

B.Sc. ARTIFICIAL INTELLIGENCE

LOCF SYLLABUS 2026



Department of Artificial Intelligence

School of Computing Sciences

St. Xavier's College (Autonomous) Palayamkottai

Tirunelveli – 627 002, Tamil Nadu, India

Vision

To mould young men and women as leaders in all walks of life so that they may serve the people especially the poor and the oppressed of our nation in truth, justice and love.

Mission

To achieve a synthesis of academic excellence and the formation of character.

To ensure social justice through equity and access

To include the excluded for empowerment

To equip students with global competencies

To engage in relevant research activities.

To promote Lab to Land through the Outreach Programme – Student Training and Action for Neighbourhood Development (STAND)

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

Undergraduate Courses

While the Tamil Nadu State Council of Higher Education (TANSCHÉ) came forward to introduce CBCS in all the affiliated colleges in Tamil Nadu in June 2008, St. Xavier's College had already introduced CBCS as early as June 2002 for UG courses and in June 2003 for PG courses. The aim of the Choice-Based Credit System is to provide ample choice of subjects to students, based on the weighted credit point system. This system offers the learners a chance to match their aptitude and interest with the subjects of their choice and learn at their own pace. Thus St. Xavier's College gives every student an opportunity to study his / her discipline - specific courses and pursue other courses from any other department simultaneously.

Essential Features of CBCS

Standardisation of degree courses to internationally accepted levels

Focus on skill-based curriculum

Emphasis on value education

Institution - Industry collaboration

Provision for earning more credits

Development of communication skills

Credit system

The credit system at St. Xavier'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 150 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)

Outcome-Based Education (OBE) is a student-centric teaching and learning methodology that focuses on measuring student performance through clearly defined outcomes. For St. Xavier's College, with its commitment to excellence and NAAC/NBA accreditation requirements, OBE is not just a regulatory expectation but a pathway to academic quality, global competitiveness, and improved employability of graduates.

We prepare students to meet future industry requirements and reinforce St. Xavier's College, Palayamkottai, as a leader in quality higher education. St. Xavier's College introduced OBE in 2018, and for the Attainment Calculation, we developed our own method in 2018. From the academic year 2025-26 onwards, in examinations, for each question we mark Course Outcome (CO), Competency and Performance Indicator, Programme Outcome / Programme Specific Outcome, Bloom's Revised Cognitive Level and we follow the OBE procedure for the calculation of the Attainment of Outcome for each student, course, semester, programme.

EVALUATION PATTERN (UG)

Continuous Internal Assessment

There is no internal minimum for any paper. However, Continuous Internal Assessment (CIA) is a mandatory requirement for all students. A student must take at least one CIA test out of two tests and must fulfil at least one mode of assessment among assignments, quiz, seminars, etc., otherwise he/she will not be permitted to write the semester examination.

S.No	Component	Marks Allotted
1	I CIA Test	50
2	II CIA Test	50
	Total	100

The total CIA marks of 100 will be converted to 70 marks. An additional 30 marks will be awarded through other internal assessment components.

The Continuous Internal Assessment (CIA) consists of two component tests, each carrying 15 marks (15 + 15). The final internal assessment marks will be calculated out of 100 (70 + 30). The obtained marks will be converted to 50 marks.

Semester (External) Examination

- The External Semester Examination will be conducted for **100 marks**.
- The obtained marks will be **converted to 50 marks**.

Question Pattern

UG Semester Examinations Part- I & II & III (3 Hours)

PART	TYPE	Mark Distribution	Total Marks
A	MCQ	20X1	20
B	ALL	5X3	15
C	Either/or	5X7	35
D	3 out of 5	3X10	30
		Total	100

UG Semester Examinations Part- IV (2 Hours)

PART	TYPE	Mark Distribution	Total Marks
A	MCQ	5X1	5
B	ALL	5X2	10
C	Either/or	5X5	25
D	1 out of 2	1X10	10
		Total	50

UG Internal Examinations Part- I & II & III (1.30 Hours)

PART	TYPE	Mark Distribution	Total Marks
A	MCQ	6X1	6
B	ALL	3X3	9
C	Either/or	3X5	15
D	2 out of 3	2X10	20
		Total	50

UG Internal Examinations Part- IV (1.00 Hour)

PART	TYPE	Mark Distribution	Total Marks
A	MCQ	5X1	5
B	ALL	5X3	15
C	2 out of 3	2X7.5	15
		Total	35

Grading System

Range of Marks	Letter Grade	Grade Point	Description
90-100	A+	9.0-10.0	Outstanding
80-89	A	8.0-8.9	Excellent
70-79	B+	7.0-7.9	Very Good
60-69	B	6.0-6.9	Good
50-59	C	5.0-5.9	Above Average
40-49	D	4.0-4.9	Average
00-39	U	0	Reappear

PROGRAMME OUTCOMES (POS) FOR UG PROGRAMME
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Students of all Undergraduate Degree Programmes at the time of graduation will be able to attend the following:

PO 1: Critical thinking: Acquire the knowledge in the respective field and take informed actions

PO 2: Effective communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO 3: Social interaction: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.

PO 4: Effective Citizenship: Demonstrate empathic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO 5: Ethics: Recognize different values systems and apply ethical principles and commit to professional ethics and responsibilities and norms of different value systems.

PO 6: Environment and Sustainability: Demonstrate the issues of environmental contexts and sustainable development.

PO 7: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern IT Tools including prediction and modeling to complex activities with an understanding of the limitations

PO 8: Self directed and lifelong Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of socio-technological changes

PROGRAMME SPECIFIC OUTCOMES (PSOs) – ARTIFICIAL INTELLIGENCE

Upon completion of the programme, the student would be able to

PSO1: Apply Fundamental AI Concepts and Techniques

Demonstrate a comprehensive understanding of core artificial intelligence principles, including intelligent agents, problem-solving methods, knowledge representation, and machine learning models, to design and implement AI-based solutions for real-world applications.

PSO2: Develop and Implement Algorithms for AI Systems

Design, develop, and evaluate algorithms for supervised, unsupervised, and reinforcement learning, including clustering, classification, regression, and neural network models, to solve complex computational problems in AI.

PSO3: Utilize Programming and Software Tools for AI Development

Apply programming languages such as C++, Java, Python, and React JS, along with tools like TensorFlow, Keras, and Power BI, to develop, test, and deploy AI applications, including web-based and data-driven systems.

PSO4: Design and Manage Database Systems for AI Applications

Create and manage relational and NoSQL database systems, using SQL, PL/SQL, and MongoDB, to efficiently store, retrieve, and process data for AI-driven applications, ensuring scalability and performance.

PSO5: Analyse and Visualize Data for Decision-Making

Employ statistical methods, data visualization techniques, and tools like Excel, Power BI, and R to analyse and interpret data, enabling data-driven decision-making and predictive modelling in AI contexts.

PSO6: Solve Real-World Problems Using AI and Related Technologies

Formulate and solve real-world problems in domains such as healthcare, finance, robotics, and IoT by applying AI techniques, optimization algorithms, and data structures, ensuring ethical and efficient solutions.

PSO7: Demonstrate Proficiency in System-Level Technologies

Understand and implement system-level technologies, including operating systems, microprocessors, and cloud computing, to support the development and deployment of AI systems in diverse environments.

PSO8: Exhibit Professional and Ethical Competencies

Apply professional communication, ethical hacking principles, and cybersecurity practices to develop secure AI systems, collaborate effectively in teams, and address ethical challenges in AI deployment.

ARTIFICIAL INTELLIGENCE (BSc) – Programme Structure

Sem	Part	Status	Sub. Code	Title of the Paper	Hrs	Cdt
I	I	Lang	26UGTL11	General Tamil – I		
	I	Lang	26UGHL11	Hindi – I		
	I	Lang	26UGFL11	French – I	6	3
	II	Lang	26UGEL11	General English – I	6	3
	III	Core-T1	26UAIC11	Introduction to Artificial Intelligence	5	5
	III	Core-P1	26UAIC12	Practical: Programming Using Python	3	3
	III	EC-T1	26UAIE11	Discrete Mathematics	4	3
	III	EC-P1	26UAIE12	Web Designing Basics	2	2
	IV	SEC1	26UAIN11	Data Visualization using Excel	2	2
	IV	FC	26UHER11/ 26UHEE11	Foundation Course: Religion: Catholic Doctrine/ Ethics	2	2
					30	23
II	I	Lang	26UGTL21	General Tamil – II		
	I	Lang	26UGHL21	Hindi – II		
	I	Lang	26UGFL21	French – II	6	3
	II	Lang	26UGEL21	General English – II	6	3
	III	Core-T2	26UAIC21	Java Programming	5	5
	III	Core-P2	26UAIC22	Practical: Programming using Java	3	3
	III	EC-T2	26UAIE21	Introduction to Statistical Methods	4	3
	III	EC-P2	26UAIE22	Practical: Statistical Methods Lab	2	2
	IV	SEC2	26UAIN21	Power BI	2	2
	IV	SEC3	26UHEI21	Integrated Personality Development	2	2
					30	23
III	I	Lang	26UGTL31	General Tamil – III		
	I	Lang	26UGHL31	Hindi – III		
	I	Lang	26UGFL31	French – III	6	3
	II	Lang	26UGEL31	General English – III	6	3
	III	Core-T3	26UAIC31	Machine Learning	5	5
	III	Core-P3	26UAIC32	Practical: Machine Learning Lab	3	3
	III	EC-T3	26UAIE31	Database Systems	4	3
	III	EC-P3	26UAIE32	Practical: DMBS Lab using Oracle	2	2
	IV	SEC4	26UHEL31	Life Issues & Entrepreneurial Skill Development	2	2
	IV	SEC5	26UAIS31	Data Visualization using Power BI	2	2
					30	23
IV	I	Lang	26UGTL41	General Tamil – IV		
	I	Lang	26UGHL41	Hindi – IV		
	I	Lang	26UGFL41	French – IV	6	3
	II	Lang	26UGEL41	General English – IV	6	3
	III	Core-T4	26UAIC41	Artificial Internet of Things	4	4
	III	Core-P4	26UAIC42	Practical: AIOT Lab	3	3

	III	EC-T4	26UAIE41	Principles of Data Science	4	4
	III	EC-T5	26UAIE42	R Programming	3	3
	IV	EC-P4	26UAIE43	Practical: R Programming Lab	2	2
	IV	EVS	26UEVS41	Environmental Studies	2	2
	V	Extension Activities		STAND (Student Training and Action for Neighbourhood Development)	-	1
					30	25
V	III	Core-T5	26UAIC51	Deep Learning	5	5
	III	Core-T6	26UAIC52	Practical: Programming for Deep Learning	5	3
	III	Core-P5	26UAIC53	Neural Networks	5	5
	III	Core-P6	26UAIC54	Practical: Neural Networks Lab	5	3
	III	EC-T5	26UAIE51	React JS	4	3
	III	EC-P5	26UAIE52	Practical: React JS Lab	4	3
	IV	VE	26UVEH51	Human Rights & Social Analysis	2	2
	IV	Internship	26UAI51	Internship	-	2
					30	26
VI	III	Core-T7	26UAIC61	AI Essentials	5	4
	III	Core-T8	26UAIC62	Practical: Programming for Image Processing	4	2
	III	Core-P7	26UAIC63	Natural Language Processing	5	4
	III	Core-P8	26UAIC64	Practical: Natural Language Processing Lab	4	2
	III	Core	26UAIC65	Project with Viva Voce	6	3
	III	EC-T6	26UAIE61	Data Analytics	4	3
	IV	SEC- 6	26UAIS61	Professional Competency Skill	2	2
					30	20
				TOTAL	180	140
				Additional Compulsory Courses		
				I Year (Add-On Course)		2
				II Year (Value- Added Course)		2
				III Year (Extra - Credit Course)		2
				Industrial Visit		1
				MOOC		2
				Co-curricular / Extra-Curricular Activities		1
				TOTAL	180	150

ADD-ON COURSES

Sem.	Course Code	Title of the Course	Credits
I	26UAIAO1	Office Automation	2
I	26UAIAO2	MS EXCEL	2
I	26UAIAO3	Google Office Tools	2

VALUE ADDED COURSES

Sem.	Course Code	Title of the Course	Credits
II	26UAIVA1	Cyber Security	2
II	26UAIVA2	Big Data Analytics	2
II	26UAIVA3	Ethical Hacking	2

EXTRA CREDIT COURSES

Sem.	Course Code	Title of the Course	Credits
I	26UAIEC1	Basics of Python Programming	2
II	26UAIEC2	Fundamentals of AI	2
III	26UAIEC3	User Interface Design (UI/UX)	2
IV	26UAIEC4	Brain-Computer Interface (BCI)	2
V	26UAIEC5	Health Care Analytics	2
VI	26UAIEC6	Recommender System	2

பொதுத்தமிழ் - I
26UGTL11

Sem	Course Code	Course Category	Hours	Credit	MARK FOR EVALUATION		
					CIA	ESE	TOTAL
I	26UGTL11	GT	6 Hrs	3	100	100	100
COURSE TITLE		பொதுத்தமிழ் - I					

COURSE OUTCOMES: (பயன்கள்)

CO1	பாரதியார் காலந்தொட்டுத்தற்காலப் புதுக்கவிதைகள் வரையிலானகவிதைகளை அறிமுகப்படுத்துவதால் படைப்பாற்றல் திறன் பெறுதல் (K1, K2)
CO2	புதுக்கவிதைவரலாற்றினை அறிந்துகொள்ளுதல்.(K2)
CO3	இக்கால இலக்கியவகையினைக் கற்பதன் மூலம் படைப்பாக்கத்திறனைப்பெறுதல்.(K4)
CO4	மொழிஅறிவோடுசிந்தனைத் திறன் அதிகரிக்கச் செய்தல்.(K3)
CO5	தமிழ்மொழியைப் பிழையின்றிஎழுதவும்,புதியகலைச்சொற்களைஉருவாக்கவும் அறிந்து கொள்ளுதல்.(K4)
CO6	காலந்தோறும் சமூகச் சிந்தனைகள் மாறுவதை இலக்கியவரலாற்றின் மூலம் புரிந்துகொள்ளுதல்.(K6)

UNITS	SYLLABUS CONTENTS	HOURS
I	மரபுக் கவிதை 1. பெ.சுந்தரனார் - தமிழ்த்தெய்வவணக்கம் 2. இராமலிங்கஅடிகளார் - வள்ளலார் பாடல்கள் 3. பாரதியார் - பாரத ஜனங்களின் தற்கால நிலைமை 4. பாரதிதாசன் - சிறுத்தையே வெளியில் வா 5. மு.நல்லசுவாமிபண்டிதர் - சிலுவைத் தியானமாலை - மரியாள் புலம்பல் 6. கவிமணிதேசிகவிநாயகம்பிள்ளை -புத்தரும் ஏழைச்சிறுவனும் 7. முடியரசன் - மொழிஉணர்ச்சி 8. கண்ணதாசன் - ஆட்டனத்திஆதிமந்தி – ஆதிமந்திபுலம்பல் 9. கல்யாணசுந்தரம் - பட்டுக்கோட்டையார் பாடல் புதுக்கவிதை 1. கவிக்கோஅப்துல் ரகுமான் - வீட்டுக்கொருமரம் வளர்ப்போம் 2. சிற்பி— கவிதைமுடியவில்லை 3. மு.மேத்தா— வாழைமரத்தின் சபதம் 4. வைரமுத்து— புத்தகப்புராணம் 5. ஞானக்கூத்தன் - அம்மாவின் பொய்கள் 6. அறிவுமதி—வள்ளுவம் பத்து 7. நா.முத்துக்குமார் - ஆனந்தயாழை மீட்டுகிறாய் 8. சுகிர்தாராணி— சபிக்கப்பட்டமுத்தம் 9. அபிமானி - தலித்தியக்கவிதைகள் - 10. வைகைச் செல்வி – அம்மி 11. நாட்டுப்புறப்பாடல்	30

II	சிறுகதைகள் 1. புதுமைப்பித்தன் - கடவுளும் கந்தசாமிப் பிள்ளையும் 2. கு.ப.ராஜ கோபாலன் - விடியுமா? 3. கி.ராஜநாராயணன் - கதவு 4. வண்ணதாசன் - ஒருசிறுஇசை 5. உமாமகேஷ்வரி - மரப்பாச்சி உரைநடை 1. இலக்கியத்தின் உயிர்- இரா.மோகன் 2. இருபதாம் நூற்றாண்டுக்கவிதைகளில் தொழிலாளர் நிலை- இரா.மோகன் 3. எண்பதுகளில் புதுக்கவிதைப் போக்குகள் - இரா.மோகன் 4. தமிழ்ச் சிறுகதைகளில் முன்னிலைஉத்தி- இரா.மோகன் 5. வளமுடன் வாழ - அருள்முனைவர் ச.இன்னாசிமுத்து.சே.ச.	15
III	தமிழ் இலக்கியவரலாறு (இக்கால இலக்கியம்)	15
IV	இலக்கணம் - எழுத்து 1. தொல்காப்பியத்தின் எழுத்துவகை 2. முதல் எழுத்துக்கள் 3. சார்பெழுத்துக்கள் 4. மொழிமுதல் எழுத்துக்கள் 5. மொழி இறுதிஎழுத்துக்கள் 6. மொழி இடைஎழுத்துக்கள் 7. போலி 8. பதவிலக்கணம் 9. புணர்ச்சி இலக்கணம்	15
V	பிழையின்றிஎழுதுவோம் 1. பிழைப்பட எழுதும் சொற்களும், திருத்தங்களும் 2. சொற்பொருள் வேறுபாடு 3. பிழையான வாக்கியங்களும், திருத்தங்களும் 4. நிறுத்தற்குறிகள் 5. மரபு 6. வல்லெழுத்து (க்,ச்,த்,ப்) மிகுமிடங்கள் 7. வல்லெழுத்துமிகா இடங்கள் 8. வாக்கியம் :வகைகளும்,மாற்றங்களும் 9. வழ(ழு)க்குத் தமிழ் 10.உவமைகள் - பழமொழிகள் - மரபுத் தொடர்கள்	15
TEXT BOOKS (பாடநூல்கள்)		
- தமிழ்த்துறை வெளியீடு- தூய சவேரியார் கல்லூரி,(தன்னாட்சி)பாளையங்கோட்டை. - வகைமைநோக்கில் தமிழ் இலக்கியவரலாறு- பாக்கியமேரி		
REFERENCE BOOKS (பார்வைநூல்கள்)		
- தமிழ் இலக்கியவரலாறு- சிற்பிபாலசுப்பிரமணியன் - புதியநோக்கில் தமிழ் இலக்கியவரலாறு- தமிழண்ணல் - தமிழ் இலக்கியவரலாறு- சேதுராமன்		
WEB SOURCES(இணையதளங்கள்)		
- Tamil Heritage Foundation – www.tamilheritage.org<http://www.tamilheritage.org> - Tamil Virtual University Library – www.tamilvu.org/library http://www.virtualvu.org/library - Project Madurai – www.projectmadurai.org - Chennai Library – www.chennailibrary.com<http://www.chennailibrary.com> - Tamil University Library – www.ulib.prg<http://www.ulib.prg> - Tamil E-books downloads – tamilebooksdownloads.blogspot.com - Tamil Books online – books.tamilcube.com - Catalogue of the Tamil Books in the library of British congress archive.org		

பொதுத்தமிழ் - II
26UGTL21

Sem	Course Code	Course Category	Hours	Credit	MARK FOR EVALUATION		
					CIA	ESE	TOTAL
II	26UGTL21	GT	6 Hrs	3	100	100	100
COURSE TITLE		பொதுத்தமிழ் - II					

COURSE OUTCOMES (பயன்கள்)

CO1	பக்தி இலக்கியத்தின்தோற்றம்,வளர்ச்சி சிற்றிலக்கியத்தின் தோற்றம்,வளர்ச்சி குறித்து அறிந்துகொள்வர்.(K1)
CO2	பக்தி இலக்கியங்கள் ,சிற்றிலக்கியங்கள் முதலியவற்றின் இலக்கண மற்றும் இலக்கிய அமைப்பை விளங்கிக் கொள்வர் (K2)
CO3	பக்தி இலக்கியப் பாடல்களில் காணப்படும் தெய்வவழி பாட்டுணர்வு, சிற்றிலக்கியங்களில் காணலாகும் சமூகநீதிக் கருத்துகளை, இன்றைய வாழ்வோடு தொடர்புபடுத்தி நோக்குவர் (K3)
CO4	பக்தி இலக்கியம் சிற்றிலக்கியங்களின் வழி இலக்கண இலக்கியச்சிறப்புகளை ஒப்பிட்டுப் பேதங்களைக் காண்பர். (K3)
CO5	பக்தி இலக்கிய, சிற்றிலக்கியங்களின் வழி தமிழ்மொழி, பண்பாடு, மதம், தத்துவம் ஆகியவற்றினை மதிப்பிட்டுச் சீர்தூக்கிப் பார்ப்பர் (K5)
CO6	கற்ற இலக்கியங்களை அடிப்படையாகக் கொண்டு,சிறுபக்திக் கவிதைகள் அல்லது சிற்றிலக்கிய மரபில் பாடல் இயற்றும் திறன் பெறுவர்.,(K6)

UNITS	SYLLABUS CONTENTS	HOURS
I	பக்தி இலக்கியம் -1 1. திருஞானசம்பந்தர் - திருக்கோடிக்கா 2. திருநாவுக்கரசர் - திருப்பாதிரிப்புலியூர் 3. திருப்பாவை - ஆண்டாள் 4. குலசேகரஆழ்வார் - 5 ஆம் பதிகம் 5. சித்தர் பாடல்கள் - அழகணிசித்தர் (தேர்ந்தெடுக்கப்பட்டபாடல்கள்) சிற்றிலக்கியம்: 2 1. கலிங்கத்துப்பரணி - களம் பாடியது 2. திருக்குற்றாலக் குறவஞ்சி - மலைவளம் 3. திருக்காவலூர்க்கலம்பகம் - சமூகஉல்லாசம் 4. முக்கூடற்பள்ளு-நாட்டு வளம் 5. தமிழ்விடுதூது - தூதுக்கானகாரணம்	30
II	ஊரைநடை 1. இறைநம்பிக்கையும் மனிதவாழ்வும் 2. இயேசுபிரான் குறிப்பிடும் எண்வகைமனிதர்கள் 3. நபிகள் நாயகத்தின் வாழ்வியல் நெறிகள் 4. திருமூலர் காட்டும் இறைநெறி 5. வள்ளலார் கூறும் வாழ்வியல் நாவல் - கருப்பாயி என்கிற நூர்ஜஹான் -அன்வர் பாலசிங்கம்	15
III	தமிழ் இலக்கியவரலாறு (பக்திஇலக்கியம்,சிற்றிலக்கியம் தொடர்பானபகுதிகள்)	15
IV	இலக்கணம் சொல்லின் இலக்கணம்-பெயர் ,வினை, இடை,உரிச்சொற்கள் பிறமொழிச் சொற்களைத் தமிழில் வழங்கும் முறை	15

V	மொழிபெயர்ப்பு ஆட்சிச் சொல்லகராதி - மரபுத் தொடர்கள் -பழமொழிகள் - திருக்குறள்	15
TEXT BOOKS (பாடநூல்கள்)		
1. தமிழ்த்துறைவெளியீடு - தூயசவேரியார் தன்னாட்சிக் கல்லூரி,பாளையங்கோட்டை. 2. வகைமைநோக்கில் தமிழ் இலக்கியவரலாறு - முனைவர்பாக்கியமேரி 3. கருப்பாயின்கிறநூர்ஜஹான் -அன்வர் பாலசிங்கம்		
REFERENCE BOOKS (பார்வைநூல்கள்)		
• தமிழ் இலக்கியவரலாறு - சிற்பி. பாலசுப்பிரமணியன் • புதியநோக்கில் தமிழ் இலக்கியவரலாறு - தமிழண்ணல் • தமிழ் இலக்கியவரலாறு- சேதுராமன்		
WEB SOURCES (இணையதளங்கள்)		
• Tamil Heritage Foundation- www.tamilheritage.org • Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library • Project Madurai - www.projectmadurai.org. • Chennai Library- www.chennailibrary.com . • Tamil Universal Digital Library- www.ulib.prg . • Tamil E-Books Downloads- tamilebooksdownloads..blogspot.com		

பொதுத்தமிழ் - III
26UGTL31

Sem	Course Code	Course Category	Hours	Credit	MARK FOR EVALUATION		
					CIA	ESE	TOTAL
III	26UGTL31	GT	6 Hrs	3	100	100	100
COURSE TITLE		பொதுத்தமிழ் - III					

COURSE OUTCOMES (பயன்கள்)

CO1	மாணவர்கள் காப்பியம், உரைநடை, ஊடகத்தமிழ், இலக்கணம், யாப்பு ஆகியவற்றின் அடிப்படைக் கருத்துக்கள்,பண்புகள், வரலாற்றுப் பின்னணிகளை அறிதல். (K1)
CO2	மாணவர்கள் தமிழ் இலக்கியவடிவங்கள் (காப்பியம்,உரைநடை) மற்றும் இலக்கணக் கூறுகளைப் (எழுத்து,சொல்,பொருள்,யாப்பு) புரிந்துகொண்டு அவற்றின் தனித்துவங்களைவிளங்கிக் கொள்ளல். (K2)
CO3	மாணவர்கள் கற்ற இலக்கணவிதிகள் மற்றும் யாப்புமுறைகளைப் பயன்படுத்தி சரியான தமிழ் வாக்கியங்களையும் செய்யுள்களையும் உருவாக்கப் பயிற்சியளித்தல். (K3)
CO4	மாணவர்கள் காப்பியங்கள் மற்றும் உரைநடைப் படைப்புகளைப் பகுத்து, ஆய்வுசெய்து,அதன் கருத்து,கட்டமைப்பு, இலக்கியநயம் ஆகியவற்றை ஆராய்தல். (K4)
CO5	மாணவர்கள் இலக்கியப் படைப்புகளைதரம்,மொழிநடை, இலக்கணஅமைப்பு ஆகியவற்றைவிமர்சனமுறையில் மதிப்பீடுதல், (K5)
CO6	மாணவர்கள் தமிழ் இலக்கணம் மற்றும் யாப்புஅடிப்படையில் சுயமாக செய்யுள்,கட்டுரை,உரைநடைப் படைப்புகளைஉருவாக்கப் பயிற்சியளித்தல்;(K6)

UNITS	SYLLABUS CONTENTS	HOURS
I	1. சிலப்பதிகாரம் - வழக்குரைக் காதை. 2. மணிமேகலை- ஆபுத்திரன் திறம் அறிவித்தகாதை. 3. சீவகசிந்தாமணி- பதுமையர் இலம்பகம். 4. கம்பராமாயணம் - மந்தரைச் சூழ்ச்சிப் படலம்.	30
	1. சூளாமணி 2. உதயணகுமாரகாவியம் 3. இயேசுகாவியம் 4. மருமக்கள் வழி மான்மியம்	
II	ஊரைநடை 1. காளத்திவேடனும் கங்கைவேடனும். 2. தீமையை இயற்றும் தன்மையினர் கூனி இயாகோ. 3. சிலம்புகாட்டும் சீர்மிகு சிந்தனைகள். 4. மணிமேகலை காப்பியத்தில் மானுட விழுமியங்கள். நாடகம் - வேலைக்காரி - அறிஞர் அண்ணா.	15
III	தமிழ் இலக்கிய வரலாறு (காப்பியங்கள்)	15
IV	இலக்கணம் - யாப்பு,எழுத்து, அசை. சீர்,தளை, அடி,தொடை,பா வகைகள்	15

