life problems.
To impart knowledge on coefficient of skewness and coefficient of correlation.
To interpret the relationship between variables.
To apply the theoretical distributions and discuss the expected results in real life problems.

UNIT I: Measures of Central Tendency (average) (18 Hours)

Arithmetic mean: Discrete series, Continuous series - Open end classes - Median: Discrete series, Continuous series - Quartiles - Mode: Discrete series, Continuous series

UNIT II: Dispersion and Skewness (18 Hours)

Concept of Variation - Methods of Measuring Dispersion: Range, Inter quartile range, Mean deviation, Standard deviation - Mean deviation: Individual series, Discrete series, Continuous series - Standard deviation: Individual series, Discrete series, Continuous series - Coefficient of variation - Skewness - Relative measure of skewness: Karl Pearson's coefficient of skewness

UNIT III: Correlation and Regression (18 Hours)

Correlation - Properties of coefficient of correlation - Karl Pearson's coefficient of correlation - Rank correlation coefficient - Regression: Regression of Y on X - Deviation taken from arithmetic mean of X on Y - Deviation Taken from assumed mean.

UNIT IV: Probability (18 Hours)

Mathematical Preliminaries - Permutation and Combination - Measurement of Probability - Bayes Theorem.

UNIT V: Theoretical Distribution (18 Hours)

Binominal distribution: Properties of Binominal distribution - Fitting a Binominal distribution - Poisson distribution: Fitting a Poisson distribution - Normal distribution.

Note: No derivations problems only.

Teaching Methodology	Chalk and Talk method, Problem solving

Book for Study

1. Pillai, R. S. N. & Bagavathi. (2009). *Statistics Theory and Practice*. (7th Ed.). S. Chand and Company Ltd.
   UNIT I: Chapter 9 (Pages 125-134,136-139,145-154,156-159, 166-172).
   UNIT II: Chapter 10 (Pages 241-268, 278-290), Chapter 11 (Pages 338-347)
   UNIT III: Chapter 12 (Pages 396-410,415-420), Chapter 13 (Pages 465-480)
   UNIT IV: Chapter 18 (Pages 726-759)
   UNIT V: Chapter 19 (Pages 769-800)

Books for Reference

1. Gupta, S. C. & Kapoor, V. K. (2002). *Fundamentals of Mathematical Statistics.* (11th Ed.). Sultan Chand & Sons.
2. Gupta, S. P. (2005). *Statistical method.* (33rd Ed.). Sultan Chand & Sons.
3. Vittal, P. R. (2004). *Mathematical Statistics.* Margham Publications.

4. Kapur, J. N. & Saxena, H. C. (2010). *Mathematical Statistics.*, (20th Ed.). S. Chand & Co Ltd.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	acquire knowledge of probability and statistical methods, theoretical distributions.	**K1**
CO2	understand the fundamental concepts of measures of central tendency, dispersion, correlation and theoretical distributions	**K2**
CO3	construct appropriate mathematical model to solve a variety of practical problems.	**K3**
CO4	accurate and efficient use of different methods such as measures of central tendency, dispersion, correlation and theoretical distributions	**K4**
CO5	demonstrate the competency in solving problems related to probability and statistics.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UAI23AC02**			**Allied Course - 2:** Statistical Methods						**6**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	2	1	3	3	2	2	3	**2.2**
CO2	2	3	2	1	2	3	3	2	2	3	**2.3**
CO3	1	2	3	2	3	2	3	2	3	2	**2.3**
CO4	1	2	2	3	1	2	3	2	2	3	**2.1**
CO5	1	2	2	2	3	1	3	2	2	3	**2.1**
										Mean Overall Score	**2.2 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHE24VE02	**Value Education - 2:** Fundamentals of Human Rights	2	1

Course Objectives
To sensitize students about various human rights and their importance
To empower them with the right understanding of human rights
To enable them to understand the Fundamental rights and the duties in the constitution of India
To help them comprehend the background, principles and the articles of UDHR
To make them involved in activities to defend human rights

UNIT I: Human Rights - An Introduction **(6 Hours)**

Introduction- Classification of Human Rights- Scope of Human Rights-Characteristics of Human Rights - 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- Preamble to Indian Constitution - 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 - NHRC - SHRC.

Teaching Methodology	Chalk and Talk, Power point, Handouts and Group discussion

Book for Study

1. Department of Human Excellence, (2021). *Techniques of Social Analysis: Fundamentals of Human Rights.*

Books for Reference

1. Venkatachalem. (2005). *The Constitution of India, Giri Law House.*
2. Naik, V. & Shany, M. (2011). *Human rights education and training*, Crescent Publishing Corporation.
3. Neera, B. (2011). *Human Rights Content and Extent.* Swastika Publications.

Websites and eLearning Sources

1. https://www.un.org/en/universal-declaration-human-rights/
2. https://www.ilo.org/global/lang--en/
3. https://www.amnesty.org/en/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Identify the importance and the values of human rights	**K1**
CO2	Understand the historical background and the development of Human Rights and the related organizations	**K2**
CO3	Apply the provisions of National and International human rights to themselves and the society	**K3**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UHE24VE02**			**Value Education - 2:** Fundamentals of Human Rights						**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO 2**	**PSO3**	**PSO 4**	**PSO5**	
CO1	3	2	1	2	2	3	2	2	2	2	**2.1**
CO2	3	2	1	2	2	3	2	2	2	2	**2.1**
CO3	3	2	2	2	2	2	3	2	1	2	**2.1**
										Mean Overall Score	**2.1 (Medium)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHE24AE01	**Ability Enhancement Compulsory Course - 2:** Environmental Studies	2	1

Course Objectives
To enable students connect themselves with nature
To Impart knowledge of the concept of Biodiversity
To create awareness of the causes and consequences of various pollution
To help them recognize the available natural resources and the need to sustain them
To enable them to Identify the environmental problems and offer alternatives by making interventions both individually and collectively

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.

Teaching Methodology	Chalk and Talk, Power point and Field visit

Book for Study

1. Department of Human Excellence, (2021). *Environmental Studies.*

Books for Reference

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

Websites and eLearning Sources

1. https://www.unep.org/
2. http://moef.gov.in/en/
3. https://www.ipcc.ch/reports/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	identify the concepts related to global ecology and the environment	**K1**
CO2	comprehend the natural resources and environmental organizations	**K2**
CO3	apply the acquired knowledge to sensitize individuals and public about the environmental crisis	**K3**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**							**Hours**		**Credits**
2	**23UHE24AE01**	**Ability Enhancement Compulsory Course - 2:** Environmental Studies							**2**		**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	1	2	2	3	2	2	2	2	**2.1**
CO2	3	2	1	2	2	3	2	2	2	2	**2.1**
CO3	3	2	2	2	2	2	3	2	1	2	**2.1**
Mean Overall Score											**2.1 (Medium)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	23UTA31GL03	General Tamil - 3	4	3

கற்றலின் நோக்கங்கள்
தனிப்பாடல்களின் பாடற்பொருளை அறிதல்
சிற்றிலக்கியங்களின் வகைகளையும் வகைமைகளையும் அறிதல்
இடைக்காலப் புலவர்களின் பங்களிப்பை உணர்தல்
சிற்றிலக்கியங்களின் பாடுபொருள், தனித்தன்மை, மரபு ஆகியவற்றை அறிதல்
சிற்றிலக்கியங்கள்வழி தமிழின் வளர்ச்சி நிலையை அறிதல்

அலகு – 1 ***(12 மணி நேரம்)***

ஔவையார்
காவிரியே தார்வேந்தன் (16) **கற்றது கைமண்ணளவு** *(39)* **மதியாதார் முற்றம்** *(42)*
இனியது கேட்கின் *(55)* **தாயொடு அறுசுவை** *(64)*
காளமேகப் புலவர் -
நஞ்சிருக்குத் தோலுரிக்கு நாதர்முடி*(4)* **ஓடுஞ் சுழிசுத்த முண்டமாகும்** *(16)*
அடிநந்தி சேர்தலால் ஆகம் *(22)* **செருப்புக்கு வீரரைச் சென்றுழக்கும்** *(52)*
துதிவாணி வீரம் *(80)*
இராமச்சந்திர கவிராயர் – **வஞ்சகர்பா னடந்தலைந்த** - *19*
பொற்களந்தைப் படிக்காசுத் தம்பிரான் – **குட்டுதற்கோபிள்ளைப் பாண்டிய** - *21*
தமிழ்விடுதூது,- கண்ணிகள் *19* **முதல்** *62* **வரை**
கலிங்கத்துப்பரணி -தேவியைப் பரவியது, பாடல் *121* **முதல்** *134* **வரை**

அலகு - 2 ***(12 மணி நேரம்)***

முக்கூடற்பள்ளு –நாட்டுப்படலம் பாடல்கள் *19* –முதல் *27* வரை
முத்துகுமாரசாமி பிள்ளைத்தமிழ் – அம்புலிப்பருவம் முதல் *5* பாடல்கள்
அறிஞர் அண்ணா – வேலைக்காரி நாடகம்

அலகு - 3 ***(12 மணி நேரம்)***

திருக்குற்றாலக்குறவஞ்சி – மலைவளம் *(6 பாடல்கள்)*
இலக்கியவரலாறு – சிற்றிலக்கியங்கள்
நற்றமிழ்க்கோவை கட்டுரைகள் *7, 8, 9*

அலகு - 4 ***(12 மணி நேரம்)***

தாயுமானவர் திருப்பாடல்கள் – பராபரக்கண்ணி *7* முதல் *30* வரை உள்ள கண்ணிகள்
இலக்கணம் – அணிகள்
குணங்குடி மஸ்தான் சாகிபு – குறை இரங்கி உரைத்தல் – *7* பாடல்கள்

அலகு – 5 ***(12 மணி நேரம்)***

திருவருட்பா – திருக்கதவம் திறத்தல்
இலக்கிய வரலாறு – இடைக்காலப் புலவர்கள், நாடகத்தமிழ்
நற்றமிழ்க்கோவை -கட்டுரைகள் – *10, 11, 12*

கற்பித்தல் முறை	**விரிவுரை** *(Lecture),* **காணொளிக் காட்சி** *(Videos),* **விளக்கக் காட்சி** *(PPT presentation)*

பாட நூல்கள்

1. தமிழாய்வுத்துறை *(2023).* பொதுத்தமிழ்-3, தூய வளனார் கல்லூரி
2. தமிழாய்வுத்துறை *(2021).* நற்றமிழ்க்கோவை, தூய வளனார் கல்லூரி

பார்வை நூல்கள்

1. செயராமன், ந.வீ. *(1967).* சிற்றிலக்கியச் செல்வம், மணிவாசகர் பதிப்பகம்
2. பொன்னுசாமி *(2023).* சிற்றிலக்கிய வரலாறு, இரண்டு தொகுதிகள்,பாரிநிலையம்
3. சண்முகம் பிள்ளை, மு. *(2022).* சிற்றிலக்கிய வகைகள், மணிவாசகர் பதிப்பகம்

Websites and eLearning Sources

1. https://ta.wikipedia.org/wiki/
2. https://www.britannica.com/science/Siddha-medicine
3. https://nischennai.org/main/siddha-medicine/

4. https://tamil.hindustantimes.com/
5. https://www.tamiluniversity.ac.in/english/library2-/digital-library/
6. https://www.tamilelibrary.org/
7. www.projectmadurai.or
8. http://www.tamilvu.org/ta/library-libcontnt-273141
9. https://www.tamildigitallibrary.in/
10. https://noolaham.org/

Course Outcomes		
CO No.	**CO-Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K - Level)**
CO1	***இடைக்காலப் புலவர்களின் பாட்டுதிதிறனை அறிந்து கொள்வர்***	**K1**
CO2	***சிற்றிலக்கிய வகைகளையும் வகைமைகளையும் அறிந்து கொள்வர்***	**K2**
CO3	***பள்ளு, பரணி, பிள்ளைத்தமிழ், குறவஞ்சி போன்ற இலக்கியங்கள் வழி வீரம், பக்தி, காதல் உணர்வை அறிந்து கொள்வர்***	**K3**
CO4	***சிற்றிலக்கியங்களின்அமைப்பு பாட்டு வடிவங்களை அறிந்து கொள்வர்***	**K4**
CO5	***இடைக்காலத் தமிழ் வளர்ச்சி நிலையை அறிந்து கொள்வர்***	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
3	**23UTA31GL03**			General Tamil - 3					**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**	
CO1	3	2	2	3	2	3	2	3	3	2	**2.5**
CO2	2	2	2	3	3	2	2	3	3	2	**2.4**
CO3	3	3	2	3	3	2	2	3	3	3	**2.7**
CO4	3	2	2	3	2	3	2	3	2	3	**2.5**
CO5	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/Week	Credits
3	23UFR31GL03	French - 3	4	3

Course Objectives
To analyse the French clothing with respect to its culture
To apply prepositions and understand its usages
To analyse a contemporary text in present tense
To evaluate the French festivals and compare with their own cultural context
To apply the past tense using simple conversation

UNIT I **(12 Hours)**

- TITRE: Vivre la ville
- 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: Félicitations! / 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

Teaching Methodology	PPT Presentation, Seminar, Video Assignments

Book for Study

1. Dauda, P., Giachino, L., & Baracco, C. (2016). *Generation A1*. Didier.

Books for Reference

1. Girardet, J., & Pecheur, J. (2017). *Echo A1*. (2nd Ed.). CLE International.
2. Mérieux, R., & Loiseau, Y. (2012). *Latitudes A1*. Didier.
3. Fournier, I. (2011). *Talk French.* Goyal Publishers.

Websites and eLearning Sources

1. https://francais.lingolia.com/en/grammar/prepositions
2. https://www.lawlessfrench.com/grammar/present-tense/
3. https://www.thoughtco.com/textures-french-adjectives-and-expressions-1368980
4. https://study.com/academy/lesson/past-tense-in-french.html
5. https://absolutely-french.eu/french-celebrations/?lang=en

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	relate colours, materials and shapes to the french clothing.	**K1**
CO2	select appropriate prepositions in giving directions.	**K2**
CO3	construct a text in present tense using different verbs.	**K3**
CO4	examine the travel manners and celebrations of the French.	**K4**
CO5	justify the usage of past tense in a biography.	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
3	**23UFR31GL03**		French - 3						**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	1	2	2	3	2	3	1	2	3	**2.1**
CO2	3	2	3	3	1	2	1	2	2	3	**2.2**
CO3	2	1	3	2	2	3	1	3	2	2	**2.1**
CO4	3	1	3	2	3	3	3	1	2	3	**2.4**
CO5	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/Week	Credits
3	23UHI31GL03	Hindi - 3	4	3

Course Objectives
To appreciate the features of Modern Hindi Prose
To understand the Hindi literature in association with the contemporary requirements
To enable the students to develop their effective communicative skills in Hindi
To strengthen the language competence among the students
To empower the students with globally employable soft skills

UNIT I **(12 Hours)**

- Tera Sneh Na Khooon
- Samband Bodak
- Reethikal - Namakarn
- Tense

UNIT II **(12 Hours)**

- Himadri Thung Sring Se
- Paribakshik Shabdavali
- Smuchaya 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
- Bahoo Ki Vidha (One Act Play)

Teaching Methodology	Videos, PPT, Quiz, Group Discussion, Case Based Problem Solving

Books for Study

1. Jain, S. K. (2019). *Anuwad: Siddhant Evam Vyavhar*. Kailash Pustak Sadan.
2. Gupth, K. M. (2020). *Hindi Vyakaran*, Anand Prakashan.
3. Bosalae, S. (2020). *kavya sarang*. Rajkamal Prakashan.

Books for Reference

1. Ramdev. (2016). *Vyakaran Pradeep*. Hindi Bhavan.
2. Singh, L. P. (2017). *Kavya Ke Sopan*. Bharathy Bhavan Prakashan.

