





UNDER GRADUATE DEGREE PROGRAMME

B.C.A. Three Years

/

B.C.A. (Hons) Four Years

CURRICULUM & SYLLABUS

REGULATION 2026

Effective from the Academic Year

2026-2027

Department of Computer Applications
School of Computing Science



VELS
INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)
(Deemed to be University Estd. u/s 3 of the UGC Act, 1956)
PALLAVARAM, THALAMBUR, PERIYAPALAYAM, THIRUVANMIYUR - CHENNAI



VISION OF THE INSTITUTION
To make the Institute an epitome of excellence in higher education by effectively providing high quality education and rigorous training to students in multiple streams of choice with ample scope for all round development to make them excel in their profession for betterment of the society.

MISSION OF THE INSTITUTION	
M1	Effectively imparting knowledge and inculcating innovative thinking.
M2	Facilitating skill enhancement through add on courses and hands on training.
M3	Doing original, socially relevant, high quality research.
M4	Instilling the spirit of integrity, equity, professional ethics and social harmony.







DEPARTMENT OF COMPUTER APPLICATIONS

VISION OF THE DEPARTMENT
To produce globally competent graduates, skilled intellectual professionals in the field of Computer Science and Information Technology to meet the current challenges in the fast-growing IT industry.

MISSION OF THE DEPARTMENT	
M1	To impart transformative education in Computer Applications through a rigorous blend of theoretical foundations, practical exposure, and emerging technological advancements.
M2	To cultivate intellectual competence, analytical thinking, innovation, and problem-solving abilities that empower students to excel in the dynamic global IT ecosystem.
M3	To foster a culture of research, entrepreneurship, professional ethics, and lifelong learning for sustained academic and career excellence.
M4	To nurture socially responsible and value-driven professionals with leadership qualities, environmental consciousness, and a commitment toward national and global development.

PROGRAMME EDUCATIONAL OUTCOMES (PEO)	
PEO1	Graduates will demonstrate professional competence in computer applications by applying principles of computer science, programming, and software development in industry, higher education, and entrepreneurial ventures
PEO2	Graduates will exhibit ethical values, professional integrity, social responsibility, and awareness of legal, cyber , and environmental issues in computing practices.
PEO3	Graduates will develop innovative and entrepreneurial abilities to create technology-driven solutions, digital services, and software applications for real-world problems.
PEO4	Graduates will pursue lifelong learning and contribute to societal development through continuous adaptation to emerging technologies, sustainable practices, digital transformation, and community-oriented solutions.

PROGRAMME OUTCOMES (PO)	
PO1	**Computational Knowledge :** Apply knowledge in computing, mathematics, data science, cloud computing, and emerging technologies to solve real-world problems effectively.
PO2	**Problem Analysis :** Identify, analyze, and solve computing and data-driven problems using logical thinking and analytical skills to develop innovative solutions.
PO3	**Design and Development of Solutions:** Design, develop, test, and implement software systems,cloud-based applications, and data-driven solutions for industrial and societal needs.
PO4	**Modern Tool Usage :** Use modern computing tools, programming frameworks, cloud platforms, AI technologies, and data analytics tools for effective solution development.

PO5	**Research, Innovation, and Entrepreneurship:** Demonstrate creativity, innovation, research skills, and entrepreneurial abilities in developing technology-based solutions and products.
PO6	**Professionalism, Ethics, and Society :** Apply ethical values, cyber ethics, professional integrity, and social responsibility in computing practices and technology usage.
PO7	**Environment and Sustainability:** Understand the impact of computing technologies on society and environment and adopt sustainable and ethical computing practices.
PO8	**Communication, Leadership, and Teamwork :** Demonstrate effective communication, leadership, interpersonal, and teamwork skills in multidisciplinary and professional environments.
PO9	**Lifelong Learning :** Engage in continuous learning, professional development, and adaptability to emerging technologies and global industrial trends.

PROGRAMME SPECIFIC OUTCOMES (PSO)	
PSO1	Acquire expertise to apply knowledge discovery techniques, machine learning, big data analytics and edge computing concepts to develop sustainable and socially relevant software applications to solve real world computing and business challenges.
PSO2	Develop competence to design, and deploy efficient software systems by applying modern computing methodologies , programming framework , and agile practices to meet evolving industrial and societal requirements.

ABBREVIATIONS

PCC	Programme Core Courses
AEC	Ability Enhancement Courses
PEC	Professional Elective Courses
MDC	Multidisciplinary Courses
VAC	Value Added Courses
SEC	Skill Enhancement Courses
SI	Summer Internship
PRD	Project Report Dissertation







CURRICULUM STURUCTURE

B.C.A Three Years / B.C.A. (Hons) Four Years

Total number of Credits: 176

	B.C.A (Hons) Four Year - Minimum Credits to be earned :176 **B.C.A Three Year - Minimum Credits to be earned: 132**									
	SEMESTER 1									
			Hours/Week				**C**	**Maximum Marks**		
Category	**Code**	**Course**	**L**	**T**	**P**	**SL**		**CIA**	**SEE**	**Total**
AEC		Tamil I / Hindi I/ French I / Sign language I	3	0	0	3	3	40	60	100
AEC		English I	3	0	0	3	3	40	60	100
MDC		Mathematics - I	3	0	0	3	3	40	60	100
PCC		Problem Solving Techniques	3	0	0	3	3	40	60	100
PCC (Lab)		Problem Solving Techniques Lab	0	0	2	2	1	40	60	100
PCC		Computer Architecture	3	0	0	3	3	40	60	100
PCC (Lab)		Computer Architecture Lab	0	0	2	2	1	40	60	100
VAC		Indian Knowledge System	2	0	0	2	2	40	60	100
VAC		Environmental Science and Sustainability	2	0	0	2	2	40	60	100
			19	**0**	**4**	**23**	**21**	-	-	-

CIA - Continuous Internal Assessment SEE - Semester End Examination

L – Lecture, T- Tutorial, P- Practical, SL – Self – Learning , C - Credit

SEMESTER 2										
			Hours/Week				C	Maximum Marks		
Cat`egory	Code	Course	L	T	P	SL		CIA	SEE	Total
AEC		Tamil II / Hindi II/ French II / Sign language II	3	0	0	3	3	40	60	100
AEC		English II	3	0	0	3	3	40	60	100
MDC		Mathematics- II	3	0	0	3	3	40	60	100
PCC		Data Structures	3	0	0	3	3	40	60	100
PCC (Lab)		Data Structures Lab	0	0	2	2	1	40	60	100
PCC		Operating Systems	4	0	0	4	4	40	60	100
PCC		Object Oriented Programming using Java	3	0	0	3	3	40	60	100
PCC (Lab)		Object Oriented Programming using Java Lab	0	0	2	2	1	40	60	100
VAC		Universal Human Values	1	0	0	1	1	40	60	100
AEC		Communication skills	0	0	4	4	2	40	60	100
			20	0	8	28	24	-	-	-

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SEMESTER 3										
			Hours/Week				C	Maximum Marks		
Category	Code	Course	L	T	P	SL		CIA	SEE	Total
MDC		Probability and Statistics	3	0	0	3	3	40	60	100
PCC		Relational Data Base Management System	3	0	0	3	3	40	60	100
PCC (Lab)		Relational Data Base Management System Lab	0	0	4	4	2	40	60	100
PCC		Python Programming	3	0	0	3	3	40	60	100
PCC (Lab)		Python Programming Lab	0	0	2	2	1	40	60	100
PCC		Software Engineering	3	0	0	3	3	40	60	100
PEC		Basics of Data Analytics using Spreadsheet / Feature Engineering	3	0	0	3	3	40	60	100
VAC		Yoga/Sports/NCC/NSS/ Disaster Management	0	0	4	4	2	40	60	100
SEC		Professional Development – I	2	0	0	2	2	40	60	100
SEC		Global Certification	0	0	0	1	1	-	-	100
TOTAL			17	0	10	28	23	-	-	-

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SEMESTER 4										
			Hours/Week				C	Maximum Marks		
Category	Code	Course	L	T	P	SL		CIA	SEE	Total
SEC		Entrepreneurship and Start up Ecosystem	2	0	0	2	2	40	60	100
PCC		Computer Networks	3	0	0	3	3	40	60	100
PCC (Lab)		Computer Networks Lab	0	0	4	4	2	40	60	100
PCC		Design and Analysis of Algorithm	3	0	0	3	3	40	60	100
PCC		Artificial Intelligence	4	0	0	4	4	40	60	100
PCC (Lab)		Artificial Intelligence Lab	0	0	4	4	2	40	60	100
PEC		Data Visualization / Neural network	3	0	0	3	3	40	60	100
SEC		Design Thinking and Innovation	2	0	0	2	2	40	60	100
SEC		Professional Development – II	2	0	0	2	2	40	60	100
TOTAL			19	0	8	27	23	-	-	-

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SEMESTER 5										
			Hours/Week				C	Maximum Marks		
Category	Code	Course	L	T	P	SL		CIA	SEE	Total
PEC		Machine Language / Internet of Things	3	0	0	3	3	40	60	100
PEC (Lab)		Machine learning lab / Internet of Things lab	0	0	4	4	2	40	60	100
PEC		Digital Marketing / UI and UX design	3	0	0	3	3	40	60	100
PEC		Big data Analytics / Natural Language Processing	3	0	0	3	3	40	60	100
PEC (Lab)		Big data Analytics lab / Natural Language Processing lab	0	0	4	4	2	40	60	100
SEC		Quantitative Techniques	2	0	0	2	2	40	60	100
SI		Summer Internship -I / Capstone Project	0	0	8	8	4	40	60	100
PRD		Major Project [Evaluation in sixth semester]	-	-	-	0	0	-	-	-
SEC		Professional Development – III	2	0	0	2	2	40	60	100
TOTAL			13	0	16	29	21	-	-	-

CIA - Continuous Internal Assessment SEE - Semester End Examination

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SEMESTER 6										
			Hours/Week				C	Maximum Marks		
Category	Code	Course	L	T	P	SL		CIA	SEE	Total
PCC		Generative AI	4	0	0	4	4	40	60	100
PEC		Exploratory Data Analysis / Deep Learning for Computer Vision	4	0	0	4	4	40	60	100
PEC		Data Analysis using R / Web development using Angular JS and MongoDB	3	0	0	3	3	40	60	100
PEC (Lab)		Data Analysis using R lab / Web development using Angular JS and MongoDB lab	0	0	4	4	2	40	60	100
SEC		Professional Development – IV	2	0	0	2	2	40	60	100
PRD		Major Project [Initiated in Fifth Semester]	0	0	4	4	4	40	60	-
SEC		On Job Training/ Apprenticeship/Starts up	0	0	1	1	1	40	60	100
TOTAL			13	0	9	22	20	-	-	-

CIA - Continuous Internal Assessment SEE - Semester End Examination

L – Lecture, T- Tutorial, P- Practical, SL – Self – Learning , C - Credit

SEMESTER 7

Category	Code	Course	Hours/Week L	T	P	SL	C	Maximum Marks CIA	SEE	Total
MDC		Social Network Analysis	3	0	0	3	3	40	60	100
PCC		Optimization of ML	4	0	0	4	4	40	60	100
PCC (Lab)		Machine Language Lab	0	0	4	4	2	40	60	100
PEC		Edge Computing / Advanced Web Technologies	4	0	0	4	4	40	60	100
PEC (Lab)		Edge Computing Lab / Advanced Web Technologies Lab	0	0	4	4	2	40	60	100
PEC		Data Mining and Warehousing / Explainable AI	3	0	0	3	3	40	60	100
PRD		Dissertation work (evaluation in Eighth semester)	-	-	-	-	-	40	60	100
SI		Summer Internship II	0	0	8	4	4	40	60	-
TOTAL			14	0	16	26	22	-	-	-

CIA - Continuous Internal Assessment **SEE - Semester End Examination**

L – Lecture, T- Tutorial, P- Practical, SL – Self – Learning , C - Credit

SEMESTER 8										
			Hours/Week				C	Maximum Marks		
Category	Code	Course	L	T	P	SL		CIA	SEE	Total
PEC		Go programming / Serverless Database Techniques	4	0	0	4	4	40	60	100
PEC (Lab)		Go programming lab / Serverless Database Techniques lab	0	0	4	4	2	40	60	100
PEC		Deep learning / Full stack web development	4	0	0	4	4	40	60	100
PEC (Lab)		Deep learning lab / Full stack web development lab	0	0	4	4	2	40	60	100
PEC		Predictive Analysis / Robotic and Intelligent systems	2	0	0	2	2	40	60	100
PRD		Dissertation work (Started in seventh semester)	0	0	16	16	8	40	60	-
TOTAL			10	0	24	34	22	-	-	-

CIA - Continuous Internal Assessment SEE - Semester End Examination

L – Lecture, T- Tutorial, P- Practical, SL – Self – Learning , C - Credit

PROGRAMME CORE COURSES

Category	Code	Course	L	T	P	SL	C
PCC		Problem Solving Techniques	3	0	0	3	3
PCC (Lab)		Problem Solving Techniques Lab	0	0	2	2	1
PCC		Computer Architecture	3	0	0	3	3
PCC (Lab)		Computer Architecture Lab	0	0	2	2	1
PCC		Data Structures	4	0	0	4	3
PCC (Lab)		Data Structures Lab	0	0	2	2	1
PCC		Operating Systems	4	0	0	4	4
PCC		Object Oriented Programming using Java	3	0	0	3	3
PCC (Lab)		Object Oriented Programming using Java Lab	0	0	3	3	1
PCC		Relational Data Base Management System	3	0	0	3	3
PCC (Lab)		Practical V - Relational Data Base Management System Lab	0	0	4	4	2
PCC		Python Programming	3	0	0	3	3
PCC (Lab)		Practical VI - Python Programming Lab	0	0	2	2	1

PCC		Software Engineering	3	0	0	3	3
PCC	26CBCA41	Computer Networks	3	0	0	3	3
PCC (Lab)	26PBCA41	Computer Networks Lab	0	0	4	4	2
PCC		Design and Analysis of Algorithm	3	0	0	3	3
PCC		Artificial Intelligence	4	0	0	4	4
PCC (Lab)		Artificial Intelligence Lab	0	0	4	4	2
PCC		Generative AI	4	0	0	4	4
PCC		Optimization of ML	4	0	0	4	4
PCC (Lab)		Machine Language Lab	0	0	4	4	2

PROFESSIONAL ELECTIVE COURSES

Category	Code	Course	L	T	P	SL	C
PEC		Elective –I Basics of Data Analytics using Spreadsheet Elective –I Feature Engineering	3	0	0	3	3
PEC		Elective –II Data Visualization Elective –II Neural network	3	0	0	3	3
PEC		Elective –III Machine Language Elective –III Internet of Things	3	0	0	3	3
PEC (Lab)		Elective -III - Practical Machine learning lab Elective -III – Practical Internet of Things lab	0	0	4	4	2
		Elective –IV Digital Marketing	3	0	0	3	3