V	ஊடகத்தமிழ் - விளக்கம், வகைகள்,செயல்பாடுகள் 1.இதழ்கள் 2.வானொலி 3.தொலைக்காட்சி 4.திரைப்படம்	15
TEXT BOOKS (பாடநூல்கள்)		
- தமிழ்த்துறைவெளியீடு-தூயசவேரியார்க் கல்லூரி,(தன்னாட்சி) பாளையங்கோட்டை. - வகைமைநோக்கில் தமிழ் இலக்கியவரலாறு-பாக்கியமேரி		
REFERENCE BOOKS (பார்வைநூல்கள்)		
- தமிழ் இலக்கியவரலாறு-சிற்பிபாலசுப்பிரமணியன் - புதியநோக்கில் தமிழ் இலக்கியவரலாறு-தமிழண்ணல் - தமிழ் இலக்கியவரலாறு-சேதுராமன்		
WEB SOURCES (இணையதளங்கள்)		
- Tamil Heritage Foundation – www.tamilheritage.org<http://www.tamilheritage.org> - Tamil Virtual University Library – www.tamilvu.org/library http://www.virtualvu.org/library - Project Madurai – www.projectmadurai.org - Chennai Library – www.chennailibrary.com<http://www.chennailibrary.com - Tamil University Library – www.ulib.prg<http://www.ulib.prg> - Tamil E-books downloads – tamilebooksdownloads.blogspot.com - Tamil Books online – books.tamilcube.com - Catalogue of the Tamil Books in the library of British congress archive.org		

பொதுத்தமிழ் - IV
26UGTL41

Sem	Course Code	Course Category	Hours	Credit	MARK FOR EVALUATION		
					CIA	ESE	TOTAL
IV	26UGTL41	GT-IV	6 Hrs	3	100	100	100
COURSE TITLE		பொதுத்தமிழ்- IV					
COURSE OUTCOMES (பயன்கள்)							
CO1:	பழந்தமிழ் இலக்கியவரலாற்றறிவைப் பெறுதல் (K1, K2)						
CO2:	சங்க இலக்கிய அறிமுகங்களின் ஊடாகத் தமிழர் வாழ்வியல் நெறிகளை உணர்தல். (K2,K3)						
CO3:	தமிழ் இலக்கியங்களின் செய்யுள் உருவம்,உள்ளடக்கம், படைப்பியல் கொள்கைகளைப் புரிந்துகொள்ளுதல். (K4)						
CO4:	அகத்திணை,புறத்திணைவாழ்வியல் நெறிப்பாடுகளின் ஊடாகத் தமிழர்ப்பண்பாட்டு அடிப்படைகளை மதிப்பிடும் திறன் பெறுதல். (K2,K3)						
CO5:	மொழித்திறன்,படைப்புத்திறன் பெறுதல். (K3,K4)						
CO6:	நாடக இலக்கியஅனுபவத்தின் வழியாகதமிழ்ச் சமூகநிலைகளை இலக்கியமாக்கும் நுட்பங்களைப் பெறுதல். (K2,K6)						

UNITS	SYLLABUS CONTENTS	HOURS
I	செய்யுள் பகுதி 1 1. நற்றிணை (5பாடல்கள்) 2. குறுந்தொகை (5பாடல்கள்) 3. அகநானூறு (2பாடல்கள்) 4. புறநானூறு (5பாடல்கள்)	30
	செய்யுள் பகுதி 2 1. நெடுநல்வாடை முழுமையும் 2. திருக்குறள் (விருந்தோம்பல், நட்பாராய்தல், குறிப்பறிதல்) 3. நாலடியார் (கல்வி)	
II	உரைநடைக் கட்டுரைகள் 1. ஊரும் பேரும் - ரா.பி. சேதுபிள்ளை 2. தமிழர் பண்பாடும்அதன் சிறப்பியல்புகளும் - தனிநாயகம் அடிகளார் 3. இலக்கியஉருவாக்கமும் பயனும் - சேதுமணிமணியன் பயண இலக்கியம் 1. மண் புதிது - சுப்ரபாரதிமணியன்	15
III	தமிழ் இலக்கியவரலாறு 1. சங்ககாலம் 2. சங்கம் மருவியகாலம்	15
IV	இலக்கணம் -பொருள் 1. அகப்பொருள் 2. புறப்பொருள் 3. அணியிலக்கணம் (உவமை,உருவகம்,பிறிதுமொழிதல்,வஞ்சப்புகழ்ச்சி,தற்குறிப்பேற்ற அணி)	15
V	மொழிப்பயிற்சி 1. ஒப்பும் மறுப்பும் (ஒருகருத்தினை வெட்டி,ஒட்டி எழுதும் பயிற்சி) 2. விண்ணப்பம் எழுதுதல் (பயிற்சி) 3. தமிழில் தன்விவரக் குறிப்புவரைதல் (பயிற்சி) 4. மேடைப்பேச்சு நுட்பங்கள் (நேர்முகப் பயிற்சிமற்றும் மதிப்பீடு)	15

TEXT BOOKS (பாடநூல்கள்)	
1. பொதுத்தமிழ் பாடநூல், தமிழ்த்துறை வெளியீடு ,தூய சுவேரியார் கல்லூரி,பாளையங்கோட்டை.	
2. பாக்கியமேரி,தமிழ் இலக்கியவரலாறு,பதினொன்றாம் பதிப்பு - 2025 ,பூவேந்தன் பதிப்பகம்,மயிலாப்பூர்,சென்னை.	
3. சுப்பரபாரதிமணியன்இமண் புதிது,முதல் பதிப்பு 2018 அறிவுப்பதிப்பகம்,சென்னை.	
REFERENCE BOOKS (பார்வைநூல்கள்)	
பார்வை நூல்கள்	
1. மது.ச.விமலானந்தம்தமிழ் இலக்கியவரலாறு,	
2. மு. வரதராசனார்,தமிழ் இலக்கியவரலாறு,	
3. தமிழண்ணல்,புதியநோக்கில் தமிழ் இலக்கியவரலாறு.	
WEB SOURCES (இணையதளங்கள்)	
• Tamil Heritage Foundation – www.tamilheritage.org<http://www.tamilheritage.org> • Tamil Virtual University Library – www.tamilvu.org/library http://www.virtualvu.org/library • Project Madurai – www.projectmadurai.org • Chennai Library – www.chennailibrary.com<http://www.chennailibrary.com> • Tamil University Library – www.ulib.prg<http://www.ulib.prg> • Tamil E-books downloads – tamilbooksdownloads.blogspot.com • Tamil Books online – books.tamilcube.com • Catalogue of the Tamil Books in the library of British congress archive.org	

HINDI

SEMESTER 1

UNIT I: GRAMMAR

- Swar(स्वर),
- Vyanjan(व्यंजन),
- Barah Khadi(बारहखड़ी),
- Shabd aur Vakya Rachna (शब्द और वाक्य रचना)

UNIT II: SUBODH HINDI RACHNA

- Binna binna arth(भिन्न भिन्न अर्थ),
- Numbers (गिनती1-100),
- Vaakyong mein Prayag kijiye (वाक्यों में प्रयोग कीजिये)
- Rishto ke Naam (रिश्तों के नाम)
- Gharelu padartho ke Naam (घरेलु पदार्थों के नाम)

UNIT III: PROSE

- Sadharan Vakya aur Sangya (संज्ञा),
- Sarvanaam(सर्वनाम)
- Visheshan(विशेषण)
- Kriya (क्रिया)

UNIT IV: SHORT STORIES

- Bacho ki Kahaniya

UNIT V: COMPREHENSION

- Sant Tiruvalluvar, संत तिरुवल्लुवर,
- Hamara desh, (हमारा देश,)
- Paryavaran Sanrakshan, (पर्यावरण संरक्षण)
- Naari Sashaktikaran, (नारी सशक्तिकरण)
- Rastriya janvar(राष्ट्रीय जानवर)

Reference Books

Hindi sentences - Chaturbhuj Sahay
Subodh Hindi Grammar - Phoolchand Jain
Sankshipt Hindi Grammar - Kamta Prasad
Practical Hindi - Nagappa
Abhinav Hindi Grammar – Nagappa
Saral Hindi Grammar - Shyamchandra Kapur
Grammar Pradeep - Ramdev
Laghu Bal Kathaye - Ramashankar
Captivating Stories - Premchand
CONCISE GRAMMAR OF THE HINDI LANGUAGE - H.C Scholberg
Hindi Grammar - Edwin Greaves

SEMESTER II

UNIT I: Hindi Ekankiya

- Sooryodhaya(सूर्योदय),
- Mayoppiya (मायोपिया),
- Udhayan (उदयन),
- Upendranath Ashk – Lakshmi ka Swagat

Characters: (Tippani)

- Nirjarani (निर्झरणी),
- Sudhi(सुधी)
- Thathagath(तथागत),
- Udhayan (उदयन),

UNIT II: Hindi Kahaniya

- Premchand – Bade Ghar ki Beti
- Malathi Joshi – Vo Tera Ghar Yah Mera Ghar
- Gyanranjan - Pita

UNIT III: ANCIENT POETRY

- Pathya Chayanika– KabeerDhoha–Saaki (साखी) 1 to 10.

UNIT IV: Vyakaran

- Kriya Visheshan (क्रियाविशेषण),
- Sambandh Bodhak (संबंधबोधक),
- Samuchay Bodhak (समुच्चयबोधक)
- Vismayadi Bodhak (विस्मयादिबोधक) aadi shabdo ka prayog

UNIT V:

Pratiyogi Pariksha par aadharit Nimnalikhit Vishayo se sambandhit Prashikshan Karya

- Tamil Bhasha: Mahakavi Bharatiyar
- Sanket Vikas dwara Lekhan kala aur Kahani Lekhan ka Vikas
- Gadyansh dekhkar sahi Shirshak chunna
- Pathit Vyakaran par aadharit Vakya rachna
- Vibhinna Pratiyogi parikshao ke bare mein suchna pradan dena

Reference Books

- Sooryodaya (Dakshin Bharat Hindi Pracharsabha publications)
- Aath Ekanki Natak - Ed. Dr. Ramkumar Verma
- Das Ekanki

SEMESTER III

Niji Patra – Arth aur Bhed, Pitaji/Mataji ke naam patra, Mitra, Bhai aadi ke naam patra

UNIT I: Niji Patra Lekhan

- Niji Patra - Arth aur Bhed
- Pitaji/Mataji ke naam patra
- Mitra, Bhai aadi ke naam patra
- Paribhashik Shabdawali - 20 words

Unit II

- Samajik Patra Lekhan
- Aavedan Patra - Noukri, Chutti aadi
- Dak Adhikari ke naam patra
- Paribhashik shabdawali - 20 words

Unit III

- Vyavasayik Patra Lekhan
- Vyavasayik Patra - Arth aur Bhed
- Prakashak ke naam patra
- Shikayathi
- Paribhashik shabdawali - 20 words

Unit IV

- Samanya Parichay
- Sarkari Patra
- Ardh-Sarkari Patra
- Gyapan, Paripatra
- Anusmarak
- Paribhashik Shabdawali - 20 words

Unit V

- Precis Writing And Applied Grammar (Ling, Vachan and Karak)
- Karak (कारक)
- Vachan badaliye(वचन बदलिए),
- Ling badaliye(लिंग बदलिए)

Reference Books

- Viyavaharik Hindi, Hindi Prachar press, T.Nagar, Madras-600 017
- Alekhan aur Tippan - Prof. Viraj
- Alekhan Kichlu

SEMESTER IV

UNIT I: STORIES (दक्षिणी कथाएं)

- Meri pathni(मेरी पत्नी),
- Thotha aur Mynah(तोता और मैना),
- Noorunisha(नूरनिशा),
- Mruthudhand (मृत्यु दंड),
- Karmaveer(कर्मवीर) and their Characters.

UNIT II: Proudlyogiki aur Hindi

- Unicode
- Dewanagari Lipi
- Hindi ki Vibhinna Website - Ek Parichay

UNIT III: POETRY (काव्यशास्त्र)

Ras :

- Kavyaras (काव्यरस),
- Veer ras (वीररस),

Sandh:

- Chowpayi (चौपाई),
- Rola(रोला),

Alankar:

- Yamakalankar (यमकअलंकार),
- Upmaalankar (उपमाअलंकार).

UNIT IV:

AUTOBIOGRAPHY (Sathya ka Swar–Gandhiji ki Jeevani)

- Ma, bap aur Janma(मां, बाप और जन्म)
- Ladakpan (लड़कपन)
- High school mein (हाई स्कूल में)
- Vivah aur Mamsabhakshan(विवाह और मांस भक्षण)
- Ankhen Kuli (आंखें खुली)

Unit V :Pratiyogi priksa par aadharit Computer sambandhit prashikshan Karya

- Hindi mein Powerpoint banana
- Hindi mein Google Document taiyar karna
- Hindi mein Google form taiyar karna
- Vibhinna pratiyogi pariksha ke bare mein suchna pradan karna

Reference Books

- Social Networking: Naye Samay ka Samvad – Ed. Sanjay Dwivedi
- Jansanchar aur Maas Culture - Jagdeeshwar
- Media: Bhumandalikaran aur Samaj - Ed. Sanjay Dwivedi
- Naye Jamane ki Patrakarita - Sourabh Shukla
- Patrakarita se Media tak - Manoj Kumar

French semester-I

UNIT. I

Communication:	Decrire la salle de classe et le professeur.
Grammaire :	Les articles indifinis et defines, les verbes reguliers et irreguliers.
Culture:	Les symbols de la France.
Projet:	Desiner les objets dans le sac et dans la trousse.

UNIT. II

Communication:	Parler de la journee.
Grammaire :	Les verbes pronominux, Affirmatif Negatif et interrogatif
Culture:	Les Frontieres de la France.
Projet:	Faire un rapport sur la journee des parents.

UNIT. III

Communication:	se presenter, parler de la nationlite, dire son numero de telephone.
Grammaire :	Les prepositions , Accord adjective nom, verbes aller venir.
Culture:	Les fete en France trditions et multi culturralisme.
Projet:	faire une liste des camardes et noter leurs numeros de telephone a haute voix et demander a un ami de verifier.

UNIT. IV

Communication:	parler de la nourriture et des repas simples et sains.Decrire les repas.
Grammaire :	L'impertif, Les articles partitifs,
Culture:	Les plats francais.
Projet:	Dessiner et decrire l nourriture que les gens mangent dans leur pays,

UNIT. V

Communication:	Exprimer ses gouts.
Grammaire :	Les adjectifs qulificatifs, les adjectifs possessifs, La negation.
Culture:	La France et ses regions.
Projet:	qu'est-ce que tu aimes faire pendant ton temps libre?

- Lecon 1.** La vie scolaire de luc
- Lecon 2.** La vie quotidienne de luc
- Lecon 3.** Le monde multiculturel
- Lecon 4.** La bonne nourriture
- Lecon 5.** Parlons de nos preferences

Ref.Avenir method de francais 3

French
Semester-II

UNIT. I

Communication:	Demander et donner les directions , Situer un endroit (sur la carte)
Grammaire :	Les prepositions L'interrogation.
Culture:	Les vêtements français.
Projet:	Faire une carte de la ville imaginaire.

UNIT. II

Communication:	Parler de la semaine ,Parler des activités faites pendant la semaine.
Grammaire :	Les articles contractes,Les adjectifs démonstratifs, les expressions avec les verbes Faire et Avoir.
Culture:	Les villes connues en France.
Projet:	Preparer un emploi du temps avec des activités faites pendant la semaine.

UNIT. III

Communication:	Parler du passé, Raconter le week end dernier.
Grammaire :	Le passé composé avec l'auxiliaire avoir, La formation du participe passé.
Culture:	Noël
Projet:	Faire un petit dossier sur les activités faites pendant les vacances d'été.coller les photos de ces activités faites.

UNIT. IV

Communication:	Parler du passé, Raconter les vacances dernières
Grammaire :	Le passé composé avec l'auxiliaire être.
Culture:	Les montagnes en France.
Projet:	Preparer un dossier sur la fête favorite célébrée l'année dernière.

UNIT. V

Communication:	Parler de la ville de demain , Exprimer des projets et des prédictions.
Grammaire :	Le futur proche, Le futur simple.
Culture:	Les monuments en France.
Projet:	Imaginer et présenter la ville du futur

Leçon 6. Sara cherche son chemin

Leçon 7. Ma semaine en action

Leçon 8. Mon week end dernier

Leçon 9. Mon séjour à Annecy

Leçon 10. La ville du futur

Ref.Avenir method de français 3

French
semester-III

UNIT. I

- Communication:** Decrier ce que les Francais aiment faire , Parler de la vie des Francais.
- Grammaire :** Les articles indefinis et defins ,Les articles partitifs,Les articles contractes.
- Culture:** La France dans le Coeur des Francais.
- Projet:** Preparer un dossier sur ce que les gens du pays aiment faire.

UNIT. II

- Communication:** Comparer la vie des adolescents d'autrefois et d'aujourd'hui.
- Grammaire :** Le negation,Les articles.
- Culture:** Les sous cultures adolescents.
- Projet:** Decrivez la vie des adolescents d'hier et d'aujourd'hui.

UNIT. III

- Communication:** Parler d'un sport.
- Grammaire :** L'imperatif,L'interrogation questions/reponses,Lesconjonctins.
- Culture:** Le sport en France.
- Projet:** Parler du sport favort.

UNIT. IV

- Communication:** Decriver les vacances,Racontredes experiences,Envoyerles mails.
- Grammaire :** Le passe compose.
- Culture:** La France ,une destination touristique.
- Projet:** Dessiner ou coller les images de l'anniversaire fete l'annee derniere, rediger un petit texte pour raconter ce jour.

UNIT. V

- Communication:** Parler d'une sortie scolaire,Ecrire un e-mail.
- Grammaire :** Le passe recent, le futur proche .
- Culture:** Les penitures celebres du muse du Louvre.
- Projet:** Ecris sur une visite au muse.

- Lecon 1.** Esprit Francais.
- Lecon 2.** Les ados modernes
- Lecon 3.** Une grande aventure a velo
- Lecon 4.** Un sejour a nice
- Lecon 5.** La sortie au muse scientifique

Ref.Avenir method de francais 4

French
Semester-IV

UNIT. I

Communication:	Parler de l'automobile
Grammaire :	Les adjectifs les verbes .
Culture:	Les automobiles en France.
Projet:	Faire un dossier sur ta voiture .Coller une photo de cette voiture et decire cette voiture.

UNIT. II

Communication	Reflechir aux villes a venir,Parler des projets d'avenir.
Grammaire :	Le futur simple ,le futur proche.
Culture:	Les projets d'avenir en France
Projet:	preparer un dossier sur les changements attendus dans la ville

UNIT. III

Communication:	partager la recette , Parler de la nourriture.
Grammaire :	Les adverbs de quantite,l'adjectif indefini.
Cultur	les fetes et les traditions.
Projet:	Preparerun dossier sur un dessert prefereet parle de son origine.

UNIT. IV

Communication:	Discuter les avantages d'internet,Ecrire un blog.
Grammaire :	Les adjectifs demonstratifs , Les adjectifs possessifs ,Les prepositions.
Culture:	Les principaux medias francais.
Projet:	Faire un rapport sur les avantages et les inconvenients d'internet.

UNIT. V

Communication:	Rediger des invitations , Ecrire des .messages les consignes, Repondre a une invitation.
Grammaire :	Les verbes pronominaux , les verbes pronominaux a l'impertif.
Culture:	Les arts du spectacle en France.
Projet:	Rediger une belle invitation pour feter l'anniversaire d'un grand parent.

Lecon 6. Le monde des automobiles

Lecon 7. La vie en 2050

Lecon 8. L'epiphanie en France

Lecon 9. La vie en ligne

Lecon 10. On fait quoi ce week-end?

Ref.Avenir method de francais 4

GENERAL ENGLISH

DEPARTMENT OF ENGLISH

UG – PART II - GENERAL ENGLISH

(The Seven-Tier Pattern recommended by UGC Curriculum Development Centre and Identified as Best Practice by NAAC)

	Stream A (For learners of high entry level proficiency)	Stream B (For learners of average entry level proficiency)	Stream C (For learners of low entry level proficiency)
Courses in Semester I	IV 26UGEL14	III 26UGEL13	I 26UGEL11
Courses in Semester II	V 26UGEL25	IV 26UGEL24	II 26UGEL22
Courses in Semester III	VI 26UGEL36	V 26UGEL35	III 26UGEL33
Courses in Semester IV	VII 26UGEL47	VI 26UGEL46	IV 26UGEL44

GENERAL COURSE OUTCOMES

CO1 Acquire the four language skills (Listening, Speaking, Reading, and Writing)

CO2 Develop the skill of independent reading and interpreting of graded texts

CO3 Expand and consolidate active and passive vocabulary

CO4 Acquire the skills needed to participate in a conversation that builds knowledge collaboratively

CO5 Acquire a clear understanding of English Grammar to facilitate the accuracy of communication.

CO6 Develop the skills of formal written communication to be used in academic and career-related contexts

TEXTS

Course I – *SPARK I: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.

Course II - *SPARK II: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.

Course III - *SPARK III: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.

Course IV - *SPARK IV: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.

Course V - *SPARK V: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.

Course VI – *SPARK VI: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.

Course VII - *SPARK VII: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.

EXTERNAL EXAMINATION

❖ External Examination has two components:

1) Written Examination and 2) Spoken English Viva Voce

❖ A three-hour written examination will be conducted for 100 marks for all General English papers and the scores will be converted to 40 marks, with a pass minimum of 16 marks.

❖ At the end of every semester, Spoken English Viva Voce will be conducted for all the students for 100 marks (four components) and the scores will be converted to 10 marks, with a required pass minimum of 4 marks.

❖ To pass in any General English paper, a student must secure the pass minimum of 40 out of 100 (16/40 in Written Examination and 4/10 in Spoken English Viva Voce Examination).

Distribution of marks: **Written Exam** (100 marks) Converted to 40 marks
 Spoken English Viva voce (100 marks) Converted to 10 marks
 TOTAL (40+10) = 50 marks

INTERNAL ASSESSMENT

❖ Two Internal Examinations shall be conducted for 50 marks each along with the Continuous Internal Assessments for 30 marks.

❖ The internal assessment for the courses may include skill-based activities such as seminar presentation/spoken English /critical podcast/ video essay/ creating a 5–8 slides on a topic/ composing a poem/ submitting a relevant photo with description etc.

In both the Internal Examinations and Semester Written Examination, 40% of the mark is allotted for literature-based questions, and 60% of the mark is allotted for grammar and composition exercises.

General English Evaluation Procedure

Internal Examination			Converted to	Total
CIA 1 (Written)	50	Converted to 70	50	100
CIA 2 (Written)	50			
Two Classroom Assessments (Spoken/Skill-based Activities) 2x 15	30	30		
External Examination			Converted to	
Semester Exam (Written)	100	Converted to 40/ (Pass Min. 16)	50	
Semester Viva Voce 4x25 (Spoken)	100	Converted to 10/ (Pass Min. 4)		

Course I

Hours: 6

Course Code: 26UGEL11

Credits: 3

LEARNING OUTCOMES

LO1 To provide an ambience to acquire the basic language skills, listening, speaking, reading, and writing

LO2 To make the learners learn the basic elements of grammar

LO3 To enable them to involve in basic communicative activities

LO4 To develop basic vocabulary

LO5 To help the learners comprehend and respond in English

LO6 To build confidence in using English to communicate

UNIT – I POETRY (READING AND WRITING SKILLS)

1. Sarojini Naidu- “Indian Weavers”
2. Robert Burns – “My Love is like a Red Red Rose”

UNIT – II SHORT STORIES (READING AND WRITING SKILLS)

1. W. Somerset Maugham – “The Ant and the Grasshopper”
2. Guy De Maupassant – “The Necklace”

UNIT –III GRAMMAR AND VOCABULARY SKILLS

1. Use of Verbs: Verb Grid (Positive, Negative & Question), Regular Verbs, Irregular Verbs & Modal
2. Tenses: Active Voice Tenses & Passive Voice Tenses
3. Use of Nouns: Forms of Personal Pronouns, Use of Nouns as Subject, Object, Complement and Object of the Preposition
4. Sentence Patterns: SV, SVO, SVC, SVA, SVOA, SVIODO
5. Punctuation and Capitalisation
6. Reading Comprehension (5 Anecdotes and 5 Wisdom Stories)

UNIT – IV LISTENING AND SPEAKING SKILLS

1. Listening Practice –Listen and Do exercises: Listening to English songs, simple Indian short stories, homonyms/homophones
2. Pronunciation Practice: Vegetables, Fruits, Flowers, Trees, Spices, Eatables
3. Introducing Oneself
4. Introducing Others

UNIT –V LISTENING AND SPEAKING SKILLS

1. Greetings
2. Making Request
3. Reading Aloud (From the text)
4. Describing a place / a picture (With hints)

COURSE OUTCOMES

Learners will be able to

CO1 Use grammatical structures in meaningful constructions

CO2 Use oral communication for day-to-day activities

CO3 Use simple sentences for oral and written communication

CO4 Use punctuation and capitalisation accurately

CO5 Comprehend what they listen to, and respond to it at the primary level

CO6 Read and appreciate simple stories and anecdotes

TEXT BOOKS

- *SPARK I: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.
- *Intermediate English Grammar* by Raymond Murphy. Cambridge University Press, 2019.

REFERENCE

- *Spoken English: A Foundation Course* by Kamalesh Sadanand and Susheela Punitha, Orient Longman Private Limited, 2008, ISBN 81-250-3467-6.
- *Spoken English for You* by G. Radhakrishna Pillai and K. Rajeevan, Emerald Publishers, 1987, ISBN 978-81-7966-023-2.
- *Better English Pronunciation* by Thakur KBP Sinha, Vijay Nicole Imprints, 2005, ISBN 81-8209-068-7.
- Bhatnagar, R. P. *English for Competitive Examinations*, India: Trinity Press, 2017
- Sinha, R. P. *Current English Grammar and Usage with Composition*. India: Oxford University Press, 2018.