3. Shukla, A. R. (2021). *Hindi Sahitya Ka Itihas*, Prabhat Prakashan.
4. Gosamy, K. (2016). *Anuvad vigyan ki Bhumika*. Rajkamal Prakashan.

Websites and eLearning Sources

1. https://www.hindwi.org/poets/jaishankar-prasad/all
2. https://youtu.be/e9wK-pYfVPc
3. https://www.amarujala.com/kavya/sahitya/sumitranandan-pant-best-hindi-poems
4. https://mycoaching.in/samuchchay-bodhak-kya-hai
5. https://www.subhshiv.in/2021/06/avikari-shabd.html

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will able to	**Cognitive Levels (K - Level)**
CO1	find out the dialects of Hindi language.	**K1**
CO2	compare the poems of Sumithra Nandanpanth, Prasad & Bachan in Context with their experience of life.	**K2**
CO3	illustrate the importance given to family ethics by the youth in the modern period according to “Bahoo Ki vidha” One Act play.	**K3**
CO4	categorize the poetics in some selective poems.	**K4**
CO5	justify the social & political conditions of Devotional period in Hindi Literature.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**				**Hours**			**Credits**
3	**23UHI31GL03**			Hindi - 3				**4**			**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	3	2	3	2	1	3	2	**2.4**
CO2	3	2	3	2	2	3	2	3	2	3	**2.5**
CO3	3	2	2	3	1	3	2	3	2	3	**2.4**
CO4	2	3	3	2	3	2	3	3	2	1	**2.4**
CO5	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/Week	Credits
3	23USA31GL03	Sanskrit - 3	4	3

Course Objectives
To introduce simple poetry in Sanskrit
To give an exposure to the Vedas and Vedangas
To acquaint students with epics and puranas
To train students in conjugation of verbs in future tense
To introduce Upasarga-s and their role in verb formations

UNIT I **(12 Hours)**

Ramodantam , Balakandam (1-15 verses)

UNIT II **(12 Hours)**

Ramodantam, Balakandam (15-30 verses)

UNIT III **(12 Hours)**

Vedas - Vedangas vivaranam

UNIT IV **(12 Hours)**

Asta dasha Purana and Dashopanishads

UNIT V **(12 Hours)**

Upasargas and Bhavishyat Kaalah Vakya Prayoga

Teaching Methodology	Videos, PPT, Blackboard, Demonstration, Exercises

Books for Study

1. Vedic literature
2. Ramodantam

Books for Reference

1. Parameshwara. (2018). *Ramodantam*. LIFCO.
2. Vadhyaran, R. S., & Sons. (2019). *History of Sanskrit Literature*, Book - Sellers and Publishers.
3. Kulapathy, K. M Saral *Sanskrit Balabodh, Bharathita vidya bhavan*, Munshimarg.

Websites and eLearning Sources

1. https://www.scribd.com/doc/210917188/Sri-Ramodantam-Sanskrit-Text-With-English-Translation
2. http://www.sushmajee.com/ms-ppp/text/ved-notes.pdf
3. https://occr.org.in/publication/Vedanga.pdf
4. https://www.forgottenbooks.com/en/download/TheThirteenPrincipalUpanishadsTranslatedFromtheSanskrit_10017247.pdf
5. https://www.learnsanskrit.org/guide/uninflected-words/the-upasarga/

Course Outcomes		
CO No.	CO-Statements On successful completion of this course, students will be able to	Cognitive Levels (K - Level)
CO1	remember Characters and events of Ramayana	K1
CO2	understand social ethics and moral duties.	K2
CO3	apply the values learnt, in day to day life	K3
CO4	appreciate the Vedic Philosophy	K4
CO5	evaluate and create new words with upasargas	K5

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
3	**23USA31GL03**			Sanskrit - 3						**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**	
CO1	1	2	2	3	3	3	3	3	2	1	2.3
CO2	3	3	2	3	3	2	2	3	3	3	2.7
CO3	3	3	1	3	3	1	1	3	3	3	2.4
CO4	2	2	1	2	3	2	2	3	2	1	2.0
CO5	3	3	2	3	2	2	3	3	3	2	2.6
Mean Overall Score											**2.4 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	23UEN32GE03	General English - 3	5	3

Course Objectives
To develop strategies to enhance reading skills through teacher-led practices, promoting comprehension, critical analysis, and creative engagement with various genres.
To strengthen informal and formal letter writing skills.
To analyze and appreciate different literary forms, including anecdotes, biographies, poems, and prose, fostering critical thinking and creative expression.
To practice applying grammatical structures, including the simple future and future continuous tenses, in writing tasks.
To engage in critical discussions through reading and writing about societal issues.

UNIT I: Suggestions to Develop Your Reading Habit **(13 Hours)**

1.0 Introduction
1.1 Objectives
1.2 Listening and Reading Skills through Teacher-led Reading Practice
1.3 Glossary
1.3.1 Words
1.3.2 Phrases
1.4 Reading Comprehension
1.5 Critical Analysis
1.6 Creative Task
1.7 General Writing Skill: Letter Writing: Informal
1.8 Grammar: Simple Present Tense

UNIT II: The Secret of Success: An Anecdote **(13 Hours)**

1.9 Introduction
2.0 Objectives
2.1 Listening and Reading Skills through Teacher-led Reading Practice
2.2 Glossary
2.3.1 Words
2.3.2 Phrases
2.4 Reading Comprehension
2.5 Critical Analysis
2.6 Creative Task
2.7 General Writing Skills: Letter Writing: Formal
2.8 Grammar: Present Continuous Tense

UNIT III: The Impact of Liquor Consumption on the Society **(13 Hours)**

2.9 Introduction
3.0 Objectives
3.1 Listening and Reading Skills through Teacher-led Reading Practice
3.2 Glossary
3.3.1 Words
3.3.2 Phrases
3.4 Reading Comprehension
3.5 Critical Analysis
3.6 Creative Task
3.7 General Writing Skills: Letter to Newspaper
3.8 Grammar: Simple Past Tense

UNIT IV: Dr. A.P.J. Abdul Kalam: A Short Biography **(12 Hours)**

3.9 Introduction
4.0 Objectives
4.1 Listening and Reading Skills through Teacher-led Reading Practice
4.2 Glossary
4.3.1 Words
4.3.2 Phrases
4.4 Reading Comprehension
4.5 Critical Analysis
4.6 Creative Task
4.7 General Writing Skill: Write a letter applying for a job
4.8 Grammar: Past Continuous Tense

UNIT V: Golden Rule: A Poem **(12 Hours)**

4.9 Introduction
5.0 Objectives
5.1 Listening and Reading Skills through Teacher-led Reading Practice
5.2 Glossary
5.3.1 Words
5.3.2 Phrases
5.4 Reading Comprehension
5.5 Critical Analysis
5.6 Creative Task
5.7 Grammar: Simple Future Tense
5.8 General Writing Skill: Circular-Writing

UNIT VI: Hygiene **(12 Hours)**

5.9 Introduction
6.0 Objectives
6.1 Listening and Reading Skills through Teacher-led Reading Practice
6.2 Glossary
6.3.1 Words
6.3.2 Phrases
6.4 Reading Comprehension
6.5 Critical Analysis
6.6 Creative Task
6.7 General Writing Skill: Writing an Agenda for a Meeting
6.8 Grammar: Future Continuous Tense

Teaching Methodology	Lecture Method, Use of ICT Tools and Interactive method

Book for Study

1. Jayraj., A. S. J., Francis, V. & Jayakanth. (2017). *Trend-Setter*: *An Interactive General English Textbook for Undergraduate Students*, (3rd Ed.) Trinity.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	recall and explain the fundamental components of English language and grammar.	**K1**
CO2	demonstrate their understanding of various texts by summarizing, paraphrasing, and interpreting the contents.	**K2**
CO3	apply their language and comprehension skills to create written communication.	**K3**
CO4	critically analyze the texts presented in the course.	**K4**
CO5	synthesize the language and grammar knowledge to compose creative tasks	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
3	**23UEN32GE03**			General English - 3						**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**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
CO4	2	2	3	2	3	3	2	3	2	3	**2.5**
CO5	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/Week	Credits
3	24UAI33CC05	**Core Course - 5:** R Programming	5	4

Course Objectives
To provide fundamental skills for R and S features, data manipulation, handling missing values, and performing input/output, subsetting, and date-time operations in R.
To introduce control structures, functions, and key R data structures, with an emphasis on vector operations, indexing, and manipulation, including arrays and matrices.
To focus on creating and manipulating lists and data frames, including indexing and applying functions on them
To explore the factors, tables, and matrix-like operations, as well as mathematical functions for probability, cumulative sums, and statistical distributions.
To introduce S3 and S4 classes, covering class creation, inheritance, and generic functions, along with visualization, simulation, and statistical data manipulation in R.

UNIT: Introduction **(15 Hours)**

Overview of R and S, Basic Features of R, Limitations of R, R Nuts and Bolts: Entering Input, Evaluation, R Objects, Numbers, Attributes- Creating Vectors, Mixing Objects, Explicit Coercion, Matrices, Lists-Factors, Missing Values, Data frames, Names. Accessing the Keyboard and Monitor, Getting Data, In and Out of R: Reading and Writing Data, Reading Data Files with read.table(), Reading in Larger Datasets with read.table, Examples for Reading and Writing Files, Calculating Memory Requirements for R Objects, Subsetting R Objects: Subsetting a Vector, Subsetting a Matrix, Subsetting Lists. Subsetting Nested Elements of a List, Extracting Multiple Elements of a List, Partial Matching, Removing NAValues. Dates and Times: Dates in R, Times in R, Operations of Dates and Times.

UNIT II: Control Structures and Vectors **(15 Hours)**

Arithmetic and Boolean Operators and Values, Control Structures - Functions: Introduction, Variable Scope, Default Arguments, Recursion, An Overview of String-Manipulation Functions, Preview of Some Important R Data Structures: Vectors, Character Strings, Matrices, Lists, Data Frames, Classes, Vectors: Scalars, Vectors, Arrays, and Matrices: Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors, Declarations, Recycling.

Common Vector Operations: Vector Arithmetic and Logical Operations, Vector Indexing, Generating Useful Vectors with the : Operator, Generating Vector Sequences with seq(), Repeating Vector Constants with rep().

Matrices and Arrays: Creating Matrices, General Matrix Operations, Applying Functions to Matrix Rows and Columns, Adding and Deleting Matrix Rows and Columns.

UNIT III: Lists and Data Frames **(15 Hours)**

Creating Lists, General List Operations: List Indexing Adding and Deleting List Elements, Getting the Size of a List, Extended Example Text Concordance, Accessing List Components and Values, Applying Functions to Lists, Recursive Lists, Data Frames: Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations.

UNIT IV: Factors and Tables **(15 Hours)**

Factors and Levels, Common Functions Used with Factors, Working with Tables, Other Factor and Table-Related Functions, Math Functions, Functions for Statistical Distributions, Sorting, Set Operations

UNIT V: OOPS **(15 Hours)**

S3 Classes: S3 Generic Functions, Example, Finding the Implementations of Generic Methods., Writing S3 Classes, Using Inheritance, S4 Classes, Writing S4 Classes, Implementing a Generic Function on an S4 Class, S3 Versus S4, Graphics, Visualization Using Graphs, Profiling R Code, Simulation, Statistical Analysis with R.

Teaching Methodology	Providing Hands on Sessions, Using OER's to supplement the teaching contents, Demonstrations by connecting R programming with s application

Books for Study

1. Peng, R. D. (2015). *R Programming for Data Science*, Leanpub Publisher.
   UNIT I: Pages: 4-8, 12-26, 36-42, 45-48
   UNIT II: Pages: 62-69
   UNIT V: Pages: 116-130.
2. Matloff, N. (2011). *The Art of R Programming- A Tour of Statistical Software Design*, First Edition, Kindle Edition, No Starch Press.
   UNI I: Chapter 10.1, 10.2.1, 10.2.2, 10.2.3, 10.2.6
   UNIT II: Chapters 1.3, 1.4, 2.1-2.4, 3.1-3.4, 7.2, 11.1
   UNIT III: Chapters 4, 5.1, 5.2
   UNIT IV: Chapters 6.1-6.4, 8.1-8.3, 8.5
   UNIT V: Chapter 9.1-9.3, 12

Book for Reference

1. Grolemund, G. & Wickham, H. (2014). *Hands-On Programming with R: Write Your Own Functions and Simulations*, (1st Ed.)..

Website and eLearning Sources

1. RStudio, http://www.rstudio.org/
2. StatET, http://www.walware.de/goto/statet/
3. ESS(EmacsSpeaks Statistics), http://ess.r-project.org
4. JGR(JavaGUIfor R), http://cran.r-project.org/web/packages/JGR/index.htm

Course Outcomes		
COs	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
CO1	recall R's purpose, basic syntax, data types, data handling, subsetting, installation, running scripts, and arithmetic/logical operations.	**K1**
CO2	identify R's control structures, functions, scoping rules, and data structures.	**K2**
CO3	apply list operations and data frame management in R, including indexing, creation, and access.	**K3**
CO4	evaluate factors, tables, matrix operations, and statistical functions in R, including mathematical and probability calculations.	**K4**
CO5	design S classes and generic functions, and apply visualization, simulation, and statistical analysis in R.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
3	**24UAI33CC05**			**Core Course - 5:** R Programming					**5**		**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	3	3	2	2	**2.7**
CO2	2	2	2	3	2	3	3	3	3	3	**2.6**
CO3	2	2	3	3	2	2	3	2	2	3	**2.4**
CO4	2	2	2	2	3	2	3	2	3	2	**2.3**
CO5	2	3	2	2	2	3	3	3	2	2	**2.4**
										Mean Overall Score	**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	24UAI33CC06	**Core Course - 6:** Database Systems: Relational and NoSQL	5	4

Course Objectives
To understand information systems, data management, SQL and NoSQL databases, and big data.
To grasp database modeling and design, including ER models, relational and graph implementations, and data architecture.
To comprehend database languages, including relational algebra, graph-based languages, and data protection.
To grasp data consistency, transaction concepts, and ACID vs. BASE.
To grasp data architecture, including processing, storage, query optimization, parallel processing, and NoSQL technologies.

UNIT: Data Management **(15 Hours)**

Information Systems and Data Databases – SQL Databases – Big Data – No SQL Databases – Organizing Data Management.

UNIT II: Data Modelling **(15 Hours)**

From Data Analysis to Database – The Entity-Relationship Model – Implementation in the Relational Model – Implementation in the Graph Model – Enterprise wide Data Architecture – Formula for Database Design.

UNIT III: Database Languages **(15 Hours)**

Interacting with Databases – Relational Algebra – Relationally Complete Languages – Graph based Languages – Embedded Languages – Handling NULL Values – Integrity Constraints – Data Protection Issues.

UNIT IV: Data Consistency **(15 Hours)**

Multi-user Operation – Transaction Concept – Consistency in Massive Distributed Data – Comparing ACID and BASE.

UNIT V: Database Architecture and NoSQL **(15 Hours)**

Processing of Homogeneous and Heterogeneous Data – Storage and Access Structure – Translation and Optimization of Relational Queries – Parallel Processing with MapReduce – Layered Architecture – Use of Different Storage Structures -NoSQL Databases: Development of Non-relational Technologies – Key-value stores – Column- Family Stores – Document Stores – XML Databases – Graph Databases.

Teaching Methodology	Providing Hands on Sessions, Using OER's to supplement the teaching contents, Demonstrations by connecting the database with a front-end application

Book for Study

1. Meier, A. & Kaufmann, M. (2019). *SQL & NoSQL Databases*, Springer.
   UNIT I **:** Chapter1 Unit II : Chapter2
   UNIT III : Chapter 3 Unit IV : Chapter 4
   UNIT V : Chapters 5&7

Books for Reference

1. Silberschatz, A., Henry, F. K. & Sudarshan. (2015). *Database System Concepts*, (6th Ed.). McGraw-Hill International Edition.
2. Elmasri, R. & Shamkant, B. N. (2016). *Fundamental of Database Systems*, (7th Ed.). Pearson.

