B Sc ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

LOCF SYLLABUS 2025

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) UNDERGRADUATE 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.*

Skill Enhancement Course (SEC): *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 (AECC): *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 (DSE): *These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature. Four courses are offered, two courses each in semester V and VI*

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

Open Elective (OE): *A course chosen from a different discipline or subject area, typically to gain exposure. Students pursuing specific disciplines must select Open Elective courses from the options available across departments as per the college's course offerings. The breadth of Open Elective (OE) Courses is directly linked to the diversity of disciplines offered by the college. Two OE Courses are available, one in each semester V and VI, and are open to students from other departments.*

Self-Learning (SL): *A two-credit course designed to foster students' ability for independent and self-directed learning. There are* Four Self-Learning Courses:

- *Compulsory MOOC on NPTEL-SWAYAM in Semester I or II*
- 'Artificial Intelligence' *as a Self-Learning Course jointly offered by the Departments of CS, AI, IT and Data Science on JosTEL in Semester III*
- *A Department-Specific Self-Learning Course in Semester IV on JosTEL*
- *A Certificate Course in Semester V: Each department will offer ONE certificate Course (45 – 60 hours) that will be creditised in the curriculum.*

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. One of the Core Courses in Sem IV is offered as internship embedded course which contains content related to industry.*

Experiential Learning (EL): *In the sixth semester, students are required to undertake a one credit Project / Industrial visit / Field visit chosen by the department. This component is intended to foster learning by direct experience and application of acquired knowledge to practical settings.*

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:

25	**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
SEC - 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
SL - Self-Learning
OE - Open Elective
PW - Project and Viva Voce
CE - Comprehensive Examination
EL - Experiential Learning
OR - Outreach Programme

EVALUATION PATTERN (UG)

Continuous Internal Assessment

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

Passing minimum: 40 marks

* *The first component is a compulsory online test (JosTEL platform) for 15 marks comprising 7 questions (1 mark) at K1 level and 4 questions (2 marks) at K2 level;* The second component is decided by the course in-charge in accordance with the prescribed K levels.

Question Paper Blueprint for Mid and End Semester Tests

Duration: 2 Hours								**Maximum Marks: 60**
Section		**K levels**						**Marks**
		K1	**K2**	**K3**	**K4**	**K5**	**K6**	
A *(compulsory)*		7						7 × 1 = 7
B *(compulsory)*			5					5 × 3 = 15
C *(either…or type)*				3				3 × 6 = 18
D *(2 out of 3)*	Mid Sem				1(2)	1*		2 × 10 = 20
	End Sem				1*	1(2)		
							Total	**60**

***** *Compulsory*

Question Paper Blueprint for Semester Examination

Duration: 3 Hours						**Maximum Marks: 100**
Section	**K levels**					**Marks**
	K1	**K2**	**K3**	**K4**	**K5**	**K6**	
A *(compulsory)*	10						10 × 1 = 10
B *(compulsory)*		10					10 × 3 = 30
C *(either…or type)*			5				5 × 6 = 30
D *(3 out of 5)*				2(3)	1(2)		3 × 10 = 30
						Total	**100**

***** *Compulsory*

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

Title of the Course	**CIA**	**Semester Examination**	**Final**
• One credit Core Course (Sem 1) • Skill Enhancement Course (NCC and Department Specific)	25 + 25 = 50	50 *(Department)*	100
• Self - Learning Course (Dept Specific) • Comprehensive Examination	25 + 25 = 50	50 *(CoE)*	100
• Value Education • Environmental Studies	50	50 *(CoE)*	100
• Skill Enhancement Course: Soft Skills • Self - Learning Course (Common) • Self - Learning Online Course (NPTEL / SWAYAM) • Certificate Course • Internship	100	-	100
• Project / Industrial Visit / Field Visit	100	-	100

Grading System

The marks obtained in the CIA and semester for each course will be graded as per the scheme provided in Table - 1.

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

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

$$WAM = \frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$$

Where,

Ci - credit earned for the Course i

Gpi - Grade Point obtained for the Course i

Mi - Marks obtained for the Course i

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

WAM - Weighted Average Marks

Classification of Final Results

- For each of the first three parts in the UG Programme, there shall be separate classification on the basis of CGPA, as indicated in Table - 2.
- For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts / Science / Commerce / Management as Outstanding / Excellent / Very Good / Good / Above Average / Average, the marks and the corresponding CGPA earned by the candidate in Part III alone will be the criterion, provided the candidate has secured the prescribed passing minimum in all the five Parts of the programme.
- Grade in Part IV and Part V shall be shown separately and it shall not be taken into account for classification.
- A pass in SHEPHERD will continue to be mandatory although the marks will not be counted for the calculation of the CGPA.
- Absence from an examination shall not be considered as an attempt.

Table - 1: Grading of the Courses

Mark Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below 90	9	A+
70 and above and below 80	8	A
60 and above and below 70	7	B+
50 and above and below 60	6	B
40 and above and below 50	5	C
Below 40	0	RA

Table - 2: Grading of the Final Performance

CGPA	Grade	Performance
9.00 and above	O	Outstanding*
8.00 to 8.99	A+	Excellent*
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appear

**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 considered "Very Good".*

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.

B Sc Artificial Intelligence and Machine Learning					
Programme Structure					
Part	**Semester**	**Specification**	**No. of Courses**	**Hours**	**Credits**
1	1- 4	Languages (Tamil / Hindi / French / Sanskrit)	4	16	12
2	1 - 4	General English	4	20	12
3	1 - 6	Core Course	14	58	39
	1 - 6	Core Practical	7	21	14
	1 & 2	Allied Course	2	12	8
	1 & 2	Allied Practical	-	-	-
	3 & 4	Allied Optional	2	8	6
	3 & 4	Allied Optional Practical	1	4	2
	5 & 6	Discipline Specific Elective	4	16	12
	5	Internship	1	-	1
	6	Project	1	3	2
	6	Project / Industrial Visit / Field Visit	1	-	1
	6	Comprehensive Examination	1	-	2
4	1 - 4	Value Education	4	8	4
	1 & 2	Ability Enhancement Compulsory Course	2	2	3
	2 - 5	Self - Learning	4	-	8
	3 & 4	Skill Enhancement Course	2	4	2
	5 & 6	Open Elective	2	8	4
5	2 - 6	Outreach Programme (SHEPHERD)	-	-	4
	2 - 6	Co-curricular and Extracurricular Activities	-	-	1
	2 - 6	Extra Credit Courses (MOOC) / Certificate Courses	5	-	(15)
		Total	**61**	**180**	**137 (15)**

B Sc ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING PROGRAMME PATTERN									
Course Details							Scheme of Exams		
Sem.	Part	Course Code	Course Type	Title of the Course	Hours	Credits	CIA	SE	Final
1	I	25UTA11GL01	GL	General Tamil - 1	4	3	100	100	100
		25UFR11GL01		Language French - 1					
		25UHI11GL01		Language Hindi - 1					
		25USA11GL01		Language Sanskrit - 1					
	II	25UEN12GE01A	GE	**General English – 1:** Pre-Intermediate Stream	5	3	100	100	100
		25UEN12GE01B		**General English – 1:** Intermediate Stream					
	III	25UAI13CC01	CC Major	**Core Course - 1:** Programming in C	5	4	100	100	100
		25UAI13CC02		**Core Course - 2:** Data Structures and Algorithms	5	3	100	100	100
		25UAI13CP01		**Core Practical - 1:** Programming in C	3	2	100	100	100
		25UAI13AC01	AC Minor	**Allied Course - 1:** Numerical Methods	6	4	100	100	100
	IV	25UHE14VE01	VE	**Value Education - 1:** Essentials of Humanity*	2	1	50	50	50
		25UEN14AE01	AECC	**Ability Enhancement Compulsory Course -1:** Communicative English	-	2	100	-	100
				Total	**30**	**22**			
2	I	25UTA21GL02	GL	General Tamil - 2	4	3	100	100	100
		25UFR21GL02		Language French – 2					
		25UHI21GL02		Language Hindi – 2					
		25USA21GL02		Language Sanskrit - 2					
	II	25UEN22GE02A	GE	**General English – 2:** Pre-Intermediate Stream	5	3	100	100	100
		25UEN22GE02B		**General English – 2:** Intermediate Stream					
	III	25UAI23CC03	CC Major	**Core Course - 3:** Programming in Python	4	3	100	100	100
		25UAI23CC04		**Core Course - 4:** Digital Computer Fundamentals	4	3	100	100	100
		25UAI23CP02		**Core Practical - 2:** Programming in Python	3	2	100	100	100
		25UAI23AC02	AC Minor	**Allied Course - 2:** Statistical Methods	6	4	100	100	100
	IV	25UHE24AE02	AECC	**Ability Enhancement Compulsory Course -2:** Environmental studies*	2	1	50	50	50
		25UHE24VE02	VE	**Value Education - 2:** Fundamentals of Human Rights*	2	1	50	50	50
		25UAI24SL01	SL	Online Courses: (NPTEL/SWAYAM)	-	2	-	100	100
				Extra Credit Courses	-	(3)			
				Total	**30**	**22 (3)**			
3	I	25UTA31GL03	GL	General Tamil - 3	4	3	100	100	100
		25UFR31GL03		Language French – 3					
		25UHI31GL03		Language Hindi – 3					
		25USA31GL03		Language Sanskrit - 3					
	II	25UEN32GE03B	GE	General English – 3: English for Science - 1	5	3	100	100	100
	III	25UAI33CC05	CC Major	**Core Course - 5:** R Programming	4	3	100	100	100
		25UAI33CC06		**Core Course - 6:** Database Systems: Relational and NoSQL	4	3	100	100	100
		25UAI33CP03		**Core Practical - 3:** R Programming	3	2	100	100	100
		25UAI33AO01A	AO Minor	**Allied Optional - 1:** Applied Physics - 1	4	3	100	100	100
		25UAI33AO01B		**Allied Optional - 1:** Principles of Electronics					
		@		**Allied Optional Practical:** Applied Physics	2	-	-	-	-
		@		**Allied Optional Practical:** Electronics					
	IV	25UHE34VE03A	VE	**Value Education - 3:** Social Ethics – 1*	2	1	50	50	50
		25UHE34VE03B		**Value Education - 3:** Religious Doctrine – 1*					
		25UNC34SE01 / 25USS34SE01	SEC	**Skill Enhancement Course – 1:** Introduction to NCC / **Skill Enhancement Course – 1:** Soft Skills	2	1	100	-	100
		25UAI34SL02	SL	Artificial Intelligence (Online)	-	2	100	-	100
		-		Extra Credit Courses	-	(3)			
				Total	**30**	**21 (3)**			
4	I	25UTA41GL04B	GL	General Tamil – 4 - Scientific Tamil (அறிவியல் தமிழ்)	4	3	100	100	100
		25UFR41GL04		Language French – 4					
		25UHI41GL04		Language Hindi – 4					
		25USA41GL04		Language Sanskrit - 4					
	II	25UEN42GE04B	GE	General English – 4: English for Science - 2	5	3	100	100	100
	III	25UAI43CC07	CC Major	**Core Course - 7:** Introduction to Artificial Intelligence	4	3	100	100	100
		25UAI43CC08		**Core Course - 8:** Web Design and Development (Internship Embedded Course)	4	3	100	100	100
		25UAI43CP04		**Core Practical - 4:** Artificial Intelligence	3	2	100	100	100
		25UAI43AO02A	AO Minor	**Allied Optional - 2:** Applied Physics - 2	4	3	100	100	100
		25UAI43AO02B		**Allied Optional - 2:** Communication Electronics					
		25UAI43OP01A		**Allied Optional Practical:** Applied Physics	2	2	100	100	100
		25UAI43OP01B		**Allied Optional Practical:** Electronics					

	IV	25UHE44VE04A	**VE**	**Value Education – 4:** Social Ethics – 2*	2	1	50	50	50
		25UHE44VE04B		**Value Education – 4:** Religious Doctrine – 2*					
		25UNC44SE02 / 25UAI44SE02	**SEC**	**Skill Enhancement Course – 2:** NCC (Special Subject) / **Skill Enhancement Course – 2:** Data Analysis Using Spreadsheet	2	1	100	-	100
		25UAI44SL03	**SL**	**Self Learning:** Web Ethics*	-	2	50	50	50
				Extra Credit Course	-	(3)			
				Total	**30**	**23 (3)**			
5	III	25UAI53CC09	**CC Major**	**Core Course - 9:** Embedded Systems and IoT	4	3	100	100	100
		25UAI53CC10		**Core Course - 10:** Robotics	4	2	100	100	100
		25UAI53CC11		**Core Course - 11**: Neural Networks and Fuzzy Logic	4	2	100	100	100
		25UAI53CP05		**Core Practical - 5:** IoT Programming	3	2	100	100	100
		25UAI53CP06		**Core Practical - 6:** Robotics	3	2	100	100	100
		25UAI53ES01A	**DSE**	**Discipline Specific Elective - 1:** Virtual Reality and Augmented Reality	4	3	100	100	100
		25UAI53ES01B		**Discipline Specific Elective - 1:** Digital Marketing					
		25UAI53ES02A		**Discipline Specific Elective - 2:** Computer Networks	4	3	100	100	100
		25UAI53ES02B		**Discipline Specific Elective - 2:** Security in Computing					
		25UAI53IS01	**IS**	Internship	-	1	100	-	100
	IV	25UAI54OE01	**OE**	**Open Elective - 1 (WS):** Cyber Security	4	2	100	100	100
		25UAI54SL04	**SL**	**Certificate Course:** AI for Everyone	-	2	100	-	100
		-		Extra Credit Courses	-	(3)			
				Total	**30**	**22 (3)**			
6	III	25UAI63CC12	**CC Major**	**Core Course - 12:** Machine Learning	4	3	100	100	100
		25UAI63CC13		**Core Course - 13:** Data Visualization Techniques	4	2	100	100	100
		25UAI63CC14		**Core Course - 14:** Operations Research	4	2	100	100	100
		25UAI63CP07		**Core Practical - 7:** Machine Learning and Data Visualization Techniques	3	2	100	100	100
		25UAI63PW01		Project Work and Viva Voce	3	2	-	100	100
		25UAI63ES03A	**DSE**	**Discipline Specific Elective - 3:** Big Data Fundamentals	4	3	100	100	100
		25UAI63ES03B		**Discipline Specific Elective - 3:** Deep Learning					
		25UAI63ES04A		**Discipline Specific Elective - 4:** Human Computer Interaction	4	3	100	100	100
		25UAI63ES04B		**Discipline Specific Elective - 4:** Natural Language Processing					
		25UAI63EL01A	**EL**	Project / Industry Visit / Field Visit	-	1	100	-	100
		25UAI63EL01B							
		25UAI63EL01C							
		25UAI63CE01	**CE**	Comprehensive Examination*	-	2	50	50	50
	IV	25UAI64OE02	**OE**	**Open Elective - 2:** Gen AI tools	4	2	100	100	100
		-		Extra Credit Courses	-	(3)			
				Total	**30**	**22 (3)**			
1 – 6	V	25UCW65OR01	**OR**	Outreach Programme	-	4			
		25UCW65EC01	**EC**	Co-Curricular & Extra Curricular Activiries		1			
				Total (3 years)	**180**	**137 (15)**			

***For Grade Calculation:** Marks obtained out of 50 will be converted into 100 in the mark statements.

Open Elective - 1 (WS): 5th Semester

School	Course Code	Title of the Course
SCS		
Artificial Intelligence and Machine Learning	25UAI54OE01	Cyber Security
BCA	25UBC54OE01	Digital Marketing
Computer Science	25UCS54OE01	Web User Interface Design
Mathematics	25UMA54OE01	Quantitative Aptitude
Statistics	25UST54OE01	Quality Management and Official Statistics

Open Elective - 2: 6th Semester
Offered to students from other Departments

Department	Course Code	Title of the Course
Artificial Intelligence and Machine Learning	25UAI64OE02	Gen AI tools
Botany	25UBO64OE02	Landscape Designing and Waste Management
Biotechnology	25UBT64OE02	Food Science and Technology
BBA	25UBU64OE02A	Practical Stock trading
	25UBU64OE02B	Export Management
B Com Business Analytics	25UCB64OE02	Personal Investment Planning
B Com Computer Application	25UCC64OE02A	Social Media Marketing
	25UCC64OE02B	Basics of Banking
B Com Strategic Finance	25UCF64OE02	Personal Financial Management
Chemistry	25UCH64OE02	Food & Nutrition
B Com	25UCO64OE02A	Digital Marketing
	25UCO64OE02B	Digital Banking
	25UCO64OE02C	Stock Trading
Computer Science	25UCS64OE02	Design Thinking
BCA	25UBC64OE02	Web Design
Economics	25UEC64OE02	Economics for Competitive Exams
Electronics	25UEL64OE02A	CCTV and Smart Security Systems
	25UEL64OE02B	Entrepreneurial Electronics
English	25UEN64OE02	English for Employability
History	25UHS64OE02	Intellectual Revivalism in Tamil Nadu
Mathematics	25UMA64OE02	Mathematics for Competitive Examinations
Physics	25UPH64OE02A	Laser Technology and its Application
	25UPH64OE02B	Physics of Earth
Statistics	25UST64OE02	Applied Statistics
Tamil	25UTA64OE02	படைப்பிலக்கியம் (Creative writing)
Visual Communication	25UVC64OE02	Digital Media and Production

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25UTA11GL01	பொதுத்தமிழ் – 1: General Tamil - 1	4	3

கற்றலின் நோக்கங்கள் (Course Objectives)
புதிய இலக்கிய வடிவங்களை அறியும் திறனைப் பெறுதல்
எழுத்து சொல் இலக்கணத்தில் இன்றியமையாமையை உணர்தல்
புதுக்கவிதைகளின் கூறுகளை வாழ்வியலோடு பொருத்திப்பார்த்தல்
தமிழ்க்கவிதைகளைப் பிறமொழிக் கவிதைகளோடு ஒப்பிட்டுப் பார்த்தல்
புதுக்கவிதைகளைப் படைக்கும் திறன் பெறுதல்

அலகு-1 **(12 மணி நேரம்)**

பாரதியார் கவிதைகள் - பாஞ்சாலிசபதம்: சபதச் சருக்கம்
பாரதிதாசன் கவிதைகள் - புரட்சிக்கவி : மன்னனின் சர்வாதிகாரம், கவிஞனின் எழுச்சியுரை, கவிஞனின் மொழிப்பற்று, மக்களாட்சி மலரும் விதம்
இலக்கிய வரலாறு - இருபதாம் நூற்றாண்டுத் தமிழ்க்கவிஞர்கள்
உரைநடை - முதல் மூன்று கட்டுரைகள்

அலகு-2 **(12 மணி நேரம்)**

வெ.இராமலிங்கனார் - தமிழ், அரசியல்
முடியரசனார் - தொழிலாளி, துறைதோறும் தமிழே காண்பீர், மொழியுணர்ச்சி
பெருஞ்சித்திரனார் - என்னென்று சொல்வோம், இனியேனும் ஒன்றிணைவீர்
பட்டுக்கோட்டையார் - என் விருப்பம், ஏட்டில் படித்ததோடு இருந்து விடாதே, அன்னசத்திரம் இருப்பதெதனாலே?
இலக்கிய வரலாறு - புதுக்கவிதை வடிவங்கள்
இலக்கணம் - எழுத்து

அலகு-3: சமூகக் கவிதைகள் **(12 மணி நேரம்)**

சுரதா - நெஞ்சில் நிறுத்துங்கள், பூம்புகார்
மு. மேத்தா - உன்னுடைய கொடியை
கண்ணதாசன் - ஆணவம் அழியும்
அப்துல் ரகுமான் - பசி
தங்கம் மூர்த்தி - கூடு திரும்புதல் எளிதன்று
ஜெயபாஸ்கரன் - ஒற்றைக் கேள்வியுடன் ஒருவர்
இலக்கிய வரலாறு - சிறுகதை- உரைநடை
சிறுகதை - முதல் மூன்று கதைகள்

அலகு-4: அரசியல் கவிதைகள் **(12 மணி நேரம்)**

ஈரோடு தமிழன்பன் - எட்டாவது சீர்
யுகபாரதி - பழைய புத்தக வியாபாரி
கனிமொழி - கருவறை வாசனை
அ.வெண்ணிலா - நீரில் அலையும் முகம்
பெருமாள் முருகன் - குழந்தைகளைத் தண்டித்தல்
சீனு ராமசாமி - அகதி
கல்கி சுப்பிரமணியம் - விதியை எழுதினேன்
இலக்கணம் - சொல்

அலகு-5: அயலகக் கவிதைகள் **(12 மணி நேரம்)**

தஸ்லீமா நஸ்ரின் - கல் உடைக்கும் பெண்
மாயா ஏஞ்சலு - கைத்தட்டுங்கள் கொண்டாடுங்கள்
நானிலு கவிதைகள் - 10 கவிதைகள்
உரைநடை - நான்கு முதல் ஆறு வரை உள்ள கட்டுரைகள்
சிறுகதை - நான்கு முதல் ஆறு வரை உள்ள கதைகள்