PEC		Elective –IV UI and UX design					
PEC		Elective –V Big data Analytics Elective –V Natural Language Processing	3	0	0	3	3
PEC(Lab)		Elective -V – Practical Big data Analytics lab Elective -V – Practical Natural Language Processing lab	0	0	4	4	2
PEC		Elective –VI Exploratory Data Analysis Elective –VI Deep Learning for Computer Vision	4	0	0	4	4
PEC		Elective –VII Data Analysis using R Elective –VII Web development using Angular JS and MongoDB	3	0	0	3	3
PEC(Lab)		Elective -VII Practical - Data Analysis using R lab Elective -VII Practical - Web development using Angular JS and MongoDB lab	0	0	4	4	2
PEC		Elective –VIII -Edge Computing Elective –VIII - Advanced Web Technologies	4	0	0	4	4
PEC (Lab)		Elective -VIII – Practical - Edge Computing Lab Elective -VIII – Practical - Advanced Web Technologies Lab	0	0	4	4	2
PEC		Elective –IX - Data Mining and Warehousing Elective –IX - Explainable AI	3	0	0	3	3
PEC		Elective –X - Go programming Elective –X - Serverless Database Techniques	4	0	0	4	4
PEC (Lab)		Elective -X – Practical - Go programming lab Elective -X – Practical - Serverless Database Techniques lab	0	0	4	4	2
PEC		Elective -XI - Deep learning Elective -XI - Full stack web development	4	0	0	4	4

PEC (Lab)		Elective -XI - Practical - Deep learning lab Elective -XI - Practical - Full stack web development lab)	0	0	4	4	2
PEC		Elective -XII - Predictive Analysis. Elective -XII Robotic and Intelligent systems	2	0	0	2	2

ABILITY ENHANCEMENT COURSES

Category	Code	Course	L	T	P	SL	C
AEC		Tamil-I / Hindi-I/ French-I	3	0	0	3	3
AEC		English-I	3	0	0	3	3
AEC		Tamil-II / Hindi-II / French-II	3	0	0	3	3
AEC		English-II	3	0	0	3	3
AEC		Communication Skills	0	0	4	4	2

VALUE ADDED COURSES

Category	Code	Course	L	T	P	SL	C
VAC		Indian Knowledge System	2	0	0	2	2
VAC		Environmental Science and Sustainability	2	0	0	2	2
VAC		Universal Human Values	1	0	0	1	1
VAC		Yoga/Sports/NCC/NSS/Disaster Management	0	0	4	4	2

MULTIDISCIPLINARY COURSES

Category	Code	Course	L	T	P	SL	C
MDC		Mathematics- I	3	0	0	3	3
MDC		Mathematicas - II	3	0	0	3	3
MDC		Probability and Statistics	3	0	0	3	3
MDC		Social Network Analysis	3	0	0	3	3

SKILL ENHANCEMENT COURSES

Category	Code	Course	L	T	P	SL	C
SEC		Professional Development – I	2	0	0	2	2
SEC		Global Certification	0	0	0	1	1
SEC		Entrepreneurship and Start up Ecosystem	2	0	0	2	2
SEC		Design Thinking and Innovation	2	0	0	2	2
SEC		Professional Development – II	2	0	0	2	2
SEC		Quantitative Techniques	2	0	0	2	2
SEC		Professional Development – III	2	0	0	2	2
SEC		Professional Development – IV	2	0	0	2	2
SEC		On Job Training/ Apprenticeship/Starts up	0	0	1	1	1

SUMMER INTERNSHIP

Category	Code	Course	L	T	P	SL	C
SI		Summer Internship - I	0	0	8	8	4
SI		Summer Internship- II	0	0	8	8	4

PROJECT REPORT DISSERTATION

Category	Code	Course	L	T	P	SL	C
PRD		Major Project [Initiated in Fifth Semester]	0	0	4	4	4
PRD		Dissertation work (Started in seventh semester)	0	0	16	16	8

CREDIT DISTRIBUTION

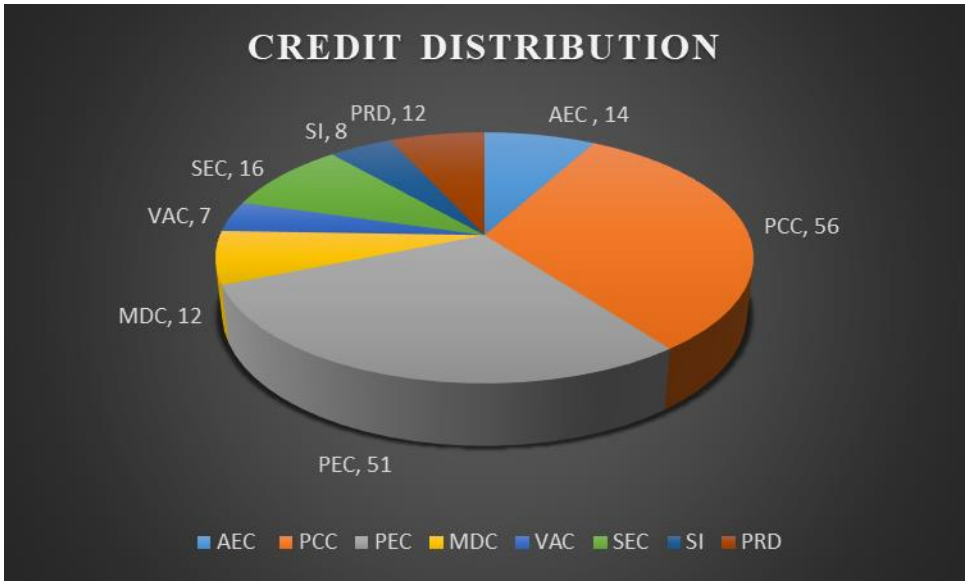
B.C.A. (Hons) / 4 Years

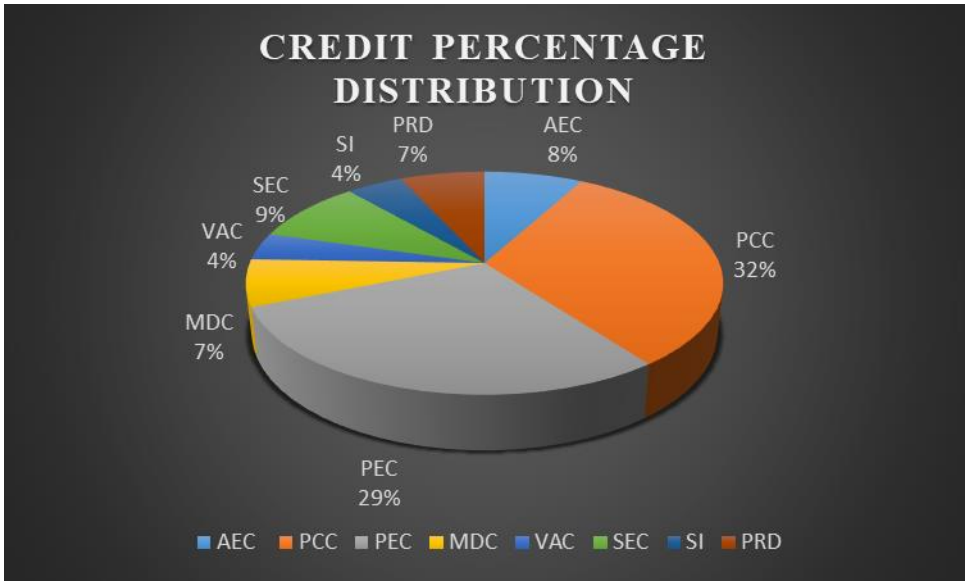
Minimum credits to be earned: 176

B.C.A / 3 Years

Minimum credits to be earned: 132

Component	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	3 Yrs. Total Credits	VII Sem	VIII Sem	4 Yrs Total Credits
AEC	6	8	-	-	-	-	**14**	-	-	**14**
PCC	8	12	12	14	-	4	**50**	6	-	**56**
PEC	-	-	3	3	13	9	**28**	9	14	**51**
MDC	3	3	3	-	-	-	**9**	3	-	**12**
VAC	4	1	2	-	-	-	**7**	-	-	**7**
SEC	-	-	3	6	4	3	**16**	-	-	**16**
SI	-	-	-	-	4	-	**4**	4	-	**8**
PRD	-	-	-	-	-	4	**4**	-	8	**12**
Total Credits	**21**	**24**	**23**	**23**	**21**	**20**	**132**	**22**	**22**	**176**


CREDIT DISTRIBUTION
PRD, 12
AEC , 14
SI, 8
SEC, 16
VAC, 7
PCC, 56
MDC, 12
PEC, 51
AEC PCC PEC MDC VAC SEC SI PRD


CREDIT PERCENTAGE DISTRIBUTION
PRD 7%
AEC 8%
SI 4%
SEC 9%
VAC 4%
PCC 32%
MDC 7%
PEC 29%
AEC PCC PEC MDC VAC SEC SI PRD

ABBREVIATIONS

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SI	Summer Internship
PRD	Project Report Dissertation

SEMESTER I

26LTAMI1	TAMIL-I	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

மாணவர்களின் தமிழ்மொழித் திறத்தை மேம்படுத்துதல், சங்க இலக்கிய நாட்டத்தை மேம்படுத்துதல், நீதி இலக்கியங்கள் வழி அறக் கருத்துகளை இன்றைய தலைமுறையினர் அறியச் செய்தல், இலக்கிய வடிவங்களான உரைநடை சிறுகதை ஆகியவற்றின் சமூக நிலை குறித்து அறியச் செய்தல், மாணவர்களுக்குத் தமிழைத் தவறின்றி எழுதுவதற்குத் தேவையான பயிற்சி அளித்து அவர்களின் மொழித்திறனை மேம்படுத்துதல், கலைச்சொற்கள் போன்ற தமிழ் மொழியின் வளர் நிலைகளை அறிமுகம் செய்தல் போன்றன இந்தப் பாடத்திட்டத்தின் முக்கிய நோக்கமாகும்.

UNIT I	அலகு- 1: தமிழ் மொழி வரலாறு	10 Hours

அலகு- 1: தமிழ் மொழி வரலாறு

மொழிக்குடும்பம் - இந்திய மொழிக்குடும்பங்கள் - இந்திய ஆட்சி மொழிகள் - திராவிட மொழிக்குடும்பங்கள் - திராவிட மொழிகளின் வகைகள் -திராவிட மொழிகளின் சிறப்புகள் - திராவிட மொழிகளின் வழங்கிடங்கள் - திராவிட மொழிகளுள் தமிழின் இடம் - தமிழ்மொழியின் சிறப்புகள் - தமிழ் பிறமொழித் தொடர்புகள்.

UNIT II	அலகு- 2: சங்க இலக்கியங்கள்	9 Hours

புறநானூறு- பாடல் எண்: 195 (பல்சான்றீரே) 192 (யாதும் ஊரே) 188 (படைப்பு பல) குறுந்தொகை- பாடல் எண்: 03 (நிலத்தினும்) 131 (ஆடமை புரையும்) 57(பூவிடைப்படினும்) 202 (நோம் என் நெஞ்சே) 167 (முளிதயிர்) நெடுநல்வாடை: பாடல் வரிகள் 45 முதல் 72 வரை

UNIT III	அலகு - 3 அற இலக்கியங்கள்	9 Hours

திருக்குறள் அறன் வலியுறுத்தல் (அறம்). நட்பாராய்தல் (பொருள்). குறிப்பறிதல்(இன்பம்).. மூன்று அதிகாரங்கள் (முழுமையும் நாலடியார் - பாடல் எண்: 139 (கல்லாரே ஆயினும்) 248 (நுண்ணிலைக்கான்) 216 (கடையாயர்) ஔவையார் - மூதுரை- பாடல் எண்- 10 (நெல்லுக்கு இறைத்தநீர்). - பாடல் எண்- 16 (அடக்கமுடையார்)

UNIT IV	அலகு - 4 உரைநடை	9 Hours

சிற்பியே உன்னைச் செதுக்குகிறேன் - வைரமுத்து - லட்சியம்,கல்வி, கலை, உறவு, மொழி,சாதனை ஆகிய தலைப்பிலான கட்டுரைகள்

சிறுகதை புதுமைப்பித்தன் - சாபவிமோசனம்
ஜெயகாந்தன் - ஒரு பிடி சோறு

UNIT V	அலகு 5 மொழித்திறன்	8 Hours

பிழை நீக்கி எழுதுதல் - ஒற்றுப்பிழை நீக்கி எழுதுதல் - தொடர்பிழை நீக்கி எழுதுதல் கலைச்சொல்லாக்கம் - தேவைகள் - கலைச்சொற்களின் பண்புகள் அறிவியல் கலைச்சொற்கள். கடிதம் - வகைகள் - அலுவலகக் கடிதங்கள் - பயிற்சி

Total: 45 Hours

Self-Learning: 45 Hours

பார்வை நூல்கள்

1. திராவிட மொழிகள் (இரண்டு தொகுதிகள்) டாக்டர் ச.அகத்தியலிங்கம் மணிவாசகர் பதிப்பகம் 2021
2. சங்க இலக்கிய உரை என் சி பி எச் சென்னை 2010
3. திருக்குறள் தெளிவுரை வரதராசன், மு., கழக வெளியீடு, 1994.
4. துவரின்றித் தமிழ் எழுத - மருதூர் அரங்கராசன், ஐந்திணைப் பதிப்பகம், 2003.
5. சிற்பியே உன்னை செதுக்குகிறேன் வைரமுத்து சூர்யா லிட்ரேச்சர் சென்னை 2011
6. **பாடநூல் தேடலுக்கான இணையம்** - https://archive.org/
7. https://tamildigitallibrary.in/Articles/

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Appreciate and interpret the aesthetic values and literary excellence embedded in Sangam literature.	K2
CO2	Analyze and apply the ethical and moral principles presented in classical Tamil literature to contemporary life situations.	K3
CO3	Examine the evolution, social relevance, and narrative techniques of Tamil prose, short stories, and related literary forms.	K4
CO4	Evaluate proficiency in Tamil language skills including listening, speaking, reading, and writing.	K5
CO5	Identify the historical development of the Tamil language and the formation of technical terminology in Tamil.	K1

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	2	-	-	-	-	-
CO2	-	-	-	-	-	3	2	-	2	-	-
CO3	-	-	-	-	-	2	2	2		-	-
CO4	-	-	-	-	-	-	-	3	2	-	-
CO5	-	-	-	-	-	-	-	-	2	-	-
Avg	-	-	-	-	-	2.3	2	2.5	2	-	-

	HINDI-I	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- To improve students' proficiency in the Hindi language, to increase their interest in prose literature,
- To make the present generation aware of moral values, social limits through various genre of Hindi prose
- To improve students' language proficiency by giving them the necessary training to write error-free correspondence, and to familiarize them with technical terminology and updated language technology.

UNIT I		9 Hours

इकाई/UNIT I : हिन्दी साहित्य का इतिहास - काल विभाजन - गद्य विकास -सामान्य परिचय, कहानी - लॉटेरी (मुंशी प्रेमचंद), भाव एक, भाषा अनेक (देश भक्ति और राष्ट्रीय एकता) - विभिन्न भारतीय संस्कृति एवं प्रदेशों के परिचय History of Hindi Literature – Periodization – Development of Prose – General Introduction, Short Story – "Lottery" (Munshi Premchand), "One Emotion, Many Languages" (Patriotism and National Integration) – Introduction to various Indian cultures and regions.