3. Date, C. J., Kannan, A. & Swamynathan, S. (2016). *An Introduction to Database Systems*, (8th Ed.). Pearson Education Reprint.

Website and eLearning Source

1. https://www.geeksforgeeks.org/dbms/

Course Outcomes		
COs	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	define database models and database management skills.	**K1**
CO2	explain the applications of database models.	**K2**
CO3	experiment with various database languages.	**K3**
CO4	distinguish the ACID properties and data consistency.	**K4**
CO5	appraise and adopt the NoSQL databases for the recent technologies.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
3	**24UAI33CC06**			**Core Course - 6:** Database Systems: Relational and NoSQL					**5**		**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	2	3	1	3	3	2	3	2	**2.5**
CO2	3	2	3	2	2	3	3	2	3	3	**2.6**
CO3	1	2	3	3	3	2	3	2	2	2	**2.3**
CO4	1	2	1	1	3	2	3	2	3	3	**2.1**
CO5	1	2	1	1	2	3	3	2	2	3	**2**
										Mean Overall Score	**2.3 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	24UAI33CP03	**Core Practical - 3:** R Programming	3	2

List of Exercises

1. Descriptive statistics.
2. t-test.
3. Simple linear regression analysis.
4. Chi-square test on a contingency table to test for independence.
5. One-way ANOVA on a given dataset.
6. Two-sample t-test to compare means of two independent samples.
7. Non-parametric tests.
8. Analyze residuals from a regression model for assessing the model's adequacy.
9. Plotting various probability distributions.
10. Analysing a time series dataset

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	23UAI33AO01A	**Allied Optional - 1:** Applied Physics - 1	4	3

Course Objectives
To recall the basic concepts of electrostatics, electromagnetic induction, laser and fiber optic communication.
To understand the importance of coulomb's law and its application in electrostatics.
To explore the concept of electromagnetic induction using Faraday's and Lenz's laws.
To compare the different types of magnetic materials and their properties.
To categorize the different types of LASER and Optical Fibres used for various applications.

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 resistances - star delta transformation - Definition of electrostatic potential - potential difference - potential due to a point charge - Potentiometer - uses of potentiometer.

UNIT II: Electromagnetic Induction **(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.

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 - pumping - Ruby Laser - He-Ne Laser- Semiconductor Laser - Carbon di oxide 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 optic sensor - fibre materials - single mode fibres - multimode step index fibres - multimode graded index fibre - comparison - plastic clad fibres - all plastic fibres - Optical fibres as an optical wave guide - propagation modes in single mode fibres - monomode and multimode step index fibres - attenuation on optical fibres - Analog and Digital fibre communication system.

Teaching Methodology	Chalk and talk, Demo Videos, PPT, Handouts, Study materials

Books for Study

1. Sehgal, D. L., Chopra, K. L., & Sehgal N. K. (2004). *Electricity and Magnetism*, (6th Ed.). Sultan Chand & Sons.
2. Murugeshan, R., & Sivaprasath, K., (2016). *Optics and Spectroscopy*, (9th Ed.). S. Chand & Company Ltd.

Books for Reference

1. Tewari, K. K. (2003). *Electricity and magnetism*. S. Chand & Co Ltd.
2. Griffiths, D. J. *Introduction to electrodynamics*, (3rd Ed.). Prentice Hall of India Pvt. Ltd.

3. Halliday, D., Resnick, R., & Walker, J. (2015). *Fundamentals of Physics*, (10th Ed.). Wiley.

Websites and eLearning Sources*

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)

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	acquire Basic knowledge in the concepts of Electrostatics, Electromagnetic induction, Magnetic properties, LASER and Optical fiber.	**K1**
CO2	understand the problems on Electrostatics and Electromagnetic induction with moderate complexity by adopting the basic concepts	**K2**
CO3	apply the principle of electromagnetic induction in various suitable problems.	**K3**
CO4	analyze and explain the importance of LASER and Optical Fibre in society especially on technological applications.	**K4**
CO5	categorize the concepts and methods of laser, Holography and fibre optic communication.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
3	**23UAI33AO01A**			**Allied Optional - 1:** Applied Physics - 1						**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**	
CO1	3	2	2	3	1	3	3	3	2	1	2.3
CO2	3	3	2	2	1	3	3	2	2	1	2.2
CO3	3	3	2	2	1	3	3	3	2	1	2.3
CO4	3	3	2	2	1	3	3	3	2	1	2.3
CO5	3	2	2	2	1	3	3	3	2	1	2.2
										Mean Overall Score	**2.26 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	23UAI33AO01B	**Allied Optional - 1**: Principles of Electronics	4	3

Course Objectives
To introduce variety of semiconductor devices used in electronic circuits along with their operation.
To understand circuits used for interfacing with computer and their design.
To understand the concept of sensors and functionality of sensor systems.
To implement and realize sensor systems using commercially available sensor modules.
To Simulate any electronic circuits using Pspice and study their transfer characteristics.

UNIT I: Semiconductor Devices **(12 Hours)**

Introduction to semiconductor devices-diode-Bipolar Junction Transistor- Field effectTransistor-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).

Teaching Methodology	Chalk and Talk, PPT

Books for Study

1. Malvino, A., Bates, D., & Hoppe, P. (2015). *Electronic Principles,* (9th Ed.). McGraw Hill.
2. Mathivanan, N. (2007). *PC- Based Instrumentation: Concepts and Practice.* PHI Learning.
3. Tuinenga, P. W. (2015). *A guide to circuit simulation and Analysis using PSPICE.* Pearson Education.
4. *Material Prepared by the Department*

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

Books for Reference

1. Mottershead, A. (1979). *Electronic Devices and Circuits.* PHI Learning.
2. Sinclair, I. (2000). *Sensors and Transducers.* Newnes.
3. Rahid. (2005). *Introduction to PSPICE using ORCAD for Circuits and Electronics.* PHI Learning.

Website and eLearning Sources

1. https://onlinecourses.nptel.ac.in/noc23_ma94/preview

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will be able to	**Cognitive Levels (K-Level)**
CO1	classify and interpret the semiconductor devices	**K1**
CO2	demonstrate and analyze the functionalities of various Electronic circuits	**K2**
CO3	distinguish and evaluate various sensors	**K3**
CO4	compare and estimate the operations of integrated sensors	**K4**
CO5	design and develop Electronic circuits for different applications	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
3	**23UAI33AO01B**			**Allied Optional - 1**: Principles of Electronics						**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	2	1	2	2	2	3	3	2	2	**2.1**
CO2	3	3	2	3	2	3	3	3	2	2	**2.6**
CO3	2	3	2	2	2	3	2	3	2	3	**2.4**
CO4	3	3	2	3	2	3	3	2	2	3	**2.6**
CO5	3	3	2	3	2	3	3	2	2	3	**2.6**
										Mean Overall Score	**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	23UHE34VE03A	**Value Education - 3:** Social Ethics - 1	2	1

Course Objectives
To gain a comprehensive understanding of the principles advocated in social ethics.
To examine the different types of political systems in a thorough manner.
To comprehend the role and obligations of the educated youth.
To evaluate the conduct of the elected representatives in a detailed manner.
To thoughtfully analyze the various forms of cybercrime.

UNIT I: Introduction to Social Ethics **(6 Hours)**

Social ethics, social ethics and social responsibility, social ethics play an important role on the areas, religion influences social changes and vice versa, 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, Cybercrime, 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

Book for Study

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

Books for Reference

1. Arora, R. K. (2014). *Ethics, Integrity and Values*. Public Service Paperback.
2. Cunningham, D. (2004). *There's something happening here: The new left, the Klan, and FBI counterintelligence*. Berkeley: University of California Press.
3. Mali, P. (2017). *Cyber law & Cyber Crimes simplified*. Cyber Info media Paperback.
4. Richardson, M. (2019). *Cyber Crime: Law and Practice Hardcover - Import*.

Websites and eLearning Sources

1. https://cybercrime.gov.in/
2. https://open.lib.umn.edu/sociology/chapter/14-2-types-of-political-systems/

3. https://www.esv.org/resources/esv-global-study-bible/social-ethics/
4. https://en.wikipedia.org/wiki/Political_system

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	know the responsibility of the educated youth.	**K1**
CO2	understand the values prescribed under social ethics.	**K2**
CO3	apply their minds critically to the various types of cybercrime.	**K3**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
3	**23UHE34VE03A**			**Value Education - 3:** Social Ethics - 1						**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	2	2	3	3	**2.7**
CO2	3	2	2	2	3	2	2	3	2	2	**2.3**
CO3	2	3	3	3	2	3	3	3	3	3	**2.8**
										Mean Overall Score	**2.6 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	23UHE34VE03B	**Value Education - 3:** Religious Doctrine - 1	2	1

Course Objectives
To impart knowledge to students about Salvation History
To familiarize students with the life and mission of Jesus Christ
To help Students understand the Holy Spirit
To empower students on Gospel Values
To equip the students about Mother Mary

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: Gospel Values **(6 Hours)**

UNIT V: Mary, the Mother of God **(6 Hours)**

Teaching Methodology	Chalk and Talk, Power point, Assignment and Group discussion

Books for Study

1. Department of Human Excellence. (2022). *Fullness of Life.* St. Joseph's College, Tiruchirappalli.

Books for Reference

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

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	understand the Salvation History	**K1**
CO2	grasp to the life and purpose of Jesus Christ	**K2**
CO3	live out the teachings of the Gospel	**K3**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
3	**23UHE34VE03B**			**Value Education - 3:** Religious Doctrine - 1						**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	2	2	3	3	**2.7**
CO2	3	2	2	2	3	3	3	3	2	2	**2.5**
CO3	2	2	3	3	2	2	3	3	3	3	**2.6**
										Mean Overall Score	**2.6 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	23UTA41GL04B	General Tamil - 4: அறிவியல் தமிழ் (Scientific Tamil)	4	3

கற்றலின் நோக்கங்கள்
அன்றாட வாழ்வில் அறிவியலின் செல்வாக்கை அறிந்துகொள்ளுதல்
பண்டைத்தமிழர் வாழ்வில் இடம்பெற்ற அறிவியல்கூறுகளைக் கண்டறிதல்
அறிவியலின் வளர்நிலைகளையும் வகைப்பாடுகளையும் கண்டுணர்தல்
பண்டைத்தமிழரின் பல்துறைச் சிந்தனைகள்வழி தமிழர் தம் பண்பாட்டு மேன்மையை உணர்தல்
படைப்பாற்றல் திறனைக் கண்டறிந்து வளர்த்தெடுத்தல்

அலகு 1 **(12 மணி நேரம்)**

தொல்காப்பியம்: நிலம் தீ நீர் வளி விசும்போடு (தொல். பொருள் 635)

ஒன்றறிவதுவே (தொல். பொருள் 571)

புறநானூறு

மண் திணித்த நிலனும் (புறம் 2 1- 6) செஞ்ஞா யிற்றுச் செலவும் (புறம் 30 1- 7)

அகநானூறு

அம்ம வாழி, தோழி (அகம் 141: 1-11) செஞ்ஞா யிற்றுச் செலவும் (புறம் 30 1-7)

பதிற்றுப்பத்து

நிலம் நீர் வளி விசும்பு என்ற நான்கின் (பதிற்று 14:1-4)

நெடுவயின் ஒளிறு மின்னுப் பரந்தாங்கு (பதிற்று 24:1-26)

உரைநடைக்கட்டுரை: வியக்க வைக்கும் தமிழரின் அறிவியல்

அலகு 2 **(12 மணி நேரம்)**

சித்தர் பாடல்கள்

பதார்த்த சிந்தாமணி

குளத்து சலந்தானே கொடிதான (27) ஏரிசலம் வாதமிகு மதுவே (31)

அருவிநீர் மேக மகற்றுங் (39) மேவிய சீவன் வடிவது சொல்லிடில் (திருமூலர்)

அணுவில் அணுவினை ஆதிபிரானை (திருமூலர்)

நட்டகல்லைத் தெய்வமென்று (சிவவாக்கியர்)

உரைநடைக்கட்டுரை: தமிழர்களின் மருத்துவ அறிவியல்

அலகு 3 **(12 மணி நேரம்)**

திருக்குறள் (2 அதிகாரங்கள்)

வான் சிறப்பு, மருந்து வலைப்பூக்கள் உருவாக்கல், பராமரித்தல் புதிய அறிவியல் கலைச்சொல்லாக்கங்களை உருவாக்குதல்

உரைநடைக்கட்டுரை: தமிழ் இலக்கியங்களில் வெளிப்படும் நீர் மேலாண்மையியல்

அலகு 4 **(12 மணி நேரம்)**

புதினம்: சொர்க்கத்தீவு - சுஜாதா நூல் - திறனாய்வு அறிவியல் புனைவு

ஆவணப்படம், திரைப்படம் - திறனாய்வு

உரைநடைக்கட்டுரை: தமிழில் அறிவியல் புனைவுகள்

அலகு 5 **(12 மணி நேரம்)**

அறிவியல்; கலைச்சொற்கள் அன்றாட வாழ்வில் அறிவியல் பழமொழிகளைத் தொகுத்தல் மூலிகைகள், கீரைகள் ஆகியவற்றின் முக்கியத்துவத்தைக் காட்சிப்படுத்துதல். தமிழர் அறிவியல் கண்காட்சி நடத்துதல்

உரைநடைக்கட்டுரை: அறிவியல் தமிழின் வளர்ச்சி நிலைகள்;

கற்பித்தல் முறை	விரிவுரை (Lecture), காணொளிக் காட்சி (Videos), விளக்கக் காட்சி (PPT presentation)

பாட நூல்கள்

1. தமிழாய்வுத்துறை (2021). அறிவியல் தமிழ் , தூய வளனார் தன்னாட்சிக் கல்லூரி
2. சுஜாதா. (2009). சொர்க்கத்தீவு, லிசா பப்ளிகேஷன்ஸ்,
3. மூர்த்தி, அ.கி. (2001). அறிவியல் கலைச்சொல் அகராதி, மணிவாசகர் பதிப்பகம்.