QUESTION PATTERN

SEMESTER EXAMINATION

Marks

PART A - MCQs (7 from each of the Units I, II & 6 from Unit III)

20

PART B - Compulsory - Units I, II & III (5X3)

15

- Unit I - Short answer/ ERC
- Unit II - Short answer/ ERC
- Verb Grid (be verb)
- Verb Grid (possessive)
- Verb Grid (action/passive)

PART C – Compulsory- Unit III (5x7)

35

- Use of Verbs: Verb Grid
- Tenses
- Use of Nouns
- Sentence Patterns
- Punctuation and Capitalisation

PART D - (3x10)

30

- Essay (250 words) Unit I (Either/or)

- Essay (250 words) Unit II (Either/or)
- Compulsory -Comprehension

TOTAL **100**

INTERNAL EXAMINATIONS Marks

PART A - MCQs 6X1(2 from each of the Units I, II & III) 6

PART B- Compulsory - one question from each of the Units I, II & III

1 Short answer/ 1 ERC / Grammar (3X3) 9

PART C –Compulsory (Unit III) (3X5) 15

PART D- (2X10) 20

- Essay - Either /or Units – I & II 250 words

- Compulsory- Grammar/ Composition

TOTAL **50**

INTERNAL ASSESSMENTS Marks

Skill-based activity - 2x15 30

(Seminar presentation/Spoken English/Critical Podcast/ Video Essay/ Creating a 5–8 slide on a topic/
Composing a poem/ Submitting a relevant photo with description, etc.)

TOTAL 30

Viva Voce Components: 100 Marks

1. Introducing Oneself / Others (25)
2. Reading Aloud (From the text) (25)
3. Describing a place / a picture (With hints) (25)
4. Conversation with the examiner (Greetings/ Making Request) (25)

COURSE II

Hours: 6

Course Code: 26UGEL22

Credits: 3

LEARNING OUTCOMES

LO1 To provide an ambience to acquire the basic language skills, listening, speaking, reading, and writing

LO2 To make the learners frame questions and answers

LO3 To enable them to involve in basic communicative activities

LO4 To develop a comprehensible use of adjectives

LO5 To help the learners comprehend and respond in English

LO6 To develop oral communication for day-to-day activities

UNIT – I POETRY (READING AND WRITING SKILLS)

1. Rabindranath Tagore – “Leave this Chanting and Singing”
2. Gerard Manley Hopkins- “God’s Grandeur”

UNIT – II SHORT STORIES (READING AND WRITING SKILLS)

1. Sister Nivedita - “The Judgement Seat of Vikramaditya”
2. Stephen Leacock - “With the Photographer”

UNIT – III GRAMMAR AND VOCABULARY SKILLS

1. Use of Adjectives
2. Use of Conditional ‘If’ (Probable & Improbable Conditions)
3. Use of ‘who’, ‘which’, ‘where’ & ‘that’ in combining sentences
4. Framing questions – ‘Wh –’ & ‘Yes’ / ‘No’ Questions
5. Prefixes and Suffixes
6. Developing Hints into a Paragraph

UNIT – IV LISTENING AND SPEAKING SKILLS

1. Listening Practice – Listen and Do exercises: Sound patterns and words ending ‘s’ endings and ‘d’ endings, and Listening to English songs and Indian short stories
2. Pronunciation Practice: Medical Terms/ Names of Ailments/People /Currency/ Countries and Capitals/World-famous Cities
3. Making Requests
4. Offering help

UNIT – V LISTENING AND SPEAKING SKILLS

1. Seeking Permission
2. Expressing Gratitude
3. Reading Aloud (from the Prescribed Text)
4. Narrating a Story (from Hints)

COURSE OUTCOMES

Learners will be able to

CO1 Use grammatical structures in meaningful contexts

CO2 Use oral communication for day-to-day activities

CO3 Use simple sentences for oral and written communication

CO4 Use enhanced vocabulary

CO5 Comprehend and respond to what they listen to at the secondary level
CO6 Read and appreciate simple pieces of fiction and non-fiction

TEXT BOOKS

- *SPARK II: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.
- *Intermediate English Grammar* by Raymond Murphy. Cambridge University Press, 2019.

REFERENCE

- *Spoken English: A Foundation Course* by Kamalesh Sadanand and Susheela Punitha, Orient Longman Private Limited, 2008, ISBN 81-250-3467-6.
- *Spoken English for You* by G. Radhakrishna Pillai and K. Rajeevan, Emerald Publishers, 1987, ISBN 978-81-7966-023-.
- *Better English Pronunciation* by Thakur KBP Sinha, Vijay Nicole Imprints, 2005, ISBN 81-8209-068-7.
- Bhatnagar, R. P. *English for Competitive Examinations*, India: Trinity Press, 2017.
- Sinha, R. P. *Current English Grammar and Usage with Composition*. India: Oxford University Press, 2018.

QUESTION PATTERN

SEMESTER EXAMINATION

Marks

PART A – MCQs (7 from each of the Units I, II, and 6 from Unit III)	20
PART B – Compulsory Units I, II & III - Short answers/ ERC/Grammar (5X3)	15
• Unit I - Short answer/ ERC • Unit II - Short answer/ ERC • Prefixes • Suffixes • Adjectives	
PART C – Compulsory Unit III (5x7)	35
• Adjectives • Use of 'who' & 'where' in combining sentences • Use of 'which' & 'that' in combining sentences • Framing questions – 'Wh –' & 'Yes' / 'No' Questions • Developing Hints into a Paragraph	
PART D – (3x10)	30
• Essay (250 words) Unit I (Either/or) • Essay (250 words) Unit II (Either/or) • Compulsory -Use of Conditional 'If' (Probable & Improbable Conditions)	

TOTAL

100

INTERNAL EXAMINATIONS	Marks
PART A - MCQs 6X1(2 from each of the Units I, II & Unit III)	6
PART B- Compulsory-one question from each of the Units I, II & III	
1 Short answer/ 1 ERC/ Grammar (3X3)	9
PART C –Compulsory (Unit III) (3X5)	15
PART D – (2X10)	20
• Essay - Either /or Units – I & II 250 words • Compulsory - Grammar/ Composition	
TOTAL	50

INTERNAL ASSESSMENTS	Marks
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Skill based activity – 2x15	30
(Seminar presentation/Spoken English/Critical Podcast/ Video Essay/ Creating a 5–8 slide on a topic/ Composing a poem/ Submitting a relevant photo with description, etc.)	
TOTAL	30

Viva-Voce Components: 100 Marks

1. Pronunciation: Medical Terms/ Names of Ailments/People /Currency/ Countries and Capitals/ World famous Cities (25)
2. Conversation: Making Requests/Offering help/Seeking Permission /Expressing Gratitude (25)
3. Reading Aloud (from the Prescribed Text) (25)
4. Narrating a Story (from Hints) (25)

COURSE III

Hours: 6

Course Code: 26UGEL13, 26UGEL33

Credits: 3

LEARNING OUTCOMES

LO1 To involve the learners in reading and interpreting English in poetry and prose (Fiction and Non-fiction)

LO2 To enable learners to write about prescribed literature

LO3 To help learners learn the appropriate use of articles, prepositions and adverbs

LO4 To help learners develop vocabulary register through homonyms, homophones and homographs

LO5 To facilitate in learners, the ability to create a narration based on hints

LO6 To build confidence in the learners to speak English for specific purposes

UNIT – I POETRY (READING AND WRITING SKILLS)

1. William Shakespeare – “All the World’s a Stage”
2. P. B. Shelley – “Ozymandias”
3. Oliver Goldsmith – “The Village Schoolmaster”

UNIT – II SHORT STORIES/ PROSE (READING AND WRITING SKILLS)

1. O. Henry – “The Gift of the Magi”
2. Katherine Mansfield – “A Cup of Tea”
3. Mark Twain – “A Day at Niagara”

UNIT – III GRAMMAR AND VOCABULARY SKILLS

1. Articles
2. Prepositions
3. Adverbs
4. Spotting Errors (Articles/ Prepositions / Adverbs)
5. Homonyms, Homophones, Homographs
6. Constructing a story using hints

UNIT –IV LISTENING AND SPEAKING SKILLS

1. Listening Practice: Listen and Do exercises: Listening to short passages , short stories (Indian and British) , English songs, *Mind your Language* (Episodes:1-2)
2. Pronunciation Practice : Words related to professions
3. Words generally mispronounced
4. Telephonic Conversation
5. Making Suggestions

UNIT – V LISTENING AND SPEAKING SKILLS

1. Complimenting / Congratulating
2. Expressing Sympathy
3. Reading aloud
4. Describing a picture/ Describing a process
5. Personal Conversation (Habits, Hobbies, Future Plan)

COURSE OUTCOMES

Learners will be able to

CO1 Read and understand English in poetry and prose (Fiction and Non-Fiction)

CO2 Write coherent essays about the prescribed literature

CO3 Use articles, prepositions and adverbs appropriately

CO4 Use homonyms, homophones, and homographs appropriately, ensuring clarity and precision in their spoken and written English

CO5 Create a narration from hints

CO6 Speak English confidently in a descriptive as well as expository style

TEXT BOOKS

- *SPARK III: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.
- *Intermediate English Grammar* by Raymond Murphy. Cambridge University Press, 2019.

REFERENCE

- *Spoken English: A Foundation Course* by Kamalesh Sadanand and Susheela Punitha, Orient Longman Private Limited, 2008, ISBN 81-250-3467-6.
- *Spoken English for You* by G. Radhakrishna Pillai and K. Rajeevan, Emerald Publishers, 1987, ISBN 978-81-7966-023-2.
- *Better English Pronunciation* by Thakur KBP Sinha, Vijay Nicole Imprints, 2005, ISBN 81-8209-068-7.
- Bhatnagar, R. P. *English for Competitive Examinations*, India: Trinity Press, 2017.
- Sinha, R. P. *Current English Grammar and Usage with Composition*. India: Oxford University Press, 2018.

QUESTION PATTERN

SEMESTER EXAMINATION

Marks

PART A - MCQs (7 from each of the Units I, II, and 6 from Unit III)

20

PART B - Compulsory - Units I, II & III (5X3)

15

- Unit I - Short answer/ ERC
- Unit II - Short answer/ ERC
- Articles
- Prepositions
- Adverbs

PART C – Compulsory - Unit III (5x7)

35

- Articles
- Prepositions
- Adverbs
- Homonyms, Homophones, Homographs
- Constructing a story using hints

PART D - (3x10)

30

- Essay (250 words) Unit I (Either/or)

- Essay (250 words) Unit II (Either/or)
- Compulsory -Spotting Errors (Articles/ Prepositions / Adverbs)

TOTAL **100**

INTERNAL EXAMINATIONS

Marks

PART A - MCQs 6X1(2 from each of the Units I, II &Unit III)

6

PART B- Compulsory one question from each of the Units I, II & III

1 Short answer/ 1 ERC/ Grammar (3X3)

9

PART C – Compulsory- (Unit III) (3X5)

15

PART D- (2X10)

20

- Essay - Either /or Units – I & II 250 words

- Compulsory- Grammar/ Composition

TOTAL

50

INTERNAL ASSESSMENTS Marks

Skill based activity – 2x15 30

(Seminar presentation/Spoken English/Critical Podcast/ Video Essay/ Creating a 5–8 slide on a topic/
Composing a poem/ Submitting a relevant photo with description etc.)

TOTAL 30

Viva-Voce Components: 100 Marks

1. Pronunciation: Words related to professions /Words generally mispronounced (25)
2. Conversation: Making Suggestions /Complimenting / Congratulating /Expressing Sympathy /
Habits, Hobbies, Future Plan (25)
3. Reading aloud (25)
4. Describing a picture/ Describing a process (25)

COURSE IV

Hours: 6

Course Code: 26UGEL14, 26UGEL24, 26UGEL44

Credits: 3

LEARNING OUTCOMES

LO1 To make learners read and understand intermediate level poetry and prose

LO2 To encourage learners to continue building a vocabulary register as the students interpret, speak, and write about prescribed literature

LO3 To make learners use tenses and concord in meaningful constructions

LO4 To enable learners to employ appropriate synonyms and antonyms in written and spoken communication

LO5 To help learners learn the different types of letters, resumes and the art of composing e-mails and the use of appropriate language

LO6 To build confidence in students to speak English naturally and clearly, moving from basic sounds and reading practice to advanced conversations about books and real-world issues

UNIT – I POETRY (READING AND WRITING SKILLS)

1. John Milton – “On His Blindness”
2. Lewis Carroll – “The Walrus and the Carpenter”
3. Rudyard Kipling – “If”

UNIT – II SHORT STORIES /DRAMA (READING AND WRITING SKILLS)

1. Rabindranath Tagore – “The Postmaster”
2. Ernest Hemingway– “Cat in the Rain”
3. Fritz Karinthy –“The Refund”

UNIT – III GRAMMAR AND VOCABULARY SKILLS

1. Tenses
2. Concord
3. Spotting Errors (Tenses and Concord)
4. Describing a thing / a place / an event
5. Synonyms and Antonyms (Bhatnagar)
6. Letter Writing (Formal & Informal), Resumes and Composing emails

UNIT – IV LISTENING AND SPEAKING SKILLS

1. Listening Practice: Listen and Do exercises: Listening to conversations, announcements, interviews of popular personalities, and *Mind your Language* (Episodes: 3-4)
2. Complaining
3. Apologising
4. Offering encouragement and responding to them
5. Warning Someone

UNIT –V LISTENING AND SPEAKING SKILLS

1. Pronunciation Practice: Vowels and Diphthongs & Strong and Weak forms of words
2. Reading Aloud
3. Issue-based conversation

4. Speaking about prescribed literature
5. Speaking on a given topic

COURSE OUTCOMES

Learners will be able to

CO1 Read, interpret, and analyse intermediate level of English in poetry, prose, and fiction

CO2 Write coherent essays on prescribed literature

CO3 Use the various tense forms accurately with proper subject - verb agreement

CO4 Compose logically organized descriptive paragraphs, formal letters, professional resumes and emails

CO5 Use synonyms and antonyms appropriately, allowing for more expressive, varied, and accurate communication

CO6 Speak English fluently with confidence in an expository as well as analytical style

TEXTBOOKS

- *SPARK IV: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.
- *Intermediate English Grammar* by Raymond Murphy. Cambridge University Press, 1999.

REFERENCE

- *Spoken English: A Foundation Course* by Kamalesh Sadanand and Susheela Punitha, Orient Longman Private Limited, 2008, ISBN 81-250-3467-6.
- *Spoken English for You* by G. Radhakrishna Pillai and K. Rajeevan, Emerald Publishers, 1987, ISBN 978-81-7966-023-2.
- *Better English Pronunciation* by Thakur KBP Sinha, Vijay Nicole Imprints, 2005, ISBN 81-8209-068-7.
- Bhatnagar, R. P. *English for Competitive Examinations*. India: Trinity Press, 2017.
- Sinha, R. P. *Current English Grammar and Usage with Composition*. India: Oxford University Press, 2018.

QUESTION PATTERN

SEMESTER EXAMINATION	Marks
PART A - MCQs (7 from each of the Units I, II, and 6 from Unit III)	20
PART B- Compulsory- Units I, II & III (5X3)	15
• Unit I - Short answers/ ERC • Unit II - Short answers/ ERC • Tenses • Concord • Spotting Errors (Tenses and Concord)	
PART C – Compulsory- Unit III (5x7)	35
• Tenses	

- Concord
- Spotting Errors (Tenses and Concord)
- Describing a thing / a place / an event
- Synonyms(4) and Antonyms(3)

PART D - (3x10) 30

- Essay (250 words) Unit I (Either/or)
- Essay (250 words) Unit II (Either/or)
- Compulsory- Letter Writing/Resumes/ Composing emails

TOTAL 100

INTERNAL EXAMINATIONS

Marks

PART A - MCQs 6X1(2 from each of the Units I, II & Unit III)

6

PART B- Compulsory one question from each of the Units I, II & III

1 Short answers/ 1 ERC/ Grammar (3X3)

9

PART C –Compulsory (Unit III) (3X5)

15

PART D- (2X10)

20

- Essay - Either /or Units – I & II 250 words
- Compulsory- Grammar/ Letter writing/ Composition

TOTAL 50

INTERNAL ASSESSMENTS Marks

Skill based activity – 2x15 30

(Seminar presentation/Spoken English/Critical Podcast/ Video Essay/ Creating a 5–8 slide on a topic/ Composing a poem/ Submitting a relevant photo with description, etc.)

TOTAL 30

Viva-Voce Components: 100 Marks

1. Reading Aloud (25)
2. Issue-based conversation (25)
3. Speaking about prescribed literature (25)
4. Speaking on a given topic (25)

COURSE V

Hours: 6

Course Code: 26UGEL25, 26UGEL35

Credits: 3

LEARNING OUTCOMES

LO1 To introduce learners to the intermediate level of English through prescribed literature

LO2 To make learners read, interpret, and write about prescribed pieces of literature

LO3 To make learners learn complex language structures, the appropriate use of conjunctions and voice forms

LO4 To help learners become familiar with the accurate use of language with an awareness of common errors in language use

LO5 To make learners understand the logical sequence of ideas within a paragraph

LO6 To make learners speak English fluently with confidence, argue both sides of a topic with confidence, and discuss difficult modern issues with logic and ease

UNIT – I POETRY (READING AND WRITING SKILLS)

1. William Wordsworth – “The Solitary Reaper”
2. H.W. Longfellow – “A Slave’s Dream”
3. Robert Frost – “The Road Not Taken”

UNIT – II PROSE/ DRAMA (READING AND WRITING SKILLS)

1. Oscar Wilde - “The Model Millionaire”
2. A. A. Milne – “The Boy Comes Home”
3. Francis Bacon – “Of Friendship”

UNIT – III GRAMMAR SKILLS

1. Synthesis and Transformation of Sentences (Simple, Compound & Complex)
2. Conjunctions
3. Active – Passive Voice
4. Spotting Errors (Simple, Compound & Complex sentences/ Conjunctions/ Active – Passive Voice)

UNIT – IV ADVANCED WRITING/ VOCABULARY AND ANALYTICAL SKILLS

1. Expansion of Ideas / Proverbs
2. Dialogue Writing
3. Words often confused (Bhatnagar)
4. Sentence Arrangement

UNIT – V LISTENING AND SPEAKING SKILLS

1. Listening Practice - Listen and Do exercises: Listening to news reading, directions, stories in American English, and watching movies
2. Pronouncing Words ending with common Inflections (like – ‘logy’ ‘-graphy’ ‘-ation’ etc.), Pronouncing ‘R’ in different positions

3. Reading and Interpreting
4. Turncoat
5. Expand a Proverb
6. Issue-Based Conversation

COURSE OUTCOMES

Learners will be able to

CO1 Read, interpret and analyse poetic English to understand open possibility of inferences

CO2 Write logically planned essays to address specific questions concerning prescribed literature

CO3 Understand the forms and structural differences in different types of sentences and their specific purposes

CO4 Use complex language structures with appropriate conjunctions and voice forms

CO5 Use vocabulary actively with an awareness of words often confused

CO6 Use Spoken English fluently with confidence and accuracy for specific purposes such as analytical, argumentative, and expository talks

TEXT BOOKS

- *SPARK V: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.
- *Intermediate English Grammar* by Raymond Murphy. Cambridge University Press, 1999.

REFERENCE

- *Spoken English: A Foundation Course* by Kamalesh Sadanand and Susheela Punitha, Orient Longman Private Limited, 2008, ISBN 81-250-3467-6.
- *Spoken English for You* by G. Radhakrishna Pillai and K. Rajeevan, Emerald Publishers, 1987, ISBN 978-81-7966-023-2.
- *Better English Pronunciation* by Thakur KBP Sinha, Vijay Nicole Imprints, 2005, ISBN 81-8209-068-7.
- Bhatnagar, R. P. *English for Competitive Examinations*. India: Trinity Press, 2017.
- Sinha, R. P. *Current English Grammar and Usage with Composition*. India: Oxford University Press, 2018.

QUESTION PATTERN

SEMESTER EXAMINATION

Marks

PART A - MCQs (8 from Unit I, 7 from Unit II, and 5 from Unit III)	20
PART B- Compulsory Units I & II – 3 Short answers/ 2 ERC (5X3)	15
PART C – Compulsory - Unit III & IV (5x7)	35

- Synthesis and Transformation of Sentences (Simple, Compound & Complex)
- Conjunctions
- Active – Passive Voice

- Expansion of Ideas / Proverbs
- Words often confused

PART D - (3x10)	30
• Essay (250 words) Unit I & II (Either/or) • a) Dialogue Writing (5) b) Sentence Arrangement (5) • Compulsory -Spotting Errors (Simple, Compound & Complex sentences/ Conjunctions/ Active – Passive Voice)	
TOTAL	100

INTERNAL EXAMINATIONS Marks

PART A - MCQs 6X1(1 from Units I & II , 5 from Units III & IV)	6
PART B- Units I & II – 2 Short answers/ 1 ERC (3X3)	9
PART C –Compulsory (Units III & IV) (3X5)	15
PART D- (2X10)	20
• Essay - Either /or Units – I & II 250 words • Compulsory -Grammar/ Letter writing/ Composition	
TOTAL	50

INTERNAL ASSESSMENTS Marks

Skill based activity – 2x15	30
(Seminar presentation/Spoken English/Critical Podcast/ Video Essay/ Creating a 5–8 slide on a topic/ Composing a poem/ Submitting a relevant photo with description, etc.)	
TOTAL	30

Viva-Voce Components: 100 Marks

1. Reading and Interpreting (25)
2. Turncoat (25)
3. Expand a Proverb (25)
4. Issue-Based Conversation (25)

COURSE VI

Hours: 6

Course Code: 26UGEL36, 26UGEL46

Credits: 3

LEARNING OUTCOMES

LO1 To introduce learners to the advanced level of poetic English through representative pieces, to make them understand the oblique use of language

LO2 To make them read and understand classical English novel

LO3 To familiarise them with advanced language structures and the use of idioms and phrasal verbs

LO4 To make them understand and use different degrees for comparison, and use language for reporting speech

LO5 To acquaint them with the skills of expanding or developing, condensing ideas and responding to advertisements

LO6 To make them organize their professional knowledge into clear speeches, and discuss important world issues with confidence and logic

UNIT –I POETRY (READING AND WRITING SKILLS)

1. John Keats – “La Belle Dame Sans Merci”
2. John Donne – “Death Be Not Proud”
3. Walt Whitman – “O Captain! My Captain!”

UNIT - II FICTION (READING AND WRITING SKILLS)

George Orwell –*Animal Farm*

UNIT – III GRAMMAR AND VOCABULARY SKILLS

1. Degrees of Comparison
2. Direct- Indirect Speech
3. Spotting Errors/Correcting Errors (Comprehensive)
4. Idioms and Phrasal Verbs (Bhatnagar)

UNIT – IV ADVANCED WRITING AND ANALYTICAL SKILLS

1. Précis Writing
2. Essay Writing
3. Responding to the given advertisement
4. Cloze Test

UNIT – V LISTENING AND SPEAKING SKILLS

1. Listening Practice - Listen and Do exercises: Listening to famous speeches, poetry renditions, sports commentary, and TED Talks
2. Pronunciation Practice: Words generally often mispronounced
3. Reading and Interpretation
4. Issue-Based Conversation
5. Public speaking on a subject topic
6. Extempore

COURSE OUTCOMES

Learners will be able to

- CO1** Read and interpret the oblique language of poetry and write appreciative essays on the prescribed literature
- CO2** Read, interpret, and write analytical essays about prescribed literature
- CO3** Use advanced grammar structures to report speech and use the three degrees of comparison for intended emphasis
- CO4** Use advanced nuances of language such as idioms and phrasal verbs
- CO5** Write reflective, descriptive, expository and imaginative essays with appropriate content, and condense material to a précis
- CO6** Use English fluently and accurately for public speaking, extempore and other specific purposes

TEXT BOOKS

- *SPARK VI: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.
- Orwell, George. *Animal Farm*. Maple Classics, 2013.
- *Intermediate English Grammar* by Raymond Murphy. Cambridge University Press, 1999.

REFERENCE

- *Spoken English: A Foundation Course* by Kamalesh Sadanand and Susheela Punitha, Orient Longman Private Limited, 2008, ISBN 81-250-3467-6.
- *Spoken English for You* by G. Radhakrishna Pillai and K. Rajeevan, Emerald Publishers, 1987, ISBN 978-81-7966-023-2.
- *Better English Pronunciation* by Thakur KBP Sinha, Vijay Nicole Imprints, 2005, ISBN 81-8209-068-7.
- Bhatnagar, R. P. *English for Competitive Examinations*. India: Trinity Press, 2017.
- Sinha, R. P. *Current English Grammar and Usage with Composition*. India: Oxford University Press, 2018.

QUESTION PATTERN

SEMESTER EXAMINATION

	Marks
PART A - MCQs (7 from Unit I, 8 from Unit II, and 5 from Unit III)	20
PART B – Compulsory -2 ERC from Unit I / 3 Short answers from Units II	15
PART C – Compulsory- Unit III & IV (5x7)	35
• Degrees of Comparison • Direct- Indirect Speech • Précis Writing • Essay Writing • Responding to the given advertisement	
PART D - (3x10)	30
• Essay (250 words) Unit I & II (Either/or) • Compulsory- Spotting Errors (5) Correcting Errors(5) (Comprehensive) • Compulsory- a) Idioms and Phrasal verbs (5) b) Cloze Test (5)	
TOTAL	100

INTERNAL EXAMINATIONS	Marks
PART A - MCQs 6X1(1 from Units – I & II , 5 from Units III)	6
PART B- Compulsory Units I & II	
1 ERC from Unit I /2 Short answers from Units I & II (3X3)	9
PART C –Compulsory (Unit III & IV) (3X5)	15
PART D- (2X10)	20
• Essay - Either /or Units – I & II 250 words • Compulsory- Grammar/ Composition	
TOTAL	50

INTERNAL ASSESSMENTS Marks

Skill based activity - 2x15 30
 (Seminar presentation/Spoken English/Critical Podcast/ Video Essay/ Creating a 5–8 slide on a topic/
 Composing a poem/ Submitting a relevant photo with description, etc.)
TOTAL 30

Viva-Voce Components: 100 Marks

1. Reading and Interpretation (25)
2. Issue Based Conversation (25)
3. Public speaking on subject related topic (25)
4. Extempore (25)

COURSE – VII

Hours: 6

Course Code: 26UGEL47

Credits: 3

LEARNING OBJECTIVES

LO1 To facilitate learners' reading advanced English through representative pieces of Literature

LO2 To help learners infer and interpret prescribed literature and write coherent, analytical essays

LO3 To help learners analyse a selected dramatic scene to identify how dialogue and stage directions reveal character motivation and advance the central conflict

LO4 To encourage learners in using English skillfully and creatively to discuss, brainstorm or debate a topic, through active practice

LO5 To equip learners with the soft skills necessary for employability

LO6 To help learners to produce structured reports, engaging blogs and original creative pieces by adapting their writing style to suit different purposes and audiences

UNIT –I DRAMA (READING AND WRITING SKILLS)

1. *Julius Caesar* – Act III, Scene I
2. *Othello* – Act V, Scene II
3. *Hamlet*- Act I, Scene III

UNIT –II FICTIONS (READING AND WRITING SKILLS)

H. G. Wells –*Time Machine*

UNIT –III SOFT SKILLS AND SPEAKING SKILLS (Theory and Practice)

1. Interview Skills*
2. Group Discussion*
3. Debate*
4. Interpersonal Skills*

(* Included for Spoken English Viva Voce and Internal Assessments)

UNIT –IV SOFT SKILLS

1. Time Management
2. Problem-Solving Techniques
3. Teamwork
4. Leadership

UNIT –V ADVANCED WRITING SKILLS

1. Report Writing
2. Blog writing
3. Creative Writing (poem/short story)

COURSE OUTCOMES

Learners will be able to

CO1 Read and understand advanced forms of English in Literature

CO2 Interpret and write analytical essays on topics concerning prescribed pieces of literature

CO3 Speak English fluently and accurately in professional contexts

CO4 Use English effectively and creatively for interviews, group discussions, etc.