UNIT II		9 Hours

इकाई/UNIT II : एकाँकी - अखबारी विज्ञापन (चिरंजीत) - भाषा कौशल विकास -प्रयोजनमूलक हिन्दी - तकनीकी शब्द, पद एवं विभागीय नाम, प्रशासनिक वाक्यांश One-Act Play – "Newspaper Advertisement" (Chiranjit) – Development of Language Skills – Functional Hindi – Technical Terms, Designations and Departmental Names, Administrative Phrases

UNIT III		9 Hours

इकाई/UNIT III: हास्य व्यंग्य कहानी - तुम कब जाओगे, अतिथि (शरद जोशी) - प्रयोजनमूलक हिन्दी - पत्र लेखन - पत्रों के विभिन्न प्रकार - औपचारिक पत्र Humorous Satirical Story – "Tum Kab Jaoge, Atithi" (Sharad Joshi) – Functional Hindi – Letter Writing – Different Types of Letters – Formal Letters.

UNIT IV		9 Hours

इकाई/UNIT IV: राष्ट्र भक्ति कहानी - पुरस्कार (जयशंकर प्रसाद) – प्रयोजनमूलक हिन्दी - पत्र लेखन- पत्रों के विभिन्न प्रकार - अनौपचारिक पत्र Patriotic Story – "Puraskaar" (Jaishankar Prasad) – Functional Hindi – Letter Writing – Different Types of Letters – Informal Letters.		
UNIT V		**9 Hours**
इकाई/UNIT V : निबंध: भारतीय विज्ञान की कहानी (गुणाकार मुले) - विश्व के लिए भारत की देन, प्रयोजनमूलक हिन्दी - भाषा प्रौद्योगिकी – युनिकोड हिन्दी फ़ॉन्ट्स,इनस्क्रिप्ट कीबोर्ड - ई-पुस्तकालय – ई-शब्दकोश – ई-अध्ययन – व्यावहारिक उपयोग हेतु कृत्रिम बुद्धिमत्ता Essay: "The Story of Indian Science" (Gunakar Mule) – India's Contribution to the World – Functional Hindi – Language Technology – Unicode Hindi Fonts, Inscript Keyboard – e-Library – e-Dictionary – e-Learning – Artificial Intelligence for Practical Use		

Total: 45 Hours

Self-Learning: 45 Hours

संदर्भ ग्रन्थ/ Reference Books

1. Munshi Premchand: Mansarovar (Short Story Collection), Vol. 8 Hans Prakashan / Saraswati Press / Prabhat Prakashan (various editions available)

2. Vyavaharik Hindi, Publisher: Rajpal & Sons, New Delhi

3. One-Act Play Collection, Lokbharti Prakashan, Prayagraj

4. Prayojanmoolak Hindi, Dr. Naresh Mishra / Dr. Kailash Chandra Bhatia,Rajkamal Prakashan / Vani Prakashan

5. Sharad Joshi Vyangya Rachanavali, Vol. 1, Rajkamal Prakashan

6. Prasad Ki Shreshtha Kahaniyan, Lokbharti Prakashan

7. Vyavaharik Hindi Aur Patra Lekhan, Dr. Hardev Bahri, Kitab Mahal, Allahabad

8. Bharatiya Vigyan Ki Kahani – Gunakar Mule, Rajkamal Prakashan

9. Computer Aur Hindi Bhasha, Dr. Bholanath Tiwari, Vani Prakashan

10. Hindi Sahitya Ka Itihas, Ramchandra Shukla, Nagari Pracharini Sabha, Varanasi

11. Kendriya Hindi Sansthan, Banking Hindi Patyakram, 2012.

वेब लिंक्स/ Web Sources:

1. https://www.prabhatbooks.com

2. jhttps://vaniprakashan.com

3. https://www.rajkamalprakashan.com

4. https://home.unicode.org

5. https://home.unicode.org

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Develop interest in Hindi language & literature , various culture of India	K2
CO2	Learn moral values in a lighter way & proficient in functional hindi	K3
CO3	Know the awareness about the social limitations	K2
CO4	Identify the importance of patriotism	K1
CO5	Analyze and produce structured functional Hindi content using modern technology tools.	K4

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	**2**	-	-	**2**	-	-
CO2	-	-	-	-	-	**3**	-	**2**	**2**	-	-
CO3	-	-	-	-	-	**2**	-	-	-	-	-
CO4	-	-	-	-	-	**2**	-	-	-	-	-
CO5	-	-	-	-	-	-	-	**3**	**2**	-	-
Avg	-	-	-	-	-	**2.3**	-	**2.5**	**2**	-	-

	FRENCH–I	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- To greet, to express excuse and to introduce oneself
- To introduce another person
- To express his/her ideas, opinions and weekend projects
- To request someone to do something, polite manners
- To accept, refuse, enquire and indicate the time and date
- To express himself / herself in positive and negative manner

UNIT I	**Salut**	**6 Hours**
les nombres, Les jours de la semaine et du mois, La nationalité		
UNIT II	**Enchanté**	**8 Hours**
Les verbes Etre, Avoir, Aller, Regular ER verbes, Present tense.		
UNIT III	**J'Adore**	**8 Hours**
La negation, l'adjectif possessif, le futur proche		
UNIT IV	**Tu veux bien**	**10 Hours**
Les articles de finis/indéfinis, Les pronoms après une préposition (avec lui, chez moi), Le passé composé		
UNIT V	**On se voit quand**	**6 Hours**
Les pronoms compléments directs me, te, nous, vous, L'interrogation avec est-ce que, L'heure et la date.		
UNIT VI	**Bonne idée**	**7 Hours**
Les articles partitifs, Le masculin et le féminin des adjectifs, Les pronoms compléments directs le, la, les, La négation : ne… pas de.		

Total: 45 Hours

Self-Learning: 45 Hours

Text Books :

1. LATITUDES 1 (A1/A2) MÉTHODE DE FRANÇAIS - Régine Mérieux and Yves Loiseau

Reference Books:

1. SAISON A1 - MÉTHODE DE FRANÇAIS - Marie-Noëlle Cocton, Élodie Heu, Catherine Houssa, Émilie Kasazian

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Greet, excuse and introduce oneself in simple communication situations.	K2
CO2	Recall basic expressions used for introducing someone.	K1
CO3	Analyze and express ideas, opinions, and weekend activities in different contexts.	K4
CO4	Ask someone to do tasks in a polite and appropriate manner.	K3
CO5	Accept, refuse, enquire, and indicate time and date in everyday communication.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	**2**	-	**2**	-	-	-
CO2	-	-	-	-	-	-	-	**2**	-	-	-
CO3	-	-	-	-	-	-	-	**3**	**2**	-	-
CO4	-	-	-	-	-	**2**	-	**3**	-	-	-
CO5	-	-	-	-	-	-	-	**3**	-	-	-
Avg	-	-	-	-	-	**2**	-	**2.6**	**2**	-	-

	INDIAN SIGN LANGUAGE - I (BASIC)	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- Understand Deaf culture and why Indian Sign Language (ISL) is important for making sure everyone has equal rights and can participate in society.
- Learn the basics of everyday conversation so you can talk to hearing-impaired community using sign language.
- Learn how to sign about daily life, such as your routine, what you need, food, people, and how to describe things like Color, shape, and size.
- To bring ISL into everyday places like schools, jobs, and public services to make the world more inclusive.
- Stay motivated to keep practicing and improving your ISL skills so you can support and stand up for the hearing-impaired community.

UNIT I		**9 Hours**
The Basics: Alphabets (finger-spelling), numbers, weekdays, colors, and how to give wishes.		
UNIT II		**9 Hours**
People & Food: Months, food items, family members, and different types of behavior.		
UNIT III		**9 Hours**
Feelings & Festivals: Using expressions, plus signs for fruits, vegetables, and various festivals.		
UNIT IV		**9 Hours**
Home & Nature: Clothing and cosmetics, things on the earth or in the sky, parts of a house, and animals and birds.		
UNIT V		**9 Hours**
Society & School: Names of states and cities, religions, education terms, and school items.		

Total: 45 Hours

Self-Learning: 45 Hours

Text Books :

1. Indian Sign Language Dictionary by Ramakrishna Mission Vidyalaya, IHRDC, Coimbatore

Reference Books:

1. Sign Language in India: A Linguistic Exploration by Dr. Sandeep Sharma Jat .

2. The Indian Sign Language by William P. Clark.

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	**Master the Basics**: Use finger-spelling for the alphabet and communicate numbers, days of the week, and months.	K1
CO2	**Grow Your Vocabulary**: Sign about common foods, family members, clothes, and household items.	K2
CO3	**Talk About Nature:** Identify and sign various animals, birds, fruits, vegetables, and elements like the earth and sky.	K2
CO4	**Socialize:** Give people well wishes, describe different behaviours, and talk about festivals and religions.	K3
CO5	**Navigate Places & Education Field:** Sign the names of specific states and cities, along with words used in education field.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	**3**	-	**3**	**2**	-	-
CO2	-	-	-	-	-	**3**	-	**3**	**2**	-	-
CO3	-	-	-	-	-	**3**	**2**	**3**	**2**	-	-
CO4	-	-	-	-	-	**3**	-	**3**	**2**	-	-
CO5	-	-	-	-	-	**3**	-	**3**	**2**	-	-
Avg	-	-	-	-	-	**3**	**2**	**3**	**2**	-	-

	ENGLISH–I	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- To develop an understanding of prose, poetry, and short stories.
- To enhance reading comprehension and critical thinking skills.
- To improve accuracy and clarity in language use.
- To build a rich and adequate vocabulary.
- To promote the use of digital tools for communication and presentation skills.

UNIT I	Grammar & Vocabulary	9 Hours

- Parts of Speech
- Subject – Verb Agreement
- Tenses
- Prefix and Suffix
- Spot the errors

UNIT II	Prose	9 Hours

- A.G. Gardiner – *On the Rule of the Road*
- Helen Keller – Excerpt from *The Story of My Life – Chapter IV*

Listening: Audio summary comprehension

Speaking: Discussion on freedom & learning

Reading: Passage comprehension

Writing: Reflective paragraph writing

UNIT III	Poetry	9 Hours

- William Wordsworth – *The Solitary Reaper*
- Rabindranath Tagore – *Where the Mind is Without Fear*

Listening: Infer the central idea of the poem.

Speaking: Sharing personal interpretation of the poem

Reading: Read aloud exercise

Writing: Critical Appreciation

UNIT IV	Short stories	9 Hours

- O. Henry – *The Gift of the Magi*
- R.K. Narayan – *An Astrologer's Day*

Listening: Story narration

Speaking: Retell the story

Reading: Silent reading and reflective reading

Writing: Summary & Character analysis

UNIT V	One-Act Play	9 Hours

- Douglas Turner Ward-*The Shirt*
- J. M. Synge-*Riders to the Sea*

Listening: Listening to dialogue delivery

Speaking: Role play and enactment

Reading: Character mapping and identification of key ideas

Writing: Dialogue writing & Short critical commentary

Total: 45 Hours

Self-Learning: 45 Hours

Text Books:

1. Naik, M. K., ed *Indian Prose in English: An Anthology*. Oxford University Press, 2001.
2. Greenblatt, Stephen, ed. *The Norton Anthology of English Literature*. 9th ed., W. W. Norton & Company, 2012.
3. Henry, O. *Selected Short Stories of O. Henry*. Penguin Classics, 2001.
4. Narayan, R. K. *Malgudi Days*. Indian Thought Publications, 1982.
5. Wren, P. C., and H. Martin. *High School English Grammar and Composition.* Revised ed., S. Chand & Company, 2009.
6. McCarthy, Michael, and Felicity O'Dell. *English Vocabulary in Use*. 4th ed., Cambridge University Press, 2017.

References:

1. Murphy, Raymond. *English Grammar in Use*. Cambridge University Press, 2019.
2. Strunk Jr., William, and E. B. White. *The Elements of Style*. 4th ed., Longman, 2000.
3. Quirk, Randolph, et al. *A Comprehensive Grammar of the English Language*. Longman, 1985.
4. Hacker, Diana, and Nancy Sommers. *The Bedford Handbook*. 11th ed., Bedford/St. Martin's, 2020.

Websites:

- British Council. *LearnEnglish*. British Council, https://learnenglish.britishcouncil.org.
- Duolingo. *Duolingo*. Duolingo Inc., https://www.duolingo.com.

BBC. *BBC Learning English*. BBC, https://www.bbc.co.uk/learningenglish.

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Demonstrate understanding of prose, poetry, and short stories.	K2
CO2	Analyze reading comprehension texts and develop critical thinking skills.	K4
CO3	Apply language skills to improve accuracy and clarity in communication.	K3
CO4	Recall and use appropriate vocabulary in different contexts.	K1
CO5	Evaluate digital tools for effective communication and presentation skills.	K5

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	2	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	-	-
CO3	-	-	-	-	-	-	-	3	2	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-
CO5	-	-	-	3	-	2	-	3	2	-	-
Avg	-	-	-	3	-	2	-	2.8	2	-	-

	MATHEMATICS–I	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- To learn various concept in matrix
- To apply the concept of Sets to promote critical thinking, problem-solving technique and interdisciplinary connections.
- To analyse the relationships, decisions making and modeling complex systems using Partial Order Relations.

UNIT I	MATRICES & DETERMINANTS	9 Hours

Matrices: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Cramer's Rule, Rank of Matrix Dependence of Vectors**. Determinants:** Definition, Minors, Cofactors, Properties of Determinants

UNIT II	SETS	9 Hours

Sets: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, CaPPRDinality of Set, Simple Applications.

UNIT III	RELATIONS & FUNCTIONS	9 Hours

Relations: Properties of Relations, Equivalence Relation. **Functions:** Partial OPPRDer Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions,

UNIT IV	PARTIAL ORDER RELATIONS	9 Hours

Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, GLB, LUB.

UNIT V	NUMBER SYSTEM AND CONVERSIONS	9 Hours

Number Systems: Binary Numbers, Octal Numbers, Decimal numbers, Hexa Decimal numbers. **Number base conversions**: Octal and Hexa Decimal Numbers - Complements - Signed Binary Numbers - Binary Arithmetic - Binary Codes - Decimal Code

Total: 45 Hours

Self-Learning: 45 Hours

Textbook

1. Kolman, Busby, Ross and Rehman (2003), Discrete Mathematical Structures for Computer Science, Pearson Education, 5th Edition,

Reference Books

1.D.S. Malik and M.K. Sen(2004), Discrete Mathematical Structures: Theory and Applications, Thomson.