பார்வை நூல்கள்

1. நெடுஞ்செழியன். (2017). இன்னும் மீதமிருக்கிறது நம்பிக்கை, பூவுலகின் நண்பர்கள் வெளியீடு
2. குழந்தைசாமி, வா. செ. (2001). அறிவியல்தமிழ், பாரதி பதிப்பகம்

Websites and eLearning Sources

1. www.tamilvu.org
2. www.tamildigitallibrary.in
3. https://www.tamiluniversity.ac.in/english/library2-/digital-library/
4. https://www.tamilelibrary.org/

Course Outcomes		
CO No.	**CO-Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K - Level)**
CO1	*பண்டைய தமிழர்களின்; அறிவியல் அறிவை அறிந்து கொள்வர்.*	**K1**
CO2	*பண்டைய தமிழ் இலக்கியங்களுள் காணாலும் அறிவியல் சிந்தனைகளைப் புரிந்துகொள்வர்.*	**K2**
CO3	*தமிழரின் அறிவியல் மருத்துவத்தையும், நீர் மேலாண்;மை அறிவையும் அறிந்து கொள்வர்.*	**K3**
CO4	*இக்கால இலக்கியங்களுள் அறிவியல்துறை பெற்றுள்ள இடத்தை அறிந்து கொள்வர்.*	**K4**
CO5	*அறிவியல் கலைச்சொற்களைத் தமிழில் கற்றுக் கொண்டு அறிவியல்தமிழ் வளரத் துணைபுரிவர்.*	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
4	**23UTA41GL04B**			**General Tamil - 4 *அறிவியல் தமிழ்* (Scientific Tamil)**						**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**	
CO1	1	2	3	2	2	3	3	2	2	2	**2.2**
CO2	2	2	3	2	2	2	3	2	3	2	**2.3**
CO3	1	2	2	3	2	2	2	3	3	3	**2.3**
CO4	2	2	3	2	2	3	2	3	3	2	**2.4**
CO5	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/Week	Credits
4	23UFR41GL04	French - 4	4	3

Course Objectives
To analyse the French clothing with respect to its culture
To apply prepositions and understand its usages
To analyse a contemporary text in present tense
To evaluate the French festivals and compare with their own cultural context
To apply the past tense using simple conversation

UNIT I **(12 Hours)**

- TITRE: On fait le mélange!
- GRAMMAIRE : le présent progressif, les pronoms possessifs, la phrase négative
- LEXIQUE : décrire les étapes d'une action, la maison, les taches ménagères
- PRODUCTION ORALE : comprendre le récit d'un voyage
- PRODUCTION ECRITE : raconter ses actions quotidiennes

UNIT II **(12 Hours)**

- TITRE: à 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 passées, le corps humain : extérieur, le corps humain : intérieur
- PRODUCTION ORALE : échanger sur ses projets de vacances
- PRODUCTION ECRITE : raconter un souvenir

UNIT IV **(12 Hours)**

- TITRE: Accidents et catastrophes
- GRAMMAIRE : les adjectifs et les pronoms indéfinis : rien/ personne/aucun, les verbes dire, courir et mourir
- LEXIQUE : savoir les mots et les expressions des catastrophes naturelles, les maladies et les remédies, les accidents, les catastrophes naturelles
- PRODUCTION ORALE : comprendre des personnes qui expriment leur accord ou leur désaccord selon un thème donné
- PRODUCTION ECRITE : écrivez sur une catastrophe naturelle en articulant la cause et la conséquence

UNIT V **(12 Hours)**

- TITRE: Faire ses études a l'étranger/ bon voyage/ la météo
- 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, la météo
- PRODUCTION ORALE : exprimer son opinion sur la météo/parler de l'avenir
- PRODUCTION ECRITE: comparer le système scolaire français et indien

Teaching Methodology	Workshop, group activity, Sharing contemporary french cultural videos

Book for Study

1. Dauda, P., Giachino, L., & Baracco, C. (2016). *Generation A1*. Didier.

Books for Reference

1. Girardet, J., & Pecheur, J. (2017). *Echo A1*. (2nd Ed.). CLE International.
2. Mérieux, R., & Loiseau, Y. (2012). *Latitudes A1*. Didier.
3. Fournier, I. (2011). *Talk French.* Goyal Publishers.

Websites and eLearning Sources

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

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	recall the vocabulary pertaining to dwelling place.	**K1**
CO2	outline crisis management in France.	**K2**
CO3	develop a travel diary of your own.	**K3**
CO4	simplify the French education system.	**K4**
CO5	interpret past tenses in a text.	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
4	**23UFR41GL04**		French - 4						**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	1	3	2	2	3	2	1	2	2	**2.1**
CO2	3	1	2	3	3	3	2	1	3	1	**2.2**
CO3	3	2	3	2	2	3	2	1	3	2	**2.3**
CO4	3	1	2	2	3	3	3	1	3	3	**2.4**
CO5	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/Week	Credits
4	23UHI41GL04	Hindi - 4	4	3

Course Objectives
To strengthen the language competence among the students
To equip students with cinematic perspective by comparative studies of Hindi literature
To enable the students to develop their effective communicative skills in Hindi
To strengthen the language competence among the students
To incept research-oriented aspirations among students

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

Teaching Methodology	Debate Participation, Videos, PPT, Quiz, Project Work

Books for Study

1. Bosalae, S. (2020). *kavya sarang*. Rajkamal Prakashan.
2. Gupth, M. K. (2020). *Hindi Vyakaran*. Anand Prakashan.
3. Jain, S. K. (2019). *Anuwad: Siddhant Evam Vyavhar*. Kailash Pustak Sadan.

Books for Reference

1. Chaturvedi, R. P. (2015). *Hindi vyakarana*. Upakar Prakashan.
2. Ramdev. (2016). *Vyakaran Pradeep*. Hindi Bhavan.
3. Gosamy, K. (2016). *Anuvad vigyan ki Bhumika*. Rajkamal Prakashan.
4. Shukla, A. R (2021). *Hindi Sahitya Ka Itihas*, Prabhat Prakashan.

Websites and eLearning Sources

1. https://youtu.be/xmr-DaQ3LhA
2. https://mycoaching.in/adhunik-kaal
3. https://m.sahityakunj.net/entries/view/bhartiya-sahitya-mein-anuvad-kee-bhoomika
4. https://mycoaching.in/upsarg-in-hindi
5. https://kalingaliteraryfestival.com/speakers/mamta-kalia/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will able to	**Cognitive Levels (K - Level)**
CO1	list out the social conditions prevailed in Modern Period which are depicted in Hindi Literature.	**K1**
CO2	discuss the dialects of Hindi language.	**K2**
CO3	illustrate the works of some eminent Hindi Writers related to society.	**K3**
CO4	analyze the human values expressed in life and literature of Hindi Novelist “Mamatha Kaliyah”.	**K4**
CO5	evaluate the film & Literary works in Hindi.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
4	**23UHI41GL04**			Hindi - 4					**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	3	3	2	3	2	3	1	2.4
CO2	3	2	3	3	2	3	2	3	1	2	2.4
CO3	3	2	2	3	2	2	1	3	2	3	2.3
CO4	3	2	3	1	3	3	2	3	3	2	2.5
CO5	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/Week	Credits
4	23USA41GL04	Sanskrit - 4	4	3

Course Objectives
To give an exposure to Sanskrit drama in general
To showcase the structure of pre-kalidasan plays in Sanskrit
To coach students in Sanskrit morphology
To acquaint students with the structures of Sanskrit syntax
To impart communicative skills in Sanskrit by training in the functional aspects of the language

UNIT I **(12 Hours)**

Samskrita Vyavahara sahasri vakiya Prayogaha

UNIT II **(12 Hours)**

Lot Lakaarah, Prayaogh Kartari Vaakyaani

UNIT III **(12 Hours)**

Naatakasya Itihaasah Vivaranam, Thuva and Tum Suffixs

UNIT IV **(12 Hours)**

Karnabhaaram , Naatakasya Visistyam

UNIT V **(12 Hours)**

Samskrita Racanani Vubhavoga

Teaching Methodology	Videos, PPt, Blackboard, Demonstration, Exercises

Books for Study

1. *Karnabhavam & Literature Language*
2. *Dhaatu Manjari*
3. Samskrita Vyavahara Sahasri (*A Collection of One Thousand Sentances*), Samskrita Bharati, Delhi.

Books for Reference

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

Websites and eLearning Sources

1. https://sanskritdocuments.org/doc_z_misc_major_works/daily.pdf
2. https://www.learnsanskrit.org/guide/verbs-1/karmani-and-bhave-prayoga/
3. https://ia902903.us.archive.org/7/items/in.ernet.dli.2015.102820/2015.102820.The-Sanskrit-Drama-In-Its-Origin-Development-Theory-And-Practice.pdf
4. https://archive.org/details/oafI_karna-bharam-karnas-burden-of-bhasa-with-dr.-sudhakar-malaviya-gokuldas-sanskrit
5. https://sanskritwisdom.com/composition/essays/sanskrit-language/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	understand human behaviors by studying dramas	**K1**
CO2	remember and identifying Mahabharata characters and events	**K2**
CO3	apply the morals learnt in day to day life	**K3**
CO4	appreciate ancient Sanskrit dramas	**K4**
CO5	create new conversational sentences and to Improve self-character (Personality Development)	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
4	**23USA41GL04**			Sanskrit - 4					**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**	
CO1	2	2	2	2	3	3	3	3	3	2	**2.4**
CO2	2	2	3	3	2	3	2	3	3	2	**2.5**
CO3	3	3	2	3	2	1	1	3	3	3	**2.4**
CO4	2	2	3	2	3	3	3	3	2	3	**2.6**
CO5	2	3	3	3	2	1	3	3	3	2	**2.5**
										Mean Overall Score	**2.48 (High)**

Semester	Course Code	Title of the Course	Hours/week	Credits
4	23UEN42GE04	General English - 4	5	3

Course Objectives
To develop and enhance language proficiency in listening, reading, and writing skills through teacher-led reading practice, and comprehension exercises.
To encourage creative thinking through creative tasks and essay writing.
To foster effective communication skills by engaging in tasks that require note-taking, note-making, précis writing, paragraph writing, and the synthesis of information from different sources.
To strengthen grammatical skills by focusing on the application of different tenses and to emphasise grammatical accuracy in various writing tasks.
To encourage students to critically engage with media content and evaluate information.

UNIT I: Women Through the Eyes of Media **(13 Hours)**

1.0 Introduction
1.1 Objectives
1.2 Listening and Reading Skills through Teacher-led Reading Practice
1.3 Glossary
1.3.1 Words
1.3.2 Phrases
1.4 Reading Comprehension
1.5 Critical Analysis
1.6 Creative Task
1.7 General Writing Skill: Writing Minutes of a Meeting
1.8 Grammar: Present Perfect Tense

UNIT II: Effects of Tobacco Smoking **(13 Hours)**

1.9 Introduction
2.0 Objectives
2.1 Listening and Reading Skills through Teacher-led Reading Practice
2.2 Glossary
2.3.1 Words
2.3.2 Phrases
2.4 Reading Comprehension
2.5 Critical Analysis
2.6 Creative Task
2.7 General Writing Skill: Note-Taking
2.8 Grammar: Present Perfect Continuous Tense

UNIT III: Short Message Service (SMS) **(13 Hours)**

2.9 Introduction
3.0 Objectives
3.1 Listening and Reading Skills through Teacher-led Reading Practice
3.2 Glossary
3.3.1 Words
3.3.2 Phrases
3.4 Reading Comprehension
3.5 Critical Analysis
3.6 Creative Task
3.7 General Writing Skill: Note-Making
3.8 Grammar: Past Perfect Tense

UNIT IV: An Engineer Kills Self as Crow Sat on his Head: A Newspaper Report (12 Hours)

3.9 Introduction
4.0 Objectives
4.1 Listening and Reading Skills through Teacher-led Reading Practice
4.2 Glossary
4.3.1 Words
4.3.2 Phrases
4.4 Reading Comprehension
4.5. Critical Analysis
4.6. Creative Task
4.7 General Writing Skill: Précis Writing
4.8 Grammar: Past Perfect Continuous Tense

UNIT V: Traffic Rules (12 Hours)

4.9 Introduction
5.0 Objectives
5.1 Listening and Reading Skills through Teacher-led Reading Practice
5.2 Glossary
5.3.1 Words
5.3.2 Phrases
5.4 Reading Comprehension
5.5 Critical Analysis
5.6 Creative Task
5.7 General Writing Skill: Paragraph Writing
5.8 Grammar: Future Perfect Tense

UNIT VI: A Handful of Answers: A Zen Tale (12 Hours)

5.9 Introduction
6.0 Objectives
6.1 Listening and Reading Skills through Teacher-led Reading Practice
6.2 Glossary
6.3.1 Words
6.3.2 Phrases
6.4 Reading Comprehension
6.5 Critical Analysis
6.6 Creative Task
6.7 General Writing Skill: Writing Short Essays on Current Issues/General Topics
6.8 Grammar: Future Perfect Continuous Tense

Teaching Methodology	Lecture Method, Use of ICT Tools and Interactive method

Book for Study

1. Jayraj, A. S. J., Francis, V. & Jayakanth. (2016). *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*. Trinity.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	identify and explain key concepts and topics discussed in the course.	**K1**
CO2	understand the content by summarising, paraphrasing, and interpreting the materials presented.	**K2**
CO3	apply their knowledge to create various forms of written communication, such as meeting minutes, notes, précis, paragraphs, and essays.	**K3**
CO4	analyse the application of different tenses in various texts.	**K4**
CO5	synthesise their knowledge by creating creative tasks, including short essays on current issues and general topics	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
4	**23UEN42GE04**			**General English - 4**					**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**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
CO4	2	2	3	2	3	3	2	3	2	3	**2.5**
CO5	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/Week	Credits
4	24UAI43CC07	**Core Course - 7:** Introduction to Artificial Intelligence	5	4

Course Objectives
To grasp AI fundamentals: goals, techniques, sub-fields, and knowledge representation.
To understand knowledge in AI and grasp propositional and first-order logic, including syntax, semantics, and resolution.
To explore taxonomic reasoning, ontologies, situation calculus, and non-monotonic reasoning.
To grasp robotics hardware, perception, movement planning, software, applications, and 3D imaging.
To understand weak and strong AI, ethical considerations, future developments, and agent components and architectures.

UNIT I: AI Introduction **(15 Hours)**

The Turing Test - Goals of AI - Roots of AI - Artificial Consciousness - Techniques Used in AI - Subfields of AI - Perception, Understanding, and Action - Physical Symbol System Hypothesis - Considerations for Knowledge Representation - Knowledge Representation Using Natural Language.

UNIT II: Logic and Reasoning Patterns **(15 Hours)**

Role of Knowledge - Propositional Logic - Reasoning Patterns. First Order Predicate Logic: Introduction - Representation in Predicate Logic - Syntax and Semantics - Conversion to Clausal Form - Substitutions and Unification - Resolution Principle - Complexity of Resolution Proof - Interpretation and Inferences - Most General Unifiers - Unfounded Sets.

UNIT III: Real-World Knowledge Representation and Reasoning **(15 Hours)**

Introduction - Taxonomic Reasoning - Techniques for Common Sense Reasoning – Ontologies - Ontology Structures - Reasoning Using Ontologies - Ontological Engineering - Situation Calculus – Non monotonic Reasoning - Default Reasoning.

UNIT IV: Robotics **(15 Hours)**

Introduction - Robot Hardware - Robotic Perception - Planning to Move - Planning Uncertain Movements – Moving - Robotic Software Architectures - Application Domains. Perception: Image Formation - Early Image-Processing Operations - Reconstructing the 3D World.

UNIT V: Philosophical Foundations **(15 Hours)**

Weak AI: Can Machines Act Intelligently? - Strong AI: Can Machines Really Think? - The Ethics and Risks of Developing Artificial Intelligence - Summary, Bibliographical and Historical Notes, Exercises. AI: The Present and Future: Agent Components - Agent Architectures.

Books for Study

1. Chowdhary, K. R. (2016). *Fundamentals of Artificial Intelligence,* Springer Nature India Pvt.
   Unit I **:** Chapter 1
   Unit II **:** Chapters 2,3
   Unit III: Chapter 6
2. Russell, S. & Norvig, P. (2010). *Artificial Intelligence: A Modern Approach,* (3rd Ed.). Prentice-Hall, Inc.
   Unit IV: *Chapters 24 (24.1, 24.2, 24.4), Chapters 25*
   Unit V**:** *Chapters 26, 27(27.1, 27.2)*

Books for Reference

1. Seshadri, S. (2017). *A first course in Artificial Intelligence and Agent Technology*, (1st Ed.). Lap Lambert Academic Publishing.
2. Ertel, W. (2017). *Introduction to Artificial Intelligence*, Springer.
3. Knight, K., Rich, E. & Nair, S. B. (2017). *Artificial Intelligence,*, McGraw Hill Education.