கற்பித்தல் அணுகுமுறை Teaching Methodology	விரிவுரை **(Lecture),** காணொளிக் காட்சி **(Videos),** விளக்கக் காட்சி **(PPT presentation)**
மதிப்பீட்டு முறைகள் Assessment methods	நூல் நோக்குத் தேர்வு **(Open Book Test),** இயங்கலைத்தேர்வு **(**Online Test), ஒப்படைவு **(Assignment),** வினாடி வினா **(Quiz),** கருத்துரை **(Seminar)**

பாடநூல்:

பொதுத்தமிழ்-1(2025), தமிழாய்வுத்துறை, தூய வளனார் கல்லூரி

Websites and eLearning Sources:

- *https://www.tamilvu.org/library/nationalized/pdf/35-subbureddiyar/452-panjalisabatham.pdf*
- *https://www.annacentenarylibrary.org - https://shorturl.at/KWZx5*
- *https://eluthu.com/kavithai*
- *https://www.tamilvu.org/courses/degree/p103/p1032/html/p1032614.htm*
- *https://kavithaivaasal.blogspot.com/2017/11/blog-post.html*

Course Outcomes

CO No.	***CO-Statements*** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	***Cognitive Levels (K –Levels)***
CO–1	இக்கால இலக்கிய வகைகளைக் கண்டறிவர்	***K1***
CO–2	எழுத்து, சொல்லிலக்கணங்களின் அடிப்படைகளை வகைப்படுத்தி அறிவர்.	***K2***
CO–3	அயலகக் கவிதை வடிவங்கள் குறித்த தெளிவான விளக்கங்களைப் பெறுவர்.	***K3***
CO–4	மொழிபெயர்ப்புக் கவிதைகளைக் கற்பதன் வாயிலாகத் திறனாய்வு செய்யும் திறனை வளர்த்தெடுப்பர்.	***K4***
CO–5	புதுக்கவிதை வாயிலாக வெளிப்படும் சமூக, அரசியல் விழுமியங்களை மதிப்பிடுவர்	***K5***

Relationship Matrix											
Semester	***Course Code***			***Title of the Course***						***Hours***	***Credits***
1	***25UTA11GL01***			பொதுத்தமிழ் – *1: General Tamil - 1*						***4***	***3***
Course Outcomes↓	***Programme Outcomes (PO)***					***Programme Specific Outcomes (PSO)***					***Mean Scores of COs***
	PO-1	***PO-2***	***PO-3***	***PO-4***	***PO-5***	***PSO-1***	***PSO-2***	***PSO-3***	***PSO-4***	***PSO-5***	
CO-1	*3*	*3*	*2*	*2*	*3*	*3*	*3*	*2*	*3*	*3*	*2.7*
CO-2	*2*	*2*	*3*	*2*	*2*	*3*	*2*	*3*	*2*	*3*	*2.4*
CO-3	*3*	*2*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*2*	*2.8*
CO-4	*2*	*2*	*2*	*2*	*1*	*2*	*2*	*3*	*2*	*2*	*2.0*
CO-5	*3*	*2*	*3*	*2*	*2*	*3*	*2*	*2*	*3*	*3*	*2.5*
										Mean Overall Score	***2.48 (High)***

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25UFR11GL01	Language French – 1	4	3

Course Objectives
Familiarize students with the French language through an exploration of francophone culture, traditions, and civilization.
Build fundamental knowledge in listening, speaking, reading, and writing (LSRW) as outlined by the Common European Framework of Reference for Languages (CEFR).
Enable students to understand and use basic grammatical structures and essential vocabulary in context.
Equip students with the skills needed to engage in simple, real-life conversations and interactions in French.
Foster a deeper connection to the language by integrating cultural elements, enhancing motivation and intercultural awareness.

UNIT I **(12 Hours)**

1. Titre - Je Suis
2. Lexique - L'alphabet, les salutations, les loisirs, les nombres
3. Grammaire - Les pronoms personnels sujets, les articles définis et indéfinis, les verbes auxiliaires, les adjectifs de nationalité, l'adjectif interrogatif 'quel'
4. Production orale- se présenter
5. Production écrite - Donner des informations personnelles

UNIT II **(12 Hours)**

6. Titre - Près de moi
7. Lexique – Les lieux, la famille, la situation familiale, les professions
8. Grammaire – les verbes en 'er'au présent, le masculin et le féminin des professions, les adjectifs possessifs
9. Production orale- Demander et dire le lieu d'habitation
10. Production écrite - Présenter et parler de sa famille

UNIT III **(12 Hours)**

11. Titre - Qu'est-ce qu'on mange ?
12. Lexique – les commerces, les commerçants, les aliments, les moyens de paiement
13. Grammaire – le singulier et le pluriel des noms, les prépositions de lieu, les verbes en 'ir'
14. Production orale- faire des courses alimentaires, demander et dire le prix
15. Production écrite - Donner une appréciation, commander au restaurant, créer un menu

UNIT IV **(12 Hours)**

16. Titre - C'est où
17. Lexique – la ville, les monuments, les transports
18. Grammaire – la fréquence, l'impératif, les connecteurs
19. Production orale- demander et indiquer le chemin, se déplacer des transports en commun
20. Production écrite - présenter une ville ou un quartier, créer un guide pour un monument

UNIT V **(12 Hours)**

21. Titre - C'est tendance
22. Lexique – les vêtements, les couleurs, les matières, les objets technologiques, la météo
23. Grammaire – le genre et le nombre des adjectifs, le futur proche, la place des adjectifs, l'adjectif démonstratif
24. Production orale- demander et dire l'utilité d'un produit, parler de la météo
25. Production écrite - Donner une appréciation sur un vêtement, décrire un objet
26. Indian knowledge system- Incorporating hand gestures and expressions to reinforce non-verbal communication in French and assimilating traditional Indian culinary knowledge while learning French food cultures (5%)

Teaching Methodology	Kinesthetic & Multi-Sensory Learning, Rhythm-Based Learning – ex.comptines, Deductive & Explicit Learning- structural approach, oral approach, blended learning, media integration
Assessment Methods	*Oral assessment:* Introduce Oneself – (Rubric –assessed on correct usage of vocabulary, personal pronouns and basic verbs) *TPR activity:* Evaluate comprehension of oral commands like action words. (Rubric –assessed on comprehension, response and reaction time) *Reading comprehension:* Read a simple passage like a personal description, and answer questions. (Rubric –assessed on accuracy of response) *Written assessment:* Write simple structured texts on short personal introduction. (Rubric –Graded on correct grammar, sentence structure, and vocabulary usage)

Books for Study:

1. Mensdorff-Pouilly, L., Opatski, S., Petitmengin, V., Pons, S., Sperandio, C., Djimli, H., &Veldeman-Abry, J. (2022). *Édito A1: Méthode de français* (2nd ed.). Didier FLE, Hatier. (P.1-P.86)

Books for Reference:

1. Dauda, P., Giachino, L., &Baracco, C. (2020). *Génération A1*. Didier.
2. Mérieux, R., &Loiseau, Y. (2012). *Latitudes A1*. Didier.

Websites and e-learning Sources:

1. https://apprendre.tv5monde.com/en
2. https://www.thefrenchexperiment.com
3. https://www.iletaitunehistoire.com
4. https://www.francaisfacile.com
5. https://www.francaisauthentique.com

	Course Outcomes	
CO No.	**CO–Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K –Levels)**
CO1	Recognize and use fundamental vocabulary including greetings, while constructing simple sentences with personal pronouns and basic verbs.	**K1**
CO2	Introduce themselves, ask and answer questions about personal details, express preferences, and engage in role-play conversations related to daily life	**K2**
CO3	Differentiate between definite and indefinite articles, form plural and singular nouns, conjugate regular verbs in the present tense, and use adjectives correctly	**K3**
CO4	Ask for and give directions, order food, discuss weather conditions, describe clothing and objects, and create simple structured texts such as menus, guides, and personal descriptions.	**K4**
CO5	Demonstrate awareness of Francophone culture through language use in real-world scenarios, such as public transport, shopping, dining, and professional settings.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
1	**25UFR11GL01**			Language French – 1					**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	2	1	3	2	1	1	2	3	1.9
CO2	3	2	3	3	1	3	2	3	3	3	2.6
CO3	2	2	2	2	2	2	1	2	2	2	1.9
CO4	3	3	3	3	2	3	2	2	2	3	2.6
CO5	3	2	2	3	3	3	3	2	3	3	2.7
Mean Overall Score											**2.34 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25UHI11GL01	Language Hindi - 1	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)**

1. Swar
2. Vyanjan
3. Barah Khadi
4. Shabd aur Vakya

UNIT II **(12 Hours)**

5. Rishtom ke Naam
6. Gharelu Padartho ke Naam
7. Sangya
8. Hindi Ginthi

UNIT III **(12 Hours)**

9. Sapthah ke Din
10. Sarvanam
11. Vilom Shabd
12. Dr. Abdul Kalam

UNIT IV **(12 Hours)**

13. Sal ke Maheene
14. Shareer ke Ang
15. Visheshan
16. Batcheeth - Dookan mein

UNIT V **(12 Hours)**

17. Janvarom ke Naam
18. Rang
19. Dishayem
20. Adhikal (Introduction)

Teaching Methodology	Peer Instruction Exercise, Videos, PPT, Quiz, Group Discussion
Assessment Methods	Seminar, Quiz, Assignment

Books for Study:

1. *Prathamic Patya Pusthak*, Dakshina Bharath Hindi Prachara Sabha, Thiagaraya Nagar, Chennai, 2022.
2. M. Ravi Chandran, *Concise Trilingual Dictionary,* Lotus Publications, Madurai, 2021.
3. M.kamathaprasad Gupth, *Hindi Vyakaran*, Anand Prakashan, Kolkatta, 2020.
4. *Madyama Patya Pusthak*, Dakshina Bharath Hindi Prachara Sabha, Thiagaraya Nagar, Chennai, 2022.

Books for Reference:

1. Dr. A. P. J. Abdul Kalam, *Mere sapnom ka Bharath*, Prabath Prakashan, Noida, 2020,
2. *Meri Pratham Hindi Sulekh Shabd Gyaan*, Wonder House Books, Noida, 2022.
3. Aravind Kumar, *Sampoorna Hindi Vyakaran our Rachana*, Lucent publisher, 2022.
4. *Adhunik Hindi Vyakaran our Rachana,* Bharati Bhavan Publishers & distributors, 2024.
5. Acharya Ramchandra Shukla, *Hindi Sahitya Ka Itihas*, Prabhat Prakashan, 2023.

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**	**Cognitive Levels (K –Levels)**
	On successful completion of this course, students will be able to	
CO1	Introduction to Hindi sounds.	**K1**
CO2	Acquisition of Hindi Vocabulary.	**K2**
CO3	Sentence formation in Hindi.	**K3**
CO4	Practical application of grammar.	**K4**
CO5	Justify the social & political conditions of Aadhi Kaal in Hindi Literature.	**K5**

Relationship Matrix											
Semester	**Course code**			**Title of the Course**				**Hours/week**			**Credits**
1	**25UHI11GL01**			Language Hindi - 1				**4**			**3**
Course Outcomes (COs)	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scoreof 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	**25USA11GL01**	Language Sanskrit - 1	**4**	**3**

Course Objectives
To improve knowledge in Sanskrit
To train students in reading Sanskrit words
To introduce the fundamental grammar
To coach ethics and improve self-confident
To train the students to use the tenses in Sanskrit

UNIT I **(12 Hours)**

Introduction to Sanskrit

UNIT II **(12 Hours)**

Subhandha shabda vicaraha (akaara, aakaara, ikaara, iikaara)

UNIT III **(12 Hours)**

Vartamankala lat lakaara vakya prayogaha

UNIT IV **(12 Hours)**

Samskrita sharala vakya paricayaha

UNIT V **(12 Hours)**

Selected verses from good saying in Sanskrit

Teaching Methodology	Videos, PPT, Blackboard, Demonstration, Exercises
Assessment Methods	Seminar, Quiz, Group Discussion.

Books for Study:

Shadhamanjari

Books for Reference:

1. Kulapathy, K.M., Sarala Samkrit Balabodh, Bharatiya Vidya Bhavan, Munushimarg Mumbai – 4000 007 2021
2. R.S. Vadhyar & Sons, Book – Sellers and publishers, Kalpathi. Palagahat 678003, Kerala, South Inida, Shabdha Manjari 2022
3. Balasubramaniam R, Samskrita Akshatra Siksha, Vangals Publications, 14th Main road, JP Nagar, Bangalore – 78 2020

Websites and e-Learning Sources:

1. https://www.learnsanskrit.org/static/pdf/vyakarana.pdf
2. https://archive.org/details/in.ernet.dli.2015.382597
3. https://openpathshala.com/sanskrit-grammar-basic/3

Course Outcomes		
CO No.	**CO–Statements**	**Cognitive Levels (K –Levels)**
	On successful completion of this course, students will be able to	
CO–1	Remember and Recall words relating to objects.	**K1**
CO–2	Understand classified vocabulary.	**K2**
CO–3	Apply nouns and verbs	**K3**
CO–4	Analyze different forms of names and verbs	**K4**
CO–5	Appreciate the good saying of Sanskrit Improve the self-values.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
1	**25USA11GL01**			Language Sanskrit - 1						**4**	**3**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PS02**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	1	1	3	2	3	2	3	2	2	2.2
CO-2	2	2	3	3	1	2	2	3	3	2	2.3
CO-3	3	2	2	2	2	2	2	3	3	2	2.3
CO-4	3	2	2	3	2	3	3	3	2	2	2.3
CO-5	3	2	3	2	3	2	2	3	3	3	2.6
Mean Overall Score											**2.34 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25UEN12GE01A	**General English – 1:** Pre-Intermediate Stream	5	3

Course Objectives (CO)
To develop basic listening, speaking, reading, and writing skills
To improve comprehension and fluency in both oral and written communication
To learn language rules to create meaningful written and spoken communication
To learn and integrate new vocabulary to expand language proficiency
To construct grammatically correct sentences and engage in simple conversations

UNIT I: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening for familiar words in stories
	(Practice)	**:**	"The City Mouse and the Country Mouse"
Reading:	**(Skill)**	**:**	Reading aloud
	(Practice)	**:**	"The Peacock and the Crane" "The Curious Monkey"
Grammar:	**(Practice)**	**:**	Nouns: Types; Gender
Vocabulary:	**(Practice)**	**:**	Kinship terms
Speaking:	**(Skill)**	**:**	Repetition of Minimal Pairs
	(Practice)	**:**	Pronunciation of words
Writing:	**(Skill)**	**:**	Using capital letters correctly in names, the pronoun 'I,' days, months, languages, nationalities, sentence beginnings, and book titles
	(Practice)	**:**	Capitalisation

UNIT II: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening to identify phrases and sentences
	(Practice)	**:**	"How to Be Happy in Every Situation"
Reading:	**(Skill)**	**:**	Reading for main ideas
	(Practice)	**:**	"The World is a Mirror"
Grammar:	**(Practice)**	**:**	Countable and Uncountable Nouns; Singular and Plural Nouns; Pronouns
Vocabulary:	**(Practice)**	**:**	Human body vocabulary
Speaking:	**(Skill)**	**:**	Responding to basic questions
	(Practice)	**:**	Simple conversations
Writing:	**(Skill)**	**:**	Writing personal and academic information with correct spelling
	(Practice)	**:**	Using Correct Spelling in Writing

UNIT III: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening for main ideas
	(Practice)	**:**	"Magic Pot"
Reading:	**(Skill)**	**:**	Identifying the message of the story
	(Practice)	**:**	Zen story: "Carry On" Zen story: "Harmony"
Grammar:	**(Practice)**	**:**	Adjectives, Articles and Verbs
Vocabulary:	**(Practice)**		Vegetables and Fruits
Speaking:	**(Skill)**		Using 'be' verbs and adjectives to describe people, things and pictures
	(Practice)		Describing People, Things and Pictures
Writing:	**(Skill)**	**:**	Practising correct punctuation in writing
	(Practice)	**:**	Punctuation

UNIT IV: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening for the main ideas in the story and expressing one's views about them
	(Practice)	**:**	"A Glass of Milk"
Reading:	**(Skill)**	**:**	Understanding the central idea of the story and sharing personal views

	(Practice)	**:**	"Birbal: The Wise Man"
Grammar:	**(Practice)**	**:**	Simple Present Tense
Vocabulary:	**(Practice)**	**:**	Plants, Trees and Flowers
Speaking:	**(Skill)**	**:**	Describing daily routines using the simple present tense
	(Practice)	**:**	Describing one's own routine and a friend's routine
Writing:	**(Skill)**	**:**	**Writing simple sentences in response to questions and on a given topic**
	(Practice)	**:**	Writing Simple Sentences

UNIT V: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening to understand the sequence of ideas
	(Practice)	**:**	A Father and His Son
Reading:	**(Skill)**	**:**	Identifying the implicit idea of the story
	(Practice)	**:**	"The Stone Cutter"
Grammar:	**(Practice)**	**:**	Simple Past Tense
Vocabulary:	**(Practice)**	**:**	Birds, Animals and Insects
Speaking:	**(Skill)**	**:**	Narrating stories, events, or experiences using the simple past tense
	(Practice)	**:**	Narrating a Familiar Story or Past Events
Writing:	**(Skill)**	**:**	Writing a paragraph using a picture by answering questions or describing it.
	(Practice)	**:**	Picture Composition

Teaching Methodology	Lectures, task-based activities, audio-visual listening tasks, guided reading and writing exercises, discussions
Assessment Method	Listening and reading comprehension exercises, verbal presentations, role plays and conversations, writing tasks

Books for Study:
Seeds of English Skills by Dr. M. John Britto, Dr. B. Sam Jerome Sharone, and Dr. S. Sajeev.

	Course Outcomes	
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
CO-1	Recognize basic sounds, words, and simple ideas through listening practice.	**K1**
CO-2	Understand and engage in simple conversations, improving fluency in both oral and written communication.	**K2**
CO-3	Apply grammatical rules to construct meaningful sentences in spoken and written forms.	**K3**
CO-4	Integrate new vocabulary into everyday communication to expand language proficiency.	**K4**
CO-5	Construct grammatically correct sentences and engage in simple conversations, expressing personal experiences and opinions.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
1	**25UEN12GE01A**			**General English – 1:** Pre-Intermediate Stream						**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PS02**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	3	2	3	2	3	2	2	**2.4**
CO2	3	2	2	3	2	3	2	3	2	3	**2.5**
CO3	3	2	2	2	3	2	2	3	2	2	**2.3**
CO4	3	2	2	2	2	2	2	2	2	3	**2.2**
CO5	3	2	3	2	3	2	3	2	3	2	**2.5**
Mean Overall Score											**2.38 (High)**

Semester	Course Code	Title of the Course	Hours/ Week	Credits
1	25UEN12GE01B	**General English – 1:** Intermediate Stream	5	3

Course Objectives
To improve students' ability to listen, speak, read, and write in English through interactive and meaningful activities tailored to real-life contexts.
To enable students to use appropriate vocabulary, grammar, and pronunciation to introduce themselves, express opinions, describe people and places, and engage in conversations.
To equip students with reading strategies to comprehend texts, and apply structured writing methods to express ideas coherently.
To develop students' ability to use common grammar structures accurately and expand their vocabulary through word formation techniques.
To help students apply effective learning strategies to enhance their academic and professional success.