2. Goodaire & Parmenter (2000), Discrete Mathematics & Graph Theory, Pearson Education.

3. Kenneth H. Rosen, (2004), Discrete Mathematics and its Applications, Tata McGraw Hill, 5th Ed.

4. C.L. Liu (1986), Elements of Discrete Mathematics, 2nd Edition, McGraw Hill

Web Links:

1. https://www.geeksforgeeks.org/mathematics-partial-oPPRDers-lattices/

2. https://www.ipsgwalior.org/download/number%20system.pdf

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand matrices and determinants including operations, inverse, rank, and properties.	K1
CO2	Explain sets and set operations such as union, intersection, complement, and Cartesian product.	K2
CO3	Apply relations and functions including equivalence relations, domain, range, and composition.	K3
CO4	Analyze partial order relations, Hasse diagrams, chains, GLB and LUB concepts.	K4
CO5	Evaluate number systems, conversions, binary arithmetic, and coding systems.	K5

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2

CO1	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO2	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**
CO3	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**
CO4	**3**	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**2**	**-**	**2**
CO5	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
Avg	**3**	**2.6**	**2.8**	**-**	**2**	**-**	**-**	**-**	**2**	**2.3**	**2.3**

	PROBLEM SOLVING TECHNIQUES	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- Understand basic terminology of computers, problem solving, programming Languages and their evolution.
- Create specification from problem requirements by asking questions to disambiguate the requirement statement..
- Design the solution from specification of a problem and write pseudo code of the algorithm using basic building blocks or structured programming constructs (Sequence, Selection and Repetition statement).
- Translate an algorithm into a C computer program.
- Testing and analyzing programs using debugging tools.

UNIT I		9 Hours

Problems And Problem Instances, Generalization and Special Cases, Types of Computational Problems, Classification of Problems, Analysis of Problems, Solution Approaches, Algorithm Development, Analysis of Algorithm, Efficiency, Correctness, Role of Data Structures in Problem Solving, Problem-Solving Steps (Understand the Problem, Plan, Execute, And Review), Breaking the Problem into Sub problems, Input/output Specification, Input Validation, Pre and Post Conditions.

UNIT II		9 Hours

Structured Programming Concepts: Sequence (Input/Output/Assignment), Selection (If, If-Else) And Repetition (For, While, Do-While) Statements, Control Structure Stacking and Nesting.Different Kinds of Repetitions: Entry Controlled, Exit Controlled, Counter Controlled, Definite, Indefinite and Sentinel-Controlled Repetitions. Pseudo code and Flowcharts. Definition and Characteristics of Algorithms, Standard Algorithm Format. Problems Involving Iteration and Nesting: Displaying Different Patterns and Shapes Using Symbols and Numbers, Generating Arithmetic and Geometric Progression, Fibonacci and Other Sequences, Approximate Values For π, Sin(x), Cos(x), Etc. Using Taylor Series.

UNIT III		9 Hours

C Language: Introduction To Programming Languages, Different Generations of Programming Languages. Typed Vs Type less Programming Languages, History of C Language, An Empty C Program. C Language Counterparts For Input (scanf()), Output (printf()) Statements,

Assignment, Arithmetic, Relational and Logical Operators. If, If-Else Statements, For, While, Do-While Statements. Data Types. Translating Pseudocode/Algorithm to C Program. Incremental Compilation and Testing of the C Program. Simple Problems Involving Input, Output, Assignment Statement, Selection and Repetition. Good Coding Practices.		
UNIT IV		**9 Hours**
Problems on Numbers: Extracting Digits of a Number (Left to Right and Right to Left), Palindrome, Prime Number, Prime Factors, Amicable Number, Perfect Number, Armstrong Number, Factorial, Converting Number from One Base to Another. Statistics (Maximum, Minimum, Sum and Average) on a Sequence of Numbers which are Read using Sentinel- Controlled Repetition using only a few Variables. C Language: else-if Ladder, switch Case, Increment/Decrement Operators, break and continue Statements.		
UNIT V		**9 Hours**
Modular Programming, Top-Down and Bottom-Up Approaches to Problem Solving. Recursion. Problems on Arrays: Reading and Writing of Array Elements, Maximum, Minimum, Sum, Average, Median and Mode. Sequential and Binary Search. Any one Sorting Algorithm. Matrix Operations. C Language: Function Definition and Declaration (Prototype), Role of Return Statement, One Dimensional and Two-Dimensional Arrays. String Functions. Other Operators, Operator Precedence and Associativity. Debugging.		

Total: 45 Hours

Self-Learning: 45 Hours

TEXT BOOKS:

1. Venkatesh, Nagaraju Y, Practical C Programming for Problem Solving, Khanna Book Publishing Company, 2024.
2. AICTE's Programming for Problem Solving (with Lab Manual), Khanna Book Publishing Company, 2024.
3. Harvey Deitel and Paul Deitel, C How to Program, 9th edition, Pearson India, 2015.
4. R G Dromey, How to Solve It by Computer.

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis Ritchie, The C Programming Language, 2nd edition,Pearson, 2015.
2. Jeri Hanly and Elliot Koffman, Problem Solving and Program Design in C, 8th edition,Pearson, 2015.

WEB LINKS:

1. www.GeeksforGeeks.org
2. www.TutorialsPoint.com
3. www.Programiz.com
4. www.W3Schools.com
5. www.Javatpoint.com

NPTEL LINKS:

1. https://nptel.ac.in/courses/106105171

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Develop algorithmic solutions using flowcharts and pseudocode and analyze their time complexity.	K4
CO2	Write, compile, and debug C programs using appropriate syntax, variables, and operators.	K3
CO3	Implement conditional, looping structures, and arrays to solve computational problems.	K3
CO4	Create modular programs using functions and manage memory effectively using pointers.	K6
CO5	Manage data using structures and perform file input/output operations in C.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	3	3	2	-	-	-	-	-	2	3	-
CO2	3	-	-	-	-	-	-	-	2	-	-
CO3	3	2	-	-	-	-	-	-	2	-	-
CO4	3	3	3	-	-	-	-	-	3	-	3
CO5	3	2	-	-	-	-	-	-	2	-	-
AVG	**3**	**2.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**2.2**	**3**	**3**

	PROBLEM SOLVING TECHNIQUES LAB	L	T	P	SL	C
		0	0	2	2	1

COURSE OBJECTIVES

- To impart foundational knowledge of C programming that enables students to write, compile, and debug basic C programs..
- To develop logical and algorithmic thinking through implementation of common mathematical, string, and file operations.
- To enhance problem-solving skills using structured programming approaches, including functions, control structures, arrays, pointers, and structures.

PROGRAMMING EXCERSICE

1. Convert temperature from Celsius to Fahrenheit and vice versa.
2. Read three numbers and display them in sorted (non-decreasing) order..
3. Display all odd numbers in the range ([1, n]).
4. Display multiplication tables:
   a) First 10 tables up to 10 rows
   b) Generalize for (n) tables and (m) rows
5. Display following patterns of n rows (n > 0), For the below examples n = 5?For each pattern write a separate algorithm/program?

$ $$ $$$ $$$$ $$$$$	$ $$ $$$ $$$$ $$$$$	12345 1234 123 12 1	12345 1234 123 12 1

6. Display the following patterns of n rows (n > 0), for the below examples n = 5?

Hollow square pattern:	Triangle Patterns with numbers:	Square with diagonals:	Diamond Pattern
##### # # # # # # #####	1 121 12321 1234321 123454321	* *	* *** ***** *** *

7. Generate first (n) terms of:
   a) Arithmetic Progression
   b) Geometric Progression
8. Display first (n) terms of Fibonacci sequence.
9. Compute approximate value of (e^x) using Taylor series.
10. Compute approximate value of (\sin(x)) and (\cos(x)) using Taylor series.
11. Extract digits of a number (left to right and right to left).
12. Check whether a number is a palindrome.
13. Assign grades based on marks using:
    a) Else-if ladder
    b) Switch case
14. Find sum of numbers using sentinel-controlled repetition.
15. Check whether a number is prime.
16. Check whether a number is an Armstrong number.
17. Convert a number from one base to another (base 2 to 10).
18. Display digits of a number in words (e.g., 543 → FIVE FOUR THREE).
19. Find maximum, minimum, sum, and average using sentinel input.
20. Compute BMI and classify as Underweight, Normal, Overweight, or Obese.
21. Check whether a number is a circular prime (modular approach).
22. For an array, compute mean, range, and mode.
23. Implement string length and string reverse functions.
24. Perform matrix operations: addition, subtraction, transpose.
25. Solve the following using recursion:
    a) Factorial of a number
    b) Display digits (left to right and right to left)
    c) Compute (x^y)
    d) Reverse a sequence using sentinel-controlled input

Total: 15 Hours

Self-Learning: 15 Hours

TEXT BOOKS:

1. Ray Dowson ,"Programming in ANSI C", 3rd Edition , Loughborough UniversityInstitutional Repository , ISBN 1-874152-10-1
2. E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw HillEducation, ISBN: 978-93-5316-513-0

REFERENCE BOOKS:

1. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition, 2018, Oxford UniversityPress, ISBN: 978-01-9949-147-6.
2. Yashavant P. Kanetkar, "Let Us C", 16th Edition, 2019, BPB Publications, ISBN: 978-93-8728-449-4.
3. Jacqueline A Jones and Keith Harrow, "Problem Solving with C", PearsonEducation. ISBN: 978-93-325-3800-9.
4. Dr. Guruprasad Nagraj, "C Programming for Problem Solving", HimalayaPublishing House. ISBN-978-93-5299-361

WEB LINKS:

1. www.w3schools.com
2. www.tutorialspoint.com
3. www.javapoint.com

NPTEL LINKS:

1. https://nptel.ac.in/courses/106105171

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand the syntax, semantics, and structure of C programming language.	K2
CO2	Apply conditional, looping, and branching constructs to solve computational problems such as prime checking and Fibonacci generation.	K3
CO3	Analyze problems and develop modular programs using functions, pointers, and structures.	K4
CO4	Implement C programs to solve real-world problems using arrays, strings, files, and user-defined functions.	K6
CO5	Evaluate the performance and correctness of various algorithms implemented in C for arithmetic, logic, and data processing tasks.	K5

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	3	-	-	-	-	-	-	-
CO2	3	-	-	3	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	3	-	3
CO4	3	3	3	3	-	-	-	-	3	2	3
CO5	3	3	2	3	-	-	-	-	3	3	2
AVG	**3**	**3**	**2.6**	**3**	**-**	**-**	**-**	**-**	**3**	**2.5**	**2.6**

		L	T	P	SL	C
	COMPUTER ARCHITECTURE	3	0	0	3	3

COURSE OBJECTIVES

- To understand the basics of Digital Electronics and Binary Number System
- To learn the implementation of Combinational Circuit.
- To learn the implementation of Sequential Circuit.
- To Understand the Organization of basic computers.
- To understand the concept of Parallel Processing.
- To understand the concept of memory organization.

UNIT I		9 Hours

Digital Principles: Definition for Digital signals, Digital logic, Digital computers, Von Neumann Architecture, Boolean Laws and Theorems, K-Map: Truth Tables to K-Map, 2, 3 and 4 variable K Map, K-Map Simplifications, Don't Care Conditions, SOP and POS.

Number Systems: Decimal, Binary, Octal, Hexadecimal, Number System Conversions, Binary Arithmetic, Addition and subtraction of BCD, Octal Arithmetic, Hexadecimal Arithmetic, Binary Codes, Decimal Codes, Error detecting and correcting codes, ASCII, EBCDIC, Excess- 3 Code, The Gray Code.

UNIT II		9 Hours

Combinational Circuits: Half Adder and Full Adder, Subtractor, Decoders, Encoder, Multiplexer, Demultiplexer

Sequential Circuits: Flip-Flops- SR Flip- Flop, D Flip-Flop, J-K Flip-Flop, T Flip-Flop. **Register:** 4 bit register with parallel load, Shift Registers- Bidirectional shift register with parallel load. Binary Counters-4 bit synchronous and Asynchronous binary counter.

UNIT III		9 Hours

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator logic. Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC), RISC Vs CISC.

UNIT IV		9 Hours

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input-Output Processor(IOP).

UNIT V		9 Hours

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Total: 45 Hours

Self-Learning: 45 Hours

TEXT BOOKS:

1. Donald P Leach, Albert Paul Malvino, Goutam Saha- "Digital Principles & Applications" , Tata McGraw Hill Education Private Limited,2011Edition.
2. M. Morris Mano- "Computer System Architecture", Pearson/Phi, Third Edition.

REFERENCE BOOKS:

1. William Stallings- "Computer Organization and Architecture", Pearson/PHI, Sixth Edition,
2. Andrew S. Tanenbaum- "Structured Computer Organization", PHI /Pearson 4th Edition,
3. M.V .Subramanyam, "Switching Theory and Logic Design", Laxmi Publications (P) Ltd.
4. Ikvinderpal Singh, Computer Organization Architecture, Khanna Book Publishing.

WEB LINKS:

1. WWW.GeeksforGeeks.org – Digital Electronics and Computer Organization
   GeeksforGeeks – Digital Electronics
2. WWW.TutorialsPoint.com – Computer Organization Tutorial
   TutorialsPoint – Computer Organization
3. WWW.Javatpoint.com – Digital Electronics Tutorial
   Javatpoint – Digital Electronics
4. WWW.Programiz.com – Number Systems and Computer Fundamentals
   Programiz – Computer Fundamentals
5. WWW.W3Schools.com – Computer Basics and Binary Concepts
   W3Schools – Computer Fundamentals

NPTEL LINKS:

1. https://nptel.ac.in/courses/106102157

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL

CO1	Understand different number systems, binary arithmetic, and logic gates in digital electronics.	K2 / K3
CO2	Analyze Boolean functions using Karnaugh Maps and realize them using logic gates.	K4
CO3	Design combinational circuits such as adders, subtractors, multiplexers, and decoders.	K5
CO4	Explain the working of sequential circuits including flip-flops, counters, and shift registers.	K2
CO5	Describe the basic architecture and operational flow of a computer system using register transfer and micro-operations.	K2

COURSE ARTICULATION MATRIX

	PO1	**PO2**	**PO3**	**P O4**	**PO5**	**PO6**	**PO7**	**PO 8**	**PO9**	**PSO1**	**PSO2**
CO1	3	2	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	2	-	2
CO3	3	3	3	-	-	-	-	-	3	-	3
CO4	2	2	-	-	-	-	-	-	2	-	2
CO5	2	-	-	-	-	-	-	-	2	-	2
AVG	**2.6**	**2.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**2.2**	**-**	**2.3**

		L	**T**	**P**	**SL**	**C**
	COMPUTER ARCHITECTURE LAB	**0**	**0**	**2**	**2**	**1**

COURSE OBJECTIVES

- To understand and verify the operation of basic and universal logic gates through practical implementation and truth table verification.
- To design and implement combinational and sequential logic circuits such as adders, subtractors, flip-flops, counters, shift registers, encoders, decoders, and multiplexers.
- To apply Boolean algebra and De Morgan's theorems for simplifying and realizing logic circuits using SOP and POS forms.
- To develop practical skills in assembling, configuring, and troubleshooting computer hardware components and peripheral devices.
- To install, configure, and maintain operating systems and BIOS settings, and diagnose common hardware and system-level problems.