Websites and eLearning Sources

1. Henry Patrick Winston, "*Artificial Intelligence*", MIT Open Courseware: https://ocw.mit.edu/courses/6-034-artificial-intelligence-fall-20
2. Introduction to Artificial Intelligence: https://nptel.ac.in/courses/106106140/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	define the basic principles, models, and algorithms of Artificial Intelligence.	**K1**
CO2	understand knowledge representation, reasoning, and machine learning techniques to real-world problems.	**K2**
CO3	choose appropriate Artificial Intelligence functions.	**K3**
CO4	identify the components involved in intelligent systems such as Robotic Perception, Image-Processing Operations to create optimal models.	**K4**
CO5	evaluate Artificial Intelligence with Human Intelligence and Traditional Information Processing.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
4	**24UAI43CC07**			**Core Course - 7:** Introduction to Artificial Intelligence					**5**		**4**
COs	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	2	3	3	3	3	3	2	**2.8**
CO2	3	3	3	2	2	3	3	3	3	3	**2.9**
CO3	2	3	3	3	2	3	3	2	2	2	**2.5**
CO4	3	3	3	3	3	2	2	3	3	3	**2.8**
CO5	3	3	2	3	2	3	3	3	2	3	**2.7**
										Mean Overall Score	**2.7 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	24UAI43CC08	**Core Course - 8:** Web Design and Development	5	4

Course Objectives
To understand HTTP, HTML basics, web servers and PHP integration with HTML.
To master PHP essentials: expressions, operators, conditionals, looping, casting, dynamic linking, strings, arrays, and array functions.
To comprehend PHP function handling: passing arguments, returning data, nesting functions, and practical uses for date/time, file handling, and web data interactions.
To understand PHP server variables, HTTP headers, data validation, client-side validation, and JavaScript expressions and control flow.
To create and manage a MySQL database: tables, data operations, error handling, sessions, cookies. Manipulate images: upload, convert file types, validate user input.

UNIT I: Introduction to Dynamic Web Content (15 Hours)

HTTP and HTML: Basics -The Request/Response Procedure -The Apache Web Server - What Is a WAMP, MAMP, or LAMP -Installing AMPPS on Windows Introduction to PHP: Incorporating PHP Within HTML - The Structure of PHP.

UNIT II: Expressions and Control Flow in PHP (15 Hours)

Expression -Operator – Conditionals -Looping -Implicit and Explicit Casting -PHP Dynamic Linking ESSENTIAL PHP: Creating your Development Environment- Mixing HTML and PHP - Command Line.PHP Strings and Arrays: String Function - Modifying Data in an Array -Deleting Array Elements - Array with Loops - PHP Array Functions – Sorting Array - Splitting Array - Merging Array.

UNIT III: Functions and Web Controls (15 Hours)

Passing Function - Passing Arrays to Function - Passing by Reference - Using Default Arguments - Passing Variable Numbers of Argument - Returning Data from Function – Nesting Functions. Practical PHP: Date and Time Functions - File Handling - System Calls Reading Data in Web Pages: Setting up Web Pages to communicate with PHP - Text field - Checkbox - Radio Button - Password Controls – List Boxes -Button - Hidden Control - File Upload.

UNIT IV: JavaScript (15 Hours)

PHP's Server Variables - HTTP Header - Getting the User's Browser Type - HTTP Header - Data Validation - Client-Side Data Validation. Expressions and Control Flow in Javascript: Expressions - Literals and Variables – Operators -Validating User Input with JavaScript - Regular Expressions- JavaScript Functions - JavaScript Arrays- Validating User Input with JavaScript.

UNIT V: Working with Database (15 Hours)

Creating a MYSQL Database – Creating a New Table – Putting Data into the New Database – Accessing the Database –Update data into the Database– Insert data into the Database – Delete data from Database– Handling and Avoiding Errors – Session and Cookies. Manipulating and Creating Images: Upload Images – Converting Image Files Types- Validating User Input.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions.

Book for Study

1. Nixon, R. (2018). *Learning PHP, MYSQL & JavaScript*, (5th Ed.). O'Reilly.

   Unit I: Chapters 1, 2, 3
   Unit II: Chapter 4
   Unit III: Chapter 7
   Unit IV: Chapters 14 and 16
   Unit V: Chapters 10 and 12

Books for References

1. Holzner, S. (2017). *PHP: The Complete Reference*, McGraw-Hill Education.
2. McPeak, J. & Wilton, P. (2015). *Beginning JavaScript*, (5th Ed.). John Wiley & Sons, Inc.

Websites and eLearning Sources

1. php.net/manual/en/intro-whatis.php
2. https://teamtreehouse.com/tracks/beginning-php

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
CO1	understand the PHP basic syntax for variable types, structures and controls.	**K1**
CO2	identify the appropriate programming environment for developing dynamic client-side and server-side web applications.	**K2**
CO3	classify the tools to create dynamic website.	**K3**
CO4	distinguish the various existing libraries for developing real-time applications.	**K4**
CO5	build Dynamic web sites using server-side PHP Programming and Database connectivity.	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**							**Hours**	**Credits**
4	**24UAI43CC08**		**Core Course - 8:** Web Design and Development							**5**	**4**
COs	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**Mean Score of COs**
CO1	3	2	2	3	2	3	3	2	3	3	**2.6**
CO2	2	2	3	3	2	2	3	2	2	3	**2.4**
CO3	2	3	3	2	3	2	2	3	3	2	**2.5**
CO4	3	2	2	3	2	3	2	2	3	2	**2.4**
CO5	2	3	3	2	2	2	2	3	2	3	**2.4**
Mean Overall Score											**2.46 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	24UAI43CP04	**Core Practical - 4:** Artificial Intelligence	3	2

List of Exercises

1. Hill Climbing problem
2. Towers of Hanoi problem
3. Missionaries and Cannibals problem
4. 8 queens problem
5. A* Algorithm
6. Breadth first algorithm
7. Depth first algorithm
8. Predicate Logic

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	23UAI43AO02A	**Allied Optional - 2:** Applied Physics - 2	4	3

Course Objectives
To know the basic concepts of diodes, transistors, amplifiers, oscillators and Microprocessors.
To understand the functioning of operational amplifiers and modulation and demodulation.
To explore the transistors actions, types of oscillatory circuit, properties of amplifiers.
To compare and contrast between various types of operational amplifiers and learn different instructions set used in Intel 8085.
To construct and experiment the transistor connections, Hartley and Colpitts oscillators.

UNIT I: Diode and Transistor **(12 Hours)**

PN junction - properties - VI characteristics - Zener diode - Equivalent circuit of Zener diode -Voltage stabilizer - Transistor - transistor action - symbols - transistor connections (CB, CE) -Comparison of transistor connections.

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 - Sinusoidal oscillator - types - oscillatory circuit - Barkhausen criterion - Hartley and Colpitt's oscillator - transistor crystal oscillator.

UNIT III: Operational Amplifier **(12 Hours)**

Operational amplifier - basic circuit of differential amplifier - operation - CMRR - Properties of operational amplifier - Inverting amplifier - non-inverting 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)**

Microprocessor Architecture: Intel 8085 - Block Diagram - ALU - Registers - Buses - Pin Configuration - Instruction Word Size - Instruction cycle - Timing Diagram - Addressing Modes - Stack & Subroutines - Interrupts of 8085 - Assembly Language Programs (ALP): Addition & subtraction of 8-bit data, multiplication and division program.

Teaching Methodology	Chalk and talk, Demo Videos, PPT, Handouts, Study materials

Books for Study

1. Mehta, M. R. V. K. (2021). *Principles of Electronics*, (12th Ed.). S. Chand & Company.
2. Ram, B. (2010). *Fundamentals of Microprocessor and Microcomputers*, (7th Ed.). Dhanapat Rai Publications.

UNIT	BOOK	CHAPTER	SECTION
1	1	3,4& 6	3.19, 3.20, 3.23, 4.27, 4.28, 4.29, 4.30, 6.1, 6.4, 6.6, 6.8, 6.9, 6.10, 6.11, 6.15
2	1	6, 12	6.17, 6.18, 6.19, 6.22, 6.23, 12.1, 12.2, 12.3, 12.7, 12.11, 12.12, 12.21
3	1	23	23.1, 23.3, 23.4, 23.8, 23.15, 23.24, 23.26, 23.27, 23.32, 23.35, 23.37
4	1	16	16.1-16.22
5	2	3,4,5,6 & 7	3.1, 3.1.1-3.1.4, 3.1.8, 3.2-3.3.5, 4.3, 4.3.1-4.3.5, 5.5-5.6, 7.5, 6.3, 6.4, 6.29, 6.30.

Books for Reference

1. Bhargava, N. N., Kulshreshtha, D. C., & Gupta, S. C. (2013). *Basic electronics and linear circuits*, (2nd Ed.). Tata McGraw Hill Publishing Company Limited.
2. Gaonkar, R. S. (2002), *Microprocessor Architecture, Programming, and Applications with the 8085*, (5th Ed.). Prentice Hall.
3. Routt, W. A. (2006). *Microprocessor Architecture, Programming, and Systems featuring the 8085*, (1st Ed.). Thomson Delmar Learning.

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)

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, student will be able to	**Cognitive Levels (K - Level)**
CO1	acquire knowledge and conceptual understanding of fundamental electronics.	**K1**
CO2	apply the knowledge of microprocessor to write assembly language program for simple applications.	**K2**
CO3	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.	**K3**
CO4	describe and understand the basics of modulation and applications of electronic devices in radio communication.	**K4**
CO5	take part in mini projects based on electronic devices.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
4	**23UAI43AO02A**			**Allied Optional - 2:** Applied Physics - 2					**4**		**3**
COs	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	2	3	2	3	2	2	2	1	**2.3**
CO2	3	3	2	2	1	3	2	3	2	1	**2.2**
CO3	3	2	3	2	1	3	3	1	2	1	**2.2**
CO4	3	2	3	2	1	3	2	2		2	**2.3**
CO5	3	2	2	2	2	2	3	3	2	1	**2.2**
										Mean Overall Score	**2.24 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	23UAI43AO02B	**Allied Optional - 2**: Communication Electronics	4	3

Course Objectives
To study and understand serial and parallel protocols for data communication
To realize the architecture of optical communication and wave guides.
To understand different kinds of detectors used in optical communication and their efficiency
To understand various methods in wireless communication and their trends.
To understand and realize the potential of remote server and its protocols using ESP8266

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.

Teaching Methodology	Chalk and Talk, PPT

Books for Study

1. Mathivanan, N. (2007). *PC- Based Instrumentation: Concepts and Practice.* PHI Learning.
2. Senior, J. M. (2002). *Optical Fiber Communications,* (2nd Ed.). PHI Learning.
3. Thakur, M. R. (2018). *Node MCU ESP8266 Communication Methods and Protocols Programming with Arduino IDE.*
4. *Material Prepared by the Department*

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

Books for Reference

1. Axelson, J. (2012). *USB Complete: The Developer's Guide, (4th Ed.).* Lakeview Research.
2. Gehlot, A., Singh, R., Malik, P. K., Gupta, L. R. & Singh, B. (2020). *Internet of things with 8051 and EPS8266.* CRC Press.

Website and eLearning Source

1. https://onlinecourses.nptel.ac.in/noc23_ma94/preview

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, the students will be able to	**Cognitive Levels (K-Level)**
CO1	understand serial and parallel Communication	**K1**
CO2	infer and Elaborate Optical Communication	**K2**
CO3	experiment and Perceive various optical sources and detectors	**K3**
CO4	appraise various Wireless Networks	**K4**
CO5	apply and Analyze wireless networking using ESP 8266	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**	
4	**23UAI43AO02B**			**Allied Optional - 2:** Communication Electronics				**4**		**3**	
COs	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	2	3	2	1	2	3	3	2	2	**2.2**
CO2	3	3	2	2	2	3	3	2	2	3	**2.5**
CO3	3	3	2	3	2	2	3	3	2	2	**2.5**
CO4	3	3	3	3	2	2	3	3	3	2	**2.7**
CO5	3	3	3	3	2	3	3	3	3	3	**2.9**
										Mean Overall Score	**2.6 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	23UAI43AP01A	**Allied Optional Practical:** Applied Physics	4	2

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 low range 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 / Colpitts's Oscillator
20. Hysteresis
21. Microprocessor I (Data Transfer)
22. Microprocessor II (8bit-addition, subtraction, multiplication & division)

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	23UAI43AP01B	**Allied Optional Practical:** Electronics	4	2

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/Week	Credits
4	23UHE44VE04A	**Value Education - 4:** Social Ethics - 2	2	1

Course Objectives
To understand the significance of natural resources and strive to coexist harmoniously with nature.
To implement strategies for disaster management within the community.
To evaluate the significance and distinctions between science and religion.
To recognize the importance of maintaining a healthy lifestyle.
To utilize counseling techniques to address and resolve individuals' issues.

UNIT I: Harmony with Nature **(6 Hours)**

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

UNIT II: Issues Dealing with Science and Religion **(6 Hours)**

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

UNIT III: Public Health **(6 Hours)**

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

UNIT IV: Disaster Management **(6 Hours)**

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

UNIT V: Counselling for Adolescents **(6 Hours)**

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

Books for Study

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

Books for Reference

1. Albert, D. & Steinberg, L. (2011). *Judgment and decision making in adolescence*: Journal of Research on Adolescence, page no: 211-224.
2. Larry, R. C. (2000). *Disaster Management and Preparedness,* Lewis Publications.
3. Hurlock, E. B. (2001). *Developmental Psychology: A: Life-Span Approach*. (5th Ed.). Tata McGraw-Hill.
4. Sangha, K. (2015). *Ways to Live in Harmony with Nature: Living Sustainably and Working with Passion.* Jo Jo Publishing.

Websites and eLearning Sources

1. https://en.wikipedia.org/wiki/Disaster_management_in_India
2. https://ndma.gov.in/
3. https://talkitover.in/services/child-adolescent-counselling/
4. https://www.nipccd.nic.in/schemes/adolescent-guidance-centre-19#gsc.tab=0

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Know the value of natural recourses and to live in a harmony with nature.	**K1**
CO2	Apply the plans of disaster management in the society.	**K2**
CO3	Analyse the importance and differences of science and religion.	**K3**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
4	**23UHE44VE04A**			**Value Education - 4:** Social Ethics - 2						**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	3	2	3	3	**2.8**
CO2	3	2	2	3	3	2	3	3	2	2	**2.5**
CO3	2	3	3	3	2	3	3	3	3	3	**2.8**
										Mean Overall Score	**2.7 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	23UHE44VE04B	**Value Education - 4:** Religious Doctrine - 2	2	1

Course Objectives
To explore the rich historical background of the Catholic Church
To explore and comprehend the Sacraments practiced by the Catholic Church
To incorporate Christian Prayer into daily routines
To reflect on personal growth through the lens of Sacraments and Christian Prayer
To promote unity by embracing universal values from various religions

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 The Christian Prayer **(6 Hours)**

UNIT V Harmony of Religions **(6 Hours)**

Teaching Methodology	Chalk and Talk, Power point, assignment and Group discussion

Book for Study

1. Department of Human Excellence (2022). Fullness of Life, St Joseph's College (Autonomous), Tiruchirappalli.

Book for Reference

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

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	understand the history of the Catholic Church	**K1**
CO2	examine and grasp the Sacraments of the Catholic Church	**K2**
CO3	apply the Christian Prayer to their everyday life	**K3**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
4	**23UHE44VE04B**			**Value Education - 4:** Religious Doctrine - 2						**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	2	2	3	3	**2.7**
CO2	3	2	2	2	3	3	3	3	2	2	**2.5**
CO3	2	2	3	3	2	2	3	3	3	3	**2.6**
										Mean Overall Score	**2.6 (High)**

Semester	Course Code	Title of the course	Hours/Week	Credits
5	24UAI53CC09	**Core Course - 9:** Embedded Systems and IoT	4	2

Course Objectives
To compare embedded systems with general computing systems and understand embedded system classifications, purposes, components, and communication interfaces.
To study embedded firmware design, development languages, tools, file types, and hardware/firmware integration and testing.
To grasp design, protocols, technologies, levels, applications, IoT vs. M2M, systems management, and app development.
To explore IoT devices, interfaces, APIs, real-time applications, and cloud connectivity.
To understand IoE architecture, smart objects, secure mobility, IoT analytics, cloud storage, APIs, and AWS.