CO5 Behave, react, and handle situations connected to employability, using the acquired knowledge of soft skills

CO6 Demonstrate versatility in written communication by producing structured technical reports, engaging digital content for blogs, and original creative works that employ evocative language and narrative techniques

TEXT BOOKS

- *SPARK VII: An Integrated Course Text for General English*, Department of English, St. Xavier's College (Autonomous), Palayamkottai.
- Wells, H. G. *Time Machine*. Oxford University Press, 2017 Ed.
- Alphonse S. J., Xavier. *We Shall Overcome: A Textbook on Life Coping Skills*. ICRDDCE Publication, 2004.

REFERENCE

- Sijwalii B.S. and Indu Sijwali, *General Interview Skills for Both Government and Private Sectors*. Arihant Publications, 2023.
- Soman, Ashok M, *Graduates and Postgraduates Entering the Corporate World*. Himalaya Publishing House, 2023.
- Patnaik, Priyadarshi, *Communication, Logical Thinking, and Public Speaking*. Cambridge University Press, India, 2016.

QUESTION PATTERN

SEMESTER EXAMINATION	Marks
PART A - MCQs (5 from each of the Units I, II, III & IV)	20
PART B- Compulsory - (5X3) ERC from Unit I/ Short answers from Units II, III & IV	15
• Unit I • Unit II • Units III • Units IV • Units III/ IV	
PART C –Compulsory- Units I, II, III, IV & V (5x7)	35
• Short Essay (200 words)/ Annotation Unit I • Short Essay Unit II (200 words) • Short Essay Unit III (200 words) • Short Essay Unit IV (200 words) • Creative Writing (poem/short story)	
PART D - (3x10)	30
• Essay (250 words) Unit I & II (Either/or) • Compulsory -Report writing (250 words) • Compulsory - Blog writing (250 words)	
TOTAL	100

INTERNAL EXAMINATIONS		Marks
PART A - MCQs 6X1 (1 from Units I & II , 5 from Units III & IV)		6
PART B- Units I & II – 2 Short answers from Units I & II/ 1 ERC from Unit I (3X3)		9
PART C –Compulsory (Unit III & IV) (3X5)		15
PART D- (2X10)		20
1. Essay - Either /or Units – I & II 250 words		
2. Compulsory - Report writing / Blog writing/ Creative Writing (Unit V)		
TOTAL		50

INTERNAL ASSESSMENTS Marks

Skill based activity – 2x15 30
 (Seminar presentation/ Video Essay/ Creating a 5–8 slide on a topic/ writing a poem, short story/Mock Interview /Group Discussion/Debate etc.)

TOTAL 30

Viva-Voce Components: 100 Marks

1. Interview Skills: Mock Interview (25)
2. Group Discussion (25)
3. Debate (25)
4. Interpersonal Skills: Conversation (25)

DEPARTMENT OF HUMAN EXCELLENCE
St. Xavier's College (Autonomous), Palayamkottai
Courses Offered

Semester	Category	Course Code	Course Title
I	FC	26UHER11/ 26UHEE11	Religion: Catholic Doctrine / Ethics
II	SEC3	26UHEI21	Integrated Personality Development
III	SEC4	26UHEL31	Life Coping and Entrepreneurial Skills Management
IV	EVS	26UEVS41	Environmental Studies
V	VE	26UVEH51	Human Rights and Social Analysis

NME

Semester	Category	Course Code	Course Title
I	Library	26ULBN11	Foundations of Library Science
I	XRF	26UXRN11	Traditional Knowledge of Indian Medicinal Systems
II	Library	26ULBN21	Information Resources
II	STAND	25USTN21	Rural Development Studies
II	XRF	26UXRN21	Indian Traditional Medicinal Foods
III	XRF	26UXRN31	Food Microbiology
IV	XRF	26UXRN41	Herbal Resources and Their Conservation
IV	MAX Forum	26UMXN41	Society, Economy and Politics in Contemporary India

Common Question Pattern

Internal Test

Part A	Answer ALL the questions in one or two lines	5 x 2 = 10
Part B	Answer ALL the questions, each in a paragraph	3 x 5 = 15
Part C	Write an essay on the following	1 x 10 = 10

Semester Exam

Part A	Answer ALL the questions in one or two lines	10 x 3 = 30
Part B	Answer ALL the questions, each in a paragraph	5 x 8 = 40
Part C	Write an essay on each the following	2 x 15 = 30

RELIGION: CATHOLIC DOCTRINE
(26UHER11)

SEMESTER:I	VE	HOURS:2	CREDITS: 2	TOTALHOURS:30
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Course Outcomes:

Upon completion of the course the students will be able to

- CO1:** Recite the Sacraments (K1)
- CO2:** Identify the challenges of the present day church (K1)
- CO3:** Associate Old and New testaments of the bible (K2)
- CO4:** Explain the Church history (K2)
- CO5:** Discuss the Marian worship (K2)
- CO6:** Summarize the catholic social teachings (K2)

Unit I: Introduction to Bible (6 Hours)

Bible as a Word of God, its inspiration, the Canon - Old and New Testaments and their interconnectedness - Traditional and modern interpretations

Unit II: Jesus and His Teachings (6 Hours)

Parables of Jesus – Important Teachings of Jesus: Kingdom of God – God’s Mercy – Trust in Providence – Two Commandments of love – Be committed – No condemnation of wealth – No condemnation of sinners – Love of enemies; Prayer: Jesus’ Prayer – Types of Prayer; Jesus the Healer – Types of Miracles of Jesus – Jesus the Liberator

Unit III: A Brief History of the Church & Changes and Challenges of the Modern World

(6 Hours)

The beginnings of the Church - Medieval period and its challenges - The importance of the Second Vatican Council and their decrees – Synodality; Casteism – Ecumenical unity and Inter Religious harmony – Digital world and Religious Faith - Catholic Social Teachings

Unit IV: Introduction to the Sacraments and Trinity (6 Hours)

The origin of the seven sacraments - Their practices and meanings – Trinity: The Father – The Son and the Holy Spirit

Unit V: Introduction to Mariology (6 Hours)

Mary, Mother of God and Jesus - Mary, our Mother and in the Gospels - Mariology in the history of the Church – Mary as a Prophet of revolution

REFERENCES:

- “Faith Matters” material prepared by the Department of Human Excellence.
- Second Vatican Council Documents.

ETHICS
(26UHEE11)

SEMESTER:I	VE	HOURS:2	CREDITS: 2	TOTALHOURS:30
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Course Outcomes

After completing this course, the learner will be able to know/understand: Cognitive Level (K-Level)

CO-1 Describe the Ethical foundations and human values (K2)

CO-2 Identify Ethics and its relationship with religions (K1)

CO-3 Evaluate the personal ethical codes in day-to-day life (K5)

CO-4 Associate ethics in family and society (K3)

CO-5 Apply moral, professional, and personal ethics in academic, workplace, and daily life situations. (K3)

CO-6 Analyse the modern ethical issue (K4)

Unit-I Introduction to Ethics and Human Interface (6 Hours)

Meaning, Nature and Scope of Ethics-Challenges and Importance of ethics-Basic ethical foundations-Human values: Tolerance, Compassion, Rationality, Objectivity. Scientific Attitude, Integrity, Respecting Conscience and Empathy. Mahatma Gandhi and Ethical practices: Non violence, Truth, Non-hatred and love for all, concern for the poorest, objectivity nationalism and Education for man making relation between ends and means.

Unit-II Ethics and Major religions and civilizations (6 Hours)

Ethics and its relationship with Religions- Ten Commandments: Christianity and Judaism tradition-Hinduism- Dharma and Mokhya (out of 4 goals of life Dharma, Artha, Kama and Mokhya),concept of Purusartha, Nisakama Karma (work without attachment to results), Concept of Basudev Kutumba and Peace(Whole including all animals, plants, inanimate beings and human form one world)-Islamic Ethics: Justice, Goodness, Kindness, Forgiveness, Honesty, Purity and piety- Buddhism - Arya AstangikaMarg: Right view, Thought , Speed, Action, Livelihood, Efforts, Attention and Concentration.

Unit-III Personal and Professional ethics (6 Hours)

Moral percepts -Dynamics of personal morality-Moral Conscience-Ethical aspects of Thirukural-Evils of corruption- Professional ethics- Nature, Characteristics, scope, type. Professional Value: Trusteeship, Inclusiveness, Commitment, Sustainability, Accountability, Transparency, Impartiality.

Unit-IV Governance, Family and Social Ethics (6 Hours)

Concept of Good Governance-Principles: Transparency, Accountability, Rule of Law-Ethical Leadership and Public Responsibility-Corruption and Integrity in Public Life-Role of Family in ethical formulations-Respecting persons-Peace and Justice-Human Duties-Respecting Persons and Human Dignity-Equality, Justice and Fairness -Peace, Non-violence and Social Harmony-Tolerance, Pluralism and Social Inclusion.

Unit- V Judicious Use of Technology (6 Hours)

Judicious use of Mobile Phones, Electrical machines, Plastics, Television, Computers and their harmful effects. Ethics and Use of Digital Technology: Cyber ethics-, Ethics of social media: WhatsApp, Face book, Twitter and others.

Recommended Books/e-resources:

- R.R. Gaur, R Sangal, G.P. Bagaria (2009): A Foundation Course in Human Values and Professional Ethics, Excel Books.
- D.R. Kiran (2014) Professional Ethics and Human Values, McGraw Hill Education (India).
- Vivian L Vignoles (2017): Identity: Personal and Social, Chapter to appear in Oxford Handbook of Personality and Social Psychology (2nded.), edited by Kay Deaux and Mark Snyder.
- https://cdn.visionias.in/value_added_material/3b896-ethics.pdf
- Sargolzaei, E., & Nikbakht, M. (2017). The Ethical and Social Issues of Information Technology: A Case Study. International Journal of Advanced Computer Science and Applications, 8(10), 138–146. <https://doi.org/10.14569/ijacsa.2017.081019>
- Mirghaderi, L., Sziron, M., & Hildt, E. (2023). Ethics and Transparency Issues in Digital Platforms: An Overview. AI (Switzerland), 4(4), 831–843. <https://doi.org/10.3390/ai4040042>
- Müller, V. C. (2022). The History of Digital Ethics. Digital Dreams Have Become Nightmares: What We Must Do. <https://doi.org/10.1145/3640479.3640499>
- Course Material Prepared by Department of Human Excellence.

INTEGRATED PERSONALITY DEVELOPMENT

(26UHEI21)

SEMESTER: II	SEC3	HOURS: 2	CREDITS: 2	TOTAL HOURS: 30
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Course Outcomes:

After completing this course, students will be able to:

- CO1:** Analyze individual personality traits, habits, and attitudes by utilizing self-awareness frameworks such as SWOC and the Johari Window. (K4)
- CO2:** Formulate actionable plans to build self-confidence, a positive mindset, and healthy self-esteem for continuous personal growth. (K6)
- CO3:** Implement self-management techniques, including mindfulness, yoga, and distraction control, to regulate stress and improve discipline. (K3)
- CO4:** Demonstrate effective interpersonal skills, including rapport building, assertiveness, and conflict management, within group discussions and team environments. (K3)
- CO5:** Design a systematic roadmap of realistic personal and academic goals using structured goal-setting methodologies. (K6)
- CO6:** Integrate ethical values, social responsibility, and gender sensitivity into professional conduct and real-life decision-making. (K4)

UNIT-I: Self-Knowledge

(6 Hours)

Exploring Habits, Attitudes, Self Awareness – Self introspection - SWOC analysis – Johari Window's Self identity. Enhancing one's Self image, Self -Esteem, Building self Confidence and Positive Mind Set.

UNIT-II: Self Management

(6 Hours)

Understanding of One's Life Story- Focusing on Internal Narratives – Self-Talk, Self-Discipline- Managing Change, -Adaptation to change, Managing Distractions, Yoga and Mindfulness -Overcoming Inferiority Complex

UNIT-III: Personal Competence and Goal Setting

(6 Hours)

Developing Rapport - Giving and Receiving Constructive Feedback - Assertiveness and Conflict Management Skills - Group Discussion Skills –Goal Setting.

UNIT-IV: Personality Development

(6 Hours)

Recognizing the growth in different dimension of Holistic and Integrated Personality Development-Ethical Behavior-Gender Sensitivity and Respect- Civic Responsibility-Social Media Responsibility

UNIT-V: Emotional Well-Being

(6 Hours)

Meaning -Types of Emotions- Expressing Emotions- Managing Difficult Emotions - Self-Control-Healthy Relationships- Building Resilience & Coping Skills - -Mental Health Awareness.

Reference Books:

1. Dr.Xavier Alphonse S.J ,We Shall Overcome, ICRDEC Publications,Chennai,2004.
2. Harold R Wallace and L. Ann Masters, Personality Development South- Western Cengage Learning India PL,NewDelhi,2006.
3. Course Material Prepared by Department of Human Excellence.

**LIFE COPING AND ENTREPRENEURIAL SKILLS MANAGEMENT
(26UHEL31)**

SEMESTER:III	SEC 4	HOURS:2	CREDITS:2	TOTAL HOURS:30
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Course Outcomes:

After completion of the Course, the students will be able to

- CO1:** Explain holistic health including physical, mental, and social wellbeing. (K2)
- CO2:** Apply healthy lifestyle practices including nutrition, hygiene, and digital wellbeing. (K3)
- CO3:** Analyze social and professional situations using empathy and ethical reasoning. (K4)
- CO4:** Apply structured decision-making and problem-solving skills in real-life situations. (K3)
- CO5:** Demonstrate coping strategies for stress, crisis, and uncertainty. (K3)
- CO6:** Evaluate addiction risks and design strategies for a healthy lifestyle. (K5)

Unit I: Holistic Health & Lifestyle Management (6 Hours)

WHO's definition of Health – Dimensions of Health – Adolescent Health and Women's Health – Understanding Physical Self – Personal Hygiene and Grooming – Balanced Diet and Nutrition – Healthy Habits and Lifestyle – Lifestyle Diseases and Prevention – Digital Wellbeing (Screen Time, Sleep Cycle, Mental Balance) – Public Health Awareness.

Unit II: Social Intelligence & Relationship Management (6 Hours)

Family Relationship: Values in family relationship, nuclear family, Joint Family, Dependence, Overdependence, Happy family, Broken Family - Caring Elders - Rapport Building with Peers/ Friends, Strangers, Transgenders - Professional Relationship: Officials, Mentors, Staff & Service Personnel- Other centeredness and others point of view and Empathy.

Unit III: Decision-Making & Problem-Solving Skills (6 Hours)

Types of Problems (Academic, Personal, Financial, Social) – Problem-Solving Strategies – Decision-Making Process – Rational and Intuitive Decision-Making – Ignatian Discernment Process – Lateral Thinking and Creativity – Basic Financial Literacy (Needs vs Wants, Saving, Budgeting).

Unit IV: Coping with Stress, Crisis & Change (6 Hours)

Meaning and Types of Stress – Causes of Stress (Academic, Social, Digital) – Stress Management Techniques – Emotional Regulation Strategies – Time Management and Productivity – Crisis Management (Failure, Uncertainty, Loss) – Building Resilience and Adaptability.

Unit V: Addiction Awareness & Personal Safety (6 Hours)

Meaning and Types of Addiction – Substance Addiction – Digital and Internet Addiction – Causes and Effects of Addiction – Prevention and Control Measures – Self-Regulation Techniques – Cyber Safety and Responsible Internet Usage – Seeking Help and Counselling Support.

Activity Collaborators: Anti-drug Club, Women's Forum.

Reference Books:

1. Dr. Xavier Alphonse S.J., We Shall Overcome, ICRDEC Publications, Chennai, 2004.
2. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998.
3. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.
4. Clear, James. 2018. Atomic Habits: An Easy & Proven Way to Build Good Habits & Break Bad Ones. New York: Avery
5. Atomic Habits – James Clear, Avery, 2018.
6. The 7 Habits of Highly Effective People – Stephen R. Covey, Free Press.
7. Emotional Intelligence – Daniel Goleman, Bantam Books.
8. Thinking, Fast and Slow – Daniel Kahneman, Penguin Books.
9. Course Material prepared by the Department of Human Excellence.

ENVIRONMENTAL STUDIES
(26UEVS41)

SEMESTER:IV	EVS	HOURS:2	CREDITS:2	TOTAL HOURS:30
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Course Outcomes:

The students will be able to:

CO1: Describe various natural resources and the fundamental principles of sustainable development to explain resource interdependence. (K1)

CO2: Explain the relationship between biodiversity and various conservation approaches to maintain ecological balance. (K2)

CO3: Apply prevention and mitigation strategies to address specific environmental issues and ecosystem degradation. (K3)

CO4: Illustrate the adverse health impacts of different types of pollution on human populations and ecosystems. (K3)

CO5: Evaluate environmental quality indicators and the effectiveness of climate change mitigation risks. (K5)

CO6: Summarize major international environmental treaties and national legislations aimed at environmental protection. (K2)

Unit I: Natural Resources (6 Hours)

Environment – Definition; Overview of natural resources: definition, types of natural resources. Biotic and abiotic, renewable and non-renewable resources. Water resources: types, over-exploitation, issues, challenges, water scarcity, conflicts. Soil and mineral resources: important minerals, problems, soil as a resource. Energy resources: sources, conventional and non-conventional, implications. (IKS- Traditional water conservation methods (e.g., temple tanks, ooranis, johads). Indigenous agricultural practices and soil conservation methods.)

Unit II: Environmental pollution and Health (6 Hours)

Natural and man-made disasters and their impacts of environment and management. Pollution: definitions, natural and man-made pollution. Different types of pollution- Air, Water, Soil, Noise, Radioactive and solid waste pollution: Sources of pollution, different types of pollutants, effects of pollution in environment and human health, prevention and control of pollution. (IKS- Traditional waste management practices. Herbal and indigenous methods to reduce pollution impacts.)

Unit III-Conservation of Biodiversity and Ecosystems (6 Hours)

Biodiversity and its distribution: Levels and types, India and world, hotspots, threat categories. Ecosystems and ecosystem services: major types in India, basic characteristics, significance. Threats to biodiversity and ecosystems: land use, commercial exploitation of species and invasive species. Types of Biodiversity conservation (*In-situ and Ex-situ*). (IKS- Sacred groves and community-based conservation practices, Role of indigenous communities in biodiversity protection)

Unit IV: Climate change: Impacts, Adaptation and Mitigation (6 Hours)

Climate change: structure and different layers of atmosphere, Impacts, vulnerability and adaptation to climate change. Mitigation of climate change: GHGs types, sources, impacts and control. Importance of 1.5 °C and 2.0 °C Global warming and Ozone depletion. Concept of carbon intensity, energy intensity and carbon neutrality; policy instruments, carbon capture and storage, climate justice. Anthropogenic factors - Human over population, over consumption, pollution, Mining, Transport, Environmental degradation and Impact of human activities. (IKS- Traditional climate-resilient farming practices. Indigenous housing designs for climate adaptation.)

Unit V: Environmental Treaties, Legislation and Sustainable Development (6 Hours)

Overview of instruments of international cooperation: bilateral, multilateral, conventions and protocols, COPs. Major International Environmental Agreements: CBD, CITES, UNCCD, UNFCCC. Major Indian Environmental Legislations: acts, rules, sites, areas, zones and judgments. Introduction to sustainable development: SDGs, targets and indicators, challenges and strategies. Principle of sustainable development, international efforts of sustainable development and sustainable development in India: Perspective and strategies. (IKS- Community based natural resource management models.)

Skill-Based Activities:

Unit-I	➤ Field observation of local water bodies ➤ Preparation of a household resource audit report ➤ Case study analysis on sustainable practices
Unit-II	➤ Air and water quality observation survey ➤ Preparation of eco-friendly products (natural cleaners, composting) ➤ Awareness campaign design
Unit-III	➤ Biodiversity documentation of campus/local area ➤ Preparation of herbarium or digital biodiversity register
Unit-IV	➤ Carbon footprint calculation (individual/department level) ➤ Tree plantation and climate awareness drive
Unit-V	➤ Mock COP session ➤ Policy analysis and presentation ➤ Preparation of sustainability action plan for the campus

General Suggestions:

- Educational visit to Xavier Solai be organized as a common activity for all students.
- Include activity based and project based assignments.
- Conduct orientation programs for EVS faculty on IKS and skill based pedagogy.
- Students examine environmental problems in their local communities and develop solutions to address them.

Reference Books:

1. Singh, J.S., Singh, S.P., Gupta, S.R. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications.
2. Harris, Frances (2012). Global Environmental Issues, 2nd Edition. Wiley- Blackwell.
3. Krishnamurthy, K.V. (2003). Textbook of Biodiversity, Science Publishers, Plymouth, UK.
4. Ahluwalia, V. K. (2015). Environmental Pollution, and Health. The Energy and Resources Institute (TERI).
5. Pittock, Barrie (2009). Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.
6. Ministry of Environment, Forest and Climate Change (2019). A Handbook on International Environment Conventions & Programmes.
7. KanchiKohli, Manju Menon (2021). Development of Environment Laws in India, Cambridge University Press.

HUMAN RIGHTS AND SOCIAL ANALYSIS
(26UVEH51)

SEMESTER:IV	VE	HOURS:2	CREDITS:2	TOTAL HOURS:30
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Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Recall key concepts of rule of law, democracy, equality, human dignity, citizenship, social justice, secularism and human rights.(K1)

CO2: Explain the Preamble to the Constitution of India, Fundamental Rights, Directive Principles, civil and political rights, socio-economic and cultural rights and collective rights.(K2)

CO3: Apply constitutional principles and human rights concepts to contemporary social issues. (K3)

CO4: Analyze interrelationships among inequalities, social structures, social problems, and reform initiatives in India. (K4)

CO5: Evaluate the effectiveness of constitutional provisions in promoting equality and social justice.(K5)

CO6: Design strategies fostering equality, communal harmony, responsible democratic citizenship and civic participation. (K6)

Unit I: Understanding basic concepts (6 Hours)

Understanding of key concepts, their meaning and significance in today's context – Rule of law, democracy, equality, human dignity, citizenship, social justice, secularism, human rights, fundamental rights and constitutional values.

Unit II: Classification of Human Rights (6 Hours)

Civil and Political rights, socio-economic and cultural rights collective rights or group rights – Preamble to the Constitution of India, Fundamental Rights - Equality rights, personal freedom and right to life, rights against arbitrary arrest and illegal detention, Rights against exploitation, Religion Freedom, Minority rights and Fundamental Duties (Art. 51A)

Unit III: Indian Social System (6 Hours)

Social Analysis - Social system and its components, Inequalities, caste structures and manifestation, Patriarchy and violence against women, Gender and sexual Minorities– A land of cultural linguistic and religious diversity –secular ethos – religious -fundamentalism-Indian politics -Interdependence of human being and society

Unit IV: Social Problems (6 Hours)

Indian Economic inequality and Poverty - Caste Discrimination : Untouchability, honour killing - Reservation policy, and Dalit empowerment - illiteracy and its effects Child labour, child abuse, bonded labour and their effects

Unit V: Social Reformers (6 Hours)

Promoting social justice and equality, women's rights, and eradication of caste discrimination - Dr. B. R. Ambedkar, Mahatma Gandhi, Dr. Muthulakshmi Reddy, Savitribai Phule, Fathima Sheik, Pandita Ramabai and E. V. Ramasamy - Focusing on service to the marginalized, healthcare, education, and human values

Reference Books:

1. P.N. Sharma, "Social problems and issues in India", Bharat Book Centre, 2014, New India
2. The Reality Reloaded, Gurjot S. Kaler, Chandigarh, India, 2018
3. Course Material Prepared by the Department of Human Excellence
4. Activity-based learning will be conducted in collaboration with the Democracy Forum and Electoral Literacy Club to promote democratic values, constitutional awareness, and responsible citizenship.

INTRODUCTION TO ARTIFICIAL INTELLIGENCE (Course Code: 26UAIC11)

SEMESTER – I CORE– T1 HOURS – 5 CREDITS – 5 TOTAL HOURS: 75

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Understand the Fundamentals of AI and Intelligent Agents(K1)

CO2: Explain Problem Solving Methods and Search Algorithms (K2)

CO3: Distinguish Knowledge Representation and Logic-Based AI (K3)

CO4: Develop and Communicate with Software Agents. (K4)

CO5: Explore Real-World Applications of AI. (K4)

CO6: Implement AI-Based Solutions in Robotics and Perception. (K5)

UNIT I INTRODUCTION (15 HOURS)

Introduction – The History of Artificial Intelligence - The Foundations of Artificial Intelligence - Intelligent Agents: Agents and Environments – Characteristics of Intelligent Agents – The Nature of Environments – The Structure of Agents - Types of Agents- *Applications of IKS in Modern AI*

UNIT II SEARCHING (15 HOURS)

Problem solving agents – Well defined problems and solutions – Searching for Solutions - Uninformed Search Strategies - Informed (Heuristic) Search Strategies - Heuristic Functions – Local Search Algorithms and Optimization Problems - Searching with Partial Observations

UNIT III LOGICAL AGENTS (15 HOURS)

Logical Agents: Knowledge-Based Agents - The Wumpus World - Logic - Propositional Logic: A Very Simple Logic - Propositional Theorem Proving - Agents Based on Propositional Logic.

UNIT IV LEARNING (15 HOURS)

Learning: Learning from Examples – Forms of Learning - Supervised Learning - Learning Decision Trees - Evaluating and Choosing the Best Hypothesis - The Theory of Learning - Regression and Classification with Linear Models - Nonparametric Models - Ensemble Learning.

UNIT V REINFORCEMENT LEARNING (15 HOURS)

Reinforcement Learning: Introduction - Passive Reinforcement Learning – Active Reinforcement Learning - Generalization in Reinforcement Learning - Applications of Reinforcement Learning.

SKILL-BASED ACTIVITIES:

1. **Hands-On Activity:** Using a platform like Teachable Machine to create and train a basic image classification model.
2. **Creative Writing:** Using an AI tool like ChatGPT to generate a story or poem, then rewriting it in their own words and discussing AI's role in creativity.
3. **Research:** Researching and presenting an AI tool, explaining its functionality and realworld applications.
4. **Brainstorming:** Brainstorming and proposing AI solutions to address global challenges, such as climate change, healthcare, or education.

5. Group Discussion: Discussing how bias can occur in AI systems and proposing ways to mitigate it.

TEXT BOOKS:

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.
2. Artificial Intelligence: A Modern Approach, 4th Edition, Stuart Russell, peter Norvig University of California at Berkeley, Pearson education, 2020.