PROGRAMMING EXCERSICE

1. Verify logic behaviour of AND, OR, NAND, NOR, EX-OR, EX-NOR, Invert and Buffer gates.
2. To study and verify NAND as a Universal Gate
3. To verify De- Morgan's theorem for 2 variables
4. Design and test of an S-R flip-flop using NAND/NOR gate.
5. Convert BCD to Excess-3 code using NAND gate
6. To Convert Binary to Grey Code
7. Verification of Truth Tables of J-K Flip-Flop using NAND/NOR gate
8. Realize Decoder and Encoder circuit using Basic Gates.
9. Design and implement the 4:1 MUX using gates.
10. Implementation of 4-Bit Parallel Adder Using 7483 IC.
11. Design and verify operation of half adder and full adder.
12. Design and verify operation of half subtractor.
13. Design and Implement a 4 bit shift register using Flip flops.
14. Implement Boolean function using logic gates in both SOP and POS
15. Design and Implement a 4 bit synchronous counter.

16. Design and verify 4 bit asynchronous counter.

Hardware

1. Familiarize the computer system layout: marking positions of SMPS, motherboard, FDD, HDD, CD, DVD and add on cards.
2. Identify the Computer Name and Hardware Specification (RAM capacity, Processor type, HDD, 32 bit/ 64 bit)
3. Identify and Troubleshoot the problems of RAM, SMPS and motherboard
4. Configure BIOS settings- disable and enable USB and LAN
5. Adding additional RAM to the system.(expanding RAM size).
6. To Study mother board layout of a system.
7. Demonstrate the assembly of a PC
8. Demonstration of various ports: CPU, VGA port, PS/2 (keyboard, mouse) ,USB, LAN, Speaker, Audio.
9. Install and configure windows OS
10. To study the installation of Printer and trouble shooting.

Total: 15 Hours

Self-Learning: 15 Hours

TEXT BOOKS:

1. M. Morris Mano and Michael D. Ciletti, Digital Design, 5th Edition, Pearson Education, 2013.
2. M. Morris Mano and Charles R. Kime, Logic and Computer Design Fundamentals, 4th Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. Anil K. Maini, Digital Electronics: Principles, Devices and Applications, Wiley India Pvt. Ltd., 2007.
2. Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Education, 2015.

WEB LINKS:

1. https://www.learningelectronics.net

2. https://www.geeksforgeeks.org

NPTEL LINKS:

1. https://nptel.ac.in/courses/106102157

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Implement basic and universal logic gates and Boolean expressions using SOP and POS forms.	K3 / K4
CO2	Design combinational circuits such as adders, subtractors, encoders, decoders, multiplexers, and code converters.	K5
CO3	Analyze sequential circuits including flip-flops, shift registers, and synchronous/asynchronous counters.	K5 / K4
CO4	Troubleshoot digital circuits using standard ICs and laboratory tools.	K3 / K5
CO5	Configure computer hardware systems and install operating systems and peripherals.	K3 / K5

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	3	2	2	3	-	-	-	-	2	-	-
CO2	3	3	3	3	-	-	-	-	2	-	-
CO3	3	3	3	3	-	-	-	-	2	-	-
CO4	3	3	2	3	-	-	-	-	3	-	-
CO5	-	2	-	3	-	-	-	-	3	2	3
AVG	**3**	**2.6**	**2.5**	**3**	**-**	**-**	**-**	**-**	**2.4**	**2**	**3**

		L	T	P	SL	C
	INDIAN KNOWLEDGE SYSTEM	**2**	**0**	**0**	**2**	**2**

COURSE OBJECTIVES

- To Gain an understanding of Indian Knowledge System.
- To develop an ability to apply the Indian Knowledge System to societal challenges faced today in areas such as holistic health, governance, public administration and sustainable living.
- To Promote the youths to do research in the various fields of Indian knowledge system

UNIT I	**AN OVERVIEW OF INDIAN KNOWLEDGE SYSTEM**	**6 Hours**
Introduction- Organization of Indian Knowledge System- The IKS corpus- A Classification framework- Historicity of Indian KnowledgeSystem -Some salient aspects of Indian Knowledge System.		
UNIT II	**PHILOSOPHICAL SYSTEM**	**6 Hours**
Introduction to Philosophy- Development of Indian Philosophical system - Unique features of Indian Philosophical system- Introduction to Yoga.		
UNIT III	**GOVERNANCE AND PUBLIC ADMINISTRATION**	**6 Hours**
Introduction - Understanding Governance from ancient to modern times- Relevance of Arthashastra- Glimpses of Nitishastra- Vidura Niti.		
UNIT IV	**WISDOM THROUGH THE AGES**	**6 Hours**
Gateways of ancestral wisdoms-Introduction to Purāṇa- The Purāṇic repository- Issues of interest in Purāṇas- Introduction to Itihāsas- Key messages in Itihāsa-Wisdom through Nīti- śāstra.		
UNIT V	**MATHEMATICS**	**6 Hours**
Introduction to Indian Mathematics- Unique aspects of Indian Mathematics- Indian Mathematicians and their Contributions.		

Total: 30 Hours

Self-Learning: 30 Hours

TEXT BOOKS:

1. Kapoor Kapil, and Singh Avadesh Kumar, Indian Knowledge System Vol.1, DK PrintWorld,Ltd. 2005

REFERENCE BOOKS:

1. The Knowledge System of Bhārata by Bhag Chand Chauhan.
2. Histrory of Science in India Volume-1, Part-I, Part-II, Volume VIII, by Sibaji Raha, et al.National

Academy of Sciences, India and The Ramkrishan Mission Institute of Culture, Kolkata

WEB LINKS:

1. https://onlinecourses.swayam2.ac.in/imb23_mg54/preview
2. https://digest.iimb.ac.in/2022/04/book-indian-knowledge-systems-co-authored-dr-b-mahadevan/
3. https://www.summarize.tech/www.youtube.com/watch?v=jcV0LIp570A

NPTEL LINKS:

1. https://share.google/FYh1V0rJs5Kkd055c

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Classify the key concepts of Indian Knowledge System and discuss the multi-faceted nature of knowledge contained in the Traditional Systems of India.	K2 / K4
CO2	Identify the rich heritage of governance in Indian Knowledge System.	K2
CO3	Recognize the relevance of Arthashastra in public administration.	K2 / K4
CO4	Identify the wisdom through ages through Ithihasas.	K1 / K2
CO5	Gain knowledge of Indian mathematicians and their contributions.	K1 / K2

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	3	-	-	2	-	-
CO2	-	-	-	-	-	3	-	3	2	-	-
CO3	-	-	-	-	-	3	-	3	2	-	-
CO4	-	-	-	-	-	3	-	3	2	-	-
CO5	-	-	-	-	-	3	-	-	2	-	-
AVG	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**3**	**2**	**-**	**-**

		L	T	P	SL	C
		2	0	0	2	2

	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY					

COURSE OBJECTIVES

- To familiarize students with basic environmental concepts, their relevance to business operations, and forthcoming sustainability challenges.
- To equip students to make decisions that consider environmental consequences.
- To enable future business graduates to become environmentally sensitive and responsible managers.

UNIT I	UNDERSTANDING ENVIRONMENT, NATURAL RESOURCES, AND SUSTAINABILITY	6 Hours

Fundamental environmental concepts and their relevance to business operations; Components and segments of the environment, the man-environment relationship, and historical environmental movements. Concept of sustainability; Classification of natural resources, issues related to their overutilization, and strategies for their conservation. Sustainable practices in managing resources, including deforestation, water conservation, energy security, and food security issues. The conservation and equitable use of resources, considering both intergenerational and intergenerational equity, and the importance of public awareness and education.

UNIT II	ECOSYSTEMS, BIODIVERSITY, AND SUSTAINABLE PRACTICES	6 Hours

Various natural ecosystems, learning about their structure, functions, and ecological characteristics. The importance of biodiversity, the threats it faces, and the methods used for its conservation. Ecosystem resilience, homeostasis, and carrying capacity, emphasizing the need for sustainable ecosystem management. Strategies for in situ and ex situ conservation, nature reserves, and the significance of India as a mega diverse nation.

UNIT III	ENVIRONMENTAL POLLUTION, WASTE MANAGEMENT, AND SUSTAINABLE DEVELOPMENT	6 Hours

Various types of environmental pollution, including air, water, noise, soil, and marine pollution, and their impacts on businesses and communities. Causes of pollution, such as global climate change, ozone layer depletion, the greenhouse effect, and acid rain, with a particular focus on pollution episodes in India. Importance of adopting cleaner technologies; Solid waste management; Natural and man-made disasters, their management, and the role of businesses in mitigating disaster impacts.

UNIT IV	SOCIAL ISSUES, LEGISLATION, AND PRACTICAL APPLICATIONS	6 Hours

Dynamic interactions between society and the environment, with a focus on sustainable development and environmental ethics. Role of businesses in achieving sustainable development goals and promoting responsible consumption.		
UNIT V	**ENVIRONMENTAL LEGISLATION**	**6 Hours**
Overview of key environmental legislation and the judiciary's role in environmental protection, including the Water (Prevention and Control of Pollution) Act of 1974, the Environment (Protection) Act of 1986, and the Air (Prevention and Control of Pollution) Act of 1981. Environmental justice, environmental refugees, and the resettlement and rehabilitation of affected populations; Ecological economics, human population growth, and demographic changes in India.		

Total: 30 Hours

Self-Learning: 30 Hours

TEXT BOOKS:

1. Poonia, M.P. *Environmental Studies* (3rd ed.), Khanna Book Publishing Co.
2. Bharucha, E. *Textbook of Environmental Studies* (3rd ed.) Orient Blackswan Private Ltd.
3. Dave, D., & Katewa, S. S. *Text Book of Environmental Studies.* Cengage Learning India Pvt Ltd.
4. Rajagopalan, R. *Environmental studies: from crisis to cure* (4th ed.). Oxford University Press.
5. Miller, G.T. & Spoolman S. *Living in the Environment*. (20th ed.). Cengage.
6. Basu, M., & Xavier Savarimuthu, S. J. *Fundamentals of environmental studies*. Cambridge University Press.

REFERENCES:

1. Roy, M. G. Sustainable Development: Environment, Energy and Water Resources. Ane Books.
2. Pritwani, K. Sustainability of business in the context of environmental management. CRC Press.
3. Wright, R.T. & Boorse, D.F. Environmental Science: Toward A Sustainable Future (13th ed,). Pearson.

WEBSITE:

1. https://www.ourplanet.com
2. https://www.undp.org/content/undp/en/home/sustainable-development-goals.html
3. www.myfootprint.org
4. https://www.globalchange.umich.edu/globalchange1/current/lectures/kling/ecosystem/ecosystem.html

NPTEL LINKS:

1. https://nptel.ac.in/courses/127106004?utm_source=chatgpt.com

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand the fundamental concepts of environment, sustainability, natural resources, and their importance in achieving ecological balance and sustainable development.	K2
CO2	Explain the structure and functions of ecosystems, biodiversity conservation methods, and sustainable ecosystem management practices.	K2
CO3	Understand the causes and impacts of environmental pollution, waste management practices, disaster management, and the importance of cleaner technologies for sustainable development.	K2
CO4	Explain environmental ethics, sustainable development goals, social issues, and the role of individuals, society, and businesses in environmental protection and responsible resource utilization.	K2
CO5	Understand environmental legislation, environmental protection acts, environmental justice, demographic changes, and their significance in environmental conservation and sustainable societal development.	K2

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	-	3	-	2	-	-
CO2	-	-	-	-	-	-	3	-	2	-	-
CO3	-	-	-	-	-	-	3	-	2	2	-
CO4	-	-	-	-	-	-	3	-	2	2	-
CO5	-	-	-	-	-	-	3	-	2	-	-
AVG	-	-	-	-	-	-	**3**	-	**2**	**2**	-

SEMESTER II

26LTAM21	TAMIL–II	L	T	P	SL	C
		3	0	0	3	3

பாடத்திட்ட நோக்கம்:

மாணவர்களிடம் தமிழரின் நாகரிகம் மற்றும் பண்பாட்டு மரபினை அறிமுகம் செய்தல் தமிழ் இலக்கிய காப்பியச் செழுமையையும் பக்தி இலக்கிய மாண்பையும் உணர்த்துதல். தமிழ்க் கவிதை வளத்தையும் அதன் பொருண்மைகளையும் எடுத்துரைத்தல். ஊடகம்- கணினி- செயற்கை நுண்ணறிவு போன்ற நவீன அறிவுசார் வளர்ச்சி நிலைகளைப் பயன்பாட்டு நோக்கில் பயிற்சியளித்தல். இதன் வாயிலாக மாணவர்களின் ஆளுமைத் திறனை மேம்படுத்தி அவர்களை போட்டித் தேர்வுகளுக்கு தயார் செய்வதும் வேலைவாய்ப்பிற்கான பயிற்சி அளிப்பதும் இந்தப் பாடத்திட்டத்தின் முக்கிய நோக்கமாகும்.

அலகு 1	தமிழர் வாழ்வும் பண்பாடும்	9 மணி நேரம்

பண்பாடு - வாழ்வியல் முறை - அகம், புறம் - உணவு முறை - விருந்தோம்பல் - நம்பிக்கைகள் - விழாவும் வழிபாடும் - கலைகள் - கட்டடம் - சிற்பம் - ஓவியம் - இசை - கூத்து - தொழிலும் வணிகமும் - அறிவியல் நோக்கு.

அலகு 2	காப்பியங்கள்	9 மணி நேரம்

1. சிலப்பதிகாரம் - ஆய்ச்சியர் குரவை
2. மணிமேகலை- காதை 19 - உலக அறவி புக்க காதை
3. கம்பராமாயணம் - மந்தரை சூழ்ச்சிப் படலம் (பாடல் எண் தேர்ந்தெடுக்கப்பட்ட 9 பாடல்கள்)

அலகு 3	பக்தி இலக்கியம்	9 மணி நேரம்

திருமூலர் - திருமந்திரம் - மூன்று பாடல்கள்

- ✔ உடம்பார் அழியின் உயிரார் அழிவர் (திருமந்திரம்: 724)
- ✔ மனையுள் இருந்தவர் மாதவர் ஒப்பர் (திருமந்திரம்:47)
- ✔ மரத்தை மறைத்தது மாமத யானை (திருமந்திரம்: 2290)

தேம்பாவணி - காட்சிப் படலம் (முதல் 5 பாடல்கள்

சீறாப்புராணம் - மானுக்கு பிணை நின்ற படலம்

அலகு 4	கவிதை இலக்கியம்	9 மணி நேரம்

- பாரதியார் - செந்தமிழ் நாடு- செந்தமிழ் நாடெனும் போதினிலே எனும் கவிதை (பாடல் எண்1.6, 7, 8, 9, 10)
- பாரதிதாசன் - இசையமுது- "தூய்மை சேரடா தம்பி" என்று தொடங்கும் பாடல்
- கவிக்கோ அப்துல்ரகுமான் - ஆலாபனை- போட்டி எனும் தலைப்பில் அமைந்த கவிதை
- நா.முத்துக்குமார் - பட்டாம்பூச்சி விற்பவன்- தூர் எனும் தலைப்பில் அமைந்த கவிதை
- இளம்பிறை - நீ எழுத மறுக்கும் எனதழகு - அம்மா எனும் தலைப்பில் அமைந்த கவிதை

அலகு 5	ஊடகத் தமிழ் – கணினித் தமிழ் அறிமுகம்	9 மணி நேரம்

ஊடகத் தமிழ்: இதழியல் - ஊடக வகைகள் - அச்சு ஊடகங்கள் - மின்னணு ஊடகம் - ஊடகங்களில் தமிழ், ஊடகங்களின் மொழி நடை - வானொலி- தொலைக்காட்சி- திரைப்படம்.