UNIT I: Embedded System **(12 Hours)**

Embedded System vs General Computing System - Classification of Embedded System, Purpose of Embedded system, Quality Attributes of Embedded System - Typical Embedded System- Core of Embedded System, Memory, Sensors and Actuators, Communication Interface- Onboard communication interface, External communication interface.

UNIT II: Software, Hardware and Firmware **(12 Hours)**

Embedded Firmware Design Approaches- Embedded Firmware Development Languages - Embedded System Development Environment - IDE, Compiler, Linker - Types of File Generated on Cross Compilation-Simulator, Emulator and Debugging- Fundamental issues in Hardware Software Co-design- Integration and Testing of Embedded Hardware and Firmware.

UNIT III: IoT **(12 Hours)**

Introduction- Characteristics - Physical design - protocols – Logical design Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs. M2M. IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

UNIT IV: APIs **(12 Hours)**

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services. Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks. Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT.

UNIT V: IoE **(12 Hours)**

Overview– Architecture-Smart objects and LLNs-Secure mobility. Home automation – Cities: Smart parking – Environment: Weather monitoring – Agriculture: Smart irrigation – Data analytics for IoT – Software & management tools for IoT cloud storage models & Communication APIs – Cloud for IoT – Amazon Web Services for IoT.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Books for Study

1. Shibu, K. V. (2014). *Introduction to Embedded System*, Tata McGraw-Hill.
   UNIT I: Chapters 1,2.1- 2.4
   UNIT II: Chapters 2.5, 7, 9, 12, 13.
2. Bahga, A. & Vijay, M. (2015). *Internet of things – A Hands on approach*. Orient Blackswan.
   UNIT III**:** Chapters 1,2,3,4,5
   UNIT IV**:** Chapters 7,8,9,10
   UNIT V: Chapters 9,10,11,13

Books for Reference

1. Wolf, M. (2012). *Computers as Components, Principles of Embedded Computing System Design*, (3rd Ed.). Morgan Kaufmann Publishers.
2. Bahga, A. & Vijay M. (2015). *Internet of Things–A hands-on approach,* Universities Press.
3. Ramon, M. C. (2014). *Intel Galileo and Intel Galileo Gen 2: API Features and Arduino Projects for Linux Programmers*, Apress.
4. Schwartz, M. (2014). *Internet of Things with the Arduino Yun*, Packt Publishing.

Websites and eLearning Sources

1. https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/
2. https://www.javatpoint.com/iot-embedded-devices

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	understand embedded systems and distinguish them from general computing systems.	**K1**
CO2	describe various approaches to embedded firmware design.	**K2**
CO3	know IoT and delineate its characteristics and enabling technologies.	**K3**
CO4	configure and program physical devices such as Raspberry Pi and Intel Galileo Gen2.	**K4**
CO5	explore the architecture and components of the Internet of everything.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
5	**24UAI53CC09**			**Core Course - 9:** Embedded Systems and IoT						**4**	**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	2	1	3	3	2	3	3	**2.4**
CO2	3	3	3	2	2	3	3	3	3	3	**2.8**
CO3	3	3	3	3	3	3	3	2	3	1	**2.7**
CO4	3	2	2	3	2	2	3	3	2	2	**2.4**
CO5	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/Week	Credits
5	24UAI53CC10	**Core Course - 10:** Robotics	4	2

Course Objectives
To understand robot fundamentals: anatomy, coordinate systems, classifications, specifications, parts, functions, and applications.
To explore different drive systems and motors, and the design and selection of various end effectors and grippers.
To comprehend sensor requirements, types, principles, and applications, plus image processing techniques for inspection, identification, visual serving, and navigation.
To grasp kinematics, manipulator dynamics, trajectory generation, mechanism design, and robot programming.
To understand RGV and AGV robots in industries: implementation, safety, and economic analysis.

UNIT I: Introduction to Robot **(12 Hours)**

Definition - Robot Anatomy - Coordinate Systems, Work Envelope Types and Classification- Specifications-Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load- Robot Parts and their Functions-Need for Robots-Different Applications.

UNIT II: Robotic Mechanism **(12 Hours)**

Pneumatic Drives-Hydraulic Drives-Mechanical Drives-Electrical Drives-D.C. Servo Motors, Stepper Motors, A.C. Servo Motors-Salient Features, Applications and Comparison of all these Drives, End Effectors-Grippers-Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.

UNIT III: Robotic Sensory Devices **(12 Hours)**

Requirements of a sensor, Principles and Applications of the following types of sensors- Position sensors - Piezo Electric Sensor, LVDT, Resolvers, Optical Encoders, pneumatic Position Sensors, Range Sensors Triangulations Principles, Structured, Lighting Approach, Time of Flight, Range Finders, Laser Range Meters, Touch Sensors, binary Sensors, Analog Sensors, Wrist Sensors, Compliance Sensors, Slip Sensors, Camera, Frame Grabber, Sensing and Digitizing Image Data- Signal Conversion, Image Storage, Lighting Techniques, Image Processing and Analysis- Data Reduction, Segmentation, Feature Extraction, Object Recognition, Other Algorithms, Applications- Inspection, Identification, Visual Serving and Navigation.

UNIT IV: Kinematics **(12 Hours)**

Forward Kinematics, Inverse Kinematics and Difference; Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 Dimension), Four Degrees of freedom (in 3 Dimension) Jacobians, Velocity and Forces-Manipulator Dynamics, Trajectory Generator, Manipulator Mechanism Design- Derivations and problems. Lead through Programming, Robot programming Languages- VAL Programming-Motion Commands, Sensor Commands, End Effector commands and simple Programs.

UNIT V: Robot Design **(12 Hours)**

RGV, AGV; Implementation of Robots in Industries-Various Steps; Safety Considerations for Robot Operations - Economic Analysis of Robots.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Book for Study

1. Klafter, R. D., Chmieleski, T. A. & Negin. (2003). *Robotics Engineering-An Integrated Approach,* PHI Learning.
   Unit I: Chapters 1&2
   Unit II: Chapter 4
   Unit III: Chapter 5
   Unit IV: Chapter 8
   Unit V: Chapter 9

Books for Reference

1. Deb, S. R. (1994). *Robotics Technology and Flexible Automation,* Tata McGraw Hill Book Co.
2. Fu, K. S., Gonzalez, R. C. & Lee, C. S. G. (1987). *Robotics Control, Sensing, Vision and Intelligence,* McGraw Hill Book Co.
3. Janakiraman, P. A. (1995). *Robotics and Image Processing*. Tata McGraw Hill.
4. Rajput, R. K. (2008). *Robotics and Industrial Automation,* S. Chand and Company.

Website and eLearning Sources

1. https://www.geeksforgeeks.org/robotics-introduction/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	define a robot and describe its anatomy, including coordinate systems and work envelope types	**K1**
CO2	compare and contrast different types of drive systems used in robotics, including pneumatic, hydraulic, mechanical, and electrical drives	**K2**
CO3	explain the principles and applications of various types of sensors used in robotics, such as position sensors and image sensors	**K3**
CO4	solve forward and inverse kinematics problems for manipulators with different degrees of freedom	**K4**
CO5	implement robots in industrial settings and analyze the economic implications of using robotics.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
5	**24UAI53CC10**			**Core Course - 10:** Robotics						**4**	**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	3	1	3	3	2	2	2	**2.4**
CO2	3	2	2	3	2	2	2	3	3	2	**2.4**
CO3	2	3	2	3	2	3	3	3	2	2	**2.5**
CO4	3	2	2	2	1	3	2	2	3	1	**2.1**
CO5	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/Week	Credits
5	24UAI53CP05	**Core Practical - 5:** IoT Programming	3	2

List of Exercises

1. (i) To interface LED/Buzzer with Arduino/Raspberry Pi
   (ii) To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi
2. (i) To interface DHT11 sensor with Arduino/Raspberry Pi
   (ii)To interface OLED with Arduino/Raspberry Pi
3. To interface motor using relay with Arduino/Raspberry Pi
4. To interface Bluetooth with Arduino/Raspberry Pi
5. To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFF when '1'/'0' is received from smartphone using Bluetooth.
6. Upload sensor data to things peak cloud.
7. Retrieve sensor data from things peak cloud.
8. To install MySQL database on Raspberry Pi and perform basic SQL queries.
9. Use Arduino/Raspberry Pi to publish temperature data to MQTT broker.
10. Create UDP server on Arduino/Raspberry Pi and respond with humidity data to UDP client when requested.

Semester	Course Code	Title of the Course	Hours/Week	Credits
5	24UAI53CP06	**Core Practical - 6:** Robotics	3	2

List of Exercises

1. Determination of maximum and minimum position of links.
2. Verification of transformation (Position and orientation) with respect to gripper and world coordinate system
3. Estimation of accuracy, repeatability and resolution.
4. Robot programming and simulation for pick and place
5. Robot programming and simulation for Colour identification
6. Robot programming and simulation for Shape identification
7. Robot programming and simulation for machining (cutting, welding)
8. Robot programming and simulation for writing practice
9. Robot programming and simulation for any industrial process (Packaging, Assembly)
10. Robot programming and simulation for multi process

Semester	Course Code	Title of the Course	Hours/Week	Credits
5	24UAI53ES01A	**Discipline Specific Elective - 1:** Virtual Reality and Augmented Reality	5	3

Course Objectives
To understand the fundamentals of virtual reality, including its components, input devices, and output devices.
To study VR development: modelling and model management.
To study VR content creation considerations: methodology, terminology, user performance, health and safety, usability, cybersickness, and side effect
To investigate VR development for web and mobile: frameworks, device setup, interaction techniques, and design for haptics and spatial audio.
To Explore VR applications: medical, military, robotics, real-time tracking, games, movies, simulations, and therapy.

UNIT I: Introduction (15 Hours)

The three I's of virtual reality-commercial VR technology and the five classic components of a VR system - Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation-interfaces and gesture interfaces-Output Devices: Graphics displays-sound displays & haptic feedback.

UNIT II: VR Development Process (15 Hours)

Geometric modelling - kinematics modelling- physical modelling - behavior modelling - model Management.

UNIT III: Content Creation Considerations for VR (15 Hours)

Methodology and terminology-user performance studies-VR health and safety issues-Usability of virtual reality system- cyber sickness -side effects of exposures to virtual reality environment.

UNIT IV: VR on the Web & VR on the Mobile (15 Hours)

JS-pros and cons-building blocks (WebVR, WebGL, Three.js, device orientation events) - frameworks (A-frame, React VR)-Google VR for Android-Scripts, mobile device configuration, building to android-cameras and interaction-teleporting-spatial Audio-Assessing human parameters-device development and drivers-Design Haptics.

UNIT V: Applications (15 Hours)

Medical applications-military applications-robotics applications- Advanced Real time Tracking- other applications- games, movies, simulations, therapy.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Book for Study

1. Burdea, C. & Coiffet, P. (2008). *Virtual Reality Technology*, (2nd Ed.). Gregory, John Wiley & Sons, Inc.
   Unit I: Chapters 1,2,3
   Unit II: Chapter 5
   Unit III: Chapter 7
   Unit IV: Chapter 7,
   Unit V: Chapter 8

Books for Reference

1. Aukstakalnis, S. (2016). *Practical Augmented* Reality, *A Guide to the Technologies, Applications, and Human Factors for AR and VR (Usability),* (1st Ed.). Addison-Wesley Professional.

2. Scoble, R. & Israel, S. (2015). *The Fourth Transformation: How Augmented Reality & Artificial Intelligence Will Change Everything*, (1st Ed.). Patrick Brewster Press.
3. Parisi, T. (2015). *Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop, Web, and Mobile, Tony Paris*i, (1st Ed.). O'Reilly Media.

Website and eLearning Sources

1. https://www.alibabacloud.com/en/knowledge/tech/introduction-to-virtual-reality?_p_lc=1

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	understand the fundamentals of virtual reality	**K1**
CO2	know the VR development: modelling and model management.	**K2**
CO3	explore VR content creation	**K3**
CO4	analyse VR development for web and mobile	**K4**
CO5	apply VR to medical, military, robotics, real-time tracking, games, movies, simulations, and therapy.	**K5**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**								**Hours**	**Credits**
5	**24UAI53ES01A**	**Discipline Specific Elective - 1:** Virtual Reality and Augmented Reality								**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	2	2	2	3	2	2	2	3	3	**2.3**
CO2	2	2	2	3	3	2	2	2	3	3	**2.4**
CO3	2	2	3	3	3	2	2	3	3	3	**2.6**
CO4	2	2	2	3	3	2	2	2	3	3	**2.4**
CO5	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/Week	Credits
5	24UAI53ES01B	**Discipline Specific Elective - 1:** Digital Marketing	5	3

Course Objectives
To understand the need and basics of digital marketing.
To classify the technology and frameworks used in digital marketing.
To choose the elements for the underlying frameworks of digital marketing.
To learn the digital marketing strategies for real-time business applications.
To develop a site/portal to promote digital marketing.

UNIT I: Introduction to Digital Marketing and Internet Marketing (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: Digital Marketing Models, Consumer Behaviour Model Creation (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: Digital Marketing Assessment Phase and Objectives Planning (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: Digital Marketing Strategy Groundwork and Roadmap (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: Basics of Web Development, Management and Usability (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.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions.

Book for Study

1. Bhatia, P. (2019). *Fundamentals of Digital Marketing*, (2nd Ed.). Pearson India Publications.
   Unit I : Chapter 1 Unit II : Chapter 2 and 3
   Unit III : Chapter 4 Unit IV : Chapter 5 Unit V **:** Chapter 7

Books for Reference

1. Ahuja, V. (2015). *Digital Marketing*. Oxford University Press.
2. Visser, M., Sikkenga, B. & Berry, M. (2018). *Digital Marketing Fundamentals: From Strategy to ROI*. Noordhoff Groningen / Utrecht.
3. Kagan, J. & Singh, S. S. (2020). *Digital Marketing: Strategy & Tactics*. Wiley Publications.

Websites and eLearning Sources

1. https://www.investopedia.com/terms/d/digital-marketing.asp
2. https://en.wikipedia.org/wiki/Digital_marketing

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	recall the basic elements and factors of digital marketing.	**K1**
CO2	classify the technology and frameworks in which digital marketing operates.	**K2**
CO3	choose the key internal analysis elements for the relevant applications of underlying Frameworks of digital marketing.	**K3**
CO4	analyze different digital marketing strategies for the real time business applications.	**K4**
CO5	determine technical specifications and to develop site/portal to promote digital marketing.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
5	**24UAI53ES01B**			**Discipline Specific Elective - 1:** Digital Marketing						**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	3	3	2	2	**2.7**
CO2	2	3	3	3	2	2	3	3	3	2	**2.6**
CO3	3	3	2	3	2	3	3	3	2	2	**2.6**
CO4	2	3	3	2	2	2	3	3	2	2	**2.4**
CO5	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/Week	Credits
5	24UAI53ES02A	**Discipline Specific Elective - 2:** Computer Networks	5	3

Course Objectives
To learn the basic concepts of data communication, networking, and the OSI model.
To understand the analog and digital signals.
To classify the error detection and correction techniques, data link control, and protocols.
To examine the technologies used in wired and wireless LAN.
To analyze the transport layer and application layer functions.

UNIT I: Data Communication (15 Hours)

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

UNIT II: Analog and Digital Signals (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: Data Link Layer (15 Hours)

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: Wired and Wireless LAN (15 Hours)

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: Transport Layer and Application Layer (15 Hours)

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

Teaching Methodology	Lecture-based instruction, Demonstration, Group Discussion, Peer Learning, Problems solving, and Project-based learning.