Unit 1: What's in a Name? (15 Hours)

1. Listening:	**(Skill)**	Listening for gist
	(Practice)	"Not Good with Names" by Cynthia Win (a TED talk)
2. Reading:	**(Skill)**	Skimming
	(Practice)	"Eli, the Equation"
3. Grammar:	**(Practice)**	Nouns
4. Vocabulary:	**(Practice)**	Forming compound nouns
5. Study Skill:		Using online dictionaries
6. Speaking:	**(Skill)**	Initiating conversations (Greeting – Starting a conversation with new people – Introducing and answering an introduction)
	(Practice)	Introducing oneself and others in conversations
7. Writing:	**(Skill)**	Narrating a personal anecdote – Using capitals and end mark punctuations in sentences
	(Practice)	Guided Composition: The story of my name

Unit 2: Family is Forever! (15 Hours)

1. Listening:	**(Skill)**	Predicting topics
	(Practice)	"Tracing Roots, Telling Stories"
2. Reading:	**(Skill)**	Scanning
	(Practice)	"Home Lost, Family Found"
3. Grammar:	**(Practice)**	Pronouns
4. Vocabulary:	**(Practice)**	Words related to family and relationships
5. Study Skill:		Recognising your learning style
6. Speaking:	**(Skill)**	Talking about your family (family members and relationships, their personalities and your attachment, family routines, and challenges)
	(Practice)	Talking about your family (in conversations)
7. Writing:	**(Skill)**	Narrating events in chronological order – Using punctuations in numbers
	(Practice)	Controlled Composition: My family history

Unit 3: Nothing is Better than a Good Friend (15 Hours)

1. Listening:	**(Skill)**	Listening for main idea
	(Practice)	"Nothing is better than a good friend"
2. Reading:	**(Skill)**	Predicting
	(Practice)	(Jigsaw reading) Fables about friends: (a) "The Hare with Many Friends" – (b) "The Two Fellows and the Bear" – (c) "The Fox and the Stork" – (d) "The Four Friends and a Hunter"
3. Grammar:	**(Practice)**	Adjectives
4. Vocabulary:	**(Practice)**	Forming nouns, adjectives, verbs and adverbs using suffixes
5. Study skill:		Setting and prioritising language learning goals
6. Speaking:	**(Skill)**	Talking about people (Describing people's appearance and their mannerism – Giving your opinion about people – Expressing what you like and dislike in a person)

	(Practice)	Delivering a short talk about one's best friend
7. Writing:	**(Skill)**	Describing people (What they wear, how they move and seem to feel, and where they are) Using comma in sentences.
	(Practice)	Controlled composition: Describing people in given pictures

Unit 4: The Inner Me **(15 Hours)**

1. Listening:	**(Skill)**	Listening to understand pronunciation
	(Practice)	"The bare necessities" from *The Jungle Book*
2. Reading:	**(Skill)**	Previewing a text
	(Practice)	"The Surprising Benefits of Being an Introvert"
3. Grammar:	**(Practice)**	Articles and Quantifiers
4. Vocabulary:	**(Practice)**	Forming words with different meanings using prefixes
5. Study skill:		Planning a study schedule
6. Speaking:	**(Skill)**	Asking about feelings – Expressing one's feelings
	(Practice)	Talking about feelings in different situations
7. Writing:	**(Skill)**	Describing character traits (Writing about what characters would say or do) Using quotation marks and apostrophes in sentences
	(Practice)	Controlled Composition: Cruel Cinderella

Unit 5: Hometown Appetite **(15 Hours)**

1. Listening:	**(Skill)**	Listening for supporting details
	(Practice)	"The Village that Raised Me"
2. Reading:	**(Skill)**	Questioning circles for active reading
	(Practice)	"Homecoming"
3. Grammar:	**(Practice)**	Prepositions of time, place and movement
4. Vocabulary:	**(Practice)**	Changing words from one class to another
5. Study skill:		Tracking progress in learning
6. Speaking:	**(Skill)**	Describing a place
	(Practice)	Talking about your hometown
7. Writing:	**(Skill)**	Describing objects – Using colon in sentences
	(Practice)	Controlled Composition: Writing posts for social media, describing your college campus and classroom

Teaching Methodology	Lectures, Demonstrations, Discussions, Peer-Review Tasks, Role-plays, Pair and group activities
Assessment Tools	Listening and reading comprehension tasks, Individual talks, Role plays, Controlled and guided compositions

Books for Study:

M.S. Xavier Pradheep Singh, J. Amalaveenus, and A. Napoleon. *English and Me* by Viva Books, 2025.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
CO1	Identify and recall common grammar structures, vocabulary, and pronunciation patterns used in everyday communication.	**K1**
CO2	Demonstrate comprehension of spoken and written texts by summarising key ideas, identifying main points, and making inferences.	**K2**
CO3	Use appropriate vocabulary, grammar, and pronunciation to introduce themselves, express opinions, describe people and places, and engage in meaningful conversations.	**K3**
CO4	Differentiate between various reading and writing strategies, such as skimming, scanning, and structured writing, to effectively interpret and construct texts.	**K4**
CO5	Critically review written and spoken texts for clarity, coherence, and correctness, providing constructive feedback for improvement.	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
1	**25UEN12GE01B**		**General English – 1:** Intermediate Stream						**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	2.5	3	3	2.5	3	3	2.5	2.5	3	2.8
CO2	2.5	3	2.5	2.5	2.5	3	3	2.5	2.5	3	2.7
CO3	3	2.5	2.5	3	3	2.5	2.5	2.5	3	2.5	2.7
CO4	2.5	2.5	2.5	3	2.5	2.5	2.5	3	2.5	2.5	2.6
CO5	3	2.5	2.5	2.5	3	2.5	2.5	2.5	3	2.5	2.65
Mean Overall Score											**2.69 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25UAI13CC01	**Core Course - 1:** Programming in C	5	4

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 **(15 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 **(15 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 **(15 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 **(15 Hours)**

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

UNIT V: Files **(15 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.
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
CO1	Define and understand the basic concepts in C Programming.	**K1**
CO2	Explain and execute programs to explore the concepts of loops 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	**25UAI13CC01**			**Core Course - 1:** Programming in C					**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	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	25UAI13CC02	**Core Course - 2:** Data Structures and Algorithms	5	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: Arrays **(15 Hours)**

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

UNIT II: Stacks **(15 Hours)**

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

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

Basic terminologies - Definition and concepts - Representation of Binary tree - Binary tree traversal.

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

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

UNIT V: Algorithm Development **(15 Hours)**

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.
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
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	**25UAI13CC02**	**Core Course - 2:** Data Structures and Algorithms					**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
1	25UAI13CP01	**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	25UAI13AC01	**Allied Course - 1:** Numerical Methods	6	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 **(18 Hours)**

Solution of algebraic and transcendental equations-Bisection method - Method of successive Approximations or iteration method -The method of False Position- Newton Raphson

UNIT II **(18 Hours)**

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

UNIT III **(18 Hours)**

Interpolation with equal intervals - Newton's forward and backward difference formulae - Approximation of derivatives using interpolation polynomials- Interpolation with unequal intervals - Divided differences- Newton's divided interpolation formula for unequal intervals - Lagrange's interpolation.

UNIT IV **(18 Hours)**

Numerical integration - Trapezoidal rule - Romberg's Method - Simpson's 1/3 -Single step methods - Taylor's series method

UNIT V **(18 Hours)**

Euler's method - Modified Euler's method – Runge Kutta method for solving equations - Milne's Predictor Corrector formulae.

Teaching Methodology	Chart, PPT, chalk and talk
Assessment Methods	Seminar, Snap Test, MCQ

Books for Study:

1. Venkataraman, M. K. (2000). *Numerical Methods in Science and Engineering*, (5th Ed.). National Publishing Company.
   Unit I: Chapter 3 (Sec: 2, 3,4,5)
   Unit II: Chapter 4 (Sec: 2, 6)
   Unit III: Chapter 6 (Sec: 3, 4), Chapter 8 (Sec:1,3, 4)
   Unit IV: Chapter 9 (Sec: 7, 8, 9, 10), Chapter 11 (Sec 6)
   Unit V: Chapter 11 (Sec 10, 12, 13,20)

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.

Websites and eLearning Sources:

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

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
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	**25UAI13AC01**		**Allied Course - 1:** Numerical Methods							**6**	**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	2	3	2	2	3	2	2	3	2	**2.4**
CO2	2	3	2	3	2	3	2	3	2	1	**2.3**
CO3	2	2	3	2	1	3	3	2	3	1	**2.2**
CO4	3	3	2	3	2	3	3	2	3	2	**2.6**
CO5	2	2	3	2	1	3	2	3	2	1	**2.1**
										Mean Overall Score	**2.4 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	25UHE14VE01	**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 holistic development
To assimilate human values comprehensively

UNIT I: 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: Human Personality (6 Hours)

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

UNIT III: Human Development (6 Hours)

Areas of Development: Physical, Intellectual, Emotional, Social Development, Moral & Spiritual development – Practical Sessions on Health and Wellness

UNIT IV: Responsible Parenthood (6 Hours)

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

UNIT V: Gender Equality and Empowerment (6 Hours)

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

Teaching Methodology	Power point
Assessment Methods	Seminars, Reports, Group Discussion, Online Tests, Assignments

Books for Study:

1. Department of Human Excellence. (2023). *Essentials of Humanity.* St. Joseph's College.

Books for Reference:

1. Alex, K. (2009). *Soft Skills.* S. Chand.
2. Norman Vincent Peale (1952). *The Power of Positive Thinking Norman Vincent Peale.* New York Times
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. https://www.psychologytoday.com/us/basics/defense-mechanisms.Accessed 12 March 2025.
3. http://www.apa.org/topics/personality#. Accessed 05 March 2021.
4. http://www.peacecorps.gov/educators/resources/global-issues-gender-equaligy-and-womens-empowerment/. Accessed 05 March 2021.
5. https://www.nextias.com/blog/women-empowerment/Accessed 12 March 2025.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	Recall the prescribed values and the 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	**25UHE14VE01**			**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**	**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
2	25UTA21GL02	பொதுத்தமிழ் – 2: General Tamil -2	4	3

கற்றலின் நோக்கங்கள் (Course Objectives)
காப்பியங்களின் தோற்றம், வரையறை, வகைகள் ஆகியவற்றை அறிந்து கொள்ளல்
பெருங்காப்பியம், சிறுகாப்பியம் இடையேயான வேறுபாட்டைக் கண்டறிதல்
சைவ வைணவ சமயப் பாடல்களில் சிறப்பினை ஒப்பிடுதல்
காப்பியங்கள் வெளிப்படுத்தும் விழுமியங்களையும் உணர்தல்
சமூகத்திற்கும், காப்பியத்திற்குமான பிணைப்புகள் குறித்துத் தெரிந்துகொள்ளுதல்

அலகு-1 **(12 மணி நேரம்)**

சிலப்பதிகாரம் - ஆய்ச்சியர் குரவை
மணிமேகலை – ஊர் அலர் உரைத்த காதை
இலக்கிய வரலாறு – சைவம் வளர்த்த தமிழ் முதல் புராணங்கள் முடிய
இலக்கணம் – அகப்பொருள் இலக்கணம்

அலகு-2 **(12 மணி நேரம்)**

திருநாவுக்கரசர் – திருவதிகை வீரட்டானம்
(கூற்றாயினவாறு எனத் தொடங்கும் முதல் 10 பாடல்கள்)
திருவாசகம் - அடைக்கலப்பத்து
(செழுக்கமலத் திரளனநின் எனத் தொடங்கும் முதல் 10 பாடல்கள்)
திருமந்திரம் – மாகேசுர பூசை (11 பாடல்கள்)
சிவவாக்கியர் பாடல்கள் (15 பாடல்கள்)
பாடல் எண்கள் – 16,22,27,33,34,35,37,38,47,81,91,225,237,242,495

அலகு-3 **(12 மணி நேரம்)**

பெரியாழ்வார் திருமொழி – திருப்பல்லாண்டு – தாலப்பருவம் (10 பாடல்கள்
திருமங்கையாழ்வாரின் பெரிய திருமொழி – திருவரங்கம் -1 (10 பாடல்கள்)
கம்பராமாயணம் – கங்கை காண் படலம் - (தேர்ந்தெடுக்கப்பட்ட 35 பாடல்கள்)
பாடல் எண்கள்: 1, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 22, 24, 25, 26, 27, 29, 30, 32,33,35,39,40,41,42,43,47,62,64,65,67,69,70
நற்றமிழ்க் கோவை – முதல் மூன்று கட்டுரைகள்.

அலகு-4 **(12 மணி நேரம்)**

சீறாப்புராணம் – நதி கடந்த படலம் – 1 முதல் 31 முடிய உள்ள பாடல்கள்
கள்வரை நதிமறித்த படலம் – 1 முதல் 16 முடிய உள்ள பாடல்கள்
இலக்கணம் – புறப்பொருள் இலக்கணம்
இலக்கிய வரலாறு – தமிழ் இலக்கண நூல்கள் முதல் சிற்றிலக்கியங்கள் முடிய

அலகு-5 **(12 மணி நேரம்)**

வீரமாமுனிவரின் தேம்பாவணி – (காசா) காசை சேர் படலம்
(1 முதல் 50 முடிய உள்ள பாடல்கள்)
சீனயி (சீனாய்) - மாமலை காண்படலம் -(1 முதல் 56 முடிய உள்ள பாடல்கள்)
நற்றமிழ்க் கோவை – இறுதி மூன்று கட்டுரைகள்.

கற்பித்தல் முறை (Teaching Methods)	விரிவுரை **(Lecture),** காணொளிக் காட்சி **(Videos),** விளக்கக் காட்சி **(PPT presentation)**
மதிப்பீட்டு முறைகள் (Assessment Pattern)	இயங்கலைத்தேர்வு **(Online Test),** நூல் நோக்குத் தேர்வு (open book test) ஒப்படைவு **(Assignment),** வினாடி வினா **(Quiz),** கருத்துரை **(Seminar)**

பாடநூல்கள்:

1. பொதுத்தமிழ் (2025), தமிழாய்வுத்துறை, தூய வளனார் கல்லூரி
2. நற்றமிழ்க் கோவை - கட்டுரைத்தொகுப்பு (2025), தமிழாய்வுத்துறை வெளியீடு, தூய வளனார் கல்லூரி

Websites and eLearning Sources:

1. https://www.tamiluniversity.ac.in/english/library2-/digital-library/
2. https://www.tamilvu.org/ta/library-l3100-html-l3100pl1-132372
3. https://www.tamilvu.org/ta/courses-degree-p202-p2021-html-p202121-28011
4. https://www.chennailibrary.com/vaishnava/naalayiradivyaprabhandham.html

5. https://www.tamilvu.org/ta/library-l4310-html-l4310por-141616
6. https://www.tamilvu.org/slet/l4100/l4100pd2.jsp?bookid=80&pno=287

Course Outcomes

CO No.	CO–Statements **இப்பாடத்தின் நிறைவில் மாணவர்கள்**	Cognitive Levels (K –Levels)
CO–1	பழந்தமிழர் வாழ்வியலையும் பன்முக ஆளுமைகளையும் அறிவர்	K1
CO–2	தமிழரின் பல்துறை அறிவு, மரபு போன்றவற்றை அறிந்து கொள்வர்.	K2
CO–3	பெருங்காப்பிய மரபிற்குள் வரும் இலக்கியங்களை அடையாளம் காண்பதோடு அவற்றை விளக்கும் திறனையும் பெறுவர்.	K3
CO–4	புராண இதிகாச மரபுகளிலிருந்து, காப்பியம் என்னும் புதிய இலக்கிய வடிவம் உருவான விதத்தை மதிப்பிடுவர்.	K4
CO–5	இலக்கிய வரலாறு, இலக்கணம், காப்பியங்கள் ஆகியவற்றைக் கற்பதன் வழி போட்டித் தேர்வுகளை எதிர்கொள்ளும் திறன் பெறுவர்	K5

Relationship Matrix											
Semester	Course Code			Title of the Course						Hours	Credits
2	25UTA21GL02			பொதுத்தமிழ் – 2: General Tamil - 2						4	3
Course Outcomes↓	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	2	3	2	3	3	3	3	3	3	3	2.8
CO-2	3	2	2	2	2	3	3	3	2	2	2.4
CO-3	2	3	1	3	1	3	3	3	1	2	2.2
CO-4	3	3	2	3	1	3	3	3	1	3	2.5
CO-5	3	3	2	2	3	3	3	2	2	2	2.5
Mean Overall Score											2.48 (High)

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	**25UFR21GL02**	Language French – 2	**4**	**3**

Course Objectives
Develop Communicative Competence in French enabling students to engage in simple, real-life conversations and interactions
Master Fundamental Grammar and Vocabulary by understanding and applying essential grammatical structures in context
Explore Francophone Culture and Civilization by integrating cultural elements of French-speaking regions
Enhance Practical Language Use in Everyday Situations
Express Ideas in Different Contexts Using Appropriate Tenses

UNIT I **(12 Hours)**

1. Titre - Qu'est-ce qu'on fait aujourd'hui ?
2. Lexique –l'heure, les activités quotidiennes, la description physique
3. Grammaire –les verbes pronominaux au présent, le passé récent, la fréquence
4. Production orale- demander l'heure, proposer une sortie
5. Production écrite - présenter ses activités quotidiennes, décrire une personne

UNIT II **(12 Hours)**

6. Titre - Chez -moi
7. Lexique – le logement, les meubles, les pièces, l'équipement
8. Grammaire – le passe compose avec avoir, les pronoms COD
9. Production orale- s'informer sur un logement
10. Production écrite - expliquer un problème domestique, écrire une annonce pour un logement

UNIT III **(12 Hours)**

11. Titre - En forme
12. Lexique – les parties du corps, les maladies, les médicaments, les sports
13. Grammaire –Le passé composé avec être, le pronom 'y',
14. Production orale- parler de sa santé, exprimer une émotion positive
15. Production écrite - Donner un conseil, exprimer son accord ou son désaccord

UNIT IV **(12 Hours)**

16. Titre - Bonne vacances
17. Lexique – les destinations, l'hébergement, la réservation, la nature
18. Grammaire – la comparaison, les verbes impersonnels à l'imparfait comme c'était
19. Production orale- réserver une chambre a l'hôtel, décrire une ville ou un paysage
20. Production écrite - réaliser une brochure touristique, écrire une carte postale

UNIT V **(12 Hours)**

21. Titre - Au travail
22. Lexique – les études, les disciplines, les lieux de travail, les taches
23. Grammaire – la durée, les pronoms relatifs
24. Production orale- parler de ses études et son projet professionnel
25. Production écrite - comparer le système scolaire français et indien
26. Indian knowledge system–Highlighting on Gurukulam Education System that focuses on traditional teacher-student relationships, oral learning methods, and holistic education while discussing education systems in India vs. France (5%)

Teaching Methodology	Visual-Linguistic Learning, Descriptive & Interpretative Learning, experiential learning, The Lexical Approach, Differentiated Instruction
Assessment Methods	*Role -play:* A mock phone call on hotel reservation, discuss daily routines, housing, and health. (Rubric – graded on grammatical accuracy, and use of appropriate vocabulary) *Picture description activity:* Describe a landscape or travel destination shown in a picture. (Rubric – Assessed on descriptive abilities and vocabulary use) *Experimental learning task:* Doctor-patient conversation about a health issue, Conduct a mock interview about career plans. (Rubric – Assessed on real-life application of language skills) *Project based assessment*: Create a travel brochure for a French-speaking destination, make a poster comparing education in France and India (Rubric – Assessed on Application of language skills in a creative way) *Written assessment*: Write a short daily routine using time expressions, write a postcard describing a recent trip (Rubric – Assessed on ability to write structured texts related to themes)

Books for Study:

1. Mensdorff - Pouilly, L., Opatski, S., Petitmengin, V., Pons, S., Sperandio, C., Djimli, H., & Veldeman - Abry, J. (2022). *Édito A1: Méthode de français* (2nd ed.). Didier FLE, Hatier. (p.87-p.165)

Books for Reference:

1. Dauda, P., Giachino, L., & Baracco, C. (2020). *Génération A1*. Didier.
2. Mérieux, R., &Loiseau, Y. (2012). *Latitudes A1*. Didier.

Websites and eLearning Sources:

1. https://www.podcastfrancaisfacile.com
2. https://www.flevideo.com
3. https://savoirs.rfi.fr/fr
4. https://www.french4me.net/
5. https://apprendre.tv5monde.com/en

Course Outcomes		
CO No.	**CO–Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K –Levels)**
CO1	Talk about daily routines, tell the time, describe people, and propose social outings using appropriate vocabulary and verb structures.	**K1**
CO2	Inquire about housing, describe household items, explain domestic issues, and write advertisements or announcements for accommodations.	**K2**
CO3	Describe body parts, discuss health conditions, give advice, express emotions, and use past tense structures to narrate past experiences.	**K3**
CO4	Make hotel reservations, describe destinations and landscapes, compare experiences, and write postcards or travel brochures.	**K4**
CO5	Discuss education, career plans, and workplace responsibilities while comparing educational systems in France and India.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**25UFR21GL02**			Language 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	2	2	1	1	2	2	2	3	2	2	1.9
CO2	2	2	2	3	1	3	3	2	3	3	2.4
CO3	2	3	2	1	2	2	1	3	2	1	1.9
CO4	3	2	2	2	2	3	2	1	2	3	2.2
CO5	3	3	3	2	3	2	3	2	3	2	2.6
Mean Overall Score											**2.2 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	**25UHI21GL02**	Language 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)**

1. Moun hi Manthra Hay
2. Letter Writing - Chutti Patra
3. Bakthikal - Namakarn
4. Sarkari Kariyalayom Ka Naam

UNIT II **(12 Hours)**

5. Baathcheeth - Aspathal Mein
6. Letter Writing - Rishthedarom ko Patra
7. Bakthikal - Samajik Paristhithiyam
8. Kriya

UNIT III **(12 Hours)**

9. Premchand
10. Kriya visheshan
11. Letter Writing - Naukari Keliye Avedan Patra
12. Bakthikal - Sahithyik Paristhithiyam

UNIT IV **(12 Hours)**

13. Kabeer ke Dohae
14. Samas
15. Letter Writing - Kitab Maangne Keliye Patra
16. Bakthikal - Salient Features, Main Division

UNIT V **(12 Hours)**

17. Anuvad
18. Sandhi
19. Bakthikal - Visheshathayem
20. Apathit Gadyansh

Teaching Methodology	Peer Instruction Exercise, Videos, PPT, Quiz, Group Discussion
Assessment Methods	Group Discussion, Seminar, Snap Test

Books for Study:

1. Viswanath Tripaty. *(2021). Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd.
2. Kamathaprasad Gupth, M. (2020). *Hindi Vyakaran*. Anand Prakashan.
3. Dr. Sadananth Bosalae. *(2020). kavya sarang*, Rajkamal Prakashan.