கணினித் தமிழ்: கணினியும் தமிழும், தமிழ் மென்பொருள்கள் (Tamil software) - எழுத்துருக்கள் (Fonts) - இணையமும் தமிழ்ப் பயன்பாடும் - மின்னூலகம் (Online e-Library), மின்னகராதி (e-Dictionary), - மின்வழிக் கற்றல் - e Learning - பயன்பாட்டு நோக்கில் செயற்கை நுண்ணறிவு.

மொத்தம்: 45 மணிநேரம்
சுய கற்றல்: 45 மணிநேரம்

பார்வை நூல்கள்

1.தமிழர் நாகரிகமும் பண்பாடும், டாக்டர் அ. தட்சிணாமூர்த்தி, ஐந்திணைப் பதிப்பகம், 2001.
2.இதழியல் கலை, டாக்டர் மா. பா. குருசாமி, குரு - தேமொழி பதிப்பகம், திண்டுக்கல், 1998.
3.கணிப்பொறியில் தமிழ், த.பிரகாஷ், பெரிகாம், 2011.
4.தமிழ்க் கணினி இணையப் பயன்பாடுகள், முனைவர் துரை. மணிகண்டன், மணிவானதி பதிப்பகம், 2013.
5.அச்சுக் கலை வழிகாட்டி, பாலசுப்பிரமணியன், ஆ. சென்னை: தனசு பதிப்பகம், 1966
6.பாடநூல் தேடலுக்கான இணையம்
http://www.tamilvu.org/courses/nielit/Chapters/Chapter1/11.pdf

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL

CO1	Describe the civilization, cultural heritage, and traditional practices of the Tamil people through literary and historical perspectives.	K2
CO2	Evaluate the structural richness, themes, and ideological significance of Tamil epics and Bhakti literature.	K5
CO3	Create Tamil poetic compositions using appropriate literary and aesthetic techniques.	K6
CO4	Apply practical knowledge and procedural skills in Tamil computing and digital applications.	K3
CO5	Develop language competence and analytical abilities required for Tamil proficiency and competitive examinations.	K4

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	**3**	**2**	-	-	-	-
CO2	-	-	-	-	-	**3**	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	**2**	-	-
CO4	-	-	-	-	-	-	-	-	**2**	-	-
CO5	-	-	-	-	-	-	-	**2**	**3**	-	-
Avg	-	-	-	-	-	**3**	**2**	**2**	**2.3**	-	-

	HINDI–II	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES:

- To introduce students to Hindi and Indian civilization and cultural heritage
- To make them understand the richness of Hindi and Indian epics and the greatness of devotional literature
- To provide practical training in modern intellectual developments such as translation, advertisement and to develop students' skills, for competitive examinations, and provide

UNIT I		9 hours

हिन्दी साहित्य का इतिहास - आदि काल, मध्यकाल, आधुनिक युग -सामान्य परिचय, प्राचीन युग - नैतिक साहित्य - तिरुक्कुरल - 5 दोहे (तिरुवल्लुवर),भक्ति काल - नैतिक साहित्य - वेमना (वेमना) के पद - History of Hindi Literature – Ancient, medieval, modern era – General Introduction, Ethical Literature - Thirukkural - 5 couplets (Thiruvalluvar), Bhakti Kal - Ethical Literature - Vemana Pad - 3 (Vemana)

UNIT II		9 hours

भक्ति काल - नैतिक साहित्य - कबीर के दोहे- 5 (कबीरदास), -भ्रमरगीत के पद-1 (सूरदास), कौशल विकास - प्रश्न निर्माण - अभ्यास

Bhakti Kal - Ethical Literature - Kabir ke Dohe - 5 (Kabirdas), Bhramargeet ke Pad -1 (Surdas),

UNIT III		9 hours

भक्ति काल - विनय के पद- 1 (तुलसीदास), कम्ब रामायण के पद - 2 (कम्बर)

Bhakti Kal - Vinay ke Pad - 1(Tulsidas), Kambaramayan ke Pad - 2 (Kambar)

UNIT IV		9 hours

आधुनिक युग - पुष्प की अभिलाषा (माखनलल चतुर्वेदी), कौशल विकास - अनुवाद : अर्थ, परिभाषा, प्रकार एवं अभ्यास Modern Era - Pushpa ki Abhilasha (Makhanlal Chaturvedi), Skill Development - Translation: Meaning, Definition & Exercise

UNIT V		9 hours

आधुनिक युग - बीज व्यथा (ज्ञानेंद्रपति), कौशल विकास - 'विज्ञापन लेखन : अर्थ, परिभाषा, प्रकार एवं अभ्यास Modern Era - Beej Vyatha (Gyanendrapathi), Skill Development – Advertisement : Meaning, Definition & Exercise

Total: 45 Hours

Self Learning: 45 Hours

संदर्भ ग्रन्थ/ Reference Books:

1. Hindi Sahitya Ka Itihas, Ramchandra Shukla, Nagari Pracharini Sabha, Varanasi

2. Thirukkural, Hindi Translator: M. Govindarajan, Central Institute of Classical Tamil,Chennai

3. Vemana ki vaani,Hindi Translator: Dr. Suryanarayan Bhanu, Potti Sriramulu Telugu University

4. Kabir Granthavali Kabir, Rajkamal Prakashan

5. Sursagar, Surdas, Lokbharti Prakashan

6. Vinay Patrika, Tulsidas, Gita Press, Gorakhpur

7. Kambaramayan, Bhuvan Vani Trust, Lucknow

8. Him Tarangini, Makhanlal Chaturvedi, Bharati Bhandar

9. Anuvaad Vigyan, Dr. Bholanath Tiwari, Kitab Mahal

10. Gyanendra Pati Ki Kavitaayein,Gyanendra Pati, Rajkamal Prakashan

11. Prayojanmoolak Hindi, Dr. Kailash Chandra Bhatia, Vani Prakashan

12. Vyavaharik Hindi – Dr. Hardev Bahri – Rajpal & Sons

वेब लिंक्स/ Web Links:

1. https://www.cict.in

2. https://vaniprakashan.com

3. https://www.rajkamalprakashan.com

4. https://www.gitapress.org

5. https://www.tamiluniversity.ac.in

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Know various types of poetry in Indian languages, culture, moral values, along with the history of Hindi literature.	K1
CO2	Know the richness of ethical and Bhakti literature in Hindi language with cultural and moral values.	K2
CO3	Know the importance of Bhakti literature.	K2
CO4	Apply the value of patriotism and proficiency in Hindi translation.	K4
CO5	Know about modern poetry and develop skills for competitive examinations.	K1

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	**3**	-	-	-	-	-
CO2	-	-	-	-	-	**3**	-	-	-	-	-
CO3	-	-	-	-	-	**3**	-	-	-	-	-
CO4	-	-	-	-	-	-	-	**2**	-	-	-
CO5	-	-	-	-	-	-	-	-	**3**	-	-
Avg	-	-	-	-	-	**3**	-	**2**	**3**	-	-

	FRENCH-II	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES:

The lessons are being chosen:

1) To express his / her where abouts and to ask seek direction
2) To express obligation and restriction
3) To describe a place
4) To narrate and to question
5) To describe someone
6) To express his desire and to speak about the future

UNIT I	**C'est où**	**10 hours**
L'impératif, Les articles contractés au, à la…, Le passé composé et l'accoPPRD du participle passé avec être.		
UNIT II	**N'oubliez pas**	**6 hours**
Le pronom relatif Qui, que, où, Les pronoms compléments indirects (me, te, lui, leur…) Skill Development - Question framing – Exercise		
UNIT III	**Belle vue sur la mer**	**6 hours**
Les adjectifs démonstratifs, Y- pronom complément.		
UNIT IV	**Quel beau voyage!**	**8 hours**
Les verbes pronominaux, En- pronom complément.		
UNIT V	**Oh ! joli**	**10 hours**
L'imparfait, L'imparfait ou le passé composé.		
UNIT VI	**Et après ?**	**5 hours**
Le futur simple, Le subjonctif présent.		

Total: 45 Hours

Self Learning: 45 Hours

Text Book:

1. LATITUDES 1 (A1/A2) MÉTHODE DE FRANÇAIS - Régine Mérieux and Yves Loiseau

Reference book:

1. SAISON A1 - MÉTHODE DE FRANÇAIS - Marie-Noëlle Cocton, Élodie Heu, Catherine Houssa, Émilie Kasazian

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Recall and express one's whereabouts and ask for directions.	K1
CO2	Understand and express obligation and restrictions in daily communication.	K2
CO3	Apply language skills to describe a place using appropriate vocabulary.	K3
CO4	Analyze and narrate events and frame questions effectively.	K4
CO5	Apply language structures to describe a person and expressions to communicate desires and future plans.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	-	-	**2**	-	-	-
CO2	-	-	-	-	-	**2**	-	**2**	-	-	-
CO3	-	-	-	-	-	-	-	**2**	-	-	-
CO4	-	-	-	-	-	-	-	**3**	**3**	-	-
CO5	-	-	-	-	-	-	-	**2**	-	-	-
Avg	-	-	-	-	-	**2**		**2.2**	**3**	-	-

	INDIAN SIGN LANGUAGE - II (ADVANCED)	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- **To Master Advanced Linguistic Structures:** Enable students to understand and apply fundamental grammatical components—including nouns, verbs, and descriptive adjectives—to construct structurally correct sentences in Indian Sign Language (ISL).
- **To Expand Domain-Specific Vocabulary:** Equip learners with specialized lexicon and technical signs related to diverse professions, academic subjects, sports, culinary items, and civic/roadway infrastructure.
- **To Develop Real-World Situational Fluency:** Train students to conduct real-time, functional conversations and handle transactional requests in high-frequency public service areas.
- **To Cultivate Environment-Based Communication Adaptability:** Foster the ability to seamlessly adapt signing styles, contextual terminology, and conversational registers according to specific immediate environments.

UNIT I		**9 Hours**
Advanced Core Vocabulary & Grammar : Subject , Sports , Noun , and Verb.		
UNIT II		**9 Hours**
Vocations, Geography & Culinary Terms : Professions , Places , Dishes & Spices , and Roadways.		
UNIT III		**9 Hours**
Qualifiers & Civic Literacy : Adjectives , Government Related Items , and Calendar Items.		
UNIT IV		**9 Hours**
Situational Sign Language: Shopping , Hospital , Police Station , and Bus Stop.		
UNIT V		**9 Hours**
Environment-Based Sign Language: Home , Office , Hotel , and School/College.		

Total: 45 Hours

Self-Learning: 45 Hours

Text Books :

1. Indian Sign Language Dictionary by Ramakrishna Mission Vidyalaya, IHRDC, Coimbatore

Reference Books:

1. Sign Language in India: A Linguistic Exploration by Dr. Sandeep Sharma Jat .

2. The Indian Sign Language by William P. Clark.

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	**Grammar & Foundations:** Construct grammatically correct sentences in Indian Sign Language (ISL) by accurately applying rules of noun-verb agreement, academic terms, and sports vocabulary.	K3
CO2	**Vocations & Infrastructure :** Demonstrate vocabulary proficiency in identifying various professions, geographical places, culinary terms, and roadway/traffic navigation signs.	K2
CO3	**Qualifiers & Civil Literacy:** Utilize descriptive adjectives to modify signs and communicate effectively about time, calendars, and government/administrative matters.	K3
CO4	**Situational Public Fluency:** Manage independent, real-time communications and transactional interactions in critical public spaces, including shopping centers, hospitals, police stations, and transit hubs.	K4
CO5	**Environment-Based Adaptation:** Adapt signing registers, conversational tone, and specific vocabularies smoothly across domestic, corporate, hospitality, and academic environments.	K5

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	-	-	2	2	-	-
CO2	-	-	-	-	-	2	-	3	2	-	-
CO3	-	-	-	-	-	3	-	3	2	-	-

CO4	-	-	-	-	-	**3**	-	**3**	**3**	-	-
CO5	-	-	-	-	-	**3**	-	**3**	**3**	-	-
Avg	-	-	-	-	-	**2.75**	-	**2.8**	**2.4**	-	-

	ENGLISH-II	L	T	P	SL	C
		3	0	0	3	3

Course Objectives:

- To appreciate prose, poetry, drama, and short fiction.
- To enhance reading and interpretative skills.
- To express ideas clearly in speech and writing.
- To use appropriate language structures in communication.
- To develop effective writing skills across formats

UNIT I	Grammar & Composition	9 hours

- Active & Passive Voice
- Direct & Indirect Speech
- Letter Writing (Formal & Informal)
- Creative Writing – Writing stories
- Hints Developing

UNIT II	Prose	9 hours

- Nadine Gordimer – *Once upon a Time*
- E. V. Lucas – *Bores*

Listening: Note-taking from audio/text recitation

Speaking: Discussion on fear, society, and behaviour

Reading: Skimming, scanning, and interpretation of textual features

Writing: Reflective paragraph writing

UNIT III	Poetry	9 hours

- Robert Frost – *Stopping by Woods on a Snowy Evening*
- Maya Angelou – *Still I Rise*

Listening: Listening and summarizing the poem

Speaking: Explaining poetic lines orally

Reading: Reading and inferring contextual meaning

Writing: Paraphrase of poems

UNIT IV	Short stories	9 hours

- Anton Chekhov – *The Bet*
- O. Henry – *After Twenty Years*

Listening: Story narration and summarizing

Speaking: Character discussion and debate

Reading: Contextual vocabulary identification

Writing: Summary and character sketch

UNIT V	One-Act Play	9 hours

- Langston Hughes - *Soul Gone Home*
- Lucille Fletcher-*Sorry, Wrong Number*

Listening: Dramatic reading and dialogue comprehension

Speaking: Role play and dramatization

Reading: Character and conflict analysis

Writing: Character sketch/dialogue writing

Total: 45 Hours

Self Learning: 45 Hours

Text Books:

- Gordimer, Nadine. "Once upon a Time." *Jump and Other Stories*. Penguin Books, 1991.
- Lucas, E. V. "Bores." *The Best Loved Essays of E. V. Lucas*. Methuen & Co., 1923.
- Frost, Robert. "Stopping by Woods on a Snowy Evening." *New Hampshire*. Henry Holt and Company, 1923.
- Angelou, Maya. "Still I Rise." *And Still I Rise*. Random House, 1978.
- Hughes, Langston. *Soul Gone Home*. In *Five Plays by Langston Hughes*. Indiana University Press, 1963.