Book for Study

1. Forouzan, B. A. (2007). *Data Communications and Networking*, (4th Ed.). McGraw-Hill Companies.
   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

Books for Reference

1. Stallings, W. (2004). *Data and computer communications*, (7th Ed.). Prentice Hall of India.
2. Tanenbaum, A. S. (2013). *Computer Networks*. Prentice Hall of India.
3. Gill, N. S. (2014). *Essential of Computer and Network Technology*. Khanna Book Publishing Company (P) Limited.

Website and eLearning Source

1. https://www.comptia.org/certifications/network

Course Outcomes		
CO No.	**CO-Statements** On completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	recall key concepts, models (OSI, TCP/IP), protocols, signal types, and networking technologies in data communication.	**K1**
CO2	to explain data communication concepts, protocols, models, transmission methods, and the functionalities of data link, transport and application layers.	**K2**
CO3	analyze network operations and evaluate the functionalities of protocols, models, various error correction and detection techniques and all OSI layers in wired and wireless networks.	**K3**
CO4	critically evaluate and design network systems by applying data communication principles, protocols, and models, addressing transmission impairments, and optimizing OSI layers, including transport and application layers, in wired and wireless networks.	**K4**
CO5	design and optimize advanced network systems by applying data communication principles, addressing impairments, and TCP/UDP of transport layer and various protocol used in application layer in wired and wireless networks.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**	**Credits**	
5	**24UAI53ES02A**			**Discipline Specific Elective - 2:** Computer Networks					**5**	**3**	
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	2	2	2	1	3	2	3	2	2	**2.2**
CO2	2	3	3	2	1	3	3	2	2	2	**2.3**
CO3	2	3	2	2	1	3	3	2	2	2	**2.2**
CO4	3	2	3	2	2	3	3	3	2	2	**2.5**
CO5	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/Week	Credits
5	24UAI53ES02B	**Discipline Specific Elective - 2:** Security in Computing	5	3

Course Objectives
To understand the computer security issues
To classify the existing attacks and threats and apply the security measures.
To identify the techniques used to overcome threats using counter measures.
To learn the recent threats, and vulnerabilities and be aware of the privacy impacts.
To create solutions by security planning and risk analysis.

UNIT I: Introduction to Computer Security and Attacks (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: Security in Operating Systems and Network (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: Security Countermeasures in Network and Databases (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: Privacy Principles and Policies (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: Management of Incidents using Laws (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.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Book for Study

1. Pfleeger, C. P., S. L., & Margulie, J. (2015). *Security in Computing*, (5th Ed.). Pearson Education.

   UNIT I: Chapters 1, 2, 4
   UNIT II: Chapter 5(5.2-5.4), Chapter 6 (6.1- 6.5)
   UNIT III: Chapter 6 (6.6 - 6.9), Chapter 7 (7.1-7.4)
   UNIT IV: Chapter 9 (9.1-9.7)
   UNIT V: Chapter10 (10.1, 10.3, 10.4), Chapter 11 (11.1-11.3, 11.6), Chapter 12, Chapter 13 (13.4)

Books for Reference

1. Kostopoulous, G. K. (2013). *Cyber Space and Cyber Security.* CRC Press.
2. Lehto, M., & Neittaanmaki, P. (2015). *Cyber Security: Analytics, Technology and Automation*. Springer International Publishing.
3. Nelson, P., & Steuart, E. (2009). *Computer Forensics and Investigations.* Cengage Learning.

Websites and eLearning Sources

1. https://www.brainkart.com/subject/Security-in-Computing_156/
2. https://www.academia.edu/31872697/Security_in_computing

3. https://studentnotes88322212.wordpress.com/2018/05/08/security-in-computing-lecture-notes-study-materials-and-important-questions-answers/
4. https://www.geeksforgeeks.org/computer-security-overview/
5. https://www.tutorialspoint.com/computer_security/index.htm

Course Outcomes		
CO No.	**CO-Statements** On completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	define and relate the concepts and terms of security.	**K1**
CO2	classify and outline existing attacks and security measures.	**K2**
CO3	identify the techniques used to materialize threats into attacks.	**K3**
CO4	analyse the recent threats, vulnerabilities and attacks and discover their effects.	**K4**
CO5	criticize and propose solutions for protecting the system from being exposed to the threats and attacks.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**				**Hours**			**Credits**
5	**24UAI53ES02B**			**Discipline Specific Elective - 2:** Security in Computing				**5**			**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	2	1	2	3	3	2	1	2	**2.2**
CO2	3	3	2	2	2	3	3	3	2	2	**2.5**
CO3	2	3	3	2	2	2	3	3	2	2	**2.4**
CO4	3	3	3	1	3	3	3	3	1	2	**2.5**
CO5	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/Week	Credits
5	24UAI53SP01	**Self-paced Learning:** Web Ethics	-	2

Course Objectives
To understand the basic concepts of Cyber Ethics, Virtues and Values.
To Illustrate the knowledge of Cyber laws, regulations in information Society.
To analyse the International Convention for Cyber Space and International Treaties.
To identify and explore the different types of Cyber Crimes and offences.
To learn the aware of Cyber Bullying and digital literacy for protecting children from bullying.

UNIT I: Introduction to 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.

Teaching Methodology	Lecture Based Instruction, Peer Learning, Group Discussion, Videos, PPT, Demonstration, and Hands on sessions

Book for Study

1. Stuckelberger, C. & Duggal, P. (2018). *Cyber Ethics 4.0, Serving Humanity with Values.* Prentice Globethics.net Global Series No.17.

Books for Reference

1. Diane, B. (2008). *Cyber Citizenship and Cyber Safety: Cyber Ethics*. The Rosen Publishing group.
2. Kizza, J. M. (2015). *Ethical and Social Issues in the Information Age*, Fifth Edition Springer.
3. Bynum, T. W. & Rogerson, S. (2004). *Computer Ethics & Professional Responsibility*. Introductory Text & Readings, Blackwell.

Websites and eLearning Sources

1. https://www.geeksforgeeks.org/what-is-cyberethics
2. https://en.wikipedia.org/wiki/Cyberethics
3. https://theknowledgereview.com/cyber-ethics

Semester	Course Code	Title of the Course	Hours/Week	Credits
5	23USS54SE01	**Skill Enhancement Course - 2:** Soft Skills	2	1

Course Objectives
To help students understand, practice, and improve their communication skills
To enable students with effective presentation skills
To help students attend interviews confidently and participate effectively in group discussions
To make students realise their potential and excel on personal as well as professional grounds
To develop the thinking skills of students for better performance in competitive exams, interviews and group discussions

UNIT I: Communication Skills

Basics of Communication: Importance of Good Communication Skills, Types of Communication Skills, Verbal Communication, Non-verbal Communication, Tips for Improving Nonverbal Communication, Communication Styles, Barriers to Communication, Ways To Improve Communication Skills, Practicum

Professional Grooming: How to Create the Impact for that First Impression, Presentation Skills, Developing Handouts, Developing Notes, Adding Visual and Audio Effects, Practicum

UNIT II: Resume Writing & Interview Skills

*Resume Writing***:** The Purpose of a Resume, Finding a Job & Making a Career, Length of Resume, Order of Resume, Tailoring the Resume, What your Resume should include, Some Tips for Listing a Bachelor's degree on Your Resume, What NOT to put on your Resume, Formatting Resume, Difference between Resume, Biodata and Curriculum Vitae, Preparation of a Resume

*Interview Skills***:** Meaning of Interview, Types of Interviews, How to get ready for the big day?, Appropriate Attire, Etiquette, Mastering the Art of Meet and Greet, Resume – Points to Remember, Practicum

Group Discussion: Why is GD Essential?, Factors that influence GD, Outcome of GD, Tips for participation in a GD, Useful phrases for GD, Success Tips in GD, Practicum

UNIT III: Personal Effectiveness

Self-Discovery: Characteristics of Personality, Kinds of Self, Who am I?, Personality Inventory Table

Goal Setting: Why do Goal Setting?, Goal Setting Process, Smart Goals

UNIT IV: Numerical Ability

Average, Simple Interest, Compound Interest, Profit and Loss, Area, Volume and Surface Area

UNIT V: **Test of Reasoning**

*Verbal Reasoning***:** Series Completion, Analogy. *Non-Verbal Reasoning*

Book for Study

1. Balaiah, J., & Joy, J. L. (2024). *Straight from the Traits: Securing Soft Skills*, (Revised 3rd Ed.). St. Joseph's College, Tiruchirappalli.

Books for Reference

1. Aggarwal, R.S. (2010). *A Modern Approach to Verbal and Non-Verbal Reasoning*, S. Chand.
2. Balaiah, J. & Joy, J. L. (2018). *Winners in the Making: A primer on soft skills*. St. Joseph's College, Tiruchirappalli.
3. Covey S. R. (2004). *The 7 Habits of Highly Effective People: Restoring the Character Ethic* (Rev. ed.). Free Press.
4. Egan, G. (1994). *The Skilled Helper* (5th Ed.). Pacific Grove, Brooks/Cole.

5. Khera, S. (2014). *You Can Win*. Macmillan Books.
6. Martin, Y. (2005). *Hiring the Best: A Manager's Guide to Effective Interviewing and Recruiting*, (5th Ed.). Adams Media.
7. Sankaran, K., & Kumar, M. (2010). *Group Discussion and Public Speaking*, (5th Ed.). M.I. Publishers.
8. Trishna. (2012). *How to do well in GDs & Interviews*, (3rd Ed.). Pearson Education.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	analyse problems directed at testing their cognitive abilities	**K3**
CO2	present the best of themselves as job seekers and communicate effectively in all contexts	**K4**
CO3	assess themselves, set goals, and manage conflicts that are expected of a good leader	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**							**Hours**	**Credits**
5	**23USS54SE01**		**Skill Enhancement Course - 2:** Soft Skills							**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	2	2	2	2	3	2	3	**2.5**
CO2	2	3	3	2	3	3	2	3	2	2	**2.5**
CO3	2	2	3	3	2	3	3	3	2	2	**2.5**
Mean Overall Score											**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	24UAI63CC11	**Core Course - 11:** Machine Learning	4	3

Course Objectives
To study the basics of machine learning, including simple classifiers, types, applications, and related perspectives and issues.
To explore probabilistic models in machine learning: Bayesian learning, Bayes theorem, Naïve Bayes classifier, and Hidden Markov models.
To understand supervised learning techniques, including regression, classification methods, and artificial neural networks, including perceptron's and back propagation.
To investigate unsupervised learning techniques, including cluster analysis and dimension reduction methods.
To understand model building, training, evaluation, and metrics like accuracy, precision, recall, AUC, and bias-variance decomposition.

UNIT I: Introduction **(12 Hours)**

Introduction, easy for human hard for machines, a simple predicting machine, classifying is not very different from predicting, training a simple classifier, one classifier is not enough, Types of machine learning, Applications of Machine Learning, Perspectives and issues in machine learning

UNIT II: Probabilistic and Stochastic Models **(12 Hours)**

Bayesian Learning – Bayes theorem, Concept learning, Maximum likelihood, Bayes optimal classifier, Gibbs algorithm, Naive Bayes classifier, Expectation maximization and Gaussian Mixture Models, Hidden Markov models.

UNIT III: Supervised Learning **(12 Hours)**

Introduction-Regression, Linear regression, Classification: Decision trees, k-Nereast Neighbours, Support Vector Machine, Logistic regression, Random Forest. Artificial Neural Network: Introduction, Perceptrons, multi-layer networks and back propagation.

UNIT IV: Unsupervised Learning **(12 Hours)**

Introduction, Supervised vs Unsupervised Cluster Analysis, K-means clustering, Hierarchical clustering. Dimension reduction: Principal Component Analysis, Linear Discriminant Analysis.

UNIT V: Modelling and Evaluation **(12 Hours)**

Building the model, training a model, evaluating a model, improving a model. Performance metrics - accuracy, precision, recall, sensitivity, specificity, AUC, RoC, Bias Variance decomposition.

Teaching Methodology	Lecture-based instruction, Demonstration, Group Discussion, and Project-based learning

Books for Study

1. Dutt, S., Chandramouli, S. & Das, A. K. (2019). *Machine Learning*. Pearson Education.
   UNIT I: Chapter1:.4,1.5,1.7,1.9 UNIT II: Chapter 6
   UNIT III: Chapter 7, 8, 10 UNIT IV: Chapter 9 (9.1,9.4)
   UNIT V: Chapter 3
2. Alpaydin, E. (2014). *Introduction to Machine Learning*, (3rd Ed.). MIT Press, Prentice Hall of India.
   UNIT II: Chapter 7&15
3. Rashid, T. (2016). *Make your own neural network*, Create Space Independent Publishing Platform.
   UNIT I: Part1

Books for References

1. Shalev-Shwartz, S. & Ben-David, S. (2014). *Understanding Machine Learning: From Theory to Algorithms.* Cambridge University Press.
2. Hastie, T., Tibshirani, R. & Friedman, J. (2014). *Elements of Statistical Learning.* Springer.
3. Charu, C. A. (2014). *Data Clustering Algorithms and Applications*, CRC Press.
4. Bishop, C. (2009). *Pattern Recognition and Machine Learning*, Springer.
5. Raschka, S. & Mirjalili, V. (2019). *Python Machine Learning*, (3rd Ed.). Packt Publishing.

Websites and eLearning Sources

1. https://www.developers.google.com/machine-learning/crash-course
2. online-ml/awesome-online-machine-learning
3. https://serokell.io/files/cr/cr9yn4wi.best-ml-courses-1.jpg

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	list out the fundamental issues and perspectives of machine learning	**K1**
CO2	compare various linear models to find a best-fit line through a set of data points	**K2**
CO3	make use of genetic algorithms as a tool for feature selection in machine learning	**K3**
CO4	examine various dimensionality reduction techniques to reduce the number of input variables in the datasets	**K4**
CO5	explain and construct the graphical models to exhibit the conditional dependence structure between random variables	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
6	**24UAI63CC11**			**Core Course - 11:** Machine Learning						**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	2	3	3	2	2	3	2	**2.4**
CO2	3	3	3	2	2	3	3	3	2	2	**2.6**
CO3	2	1	2	2	2	3	2	3	3	3	**2.3**
CO4	2	3	2	2	2	2	2	3	2	3	**2.3**
CO5	2	3	3	2	2	3	3	2	1	3	**2.4**
										Mean Overall Score	**2.42 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	24UAI63CC12	**Core Course - 12:** Data Visualization Techniques	4	3

Course Objectives
To interpret visual perception and representation of data.
To explore the models and mapping of visualization of data.
To translate and present data using various visualization techniques.
To understand metaphorical visualization and Networks software.
To evaluate various visualization techniques.

UNIT I: Introduction **(12 Hours)**

Introduction of visual perception - Visual representation of data - Gestalt principles - Information overloads.

UNIT II: Visual Representations **(12 Hours)**

Creating visual representations - Visualization reference model -Visual mapping - Visual analytics - Design of Visualization Applications.

UNIT III: Viusalization Systems **(12 Hours)**

Classification of visualization systems - Interaction and visualization techniques misleading - Visualization of one, two and multi-dimensional data - Text and text documents.

UNIT IV: Viusalization Techniques **(12 Hours)**

Visualization of Groups – Trees – Graphs – Clusters – Networks software – Metaphorical Visualization

UNIT V: Modelling and Evaluation **(12 Hours)**

Visualization of volumetric data - Vector fields - Processes and simulations - Visualization of maps - Geographic information - GIS systems – Collaborative Visualizations - Evaluating visualizations.