REFERENCE BOOKS:

1. M. Tim Jones, —Artificial Intelligence: A Systems Approach (Computer Science), Jones and Bartlett Publishers, Inc. First Edition, 2008
2. Nils J. Nilsson, —The Quest for Artificial Intelligence, Cambridge University Press, 2009.
3. William F. Clocksin and Christopher S. Mellish, Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.
4. Gerhard Weiss, —Multi Agent Systems, Second Edition, MIT Press, 2013.
5. David L. Poole and Alan K. Mackworth, — Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

PRACTICAL: PROGRAMMING USING PYTHON (Course Code: 26UAIC12)

SEMESTER– I CORE – P1 HOURS – 3 CREDITS – 3 TOTAL HOURS: 45

1. Basic Programs

- 1.1 Arithmetic Operator
- 1.2 Compound Interest
- 1.3 Menu driven program for Temperature conversion(C->F) and (F->C)

2 Conditional Statements

- 2.1 Student's Grade (if elif else)
- 2.2 Leap year (Nested if)

3 Loops

- 3.1 Printing series $1+1/3...1/n$ using while loop
- 3.2 Reverse of a number using while loop
- 3.3 Write a Python Program to Print a Multiplication Table for the given number.
- 3.4 Write a Python Program to check whether the given number is prime or not.
- 3.5 Write a Python Program to display the Fibonacci series for a given number

4 Functions

- 4.1 Functions with Default Argument
- 4.2 Functions with Call By Value
- 4.3 Functions with Call By Reference
- 4.4 Functions with Recursion->NCR
- 4.5 Fibonacci Series (Recursion)

5 Shapes and Calendar

- 5.1 Draw the star using turtle
- 5.2 Draw the Triangle Maze using turtle
- 5.3 Draw the car using turtle
- 5.4 Generate the Calendar for the given month and year

6 Advance Program

- 6.1 List Operations
- 6.2 Write a Python Program to implement the List Methods (Add, Append, Extend & Delete)
- 6.3 Write a Python Program to implement dictionary.
- 6.4 Write a Python Program to implement List Operations (Nested List, Length, Concatenation, Membership, Iteration, Indexing and slicing).
- 6.5 Write a Python Program to sort the sentence in the alphabetical order.
- 6.6 Write a Python Program to implement the Water jug Problem.

7 Searching Algorithm

- 7.1 Linear Search
- 7.2 Binary Search

8 Class and Object

- 8.1 Student Class
- 8.2 Employee Class

DISCRETE MATHEMATICS (Course Code: 26UAIE11)

SEMESTER – I EC – T1 HOURS – 4 CREDITS – 3 TOTAL HOURS: 60

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Describe the relations and functions and be able to determine their Properties. (K1)

CO2: Illustrate the basic principles of sets and operations in sets. (K2)

CO3: Solve basic set equalities. (K3)

CO4: Classify the counting principles to determine probabilities. (K4)

CO5: Determine if the argument is valid or not valid. (K5)

CO6: Formulate and solve real world problems using graphs and trees. (K6)

UNIT I SET THEORY AND RELATION (12 HOURS)

SET THEORY: Introduction – Sets and Elements – Universal Set and Empty Set – Subsets – Venn Diagrams – Set Operations – Algebra of Sets and Duality – Finite Sets, Counting Principle – Class of Sets, Power Sets and Partitions. **RELATIONS:** Introduction –Product Sets – Relations – Pictorial Representations Of Relations – Composition of Relations – Types of Relations – Closure Properties – Equivalence Relations – Partial Ordering Relations – n-ary Relations.

UNIT II FUNCTIONS (12 HOURS)

Introduction – Functions – One-to-One-Onto and Inevitable Functions – Mathematical Functions, Exponential and Logarithmic Functions – Sequences, Indexed Classes of sets – Recursively Defined Functions – Cardinality.

UNIT III LOGIC AND PROPOSITIONAL CALCULUS (12 HOURS)

Introduction – Propositions and Compound Propositions – Basic Logical Operations – Propositions and Truth Tables – Tautologies and Contradictions – Logical Equivalences –Algebra of Propositions – Conditional and Bi-conditional Statements – Arguments – Logical Implication – Propositional Functions, Quantifiers – Negation.

UNIT IV COUNTING (12 HOURS)

Introduction, Basic Counting Principles – Factorial Notation – Binomial Coefficients – Permutations – Combinations – The Pigeonhole Principle – The Inclusion – Exclusion Principle.

UNIT V GRAPH THEORY

(12 HOURS)

Graphs – Complete, Regular and Bipartite Graphs – Labeled and Weighted Graphs – Subgraphs – Paths, Connectivity – The Bridges of Königsberg, traversable Multigraphs – Tree Graphs – Planar Graphs – Spanning Tree – Minimal Spanning Tree – Euler's Formula

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Creating truth tables to understand logical operators like AND, OR, NOT, and implications.
2. **Problem-Solving Activity:** Solving problems involving set operations like union, intersection, difference, and complement using Venn diagrams.
3. **Group Discussion:** Debating real-world applications of graph theory, such as social networks, transportation systems, or computer networks.
4. **Practical Activity:** Solving combinatorial problems, such as counting permutations, combinations, and applying the pigeonhole principle.
5. **Brainstorming:** Brainstorming examples of graph theory in everyday life, such as family trees, road maps, or website structures.

TEXT BOOK

1. Seymour Lipschutz, Marc Lipson, "Discrete Mathematics", Second Edition, Tata McGraw Hill, 2019. Chapters : 1, 2, 3, 4, 5, 8.1-8.10

REFERENCE BOOKS

1. B.S. Vatsa, "Discrete Mathematics", Third Edition, Wishwa Prakashan, 2018.
2. K.D. Joshi, "Foundation of Discrete Mathematics", Wiley Eastern Ltd., 2019.

WEB RESOURCES

1. <https://discrete.openmathbooks.org/dmoi3.html>
2. https://www.academia.edu/22551485/Seymour_Lipschutz_Marc_Lipson_Schaums_Outline_of_Discrete_Mathematics_McGraw_Hill_Osborne_Media_2007

PRACTICAL: WEB DESIGNING BASICS (Course Code: 26UAIE12)

SEMESTER - I EC-P1 HOURS - 2 CREDITS-2 TOTAL HOURS: 30

LIST OF PROGRAMS

Formatting tags

1. Write a HTML Program using header tags.
2. Write a HTML Program to test text formatting like bold, italic etc.
3. Write a HTML Program to type a paragraph with different font and color

Lists and Table tags

4. Write a HTML Program for ordered list.
5. Write a HTML Program to list out the courses details using unordered list.
6. Write a HTML Program for definition list.
7. Write a HTML Program for creating class timetable.

Multimedia and Link tags

8. Write a HTML Program to import an image and hyperlink.
9. Write a HTML Program to import a video.

Form tags

10. Write a HTML Program to create login window using form controls.
11. Write a HTML Program to create college application form

CSS

12. Design a simple webpage with headings and paragraphs **using CSS** for colors and fonts.
13. Create and style multiple boxes to demonstrate the box model **using CSS**.
14. Apply class, ID, and element selectors to style a webpage **using CSS**.
15. Design a horizontal navigation bar with hover effects **using CSS**.
16. Style a registration or login form with input fields and buttons **using CSS**.
17. Create a webpage layout with header, sidebar, content, and footer **using CSS** Flexbox.
18. Make a webpage responsive for different screen sizes **using CSS** media queries.

DATA VISUALIZATION USING EXCEL (Course Code: 26UAIN11)

SEMESTER – I SEC-1 HOURS – 2 CREDITS – 2 TOTAL HOURS: 30

Outcomes:

At the end of the course the students must be able to

CO1: Recall the MS Excel interface, financial functions (**K1**)

CO2: Describe MS Excel features like Scenario Manager, Solver (**K2**)

CO3: Use Scenario Manager for Sensitivity Analysis (**K3**)

CO4: Integrate Charts, Pivot tables for data analysis (**K4**)

UNIT I: FORMATTING WORKSHEETS AND DATA

(6 HOURS)

The Excel Interface - Workbook and Worksheets - Cell and Range Selection - Filling Cell - Finding/Replacing Data - Sorting Data - Naming cells and Ranges. Formatting Worksheets and Data: Setting column width and Row height - Character and Paragraph Formatting - Fitting Text within a Cell - Number Formatting - Conditional Formatting - Adding cell Backgrounds and Borders - Removing, Replacing and Reusing Formats.

UNIT II: VISUALIZATION USING CHARTS

(6 HOURS)

Cell References - Formula Essentials - Creating Formulas - Editing Formulas. Working with Tables: Creating a Table — Formatting a Table — Creating Calculated Columns — Adding a Total Row — Sorting and Filtering. Creating Charts: Chart Elements - Creating charts - Adding and Formatting Text.

UNIT III: VISUALIZATION USING LOOKUP FUNCTIONS

(6 HOURS)

Lookup Functions: LOOKUP - HLOOKUP – VLOOKUP – CHOOSE – MATCH – INDIRECT.– chart preparation.- Trace Dependents, Error Checking, Analyzing Data with Pivot Tables.

UNIT IV: VISUALIZATION USING SLICERS AND FILTERS

(6 HOURS)

Data Validation, Custom Input Messages and error Messages, circle Invalid Data, Remove Validation. Slicers in a Table. Filters- Adding Filter, Date and Text Filters. Advanced Filter.

UNIT V: OTHER FEATURES OF EXCEL:

(6 HOURS)

Goal Seek Command — Scenario Manager — Optimization with Excel Solver - Consolidating Data — Creating Subtotals- Floodfill.

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Formatting and Organizing a Worksheet
2. **Practical Activity:** Creating and Formatting Charts
3. **Practical Activity:** Using Lookup Functions in Excel
4. **Hands-On Activity:** Using Slicers and Filters for Data Analysis
5. **Practical Activity:** Using Advanced Excel Features for Data Analysis

TEXT BOOKS:

1. Michael Alexander, Richard Kusleika, John Walkenbach, *Excel 2019 Bible*, Wiley, 2018
2. Greg Harvey, *Excel 2019 All-in-One for Dummies*, John Wiley & Sons, 2018
3. Steve Schwartz, "Microsoft Office 2010", Dorling Kindersley (India) Pvt. Ltd, 2012.
3. Wayne L. Winston, "Microsoft Office Excel 2010 Data Analysis and Business Modeling". PHI Learning Private Limited, 2011

REFERENCE BOOK(S)

1. Michael Price, *Office 2010*, Tata McGraw Hill Education Private Limited, 2011

WEB REFERENCE

www.chandoo.org

MS EXCEL (PRACTICAL)

- 1 Preparing Invoice Bill
- 2 Using Financial Functions
- 3 Using Goal seek Command
- 4 Using Scenario Manager
- 5 Slicing the Table and Making Subtotal
- 6 Creating the Pivot table
- 7 Consolidating Data sheets
- 8 Creating Charts.
- 9 Data validation in student Mark sheet
- 10 Encircle Error message

JAVA PROGRAMMING (Course Code: 26UAIC21)

SEMESTER – II CORE- T2 HOURS – 5 CREDITS – 5 TOTAL HOURS: 75

COURSE OUTCOMES:

At the end of the course the students will be able to:

CO 1: Determine the concepts of object-orientation and java programming. **(K1)**

CO 2: Associate object-oriented concepts in Java for developing applications. **(K2)**

CO 3: Illustrate the use of exceptions and perform database connectivity in Java. **(K3)**

CO 4: Analyze the functionality of inheritance, interface for developing java applications. **(K4)**

CO 5: Evaluate java packages, classes and collections and choose them for building apps. **(K5)**

UNIT I (15 HOURS)

An overview of Java: Object oriented Programming – A first simple program-Data Types, variables: Java is a strongly typed language – The simple styles – Integers - Floating point types – Characters – Boolean – a close look at literal – variables Type Conversion casting – Automatic type promotion in expressions. **Operators:** Arithmetic operators - relational operator – Boolean logical operator the assignment operator – the ? Operator – operator precedence – using parenthesis. Control statements: Java selection statements – Iteration statements – Jump statements- Loops- Arrays.

UNIT II (15 HOURS)

Introducing Classes: Class fundamentals – Declaring objects – Assigning object reference variables – Introducing methods – Constructors- this keyword – String functions- Input given by users .

UNIT III (15 HOURS)

Inheritance: Inheritance basics - using super – creating a multilevel hierarchy - method overriding – dynamic method dispatch – using abstract classes - using final with inheritance - the object class.

UNIT IV (15 HOURS)

Exception Handling: Fundamentals - Exception types – Uncaught exceptions – Using try and catch clauses – nested try statements – throw –throws- Java's built in exceptions – creating your own exceptions subclasses. Interfaces – Multiple Inheritance in Java - Extending and Initialising fields in Interfaces.

UNIT V (15 HOURS)

Multithreaded Programming : The Java Thread Model – The Main Thread – Creating Thread – Creating Multiple Threads – Using isAlive() and join() – Thread Priorities – Synchronization.

SKILL BASED ACTIVITIES:

1. **Problem-Solving Activity:** Writing a Java program that uses if-else or switch-case statements to determine the grade based on a given score.
2. **Creative Activity:** Writing Java programs using loops to print patterns like pyramids, triangles, or number sequences.

3. **Error Management Activity:** Writing a Java program that handles exceptions, such as dividing by zero or accessing an invalid array index.
4. **Debate:** Debating the advantages and disadvantages of Java compared to Python for different use cases, such as web development or data science.
5. **Creative Activity:** Brainstorming and listing real-world applications of Java and discussing why Java is suitable for these applications.

TEXT BOOKS:

1. Schildt, Herbert. Java: The Complete Reference. McGraw-Hill Education Group, 2014.

REFERENCE BOOKS:

1. Eckel, Bruce. Thinking in Java. 4th ed. Pearson Education, 2006.
2. Liang, Y. Daniel. Intro to Java Programming, Brief Version. Pearson Higher Ed, 2015.
3. Holmes, J. Barry, Joyce, T. Daniel. Object-oriented Programming with Java. Jones & Bartlett Learning, 2001.

WEB REFERENCES:

- <http://docs.oracle.com/javase/tutorial/java/index.html/>
- <http://www.java2s.com/Tutorial/Java/CatalogJava.htm/>
- <https://www.edureka.co/blog/object-oriented-programming/>

PRACTICAL: PROGRAMMING USING JAVA (Course Code: 26UAIC22)

SEMESTER – II CORE- P3 HOURS – 3 CREDITS – 3 TOTAL HOURS: 45
LIST OF PROGRAMS

1.Basic Programs in Java

- 1.1 Arithmetic Operator
- 1.2 Unary operator
- 1.3 Simple interest

2 Control Structures

- 2.1 Positive or Negative
- 2.2 Checking buzz number or not
- 2.3 Finding grade using if else if ladder
- 2.4 Checking vowel using switch case
- 2.5 Menu driven using switch case
- 2.6 Quadratic equation

3 Loops

- 3.1 Printing series $1+1/3...1/n$ using while loop
- 3.2 Reverse of a number using while loop
- 3.3 Printing multiplication table using for loop
- 3.4 Finding perfect number using for loop
- 3.5 Printing pyramid using for loop
- 3.6 Checking Positive number using do while loop
- 3.7 Printing Armstrong number using do while loop

4 Array

- 4.1 Counting odd or even number in array
- 4.2 Sorting an array
- 4.3 Biggest and smallest element in an array

5 Class and Object

- 5.1 Employee class
- 5.2 Finding area of circle using non-parametrized constructor
- 5.3 Finding biggest of three number
- 5.4 Sum of digits using parametrized constructor
- 5.5 Adding two numbers using copy constructor

6 String

- 6.1 Program for PigLatin word
- 6.2 Arranging string in ascending order
- 6.3 Searching string

7 Inheritance

- 7.1 Multiple Inheritance
- 7.2 Hierarchical Inheritance
- 7.4 Method overriding

8 Operator Overloading

8.1 Multiple catch

8.2 Throws

9 Dynamic method dispatch

10 Abstract class

11 Interface

12 Multithreading

INTRODUCTION TO STATISTICAL METHODS (Course Code: 26UAIE21)

SEMESTER - II EC – T2 HOURS – 4 CREDITS – 3 TOTAL HOURS: 60

COURSE OUTCOMES:

After completing this course, a student will have:

CO1: Identify the suitable method of statistics on the given data to solve the problem of any heuristic approach of prediction.

CO2: Apply appropriate statistical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.

CO3: Design and analyze real world problems

CO4: Apply various statistical and modeling techniques for providing the solutions

CO5: Formulate suitable statistical method required as pre-processing technique for finding the solution of machine learning algorithm.

CO6: Model and solve computing problem using correlation, and resampling using appropriate statistics algorithms.

UNIT – I (12 HOURS)

Statistical Methods: Definition and scope of Statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, variables, scales of measurement nominal, ordinal, interval and ratio. Presentation: tabular and graphical, including histogram and ogives, consistency and independence of data with special reference to attributes.

UNIT – II (12 HOURS)

Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, Moments, absolute moments, factorial moments, skewness and kurtosis, Sheppard's corrections.

UNIT – III (12 HOURS)

Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple linear regression, principle of least squares and fitting of polynomials and exponential curves.

UNIT – IV (12 HOURS)

Index Numbers: Definition, construction of index numbers and problems thereof for weighted and unweighted index numbers including Laspeyre's, Paasche's, Edgeworth- Marshall and Fisher's Ideal Index numbers. Errors in Index numbers. Chain index numbers, conversion of fixed based to chain-based index numbers and vice-versa. Consumer price index numbers. Uses and limitations of index numbers.

UNIT – V (12 HOURS)

Linear correlation - scatter diagram, Pearson's coefficient of correlation, computation of coefficient of correlation from a bivariate frequency distribution, Rank correlation, Coefficient of concurrent deviation- Regression equations - properties of regression coefficients

SKILL BASED ACTIVITIES:

1. **Practical Activity:** Calculating and interpreting descriptive statistics using a dataset like exam scores or sales data.
2. **Hands-On Activity:** Conducting probability experiments, such as coin tosses or dice rolls, and comparing empirical results with theoretical probabilities.
3. **Group Discussion:** Debating the advantages and disadvantages of frequentist and Bayesian approaches to statistical inference.
4. **Brainstorming:** Brainstorming and presenting real-world applications of statistics, such as opinion polls, medical trials, or sports analytics.
5. **Creative Activity:** Brainstorming how statistics underpins machine learning, such as in model evaluation, feature selection, or probability distributions.

TEXT BOOKS:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8thEdn. The World Press, Kolkata.
2. Gupta, S. C. and Kapoor, V.K. (2008): Fundamentals of Mathematical Statistics, 4thEdition (Reprint), Sultan Chand & Sons

REFERENCE BOOKS:

1. Miller, Irwin and Miller, Marylees(2006): John E.Freund's Mathematical Statistics with Applications, (7thEdn.), Pearson Education, Asia.
2. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rdEdn., (Reprint), Tata McGraw-Hill Pub. Co.Ltd.
3. Mukhopadhyay, P. (1999): Applied Statistics, New Central Book Agency
4. Gupta, S.C. and V.K. Kapoor (2002) Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
5. Spiegel, M.R. and Stephens, L. (2010) Statistics, Schaum's Outline Series, Mc Graw Hill, New York.

WEB RESOURCES

- <http://file.allitebooks.com/20151204/Foundations%20of%20Statistical%20Algorithms.pdf>
- http://onlinestatbook.com/Online_Statistics_Education.pdf
- <https://upload.wikimedia.org/wikipedia/commons/8/82/Statistics.pdf>
- <http://cnx.org/content/col10522/1.38/pdf>
- <http://www.greenteapress.com/thinkstats/thinkstats.pdf>

PRACTICAL : STATISTICAL METHODS LAB (Course Code: 26UAIE22)

SEMESTER - II EC-P2 HOURS - 2 CREDITS-2 TOTAL HOURS: 30

LIST OF PRACTICALS:

1. Graphical Representation of Data

1. Draw bar diagrams for categorical data.
2. Construct pie charts for population statistics.
3. Represent frequency distribution using histograms.
4. Draw frequency polygons and frequency curves.

2. Problems Based on Measures of Central Tendency

1. Calculate arithmetic mean for grouped and ungrouped data.
2. Find median from discrete and continuous series.
3. Compute mode using empirical relation.
4. Compare mean, median, and mode for datasets.

3. Problems Based on Measures of Dispersion

1. Calculate range and coefficient of range.
2. Find quartile deviation and coefficient of quartile deviation.
3. Calculate variance and standard deviation.
4. Determine coefficient of variation (CV).
5. Analyze consistency using dispersion measures.

4. Problems Based on Moments, Skewness, and Kurtosis

1. Calculate raw moments and central moments.
2. Compute coefficients of skewness using Karl Pearson's method.
3. Find Bowley's coefficient of skewness.
4. Analyze positive and negative skewness.
5. Calculate kurtosis coefficients.
6. Classify distributions as leptokurtic, mesokurtic, and platykurtic.

5. Karl Pearson and Rank Correlation Coefficient

1. Calculate Karl Pearson's correlation coefficient.
2. Interpret positive, negative, and zero correlation.
3. Compute Spearman's rank correlation coefficient.
4. Analyze rank data using correlation methods.
5. Compare Pearson and Spearman correlation techniques.
6. Study relationship between height and weight datasets.

6. Lines of Regression, Angle Between Lines, and Estimated Values of Variables

1. Plot regression lines on graphs.
2. Find regression coefficients.
3. Calculate the angle between regression lines.
4. Study relationship between correlation and regression.
5. Predict sales using regression analysis.

7. Calculate Price and Quantity Index Numbers Using Simple and Weighted Average of Price Relatives

1. Calculate simple price index numbers.
2. Find weighted price index using Laspeyres method.
3. Calculate Paasche's price index.
4. Compute Fisher's Ideal Index Number.
5. Calculate consumer price index (CPI).

POWER BI (Course Code: 26UAIN21)

SEMESTER – II SEC-2 HOURS – 2 CREDITS – 2 TOTAL HOURS: 30

COURSE OUTCOMES:

At the end of the course the students will be able to

CO 1: Describe the functions and use of Power BI. (K1)

CO 2: Explain designing and building interactive visualizations using different chart types. (K2)

CO 3: Apply concepts learned in excel to create calculated columns and measures to perform advanced calculations. (K3)

CO 4: Combine multiple data sources using relationships to build robust data models. (K4)

CO 5: Publish and share reports securely with colleagues and stakeholders. (K5)

Unit I: (6 HOURS)

Introduction to PowerBI – Working with data – Importing from flat files, excel files, other sources – PowerPivot data types – Column operations - Table relationship.

Unit II: (6 HOURS)

PowerPivot data analysis – PivotTable and PivotChart – Slicers – Dashboard Implementation – Dates, hierarchies, and perspectives.

Unit III: (6 HOURS)

Data Analysis Expressions – Introduction to Power Query – Introduction to Power View – Power View visualizations.

Unit IV: (6 HOURS)

Power View filtering options – Introduction to Power Map – Preparing geospatial data.

Unit V: (6 HOURS)

Publish from Power BI desktop – Publish Dashboard to Web.

Text Books

1. Microsoft Power BI cookbook, Brett Powell, Packt Publishing Limited, 2nd edition, 2017.

Reference Books

1. Greg Deckler, Brett Powell, Microsoft Power BI Cookbook: Gain expertise in Power BI, Packt Publishing Limited, 2nd Edition, 2021.

MACHINE LEARNING (Course Code: 26UAIC31)

SEMESTER - III CORE-T3 HOURS – 5 CREDITS – 5 TOTAL HOURS: 75

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Understand the fundamentals of machine learning. **(K2)**

CO2: Distinguish various learning models including, geometric, probabilistic & logical models. **(K4)**

CO3: Apply various model evaluation techniques. **(K3)**

CO4: Identify the issues of generalization and overfitting in supervised learning models. **(K5)**

CO5: Use regularization and validation for improving model performance. **(K6)**

CO6: Understand the principles of clustering as a form of unsupervised learning. **(K2)**

UNIT I: FOUNDATIONS OF LEARNING (15 HOURS)

Components of learning – learning models – geometric models – probabilistic models – logical models – grouping and grading– learning versus design – types of learning – supervised – unsupervised – reinforcement

UNIT II: INTRODUCTION OF MACHINE LEARNING (15 HOURS)

Feasibility of learning – error and noise – training versus testing – theory of generalization – bias and variance.

UNIT III: SUPERVISED LEARNING MODELS (15 HOURS)

Perceptron – multilayer neural networks – back propagation – generalization and overfitting – regularization – validation.

UNIT IV: LINEAR MODELS (15 HOURS)

Linear classification – univariate linear regression - bivariate regression – multivariate linear regression – regularized regression – logistic regression.

UNIT V: UNSUPERVISED MACHINE LEARNING MODELS (15 HOURS)

Clustering: nearest neighbour models – k-means – clustering around medoids – hierarchical clustering.

SKILL BASED ACTIVITIES:

1. **Group Discussion:** Discussing the concepts of overfitting and underfitting, and proposing strategies to address them, such as cross-validation or regularization.
2. **Debate:** Debating the advantages and disadvantages of supervised learning versus unsupervised learning.
3. **Brainstorming:** Brainstorming and presenting real-world applications of machine learning in fields like healthcare, finance, and marketing.
4. **Hands-On Activity:** Building and visualizing a decision tree classifier using a dataset (e.g., iris dataset) and explaining how it makes predictions.
5. **Problem-Solving Activity:** Applying the K-Means clustering algorithm to group data points (e.g., customer segmentation) and analyzing the clusters.

TEXTBOOKS

1. Y. S. Abu Mostafa, M. Magdon Ismail, & H.T. Lin, —Learning from Data, AML Book Publishers, 2012.
2. P. Flach, —Machine Learning: The art and science of algorithms that make sense of data, Cambridge University Press, 2012.

REFERENCE BOOKS

C. M. Bishop, —Pattern Recognition and Machine Learning, Springer, 2007.

WEB RESOURCES

- <https://www.geeksforgeeks.org/machine-learning/>
- <https://www.javatpoint.com/machine-learning>
- https://www.w3schools.com/python/python_ml_getting_started.asp

MACHINE LEARNING LAB(Course Code: 26UAIC32)

SEMESTER – III CORE-P4 HOURS – 3 CREDITS – 3 TOTAL HOURS: 45

LIST OF PROGRAMS

1. Familiarizing students with machine learning development environments such as Python IDLE, VS Code, Jupyter Notebook, and Google Colab.
2. Loading and exploring structured datasets from CSV files using Python and the Pandas library.
3. Performing data preprocessing techniques such as handling missing values, feature scaling, and data normalization using Scikit-learn in Python.
4. Visualizing dataset features and relationships using Matplotlib and Seaborn libraries in Python.
5. Predicting house prices using Linear Regression algorithm in Python.
6. Classifying iris flower species using K-Nearest Neighbors (KNN) classification algorithm in Python.
7. Predicting student performance using Decision Tree classification algorithm in Python.
8. Detecting email spam using Natural Language Processing techniques with Naïve Bayes classifier in Python.
9. Customer purchase prediction using Support Vector Machine (SVM) classification algorithm in Python.
10. Predicting sales or stock trends using Support Vector Regression (SVR) algorithm in Python.
11. Segmenting images using K-Means clustering algorithm with OpenCV in Python.
12. Extracting image features such as edges and textures using OpenCV image processing techniques in Python.
13. Recognizing handwritten digits using Artificial Neural Network (ANN) model with Keras in Python.
14. Classifying images using Convolutional Neural Network (CNN) with TensorFlow/Keras in Python.
15. Detecting and classifying objects from webcam images using OpenCV and a trained deep learning model in Python.