Books for Reference:

1. Acharya Ramchandra Shukla. (2021). *Hindi Sahitya Ka Itihas*. Prabhat Prakashan.
2. Krishnakumar Gosamy. (2023). *Anuvad vigyan ki Bhumika*. Rajkamal Prakashan.
3. Aravind Kumar. (2022). *Sampoorna Hindi Vyakaran our Rachana*, Lucent publisher.
4. Lakshman Prasad Singh. (2021). *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 the course, the student will acquire thelisted skills	**Cognitive Levels (K-Levels)**
CO1	Find out the Terms & Expressions related to letter writing.	**K1**
CO2	Providing knowledge of Letter writing in Hindi.	**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 Hindi writers	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**				**Hours/ week**		**Credits**	
2	**25UHI21GL02**			Language Hindi – 2				**4**		**3**	
Course Outcomes (Cos)	**Programme Outcomes (Pos)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
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	**25USA21GL02**	Language 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) sarva naama sabdaha

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
Assessment Methods	Seminar, Quiz, Group Discussion.

Books for Study:

1. Saralasamkritham Siksha ,2021
2. Dhaatu Rupa Manjari ,2021

Books for Reference:

1. Paindrapuram Ashram, Srirangam – 620 006 Gopalavimshanthi 2021
2. R.S. Vadhyar & Sons book – Seller and Publishers, Kalpathi, Palghat – 678003, Kerala, South Inida, shabdha manjari
3. Kulapthy, K.M Saral sankrit Balabodh, Bharathiys Vidya Bhavan, Munshimarg Mumbai – 400007, 2020

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**	**Cognitive Levels (K –Levels)**
	On successful completion of this course, students will be able to	
CO–1	Remembering names of different objects, remembering different verbal forms and sandhi	**K1**
CO–2	Contrast different verbal forms Explain good sayings, Relate good saying to life.	**K2**
CO–3	Apply and build small sentences	**K3**
CO–4	Analyze different forms of Verbs and nouns	**K4**
CO–5	Appreciate subhashitas and Sanskrit poetry	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**25USA21GL02**			Language Sanskrit - 2						**4**	**3**
Course Outcomes↓	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	2	1	3	2	2	2	3	3	2	1	2.1
CO-2	3	2	3	2	2	3	2	3	3	2	2.5
CO-3	2	2	3	2	2	2	2	3	3	1	2.1
CO-4	3	2	3	3	1	2	3	3	3	1	2.4
CO-5	3	2	2	2	3	2	2	3	3	1	2.3
Mean Overall Score											**2.28 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	25UEN22GE02A	**General English – 2:** Pre-Intermediate Stream	5	3

Course Objectives (CO)
To strengthen listening and speaking skills for identifying key ideas and details
To improve reading comprehension and analyze different texts
To express ideas clearly in conversations and presentations, using correct grammatical structures.
To develop writing skills by creating clear and structured texts
To assess and improve language use in both spoken and written communication

UNIT I: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening to respond to story-based questions
	(Practice)	**:**	"The Hare and His Friends"
Reading:	**(Skill)**	**:**	Understanding and interpreting proverbs
	(Practice)	**:**	"Necessity is the Mother of Invention"
Grammar:	**(Practice)**	**:**	Present Continuous Tense; Past Continuous Tense
Vocabulary:	**(Practice)**	**:**	Weather and Seasons
Speaking:	**(Skill)**	**:**	Describing on-going actions in the present and the past to describe real-life situations and activities
	(Practice)	**:**	Ongoing Actions: Present & Past
Writing:	**(Skill)**	**:**	Writing a biography of a famous personality using given details
	(Practice)	**:**	Writing a Biography

UNIT II: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening to identify factual details
	(Practice)	**:**	Recycling
Reading:	**(Skill)**	**:**	Reading to convert a story into a meaningful dialogue
	(Practice)	**:**	The Shepherd and the Stranger
Grammar:	**(Practice)**	**:**	Future Expressions: Simple Future & 'Going to'; Simple Present, Present Continuous and Future Continuous Tenses
Vocabulary:	**(Practice)**	**:**	Groceries
Speaking:	**(Skill)**	**:**	Developing conversational fluency by practising conversations on familiar and everyday topics
	(Practice)	**:**	Conversations on Familiar and Everyday Topics
Writing:	**(Skill)**	**:**	Writing clear, respectful and relevant online comments
	Practice	**:**	Writing Online Comments

UNIT III: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening for specific information
	(Practice)	**:**	Telephonic Conversation
Reading:	**(Skill)**	**:**	Reading a news report
	(Practice)	**:**	Iron Age in Tamil Nadu Began 5,300 Years Ago
Grammar:	**(Practice)**	**:**	Present Perfect Tense; Past Perfect Tense
Vocabulary:	**(Practice)**	**:**	Kitchen Utensils and Household Appliances
Speaking:	**(Skill)**	**:**	Using polite expressions in conversations to request, seek permission, grant or refuse permission, and apologise
	(Practice)	**:**	Polite Expressions in Conversations
Writing:	**(Skill)**	**:**	Expressing short reflective ideas in writing
	(Practice)	**:**	Thought for the Day

UNIT IV: **(15 Hours)**

Listening:	**(Skill)**	**:**	Predicting content and vocabulary before listening
	(Practice)	**:**	Our Earth
Reading:	**(Skill)**	**:**	Identifying direct and indirect speech
	(Practice)	**:**	Birbal story: "Hot Iron Test"

Grammar:	**(Practice)**	**:**	Active and Passive Voice
Vocabulary:	**(Practice)**	**:**	Human Diseases
Speaking:	**(Skill)**	**:**	Using polite expressions in conversations to interrupt, make suggestions, and agree or disagree
	(Practice)	**:**	Polite Expressions in Conversations
Writing:	**(Skill)**	**:**	Writing a report on a given topic
	(Practice)	**:**	Report Writing

UNIT V: **(15 Hours)**

Listening:	**(Skill)**	**:**	Listening to understand formal speeches
	(Practice)	**:**	"A Tryst with Destiny" by Jawaharlal Nehru
Reading:	**(Skill)**	**:**	Reading to understand an essay
	(Practice)	**:**	"Secularism"
Grammar:	**(Practice)**	**:**	Adverbs; Prepositions
Vocabulary:	**(Practice)**	**:**	**Occupations**
Speaking:	**(Skill)**	**:**	Delivering a short prepared speech on a familiar or inspiring topic
	(Practice)	**:**	Delivering a Short Speech
Writing:	**(Skill)**	**:**	Writing a clear and well-structured essay on a given topic
	(Practice)	**:**	Essay Writing

Teaching Methodology	Lectures, task-based activities, audio-visual listening tasks, guided reading and writing exercises, discussions
Assessment Method	Listening and reading comprehension exercises, verbal presentations, role plays and conversations, writing tasks

Books for Study:

Dr. M. John Britto, Dr. B. Sam Jerome Sharone, and Dr. S. Sajeev. *Nurturing English Skills*. Emerald Publishers, 2025.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
CO1	Recognize key ideas and details in spoken and written texts, demonstrating effective listening and comprehension skills.	**K1**
CO2	Understand and interpret different types of texts, enhancing reading comprehension and critical thinking abilities.	**K2**
CO3	Apply correct grammatical structures to express ideas clearly in conversations and presentations.	**K3**
CO4	Analyze and organize ideas to write clear, coherent, and well-structured texts for various purposes.	**K4**
CO5	Evaluate and improve language use, refining both spoken and written communication.	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**							**Hours**	**Credits**
2	**25UEN22GE02A**		**General English – 2:** Pre-Intermediate Stream							**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PS02**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	3	2	3	2	3	2	2	**2.4**
CO2	3	2	2	3	2	3	2	3	2	3	**2.5**
CO3	3	2	2	2	3	2	2	3	2	2	**2.3**
CO4	3	2	2	2	2	2	2	2	2	3	**2.2**
CO5	3	2	3	2	3	2	3	2	3	2	**2.5**
Mean Overall Score											**2.38 (High)**

Semester	Course Code	Title of the Course	Hours / Week	Credits
2	25UEN22GE02B	**General English – 2:** Intermediate Stream	5	3

Course Objectives
To develop students' ability to listen, speak, read, and write effectively in English through interactive and contextualised activities.
To improve students' understanding and application of essential grammar concepts, including verb usage, auxiliary verbs, modals, adverbs, and sentence structures.
To equip students with strategies to deduce meanings of unfamiliar words using contextual clues.
To foster students' ability to brainstorm, organise information using graphic organisers, and structure written communication effectively for academic and professional contexts.
To enable students to engage in discussions, express opinions, seek and provide information, and navigate real-life situations confidently through role plays.

Unit 1: My College & Studies **15 Hours**

1. Listening:	**(Skill)**	Distinguishing between main ideas and supporting details
	(Practice)	"A Day in the Life of a College Student" (A conversation)
2. Reading:	**(Skill)**	Recognising the structure of written texts
	(Practice)	"Enter to learn, leave to serve"
3. Grammar:	**(Practice)**	Main Verb
4. Vocabulary:	**(Practice)**	Using synonyms as contextual clues to guess the meaning of unfamiliar words
5. Study skill:		Brainstorming to gather ideas in a group
6. Speaking:	**(Skill)**	Asking for, giving and refusing permission – Requesting – Communication repair: Finding about pronunciation, spelling and meaning.
	(Practice)	Role Play
7. Writing:	**(Skill)**	Writing an outline
	(Practice)	Controlled composition: Writing an outline for a given passage

Unit 2: Travel **15 Hours**

1. Listening:	**(Skill)**	Listening for specific details
	(Practice)	"A Perfect Vacation" (A conversation)
2. Reading:	**(Skill)**	Identifying main ideas and supporting details
	(Practice)	"An Unforgettable Ride"
3. Grammar:	**(Practice)**	Auxiliary Verbs
4. Vocabulary:	**(Practice)**	Using antonyms as contextual clues to guess the meaning of unfamiliar words
5. Study skill:		Mind mapping to visually organise information
6. Speaking:	**(Skill)**	Asking for and giving directions – Asking for and giving information
	(Practice)	Role Play
7. Writing:	**(Skill)**	Writing effective paragraphs
	(Practice)	Free-writing composition: An adventurous journey

Unit 3: My Social Network **15 Hours**

1. Listening:	**(Skill)**	Understanding the sequence of ideas
	(Practice)	"My Virtual Friends" (A conversation)
2. Reading:	**(Skill)**	Comprehending infographics
	(Practice)	"Social Media Etiquette
3. Grammar:	**(Practice)**	Modal Auxiliary Verbs
4. Vocabulary:	**(Practice)**	Using definitions and restatements as contextual clues to guess the meaning of unfamiliar words
5. Study skill:		Using graphic organisers (sequence of events chain, timeline, and storyboard)
6. Speaking:	**(Skill)**	Asking for and giving advice – Asking if someone agrees – Agreeing and disagreeing – Warning someone
	(Practice)	Role Play

7. Writing:	**(Skill)**	Developing stories from hints
	(Practice)	Controlled composition: Developing a story from given hints

Unit 4: Shopping **15 Hours**

1. Listening:	**(Skill)**	Detecting signposts
	(Practice)	"Let's go shopping!" (A conversation)
2. Reading:	**(Skill)**	Recognising transition of ideas
	(Practice)	"Adventures of the Grocery Store"
3. Grammar:	**(Practice)**	Adverbs and WH Question Words
4. Vocabulary:	**(Practice)**	Using examples and illustrations as contextual clues to guess the meaning of unfamiliar words
5. Study skill:		Using graphic organisers (Venn diagram, and cause-and-effect map)
6. Speaking:	**(Skill)**	Offering and accepting help – Asking for and giving opinions – Asking for and saying one's preference – Suggesting – Complaining
	(Practice)	Role Play
7. Writing:	**(Skill)**	Describing actions in a story
	(Practice)	Guided composition: Narrating a story in a comic strip

Unit 5: Ceremonies **15 Hours**

1. Listening:	**(Skill)**	Listening to intonations
	(Practice)	"Happy Birthday to You!" (A conversation)
2. Reading:	**(Skill)**	Understanding moods in a reading passage
	(Practice)	"The Light has Gone out" by Jawaharlal Nehru
3. Grammar:	**(Practice)**	Sentences
4. Vocabulary:	**(Practice)**	Using root words as clues to guess the meaning of words
5. Study skill:		Using graphic organisers (idea wheel, idea web, and concept map)
6. Speaking:	**(Skill)**	Using intonations for different types of sentences – Expressing your feelings and emotions – Congratulating and wishing someone – Expressing sympathy
	(Practice)	Role Play
7. Writing:	**(Skill)**	Expressing emotions in narrative writing
	(Practice)	Controlled composition: Describing emotions and feelings conveyed in a picture story

Teaching Methodology	Lectures, Demonstrations, Discussions, Peer-Review Tasks, Role-plays, Pair and group activities
Assessment Tools	Listening and reading comprehension tasks, Individual talks, Role plays, Controlled and guided compositions

Books for Study:

M.S. Xavier Pradheep Singh, Amalaveenus, and A. Napoleon. English and My World, 2025.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
CO1	Identify key ideas, supporting details, and organisational patterns in spoken and written texts.	**K1**
CO2	Explain the meaning of conversations and passages by recognising their structure, tone, and purpose.	**K2**
CO3	Use appropriate language functions such as requesting, suggesting, and expressing opinions effectively in real-life interactions.	**K3**
CO4	Compare different communication styles and linguistic features in various types of texts and conversations.	**K4**
CO5	Assess the effectiveness of spoken and written communication, providing constructive feedback for improvement.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**25UEN22GE02B**			**General English – 2:** Intermediate Stream						**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO-1	3	2.5	2.5	2.5	2.5	3	2.5	2.5	2.5	3	2.65
CO-2	2.5	3	2.5	2.5	2.5	3	3	2.5	2.5	3	2.7
CO-3	3	2.5	2.5	3	2.5	2.5	2.5	2.5	3	2.5	2.65
CO-4	2.5	2.5	2.5	3	2.5	2.5	2.5	3	2.5	2.5	2.6
CO-5	3	2.5	2.5	2.5	3	2.5	2.5	2.5	3	2.5	2.65
									Mean Overall Score		**2.65 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	25UAI23CC03	**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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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	**25UAI23CC03**			**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	25UAI23CC04	**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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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	**25UAI23CC04**			**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	**25UAI23CP02**	**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/ Weeks	Credits
2	25UAI23AC02	**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	Teaching Methodology Chalk and Talk method, Problem solving
Assessment Methods	Seminar, Snap Test, MCQ

Books 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 465-472,479-480)
   Unit IV: Chapter 18 (Pages 726-759)
   Unit V: Chapter 19 (Pages 769-800)

Books for Reference:

1. 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**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
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	**25UAI23AC02**		**Allied Course -2:** Statistical Methods							**6**	**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	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	3	3	2	3	2	3	2	**2.3**
CO4	1	2	2	2	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	25UHE24AE02	**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 -Subsystems of Earth - Scope and Importance - Various Recycling Methods - Environmental Movements in India – Eco- Feminism - Public awareness - Suggestions to conserve environment

UNIT II: Natural Resources (6 Hours)

Introduction - Food Resources - Land Resources - Forest resources - Mineral Resources - Water Resources - Energy Resources

UNIT III: Ecosystems, Biodiversity and Conservation (6 Hours)

Kinds of Ecosystem - General structure of ecosystem - Functions of Ecosystem - Energy flow and Ecological pyramids - Levels of Biodiversity - Biodiversity at Global Level- 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

Teaching Methodology	Power point and Field visit
Assessment Methods	Seminar, Group Discussion.

Books for Study:

1. Department of Human Excellence, (2025). *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**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
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	**25UHE24AE02**	**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
2	25UHE24VE02	**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 - Human Rights Organizations - NHRC - SHRC.

Teaching Methodology	Power point, Handouts and Group discussion
Assessment Methods	Seminars, Group Discussion, Assignments.

Books 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**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
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	**25UHE24VE02**	**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**	**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	*25UTA31GL03*	**பொதுத்தமிழ்** *– 3: General Tamil - 3*	*4*	*3*

கற்றலின் நோக்கங்கள் (Course Objectives)
சங்க இலக்கியங்களின் இன்றியமையாமையை அறிந்து கொள்ளுதல்
இலக்கியத்தினை நுட்பமாக அறிதலின் வழியாக ஆற்றுப்படுத்தும் திறன் பெறுதல்
இலக்கிய அறநெறிகளைத் தற்கால வாழ்வியலில் பயன்படுத்தும் திறன் பெறுதல்
திணை, துறைகளைப் பகுத்தாராயும் அறிவு பெறுதல்
இலக்கிய இலக்கண நுட்பங்களை வாழ்வியலோடு ஒப்பிடுதல்

அலகு – 1 : ***(12 மணி நேரம்)***

குறுந்தொகை*: குறிஞ்சித் திணை - பரணர் பாடல் (199), முல்லை - ஔவையார் பாடல் (99), மருதம் - கொல்லிக்கண்ணனார் பாடல் (34), நெய்தல் - கச்சிப்பேட்டு நன்னாகையார் பாடல் (172), பாலை - வெண்பூதி பாடல் (174)*

நற்றிணை*: குறிஞ்சி - கபிலர் பாடல் (194), முல்லை - இடைக்காடனார் பாடல் (142), மருதம் – உறையூர்க் கதுவாய்ச் சாத்தனார் பாடல் (370), நெய்தல் - அறிவுடைநம்பி பாடல் (15), பாலை - கணக்காயனார் பாடல் (24)*

ஐங்குறுநூறு: *குறிஞ்சி - அன்னாய் வாழிப் பத்து - அன்னாய் வாழி வேண்டன்னை நம் படப்பை (203), முல்லை - செவிலி கூற்றுப் பத்து - மறியிடைபடுத்த மான்பிணைபோல (401), மருதம் - வேட்கைப் பத்து - வாழி ஆதன் வாழி அவினி (01), நெய்தல் - வெள்ளாங்குருகுப் பத்து - வெள்ளாங் குருகின் பிள்ளை (157), பாலை - உடன்போக்கின் கண் இடைச் சுரத்து உரைத்த பத்து - அறம்புரி அருமறை நவின்ற (387)*

புறநானூறு*: பிசிராந்தையார் (67), அரிசில் கிழார் (146), காக்கைப்பாடினி (278), அள்ளூர் நன்முல்லையார் (306), பரணர் (352)*

அலகு – 2 : ***(12 மணி நேரம்)***

சிறுபாணாற்றுப்படை
இலக்கணம் - *யாப்பு*

அலகு – 3 : ***(12 மணி நேரம்)***

கலித்தொகை*: குறிஞ்சிக்கலி – திருந்திழாய்! கேளாய் எனத் தொடங்கும் பாடல் (64), முல்லைக்கலி – கண் அகன் இரு விசும்பில் எனத் தொடங்கும் பாடல் (101), மருதக்கலி - நறவினை வரைந்தார்க்கும் எனத் தொடங்கும் பாடல் (98), நெய்தல்கலி - இவர்திமில் எறிதிரை எனத் தொடங்கும் பாடல் (135) பாலைக்கலி - அறனின்றி அயல்தூற்றும் எனத் தொடங்கும் பாடல் (2)*

பதிற்றுப்பத்து*: குமட்டூர்க் கண்ணனாரின் புண் உமிழ் குருதி (11), பாலைக் கௌதமனாரின் கயிறு குறு முகவை (22)*

இலக்கிய வரலாறு*: சங்க இலக்கியங்கள், சங்க இலக்கியங்களின் தனித்தன்மைகள்*

அலகு – 4 : ***(12 மணி நேரம்)***

அகநானூறு*: அளிநிலை பொறாது அமரிய முகத்தள் எனத் தொடங்கும் பாடல் (5) , திதலை மாமை தளிர்வனப்பு எனத் தொடங்கும் பாடல் (135), திருந்துஇழை நெகிழ்ந்து எனத் தொடங்கும் பாடல் (387)*

தனிப்பாடல் திரட்டு:- *பிறவிக் குணமும் பழக்கமும் (196), கொடியது (242), பெரியது (244), அரியது (245), இதுவே நலம் (223)*

இலக்கிய வரலாறு: *பதினெண்கீழ்க்கணக்கு நூல்கள்*

அலகு – 5 : ***(12 மணி நேரம்)***

திருக்குறள்*: இனியவை கூறல் (10), நட்பு ஆராய்தல் (80)*

பழமொழி நானூறு*: ஆற்றவும் கற்றார் அறிவுடையார் எனத் தொடங்கும் பாடல் (40), வைத்தனை வைப்பென்று எனத் தொடங்கும் பாடல் (95), உடைப்பெருஞ் செல்வத்து எனத் தொடங்கும் பாடல் (154), தத்தமக்குக் கொண்ட எனத் தொடங்கும் பாடல் (276), நோக்கி அறிகல்லா எனத் தொடங்கும் பாடல் (337)*

இனியவை நாற்பது*:- முதல் பத்து பாடல்கள் (1-10)*
இலக்கணம் - *அணி*
நாடகம் - *விந்தனின் வாழப்பிறந்தவன்*

கற்பித்தல் அணுகுமுறை (Teaching Methodology)	**விரிவுரை** *(Lecture),* **காணொளிக் காட்சி** *(Videos),* **விளக்கக் காட்சி** *(PPT presentation)*
மதிப்பீட்டு முறைகள் (Assesment methods)	**கருத்துரை***(Seminar),* **குழுக் கலந்துரையாடல்** *(Group Discussion),* **உடனடித்தேர்வு** *(Snap Test),* **ஒப்படைவு** *(Assignment)*

பாடநூல்:

1. பொதுத்தமிழ்-3(2025), தமிழாய்வுத்துறை, தூய வளனார் கல்லூரி

பார்வை நூல்கள்:

1. சுப்பிரமணியன். ச. வே (உ.ஆ.), (2003), சங்க இலக்கியம் , கோவிலூர் மடாலயம்

2. கன்னியப்பன்.சிவ (உ.ஆ.), (2004),தனிப்பாடல் திரட்டு, முல்லை நிலையம்

Websites and eLearning Sources:

- *https://learnsangamtamil.com/*
- *https://www.tamilvu.org/library/*

Course Outcomes		
CO No.	***CO-Statements*** **இப்பாடத்தின் நிறைவில் மாணவர்கள்**	***Cognitive Levels (K-Level)***
CO1	சங்க இலக்கியத்தின் தனித்தன்மைகளை அறிவர்	***K1***
CO2	ஆற்றுப்படை இலக்கியங்களைக் கற்பதன் வழி ஆற்றுப்படுத்தும் முறையை இனங்காண்பர்	***K2***
CO3	இலக்கிய நெறிகளை நடப்பியலில் பயன்படுத்துவர்	***K3***
CO4	திணை துறைகளை நன்கு கற்பதன் வாயிலாகப் பாடல்களைப் பகுப்பாய்வர்	***K4***
CO5	யாப்பு, அணியைக் கற்பதன் வாயிலாகப் புதிய இலக்கிய வடிவங்களைப் படைக்கும் திறன் பெறுவர்.	***K5***

Relationship Matrix												
Semester	***Course Code***			***Title of the Course***							***Hours***	***Credits***
3	***25UTA31GL03***			*பொதுத்தமிழ் - 3: General Tamil - 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	*1*	*2*	*2*	*2*	*1*	*3*	*3*	*2*	*3*	*2*	*2.1*	
CO2	*3*	*2*	*1*	*3*	*2*	*3*	*2*	*2*	*3*	*1*	*2.2*	
CO3	*3*	*2*	*1*	*3*	*2*	*3*	*2*	*2*	*3*	*2*	*2.3*	
CO4	*1*	*3*	*2*	*1*	*2*	*3*	*2*	*2*	*2*	*3*	*2.1*	
CO5	*2*	*3*	*2*	*2*	*1*	*3*	*2*	*2*	*2*	*2*	*2.1*	
										Mean Overall Score	***2.16 (High)***	

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	25UFR31GL03	Language French – 3	4	3

Course Objectives	
1	Remember and Construct Narratives applying the *passé composé* with time indicators to recount past events
2	Understand and express personal memories using the *imparfait* in spoken and written communication to articulate likes, dislikes, and past events.
3	Analyze and interpret different housing options and engage in role-play scenarios to negotiate effectively.
4	Describe physical appearance and personality traits using appropriate adjectives, possessives, and comparatives to describe oneself
5	Evaluate future possibilities in science and communication, expressing hopes and possibilities using the *futur simple* and *conditionnel*

UNIT – I **(12 Hours)**

1. Titre - Nouvelles vies
2. Lexique – Parcours de vie, la vie personnelle, scolaire et professionnelle
3. Grammaire – le passé composé -formation, la phrase négative, les indicateurs de temps
4. Production orale- exprimer son intention de faire quelque chose
5. Production écrite - organiser une activité de loisir

UNIT – II **(12 Hours)**

6. Titre - Je me souviens
7. Lexique – le souvenir: la mémoire, les paysages: à la mer, à la montagne
8. Grammaire – l'imparfait -formation, les pronoms 'y' et 'en', la place de l'adjectif
9. Production orale- exprimer le fait d'aimer et de ne pas aimer
10. Production écrite - raconter un souvenir

UNIT – III **(12 Hours)**

11. Titre - Comme à la maison
12. Lexique – le logement et la location, les frais et les services, le cadre de vie
13. Grammaire – les pronoms relatifs, la comparaison, la condition
14. Production orale- jeu de rôle – louer un logement
15. Production écrite - Décrire un logement

UNIT – IV **(12 Hours)**

16. Titre - Tous pareils, tous différents
17. Lexique – l'apparence physique, les traits de caractère
18. Grammaire – les adjectifs indéfinis, les pronoms possessifs, la comparaison
19. Production orale- faire un compliment
20. Production écrite - faire le portrait physique de quelqu'un

UNIT – V **(12 Hours)**

21. Titre - En route vers le futur
22. Lexique – les sciences et les techniques, les technologies de communication
23. Grammaire – le futur simple, la condition avec 'si', le pronom 'on'
24. Production orale- exprimer un espoir – imaginer à l'avenir
25. Production écrite - Décrire l'utilité d'un objet
26. Indian knowledge system - Analyzing narrative structures in Indian epics vs. French literature by comparing the Mahabharata's moral stories especially the Panchatantra stories to French fables. Practicing French future tense by making simple predictions about personal life by referencing Indian astrology (5%)

Teaching Methodology	Project-Based Chronological Learning (PBL), Digital Media Integration, Genre-Specific Writing Approach, Scenario-based learning (SBL)
Assessment Methods	*Podcast creation:* Students record a short podcast episode on "Childhood Memory". (Rubric – assessed on ability to construct narratives using past tenses and expressing experiences. *Debate:* Debate on "Apartment vs. House: Students must compare housing options, rental costs, and services. (Rubric – evaluated on analytical skills through structured argumentation) *Timeline narrative activity:* Create a timeline about "A Typical College Day" (Rubric – Assessed on the ability to recall and construct a chronological narrative using past) *Letter writing:* Write a letter to a friend describing personal experiences. Write a formal inquiry to a landlord about an apartment (Rubric – Assessed on formal and informal written communication skills)

Books for Study:

1. Fafa, C., Gajdosova, F., Horquin, A., Pasquet, A., Perrard, M., Petitmengin, V., Sperandio, C., Dodin, M., &Veldeman-Abry, J. (2022). *Édito A2: Méthode de français* (2nd ed.). Didier FLE, Hatier. (p.13 – p.77)

Books for Reference:

1. Dauda, P., Giachino, L., &Baracco, C. (2016). *Génération A2*. Didier.
2. Girardet, J., &Pecheur, J. (2017). *Écho A2* (2nd ed.). CLE International

Websites and eLearning Sources:

1. https://www.bbc.co.uk/bitesize/subjects/zc7xpv4
2. https://conjuguemos.com/
3. https://www.busuu.com/en/course/learn-french-online
4. https://www.duolingo.com/learn
5. https://www.newsinslowfrench.com/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	Recall using vocabulary related to personal, academic, and professional life, and compose narratives using the *passé composé* and time indicators.	**K1**
CO2	Express experiences and preferences using *imparfait*to recount memories, express likes and dislikes accurately in spoken and written communication.	**K2**
CO3	Comparedifferent housing options and interpret rental-related expenses and services, and engage in role-play scenarios to negotiate accommodations.	**K3**
CO4	Characterise personal traits by describing physical appearance and personality traits, apply possessive and indefinite adjectives, and formulate comparisons effectively.	**K4**
CO5	Discuss advancements in science and communication, express hopes and possibilities using the *futur simple* and *conditionnel*structures.	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**		**Credits**
3	**25UFR31GL03**		Language 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	3	2	3	2	3	1	3	3	3	2.5
CO2	3	2	3	3	1	2	2	2	2	2	2.2
CO3	3	1	3	3	2	2	2	2	1	1	2.0
CO4	2	2	2	2	2	1	2	1	1	1	1.6
CO5	2	3	3	2	2	2	3	3	3	3	2.6
Mean Overall Score											**2.18 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
3	25UHI31GL03	Language 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)**

1. Tera Sneh na Khovoom
2. Samband Bodak
3. Reethikal - Namakarn
4. Chitra Varnan (Basic)

UNIT II **(12 Hours)**

5. Paribakshik Shabdavali
6. Smuchaya Bodak
7. Reethikal - Samajik Paristhithiya
8. Vachan Badalo

UNIT III **(12 Hours)**

9. Vismayadi Bodak
10. Reethikal - Sahithyik Paristhithiyam
11. Beerbal ki Chadurai
12. Patra-Patrikao mein Prakashit Gadyansho ka Patan(Basic)

UNIT IV **(12 Hours)**

13. Avikary Shabdh
14. Reethikal - Main Divisions
15. Ling Badalo
16. Karak

UNIT V **(12 Hours)**

17. Reethikal - Visheshathayem
18. Anuvad
19. Bahu Ki Vidha (One Act Play)
20. Bathcheeth - Kaksha mein

Teaching Methodology	Videos, PPT, Quiz, Group Discussion, Case Based Problem Solving
Assessment Methods	Quiz, Seminar, Assignment

Books for Study:

1. Dr. Sanjeev Kumar Jain. (2023). *Anuwad: Siddhant Evam Vyavhar*. Kailash Pustak Sadan.
2. Kamathaprasad Gupth, M. (2021). *Hindi Vyakaran*, Anand Prakashan.
3. Dr. Sadananth Bosalae. (2020). *kavya sarang*. Rajkamal Prakashan.

Books for Reference:

1. Ramdev. (2021). *Vyakaran Pradeep*. Hindi Bhavan.
2. Lakshman Prasad Singh. (2022). *Kavya Ke Sopan*. Bharathy Bhavan Prakashan.
3. Acharya Ramchandra Shukla. (2021). *Hindi Sahitya Ka Itihas*, Prabhat Prakashan.
4. Krishnakumar Gosamy. (2023). *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**	**Cognitive Levels (K-Level)**
	On successful completion of the course, the student will acquire thelisted skills	
CO1	Categorize the poetics in some selective poems.	**K1**
CO2	Practical application of grammar.	**K2**
CO3	Justify the social & political conditions of Riti Kaal in Hindi Literature.	**K3**
CO4	Find out the dialects of Hindi language.	**K4**
CO5	Illustrate the importance given to family ethics by the youth in the modern period according to "Bahoo Ki vidha" One Act play.	**K5**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**								**Hours**	**Credits**
3	**25UHI31GL03**	Language 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	**25USA31GL03**	Language 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
Assessment Methods	Seminar, Quiz, Group Discussion.

Books for Study:

1. VEDIC LITERATURE
2. RAMODANTAM

Books for Reference:

1. Parameshwara, Ramodantam, LIFCO Chennai 2020
2. R.S. Vadhyar & Sons, Book – sellers and publishers, Kalpathu, Palaghat – 678003, Kerala, south India, History of Sanskrit Literature 2021
3. Kulapathy, K.M Saral Sanskrit Balabodh, Bharathita vidya bhavan, Munshimarg Mumbai – 400 007 2020

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**	**Cognitive Levels (K –Levels)**
	On successful completion of this course, students will be able to	
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	**K2**
CO4	Appreciate the Vedic Philosophy	**K3**
CO5	Evaluate and create new words with upasargas	**K4**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
3	**25USA31GL03**			Language Sanskrit - 3					**4**		**3**
Course Outcomes	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
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/ Weeks	Credits
3	25UEN32GE03B	**General English - 3:** English for Science - 1	5	3

Course Objectives
To enable the students to comprehend the local and global issues through the lessons.
To enable the students to do the tasks centering on Skill Development and Grammar.
To empower the students with interactive skills.
To enhance their taste for reading that will naturally develop their vocabulary power and sentence structures
To develop the listening, speaking and writing skills of students through the prescribed texts.

UNIT I: Encounter Between Humans and Aliens (15 Hours)

1. "They're Made Out of Meat" by Terry Bisson
2. Vocabulary in Context: Meat Words
3. Writing: Informal Letter Writing
4. Speaking: Role Play
5. Grammar: Present Perfect Tense

UNIT II: Life After Death (15 Hours)

6. "The Egg" by Andy Weir
7. Vocabulary in Context: Cide Words
8. Writing: Formal Letter Writing
9. Speaking: Description of a Picture
10. Grammar: Present Perfect Continuous Tense

UNIT III: In Communion with Nature (15 Hours)

11. "A Tiger in the House" by Ruskin Bond
12. Vocabulary in Context: Animals and their babies
13. Writing: Job Application Writing (Writing Covering Letter and Curriculum Vitae)
14. Speaking: Description of an Advertisement
15. Grammar: Past Perfect Tense

UNIT IV: Mystery of Venus (15 Hours)

16. "All Summer in a Day" by Ray Bradbury
17. Vocabulary in Context: Rain Words
18. Writing: Drafting Invitation and Brochure
19. Speaking: Short Academic Presentation
20. Grammar; Past Perfect Continuous

UNIT V: Think Before You Trash (15 Hours)

21. "My Frog Recycles All His Trash" by Kenn Nesbitt
22. Vocabulary in Context: Ecological Words
23. Writing: Preparing an Advertisement
24. Speaking: Welcome Address and Vote of Thanks
25. Grammar: Future Perfect Tense and Future Perfect Continuous Tense

* Speaking Components are meant only for internal tests

Teaching Methodology	Lecture, Multimedia Presentations, Discussion and Enacting
Assessment Methods	Speaking, reading, listening and written tests

Books for Study:

1. Francis, V., Dr. D.R. Edwin Christy and Dr. D. Loyola Innaci. *Lingua Science – I*, St. Joseph's College (Autonomous), Tiruchirappalli.

Books for Reference:

1. Wilfred, D. Best. *Students Companion*. HarperCollins Publishers, 2020.

2. Wren & Martin. *Middle School English Grammar and Composition,* S Chand Publishing, 2023.
3. Carnegie, Dale. *The Quick and Easy Way to Effective Speaking*, Rupa Classics, 2013.

Websites and eLearning Sources:

1. https://jerrywbrown.com/wp-content/uploads/2020/02/They-are-made-out-of-meat-Bisson-Terry.pdf
2. https://www.are.na/block/12921440
3. https://pdfcoffee.com/andy-weir-the-egg-pdf-pdf-free.html
4. https://mrsdelcarmen.weebly.com/uploads/3/0/9/0/30908551/a_tiger_in_the_house_by_ruskin_bond.pdf
5. https://poetry4kids.com/poems/my-frog-recycles-all-his-trash/
6. https://www.stcypriansprimaryacademy.co.uk/wp-content/uploads/2021/01/All-Summer-in-a-Day-by-Ray-Bradbury.pdf

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
CO1	Identify and comprehend the local and global issues through the lessons	**K1**
CO2	Use interactive skills	**K2**
CO3	Develop the Listening and Reading Skills of the learners through teacher-led reading practice	**K3**
CO4	Enhance their Listening, Reading, Speaking, and Writing Skills	**K4**
CO5	Develop their Creative and Critical Thinking and Speaking Skills	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
3	**25UEN32GE03B**			**General English - 3:** English for Science - 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	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	25UAI33CC05	**Core Course - 5:** R Programming	4	3

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 (12 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 Fames, 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 (12 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 (12 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 (12 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 (12 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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.
   UNIT 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		
CO. No	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K-Level)**
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	**25UAI33CC05**			**Core Course - 5:** R Programming					**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	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	25UAI33CC06	**Core Course - 6:** Database Systems: Relational and NoSQL	4	3

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 (12 Hours)

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

UNIT II: Data Modelling (12 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 (12 Hours)

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

UNIT IV: Data Consistency (12 Hours)

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

UNIT V: Database Architecture and NoSQL (12 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
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	**25UAI33CC06**			**Core Course - 6:** Database Systems: Relational and NoSQL					**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	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	25UAI33CP03	**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	25UAI33AO01A	**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, Hand-outs
Assessment Methods	Seminar, Snap Test, MCQ, Online Quiz, Assignment

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**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
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	**25UAI33AO01A**			**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	25UAI33AO01B	**Allied Optional - 1:** Principles of Electronics	4	3

Course Objectives
Understand the working principles of semiconductor devices, including diodes, BJTs, FETs, MOSFETs, and optoelectronic components such as laser diodes and photodiodes.
Analyze electronic circuits, including linear power supplies, voltage regulators, relays, switch-mode power supplies (SMPS), and UPS systems.
Explore different types of sensors and transducers, including resistive, capacitive, and inductive transducers, and their applications in measuring humidity, flow rate, pH, pressure, and thermal conductivity.
Gain knowledge of integrated sensors and their interfacing techniques, including temperature sensors (LM35), Hall effect sensors, opto-isolators, magnetic field sensors, and wearable sensors.
Simulate analog circuits using PSPICE, covering circuit analysis, worst-case design, DC sweep, transfer function analysis, and controlled sources for practical circuit evaluation.

UNIT I: SEMICONDUCTOR DEVICES (12 Hours)

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

UNIT II: Electronic Circuits (12 Hours)

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

UNIT III: Sensors (12 Hours)

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

UNIT IV: Integrated Sensors (12 Hours)

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

UNIT V: PSPICE Simulation for Analog Circuits (12 Hours)

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

Teaching Methodology	Demo Videos, Review, PPT, Exercises, circuit simulation
Assessment method	Circuit design, written assignment, MCQ test, Open book test, snap test

Books for Study:

1. Malvino, A., Bates, D., & Hoppe, P. (2015). *Electronic Principles,* (9th Ed.).
2. Mathivanan, N. (2007). *PC- Based Instrumentation: Concepts and Practice.*
3. Tuinenga, P.W. (2015). *A guide to circuit simulation and Analysis using PSPICE.*

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.*
2. Sinclair, I. (2000). *Sensors and Transducers.*
3. Rahid. (2005). *Introduction to PSPICE using ORCAD for Circuits and Electronics.*

Website and eLearning Source:

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

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
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	**25UAI33AO01B**			**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	25UHE34VE03A	**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 cyber-crime.

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, Cyber-crime, Strategies in committing Cyber Crimes, Factors aiding Cyber Crime, computer Hacking, Cyber Bullying, Telecommunications piracy, Counter Measures to Cyber Crime, Ethical Hacking.

UNIT V: Social Integration (6 Hours)

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

Teaching Methodology	Lecture, PPT, Power point
Assessment Methods	Online Test, Group Discussions

Books 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**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
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 cyber-crime.	**K3**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours/Week**		**Credits**
3	**25UHE34VE03A**		**Value Education - 3:** Social Ethics - 1						**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	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	25UHE34VE03B	**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 **(6 Hours)**

God of salvation

UNIT **(6 Hours)**

Life & Mission of Jesus Christ

UNIT III **(6 Hours)**

The Holy Spirit

UNIT IV **(6 Hours)**

Gospel Values

UNIT V **(6 Hours)**

Mary, the mother of God

Teaching Methodology	Power point, Assignment and Group discussion
Assessment Methods	Online Test, Group Discussions

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**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
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/Week**	**Credits**
3	**25UHE34VE03B**			**Value Education - 3:** Religious Doctrine - 1						**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	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
3	25USS34SE01	**Skill Enhancement Course - 1:** 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 u discussions

UNIT I Communication Skills (6 Hours)

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 (6 Hours)

*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 (6 Hours)

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 (6 Hours)

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

UNIT V (6 Hours)

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

Teaching Methodology	Chart, PPT, chalk and talk, Video Presentation

Books 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.

Websites and eLearning Sources:

1. https://www.indeed.com/career-advice/resumes-cover-letters/communication-skills
2. https://www.seek.com.au/career-advice/article/50-communication-skills-for-the-workplace-your-resume
3. https://southeast.iu.edu/career/files/power-phrases.pdf
4. https://dese.ade.arkansas.gov/Files/20201209124449_Professional-Communication.docx
5. https://www.dol.gov/sites/dolgov/files/ETA/publications/00-wes.pdf
6. https://www.tmu.ac.in/other_websites/cdoe.tmu.ac.in.old/study-material/28-08-2024/COMMON/SEMESTER_2/MAIN_SOFT_SKILLS.pdf
7. https://byjus.com/maths/profit-and-loss-questions/
8. https://www.indiabix.com/

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, the students will be able to	
CO1	Analyse problems directed at testing their cognitive abilities	**K1**
CO2	Present the best of themselves as job seekers and communicate effectively in all contexts	**K2**
CO3	Assess themselves, set goals, and manage conflicts that are expected of a good leader	**K3**
CO4	Enhance numerical ability required for the employees for various transactions	**K4**
CO5	Develop aptitude skills required by the employers	**K5**

Relationship Matrix											
Semester	**Course Code**		**Title of the Course**						**Hours**	**Credits**	
3	**25USS34SE01**		**Skill Enhancement Course - 1:** Soft Skills						**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	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
CO4	2	2	3	3	2	3	3	3	2	2	2.5
CO5	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
3	25UAI34SL02	**Self - Learning:** Artificial Intelligence	-	2

Course Objectives
To introduce the basics of Artificial Intelligence, including its goals, history, and main components.
To teach the fundamentals of data types and collections, focusing on data preprocessing and basic visualization techniques.
To explore machine learning and deep learning, including types of algorithms, the ML process, and real-world applications.
To explain Natural Language Processing and Computer Vision, covering their definitions, challenges, and practical uses.
To discuss the impact of AI in various industries, including ethical considerations and future trends, while examining expert systems.