Teaching Methodology	Lecture-based instruction, Demonstration, Group Discussion, and Project-based learning

Books for Study

1. Ward, M. O., Grinstein, G. & Keim, D. (2010). *Interactive Data Visualization: Foundations, Techniques, and Applications,* (2nd Ed.). CRC Press.
2. Healy, K. (2018). *Data Visualization: A Practical Introduction*, (1st Ed.). Princeton University Press.
3. Krik, A. (2012). *Data Visualization: a successful design process*, (1st Ed.). Packt Publishing Ltd.
4. Lanum, C. (2016). *Visualizing Graph Data,* (1st Ed.). Manning.

Books for References

1. Tufte, E. (2001). The Visual Display of Quantitative Information, (2nd Ed.). Graphics Press.
2. Healy, K. (2013). Data Visualization: A Practical Introduction, Princeton.

Websites and eLearning Sources

1. https://www.tableau.com/visualization/what-is-data-visualization
2. https://datacamp.com/blog/data-visualization-techniques
3. https://pll.harvard.edu/course/data-science-visualization

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	understand the key terms in Data Visualization Techniques	**K1**
CO2	enable effective Data Visualization for visual mapping and design	**K2**
CO3	create skills on visual representation of Data	**K3**
CO4	demonstrate understanding of vsualization classification and its techniques	**K4**
CO5	demonstrate and apply the skills in creating different types of Representation	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
6	**24UAI63CC12**			**Core Course - 12:** Data Visualization Techniques						**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	2	3	3	2	2	3	2	**2.4**
CO2	3	3	3	2	2	3	3	3	2	2	**2.6**
CO3	2	1	2	2	2	3	2	3	3	3	**2.3**
CO4	2	3	2	2	2	2	2	3	2	3	**2.3**
CO5	2	3	3	2	2	3	3	2	1	3	**2.4**
Mean Overall Score											**2.42 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	24UAI63CP07	**Core Practical - 7:** Machine Learning and Data Visualization Techniques	3	2

List of Exercises

Machine Learning

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a.CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples
3. Demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and pply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Implement the naïve Bayesian classifier for a sample training data sets to redasa .CSV file. Compute the accuracy of the classifier, considering few test data sets

Data Visualization Techniques

1. Loading and Distinguishing Dependent and Independent parameters
2. Exploring Data Visualization tools
3. Drawing Charts, Graphs, Data mapping, Creating Scatter plot
4. Working with REGEX
5. Visualize Network Data

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	24UAI63ES03A	**Discipline Specific Elective - 3:** Big Data Fundamentals	5	3

Course Objectives
To understand the basic concepts of big data.
To identify the issues of data acquisition and validation.
To impart knowledge on Online transaction and analytical processing.
To analyze distributed data processing concepts.
To evaluate storage and statistical analysis techniques.

UNIT I: Introduction **(15 Hours)**

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: Big data Adoption and Planning Considerations **(15 Hours)**

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: Enterprise Technologies and Big Data Intelligence Business **(15 Hours)**

Online Transaction and Processing (OLTP) - Online Analytical Processing (OLAP) - Extract Transform Load (ETL) - Data Warehouses - Data Marts.

UNIT IV: Big Data Processing Concepts **(15 Hours)**

Introduction - Parallel Data Processing - Distributed Data Processing - Hadoop - Processing Workloads - Cluster - Processing in Batch Mode - Map - Combine - Partition - Shuffle and Sort.

UNIT V: Big Data Storage Technology **(15 Hours)**

On-Disk Storage Devices - NoSQL Database - In-Memory Storage Device - Big Data Analytics Techniques - Quantitative Analysis - Qualitative Analysis -Data Mining - Statistical Analysis - A/B Testing - Correlation-Regression - Machine Learning.

Teaching Methodology	Lecture Based Instruction, Peer Learning, Group Discussion, Videos, PPT, Demonstration, and Hands on sessions

Book for Study

1. Buhler, P., Khattak, W. & Erl, T. (2016). *Big Data Fundamentals: Concepts, Drivers & Techniques,* (1st Ed.). PHI.
   Unit I: Chapters 1, 2 Unit II: Chapter 3
   Unit III: Chapters 4 Unit IV: Chapter 6
   Unit V: Chapter 7 & 8

Books for Reference

1. DT Editorial Services. *Big Data-Black Book (Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization),* (1st Ed.). Dreamtech Press.
2. Mohanty, S., Jagadees, M. & Srivatsa, H. (2013). *Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics*. Apress Media.
3. White, T. (2012). *Hadoop: The Definitive Guide,* (3rd Ed.). O'Reilly Media.

Websites and eLearning Sources

1. https: /www.coursera.org/in/articles/big-data-analytics
2. https://www.tableau.com/learn/articles/big-data-analytics
3. https://www.tibco.com/reference-center/what-is-big-data-analytics
4. https://www.investopedia.com/terms/b/big-data.asp

Course Outcomes		
CO No.	**CO-Statements** On completion of this course, students will	**Cognitive Levels (K-Level)**
CO1	recall the basics of Big Data and its applications.	**K1**
CO2	understand big data planning, processing, Storage techniques and technologies.	**K2**
CO3	apply the cutting-edge tools and technologies to analyze big data.	**K3**
CO4	analyze the functions of various big data technologies and tools.	**K4**
CO5	evaluate the techniques and mechanisms available for big data.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
6	**24UAI63ES03A**			**Discipline Specific Elective - 3:** Big Data Fundamentals					**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	2	1	1	3	3	2	1	1	**2.0**
CO2	3	3	3	2	1	3	3	3	1	1	**2.2**
CO3	2	2	3	2	2	2	3	2	2	1	**2.1**
CO4	3	3	3	1	2	3	2	3	1	1	**2.2**
CO5	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/Week	Credits
6	24UAI63ES03B	**Discipline Specific Elective - 3:** Human Computer Interaction	5	3

Course Objectives
To learn the basic concepts of HCI.
To learn the interactive design methodologies.
To learn the various models and theories in HCI.
To understand the features of mobile app development.
To learn graphical features to design attractive web apps.

UNIT I: Foundations of HCI **(15 Hours)**

The Human: I/O channels – Memory – Reasoning and problem solving; The Computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms. - Case Studies.

UNIT II: Design and Software Process **(15 Hours)**

Interactive Design: Basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process: Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT III: Models and Theories **(15 Hours)**

Models: Cognitive models: Socio-Organizational issues and stakeholder requirements – Communication and collaboration models- Hypertext, Multimedia and WWW.

UNIT IV: Mobile HCI **(15 Hours)**

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools. - Case Studies.

UNIT V: Web Interface Design **(15 Hours)**

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - Case Studies.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Books for Study

1. Dix, A., Finlay, J., Abowd, G. & Beale, R. (2004). *Human Computer Interaction*, Pearson Education, (3rd Ed.). *(Unit I, II & III)*
2. Fling, B. (2009). *Mobile Design and Development*, (1st Ed.). O 'Reilly Media Inc. *(Unit IV)*
3. Bill Scott, B. & Neil, T. (2009). *Designing Web Interfaces*, (1st Ed.). O'Reilly. *(Unit V)*

Books for Reference

1. Kim, G. J. (2015). *Human-Computer Interaction, Fundamentals and Practice*. CRC Press.
2. Helander, M. G. (2014). *Handbook of Human-Computer Interaction*. Elsevier Science.
3. Kim, G. J. (2015). *Human-Computer Interaction: Fundamentals and Practice*. CRC Press.
4. Biele, C. (2021). *Human Movements in Human-Computer Interaction* (HCI). Springer International Publishing.
5. Kumar, S., Raja, R., Tiwari, S. & Rani, S. (2021). *Cognitive Behavior Human Computer Interaction Based on Machine Learning Algorithms*, Wiley.

Website and eLearning Source

1. Android Developer's Guide - available at: http://developer.android.com/

Course Outcomes		
CO No.	**CO-Statements** On completion of this course, students will	**Cognitive Levels (K-Level)**
CO1	understand the foundational concepts of HCI, including human capabilities, computer devices, and interaction paradigms.	**K1**
CO2	apply principles of interactive design and usability engineering to software processes, including prototyping and evaluation techniques.	**K2**
CO3	describe various HCI models and theories, including cognitive models and communication frameworks, and apply them to design problems.	**K3**
CO4	identify the components of the mobile ecosystem and design mobile applications and interfaces considering mobile design principles.	**K4**
CO5	design effective web interfaces using principles such as drag and drop, contextual tools, and process flow, and analyze case studies to understand best practices.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
6	**24UAI63ES03B**			**Discipline Specific Elective - 3:** Human Computer Interaction					**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	1	3	2	2	3	1	**2.4**
CO2	3	2	3	3	2	3	2	3	3	2	**2.6**
CO3	3	3	1	3	2	2	3	3	1	2	**2.3**
CO4	3	2	3	3	3	3	3	1	2	2	**2.5**
CO5	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/Week	Credits
6	24UAI63ES04A	**Discipline Specific Elective - 4:** Deep Learning	5	3

Course Objectives
To understand neural networks, including the limits of traditional computing, machine learning, types of neurons, and soft max output layers.
To understand tensor flow concepts, including variables, operations, placeholders, sessions, variable sharing, graphs, and visualization.
To understand convolutional neural networks, including feature selection, max pooling filters, feature maps, and convolution layers, along with their applications.
To understand Recurrent Neural Networks, including memory cells, sequence analysis, STM, memory-augmented neural networks like NTM, and their applications.
To understand reinforcement learning, including Markov Decision Processes (MDP), Q-learning, and their applications.

UNIT I **(15 Hours)**

The Neural Network – Limits of Traditional Computing – Machine Learning – Neuron–FF Neural Networks–Types of Neurons –Soft max output layers.

UNIT II **(15 Hours)**

Tensor flow–Variables–Operations–Placeholders–Sessions–Sharing Variables – Graphs Visualization.

UNIT III **(15 Hours)**

Convolution Neural Network – Feature Selection–Max Pooling–Filters and Feature Maps–Convolution Layer–Applications.

UNIT IV **(15 hours)**

Recurrent Neural Network –Memory cells–sequence analysis–STM—Memory augmented Neural Networks–NTM—Application.

UNIT V **(15 hours)**

Reinforcement Learning –MDP–Q Learning– Applications.

Teaching Methodology	PPTs, Videos, Online Portals, Hands on Demonstration

Book for Study

1. Buduma, N. & Locascio, N. (2017). *Fundamentals of Deep Learning: Designing Next Generation Machine Intelligence Algorithms.* O'Reilly Media.

   Unit-I: Chapter 1 Unit-II: Chapter 3

   Unit-III: Chapters 5 Unit-IV: Chapters 7&8

   Unit-V: Chapter 9

Books for Reference

1. Patterson, J. & Gibson, A. (2017). *Deep Learning: A Practitioner's Approach* O'Reilly Media.
2. Charniak, E. (2019). *Introduction to Deep Learning.* MIT Press.

Websites and eLearning Sources

1. http://neuralnetworksanddeeplearning.com/
2. https://udlbook.github.io/udlbook/

Course Outcomes		
CO No.	**CO-Statements** On completion of this course, students will	**Cognitive Levels (K - Level)**
CO1	describe the fundamentals of neural networks and differentiate them from traditional computing methods	**K1**
CO2	utilize TensorFlow to define variables, operations, and placeholders within computational graphs.	**K2**
CO3	explain the architecture and components of convolutional neural networks, including feature selection and convolutional layers.	**K3**
CO4	discuss the concept of recurrent neural networks, memory cells, and their applications in sequence analysis	**K4**
CO5	define Markov Decision Processes (MDP) and explain Q-learning algorithms for reinforcement learning, along with their applications	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
6	**24UAI63ES04A**			**Discipline Specific Elective - 4:** Deep Learning						**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	2	2	3	2	3	2	2	**2.3**
CO2	3	3	3	3	2	3	3	3	2	2	**2.7**
CO3	2	2	2	2	2	3	2	2	2	2	**2.1**
CO4	3	3	3	2	2	3	3	3	3	2	**2.7**
CO5	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/Week	Credits
6	24UAI63ES04B	**Discipline Specific Elective - 4:** Natural Language Processing	5	3

Course Objectives
To explore NLP challenges like language modelling, regex, finite-state automata, morphology, tokenization, spelling correction, and edit distance.
To understand N-gram models, smoothing, POS tagging, and Hidden Markov/Maximum Entropy models.
To study CFGs, English rules, tree banks, normal forms, dependency grammar, parsing, ambiguity, and probabilistic methods.
To understand representation, first-order logic, description logics, semantic analysis, word sense disambiguation, and similarity methods.
To explore discourse segmentation, coherence, reference phenomena, and anaphora resolution with algorithms and resources like WordNet and Penn Treebank.

UNIT I: Introduction **(15 Hours)**

Origins and challenges of NLP – Language Modeling: Grammar- based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance.

UNIT II: Word Level Analysis **(15 Hours)**

Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging– Hidden Markov and Maximum Entropy models.

UNIT III: Syntactic Analysis **(15 Hours)**

Context-Free Grammars, Grammar rules for English, Tree banks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs - Feature structures, Unification of feature structures.

UNIT IV: Semantics and Pragmatics **(15 Hours)**

Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, sectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT V: Discourse Analysis and Lexical Resources **(15 Hours)**

Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Co-reference Resolution – Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, Word Net, Prop Bank, Frame Net, Brown Corpus, British National Corpus (BNC).

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions

Books for Study

1. Jurafsky, D. & Martin, J. H. (2014). *Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech.* Pearson Publication.
2. Baldwin, B. (2015). *Language Processing with Java and LingPipe Cookbook.* Atlantic Publisher.
3. Reese, R. M. (2015). *Natural Language Processing with Java.* O'Reilly Media.
4. Indurkhya, N & Damerau, F. J. (2010). *Handbook of Natural Language Processing*, (2nd Ed.). Chapman and Hall/CRC Press.

Books for Reference

1. Tanveer Siddiqui, T. & Tiwary, U. S. (2008). *Natural Language Processing and Information Retrieval*. Oxford University Press.
2. Bird, S., Klein, E. & Loper, E. (2009). *Natural Language Processing with Python*, (1st Ed.). O'Reilly Media.

Websites and eLearning Sources

1. https://www.ibm.com/topics/natural-language-processing
2. https://paperswithcode.com/area/natural-language-processing

Course Outcomes		
CO No.	**CO-Statements** On completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	explain the origins and challenges of NLP, including language modelling techniques such as grammar-based and statistical language modelling.	**K1**
CO2	evaluate N-grams and apply smoothing techniques to improve language modelling.	**K2**
CO3	construct context-free grammars for English and perform syntactic parsing using probabilistic CFGs.	**K3**
CO4	utilize first-order logic and description logics for semantic representation and analysis.	**K4**
CO5	perform discourse segmentation and resolve reference phenomena using various algorithms and lexical resources such as WorldNet and Frame Net.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
6	**24UAI63ES04B**			**Discipline Specific Elective - 4:** Natural Language Processing					**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	3	2	1	2	2	2	2	1	**2.0**
CO2	2	3	3	3	1	2	3	3	2	1	**2.3**
CO3	2	3	3	3	1	2	3	3	3	1	**2.4**
CO4	2	3	3	3	1	2	3	3	3	1	**2.4**
CO5	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/Week	Credits
6	**24UAI63PW01**	Project Work and Viva Voce	**3**	**2**

All the B. Sc. 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 AI based application development or development of machine Learning algorithms.

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.

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.

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/Week	Credits
6	**24UAI63CE01**	Comprehensive Examination	**-**	**2**

UNIT 1: 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.

UNIT III Database Systems

Database - Actionable for DBA. The Entity-Relationship Model – **N**ormalization – Structured Query Language - Procedural Language - Exception Handlers.

UNIT IV: Artificial Intelligence

History-Topics-Applications-Learning methods- Machine Learning and Deep Learning

UNIT V: Computer Networks

Data Communication Networks – Analog and Digital –Digital Signals – Transmission Impairment – Data Link Layer: Error Detection and Correction LAN -Transport Layer - Application Layer - DNS in the Internet - HTTP.