DATABASE SYSTEMS (Course Code: 26UAIE31)

SEMESTER – III EC– T3 HOURS – 4 CREDITS – 3 TOTAL HOURS: 60

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Understand the fundamentals of database systems. **(K2)**

CO2: Recognize the importance of databases in modern applications and businesses. **(K4)**

CO3: Design efficient database structures using Entity-Relationship diagram. **(K6)**

CO4: Execute SQL queries for data retrieval, insertion, updating, and deletion. **(K3)**

CO5: Use SQL features like joins, subqueries, aggregate functions, and grouping. **(K3)**

CO6: Develop and use stored procedures, triggers, and views for database management. **(K6)**

UNIT I: PURPOSE OF DATABASE SYSTEM (12 HOURS)

Introduction - Database System Applications - Purpose of Database Systems - View of Data - Database Languages - Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Database Users and Administrators.

UNIT II: OVERVIEW OF DESIGN PROCESS (12 HOURS)

Structure of Relational Databases - Database Schema - Keys- Schema Diagrams - Relational Query Languages - Relational Operations. ER Model – E R Diagrams– Features of Good Relational Design – Atomic Domains and First Normal Form – 2NF – 3NF – BCNF

UNIT III: NAMING RULES AND CONVENTIONS (12 HOURS)

Data Types – Constraints – Creating Table – Displaying Information – Altering Existing Table – Dropping, Renaming and Truncating a Table. Adding New Records – Updating and Deleting Records – Retrieving Data from Table – Arithmetic Operations – Where Clause – Sorting.

UNIT IV: BUILT IN FUNCTIONS (12 HOURS)

Grouping Data – Join – Set Operators – Subquery – Views – Sequences – Synonyms – Index – Transactions – Locking Rows for Update – Controlling Access.

UNIT V: FUNDAMENTALS OF PL/SQL (12 HOURS)

PL/SQL Block Structure – Comments– Data Types– Variable Declaration – Bind Variable – Control Structures – SQL in PL/SQL – Data Manipulation in PL/SQL – Exception Handling – Procedure – Function.

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Writing and executing SQL queries on a sample database to retrieve or modify data.
2. **Group Activity:** Designing a relational database schema for a given scenario and explaining table structures and relationships.
3. **Comparison Activity:** Comparing the advantages and disadvantages of using a database system versus a spreadsheet for managing large datasets.
4. **Visual Activity:** Creating an Entity-Relationship (ER) diagram for a given scenario and explaining the entities, attributes, and relationships.
5. **Presentation Activity:** Researching and presenting how a real-world organization (e.g., banks, hospitals) uses database systems to manage their operations.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, *Database System Concepts*, McGraw Hill, Seventh edition, 2019.
2. Nilesh Shah, —Database Systems using Oracle A simplified guide to SQL and PL/SQL, Prentice Hall of India, 2009.

REFERENCE BOOKS

1. Raghu Ramakrishnan, Johannes Gehrke, —Database Management Systems, McGraw-Hill Science_Engineering_Math, 2003
2. Ramez Elmasri and Shamkant B. Navathe , —Fundamentals of Database Systems" (7th Edition), Pearson India.

WEB RESOURCES

- <https://www.geeksforgeeks.org/dbms/>
- <https://www.javatpoint.com/dbms-tutorial>
- <https://www.tutorialspoint.com/dbms/index.htm>

SEMESTER – III EC – P3 HOURS – 2 CREDITS – 2 TOTAL HOURS: 30

LIST OF PROGRAMS

DBMS / SQL Lab Exercises List

1. Creating, Modifying and Dropping Tables

1. Create student and department tables with appropriate datatypes.
2. Design tables for library management systems.
3. Create employee database tables.
4. Compare CREATE, ALTER, and DROP commands.

2. Inserting, Updating, Deleting Records in a Table

1. Update employee salary records.
2. Maintain student attendance records.
3. Perform CRUD operations on a sample database.

3. Enforcing Primary Key, Unique Key and Foreign Key to Columns in a Table

1. Create tables with primary key constraints.
2. Demonstrate referential integrity constraints.
3. Design relational tables for an online shopping system.

4. Retrieving Records from a Table Using WHERE Clause

1. Apply BETWEEN, IN, and LIKE operators.
2. Filter records using wildcard characters.
3. Query employee records based on salary range.
4. Retrieve student details department-wise.
5. Use DISTINCT with WHERE clause.

5. Retrieving Records Using Character, Number and Date Functions

1. Use UPPER, LOWER, and INITCAP functions.
2. Perform mathematical calculations in queries.
3. Calculate age using date functions.
4. Convert strings to numbers and dates.

6. Retrieving Records Using Group Functions

1. Find department-wise average salary.
2. Generate sales summary reports.
3. Use multiple columns in GROUP BY clause.
4. Analyze student marks using aggregate functions.

7. Joining Tables

1. Retrieve records from multiple related tables.
2. Display customer and order details using joins.
3. Compare joins and subqueries.
4. Perform equi-join and non equi-join operations.

8. Retrieving Records Using Sub Queries

1. Retrieve highest salary using subqueries.
2. Use correlated subqueries.
3. Compare EXISTS and IN operators.
4. Use subqueries in INSERT and UPDATE statements.

9. Creating PL/SQL Programs with Control Structures

1. Write PL/SQL blocks using IF statements.
2. Use CASE statements in PL/SQL.
3. Create loops using LOOP, WHILE, and FOR.
4. Generate multiplication tables using loops.
5. Calculate factorial using PL/SQL.
6. Develop programs for grade calculation.
7. Demonstrate branching and iterative statements.

10. PL/SQL Program with Exception Handling

1. Handle divide-by-zero exceptions.
2. Use predefined exceptions in PL/SQL.
3. Create user-defined exceptions.

11. PL/SQL Program with Procedures and Functions

1. Create stored procedures for student records.
2. Develop functions to calculate total and average marks.
3. Develop procedures for salary updates.
4. Compare procedures and functions.

DATA VISUALIZATION USING POWER BI (Course Code: 26UAIS31)

SEMESTER - III SEC5 HOURS – 2 CREDITS – 2 TOTAL HOURS: 30

COURSE OUTCOMES:

At the end of the course the students must be able to

CO 1: Describe the functions and use of Power BI. (K1)

CO 2: Explain designing and building interactive visualizations using different chart types. (K2)

CO 3: Apply concepts learned in excel to create calculated columns and measures to perform advanced calculations. (K3)

CO 4: Combine multiple data sources using relationships to build robust data models. (K4)

CO 5: Publish and share reports securely with colleagues and stakeholders. (K5)

CO 6: Apply data visualization principles to effectively present insights. (K6)

Unit I: (6 HOURS)

Introduction to PowerBI – Working with data – Importing from flat files, excel files, other sources – PowerPivot data types – Column operations - Table relationship.

Unit II: (6 HOURS)

PowerPivot data analysis – PivotTable and PivotChart – Slicers – Dashboard Implementation – Dates, hierarchies, and perspectives.

Unit III: (6 HOURS)

Data Analysis Expressions – Introduction to Power Query – Introduction to Power View – Power View visualizations.

Unit IV: (6 HOURS)

Power View filtering options – Introduction to Power Map – Preparing geospatial data.

Unit V: (6 HOURS)

Publish from Power BI desktop – Publish Dashboard to Web.

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Connecting Power BI to Different Data Sources
2. **Practical Activity:** Building a Data Model Using Joins in Power BI
3. **Group Discussion:** Exploring the Functions of DAX in Power BI
4. **Brainstorming:** Applying Power BI Visualizations to Business Scenarios
5. **Conceptual Activity:** Discuss the time and Space Complexity of Power BI Operations

TEXT BOOK

1. Microsoft Power BI cookbook, Brett Powell, Packt Publishing Limited, 2nd edition, 2017.

REFERENCE BOOKS

1. Greg Deckler, Brett Powell, Microsoft Power BI Cookbook: Gain expertise in Power BI, Packt Publishing Limited, 2nd Edition, 2021.
2. Alan Murray, —Power BI for Jobseekers, BPB Publications, 2023.
3. Jack Hyman, —Microsoft Power BI for Dummies, Wiley India Pvt. Ltd., 2023.

WEB RESOURCES

- <https://www.coursera.org/professional-certificates/>
- <https://www.geeksforgeeks.org/power-bi-tutorial/>

ARTIFICIAL INTERNET OF THINGS

(Course Code: 26UAIC41)

SEMESTER – IV CORE-T4 HOURS – 4 CREDITS – 4 TOTAL HOURS: 60

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

- CO1:** Define the concepts of Internet of Things and Artificial Intelligence and describe their characteristics. **(K1)**
- CO2:** Understand the architecture of IoT systems and the communication protocols used in connected devices. **(K2)**
- CO3:** Apply machine learning techniques for processing and analyzing sensor data generated from IoT devices. **(K3)**
- CO4:** Design intelligent AIoT systems using edge computing and cloud platforms. **(K4)**
- CO5:** Develop real-world AIoT applications such as predictive maintenance, smart monitoring and intelligent automation. **(K5)**

UNIT I Introduction To IoT and AIoT (12 Hours)

Introduction – Definition and characteristics of Internet of Things – Evolution of IoT – Physical design of IoT including sensors, actuators and embedded devices – Logical design of IoT systems – IoT architecture and functional blocks – Overview of Artificial Intelligence – Machine learning and deep learning concepts – Integration of Artificial Intelligence with Internet of Things – Introduction to AIoT architecture – Applications of AIoT in smart homes, smart cities, agriculture, healthcare and industrial systems.

UNIT II IoT Communication Protocols And Networking (12 Hours)

Communication models in IoT – Device to device communication – Device to cloud communication – Device to gateway communication – Back-end data sharing – Fundamentals of networking for IoT – TCP/IP protocol stack – IPv6 addressing for IoT devices – Application layer protocols including MQTT, CoAP, HTTP and REST APIs – WebSocket communication – Wireless communication technologies such as WiFi, Bluetooth Low Energy, Zigbee, LoRaWAN and NB-IoT – Security challenges in IoT networks including authentication, encryption and device security mechanisms.

UNIT III IoT Hardware Platforms and Data Acquisition (12 Hours)

Overview of IoT hardware platforms including Arduino, ESP32 and Raspberry Pi – Sensor interfacing techniques – Analog and digital sensors – Data acquisition from IoT devices – Data collection and streaming methods – Data preprocessing and filtering techniques – Storage and management of IoT data – Introduction to IoT cloud platforms – Integration of devices with cloud services – Real-time data monitoring and visualization using dashboards.

UNIT IV Artificial Intelligence for IoT Data

(12 Hours)

IoT Physical Devices and Endpoints – Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT Devices - IoT Physical Servers and Cloud Offerings – Python Web Application Framework – Django.

UNIT V AIoT System Design And Applications

(12 HOURS)

Introduction to Cloud storage models and Communication APIs – Python Web Application Framework - DJANGO – Designing a RESTful Web API – Case studies illustrating IoT – Smart Lighting – Home Intrusion System – IoT printer.

SKILL BASED ACTIVITIES:

- 1. Group Discussion:** Group discussion on the challenges and opportunities of AIoT technologies.
- 2. Brainstorming:** Brainstorming how IoT can improve healthcare, such as wearable devices for monitoring vitals or remote patient care.
- 3. Problem-Solving Activity:** Identifying potential security vulnerabilities in an IoT system and proposing solutions to mitigate risks.
- 4. Conceptual Activity:** Discussing how AI can enhance IoT systems, such as predictive maintenance or intelligent data analysis.
- 5. Practical Activity:** Collecting data from an IoT sensor (e.g., humidity, motion) and visualizing it using tools like ThingSpeak or Google Sheets.

TEXT BOOK

1. Arshdeep Bahga, Vijay Madisetti, “Internet of Things: A Hands-on Approach” , Second Edition, Universities Press, 2019.

REFERENCE BOOKS

1. Ammar Rayes, Samere Salam, “Internet of Things – From Hype to Reality”, Second Edition, Springer Publishers, 2019.
2. S. Misra, A. Mukherjee, and A. Roy, “Introduction to IoT”, First Edition, Cambridge University Press, 2022.
3. **Balamurugan et al.**, AIoT – A Powerful Synergy, 2024 – Focuses on Artificial Intelligence and Internet of Things integration for Industry 4.0, robotics and intelligent automation systems.
4. **K. N. Qureshi and T. Newe**, Artificial Intelligence of Things (AIoT) – New standards, AI-driven networking and communication systems, Taylor & Francis Open (Selected Chapters / Open Access), 2024.

WEB RESOURCES

<https://www.iotforall.com>
https://www.tutorialspoint.com/internet_of_things
https://www.tutorialspoint.com/internet_of_things/index.htm
<https://www.edge-ai-vision.com>

SEMESTER - IV CORE-P3 HOURS – 3 CREDITS – 3 TOTAL HOURS: 45

List of Programs

1. Understanding **Arduino UNO / ESP32 Board**, pin configuration, and basic electronic components.
2. Installing and working with **Arduino IDE**, board configuration, and uploading basic programs.
3. **Blinking LED program** using Arduino / ESP32 to understand digital output control.
4. **Reading digital input** using push button and controlling LED output.
5. **Analog sensor interfacing** using potentiometer or LDR and displaying values through Serial Monitor.
6. Interfacing **DHT11 Temperature and Humidity Sensor** and displaying sensor values.
7. Interfacing **Ultrasonic / IR / Gas sensor** and monitoring data through Serial communication.
8. Sending sensor data to **IoT cloud platform Blynk** and monitoring real-time data.
9. Connecting IoT devices with **KiwisIoT platform** and transmitting sensor data to the dashboard.
10. Controlling devices remotely through **mobile IoT dashboard** using cloud commands.
11. Reading IoT sensor data in **Python using MQTT / HTTP API**.
12. Data logging and visualization of IoT sensor data using **Python (NumPy, Pandas, Matplotlib)**.
13. Implementing **Machine Learning prediction model** using IoT sensor dataset (Regression).
14. Implementing **Anomaly Detection for IoT sensor data** using Machine Learning algorithms.
15. Implementing **Classification models** for IoT sensor data using Random Forest / XGBoost.
16. Capturing camera stream from **ESP32-CAM module** and processing it in Python.
17. Implementing **Object Detection using YOLO / OpenCV** with ESP32-CAM or webcam.
18. Developing a simple **AIoT application combining IoT sensors and AI prediction system**.

PRINCIPLES OF DATA SCIENCE (Course Code: 26UAIE41)

SEMESTER – IV EC-T4 HOURS – 4 CREDITS – 4 TOTAL HOURS: 60

Objective:

To be able to rehearse the fundamental data science concepts, apply mathematical principles to experiment diverse data-intensive tools, and apply appropriate methods to create innovative solutions for solving real-world problems.

Outcomes:

At the end of the course the students will be able to:

CO 1: Describe the fundamental concepts and principles of data science and how they are related to real-world scenarios. (K3)

CO 2: Associate the mathematical knowledge with data science by solving related problems (K2)

CO 3: Experiment various data intensive operations and tools. (K3)

CO 4: Examine the effectiveness and relevance of various tools and techniques for analyzing and visualizing data. (K4)

CO 5: Criticize the recent potential applications while selecting techniques and tools to analyze real time problems (K5)

CO 6: Formulate pioneering data-driven solutions for real-world challenges by selecting tools and techniques, and visualization strategies while relating them with the recent trends. (K6)

UNIT I: Introduction Of Data Science

(12 Hours)

: Data Science – Venn diagram – Basic terminology – Data science case studies – Types of data – levels of data – Types of data analytics – Descriptive analytics–Diagnostic analytics– Predictive analytics- Prescriptive analytics- Five steps of Data science. *Ancient Indian Logic (Nyaya Shastra) and its Parallel to the Five Steps of Data Science*

UNIT II: MATHEMATICAL PRELIMINARIES

(12 Hours)

: Basic Maths – mathematics as discipline – basic symbols and terminology –linear algebra. Basic Probability – definitions- probability – Bayesian vs frequentist – compound events – conditional probability – rules of probability.

UNIT III: Data Mining and Data Warehousing

(12 Hours)

: Introduction to Data warehousing – Design consideration of data warehouse – Data loading process – case study – Data mining – Data mining techniques – Tools and platforms – case study.

UNIT IV: Visualizing Data

(12 Hours)

: Exploratory Data Analysis – Developing the visual aesthetic – chart types – Great visualizations – Reading graphs – Interactive visualizations.

UNIT V: Data Science – Recent Trends

(12 Hours)

: Applications of Data Science, recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

Skill-Based Activities

1. **Group Discussion (GD)** : The Ethics of Predictive vs. Prescriptive Analytics in Real-World Scenarios
2. **Debate** : Bayesian vs. Frequentist Approaches to Probability in Data Modeling
3. **Design Workshop** : Creating a Data Warehouse Schema and Loading Process for a Retail Case Study
4. **Visual Critique & Peer Review** : Analyzing the Effectiveness and Aesthetic of Interactive vs. Static Data Visualizations
5. **Case Study Presentation** : Pioneering Data-Driven Solutions: Recent Trends in AI and Big Data Collection

Text Books:

1. Ozdemir, Sinan, Principles of data science. Packt Publishing Ltd, 2016.
(Unit I- Ch. 1,2,3 Unit II – Ch. 4, Ch. 5)
2. Maheshwari, Anil, “Data Analytics Made Accessible.” Seattle: Amazon Digital Services, 2nd edition, 2023. (Unit III – Ch. 3, Ch. 4)
3. Skiena, Steven S. The data science design manual. Springer, 2017. (Unit IV- Ch. 6)

Reference Books:

1. Hadrien Jean C., Data Science, Certybox Education, 2023.
2. Pierson, Lillian, Data Science for Dummies, John Wiley & Sons, 2021.
3. Grus, Joel, Data Science from Scratch: First Principles with Python, O’Reilly Media, 2019.
4. Blum, Avrim, John Hopcroft, Ravindran Kannan, Foundations of Data Science, Cambridge University Press, 2020.

Web References:

1. <https://www.analyticsvidhya.com/>
2. <https://www.simplilearn.com>
3. <https://www.ibm.com/in-en/topics/data-science>
4. <https://www.mygreatlearning.com/blog/what-is-data-science/>

R PROGRAMMING (Course Code: 26UAIE42)

SEMESTER – IV EC-T5 HOURS – 3 CREDITS – 3 TOTAL HOURS:45

Outcomes:

At the end of the course the students must be able to

CO 1: Demonstrate proficiency in using R programming language for data analysis, manipulation, and visualization. (K1)

CO 2: Apply fundamental statistical techniques to explore and summarize data effectively. (K2)

CO 3: Analyze the packages in R for efficient data manipulation and transformation. (K3)

CO 4: Build predictive models using linear regression, logistic regression, and other statistical modeling techniques in R. (K4)

CO 5: Evaluate and interpret the results of statistical models, including assessing model fit and variable importance. (K5)

CO 6: Develop reproducible data analysis workflows using R Markdown and version control tools like Git, ensuring transparent and collaborative data science practices. (K6)

Unit I: (9 HOURS)

Introduction to R: What is R - Why R – Installing – Environment - data structure - Variables – Scalars – Vectors. *Introduction to Pratyaksha (Perception) and Anumana (Inference) as the philosophical roots of data collection and statistical inference.*

Unit II: (9 HOURS)

Introduction: Matrices – List. R Programming: While - If structure - For - Arithmetic operations.

Unit III: (9 HOURS)

Data frames - attach - detach - Importing data - Tabular Data - CSV - data from excel - Accessing database – Loading – Writing to files.

Unit IV: (9 HOURS)

Manipulating Data: Selecting rows/observations - Selecting columns/fields - Merging data - Relabelling the column names - Converting variable types - Data sorting - Data aggregation.

Unit V: (9 HOURS)

Using functions in R: Mathematical Functions - String Functions - local and global variable - Box plot - Line chart - Pie graph.

SKILL-BASED ACTIVITIES

1. **The "Clean Sweep" Data Wrangling Challenge**: Provide students with a "messy" dataset in CSV or Excel format.
2. **Dynamic Dashboard Creation**: Use R Markdown to create a reproducible report
3. **Predictive Market Analysis**: Use a public dataset to build a linear or logistic regression model.
4. **Custom Function Library** : Develop a script containing user-defined functions for repetitive statistical tasks.
5. **Automated Database Fetcher**: Practice "attaching" and "detaching" data frames while performing arithmetic operations on the imported lists and matrices.

Text Books

Roger D Peng, R programming for Data science, Lulu.com, 2012.

Reference Books

Michael J. Crawley, The R Book, 2nd Edition, 2012.

R PROGRAMMING LAB (Course Code: 26UAIE43)

SEMESTER –IV EC-P4 HOURS – 2 CREDITS – 2 TOTAL HOURS: 30

LIST OF PROGRAMS

1. Initialize scalars and vectors to perform arithmetic operations and explore the R environment.
2. Create and manipulate matrices and lists using "While" and "For" loops to perform element-wise calculations.
3. Develop an "If" structure to categorize data based on specific logical conditions.
4. Import tabular data from CSV and Excel files into a data frame using "attach" and "detach" functions.
5. Load data from an external database and write the processed output back to local files.
6. Perform row and column selection, merge multiple datasets, and relabel column names for data cleaning.
7. Execute variable type conversion, data sorting, and data aggregation on complex data frames.
8. Define custom mathematical and string functions using local and global variables to automate data processing.
9. Construct Box plots, Line charts, and Pie graphs to visually interpret data distributions and trends

DEEP LEARNING (Course Code: 26UAIC51)

SEMESTER – V CORE -T5 HOURS – 5 CREDITS – 5 TOTAL HOURS:75

COURSE OUTCOMES:

At the end of the course Learners will be able to

CO 1: Illustrate the major technology trends in neural networks and deep learning(K4)

CO 2: Analyse neural networks and fully connected deep neural networks(K4)

CO 3: Apply neural networks and fully connected deep neural networks(K3)

CO 4: Evaluate efficient neural networks and deep learning for real time application(K6)

CO 5: Build efficient (vectorized) neural networks and deep learning for real time application(K5)

CO6: Create the algorithm using ANN concepts. (K5)

UNIT I : INTRODUCTION TO LEARNING (15 HOURS)

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

UNIT II : DEEP LEARNING MODELS (15 HOURS)

Tensorflow–Variables–Operations–Placeholders–Sessions–Sharing Variables–Graphs– Visualization .

UNIT III : DEEP LEARNING USING CNN (15 HOURS)

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

UNIT IV : DEEP LEARNING USING RNN (15 HOURS)

Recurrent Neural Network–Memory cells–sequence analysis–word 2vec- LSTM—Memory augmented Neural Networks–NTM—Application .

UNIT V : DEEP LEARNING APPLICATION (15 HOURS)

Reinforcement Learning –Markov Decision Processing–Q Learning– Applications.

SKILL BASED ACTIVITIES:

1. **Practical Activity:** Building and training a simple neural network using frameworks like TensorFlow or PyTorch to solve a basic classification problem.
2. **Hands-On Activity:** Creating a CNN model to classify images from a dataset and analyzing its performance.
3. **Practical Activity:** Using pre-trained models and fine-tuning them for a custom task, such as classifying a new set of images.
4. **Group Discussion:** Debating the advantages and disadvantages of deep learning compared to traditional machine learning techniques.
5. **Conceptual Activity:** Discussing strategies to prevent overfitting in deep learning models, such as dropout, regularization, and data augmentation.

TEXT BOOK:

- 1 Nikhil Buduma, Nicholas Locascio, — Fundamentals of Deep Learning: Designing Next Generation Machine Intelligence Algorithms, O'Reilly Media, 2017.

REFERENCE:

1. Ian Goodfellow, Yoshua Bengio, Aaron Courville, ||Deep Learning (Adaptive Computation and Machine Learning series||, MIT Press, 2017.
2. Charu C. Aggarwal, Neural Networks and Deep Learning, Springer, September 2018.
3. Francois Chollet, Deep Learning with Python, Manning Publications; 1st edition, 2017 3. John D. Kelleher, Deep Learning (MIT Press Essential Knowledge series), The MIT Press, 2019.

WEB REFERENCES:

- https://onlinecourses.nptel.ac.in/noc22_cs22/preview
- <https://arxiv.org/abs/1506.06579>
- <https://arxiv.org/abs/1605.06211>
- <https://cs230.stanford.edu/lecture/>

PROGRAMMING FOR DEEP LEARNING (Course Code: 26UAIC52)

SEMESTER – V CORE-P5 HOURS – 5 CREDITS – 3 TOTAL HOURS: 75

LIST OF PROGRAMS

1. Familiarizing students with deep learning development environments such as Python, Spyder IDE, Jupyter Notebook, and Google Colab.
2. Loading and preprocessing datasets for deep learning models using Python libraries such as Pandas and NumPy.
3. Performing image preprocessing techniques such as resizing, normalization, and augmentation for deep learning models using Python.
4. Predicting customer churn in a telecom dataset using Artificial Neural Network (ANN) models implemented with TensorFlow/Keras.
5. Detecting credit card fraud using deep neural network models in Python.
6. Recognizing handwritten digits using deep neural networks trained on the MNIST dataset.
7. Classifying plant leaf diseases using Convolutional Neural Networks (CNN) for agricultural applications.
8. Detecting human faces in images using deep learning based computer vision models.
9. Predicting weather conditions using Recurrent Neural Network (RNN) models in Python.
10. Forecasting energy consumption using Long Short-Term Memory (LSTM) deep learning models.
11. Detecting fake news using deep learning based Natural Language Processing techniques.
12. Performing sentiment analysis on social media posts using deep learning models.
13. Applying autoencoder networks for anomaly detection in datasets using deep learning frameworks.
14. Building a deep learning model for medical image classification such as pneumonia detection from X-ray images.
15. Performing real-time face recognition using deep learning and webcam input in Python.

NEURAL NETWORKS (Course Code: 26UAIC53)

SEMESTER – V CORE-T6 HOURS – 5 CREDITS – 5 TOTAL HOURS: 75

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Understand the difference between biological neuron and artificial neuron **(K1)**

CO2: Understand the application areas of neural networks **(K1)**

CO3: Understand building blocks of Neural Networks. **(K1)**

CO4: Develop neural network models **(K4)**

CO5: Design and develop applications using neural networks. **(K3)**

UNIT –I INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS (15 HOURS)

Introduction- Artificial Neural Networks- Historical Development of Neural Networks- Biological Neural Networks- Comparison Between them and the computer- Comparison Between Artificial and Biological Neural Network - Basic Building Blocks of Artificial Neural Networks- Artificial Neural Network (ANN) terminologies.