UNIT I: Introduction to Artificial Intelligence

Artificial Intelligence overview - Goals of Artificial Intelligence - History of Artificial Intelligence - Advantages of Artificial Intelligence - Application Areas of Artificial Intelligence – Components of Artificial Intelligence - Types of AI - Challenges in AI Development - Opportunities in AI Development - Ethical Considerations in AI

UNIT II: Data and AI

Introduction to Data – Data Types- Data Collections – Data Preprocessing – Introduction to Data Visualisation – Basic Charts – AI tools

UNIT III: Machine Learning & Deep Learning

Overview of Machine Learning - Definition of ML-History & Evolution of ML -Types of ML Algorithms - Steps in the ML Process - Applications of ML - Limitations of ML. Overview of Deep Learning - Definition of DL - Working of DL - History & Evolution of DL – Neural Networks - Applications of DL - Limitation of DL-AI Tools

UNIT IV: Natural Language Processing & Computer Vision

Definition of NLP – History of NLP – NLP working – NLP uses – NLP benefits – Challenges of NLP. Introduction to Computer Vision - Scope -Challenges of Computer Vision - Real-World Applications of Computer Vision - Images and their Features - AI Tools

UNIT V: AI in the Modern World

Overview of robotics - Machine Intelligence - Robotics Applications - A Brief History of Robotics
The Seven Areas of AI - AI Applications Across Industries - AI in Solving Human Challenges-The Future of AI - AI in Everyday Life. Definition of an Expert System - Characteristics of an Expert System - Advantages of Expert Systems - Limitations of Expert Systems - AI tools

Teaching Methodology	Lecture-Based Learning, Collaborative Learning, Online Learning Platforms
Assessment Methods	MCQ Test

Books for Study:

1. Gupta, N., and Mangla, R., *"Artificial Intelligence Basics: A Self-Teaching Introduction"*, Mercury Learning and Information, 2020. **(Unit I- Chapter 1, Unit V- Chapter 6)**
2. Shah, Chirag, "*A Hands-On Introduction to Data Science*", Cambridge University Press, 2020. **(Unit II – Chapter 2.1 – 2.4)**
3. Wagh, Sanjeev J., et al., "*Fundamentals of Data Science",* CRC Press, 2021. **(Unit II – Chapter 11.1,11.4)**
4. Shireeshkumar Sharadkumar Rudrawar, Nayana Subhash Ratnaparkhi, "*AI for Everyone: Fundamentals"*, Dnyanopasak Shikshan Mandal's Publibcation,2023 **(Unit I – chapter 2, chapter 6, Unit III – Chapter 3, 4, Unit IV – Chapter 5, Unit V- Chapter -9, Chapter -13)**
5. Gollapudi, Sunila, "*Learn Computer Vision Using OpenCV: With Deep Learning CNNs and RNNs*", Apress, 2019. **(Unit IV – Chapter 1)**

6. Murphy, Robin, “Introduction to AI Robotics”, MIT Press, 2000. (**Unit V – Chapter 1)**

Books for Reference:

1. Russell, Stuart, and Norvig, Peter, “*Artificial Intelligence: A Modern Approach*”, CreateSpace Independent Publishing Platform, 2016.
2. Burns, Samuel, “*Fundamentals of Data Science: Take the First Step to Become a Data Scientist*”, Independently Published, 2019.
3. Gaurav Meena, Kamal Kant Hiran, Mehul Mahrishi, Paawan Sharma, “*Machine Learning and Deep Learning in Real-Time Applications*”, IGI Global, 2020.
4. Kochmar, Ekaterina, “Getting Started with Natural Language Processing”, Manning Publication, 2022.
5. Davies, E. R, “*Computer Vision: Principles, Algorithms, Applications, Learning*”, Academic Press, 2017.
6. Niku, Saeed B., “*Introduction to Robotics: Analysis, Control, Applications*”, Wiley, 2020.

Websites and eLearning Sources:

1. https://www.javatpoint.com/artificial-intelligence-ai
2. https://www.geeksforgeeks.org/machine-learning/
3. https://www.kaggle.com/code/kanncaa1/deep-learning-tutorial-for-beginners
4. https://www.freecodecamp.org/news/natural-language-processing-techniques-for-beginners/
5. https://www.projectpro.io/data-science-in-python-tutorial/computer-vision-tutorial-for-beginners
6. https://www.javatpoint.com/expert-systems-in-artificial-intelligence
7. https://www.javatpoint.com/robotics-tutorial

Course Outcomes
On successful completion of this course, students will be able to
Define key concepts of Artificial Intelligence, including its goals, history, and components.
Explain the different types of data and the importance of data preprocessing for AI applications.
Classify machine learning algorithms and describe the differences between machine learning and deep learning.
Describe the principles and challenges of Natural Language Processing and Computer Vision.
Identify various applications of AI across different industries and discuss ethical considerations.

Week-wise Modules Covered
Week 1 : Introduction to AI
Week 2 : Understanding AI Problem Solving
Week 3 : Data and AI
Week 4 : Introduction to Machine Learning
Week 5 : AI and Images
Week 6 : AI and Language Process
Week 7 : AI and Robots
Week 8 : AI in Everyday Applications
Week 9 : Limitations and Challenges in AI
Week 10 : AI and the Future

Module-wise Topics
Week 1: Introduction to AI
L1: What is AI? – Simple definition and examples
L2: History of AI – Key milestones
L3: AI in daily life – *e-g:* voice assistants, recommendation systems
L4: Types of AI: Narrow AI vs. General AI
L5: AI Ethics: Basic ethical issues in AI – *e-g:* privacy, bias

Week 2: Understanding AI Problem-Solving
L6: How AI solves problems
L7: Introduction to Search Algorithms
L8: Simple Examples of Search Algorithms *e-g*: finding route on a map
L9: AI in games: How computers play simple games
L10: Decision-making in AI

Week 3: Data and AI
L11: What is data in AI?
L12: Introduction to data types and sources
L13: How AI uses data to learn?
L14: AI in data analysis- *e-g:* data sorting and searching
L15: Simple visualizations with data (charts, graphs)

Week 4: Introduction to Machine Learning (ML)
L16: What is Machine Learning?
L17: Types of Machine Learning: Supervised and Unsupervised learning
L18: Training a machine with examples (supervised learning)
L19: How ML is used in everyday apps –e-g: spam filters, recommendation systems
L20: Simple ML algorithms: Classification and Clustering

Week 5: AI and Images
L21: Introduction to Image Recognition
L22: How AI understands images
L23: Basic Image Processing – *e-g.* Detecting objects in photos
L24: Examples: AI in facial recognition and photography apps
L25: Hands-on: Uploading and classifying an image using AI tools

Week 6: AI and Language Process
L26: How AI understands and processes language
L27: Introduction to Natural Language Processing (NLP)
L28: Simple NLP tasks: Text translation and Sentiment analysis
L29: AI in chatbots and Visual Assistants – *e-g*: Siri, Alexa
L30: Hands-on: Simple chatbot

Week 7: AI and Robotics
L31: What are Robots?
L32: How AI controls robots (e-g: movement and decision making)
L33: Examples of AI in robotics: Drones, robots in manufacturing
L34: Introduction to self-driving cars

L35: Controlling a virtual robot

Week 8: AI in Everyday Applications
L36: AI in healthcare – *e-g:* AI in diagnostics and personalized medicine
L37: AI in education – *e-g*: personalized learning
L38: AI in entertainment – e-g: AI in video games and music Recommendation
L39: AI in finance – *e-g:* fraud detection
L40: AI in marketing and advertising – *e-g:* targeted ads

Week 9: Limitations and Challenges in AI
L41: Limitations of AI: What AI can't do yet
L42: Common challenges in AI – *e-g:* data privacy, security
L43: AI biases and fairness
L44: The need for human-AI collaboration
L45: Future trends: What's next for AI?

Week 10: AI and the Future
L46: AI and emerging technologies – *e-g.* Quantum Computing, IIoT
L47: Impact on AI in humans
L48: AI in solving global challenges – *e-g:* climate change, health
L49: Ethical considerations for the future
L50: Wrap-up: Recap of Key Learning

Course Materials

 Recommended Textbooks

1) "Artificial Intelligence: A Modern Approach", Stuart Russell and Peter Norvig, Pearson, 4th Edition, 2020. ISBN: 9780134610993.

Topics Covered: L1, L2, L4, L5, L6, L7, L8, L9, L10, L16, L17, L18, L20, L31, L32, L34, L39, L40, L41, L42, L43, L44, L45, L46 (24)

2) "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems", Aurélien Géron, O'Reilly Media, 2nd Edition, 2019. ISBN: 9781492032649.

Topics Covered: L11, L12, L23, L14, L15, L19, L21, L22, L23, L25, L26, L27, L28, L30 (14) 3) "Deep Learning", Ian Goodfellow, Yoshua Bengio, and Aaron Courville, MIT Press, 1st Edition, 2016. ISBN: 9780262035613.

Topics Covered: L24, L29, L36, L37, L38, L47, L48, L49

 Additional Resources

o https://www.geeksforgeeks.org/search-algorithms-in-ai
o https://towardsdatascience.com/data-analysis-and-ai-3494c95fa994

Assessments and Grading

Weekly Quizzes	: 30
Assignment	: 20
Final Test	: 50

Semester	Course Code	Title of the Course	Hours	Credits
4	25UTA41GL04B	General Tamil – IV: அறிவியல் தமிழ் (Scientific Tamil)	4	3

கற்றலின் நோக்கங்கள் (Course Objectives)
அன்றாட வாழ்வில் அறிவியலின் செல்வாக்கை அறிந்துகொள்ளுதல்
பண்டைத்தமிழர் வாழ்வில் இடம்பெற்ற அறிவியல்கூறுகளைக் கண்டறிதல்
திரைப்படம், நூல் போன்றவற்றைத் திறனாய்வு நோக்கில் ஆராய்தல்
தமிழர்தம் பண்பாடும் அறிவியலும் கொண்ட தொடர்பைப் புலப்படுத்துதல்
படைப்பாற்றல் திறனைக் கண்டறிந்து அறிவியல் படைப்புகளை உருவாக்கல்

அலகு - 1 **(12 மணி நேரம்)**

கணிதவியல்: பார்ப்பார்க்கு அல்லது பணிபு அறியலையே(பதிற்றுப்பத்து : 63) - விசும்பில் ஊழி - ஊழ்-ஊழ் செல்லக் (பரிபாடல் : திருமால் : 4-15) - கண்ணுங்கால் கண்ணும் கணிதமே (சிறுபஞ்சமூலம் :92) - உண்ணாது வைக்கும் பெரும்பொருள் (இன்னா நாற்பது -16)

உயிரியல்: தொல்காப்பியம் : மரபியல் : (27-33) - சிறுவீ ஞாழல் (நற்றிணை 195) - நீடுவெயில் உழந்த (அகநானூறு 335) - வள் இதழ் ஒண் செங்காந்தள் (குறிஞ்சிப்பாட்டு 61-98) -வாள்வரி வயமான் (அகநானூறு 99) -புல்லாகிப் பூடாய்ப் புழுவாய் மரமாகிப் (திருவாசகம்- சிவபுராணம் 26-32

உரைநடைக்கட்டுரை: வியக்க வைக்கும் தமிழரின் அறிவியல்

பயன்முறை கற்றல்: வலைப்பூக்கள் உருவாக்கம்- அறிவியல்கலைச்சொல்லாக்கம்

அலகு - 2 **(12 மணி நேரம்)**

நீரியல்: அம்ம வாழி தோழி (குறுந்தொகை 287) -அம்ம வாழி, தோழி கைம்மிக (அகம் 141: 1-11) -முழங்கு முந்நீர் முழுவதும் வளைஇப் (புறநானூறு-18) -வீங்கு விளிம்பு உரீஇய விசை அமை நோன் சிலை (அகநானூறு-175) -விசும்பு ஆடு பறவை வீழ் பதிப் படர (குறிஞ்சிப்பாட்டு 46-53)- **திருக்குறள்** வான்சிறப்பு - **பதார்த்த சிந்தாமணி :** குளத்து சலந்தானே கொடிதான (27) - ஏரிசலம் வாதமிகு மதுவே (31) -அருவிநீர் மேக மகற்நுங் (39)

ஆழிப்பேரலை: வாழ்க எம் கோ மன்னவர் (சிலப்பதிகாரம் -காடுகாண் காதை15-22)- தீங்கனி நாவல் ஓங்கும்இத் தீவிடை (மணிமேகலை-பீடிகை கண்டு பிறப்புணரந்த காதை (17-22)

உரைநடைக்கட்டுரை: தமிழர்களின் மருத்துவ அறிவியல்

புதினம்: இரா.நடராசன் : சர்க்கஸ்.காம்

அலகு - 3 **(12 மணி நேரம்)**

உலகியல்: நிலம் தீ நீர் வளி விசும்போடு (தொல்.பொருள் 635) - நிலம் நீர் வளி விசும்பு என்ற நான்கின் (பதிற்று 14:1-4) - மண் திணித்த நிலனும் (புறம் 2 1-6)

வானியல்: செஞ்ஞா யிற்றுச் செலவும் (புறம் 30 1-7) - ஆடு இயல் அழல் குட்டத்து புறநானூறு (229) - நெடுவயின் ஒளிறு மின்னுப் பரந்தாங்கு (பதிற்று 24:1-26)

உரைநடைக்கட்டுரை: தமிழ் இலக்கியங்களில் வெளிப்படும் நீர் மேலாண்மையியல்

பயன்முறை கற்றல்: நூல் – திறனாய்வு

அலகு - 4 **(12 மணி நேரம்)**

மருத்துவம்: திருக்குறள்: மருந்து - இரும்பனம் புடையல் ஈகை வான்கழல் (பதிற்றுப்பத்து -42) – ஏற்றி இறக்கி இருகாலும் பூரிக்கும் – (திருமந்திரம் 571) - இல்லையே வாதம் எழில்நடை கோழியாம் (கர்ப்ப வாகடத் திரட்டு-23)

அணு இயற்பியல்: மணிமேகலை : சமயக் கணக்கர் தந்திறங் கேட்ட காதை (105-165) - மேவிய சீவன் வடிவது சொல்லிடில் (திருமந்திரம் –ஏழாம் தந்திரம் 29:1) - அணுவில் அணுவினை ஆதிபிரானை (திருமந்திரம் –ஏழாம் தந்திரம் 28:2) - அண்டப் பகுதியின் உண்டைப் பிறக்கம் (திருவாசகம்- திருவண்டப் பகுதி 106) - அண்டங்கள் எல்லாம் அணுவாக (திருவிளையாடல் புராணம் –அணுவியல் (பாயிரம்-6) - செகத்தையெல்லாம் அணுவளவுஞ் சிதறா வண்ணஞ் (தாயுமானவர் – தந்தை தாய் 6)

உரைநடைக்கட்டுரை: தமிழில் அறிவியல் புனைவுகள்

பயன்முறை கற்றல்: திரைப்படத் திறனாய்வு- ஆவணப் படத்திறனாய்வு

அலகு - 5 **(12 மணி நேரம்)**

கட்டடவியல்: வானம் ஊன்றிய மதலை போல (பெரும்பாண் : 346-351) - விரி கதிர் பரப்பிய வியல் வாய் மண்டிலம் (நெடுநல்வாடை 72-88) - காடுகொன்று நாடாக்கி (பட்டினப்பாலை 283-288) - பெருக்காறு சடைக்கணிந்த பெருமான் சேரும் (தேவாரம் 2801)

பகுத்தறிவியல்: ஓசை உள்ள கல்லை (சிவவாக்கியர் -412)- நட்டகல்லைத் தெய்வமென்று (சிவவாக்கியர்-482)

உரைநடைக்கட்டுரை: அறிவியல் தமிழின் வளர்ச்சி நிலைகள்;

பயன்முறை கற்றல்: பழமொழிகளில் அறிவியல், மூலிகைகளைக் கண்டறிதல்

கற்பித்தல் அணுகுமுறை *(Teaching Methodology)*	விரிவுரை ***(Lecture),*** காணொளிக் காட்சி ***(Videos),*** விளக்கக் காட்சி ***(PPT presentation)***
மதிப்பீட்டு முறைகள் *(Assesment methods)*	வலைப்பூ உருவாக்கம், திரைப்படத் திறனாய்வு, மூலிகை சேகரிப்பு, நூல் திறனாய்வு

பாட நூல்கள்:

1. தமிழாய்வுத்துறை (2025), அறிவியல் தமிழ், தூய வளனார் தன்னாட்சிக் கல்லூரி
2. இரா.நடராசன்; (2010), சர்க்கஸ்.காம், Books for Children
3. மூர்த்தி அ.கி. (2001), அறிவியல் கலைச்சொல் அகராதி, மணிவாசகர் பதிப்பகம்.

பார்வை நூல்கள்:

1. அரிமாப்பாமகன். ஆ (2017), சங்க இலக்கியத்தில் சூழலியல், இராசகுணா பதிப்பகம்
2. குழந்தைசாமி.வா.செ., (2001), அறிவியல்தமிழ், பாரதி பதிப்பகம்

Websites and eLearning Sources:

- https://www.tamilcomputingjournal.org/?page_id=2622
- https://archive.org/details/dli.jZY9lup2kZl6TuXGlZQdjZl3lMyy
- https://thamizhiyal.com/?p=2775
- https://www.valaitamil.com/jan-month-Article_19160.html

Course Outcomes

CO No	***CO–Statements*** **இப்பாடத்தின் நிறைவில் மாணவர்கள்**	***Cognitive Levels (K –Levels)***
CO -1	அன்றாட வாழ்வில் அறிவியலின் செல்வாக்கை அறிந்துகொள்வர்	***K1***
CO -2	பண்டைத்தமிழர் வாழ்வில் இடம்பெற்ற அறிவியல்கூறுகளைக் கண்டறிவர்	***K2***
CO -3	திரைப்படம், நூல் போன்றவற்றைத் திறனாய்வு நோக்கில் ஆராய்வர்	***K3***
CO -4	தமிழர்தம் பண்பாடும் அறிவியலும் கொண்ட தொடர்பைப் புலப்படுத்துவர்	***K4***
CO -5	படைப்பாற்றல் திறனைக் கண்டறிந்து அறிவியல் படைப்புகளை உருவாக்கும் திறன் பெறுவர்	***K5***

Relationship Matrix											
Semester	***Course Code***			***Title of the Course***						***Hours***	***Credits***
4	***25UTA41GL04B***			*General Tamil – IV:* அறிவியல் தமிழ் *(Scientific Tamil)*						***4***	***3***
Course Outcomes↓	***Programme Outcomes (PO)***					***Programme Specific Outcomes (PSO)***					***Mean Scores of COs***
	PO-1	***PO-2***	***PO-3***	***PO-4***	***PO-5***	***PSO-1***	***PSO-2***	***PSO-3***	***PSO-4***	***PSO-5***	
CO-1	*3*	*2*	*3*	*2*	*2*	*3*	*3*	*2*	*2*	*2*	*2.4*
CO-2	*2*	*3*	*3*	*2*	*3*	*2*	*3*	*2*	*3*	*2*	*2.5*
CO-3	*3*	*2*	*2*	*3*	*3*	*3*	*2*	*3*	*3*	*3*	*2.7*
CO-4	*2*	*3*	*3*	*2*	*2*	*3*	*2*	*3*	*3*	*2*	*2.5*
CO-5	*3*	*1*	*2*	*3*	*2*	*2*	*3*	*2*	*3*	*3*	*2.4*
									Mean Overall Score		***2.5 (High)***

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	**25UFR41GL04**	Language French – 4	**4**	**3**

Course Objectives
Express preferences and opinions with precision using quantity expressions, and pronouns to convey satisfaction or dissatisfaction.
Describe Health Conditions and provide medical advice using appropriate grammatical structures to engage in meaningful discussions
Communicate Effectively in Social and Professional Settings by expressing desires and requests and using polite expressions
Exchange Travel Information and construct well-structured narratives to recount journeys
Enhance communication through structured language with contextually appropriate statements across various topics

UNIT – I **(12 Hours)**

1. Titre - En cuisine
2. Lexique – les aliments, la restauration, les goûts et les sensations
3. Grammaire – les quantités et le pronom ‘en’, la restriction ‘ne…que’, l’obligation
4. Production orale- communiquer au restaurant
5. Production écrite - exprimer sa satisfaction et son insatisfaction

UNIT – II **(12 Hours)**

6. Titre - A votre sante
7. Lexique – les corps et la sante, la médecine et les urgences
8. Grammaire – les pronoms COD et COI, le superlatif, les pronoms interrogatifs
9. Production orale- parler des problèmes de santé
10. Production écrite - Donner un conseil pour une condition médicale

UNIT – III **(12 Hours)**

11. Titre - Dans les médias
12. Lexique – les médias audios et les réseaux sociaux
13. Grammaire – la cause et la conséquence, le subjonctif, la place des pronoms
14. Production orale- exprimer son intérêt et sa préférence
15. Production écrite - faire une critique positive et négative

UNIT – IV **(12 Hours)**

16. Titre - Consommer responsable
17. Lexique – la consommation, les catégories de produits, le travail manuel
18. Grammaire – le conditionnel présent – formation et emploi, le gérondif
19. Production orale- demander et proposer un service
20. Production écrite - exprimer un souhait ou un désir

UNIT – V **(12 Hours)**

1. Titre - Envies d’ailleurs
2. Lexique – le voyage, l’hébergement, le séjour, le tourisme
3. Grammaire – le passé composé et l’imparfait dans le récit, les pronoms démonstratifs
4. Production orale- demander des renseignements sur un voyage
5. Production écrite - parler d’une visite touristique
6. Indian knowledge system - Writing travel narratives based on ancient Indian pilgrimage sites and comparing with French monuments. Using French quantity expressions and pronouns to describe Ayurvedic food portions and dietary balance and offering Ayurvedic-based medical advice**.** (5%)

