M.A.M SCHOOL OF ENGINEERING

(Autonomous)

(Accredited by NAAC || Approved by AICTE || Affiliated to Anna University)

Trichy – Chennai Trunk Road, Siruganur, Tiruchirappalli – 621 105

UG CURRICULUM

(I to VIII SEMESTERS)

B.TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Choice Based Credit System (CBCS)

(For the students admitted during the Academic year 2024- 25 and onwards)

REGULATIONS 2024

M.A.M SCHOOL OF ENGINEERING

(AUTONOMOUS)

REGULATIONS 2024

CHOICE BASED CREDIT SYSTEM

B.TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

I. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1.Utilize their proficiencies in the fundamental knowledge of basic sciences, mathematics, Artificial Intelligence, data science and statistics to build systems that require management and analysis of large volumes of data.

2.Advance their technical skills to pursue pioneering research in the field of AI and Data Science and create disruptive and sustainable solutions for the welfare of ecosystems.

3.Think logically, pursue lifelong learning and collaborate with an ethical attitude in a multidisciplinary team

4.Design and model AI based solutions to critical problem domains in the real world.

5.Exhibit innovative thoughts and creative ideas for effective contribution towards economy

II.PROGRAM OUTCOMES (POs)

PO1	Engineering Knowledge: Apply the knowledge of mathematics ,science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences ,and engineering sciences.
PO3	Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public healthand safety, and the cultural, societal, and environmental considerations.
PO4	Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern Tool Usage:Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6	The Engineer and Society:Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and Sustainability:Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and Teamwork: Function effectively as an individual, and as member or leader in diverse teams, and in multi-disciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long Learning :Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

III.PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1	Evolve AI based efficient domain specific processes for effective decision making in several domains such as business and governance domains.
PSO2	Arrive at actionable Foresight, Insight, hindsight from data for solving business and engineering problems
PSO3	Create, select and apply the theoretical knowledge of AI and Data Analytics along with practical industrial tools and techniques to manage and solve wicked societal problems
PSO4	Develop data analytics and data visualization skills, skills pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence be capable of coordinating complex projects.
PSO5	Able to carry out fundamental research to cater the critical needs of the society through cutting edge technologies of AI.

CURRICULUM

M.A.M SCHOOL OF ENGINEERING

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

REGULATIONS 2024

CHOICE BASED CREDIT SYSTEM

(Students admitted from the Academic Year 2024 – 25 onwards) I TO VIII SEMESTERS

CURRICULUM

Induction Program (Mandatory)	3 weeks duration
Induction program for students to be offered right at the start of the first year	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch& Innovations

B.TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

SEMESTER I

S.No	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
THEORY COURSES										
1.	24HS101	Communicative English	3	0	0	3	40	60	100	HS
2.	24BS101	Matrices & Calculus	3	1	0	4	40	60	100	BS
3.	24ES104	Programming in C	3	0	0	3	40	60	100	ES
4.	24HS102	Heritage of Tamil	1	0	0	1	40	60	100	HS
THEORY COURSES WITH LABORATORY COMPONENT										
5.	24BS102	Engineering Chemistry	3	0	2	4	50	50	100	BS
LABORATORY COURSES										
6.	24HS103	Communicative English Laboratory	0	0	2	1	60	40	100	HS
7.	24ES105	Programming in C Laboratory	0	0	4	2	60	40	100	ES
8.	24ES106	Engineering Practices lab	0	0	2	1	60	40	100	ES
9.	24ES107	Workshop Practices Lab	0	0	2	1	60	40	100	ES
		TOTAL	13	1	12	20				

SEMESTER II

THEORY COURSES

S.No	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
1.	24BS202	Discrete Mathematics	3	1	0	4	40	60	100	BS
2.		Language Elective	2	0	0	2	40	60	100	HS
3.	24HS201	Tamils and Technology	1	0	0	1	40	60	100	HS
4.	24ES201	Design Thinking	2	0	0	2	40	60	100	ES
5.	24ES208	Python Programming	3	0	0	3	40	60	100	ES
THEORY COURSES WITH LABORATORY COMPONENT										
6.	24BS203	Physics for Engineers	3	0	2	4	50	50	100	BS
7.	24ES210	Data Structures & Algorithms	3	0	2	4	50	50	100	ES
LABORATORY COURSES										
8.	24ES209	Python Programming Laboratory	0	0	4	2	60	40	100	ES
9	24ES205	Engineering Drawing	0	0	4	2	60	40	100	ES
10.	24TP201	Aptitude Skills and Communication skills I	0	0	2	1	100		100	EEC
		TOTAL	17	1	14	25				