References:

- Murphy, Raymond. *English Grammar in Use*. Cambridge University Press, 2019.
- Wren, P. C., and H. Martin. *High School English Grammar and Composition*. Revised ed., S. Chand & Company, 2009.

Websites

- *British Council LearnEnglish*. British Council, https://learnenglish.britishcouncil.org/.
- *Poetry Foundation*. Poetry Foundation, https://www.poetryfoundation.org/.

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand grammar concepts including voice, speech, sentence structure, and composition skills.	K1
CO2	Apply reading and writing skills through prose comprehension and reflective writing tasks.	K2
CO3	Analyze poetry to interpret themes, emotions, and contextual meanings.	K4
CO4	Evaluate short stories by examining characters, themes, and narrative techniques.	K5
CO5	Apply communication and literary skills through one-act plays including dialogue, role play, and interpretation.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	-	-	**3**	-	-	-
CO2	-	-	-	-	-	-	-	**2**	**2**	-	-
CO3	-	-	-	-	-	-	-	-	**2**	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	**3**	-	-	-
Avg	-	-	-	-	-	-	-	**2.6**	**2**	-	-

	MATHEMATICS-II	L	T	P	SL	C
		3	0	0	3	3

Course Objectives:

- To enable professional undergraduate students to understand the importance of Mathematics
- To provide basic knowledge of Discrete Mathematics and Probability.
- The main aim of this course is to help the students to read, classify and then interpret the data given to them and draw conclusions.
- Students understand the concepts like Logic, tautology and Probability.

UNIT I	Fundamentals of logic	9 hours
Fundamentals of logic: Introduction to logic, propositional logic, logical connectives and truth table, negation conjunction, disjunction.		
UNIT II	**Logic and tatology**	**9 hours**
Conditional, bi-conditional or double implication, converse, inverse and contra positive, tautology and contradiction.		
UNIT III	**Permutations and combinations**	**9 hours**
Introduction - Fundamental Principle of Counting - Permutations: Problems on permutations – Combinations - Problems on combinations, Difference between permutations and combinations.		
UNIT IV	**Basics of probability**	**9 hours**
Basics of probability: Basic Probability- Axioms of Probability- Addition and Multiplication theorem without proof-Conditional Probability-simple problems		
UNIT V	**Random variables**	**9 hours**
Random variable - Discrete random variables- Mean- Expectations- Variance- Independent random variables- simple problems, Continuous random variables- Mean- Expectations- Variance- simple problems.		

Total : 45 Hours

Self Learning : 45 Hours

Text books:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, McGraw Hill.
2. R A Johnson And C.B.Gupta., Probability and statistics for engineers (Erwin Miller And John E.Freund), 7th edition, Pearson Education / PHI.

Reference Books:

1. R. P. Grimaldi (2007), "Discrete and Combinatorial Mathematics", Pearson Education, Fifth Edition
2. Thomas Koshy (2005), "Discrete Mathematics with Applications", Academic Press
3. S.I.Resnick (1999), A Probability Path, Birhauser, Berlin

Web links:

1. https://courses.umass.edu/phil110-gmh/text/c01.pdf
2. https://www.cuemath.com/data/permutations-and-combinations/
3. https://www.toppr.com/guides/maths/probability/introduction-to-probability/

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand the fundamentals of logic including propositions, logical connectives, and truth tables.	K1
CO2	Explain conditional statements, biconditional logic, tautology, and contradiction in logical reasoning.	K2
CO3	Apply principles of permutations and combinations to solve counting problems.	K3
CO4	Analyze basic probability concepts including axioms, conditional probability, and probability theorems.	K4
CO5	Evaluate random variables including mean, expectation, variance, and their applications in problems.	K5

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	2
CO3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	2	-	-	-	-	2	-
CO5	3	3	-	-	2	-	-	-	2	3	-
Avg	3	2.8	2	-	2	-	-	-	2	2.5	2

	COMMUNICATION SKILLS	L	T	P	SL	C
		0	0	4	4	2

Course Objectives:

- To improve speaking and presentation skills.
- To build reading and writing skills for academic and professional use.
- To prepare students for job communication (resume, GD, interview)

UNIT I	Fundamentals of Communication & Basic LSRW Skills	6 hours

- **Listening:** Listening for specific information (MCQs)
- **Speaking:** Self-introduction; talking about likes and dislikes; greetings
- **Reading:** Skimming, scanning, and detailed comprehension
- **Writing:** Formal letters (job application), resume basics, problem–solution writing

Language Lab / Practical:

- Digital literacy: E- resources
- Practice: Self-introduction, JAM (Just a Minute)

UNIT II	Listening & Speaking Strategies in Context	6 hours

- **Listening:** Conversations, advertisements, small talks, TED talks, summarizing,
- **Speaking:** Impromptu talks, speech writing, mini-presentations, AI-based speaking and Pronunciation tools
- **Reading:** Identifying arguments and main ideas in texts
- **Writing:** Writing Instruction, Checklist Preparation, Paragraph writing,

Language Lab / Practical:

- Blog creation, online quizzes, and Kahoot activities
- Practice: Conversation Drills, Prompting Conversation

Listening: Note-taking from audio/text recitation

Speaking: Discussion on fear, society, and behaviour

Reading: Skimming, scanning, and interpretation of textual features

Writing: Reflective paragraph writing

UNIT III	Reading, Technical Writing & Analytical Skills	6 hours

- **Listening:** Listening to debates/Academic discussions and extracting key points
- **Speaking:** Participating in group discussions, AI for Presentation using prompts
- **Reading:** Extracting specific information; note-making
- **Writing:** Framing open-ended /closed ended questions, sequencing sentences, Report writing, and précis writing

Language Lab / Practical:

- PowerPoint presentations, Slide Share tools
- Practice: Reading comprehension, report writing, statement of purpose

UNIT IV	Critical Thinking & Presentation	6 hours

- **Listening:** Understanding instructions, interpretations & recommendations
- **Speaking:** Formal presentations, public speaking
- **Reading:** Classification and interpretation of information
- **Writing:** Instructions, recommendations, user manuals

Language Lab / Practical:

- Online discussion forums and collaborative tools
- Practice: Book/film review, presentation delivery.

UNIT V	Professional & Workplace Communication	6 hours

- **Listening:** Workplace communication.
- **Speaking:** Group discussions, interviews, persuasive communication, negotiation
- **Reading:** Professional documents and job-related texts
- **Writing:** Cover letters, resumes, formal emails, Process Descriptions

Language Lab / Practical:

- Digital tools for communication and presentations
- Practice: Mock interviews, GDs

Total: 30 Hours

Self Learning: 30 Hours

Text Books

- Kumar, Sanjay, and Pushp Lata. *Communication Skills*. Pearson Education, 2018.
- Bovée, Courtland L., and John V. Thill. *Business Communication Today*. 14th ed., Pearson, 2020.
- Raman, Meenakshi, and Sangeeta Sharma. *Technical Communication: Principles and Practice*. 3rd ed., Oxford University Press, 2015.
- Kumar, Kulbhushan. *Effective Communication Skills*. Khanna Publishing House, 2018.
- Mohan, Krishna, and Meera Banerji. *Developing Communication Skills*. 2nd ed., Macmillan Education, 2018.

References

- Sharma, R. C., and Krishna Mohan. *Business Correspondence and Report Writing: A Practical Approach to Business and Technical Communication*. 5th ed., McGraw-Hill Education, 2017.
- Mitra, Barun K. *Personality Development and Soft Skills*. 2nd ed., Oxford University Press, 2016.
- Sasikumar, V., P. Kiranmai Dutt, and Geetha Rajeevan. *A Course in Listening and Speaking I*. Cambridge University Press, 2005.
- Murphy, Raymond. *English Grammar in Use*. 5th ed., Cambridge University Press, 2019.
- Lewis, Norman. *Word Power Made Easy*. Revised ed., Goyal Publishers & Distributors, 2014.

Websites

- Purd Online Writing Lab. "OWL." *Purdue University*, https://owl.puPPRDue.edu/.
- TED. "TED Talks." *TED Conferences*, https://www.ted.com/talks.
- British Council. *Learn English*. British Council ,https://learnenglish.britishcouncil.org/

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand basic communication skills including listening, speaking, reading, and writing fundamentals.	K1
CO2	Apply listening and speaking strategies in real-life and academic communication contexts.	K2
CO3	Analyze reading and writing skills for technical communication, reports, and academic tasks.	K4
CO4	Evaluate critical thinking and presentation skills for effective communication and interpretation.	K5
CO5	Apply professional communication skills including interviews, group discussions, and workplace writing.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	-	-	**2**	-	-	-
CO2	-	-	-	-	-	-	-	**3**	-	-	-
CO3	-	**2**	-	-	-	-	-	**3**	-	-	**2**
CO4	-	**2**	-	-	-	-	-	**3**	**2**	-	-

CO5	-	-	-	-	-	2	-	3	3	-	-
Avg	-	2	-	-	-	2	-	2.8	2.5	-	2

	DATA STRUCTURES	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- Understand the fundamental concepts of Data Structures and their applications.
- Develop problem-solving skills using Data Structures.
- Implement Data Structures using C programming language.

UNIT I		9 Hours

Introduction and Overview: Definition, Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Trade-off. **Arrays:** Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, Selection Sort, and Insertion Sort. Two-Dimensional Arrays, Representation of Two- Dimensional Arrays in Memory, Matrices and Sparse Matrices, Multi-Dimensional Arrays.

UNIT II		9 Hours

Linked Lists: Definition, Comparison with Arrays, Representation, and Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List. Applications of Linked Lists: Addition of Polynomials. **Hashing and Collision:** Hashing, Hash Tables, Types of Hash Functions, Collision, and Collision Resolution with Open Addressing and Chaining.

UNIT III		9 Hours

Stacks: Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List, Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Postfix Expression, Evaluation of Postfix Expression. **Recursion:** Definition, Recursive Notation, Runtime Stack, Applications of Recursion: Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi.

UNIT IV		9 Hours

Queues: Definition, Representation of Queues using Array and Linked List, Types of Queue: Simple Queue, Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.

UNIT V		9 Hours

Graphs: Definition, Terminology, Representation, Traversal.**Trees:** Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree, Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.

Total: 45 Hours

Self-Learning: 45 Hours

TEXT BOOKS:

1. R.B. Patel, “Expert Data Structures with C”, Khanna Book Publishing Company, 2023 (AICTE Recommended Textbook)
2. Seymour Lipschutz, “Data Structures with C”, Schaum’s Outlines, Tata McGraw-Hill, 2011.
3. Yashavant Kanetkar, "Data Structures Through C", 4th Edition, BPB Publications, 2022.

REFERENCE BOOKS:

1. Reema Thareja, “Data Structures Using C", Second Edition, Oxford University Press, 2014.
2. Ellis Horowitz, Sartaj Sahni, and Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, Universities Press, 2007.

WEB LINKS:

1. WWW.GeeksforGeeks.org – Data Structures and Algorithm
2. WWW.Programiz.com – Data Structures Tutorial
3. WWW.TutorialsPoint.com – Data Structures Tutorial
4. WWW.Javatpoint.com – Data Structures using C
5. WWW.W3Schools.com – Data Structures and Algorithms

NPTEL LINKS:

1. https://nptel.ac.in/courses/106102064

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand the fundamental concepts of Data Structures and their applications.	K2
CO2	Develop problem-solving skills using Data Structures.	K3
CO3	Implement Data Structures using C programming language.	K3
CO4	Compare different data structures for time and space complexity in solving computational problems.	K4

CO5	Apply appropriate data structures such as trees, graphs, and hashing techniques for real-world applications.	K5 / K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	-	-	-	-	2	-	3
CO3	3	-	2	-	-	-	-	-	2	-	3
CO4	3	3	2	-	-	-	-	-	2	-	3
CO5	3	3	3	-	-	-	-	-	2	3	3
AVG	3	3	2.6	-	-	-	-	-	2	3	3

	DATA STRUCTURES LAB	L	T	P	SL	C
		0	0	2	2	1

COURSE OBJECTIVES

- To introduce fundamental data structures such as arrays, stacks, queues, linked lists, trees, and heaps for efficient data manipulation.
- To develop the ability to implement searching, sorting, and traversal algorithms in C with optimal time and space complexity.
- To enhance the understanding of non-linear data structures and their applications through coding and analysis of expressions, trees, and recursion.

PROGRAMMING EXCERSICE

1. Write a program for insertion and deletion operations in an array.
2. Write a program to search for an element in an array using Linear Search and Binary Search.
3. Write a program to sort an array using Bubble Sort, Selection Sort and Insertion Sort.
4. Write a program to merge two arrays.
5. Write a program to add and subtract two matrices.
6. Write a program to multiply two matrices.
7. Write a program to insert an element into a Singly Linked List:
   (a) At the beginning
   (b) At the end
   (c) At a specified position
8. Write a program to delete an element from a Singly Linked List:
   (a) At the beginning
   (b) At the end
   (c) A specified element
9. Write a program to perform the following operations in a Doubly Linked List:
   (a) Create

(b) Search for an element

10. Write a program to perform the following operations in a Circular Linked List:
    (a) Create
    (b) Delete an element from the end
11. Write a program to implement stack operations using an array.
12. Write a program to implement stack operations using a linked list.
13. Write a program to add two polynomials using a linked lists.
14. Write a program to evaluate a postfix expression using a stack.
15. Write a program to perform the following using recursion:
    (a) Find the factorial of a number
    (b) Find the GCD of two numbers
    (c) Solve Towers of Hanoi problem
16. Write a program to implement simple queue operations using an array.
17. Write a program to implement circular queue operations using an array.
18. Write a program to implement circular queue operations using a linked list.
19. Write a program to perform the following operations on a binary search tree.
    (a) Preorder Traversal
    (b) Inorder Traversal
    (c) Postorder Traversal
20. Write a program to perform insertion operation in a binary search tree.

Total: 15 Hours

Self-Learning: 15 Hours

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, 2008.
2. Reema Thareja, Data Structures Using C, 2nd Edition, Oxford University Press, 2014.
3. Seymour Lipschutz, Data Structures with C, Schaum's Outline Series, Tata McGraw-Hill Education, 2011.

REFERENCE BOOKS:

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2009.
2. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, 2nd Edition, Tata McGraw-Hill, 2008.
3. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education, 2007.