UNIT – II MODELS OF ARTIFICIAL NEURAL NETWORKS (15 HOURS)

Introduction- Learning Rules -Hebbian Learning Rule -Perceptron Learning Rule - Delta Learning Rule -Competitive Learning - Perceptron Networks: Introduction- Single Layer Perceptron- Brief Introduction to Multilayer Perceptron Networks.

UNIT – III ADALINE AND MADALINE NETWORKS (15 HOURS)

Basic concepts-single layer perceptron-Multilayer perceptron-Adaline-Madaline-Learning rules Supervised learning-Back propagation networks-Training algorithm, Advanced algorithms Adaptive network-Radial basis network modular network-Applications.

UNIT – IV FEEDFORWARD NETWORKS. (15 HOURS)

Feed Forward Networks: Introduction- Back Propagation Network (BPN)- Radial Basis Function Network (RBFN). Feedback Control Systems, Expert Control, Inverse Learning, Specialized Learning, Back propagation through Real-Time Recurrent Learning.

UNIT – V CASE STUDIES (15 HOURS)

Application of fuzzy logic and neural networks to Measurement-Control-Adaptive Neural Controllers –Signal Processing and Image Processing.

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Implementing a simple feedforward neural network using Python and NumPy to solve a binary classification problem.
2. **Practical Activity:** Creating and training a neural network using TensorFlow or Keras to classify data from a dataset like MNIST or Iris.
3. **Problem-Solving Activity:** Experimenting with hyperparameters such as learning rate, number of layers, and activation functions to optimize an ANN's performance.
4. **Group Discussion:** Debating the advantages and disadvantages of ANNs compared to traditional machine learning algorithms like decision trees or SVMs.

5. **Brainstorming:** Brainstorming and presenting real-world applications of ANNs, such as image recognition, speech processing, or financial forecasting.

TEXT BOOKS:

- 1 Sivanandam- S Sumathi- S N Deepa; —Introduction to Neural Networks— 2nd ed.-TATA McGraw HILL 2005.
- 2 VallumB.R And HayagrivaV.R, Neural networks and Fuzzy logic, BPB Publications, New Delhi

REFERENCES BOOKS:

- 1 Simon Haykin- —Neural networks A comprehensive foundations— 2nd ed.- Pearson Education- 2004.
- 2 B Yegnanarayana- —Artificial neural networks— 1st ed.- Prentice Hall of India P Ltd- 2005.

NEURAL NETWORKS LAB (Course Code: 26UAIC54)

SEMESTER – V CORE-P6 HOURS – 5 CREDITS– 3 TOTAL HOURS: 75

LIST OF PROGRAMS

1. Familiarizing students with neural network development environments such as Python, Jupyter Notebook, and Google Colab.
2. Loading and preprocessing datasets for neural network models using Python libraries such as Pandas and NumPy.
3. Performing feature scaling and normalization techniques to prepare datasets for neural network training.
4. Predicting bank loan approval using Artificial Neural Network (ANN) models in Python.
5. Predicting employee attrition in organizations using feed-forward neural network models.
6. Recognizing handwritten characters using neural network models trained on image datasets
7. Classifying types of flowers using neural network models for pattern recognition tasks.
8. Detecting anomalies in industrial sensor data using neural network models.
9. Predicting rainfall levels using neural network models for environmental data analysis.
10. Recognizing spoken digits using neural network models for basic speech recognition tasks.
11. Classifying news articles into categories using neural network models for text classification.
12. Building a neural network model for disease diagnosis prediction using medical datasets.
13. Evaluating neural network model performance using confusion matrix and classification metrics.
14. Saving and loading trained neural network models for prediction tasks in Python.
15. Performing real-time image classification using webcam input and trained neural network models.

REACT JS (Course Code - 26UAIE51)

SEMESTER – V EC-T5 HOURS - 4 CREDITS – 3 TOTAL HOURS: 60

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Understand React Fundamentals **(K1)**

CO2: Describe the purpose and usage of JSX, Babel, and the ReactDOM. **(K2)**

CO3: Build functional and class-based React components. **(K6)**

CO4: Use advanced React features like Suspense, error boundaries, and code splitting. **(K3)**

CO5: Implement testing practices using Jest, ESLint, and Prettier for maintaining code quality. **(K4)**

CO6: Utilize best practices for deploying React applications to production. **(K3)**

UNIT I (12 HOURS)

Welcome to React - React's Past and Future- Working with the Files - JavaScript for React - Declaring Variables - Creating Functions - Compiling JavaScript - Objects and Arrays – Classes.

UNIT II (12 HOURS)

How React Works - React with JSX - Page Setup - React Elements - ReactDOM - React Components - React with JSX - React Elements as JSX - Babel - Recipes as JSX - React Fragments - Intro to webpack.

UNIT III (12 HOURS)

React State Management - Building a Star Rating Component - The useState Hook - Refactoring for Advanced Reusability - State in Component Trees - Building Forms - React Context.

UNIT IV (12 HOURS)

Enhancing Components with Hooks - Introducing useEffect -. Incorporating Data - Requesting Data - Render Props - Virtualized Lists - Introducing GraphQL - Suspense - Error Boundaries - Code Splitting.

UNIT V (12 HOURS)

React Testing - ESLint – Prettier - Typechecking for React Applications - Test-Driven Development - Incorporating Jest - Testing React Components - React and the Server - Isomorphic Versus Universal - Server Rendering React - Server Rendering with Next.js – Gatsby - React in the Future.

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Creating a basic to-do list app using React to practice state management and component structure.
2. **Problem-Solving Activity:** Building a React app by breaking it into reusable components and composing them together.
3. **Conceptual Activity:** Creating a React app that demonstrates the use of state and props, such as a counter or a user profile display.
4. **Group Discussion:** Debating the pros and cons of using class components versus functional components with hooks in React.
5. **Brainstorming:** Brainstorming and presenting real-world applications of React, such as social media platforms, e-commerce sites, or dashboards.

TEXT BOOK

- 1 Alex Banks and Eve Porcello, —Learning React - Second Edition, O'Reilly Media.

REFERENCE BOOKS

- 2 Thomas, Mark Tielens. *React in Action*. Manning Publications, 2018.

WEB REFERENCE

<https://www.geeksforgeeks.org/react/>

PRACTICAL: REACT JS LAB (Course Code: 26UAIE52)

SEMESTER – V EC-P5 HOURS – 4 CREDITS – 3 TOTAL HOURS: 60

LIST OF PROGRAMS

React JS Lab Exercises

1. Creating a Simple React Application

1. Create a basic React application displaying “Hello World”.
2. Design a simple student profile page.
3. Build a digital clock application.
4. Create a basic calculator interface.

2. Creating Components

1. Create functional components for Header and Footer.
2. Develop a reusable Button component.
3. Create nested components for a webpage layout.
4. Build a Product Card component.

3. Passing Props Between Components

1. Pass student details from parent to child component.
2. Display dynamic product information using props.
3. Pass arrays as props and display lists.
4. Create reusable greeting components using props.

4. Using State in React

1. Implement a counter application using state.
2. Create a like/dislike button.
3. Build a theme toggle application.
4. Develop a simple quiz score tracker.

5. Handling Forms and User Input

1. Create a student registration form.
2. Develop a login form with validation.
3. Handle checkbox and radio button inputs.
4. Display submitted form data dynamically.

6. Conditional Rendering in React

1. Implement login/logout message display.
2. Show and hide components dynamically.
3. Create a dark/light theme switcher.
4. Display loading messages conditionally.

7. Using React Hooks

1. Create a counter using useState hook.
2. Fetch and display API data using useEffect.
3. Build a timer application using hooks.
4. Create a custom hook for form handling.

8. Program Using Styling Components

1. Apply inline CSS styling in React.
2. Use external CSS files for component styling.
3. Create responsive layouts using Flexbox.
4. Design a styled navigation bar using Bootstrap.

9. Program Using React Router for Navigation

1. Configure routing between Home and About pages.
2. Create navigation links using React Router.
3. Implement dynamic routing with URL parameters.
4. Build a multi-page student portal application.

SEMESTER – VI CORE-T7 HOURS – 5 CREDITS – 4 TOTAL HOURS: 75

COURSE OUTCOMES:

At the end of the Course the student will be able to

CO1: Understand the fundamentals of Generative Artificial Intelligence and Large Language Models. (K1)

CO2: Apply prompt engineering techniques to interact with and control generative AI systems. (K2)

CO3: Develop applications using Large Language Models and AI frameworks. (K3)

CO4: Design intelligent AI agents and multi-agent systems for automation tasks. (K4)

CO5: Build real-world AI applications using modern AI tools, frameworks and edge AI technologies. (K5)

UNIT I: Introduction To Modern Artificial Intelligence (15 Hours)

Introduction – Evolution of Artificial Intelligence – Overview of Machine Learning, Deep Learning and Generative AI – Differences between traditional AI and Generative AI – Overview of Large Language Models – Foundation models and transformer architecture – Applications of generative AI in industry – Ethical considerations **and responsible AI – AI applications in education, healthcare, robotics and automation.**

UNIT II: Generative AI And Large Language Models (15 Hours)

Introduction to Generative AI – Text generation, image generation and multimodal AI – Large Language Models architecture – Transformer model fundamentals – Pretraining and fine-tuning concepts – Overview of popular models such as GPT, LLaMA, Claude and Mistral – Tokenization and embeddings – Retrieval Augmented Generation (RAG) – Vector databases and semantic search – Applications of LLMs in chatbots, assistants and knowledge systems.

UNIT III: Prompt Engineering And AI Application Development (15 Hours)

Prompt engineering concepts – Zero-shot, few-shot and chain-of-thought prompting – Prompt design strategies for reliable AI outputs – Controlling LLM responses – Building AI applications using APIs – Creating AI-powered chatbots and assistants – Developing interactive AI applications using Streamlit – Integrating LLMs with external data sources – Building simple RAG applications for knowledge retrieval.

UNIT IV: AI Agents And Agentic Systems (15 Hours)

Introduction to intelligent agents – Autonomous AI agents and decision making – Agent architecture and workflow design – Agentic AI systems – Multi-agent collaboration – Task planning and tool usage in AI agents – Frameworks for building agent.

LangGraph and LangChain for agent workflows – CrewAI for multi-agent systems – Workflow automation using N8n – Applications of AI agents in business automation, research and data processing.

UNIT V: Edge AI And Deployment Of Intelligent Systems

(15 Hours)

Introduction to Edge AI – Edge computing and AI integration – Running AI models on embedded systems – TinyML and lightweight AI models – Deploying AI models on edge devices – AI applications in IoT and robotics – Real-time AI inference – AI model optimization and performance considerations – Future trends in AI including autonomous systems, agent ecosystems and human-AI collaboration.

SKILL BASED ACTIVITIES

1. Designing prompts for generative AI applications.
2. Building a chatbot using a Large Language Model API.
3. Creating a simple AI application using Streamlit.
4. Developing an AI agent workflow using LangGraph or CrewAI.
5. Implementing automation workflows using N8n.
6. Developing a small edge AI application for real-time inference.

TEXT BOOK

1. Chip Huyen, AI Engineering, O'Reilly Media, 2023.
2. Jay Alammar, Maarten Grootendorst, Hands on Large Language Models, O'Reilly Media, 2024.

REFERENCE BOOKS

1. Russell and Norvig, Artificial Intelligence – A Modern Approach, Pearson Education.
2. K. N. Qureshi and T. Newe, Artificial Intelligence of Things (AIoT), Taylor & Francis, 2024.
3. Sebastian Raschka, Build a Large Language Model from Scratch, Manning Publications, 2024.
4. Vijay Janapa Reddi, TinyML: Machine Learning with TensorFlow Lite, O'Reilly Media, 2020.

WEB RESOURCES

<https://huggingface.co>

<https://platform.openai.com/docs>

<https://python.langchain.com>

<https://streamlit.io>

PRACTICAL: PROGRAMMING FOR IMAGE PROCESSING
(COURSE CODE : 26UAIC62)

SEMESTER – VI CORE-P7 HOURS – 4 CREDITS -2 TOTAL HOURS: 60

LIST OF PROGRAMS

1. Apply point processing techniques, including log transformations and power-law (gamma) correction, to enhance contrast in digital images.
2. Implement histogram equalization to improve global image contrast and perform histogram matching to a specific target profile.
3. Use linear (Mean) and non-linear (Median) spatial filters to remove salt-and-pepper noise while maintaining edge integrity.
4. Execute 2D Fast Fourier Transforms (FFT) to apply Butterworth and Gaussian high-pass filters for image sharpening in the frequency domain.
5. Extract structural boundaries from an image using Sobel, Prewitt, and Canny edge detection operators.
6. Perform morphological operations—dilation, erosion, opening, and closing—to clean noise from binary image masks.
7. ChatBot creation
8. Implement the **C-Means clustering algorithm** to segment a color image into distinct regions based on pixel intensity clusters.
9. Apply **Principal Component Analysis (PCA)** to a set of facial images to generate Eigenfaces for dimensionality reduction.
10. Train a **Support Vector Machine (SVM)** to classify image sub-windows into distinct patterns such as "urban" or "rural" landscapes.
11. Develop a **Fuzzy Logic** enhancement script to classify pixels with high uncertainty, such as segmenting thin blood vessels in medical scans.

NATURAL LANGUAGE PROCESSING (Course Code: 26UAIC63)

SEMESTER – VI CORE-T8 HOURS – 5 CREDITS – 4 TOTAL HOURS: 75

COURSE OUTCOMES:

At the end of the Course the student will be able to

CO1: Understand the key concepts and techniques in Natural Language Processing. **(K1)**

CO2: Apply lexical processing techniques and part-of-speech tagging in NLP. **(K2)**

CO3: Analyze and implement syntactic parsing techniques using formal grammars. **(K3)**

CO4: Implement semantic analysis techniques for ambiguity resolution and word sense Disambiguation. **(K5)**

CO5: Apply pragmatic analysis methods and knowledge representation for NLP tasks. **(K4)**

CO6: Develop Natural Language Generation systems for content determination and sentence Planning. **(K4)**

UNIT I : INTRODUCTION TO NLP (15 HOURS)

Introduction: Application of NLP techniques and key issues- MT grammar checkers- dictation – document generation- NL interfaces- Natural language processing key issues- the different analysis level used for NLP: morpho-lexical-syntactic-semantic pragmatic-markup (TEI, UNICODE)

UNIT II : LEXICAL LEVEL (15 HOURS)

Lexical level: Error tolerant lexical processing (spelling error correction)-transducers for the design of morphologic analyzers features-towards syntax: part-of-speech tagging (BRILL, HMM).

UNIT III : SYNTACTIC LEVEL (15 HOURS)

Syntactic level: grammars- formal Chomsky hierarchy- DCSGs - systematic case – unification- stochastic- parsing top-down - bottom up - chart algorithm - CYK algorithm.

UNIT IV : SEMANTIC LEVEL (15 HOURS)

Semantic level: logical forms - ambiguity resolution - semantic network and parsers/procedural semantics - **lexical** semantics and word sense disambiguation-compositional semantics- semantic role labeling and semantic parsing.

UNIT V : PRAGMATIC LEVEL (15 HOURS)

Natural language generation: content determination – sentence planning- surface realization.
Pragmatic level: knowledge representation- reasoning- plan/goal recognition –speech acts/intentions – belief models- discourse- reference.

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Preprocessing raw text data by performing tasks like tokenization, stemming, lemmatization, and removing stopwords.
2. **Practical Activity:** Building a sentiment analysis model using a dataset and evaluating its performance using metrics like accuracy and F1-score.
3. **Conceptual Activity:** Using pre-trained word embeddings like Word2Vec or GloVe to represent text data and visualizing word relationships.
4. **Group Discussion:** Debating the pros and cons of rule-based systems versus machine learning models for NLP tasks.
5. **Brainstorming:** Brainstorming and presenting real-world applications of NLP, such as chatbots, machine translation, or voice assistants.

TEXT BOOK(S)

- 1 Danie IJ and JamesH. Martin, An Introduction to natural language processing, computation a linguistics and speech recognition prenticehall,2009.

REFERENCE BOOK(S)

- 2 1.LanH Written and Elbef, Mark A. Hall, datamining: practical machine learning tools and techniques, Morgan Kaufmann, 2013.
- 3 Mohamed ZakariaKurdi, Natural Language Processing and Computational Linguistics 1, speech, Morphology, and syntax, wiley, ISTE Ltd, 2016.

SEMESTER – VI CORE-P8 HOURS – 4 CREDITS – 2 TOTAL HOURS: 60

LIST OF PROGRAMS

1. Implementing Word Similarity

1. Find similarity between two words using cosine similarity.
2. Compare words using WordNet similarity measures.
3. Implement TF-IDF based word similarity.

2. Implementing Simple Problems Related to Word Disambiguation

1. Differentiate meanings of words like “bank”, “bat”, and “crane”.
2. Build a context-based meaning predictor.
3. Use WordNet synsets for selecting correct meanings.
4. Create a simple chatbot that resolves ambiguous words.

3. Simple Demonstration of Part of Speech (POS) Tagging

1. Implement POS tagging using NLTK.
2. Tag nouns, verbs, adjectives, and adverbs in a sentence.
3. Build a simple POS tag visualizer.

4. Implementing Lexical Analyzer

1. Implement tokenization using Python.
2. Develop a lexer for simple programming statements.
3. Detect invalid tokens in source code.
4. Count the number of tokens in a program.

5. Developing Semantic Analyzer

1. Detect semantic errors in simple programs.
2. Build a semantic analyzer for variable declaration checking.
3. Verify scope rules in nested blocks.
4. Create abstract syntax tree validation.

6. Classifying Sentiment Analysis

1. Perform sentiment analysis on movie reviews.
2. Classify tweets as positive, negative, or neutral.
3. Implement Naïve Bayes for sentiment classification.
4. Create a product review sentiment analyzer.
5. Build a real-time sentiment classifier using social media data.

7. Fake News Detection

1. Classify news articles as real or fake.
2. Implement TF-IDF for fake news classification.
3. Build a fake news detection system using NLP.
4. Perform feature extraction from news articles.
5. Create a web-based fake news detector.

DATA ANALYTICS (Course Code: 26UAIE61)

SEMESTER – VI EC-T6 HOURS – 4 CREDITS – 3 TOTAL HOURS: 60

Course Outcomes (CO)

CO 1: Explain the lifecycle of data analytics and differentiate between various data types and structures.(K2)

CO 2: Apply statistical methods and sampling techniques to validate data hypotheses.(K3)

CO 3: Analyze large datasets using data wrangling and transformation tools for business intelligence.(K4)

CO 4: Evaluate the performance of predictive models using regression and classification metrics.(K5)

CO 5: Create interactive data stories and dashboards to communicate insights to stakeholders.(K6)

Unit I: Introduction to Data Analytics

(12 Hours)

Data Analytics Overview – Data Analytics Lifecycle – Types of Analytics: Descriptive, Diagnostic, Predictive, and Prescriptive – Data Collection Strategies – Data Cleaning and Pre-processing – Handling Missing Data and Outliers. *A study of the Arthashastra's methods for quantitative data collection in agriculture and trade*

Unit II: Statistical Foundation for Analytics

(12 Hours)

Probability Distributions – Central Limit Theorem – Hypothesis Testing: T-tests, ANOVA, Chi-Square – Correlation vs. Causation – Sampling Methods – Confidence Intervals – Significance Levels (p-values).

Unit III: Data Wrangling and Exploratory Analysis

(12 Hours)

Data Integration and Transformation – Pivot Tables – Grouping and Aggregation – Feature Engineering – Exploratory Data Analysis (EDA) – Detecting Patterns and Trends – Introduction to Big Data Ecosystems.

Unit IV: Predictive Modeling

(12 Hours)

Linear Regression – Multiple Regression – Logistic Regression for Binary Classification – Decision Trees – Model Evaluation Metrics: R-squared, MAE, RMSE, Accuracy, Precision, Recall, and F1-Score.

Unit V: Data Visualization and Reporting

(12 Hours)

Principles of Visual Perception – Storytelling with Data – Chart Selection (Heatmaps, Treemaps, Bubble Charts) – Creating Interactive Dashboards – Reporting Best Practices – Ethics in Data Reporting.

Skill-Based Activities

1. Case Study Analysis: Identifying the "Analytics Gap" in a retail business model.
2. Workshop: Hands-on hypothesis testing using real-world census data.
3. Design Hackathon: Building a real-time dashboard for tracking environmental data.

Text Books

1. **Anil Maheshwari**, *Data Analytics Made Accessible*, 2nd Edition, Amazon Digital Services, 2023.
2. **Sinan Ozdemir**, *Principles of Data Science*, Packt Publishing Ltd, 2016.
3. **Steven S. Skiena**, *The Data Science Design Manual*, Springer, 2017.

Reference Books

1. **Lillian Pierson**, *Data Science for Dummies*, John Wiley & Sons, 2021.
2. **Joel Grus**, *Data Science from Scratch: First Principles with Python*, O'Reilly Media, 2019.
3. **Avrim Blum, John Hopcroft, and Ravindran Kannan**, *Foundations of Data Science*, Cambridge University Press, 2020.
4. **Hadrien Jean C.**, *Data Science*, Certybox Education, 2023.

PROFESSIONAL COMPETENCY SKILL (Course Code: 26UAIS61)

SEMESTER - VI SEC-8 HOURS – 2 CREDITS – 2 TOTAL HOURS: 30

COURSE OUTCOMES:

CO1: To use appropriate words in a professional context

CO2: To gain understanding of basic grammatical structures and use them in right context

CO3: To devise solutions to problems using multi-step arguments, based on and supported by quantitative information.

CO4: Write effective project reports.

CO5: Express and interpret solutions, and/or arguments using verbal, numerical, graphical methods

CO6: Solve any technical problem using algorithmic, computational or symbolic techniques.

UNIT I

(6 HOURS)

English competency - Sentence Correction – Prepositions - Grammar - Reading Comprehension - Synonyms & Antonym - Idioms and Phrases - Speech and Tenses – Article - Sentence Selection - Spotting Error - Sentence Arrangement - Rearranging phrases into sentences – Error identification – Tenses – Adjectives – Adverbs - Articles – Clauses – Speech patterns - Telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself.

UNIT II

(6 HOURS)

Quantitative Aptitude - Numbers – Percentage – Profit and Loss – Average – Ratio and Proportion – Mixture and Alligations – Time and Work – Time speed distance – Probability – Permutation and Combination – Age.

UNIT III

(6 HOURS)

Logical Reasoning - Coding pattern and Number series - Data Sufficiency,- Logical Word Sequence – Puzzles - Logical word sequence, Data sufficiency - Blood Relation.

UNIT IV

(6 HOURS)

Effective Project Report Writing - Structure of the Project Report: (Part 1) Framing a Title – Content – Acknowledgement — Literature Review, Research Design, Methods of Data Collection - Tools and Procedures - Data Analysis - Interpretation - Findings –Limitations - Recommendations – Conclusion – Bibliography.

UNIT V

(6 HOURS)

Programming logic - Data Types - Pointers - Functions & Scope - Recursion & Iteration - File Handling - Arrays - Variables & Registers - Loops - Input Output - OOPs - Stacks And Queues - Linked Lists - Trees – Graphs - Dynamic Programming – Hashing - Time Complexity - Searching & Sorting.

TEXT BOOKS

- 1 English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 edition)
- 2 Darla-Jean Weatherford - Technical Writing for Engineering Professionals (2016) Penwell Publishers
- 3 R.S. Aggarwal, A Modern Approach To Verbal & Non Verbal Reasoning, S. Chand Publishers.
- 4 Dr. R. S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S. Chand Publishers, 2017.
- 5 Dr. Alok Kumar, MCQs on Computer, Upkar Prakashan. Arshad Iqbal, Computer Fundamentals MCQs, Independently published, 2017.

ADD-ON COURSES
OFFICE AUTOMATION
(Course Code: 26UAIA01)

SEMESTER - I

CREDITS – 2

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Define basic functions and new formatting features in Word 2010.(K1)

CO2: Describe the Header and Footer content and update page numbers and dates.(K2)

CO3: Examine the various features of Word. (K3)

CO4: Analyze the formatting techniques.(K4)

CO5: Evaluate the process of adding pictures, wordart and animations.(K5)

CO6: Design various tables and lists. (K6)

UNIT I INTRODUCTION

Create and Manage Documents - Open a PDF in Word for editing - Insert text from a file or external source - Navigate Through a Document - Insert hyperlinks - Search for text - Create bookmarks - Move to a specific location or object in a document - Format a Document – Spell check.

UNIT II PAGE SETUP

Modify page setup - Apply document themes - Apply document style sets - Insert headers and footers - Insert page numbers - Format page background elements - Customize Options and Views for Documents - Change document views – Bullets & Numbering.

UNIT III FORMATTING TEXT

Format Text, Paragraphs, and Sections - Insert Text and Paragraphs - Find and replace text - Cut, copy and paste text - Set line and paragraph spacing and indentation - Clear formatting – Headers & Footers - Apply built-in styles to text.

UNIT IV FORMATTING PAGE

Change text to WordArt - Order and Group Text and Paragraphs - Format text in multiple columns - Change page setup options for a section - Create Tables and Lists - Apply table styles - Modify a Table - Sort table data - Configure cell margins and spacing - Merge and split cells - Split tables

UNIT V FORMAT GRAPHIC ELEMENTS

Insert Images and table captions – Charts & Cliparts- Create and Manage Simple References Insert shapes - Insert pictures- Format Graphic Elements - Apply artistic effects - Remove picture backgrounds -Format objects - Apply a picture style

TEXT BOOK

Tom Bunzel, “[Easy Microsoft Office 2010](#)”, Que Publishing, First Edition, 2010.

REFERENCE BOOKS

Gary B. Shelly, Misty E. Vermaat, “Microsoft Office 2010: Introductory”, Cengage Learning, First Edition 2012.

WEB RESOURCES

1. <https://www.javatpoint.com/ms-word-tutorial>
2. <https://www.tutorialspoint.com/word/index.html>

COURSE OUTCOMES:

At the end of the course the students will be able to

CO1: Recall the MS Excel interface, financial functions **(K1)**

CO2: Describe MS Excel features like Scenario Manager, Solver **(K2)**

CO3: Use Scenario Manager for Sensitivity Analysis **(K3)**

CO4: Integrate Charts, Pivot tables for data analysis **(K4)**

UNIT I: FORMATTING WORKSHEETS AND DATA

The Excel Interface - Workbook and Worksheets - Cell and Range Selection - Filling Cell - Finding/Replacing Data - Sorting Data - Naming cells and Ranges. Formatting Worksheets - Fitting Text within a Cell - Conditional Formatting - Adding cell Backgrounds and Borders - Removing, Replacing and Reusing Formats.

UNIT II: VISUALIZATION USING CHARTS

Cell References - Formula Essentials - Creating Formulas - Editing Formulas. Working with Tables: Creating a Table — Formatting a Table — Creating Calculated Columns — Adding a Total Row— Sorting and Filtering. Creating Charts.

UNIT III: VISUALIZATION USING LOOKUP FUNCTIONS

Lookup Functions: LOOKUP - HLOOKUP - VLOOKUP - CHOOSE - MATCH - INDIRECT.— chart preparation.- Trace Dependents, Error Checking, Analyzing Data with Pivot Tables.