Teaching Methodology	L'approche communicative (Communicative Language Teaching -CLT), Genre-Based Approach, Experimental learning, Flipped Classroom Approach
Assessment Methods	*Role-Play:* Restaurant Experience: waiter and customer ordering food and expressing opinions on the meal. (Rubric – graded on usage of expressions related to food and grammatical accuracy) *Written assessment:* Write a short critique of a social media platform, movie, or advertisement. (Rubric – assessed on ability to express opinions and logical argumentation) *Travel Blog or Postcard Writing:* Write a blog post or postcard describing a recent travel experience, using descriptive language (Rubric – assessed on structured narrative writing in a travel context and usage of past tenses) *Group Debate:* Media & Society: Debate the impact of social media on education. (Rubric – graded on critical thinking, Argument clarity and participation

Books for Study:

1. Fafa, C., Gajdosova, F., Horquin, A., Pasquet, A., Perrard, M., Petitmengin, V., Sperandio, C., Dodin, M., &Veldeman-Abry, J. (2022). *Édito A2: Méthode de français* (2nd ed.). Didier FLE, Hatier. (p.83 – p.152)

Books for Reference:

1. Dauda, P., Giachino, L., & Baracco, C. (2016). *Génération A2*. Didier.
2. Girardet, J., &Pecheur, J. (2017). *Écho A2* (2nd ed.). CLE International

Websites and eLearning Sources:

1. https://cuisine-facile.com/
2. https://www.france.fr/en/
3. https://www.sncf-connect.com/
4. https://www.routard.com/
5. https://sante.lefigaro.fr/

Course Outcomes		
CO No.	**CO–Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K –Levels)**
CO1	Apply vocabulary related to food by using quantity expressions and pronoun to communicate satisfaction or dissatisfaction in oral and written contexts.	**K1**
CO2	Identify and describe health conditions, construct superlative forms, and formulate medical advice using appropriate grammatical structures.	**K2**
CO3	Express opinions, preferences, and critiques about various media platforms, apply cause-and-consequence structures	**K3**
CO4	Utilize vocabulary related to consumption, express desires and requests effectively in professional and social interactions.	**K4**
CO5	Request and provide travel-related information and describe tourist experiences using demonstrative pronouns and structured narratives.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
4	**25UFR41GL04**			Language 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	2	1	2	2	1	3	2	1	2	2	1.8
CO2	2	2	2	3	1	2	2	2	2	2	2.0
CO3	2	3	2	3	3	2	2	3	1	1	2.2
CO4	3	3	3	2	3	3	1	2	2	2	2.4
CO5	3	2	2	3	2	2	2	1	1	2	2.0
Mean Overall Score											**2.08 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	**25UHI41GL04**	Language 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)**

1. Prathyay
2. Char Bhai
3. Adhunik Kaal - Introduction
4. Adhunik Kal – Namakarn

UNIT II **(12 Hours)**

5. Chitra Varnan (Advanced)
6. Paryayvachy Shabdh
7. Bathcheeth - Hotel mein
8. Adhunik Kal - Samajik Paristhithiyam

UNIT III **(12 Hours)**

9. Upasarg
10. Thulsi ke Dhoe
11. Apathit Gadyansh
12. Adhunik Kal – Sahithyakar

UNIT IV **(12 Hours)**

13. Review- Book/Film
14. Paryavaran Pradookshan
15. Adhunik Kal - Main Divisions
16. Anuvad

UNIT V **(12 Hours)**

17. Kaal
18. Patra-Patrikao mein Prakashit Gadyansho ka Patan (Advanced)
19. Sapnom Kee Home Delivery (Novel)
20. Adhunik Kal - Visheshathayem

Teaching Methodology	Debate Participation, Videos, PPT, Quiz, Project Work
Assessment Methods	Quiz, Snap Test, Group Discussion

Books for Study:

1. Dr. Sadananth Bosalae. (2022). *kavya sarang*. Rajkamal Prakashan.
2. Kamathaprasad Gupth, M. (2021). *Hindi Vyakaran*. Anand Prakashan.
3. Dr. Sanjeev Kumar Jain. (2022). *Anuwad: Siddhant Evam Vyavhar*. Pustak Sadan.

Books for Reference:

1. Rajeswar Prasad Chaturvedi. (2021). *Hindi vyakarana*. Upakar Prakashan.
2. Ramdev. (2021). *Vyakaran Pradeep*. Hindi Bhavan.
3. Krishnakumar Gosamy. (2023). *Anuvad vigyan ki Bhumika*. Rajkamal Prakashan.
4. Acharya Ramchandra Shukla. (2021). *Hindi Sahitya Ka Itihas*, Prabhat Prakashan.
5. Mamta Kaliya. (2022). *Sapno Ki Home Delivery.* Lokbharti 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 the course, the student will acquire the listed skills.	**Cognitive Levels (K –Levels)**
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	Evaluate the film & Literary works in Hindi.	**K4**
CO5	Analyze the human values expressed in life and literature of Hindi Novelist “Mamatha Kaliya”.	**K5**

Relationship Matrix											
Semester	**Course code**			**Title of the Course**					**Hours / week**		**Credits**
4	**25UHI41GL04**			Language Hindi – 4					**4**		**3**
Course Outcomes (COs)	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
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	25USA41GL04	Language 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
Assessment Methods	Seminar, Quiz, Group Discussion.

Books for Study:

1. Karnabhavam & Literature Language
2. Dhaatu Manjari
3. Samskrita Vyavahara Sahasri (A Collection of One Thousand Sentances),Samskrita Bharati, Delhi,2021

Books for Reference:

1. R. S. Vadhyar & Sons, Book – sellers and publishers Kalpathu,Palghat – 678 003, Kerala, south India, History of Sanskrit Literature 2021
2. Kulapathy, K.M Saral Sanskrit Balabodh, Bharathita vidya bhavan, Munshimarg Mumbai – 400 007 2020
3. Samskrita Bharathi, Aksharam 8 th cross, 2nd phase Giri nagar Bangalore Vadatu sanskritam – Samaskara Binduhu 2021

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**	**Cognitive Levels (K –Levels)**
	On successful completion of this course, students will be able to	
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	**K2**
CO4	Appreciate ancient Sanskrit dramas	**K3**
CO5	Create new conversational sentences and to Improve self-character (Personality Development)	**K4**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
4	**25USA41GL04**			Language Sanskrit - 4						**4**	**3**
Course Outcomes	**Programme Outcomes (PO)**					**Programme Specific Outcomes (PSO)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
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/ Weeks	Credits
4	25UEN42GE04B	**General English - 4:** English for Science - 2	5	3

Course Objectives
To expand vocabulary by learning and using context-specific words.
To improve writing through practice in reports, reviews, and social media posts.
To master grammar by focusing on question tags and subject-verb agreement.
To enhance speaking skills through debates and discussions.
To appreciate literature and science to boost creative thinking.

UNIT I: Simple Ways to Explore Nature **(15 Hours)**

1. "Marie Curie Biographical" Taken from The Nobel Prize
2. Vocabulary in Context: Radioactive Elements
3. Writing: Media Reports
4. Speaking: Expansion of a Proverb
5. Grammar: Question Tag

UNIT II: The Limits of Human Knowledge **(15 Hours)**

1. "The Marry Month of May" by O. Henry
2. Vocabulary in Context: Seasonal Words
3. Writing: Book or Film Review
4. Speaking: Debate
5. Grammar: WH Questions

UNIT III: Difference Between Original and Copy **(15 Hours)**

1. "The story of Dolly the sheep" taken from Natural World, Science and Technology, Scotland
2. Vocabulary in Context: Cloning Words
3. Writing: E-mail Etiquette
4. Speaking: Group Discussion
5. Grammar: Yes or No Questions

UNIT IV: The Other Worlds **(15 Hours)**

1. "The Star" by Arthur C. Clarke
2. Vocabulary in Context: Astronomical Words
3. Writing: Writing for Social Media (Blogs, Twitter, Instagram and Facebook)
4. Speaking: Story Telling
5. Grammar: Conditional Sentences

UNIT V: Scientific Temparament **(15 Hours)**

1. "The Particle Dance" by Emily Dickinson
2. Vocabulary in Context: Scientific Instruments
3. Writing: Creating Digital Profile
4. Speaking: Spin a Yarn
5. Grammar: Subject Verb Agreement

* Speaking Components are meant only for internal tests

Teaching Methodology	Lecture, Multimedia Presentations, Discussion and Enacting
Assessment Tools	Speaking, reading, listening and written tests

Books for Study:

1. Francis, V., Dr. D.R. Edwin Christy and Dr. D. Loyola Innaci. *Lingua Science – II,* St. Joseph's College (Autonomous), Tiruchirappalli.

Books for Reference:

1. Wilfred, D. Best. *Students Companion*. Harper Collins Publishers, 2020.
2. Dickinson, Emily. *The Complete Poems of Emily Dickinson*, Back Bay Books, 1973.

Websites and eLearning Sources:

1. https://www.nobelprize.org/prizes/physics/1903/marie-curie/biographical/
2. https://www.gutenberg.org/files/59637/59637-h/59637-h.htm
3. https://www.nms.ac.uk/discover-catalogue/the-story-of-dolly-the-sheep
4. https://sites.uni.edu/morgans/astro/course/TheStar.pdf
5. https://poemverse.org/short-poems-about-science/

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
CO1	Identify and comprehend the local and global issues through the lessons	**K1, K2**
CO2	Use interactive skills	**K3**
CO3	Develop the Listening and Reading Skills of the learners through teacher-led reading practice	**K6**
CO4	Improve their General Writing Skills such as Note-Taking, Note- Making Précis Writing, Paragraph Writing, and Writing Short Essays on Current	**K6**
CO5	Develop their Creative and Critical Thinking and Speaking Skills	**K6**

Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
4	**25UEN42GE04B**			**General English - 4:** English for Science - 2						**5**	**3**
Course Outcome (COs)	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO 1**	**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	25UAI43CC07	**Core Course - 7:** Introduction to Artificial Intelligence	4	3

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 (12 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 (12 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 (12 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 (12 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 (12 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.

Teaching Methodology	Providing Hands on Sessions, Using OER's to supplement the teaching contents, Demonstrations by connecting the database with a front-end application
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
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	**25UAI43CC07**			**Core Course - 7:** Introduction to Artificial Intelligence				**4**			**3**
COs	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of CO s**
	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	25UAI43CC08	**Core Course - 8:** Web Design and Development (Internship Embedded Course)	4	3

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 (12 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 (12 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 (12 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 (12 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 (12 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.
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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	**25UAI43CC08**		**Core Course - 8:** Web Design and Development (Internship Embedded Course)							**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	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	25UAI43CP04	**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	25UAI43AO02A	**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, Hand-outs
Assessment Methods	Seminar, Snap Test, MCQ, Online Quiz, Assignment

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
I	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
II	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
III	1	23	23.1, 23.3, 23.4, 23.8, 23.15, 23.24, 23.26, 23.27, 23.32, 23.35, 23.37
IV	1	16	16.1-16.22
V	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.

Websites and eLearning Sources:

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**	**Cognitive Levels (K - Level)**
	On successful completion of this course, student will be able to	
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/Week**	**Credits**
4	**25UAI43AO02A**			**Allied Optional - 2:** Applied Physics - 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	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	**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	25UAI43AO02B	**Allied Optional - 2:** Communication Electronics	4	3

Course Objectives
Understand digital communication fundamentals and work with serial (UART, USART) and parallel ports for data transfer
Analyze optical communication principles, including fiber optics, waveguides, and photodetectors.
Explore wireless communication technologies, including cellular networks (3G, 4G, 5G), WLAN, Bluetooth, and PAN.
Develop IoT applications using ESP32, focusing on Wi-Fi networking, cloud integration, and AI-based edge computing.
Implement basic networking with ESP8266, including web server setup, data posting to cloud platforms

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. Photo detectors -LM393 light sensor module TCS3200 color sensor module.

UNIT III: 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 IV: Basic Networking with ESP32 (12 Hours)

Overview of ESP32 architecture and features - Introduction to IoT concepts and applications - Setting up MicroPython and Thonny IDE for ESP32 -Flashing firmware and writing basic scripts - Wi-Fi connectivity: Connecting ESP32 to a network - Data encryption & security in IoT – Cloud and Edge computing and AI in IoT

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	Demo Videos, Review, PPT, Exercises, circuit simulation
Assessment method	Circuit design, written assignment, MCQ test, Open book test, snap test

Books for Study:

1. **Mathivanan, N. (2007). PC- Based Instrumentation: Concepts and Practice.**
2. Senior, J.M. (2002). Optical Fiber Communications, (2nd Ed.). PHI.
3. Thakur, M.R. 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.).*
2. Gehlot, A., Singh, R., Malik, P.K., Gupta, L.R., Singh, B. (2020). *Internet of things with 8051 and EPS8266.*

Websites 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	**25UAI43AO02B**			**Allied Optional - 2:** Communication 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	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	25UAI43OP01A	**Allied Optional Practical:** Applied Physics	2	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	25UAI43AO01A	**Allied Optional Practical:** Electronics	2	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. ESP 32 I/O operations using python
21. ESP 32 /8266 interface with opencv operations using python
22. ESP 32 interface with sensors
23. Interfacing RFID module using Arduino.
24. Interfacing IIC memory module using Arduino.
25. Interfacing HC-05 bluetooth module with arduino
26. Study of Parallel port for I/O operations
27. Study of Serial port data transfer to hyper-terminal.
28. Study of Colour sensing using TCS3200.

Semester	Course Code	Title of the Course	Hours / Week	Credits
4	25UHE44VE04A	**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: Counseling for Adolescents (6 Hours)

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

Teaching Methodology	Power point, Assignment and Group discussion
Assessment Methods	Online Test, Group Discussions, Seminar, Assignment

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

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**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
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	**25UHE44VE04A**			**Value Education - 4:** Social Ethics - 2						**2**	**1**
Course Outcome	**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	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	25UHE44VE04B	**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	Power point, assignment, and Group discussion
Assessment Methods	Seminars, Group Discussion, Online Tests, Assignments

Books for Study:

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

Books for Reference:

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

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
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	**25UHE44VE04B**			**Value Education - 4:** Religious Doctrine - 2						**2**	**1**
Course Outcome	**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	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	25UAI44SE02	**Skill Enhancement Course - 2:** Data Analysis Using Spreadsheet	2	1

Course Objectives
To develop proficiency in core excel functions
To master advanced excel functions for data analysis
To implement effective data sorting, filtering, and validation
To perform what-if analysis and goal seek
To create and interpret pivot tables and charts

List of Exercises

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

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

Semester	Course Code	Title of the Course	Hours/Week	Credits
4	25UAI44SL03	**Self 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.

Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Semester	Course Code	Title of the Course	Hours/Week	Credits
5	25UAI53CC09	**Core Course - 9:** Embedded Systems and IoT	4	3

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.
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books for Study:

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.

Book for Reference:

1. 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	**25UAI53CC09**			**Core Course - 9:** Embedded Systems and IoT						**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	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	25UAI53CC10	**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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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	**25UAI53CC10**			**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	25UAI53CC11	**Core Course - 11:** Neural Networks and Fuzzy Logic	4	2

Course Objectives
To understand the neural network basics, architectures, early models (Perceptron, ADALINE, MADALINE), and applications.
To comprehand backpropagation network architecture, learning process, and applications in journal bearing design, soil classification, and steel extrusion
To cover autocorrelations, BAM networks, training strategies, and applications in character recognition and fabric defect identification.
To compares fuzzy and crisp sets, covering operations, relations, and partitioning of crisp sets.
To master crisp and fuzzy logic, including propositional and predicate logic, fuzzy inference systems. defuzzification methods, and applications like fuzzy cruise and air conditioner controllers.

UNIT I: Fundamentals of Neural Network **(12 Hours)**

Basic Concepts- Human Brains - Model of an Neural Networks- Neural Network Architectures: Single Layer Feedforward Network, Multilayer Feedforward Network, Recurrent Networks - Characteristics of Neural Networks - Learning Models- Taxonomy of Neural Network Architecture**s.** Early Neural Network Architectures: Rosenblatt's Perceptron- ADALINE Network- MADALINE Network**.** Some Application Domains**.**

UNIT II: BackPropogation Networks **(12 Hours)**

Architecture of a Back propagation Network: The Perceptron Model- The Solution- Single Layer Artificial Neural Network- Model for Multilayer Perceptron. Back propagation Learning: Input Layer Computation- Hidden Layer Computation- Output Layer Computation- Calculation of Error- Training of Neural Network- Method of Steepest Descent- Effect of Learning Rate 'η'**-** Adding a Momentum Term- Back propagation Algorithm - Illustration – Applications: Design of Journal Bearing- Classification of Soil.

UNIT III: Associative Memory **(12 Hours)**

Autocorrelations. Hetero correlators: Kosko's Discrete BAM: Addition and Deletion of Pattern Pairs- Energy Function for BAM. Wang et al's Mutliple Training Encoding Strategy - Exponential BAM: Evolution Equations. Associative Memory for Real-coded Pattern Pairs: Input Normalization- Evolution Equations – Applications: Recognition of Characters- Fabric Defect Identification.

UNIT IV: Fuzzy Set Theory **(12 Hours)**

Fuzzy versus Crisp. Crisp sets: Operation on Crisp Sets-Properties of Crisp Sets, Partition and Covering. Fuzzy Sets: Membership Functions- Basic Fuzzy Set Operations- Properties of Fuzzy Sets. Crisp Relations: Cartesian Product- Other Crisp Relations- Operations on Relations. Fuzzy Relation: Fuzzy Cartesian Products- Operations on Fuzzy Relation.

UNIT V: Fuzzy Systems **(12 Hours)**

Crisp Logic: Laws of Propositional-Logic- Inference in Propositional Logic. Predicate Logic: Interpretations of Predicate Logic Formula - Inference in Predicate Logic. Fuzzy Logic: Fuzzy Quantifiers, Fuzzy Inference. Fuzzy Rule based System. Defuzzification Methods. Applications: Greg Viot's Fuzzy Cruise Controller- Air Conditioner Controller.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books for Study:

1. Rajasekaran S and Vijayalakshmi Pai (2004). *Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications*, Prentice-Hall of India.
   Unit I: Chapters 2.1 – 2.7, 2.8-2.10
   Unit II: Chapters 3.1 – 3.4.2
   Unit III: Chapters 4.1 – 4.6
   Unit IV: Chapters 6.1 – 6.5
   Unit V: Chapters 7.1 – 7.6.

Books for Reference:

1. Timothy J. Ross (2004). *Fuzzy Logic with Engineering Applications*, McGraw-Hill, Inc.
2. John Yen and Reza Langari (1999). *Fuzzy Logic: Intelligence, Control, and Information*, Prentice Hall.
3. F. Martin McNeill and Ellen Thro (1994). *Fuzzy Logic: A Practical Approach*, Academic Press

Websites and eLearning Sources

1. https://www.geeksforgeeks.org/artificial-neural-networks-and-its-applications/
2. https://www.sciencedirect.com/topics/engineering/artificial-neural-network-mod
3. https://onlinecourses.nptel.ac.in/noc21_ge07/preview
4. https://www.geeksforgeeks.org/fuzzy-logic-introduction/
5. https://filisph.net/fuzzy/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K- Level)**
CO1	Recall concepts of neural networks, backpropagation, fuzzy logic, and their applications in various systems.	**K1**
CO2	Explain neural network architectures, backpropagation, fuzzy logic, and their applications.	**K2**
CO3	Apply neural networks, backpropagation, and fuzzy logic to real-world problems.	**K3**
CO4	Evaluate and optimize the neural networks, backpropagation, and fuzzy logic for real-world applications.	**K4**
CO5	Synthesize neural network architectures, backpropagation methods, and fuzzy logic systems to design and innovate solutions for complex real-world problems.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
5	**25UAI53CC11**			**Core Course - 11:** Neural Networks and Fuzzy Logic					**4**		**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	1	3	3	1	3	3	3	2	3	**2.5**
CO2	3	2	3	1	3	1	2	2	3	3	**2.4**
CO3	2	1	3	3	3	3	2	3	3	3	**2.6**
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
5	25UAI53CP05	**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	25UAI53CP06	**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	25UAI53ES01A	**Discipline Specific Elective - 1:** Virtual Reality and Augmented Reality	4	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 (12 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 (12 Hours)

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

UNIT III: Content Creation Considerations for VR (12 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 (12 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 (12 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
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	**25UAI53ES01A**	**Discipline Specific Elective - 1:** Virtual Reality and Augmented Reality								**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of CO s**
	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	25UAI53ES01B	**Discipline Specific Elective - 1:** Digital Marketing	4	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 (12 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 (12 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 (12 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 (12 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 (12 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.
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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	**25UAI53ES01B**			**Discipline Specific Elective - 1:** Digital Marketing					**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	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	25UAI53ES02A	**Discipline Specific Elective - 2:** Computer Networks	4	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 (12 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 (12 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 (12 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 (12 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 (12 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.
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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	**25UAI53ES02A**		**Discipline Specific Elective - 2:** Computer Networks							**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of CO s**
	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	25UAI53ES02B	**Discipline Specific Elective - 2:** Security in Computing	4	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 (12 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 (12 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 (12 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 (12 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 (12 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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 Soursces:

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	**25UAI53ES02B**			**Discipline Specific Elective - 2:** Security in Computing					**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
5	**25UAI53IS01**	Internship	**-**	**1**

Semester	Course Code	Title of the Course	Hours/Week	Credits
5	25UAI54OE01	**Open Elective – 1 (WS):** Cyber Security	4	2

Course Objectives
To cover the basics of cybersecurity, focusing on key practices like password security, two-factor authentication, and data protection.
To master network security essentials, including firewalls, VPNs, malware protection, and email security.
Secure Software and Cloud Practices: Protecting Applications, Data, and Devices in the Digital Era.
To focus on secure coding, software updates, mobile device protection, cloud security, and selecting cloud service providers based on security and compliance needs.
To understand incident response, business continuity, social media security, privacy, and online reputation management.
To explore IoT security, AI/ML in cybersecurity, blockchain, cloud-native security, career paths, certifications, job trends, and ethical/legal considerations

UNIT I: Cybersecurity Basics: Protecting Your Digital Presence (12 Hours)

Meaning of Cybersecurity - The Importance of Cybersecurity - Common Cybersecurity Threats - Understanding the Cybersecurity Landscape - Essential Concepts in Cybersecurity - Password Security and Management - Two-Factor Authentication (2FA) - Secure Browsing and Phishing Awareness - Social Engineering and Online Scams - Privacy Protection and Data Encryption.