WEB LINKS:

1. WWW.GeeksforGeeks.org – Data Structures and Algorithms in C
2. WWW.Programiz.com – Data Structures Tutorial
3. WWW.TutorialsPoint.com – Data Structures using C
4. WWW.Javatpoint.com – Data Structures Tutorial
5. WWW.W3Schools.com – DSA Tutorial

NPTEL LINKS:

1. https://nptel.ac.in/courses/106102064

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand the concepts of various data structures (arrays, stacks, queues, trees, etc.) and their real-time applications.	K2
CO2	Apply algorithms like linear/binary search, stack/queue operations, and sorting techniques to solve structured problems in C.	K3
CO3	Analyze the performance and behavior of sorting and searching algorithms based on time and complexity.	K4
CO4	Implement dynamic data structures such as linked lists, trees, and stacks to solve complex problems.	K5 / K3
CO5	Evaluate postfix expressions, recursive structures, and traversal outputs for correctness and efficiency.	K5

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	3	-	-	-	-	2	-	-
CO2	3	-	-	3	-	-	-	-	2	-	3
CO3	3	3	-	3	-	-	-	-	2	3	3
CO4	3	3	3	3	-	-	-	-	3	3	3
CO5	3	3	-	3	-	-	-	-	2	-	3
AVG	3	3	3	3	-	-	-	-	2.2	3	3

	OPERATING SYSTEM	L	T	P	SL	C
		4	0	0	4	4

COURSE OBJECTIVES

- To understand the concepts, structure, services, and different types of operating systems.
- To learn process management, CPU scheduling, synchronization, deadlock handling, and memory management techniques.
- To analyze I/O management and disk scheduling algorithms for efficient resource utilization in operating systems.

UNIT I		12 Hours

Operating Systems Overview: Definition, Evaluation of O.S, Components & Services of OS, Structure, Architecture, types of Operating Systems, Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems.

Operating Systems Structures: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

UNIT II		12 Hours

Process Management: Process Definition, Process states, Process State transitions, Process Scheduling, Process Control Block, Threads, Concept of multithreads, Benefits of threads, Types of threads.

Process Scheduling: Definition, Scheduling objectives, Scheduling algorithms, CPU scheduling Preemptive and Non-preemptive Scheduling algorithms (FCFS, SJF and RR), Performance evaluation of the scheduling Algorithms

UNIT III		12 Hours

Process Synchronization: Introduction, Inter-process Communication, Race Conditions, Critical Section Problem, Mutual Exclusion, Semaphores, Monitors.

Deadlocks: System model, deadlock characterization, deadlock prevention, avoidance, Banker's algorithm, Deadlock detection, and recovery from deadlocks.

UNIT IV		12 Hours

Memory Management: Logical and Physical address map, Swapping, Memory allocation, MFT, MVT, Internal and External fragmentation and Compaction, Paging, Segmentation.

Virtual Memory: Demand paging, Page Replacement algorithms, Allocation of frames, thrashing.

UNIT V		12 Hours

I/O Management: Principles of I/O Hardware: Disk structure, Disk scheduling algorithms - FCFS,SSTF,SCAN,C-SCAN , LOOK and C- LOOK..

Total: 60 Hours

Self-Learning: 60 Hours

TEXT BOOKS:

1. Ekta Walia, Operating Systems Concepts, Khanna Publishing House, 2022.
2. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), Operating System Principles, 7th edition OR Later edition, Wiley India Private Limited, New Delhi.
3. Stallings (2006), Operating Systems, Internals and Design Principles, 5th edition, Pearson Education, India.

REFERENCE BOOKS:

1. Andrew S Tanenbaum, Modern Operating Systems, Third Edition, Prentice Hall India
2. Sumitabha Das, UNIX Concepts and Applications, 4th Edition, Tata McGraw-Hill.

WEB LINKS:

1. WWW.GeeksforGeeks.org – Operating Systems Tutorial.
2. WWW.TutorialsPoint.com – Operating System Tutorial.
3. WWW.Javatpoint.com – Operating System Tutorial.
4. WWW.Programiz.com – Computer Science and Operating System Concepts.
5. WWW.W3Schools.com – Computer Science Fundamentals.

NPTEL LINKS:

1. https://nptel.ac.in/courses/106105214

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Explain the fundamentals of the operating system including its definition, components, services, structure, types, and generations.	K2

CO2	Comprehend multithreaded programming, CPU scheduling, process management, process synchronization, memory management, deadlocks, and storage management.	K2
CO3	Compare the performance of CPU scheduling algorithms such as FCFS, SJF, and Round Robin and evaluate their suitability for different scenarios.	K4
CO4	Identify the features of I/O management and apply file handling methods in an operating system environment.	K3
CO5	Evaluate disk structure and apply disk scheduling algorithms (FCFS, SSTF, SCAN, C-SCAN) to optimize I/O performance and manage secondary storage effectively.	K5

COURSE ARTICULATION MATRIX

	PO1	**PO2**	**PO3**	**P O4**	**PO5**	**PO6**	**PO7**	**PO 8**	**PO9**	**PSO1**	**PSO2**
CO1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	3
CO3	3	3	-	-	-	-	-	-	3	-	3
CO4	3	2	-	-	-	-	-	-	3	-	-
CO5	3	3	-	-	-	-	-	-	3	-	3
AVG	3	2.5	-	-	-	-	-	-	3	-	3

	OBJECT ORIENTED PROGRAMMING USING JAVA	L	T	P	SL	C
		3	0	0	3	3

COURSE OBJECTIVES

- To introduce the object oriented programming system concepts.
- To introduce syntax and semantics of Java programming language.
- To develop modular programs using Java.
- To setup JDK environment to create, debug and run Java programs.

UNIT I		9 Hours

Fundamentals of Object Oriented Programming: Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. **Java Evolution:** Java Features, Difference between Java, C and C++, Javaand Internet, Java Environment.**Overview of Java Language:** Introduction to Simple Java Program, Use ofComments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements, Implementing Java programAnd JVM, Command Line Arguments.

UNIT II		9 Hours

Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Typecasting. **Operators & Expressions:** Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence & Associativity. **Decision Making, Branching & Looping:** Decision Making with Control Statements, Looping statements, Jump in loops, Labelled loops.

UNIT III		9 Hours

Classes, Objects and Methods: Defining Class, Methods Declaration,Constructors, Methods Overloading, Overriding Methods, Inheritance .**Arrays, Strings and Vectors:** 1D arrays, Creating an Array, 2D arrays, Strings,Vectors, Wrapper Classes, Enumerated Types **Inheritance:** Defining, extending classes, and Implementing Interfaces. Multipleinheritance and polymorphism

UNIT IV		9 Hours

Packages: Basics of packages, System packages, Creating and accessingpackages, Creating user defined packages, Adding class to a package.

UNIT V		9 Hours
Exception Handling: Using the main keywords of exception handling: try, catch,throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions		

Total: 45 Hours

Self-Learning: 45 Hours

TEXT BOOKS:

1. Balaguruswamy E. (2023). Programming with JAVA: A Primer. 7th edition. India: McGraw Hill Education
2. Schildt, H. (2022). Java: The Complete Reference. 12th edition.McGraw-Hill Education.

REFERENCE BOOKS:

1. Arunesh Goyal, The Essentials of JAVA, Khanna Book Publishing Company Private Limited, 2012.
2. Tanweer Alam, Core JAVA, Khanna Book Publishing Company Private Limited, 2015.
3. Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson,2008.
4. S. Malhotra and S. Choudhary, Programming in Java, 2nd Edition, OxfordUniversity Press, 2014.

WEB LINKS:

1. https://www.w3schools.com/java/.
2. http://www.java2s.com/.
3. https://onlinecourses.nptel.ac.in/noc22_cs47/preview

NPTEL LINKS:

1. https://nptel.ac.in/courses/106105191

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Understand the fundamentals of Object-Oriented Programming and distinguish Java from other languages like C and C++.	K2
CO2	Apply decision-making, branching, and looping concepts using Java control structures and operators.	K3
CO3	Develop Java applications using classes, objects, constructors, arrays, strings, and implement polymorphism and inheritance.	K3

CO4	Create user-defined packages to organize Java programs efficiently.	K6
CO5	Implement robust applications by handling exceptions and defining custom exception classes in Java.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	-	-	-	-	2	-	-
CO3	3	3	3	-	-	-	-	-	3	-	3
CO4	3	3	3	-	-	-	-	-	3	-	3
CO5	3	2	3	-	-	-	-	-	3	-	3
AVG	3	2.5	3	-	-	-	-	-	2.6	-	3

	OBJECT ORIENTED PROGRAMMING USING JAVA LAB	L	T	P	SL	C
		0	0	2	2	1

COURSE OBJECTIVES

- To introduce students to fundamental Java programming concepts including control structures, data handling, and object-oriented programming.
- To provide hands-on experience in applying Java features such as inheritance, polymorphism, packages, and exception handling through practical programs.
- To enable students to build real-time applications by implementing reusable Java code with strong logical and problem-solving capabilities.

PROGRAMMING EXCERSICE

1. Write a program to read two numbers from user and print their product.
2. Write a program to print the square of a number passed through commandline arguments.
3. Write a program to send the name and surname of a student through command line arguments and print a welcome message for the student.
4. Write a java program to find the largest number out of n natural numbers.
5. Write a java program to find the Fibonacci series & Factorial of a number using recursive and non recursive functions.
6. Write a java program to multiply two given matrices.
7. Write a Java program for sorting a given list of names in ascending order.
8. Write a Java program that checks whether a given string is a palindrome or not . Ex:MADAM is a palindrome.
9. Write a java program to read n number of values in an array and display it in reverse order.
10. Write a Java program to perform mathematical operations. Create a class called AddSub with methods to add and subtract. Create another class called MulDiv that extends from AddSub class to use the member data of the superclass. MulDiv should have methods to multiply and divide A main function should access the methods and perform the mathematical operations.
11. Create a JAVA class called Student with the following details as variables within it.
    a. USN, NAME, BRANCH, PHONE, PERCENTAGE
    b. Write a JAVA program to create n Student objects and print the USN,Name, Branch, Phone, and percentage of these objects with suitable headings.

12. Write a Java program that displays the number of characters, lines and wordsin a text.
13. Write a Java program to create a class called Shape with methods called getPerimeter() and getArea(). Create a subclass called Circle that overrides the getPerimeter() and getArea() methods to calculate the area and perimeterof a circle.
14. Write a Java program to create a class Employee with a method called calculateSalary(). Create two subclasses Manager and Programmer. In eachsubclass, override the calculateSalary() method to calculate and return the salary based on their specific roles.
15. Write a Java program using an interface called 'Bank' having function 'rate_of_interest()'. Implement this interface to create two separate bank classes 'SBI' and 'PNB' to print different rates of interest. Include additional member variables, constructors also in classes 'SBI' and 'PNB'.

Total: 15 Hours

Self Learning : 15 Hours

TEXT BOOKS:

1. E. (2023). Programming with JAVA: A Primer. 7th edition. India: McGraw Hill Education

2. Schildt, H. (2022). Java: The Complete Reference. 12th edition.McGraw-Hill Education.

REFERENCE BOOKS:

1. Arunesh Goyal, The Essentials ofJAVA, Khanna Book Publishing Company Private
2. Limited, 2012.
3. Tanweer Alam, Core JAVA, Khanna Book Publishing Company Private Limited, 2015.
4. Y. DanielLiang, Introduction to Java Programming, 7thEdition, Pearson,2008.
5. S. Malhotra and S. Choudhary, Programming in Java, 2nd Edition, OxfordUniversity Press, 2014.

WEB LINKS:

1. https://www.w3schools.com/java

2. http://www.java2s.com

3. https://onlinecourses.nptel.ac.in/noc22_cs47/pre

NPTEL LINKS:

1. https://nptel.ac.in/courses/106105191

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Develop Java programs using operators, control statements, arrays, and command line arguments to solve computational problems.	K3
CO2	Implement recursive and non-recursive techniques, matrices, and string operations in Java applications.	K3
CO3	Apply object-oriented concepts such as classes, objects, inheritance, and polymorphism in Java programming.	K3
CO4	Create modular and reusable Java applications using constructors, methods, interfaces, and user-defined classes.	K6
CO5	Analyze sorting, file handling, and text processing techniques in Java programs.	K34

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	3	-	-	3	-	-	-	-	-	-	-
CO2	3	-	-	3	-	-	-	-	-	-	-
CO3	3	-	3	3	-	-	-	-	3	-	3
CO4	3	3	3	3	-	-	-	-	3	-	3
CO5	3	3	-	3	-	-	-	-	-	-	-
AVG	3	3	3	3	-	-	-	-	3	-	3

	UNIVERSAL HUMAN VALUE	L	T	P	SL	C
		1	0	0	1	1

COURSE OBJECTIVES

- The candidates will be able to appreciate the complementarity between the values and skills for sustained happiness and prosperity.
- To influence the students to approach the life and profession with a holistic perspective towards a value-based living in a natural way.
- To highlight plausible implications of holistic understanding of ethical human conduct.

UNIT I	INTRODUCTION TO VALUE EDUCATION	5 Hours

Living a fulfilling life. Value education. Skill education. Complementarity of Values and Skills. Development of a holistic perspective. Right understanding, relationship and physical facility. Understanding the happiness and prosperity.

UNIT II	HARMONY AT MULTIPLE LEVELS	5 Hours

Human being as co-existence of the self and the human body. Understanding harmony in the self. Harmony in the family and understanding values in human-human relationships. Harmony in the society and understanding universal human order. Harmony in nature and understanding the interconnectedness, self-regulation and mutual fulfillment. Harmony in existence and understanding co-existence at various levels.

UNIT III	IMPLICATIONS OF THE RIGHT UNDERSTANDING	5 Hours

Ethical human conduct. Implications of value-based living. Right understanding of professional ethics. Humanistic education. Holistic technologies, production systems and management models. Strategies for transition towards value-based life and profession.

Total: 15 Hours

Self-Learning: 15 Hours

TEXT BOOKS:

1. R.R. Gaur, R. Asthana, G.P. Bagaria. (2023). A Foundation Course in Human Values and Professional Ethics. 3rd Revised Edition. Excel Books.New Delhi.

REFERENCE BOOKS:

1. Rakesh Gupta. (2008). Jeevan Vidya: An Introduction (Introductory Book to Madhyasth.)
2. Darshan-Coexistentialism). English Version. N. Tripathi. (2004). Human Values. First Edition. New Age International Publishers, New Delhi.

WEB LINKS:

1. WWW.AICTE-India.org – Universal Human Values
2. WWW.UHV.org.in – Universal Human Values Foundation
3. WWW.GeeksforGeeks.org – Professional Ethics and Human Values
4. WWW.TutorialsPoint.com – Professional Ethics Tutorial
5. WWW.NIOS.ac.in – Value Education Resources

NPTEL LINKS:

1. https://nptel.ac.in/courses/109104068

COURSE OUTCOMES

After completion of the course, the student will be able to:

COURSE OUTCOMES	DESCRIPTION	KNOWLEDGE LEVEL
CO1	Develop qualities like responsibility and the ability to handle problems with sustainable solutions.	K5
CO2	Appraise human values and the harmony at various levels.	K5
CO3	Apply critical thinking to analyse and resolve multi-level ethical conflicts.	K4
CO4	Develop qualities pertaining to value-based living.	K3
CO5	Apply what they have learnt to their own self in real life settings.	K3

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	P O4	PO5	PO6	PO7	PO 8	PO9	PSO1	PSO2
CO1	-	-	-	-	-	3	3	2	3	-	-

CO2	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**3**	**3**	**-**	**-**
CO3	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**3**	**-**	**-**
CO4	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**3**	**-**	**-**
CO5	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**3**	**-**	**-**
AVG	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**2.2**	**3**	**-**	**-**