UNIT IV: VISUALIZATION USING SLICERS AND FILTERS

Data Validation, Custom Input Messages and error Messages, circle Invalid Data, Remove Validation. Slicers in a Table. Filters- Adding Filter, Date and Text Filters. Advanced Filter.

UNIT V: OTHER FEATURES OF EXCEL:

Goal Seek Command — Scenario Manager — Optimization with Excel Solver - Consolidating Data — Creating Subtotals- Floodfill.

TEXT BOOKS:

1. Michael Alexander, Richard Kusleika, John Walkenbach, 'Excel 2019 Bible', Wiley, 2018
2. Greg Harvey, 'Excel 2019 All-in-One for Dummies', John Wiley & Sons, 2018
3. Steve Schwartz, "Microsoft Office 2010", Dorling Kindersley (India) Pvt. Ltd, 2012.

REFERENCE BOOK(S)

1. Michael Price, 'Office 2010', Tata McGraw Hill Education Private Limited, 2011

GOOGLE OFFICE TOOLS (Course Code - 26UAIAO3)

SEMESTER - I	CREDITS – 2
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COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1 : Utilize Google Docs for Document Creation and Collaboration **(K3)**

CO2 : Collaborate in real-time with others by sharing documents and making suggestions**(K2)**

CO3 : Organize, format, analyze data and apply key mathematical operations and functions**(K3)**

CO4 : Create and Present Interactive Presentations Using Google Slides**(K4)**

CO5 : Design and Build Websites Using Google Sites**(K5)**

CO6 : Efficiently Manage Cloud-Based Files Using Google Drive**(K5)**

UNIT I : CLOUD-BASED DOCUMENT PROCESSING

Google Docs - Creating new Google Docs documents - formatting text with fonts, styles, and colors - Adding images, tables, and other elements to documents - page layout, margins, and orientation - Sharing, real time collaboration, tracking & revisions - Comments, Suggestions - Extensions and add-ons

UNIT II : DATA COLLECTION ANALYSIS

(6 HOURS)

Google Sheet and Google Form - Organizing and Formatting Data in Google Sheet - mathematical operations - analyzing data using sorting - filtering, and pivot tables - charts and graphs - Designing and creating surveys with Google Forms - question formats- Quizzes – sections - reviewing and analyzing form responses - Linking Google Forms to Google Sheets - Extensions and Add-ons

UNIT III : PRESENTATION USING GOOGLE SLIDES

(6 HOURS)

Google slide layouts - Insert images, videos, and audio into slides - Slide transitions - Embedding Google Docs, Sheets, and Forms into presentations.

UNIT IV : CREATING WEBSITES WITH GOOGLE SITES

(6 HOURS)

Setting up and configuring Google Sites - Site layouts, creating pages, and organizing content. - Inserting text, images, videos, and other multimedia elements. - Site theme, logo, favicon - Site Publishing - access permissions.

UNIT IV : CLOUD-BASED FILE MANAGEMENT

(6 HOURS)

Google Drive - Overview of the Google Drive interface - Uploading and downloading files and folders - Sharing files with individuals or groups- setting different permission levels- collaboration - Managing file versions and revisions.

SKILL BASED ACTIVITIES:

1. **Hands-On Activity:** Working in groups to collaboratively edit a Google Doc, using features like comments, suggestions, and real-time editing.
2. **Creative Activity:** Creating a Google Slides presentation on a given topic, incorporating visuals, transitions, and speaker notes.
3. **Data Collection Activity:** Designing a Google Form to collect data, analyzing the responses, and presenting the results using Google Sheets.
4. **Problem-Solving Activity:** Formatting a poorly structured Google Doc using headings, bullet points, tables, and styles to improve readability and organization.
5. **Analytical Activity:** Importing a dataset into Google Sheets and creating charts to visualize and interpret the data.

TEXTBOOK

1. Ryan Teeter and Karl Barksdale "Google Workspace for Dummies" Wiley Publishing 2008.

REFERENCE BOOKS

2. La Counte, S. *Mastering Google Workspace: The complete guide to Google's cloud-based productivity suite*. Independently published (2020).

WEB REFERENCES

- https://workspace.google.com/intl/en_in/training/

VALUE ADDED COURSES

CYBERSECURITY

(Course Code: 26UAIVA1)

SEMESTER - II	CREDITS – 2
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COURSEOUTCOMES:

After successful completion of the course, students will be able to:

CO1: Understand the basic concepts and importance of Cyber Security.

CO2: Explain the fundamentals of computer networks and their security issues.

CO3: Identify common cyber threats, attacks, and vulnerabilities.

CO4: Understand cryptography techniques and basic security tools.

CO5: Understand cyber security practices, cyber laws, and safe internet usage.

UNIT – 1 Introduction to Cyber Security

Basics of Cyber Security – Importance of Cyber Security – Cyber threats and cyber attacks – Types of cyber crimes – Security principles: Confidentiality, Integrity and Availability (CIA Triad) – Cyber security domains – Overview of cyber security careers.

UNIT – 2 Computer and Network Fundamentals

Basics of computer networks – Internet architecture – OSI Model – TCP/IP Model – IP Address and MAC Address – Network devices such as Router, Switch, Firewall – Data communication over the Internet – Network vulnerabilities and security risks.

UNIT – 3 Cyber Threats and Attacks

Malware: Virus, Worm, Trojan Horse – Phishing attacks – Ransomware attacks – Password attacks – Social engineering – Denial of Service (DoS) attacks – Basic prevention techniques.

UNIT – 4 Cryptography and Security Tools

Introduction to Cryptography – Encryption and Decryption – Symmetric Encryption – Asymmetric Encryption – Hash Functions – Digital Signatures – Introduction to cyber security tools such as **Wireshark** for network analysis, **Nmap** for network scanning, and **Kali Linux** for ethical hacking demonstrations.

UNIT – 5 Cyber Security Practices and Cyber Laws

Password security and authentication – Secure internet browsing – Mobile and social media security – Introduction to IoT security – Cyber laws in India – Overview of Information Technology Act 2000 – Digital privacy and ethical issues in cyber security.

TEXT BOOKS

1. Cyber Security Essentials – Charles J. Brooks, Christopher Grow, Philip Craig and Donald Short, Cisco Press.
2. Network Security Essentials: Applications and Standards – William Stallings, Pearson Education.

REFERENCE BOOKS

1. Cryptography and Network Security: Principles and Practice – William Stallings, Pearson Education.
2. Cybersecurity and Cyberwar: What Everyone Needs to Know – Oxford University Press.
3. Introduction to Cyber Security – The Open University.

BIG DATA ANALYTICS (Course Code: 26UAIVA2)

SEMESTER – II	CREDITS – 2
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CO1: Understand the classification of digital data and the basic concepts of Big Data. **(K2)**

CO2: Explain the differences between traditional business intelligence and Big Data analytics **(K2)**

CO3: Understand the architecture of Hadoop and the working of HDFS and MapReduce. **(K2)**

CO4: Analyze the MapReduce job execution process and task execution. **(K4)**

CO5: Compare RDBMS and Hadoop ecosystem components. **(K3)**

CO6: Apply Hive concepts and Hive Query Language to perform data **(K3)**

UNIT I

Classification of Digital Data, Structured and Unstructured Data - Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Why Big Data -

UNIT II

Traditional Business Intelligence versus Big Data- Data Warehouse and Hadoop Environment - Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments.

UNIT III

A Brief History of Hadoop- The Hadoop Distributed Filesystem- Processing Data with Hadoop - Anatomy of a MapReduce Works - Anatomy of a MapReduce Job Run- Job Scheduling- Shuffle and Sort- Task Execution.

UNIT IV

Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem.

UNIT V

Hive: Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements – Partitions – Bucketing – Views - Sub- Query – Joins – Aggregations - Group by and Having - RCFile Implementation - Hive User Defined Function - Serialization and Deserialization.

TEXT BOOK:

1. Seema Acharya, Subhashini Chellappan, Big Data and Analytics, Wiley, First Edition, 2015.
2. Tom White, Hadoop: The Definitive Guide, O'Reilly Media Inc., 2015.

REFERENCE BOOKS:

1. Lublinsky, Boris, Kevin T. Smith, and Alexey Yakubovich. Professional hadoop solutions. John Wiley & Sons, 2013.
2. RadhaShankarmani, M Vijayalakshmi, Big Data Analytics, 2nd Edition, 2017, Wiley

ETHICAL HACKING
(Course Code: 26UAIVA3)

SEMESTER - II	CREDITS – 2	TOTAL HOURS: 30
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Course Outcomes

At the end of the course the students must be able to

CO1: After studied unit-1, the student will be able to understand the concepts of hacking

CO2: After studied unit-2, the student will be able to understand the concepts of scanning and enumeration

CO3: After studied unit-3, the student will be able to understand the concepts of hacking

CO4: After studied unit-4, the student will be able to understand the concepts of security.

CO5: After studied unit-5, the student will be able to understand the concepts of testing and its tools.

Unit-1: INTRODUCTION TO HACKING

Importance of Security-Elements of Security-Phases of an Attack-Types of Hacker Attacks- Hacktivism-Vulnerability Research-Introduction to Footprinting-Information Gathering Methodology-Footprinting Tools-WHO IS Tools-DNS Information Tools-Locating the Network Range-Meta Search Engines.

Unit-2: SCANNING AND ENUMERATION

Introduction to Scanning-Objectives-Scanning Methodology-Tools-Introduction to Enumeration – Enumeration Techniques –Enumeration Procedures-Tools

Unit-3: SYSTEM HACKING

Introduction-Cracking Passwords-Password Cracking Websites-Password Guessing-Password Cracking Tools-Password Cracking Counter measures-Escalating Privileges-Executing Applications-Keyloggers and Spyware.

Unit-4: PROGRAMMING FOR SECURITY PROFESSIONALS

Programming Fundamentals- C Language-HTML-PERL-Windows OS Vulnerabilities-Tools for Identifying Vulnerabilities-Counter measures-Linux OS Vulnerabilities –Tools for Identifying Vulnerabilities-Counter measures.

Unit-5: PENETRATION TESTING

(6 HOURS)

Introduction-Security Assessments-Types of Penetration Testing-Phases of Penetration Testing- Tools-Choosing Different Types of Pen-Test Tools-Penetration Testing Tools.

Textbooks:

1. “ EC-Council, “Ethical Hacking and Countermeasures:Attack Phases”, Cengage Learning,2010
2. Jon Erikson,”Hacking, 2nd Edition:The Art of Exploitation”, No starch Press Inc, 2008
3. Michael T.Simpson, Kent Backman, James E.Corley, “Hands-On Ethical Hacking andNetwork Defense”, Cengage Learning, 2013.

Reference Books:

1. Patrick Engebretson,”The Basics of Hacking and Penetration Testing-Ethical Hackingand Penetration Testing Made Easy”, Second Edition, Elsevier, 2013.
2. Rafay Boloch,”Ethical Hacking and Penetration Testing Guide”, CRC Press, 2014

EXTRA CREDIT COURSES
BASICS OF PYTHON PROGRAMMING
(Course Code: 26UAIEC1)

SEMESTER - I

CREDITS – 2

COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Demonstrate proficiency in handling loops and creation of functions. **(K1)**

CO2: Identify the methods to create and manipulate lists, tuples and dictionaries. **(K3)**

CO3: Develop programs for string processing and file organization. **(K4)**

CO4: Interpret the concepts of Object-Oriented Programming as used in Python. **(K5)**

UNIT I PYTHON BASICS

Introduction – writing a simple program – reading input from the console- Identifiers – Variables, Assignment Statements and Expressions. – Named Constants – Data types and operators – Operator precedence – Type Conversions. Common Python Functions – Strings.

UNIT II SELECTIONS, LOOPS and FUNCTIONS

Boolean Types, Values and Expressions - Generating Random Numbers – If statements – If-else – Nested If – If-else-if Statements. Loops- While loop – For Loop – Nested Loops – Minimizing Numerical Errors – Keywords Break and Continue. Defining a Function – Calling a Function – Functions with/without Return Values.

UNIT III LISTS

List Basics – Copying Lists- Passing Lists to functions – Returning List from a Function – Searching Lists – Sorting Lists.

UNIT IV OBJECTS AND CLASSES

Defining classes for objects – immutable and mutable objects – hiding data fields – Class Abstraction and Encapsulation – Super classes and Subclasses – Overriding Methods.

UNIT V FILES, EXCEPTION HANDLING

Text input and Output – File Dialogs - Retrieving Data from Web- Counting Each letter in a file – Exception Handling – Raising Exceptions- processing Exceptions using Exception Objects –

SKILL BASED ACTIVITIES:

1. **Problem-Solving Activity:** Writing a Python program for simple Banking system.
2. **Creative Activity:** Writing Python programs using loops to print patterns like pyramids, triangles, or number sequences.
3. **Error Management Activity:** Writing a Python program that handles exceptions, such as dividing by zero or accessing an invalid array index.
4. **Brain Storm Activity:** Brainstorming and listing real-world applications of Python and discussing why Python is suitable for AI applications.

TEXT BOOK

1. Introduction to Programming Using Python by Y. Daniel Liang (z-lib.org) Pearson Publications, 2017.

REFERENCE BOOKS:

1. “Python Crash Course” by Eric Matthes, No Starch Press ,2019 (2nd Edition)
2. Automate the Boring Stuff with Python , **Al Sweigart, No Starch Press, 2019 (2nd Edition)**
3. Think Python: How to Think Like a Computer Scientist , **Allen B. Downey, O’Reilly Media / Green Tea Press, 2015 (2nd Edition)**

WEB RESOURCES

- <https://www.w3schools.com/python/>
- <https://www.programiz.com/python-programming>
- <https://www.geeksforgeeks.org/python-programming-language/>
- <https://realpython.com/>
- <https://www.coursera.org/specializations/python>
- <https://www.edx.org/course/introduction-to-computer-science-and-programming-7>

FUNDAMENTALS OF AI (Course Code: 26UAIEC2)

SEMESTER - II	CREDITS – 2
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COURSE OUTCOMES:

On successful completion of the course, the learners will be able to

CO1: Understand the Fundamentals of AI and Intelligent Agents(K1)

CO2: Explain Problem Solving Methods and Search Algorithms (K2)

CO3: Distinguish Knowledge Representation and Logic-Based AI (K3)

CO4: Develop and Communicate with Software Agents. (K4)

CO5: Explore Real-World Applications of AI. (K4)

CO6: Implement AI-Based Solutions in Robotics and Perception. (K5)

UNIT I INTRODUCTION

Introduction – The History of Artificial Intelligence - The Foundations of Artificial Intelligence – Intelligent Agents: Agents and Environments – Characteristics of Intelligent Agents.

UNIT II SEARCHING

Problem solving agents – Well defined problems and solutions – Searching for Solutions - Uninformed Search Strategies - Informed (Heuristic) Search Strategies

UNIT III LOGICAL AGENTS

Logical Agents: Knowledge-Based Agents - The Wumpus World - Logic - Propositional Logic: A Very Simple Logic - Propositional Theorem Proving - Agents Based on Propositional Logic.

UNIT IV LEARNING

Learning: Learning from Examples – Forms of Learning - Supervised Learning – Un Supervised Learning - Regression and Classification with Linear Models .

UNIT V REINFORCEMENT LEARNING

Reinforcement Learning: Introduction - Passive Reinforcement Learning – Active Reinforcement Learning - Generalization in Reinforcement Learning - Applications of Reinforcement Learning.

SKILL-BASED ACTIVITIES:

1. **Hands-On Activity:** Using a platform like Teachable Machine to create and train a basic image classification model.

2. **Creative Writing:** Using an AI tool like ChatGPT to generate a story or poem, then rewriting it in their own words and discussing AI's role in creativity.
3. **Research:** Researching and presenting an AI tool, explaining its functionality and realworld applications.
4. **Brainstorming:** Brainstorming and proposing AI solutions to address global challenges, such as climate change, healthcare, or education.
5. **Group Discussion:** Discussing how bias can occur in AI systems and proposing ways to mitigate it.

TEXT BOOKS:

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.
2. Artificial Intelligence: A Modern Approach, 4th Edition, Stuart Russell, peter Norvig University of California at Berkeley, Pearson education, 2020.

REFERENCE BOOKS:

1. M. Tim Jones, —Artificial Intelligence: A Systems Approach (Computer Science), Jones and Bartlett Publishers, Inc. First Edition, 2008
2. Nils J. Nilsson, —The Quest for Artificial Intelligence, Cambridge University Press, 2009.
3. William F. Clocksin and Christopher S. Mellish, Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.
4. Gerhard Weiss, —Multi Agent Systems, Second Edition, MIT Press, 2013.
5. David L. Poole and Alan K. Mackworth, — Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

USER INTERFACE DESIGN (UI/UX)

(Course Code: 26UAIEC3)

SEMESTER - III	CREDITS – 2
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Outcomes:

At the end of the course the students must be able to

CO1 - Explain design thinking concept. (K5)

CO2 - Interpret user requirements. (K6)

CO3 - Select appropriate visual design for given problem. (K4)

CO4 - Create interactions using design tool. (K6)

CO5 - Create innovative design prototype for given applications.(K6)

UNIT 1: INTRODUCTION

Introduction to Design thinking – Concept, Purpose, 5 stages of design thinking – Empathize, Define, Ideate, Prototype, Test 1.2 Introduction to User Interface / User Experience (UI/UX) – Definition of Design with respect to digital media, User Interface, User experience, Difference between UI and UX.

UNIT 2: FIGJAM

Introduction to research and analysis tool (freeware) such as FigJam. User requirements – Definition, Types of user research - Qualitative research, Quantitative research. Tools to collect user requirements – personal observation, interviews, questionnaire, User/ Expert reviews.

UNIT 3: UI DESIGN

Storyboarding, User journey mapping. Gestalt principles of design - Aesthetics in UI design - Using Light, Color and Contrast Effectively in UI Design. Introduction to any freeware design tool such as Figma. - Effective visual communication for graphical user interface.

UNIT 4: UX DESIGN

Introduction to User Experience design. UX design open-source tool such as - Figma features – Navigations, interactions, Buttons Creating library. Gamification, micro-animation.

UNIT 5: WIREFRAMING

Introduction to Wireframing - Purpose of wireframing, Types – low fidelity, medium fidelity, high fidelity. Basics of sketching, Creating low fidelity wireframes, medium fidelity and high fidelity in Figma.

TEXTBOOK

1. Jesse James Garrett,” The Elements of User Experience: User-Centered Design for the Web and Beyond New Riders Publishing, ISBN:978-0-321-68368-7 2
2. Falk Uebernickel, Li Jiang, Walter Brenner, Britta Pukall, Therese Naef, “Design Thinking: The Handbook”, World Scientific Publishing Co Pte Ltd, No.16, South West Boag Road T. Nagar, Chennai 600017, INDIA ISBN-10: 9811203504

WEBSITES

1. https://aim.gov.in/pdf/Design_Thinking.pdf.
2. <https://www.figma.com/resource-library/what-is-design-thinki>
3. <https://www.figma.com/resource-library/design-basics/>

BRAIN COMPUTER INTERFACE (Course Code: 26UAIEC4)

SEMESTER – IV

CREDITS – 2

COURSE OUTCOMES

On successful completion of the course, the learners will be able to:

CO1: Understand the fundamentals of brain signals and the principles of Brain–Computer Interface systems. (K1)

CO2: Explain different methods for acquiring and processing brain signals such as EEG and other neuroimaging techniques. (K2)

CO3: Apply signal processing and machine learning techniques for analyzing brain signals. (K3)

CO4: Design basic BCI systems for communication, control and rehabilitation applications. (K4)

CO5: Develop intelligent BCI applications integrating AI techniques for real-world systems. (K5)

UNIT I INTRODUCTION TO BRAIN–COMPUTER INTERFACE

Introduction – Overview of Brain–Computer Interface systems – History and evolution of BCI technology – Human brain structure and neural communication – Neurons and brain signals – Components of a typical BCI system – Applications of BCI in healthcare, robotics, gaming and assistive technologies.

UNIT II BRAIN SIGNAL ACQUISITION METHODS

Brain signal acquisition techniques – Electroencephalography (EEG) – Electrocorticography (ECoG) – Functional Magnetic Resonance Imaging (fMRI) – Magnetoencephalography (MEG) – Near-Infrared Spectroscopy (NIRS) – Hardware used in BCI systems

UNIT III FEATURE EXTRACTION

Preprocessing of EEG signals – Filtering techniques – Artifact removal Signal segmentation and normalization - Feature extraction methods – Power spectral density – Event-related potentials (ERP) – Feature selection methods for brain signal classification.

UNIT IV MACHINE LEARNING FOR BCI SYSTEMS

Introduction to machine learning for brain signal analysis – Classification techniques for BCI – Support Vector Machines – Decision Trees – Random Forest – Neural Networks – Deep learning approaches for EEG signal processing – Convolutional neural networks for EEG classification .

UNIT V BCI APPLICATIONS AND FUTURE TECHNOLOGIES

Applications of Brain–Computer Interface systems –Brain-controlled robots and wheelchairs – Neurogaming and virtual reality systems – BCI in healthcare and rehabilitation –Emerging trends in BCI research – Integration of BCI with Artificial Intelligence, robotics and Internet of Things.

SKILL BASED ACTIVITIES

1. Understanding EEG devices and brain signal acquisition systems.
2. Recording and visualizing sample EEG signals.
3. Processing brain signals using signal filtering techniques.
4. Implementing machine learning models for EEG signal classification.
5. Developing a simple brain-controlled application simulation.

TEXT BOOK

Rajesh P. N. Rao, **Brain–Computer Interfacing: An Introduction**, Cambridge University Press, 2013.

REFERENCE BOOKS

1. Jonathan Wolpaw and Elizabeth Winter Wolpaw, **Brain–Computer Interfaces: Principles and Practice**, Oxford University Press, 2012.
2. Christoph Guger, Brendan Allison and Gert Pfurtscheller, **Brain–Computer Interface Research**, Springer, 2014.
3. Niels Birbaumer and Ujwal Chaudhary, **Brain–Computer Interfaces for Communication and Rehabilitation**, Springer, 2016.

WEB RESOURCES

<https://www.bci2000.org>
<https://openbci.com>
<https://www.bbci.de>

HEALTHCARE ANALYTICS (Course Code: 26UAIEC5)

SEMESTER – V	CREDITS – 2
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COURSE OUTCOMES:

CO1: Understand the basics of data analytics platforms (**K2**)

CO2: Apply analytical methodologies and fact-based management (**K3**)

CO3: Analyze data using data mining concepts, Excel, SQL (**K4**)

CO4: Use statistical reporting tools and software such as Excel, R, STATA, PSPP(**K3**)

CO5: Understand the fundamentals of healthcare analytics (**K2**)

CO6: Analyze healthcare data to support effective decision making (**K4**)

UNIT I

Introduction to Data Analytics Platform - Visualizing Data - Describing and Summarizing Data - Challenges of Conventional Systems - Intelligent Data Analysis. *Healthcare Recommendations.*

UNIT II

Analytic Methodologies or Techniques Used in Logical Analysis. Fact-Based Management to Drive Decisions and Actions - Tools - Analysis vs Reporting.

UNIT III

Data Mining - Importing Data into Excel - SQL Analysis of Variance and Experimental Design - Statistical Process Control

UNIT IV

Statistical Reporting - Foundations, Methods, Interpretations in Excel – R – STATA – PSPP – EVIEWS – Machine Learning.

UNIT V

Fundamental of Health care Analytics-Improve Decision Making-Analytics, Quality and Performance - Applications-Components-Working with data-Raw material and Analyzing data.

TEXT BOOKS

1. Prasad R N and Seema Acharya (2016). Fundamentals of Business Analytics, 2ed, Wiley
2. Trevor Strome, Health care Analytics for quality and Performance improvement, Wiley, 2013.

REFERENCE BOOKS

1. Gert H. N. Laursen, Jesper Thorlund (2018). Business Analytics for Managers, 2ed: Taking Business Intelligence Beyond Reporting, Wiley.
2. Reddy Chandan K, and Charu C. Aggarwal, eds, Healthcare Data Analytics.

COURSE OUTCOMES:

On completion of this course the student will be able to:

- CO1.** Understand with recommender systems and their applications (K2)
- CO2.** Analyse the different approaches towards recommendation (K3)
- CO3.** Evaluate the effectiveness of recommender system(K4)
- CO4.** Design recommender system (K5)

UNIT-I INTRODUCTION TO RECOMMENDATION SYSTEMS

What is Recommendation engine? Need for RECOMMENDATION systems, Framework of recommendation systems, Domain, Purpose, Context, Personalization, how will you target your users, Personalized vs. Non-Personalized, Semi/Segment - Personalized RECOMMENDATION Systems Function, Techniques.

UNIT-II COLLABORATIVE FILTERING

User-Based Algorithms, Item-based nearest neighbour recommendation: Similarity Function, ItemBased Algorithms, Further model-based and preprocessing-based approaches, Comparing UserBased and Item-Based recommendations, data drift and concept drift.

UNIT-III CONTENT-BASED FILTERING

Architecture of Content-based Systems, Advantages and Drawbacks of Content-based Filtering, Content representation and content similarity, Item profiles, discovering features of data, obtaining item features from tags, representing item profiles, Learning User Profiles and Filtering, Similaritybased retrieval.

UNIT-IV HYBRID RECOMMENDATION METHODS

Hybrid recommendation: collaborative vs content based recommendation, constraint-based recommendations, Case-based recommendations, Context-based Recommendations.

UNIT-V EVALUATING RECOMMENDATION SYSTEM

Accuracy Metrics Evaluation: RMSE versus MAE, Impact of the Long Tail, Evaluating Ranking via Correlation, Evaluating Ranking via Utility, Evaluating Ranking via Receiver Operating Characteristics.

TEXT BOOKS:

1. C.C. Aggarwal, —RECOMMENDATION Systems: The Textbook, Springer, 1st Edition, 2016.
2. Jannach D., Zanker M. and FelFering A., —RECOMMENDATION Systems: An Introduction, Cambridge University Press, 1st Edition, 2011.

REFERENCE BOOKS:

1. M.D. Ekstrand, J.T. Riedl, J.A. Konstan, —Collaborative filtering RECOMMENDATION systems, Now publishers, 1st Edition, 2011.
2. J. Leskovec, A. Rajaraman and J. Ullman, —Mining of massive datasets, Cambridge, 2nd Edition, 2012.
3. P. Pavan Kumar, S. Vairachilai, Sirisha Potluri, —RECOMMENDATION Systems: Algorithms and Applications, CRC Press, 1st Edition, 2021.

WEB REFERENCE:

- <https://realpython.com/build-recommendation-engine-collaborative-filtering>
<https://www.coursera.org/specializations/RECOMMENDATION-systems>

MOOC COURSES

1. Programming In Java (Swayam) - 12 weeks [Core T4]
2. Machine Learning (Swayam) – 8 Weeks [Elective EC-T4]
3. Recommender System (Swayam) – 8 weeks [Elective EC-T6]