UNIT II: Network Security and Threat Detection (12 Hours)

Introduction to Network Security - Firewalls and Intrusion Detection Systems (IDS) - Virtual Private Networks (VPNs) - Wireless Network Security - Securing Home Networks - Types of Malware - Antivirus and Antimalware Solutions - Detecting and Removing Malware - Ransomware and Protection Strategies - Email Security and Spam Filtering.

UNIT III: Secure Software Practices and Cloud Security (12 Hours)

Software Updates and Patch Management - Secure Coding Practices - Application Security Testing - Secure File Transfer and Sharing - Mobile Device Security - Introduction to Cloud Computing - Cloud Security Challenges - Secure Cloud Storage and Backup - Cloud Access Controls and Permissions - Cloud Service Provider Selection.

UNIT IV: Incident Response, Disaster Recovery, and Social Media Security (12 Hours)

Incident Response Planning - Detecting and Responding to Security Incidents - Business Continuity and Disaster Recovery - Incident Reporting and Documentation - Lessons Learned and Continuous Improvement - Risks and Privacy Concerns in Social Media - Social Media Account Security - Privacy Settings and Data Sharing - Identifying and Avoiding Social Engineering Attacks - Online Reputation Management.

UNIT V: Cybersecurity Trends and Career Opportunities (12 Hours)

Internet of Things (IoT) Security - Artificial Intelligence (AI) and Machine Learning (ML) in Cybersecurity - Blockchain Technology and Security - Cloud-native Security - Cybersecurity in a Hyperconnected World - Overview of Cybersecurity Roles and Responsibilities - Cybersecurity Education and Certifications - Building a Career Path in Cybersecurity - Job Market Trends and Opportunities - Ethical and Legal Considerations in Cybersecurity.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books for Study:

1. Umakant Dinkar Butkar, Mir Iqbal Faheem & Akella Sarveswara Rao (2023). *Cyber Security for Beginners: Digital Protection for Future Generation*, LAP Lambert Academic Publishing.
   Unit I: Chapters 1, 2.
   Unit II: Chapters 3, 4.
   Unit III: Chapters 5, 6.
   Unit IV: Chapters 7, 8.
   Unit V: Chapters 9, 10

Books for Reference:

1. Charles J. Brooks *et.al.,* (2018). *Cybersecurity Essentials*, Wiley.
2. P.W. Singer and Allan Friedman (2014). *Cybersecurity and Cyberwar: What Everyone Needs to Know*, Oxford University Press.

Websites and eLearning Sources

1. https://onlinecourses.nptel.ac.in/noc23_cs127/preview
2. https://www.coursera.org/professional-certificates/google-cybersecurity
3. https://www.coursera.org/professional-certificates/ibm-cybersecurity-analyst

Course Outcomes		
CONo.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K- Level)**
CO1	Recall core concepts in cybersecurity, network security, secure software practices, incident response, and emerging trends.	**K1**
CO2	Apply cybersecurity concepts, network security, secure software practices, and incident response to real-world scenarios.	**K2**
CO3	Analyze cybersecurity threats, evaluate network security measures, and assess secure software practices and incident response strategies.	**K3**
CO4	Design effective cybersecurity strategies, integrate network security essentials, and implement best practices for cloud security across various systems	**K4**
CO5	Evaluate and justify cybersecurity strategies, network security, and cloud security practices in different systems.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
5	**25UAI54OE01**			**Open Elective – 1 (WS):** Cyber Security					**4**		**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	1	3	3	1	2	2	3	3	3	**2.4**
CO2	3	2	3	1	3	3	3	2	3	3	**2.6**
CO3	2	2	2	3	3	3	2	3	3	3	**2.6**
CO4	3	2	3	3	2	3	3	2	2	3	**2.6**
CO5	1	2	3	3	2	3	3	3	2	3	**2.5**
Mean Overall Score											**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
5	25UAI54SL04	**Certificate Course:** AI for Everyone	-	2

Course Objectives
To understand the evolution and key concepts of AI.
To explore the subfields of AI, such as machine learning, computer vision, and NLP.
To analyze the applications of AI across various industries.
To study the ethical challenges in AI and its impact on society.
To delve into AI's role in research and emerging trends.

UNIT I **(12 Hours)**

The Journey of Artificial Intelligence: The Early Years of AI (1940s-1950s) to AI Renaissance (2010s). **Defining AI**: Machine Learning - Pattern Recognition - Natural Language Processing (NLP) - Computer Vision. **Artificial General Intelligence (AGI)**: Distinction from Narrow AI. **Industry Applications of AI**: Banking - Finance - Insurance - Healthcare - Retail - E-commerce - Manufacturing - Entertainment - Agriculture – Education.

UNIT II **(12 Hours)**

Computer Vision: Object Detection - Facial Recognition - Scene Understanding - Medical Imaging – Applications. **Natural Language Processing (NLP):** Text Classification - Named Entity Recognition (NER) - Question Answering - Machine Translation - Text Generation – Summarization. **Machine Learning:** Classification - Regression - Clustering - Dimensionality Reduction - Recommendation Systems – Anomaly Detection - Deep Learning - Reinforcement Learning. **Robotics:** Components of Robots - Types of Robots (e.g., Sophia).

UNIT III **(12 Hours)**

Bias, Fairness, and Ethics in AI Systems: Ethics in AI: Types of Bias - Measuring Bias Fairness in AI Systems – Transparency in AI: Security Risks - Misinterpretation - Competitive Disadvantage – Accountability in AI Systems – Privacy and Data Protection – Security of AI Models – Inclusivity and Sustainability in AI. **Robustness and Reliability**: Concept Drift – Data Drift.

UNIT IV **(12 Hours)**

AI in Healthcare: Medical Diagnosis - Disease Prevention - Drug Discovery - Virtual Medical Assistants - AI-powered Robotics – Challenges **AI in Finance: Algorithmic Trading -** Financial Risk Management - AI-based Customer Service – Challenges **AI in Retail: Inventory Management -** Personalized Shopping - Customer Support – Challenges - **AI in Agriculture: Precision Farming -** Crop Monitoring - Smart Irrigation Systems – Challenges **AI in Education: Personalized Learning -** Administrative Tasks - AI-based Tools – Challenges **AI in Transportation:** Traffic Management - Ride-Sharing - Safety and Security - Challenges.

UNIT V **(12 Hours)**

AI in Research: Physics - Astro-Physics - Experimental Chemistry - Biology - Environmental Science. **Generative AI:** Chronology of Developments - Important Models. **ChatGPT and Prompt Engineering:** Context Setting - Prompt Engineering Techniques. **Emerging Trends and Future Directions**: AI and Social Inequality - Future Implications for Society and Research**. Challenges in AI**: Data Privacy - Bias and Fairness - Transparency - Ethical Concerns - Job Displacement - Regulation - Security Risks - Resource Intensiveness - Lack of Skilled Workforce.

Teaching Methodology	Videos, PPT, Demonstration, and Hands on

Books for Study:

1. *Saptarsi Goswami*, "AI for Everyone: A Beginner's Handbook for Artificial Intelligence", Pearson India, 2024.

B**ooks for Reference:**

1. *Stuart Russell and Peter Norvig*, "Artificial Intelligence: A Modern Approach" (3rd Edition), Pearson, 2010.

2. Max Tegmark, "Life 3.0: Being Human in the Age of Artificial Intelligence", Penguin Books, 2017.
3. Nick Bostrom, "Superintelligence: Paths, Dangers, Strategies", Oxford University Press, 2014.

Website and eLearning Sources:

1. https://www.geeksforgeeks.org/ai/
2. https://deepai.org/

Course Outcomes		
CO No. ↓	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	Understand the basics and history of Artificial Intelligence (AI) and its main areas, like Machine Learning, Natural Language Processing (NLP), and Computer Vision.	**K1**
CO2	Explain key AI areas, including Computer Vision, NLP, Machine Learning, Robotics, and Knowledge Engineering, and how they work in real-life applications.	**K2**
CO3	Apply ethical principles to assess bias, fairness, and transparency in AI systems, focusing on accountability and security.	**K3**
CO4	Analyze how AI is used in different industries, such as healthcare and finance, and identify related challenges and potential solutions.	**K4**
CO5	Critically evaluate the impact of AI in research and emerging trends, like Generative AI and ChatGPT, and suggest ways to address challenges like ethics, regulation, and security risks.	**K5**

Relationship Matrix											
Sem.	**Course Code**			**Title of the Course**						**Hours/Week**	**Credits**
5	**25UAI54SL04**			**Certificate Course:** AI for Everyone						**-**	**2**
COs ↓	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	1	1	3	3	2	3	2	2	2.2
CO2	3	2	3	3	2	1	3	2	2	2	2.3
CO3	3	3	2	3	1	3	2	3	2	3	2.5
CO4	2	2	3	1	3	2	3	2	3	3	2.4

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	25UAI63CC12	**Core Course - 12:** 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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	**25UAI63CC12**			**Core Course - 12:** 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	25UAI63CC13	**Core Course - 13:** Data Visualization Techniques	4	2

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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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	**25UAI63CC13**			**Core Course - 13:** Data Visualization Techniques						**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	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	25UAI63CC14	**Core Course - 14:** Operations Research	4	2

Course Objectives
To understand the methodology of OR problem solving and formulate linear programming problem
To apply duality method for solving LPP and explain the primal-dual relationship
To develop formulation skills in transportation models and finding solutions
To know how project management techniques help in planning and scheduling a project
To familiarize students with the concept of inventory management, and its functional role in different organizations

UNIT I: Linear Programming (12 Hours)

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

UNIT II: Duality (12 Hours)

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

UNIT III: Transportation Problems (12 Hours)

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

UNIT IV: Scheduling (12 Hours)

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

UNIT V: Inventory Management (12 Hours)

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

Teaching Methodology	Videos, PPT, Demonstration, and Hands on sessions
Assessment Methods	Assignment Writing, Problem Solving and Seminar, Formulation of Business problem, Open Book Test

Books for Study:

1. Swarup, K., Guptha, P. K., & Manmohan. (2015). Operations Research. Sultan Chand & Sons.
   Unit-I: Chapter 1 (Sec: 1.1,1:2, 1:10), Chapter 2, Chapter 3(Sec:3:1-3:5), Chapter 4 (Sec: 4:1,4:3,4:4(only Two-Phase Method),4:5)
   Unit-II: Chapter 10 (Sec: 10:1,10:5-10:6,10:8-10:10,10:12-10:13,10:15), Chapter 11 (Sec 11:1-11:2,11:3(Pages:298-307)
   Unit-III: Chapter12(Sec 12:1-12:6)
   Unit-IV: Chapter 17 (Sec: 17:1-17:7)
   Unit-V: Chapter 25 (Sec 25:1-25:8)

Books for Reference:

1. Sen, R. P. (2010). *Operations Research Algorithms and Applications*. PHI.
2. Selvam, R. P. (2010). *Operations Research*, (2nd Ed.). PHI.
3. Kalavathy, S. (2013). *Operations Research*. Vikas Publishing House.

Websites and eLearning Sources:

1. http://www.universalteacherpublications.com/univ/ebooks/or/Ch3/simplexintro.htm
2. https://www.sjctni.edu/Department/cs/eLecture/CMR_Graphical%20Method%20-Special%20cases.pdf
3. https://www.geeksforgeeks.org/transportation-problem-set-1-introduction/
4. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=90044

5. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/mathematics/14._operations_research /02. linear_programming_problem__ simplex_method_for_solving_lpp_and_bigm_method/et/9219_et_et.pdf

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Choose the concepts of LPP, TP, AP, Sequencing, Gaming and project Scheduling	**K1**
CO2	Compare the concepts of LPP, TP, AP, Sequencing, Gaming and project Scheduling	**K2**
CO3	Solve the concepts of LPP, TP, AP, Sequencing, Gaming and project Scheduling	**K3**
CO4	Examine the concepts of LPP, TP, AP, Sequencing, Gaming and project Scheduling	**K4**
CO5	Prioritize the concepts of LPP, TP, AP, Sequencing, Gaming and project Scheduling	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
6	**25UAI63CC14**			**Core Course - 14:** Operations Research						**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	3	2	3	2	3	3	2	2	3	**2.6**
CO2	3	3	3	2	2	3	3	2	2	2	**2.5**
CO3	3	3	2	3	2	3	3	3	3	2	**2.7**
CO4	3	3	2	2	3	3	2	3	2	3	**2.7**
CO5	3	2	2	3	2	3	2	3	2	3	**2.5**
										Mean Overall Score	**2.6 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	25UAI63CP07	**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	**25UAI63PW01**	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	25UAI63ES03A	**Discipline Specific Elective - 3:** Big Data Fundamentals	4	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 (12 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 (12 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 (12 Hours)

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

UNIT IV: Big Data Processing Concepts (12 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 (12 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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	**25UAI63ES03A**	**Discipline Specific Elective - 3:** Big Data Fundamentals							**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	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	25UAI63ES03B	**Discipline Specific Elective - 3:** Deep Learning	4	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 **(12 Hours)**

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

UNIT II **(12 Hours)**

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

UNIT III **(12 Hours)**

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

UNIT IV **(12 Hours)**

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

UNIT V **(12 Hours)**

Reinforcement Learning –MDP–Q Learning– Applications.

Teaching Methodology	PPTs, Videos, Online Portals, Hands on Demonstration
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

Books 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	**25UAI63ES03B**	**Discipline Specific Elective -3:** Deep 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	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	25UAI63ES04A	**Discipline Specific Elective - 4:** Human Computer Interaction	4	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 (12 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 (12 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 (12 Hours)

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

UNIT IV: Mobile HCI (12 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 (12 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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-ComputerInteraction* (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	**25UAI63ES04A**			**Discipline Specific Elective - 4:** Human Computer Interaction				**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	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	25UAI63ES04B	**Discipline Specific Elective - 4:** Natural Language Processing	4	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 **(12 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 **(12 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 **(12 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 **(12 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 **(12 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
Assessment Methods	MCQ Test, Assignment Writing, Problem Solving and Seminar

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	**25UAI63ES04B**			**Discipline Specific Elective - 4:** Natural Language Processing				**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	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	**25UAI63EL01A** **25UAI63EL01B** **25UAI63EL01C**	Project / Industry Visit / Field Visit	**-**	**1**

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	25UAI63CE01	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.

Semester	Course Code	Title of the Course	Hours/Week	Credits
6	25UAI64OE02	**Open Elective - 2:** Gen AI Tools	4	2

Course Objectives
To understand the evolution, impact, and challenges of Generative AI in society and business.
To boost productivity using AI tools for writing, communication, task management, and automation.
To enhance career growth through AI-driven skill development, job search, and content creation.
To apply AI in research, social media, branding, and creative tasks.
To master AI-driven multimedia creation, including video editing, design, and creative writing.

UNIT I: Generative AI (12 Hours)

Unveiling Generative AI: A New Frontier - Tracing the Evolutionary Blueprint of Generative AI - Revolutionizing Societies and Business Ecosystems - Risks and Challenges to Manage - Impact of Generative AI on Jobs.

UNIT II: AI Tools for Personal Productivity (12 Hours)

Types of AI Tools: Categorizing AI Tools - Personal Productivity AI Tools - AI for creativity - Business and Analytical AI Tools - Choosing the Right AI Tools. Writing and Communication Tools: Enhancing Writing Skills – E-Mail Composition and Management - Real Time Communication Aid - Collaborative writing and Editing. Personal Organisation and Planning: Task Management Tools - Scheduling Assistant. Time Saving AI Assistant: Virtual Personal Assistants - Workflow Automation Tools - Intelligent Search and Retrieval - Voice-Activated Productivity

UNIT III: AI Tools for Professional Growth (12 Hours)

Career Development Tools: Resume Optimization - Interview Preparation - Career Path Recommendations - Job Search Automation. Learning and Skill Development: Personalized Learning Platforms - Skill Assessment and Feedback - Language Learning with AI - Technical Skills and Certifications. Professional Writing and Content Creation: AI for Writing Assistance - Content Research and Ideation - Content Creation Tools - Visual Content Creation.

UNIT IV: AI Tools for Research, Social Media and Creative Works (12 Hours)

Research and Analysis: Data Collection Tools - Data Analysis and Insights - Market Research and Competitor Analysis. Networking and Personal Branding: Optimizing LinkedIn Profiles - Social Media Management - Building a Personal Brand with AI. Image Creation and Editing: AI-Powered Photo Editing Tools - Image Generation with AI - Enhancing Creativity with AI - Accessibility and Ease of Use. Music and Audio Tools: AI for Music Composition - Audio Editing with AI - AI in Sound Design - Personalization in Music.

UNIT V: AI Tools for Multimedia content Generation (12 Hours)

Video Creation and Editing: Video Generation with AI - AI-Driven Video Editing Platforms - Scriptwriting and Storyboarding - Enhancing Visual Effects - Accessibility for Beginners. Design and Visual Content: Logo and Branding Design - Layout and Presentation Tools - 3D and AR Design - Customizable Templates. Creative Writing Assistance: Idea Generation and Brainstorming - Drafting and Editing - Writing for Different Formats.

Teaching Methodology	Lectures with Multimedia Presentations, Hands-on Practical Sessions, Case Studies and Industry Applications, AI Tool Demonstrations, Interactive Workshops, Industry Collaboration and Guest Lectures.
Assessment Methods	Self-Assessment, ICT Tools based Automated Grading Assessment, Capstone Project, Activity based Assessment, Gamified Assessment.

Books for Study:

1. Marr, B. (2024). *Generative AI in practice: 100+ amazing ways generative artificial intelligence is changing business and society.* Wiley.

Unit I: *Chapter 1* Basu, A. (2025). *AI tools for everyone: Your guide to artificial intelligence.* Aditya Basu - Professional Books.

Unit II: *Chapters 2 (sec: 2.2), Chapter 3 (Sec: 3.1, 3.2, 3.4)*

Unit III: *Chapter 4* (*Sec: 4.1, 4.2, 4.3)*
Unit IV: *Chapter 4 (Sec: 4.4, 4.5), Chapter 5(5.1, 5.2)*
Univt V: *Chapter 5(5.3, 5.4, 5.5)*

Books for Reference:

1. Deshmukh, J. (2024). *AI Tools for Everyone: 119 Best AI Tools to Master Everyday Tasks.* Independent publisher.
2. Olson, P. (2024). *Supremacy: AI, ChatGPT, and the Race That Will Change the World* (1st Ed.). Financial Times Publishing.
3. Deshmukh, J. (2024). *Building a Career in AI: A Practical Guide for Aspiring Professionals*, (1st Ed.). Independent publisher.

Websites and eLearning Sources:

1. https://ai.gov.ae/wp-content/uploads/2023/04/406.-Generative-AI-Guide_ver1-EN.pdf
2. https://hbr.org/topic/artificial-intelligence
3. https://www.unesco.org/en/artificial-intelligence/education
4. https://www.retaildive.com/
5. https://towardsdatascience.com/

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K-Level)**
	On successful completion of this course, students will be able to	
CO1	Recall the fundamentals of AI, its evolution, impact on businesses and society, and associated risks and challenges.	**K1**
CO2	Understand various AI tools for personal productivity, creativity, business analytics, communication, task management, and automation.	**K2**
CO3	Apply AI tools for career development, learning, skill enhancement, job search, content creation, and professional writing.	**K3**
CO4	Analyze AI applications in research, data analysis, social media management, networking, branding, and creative domains like image and music generation.	**K4**
CO5	Evaluate AI-driven tools for multimedia content creation, including video generation, design, visual effects, and writing assistance.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
6	**25UAI64OE02**			**Open Elective - 2:** Gen AI Tools					**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	2	3	2	2	2	2	**2.2**
CO2	3	3	2	2	1	3	3	2	2	3	**2.4**
CO3	2	3	3	2	2	2	3	3	2	2	**2.4**
CO4	3	3	3	2	2	2	3	3	3	2	**2.6**
CO5	2	2	2	3	3	2	2	2	3	3	**2.4**
										Mean Overall Score	**2.4 (High)**