SEMESTER III

THEORY COURSES

S.No	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
1.	24BS301	Statistics &Numerical Methods	3	1	0	4	40	60	100	BS
2.	24AD301	Fundamentals of AI	3	0	0	3	40	60	100	PC
3.	24CS302	Java Programming	3	0	0	3	40	60	100	PC
4.	24AD302	Data Exploration and Visualization	3	0	0	3	40	60	100	PC
THEORY COURSES WITH LABORATORY COMPONENT										
5.	24CS304	Design and Analysis of Algorithm's	3	0	2	4	50	50	100	PC
6.	24CS305	Digital Principles and System Design	3	0	2	4	50	50	100	PC
LABORATORY COURSES										
7.	24 AD303	AI Lab	0	0	4	2	60	40	100	PC
8.	24 CS307	Java Programming Lab	0	0	4	2	60	40	100	PC
9.	24TP301	Aptitude Skills and Communication skills II	0	0	2	1	100		100	EEC
		TOTAL	18	1	14	26				

SEMESTER IV										
THEORY COURSES										
S.No	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
1.	24AD401	Statistics for Data Science and Analytics	3	0	0	3	40	60	100	PC
2.	24CS402	Database Management Systems	3	0	0	3	40	60	100	PC
3.	24AD402	Machine Learning	3	0	0	3	40	60	100	PC
4.	24MC401	Environmental Science	3	0	0	0	40	60	100	MC
THEORY COURSES WITH LABORATORY COMPONENT										
5.	24AD403	Operating Systems	3	0	2	4	50	50	100	PC
6.	24CS405	Object Oriented Software Engineering	3	0	2	4	50	50	100	PC
LABORATORY COURSES										
7.	24AD404	Machine Learning Lab	0	0	4	2	60	40	100	PC
8.	24CS407	Database Management Systems Lab	0	0	4	2	60	40	100	PC
9.	24TP401	Aptitude Skills III & Technical Skills I	0	0	2	1	100	-	100	EEC
		TOTAL	18	0	14	22				

SEMESTER V										
THEORY COURSES										
S.No	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
1.	24CS501	Embedded System and IOT	3	0	0	3	40	60	100	PC
2.	24AD501	Computer Networks	3	0	0	3	40	60	100	PC
3.	-	Professional Elective-I	3	0	0	3	40	60	100	PE
4.	-	Professional Elective-II	3	0	0	3	40	60	100	PE
5.	-	Open Elective-I	3	0	0	3	40	60	100	OE
THEORY COURSES WITH LABORATORY COMPONENT										
6.	24AD502	Big Data Analytics	3	0	2	4	50	50	100	PC
LABORATORY COURSES										
7.	24AD503	Computer Networks Lab	0	0	4	2	60	40	100	PC
8.	24AD504	Internship	0	0	0	2	100	-	100	EEC
9.	24TP501	Aptitude Skills IV & Technical Skills II	0	0	2	1	100	-	100	EEC
		TOTAL	18	0	8	24				

SEMESTER VI										
THEORY COURSES										
S.No	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
1.	24HS601	Principles of Management	3	0	0	3	40	60	100	HS
2.	-	Professional Elective–III	3	0	0	3	40	60	100	PE
3.	-	Professional Elective–IV	3	0	0	3	40	60	100	PE
4.	-	Open Elective–II	3	0	0	3	40	60	100	OE
THEORY COURSES WITH LABORATORY COMPONENT										
5.	24AD601	Deep Learning	3	0	2	4	50	50	100	PC
6.	24AD602	Mobile Application and Development	3	0	2	4	50	50	100	PC
LABORATORY COURSES										
7.	24AD603	Design an App	0	0	4	2	60	40	100	EEC
8.	24TP601	Aptitude Skills V & Technical Skills III	0	0	2	1	100	-	100	EEC
		TOTAL	18	0	10	23				

SEMESTER VII										
THEORY COURSES										
S.NO	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
1.	24HS701	Human Values and Ethics	3	0	0	3	40	60	100	HS
2.	24AD701	Mining of massive data sets	3	0	0	3	40	60	100	PC
3.	-	Professional Elective–V	3	0	0	3	40	60	100	PE
4.	-	Open Elective–III	3	0	0	3	40	60	100	OE
		TOTAL	12	0	0	12				

SEMESTER VIII										
S.NO	Course Code	Course	L	T	P	C	Maximum Marks			Category
							CA	ES	Total	
LABORATORY COURSES										
1.	24AD801	Project Work	0	0	20	10	60	40	100	EEC
		TOTAL	0	0	20	10	60	40	100	

PROFESSIONAL ELECTIVE COURSES						
S.No	CourseCode	Course	L	T	P	C
VERTICAL I PROGRAMME SPECIFIC ELECTIVE 1						
1.	24CSX16	Image Processing and Computer Vision	3	0	0	3
2.	24CSX11	Natural Language Processing	3	0	0	3
3.	24ADX01	Predictive Analytics	3	0	0	3
4.	24ADX02	AI for Game Programming	3	0	0	3
5.	24ADX03	Healthcare Analytics	3	0	0	3
6.	24ADX04	Social Media Analytics	3	0	0	3
7.	24CSX15	Image and Video Analytics	3	0	0	3
8.	24CSX22	Digital Marketing				
VERTICAL II PROGRAMME SPECIFIC ELECTIVE 2						
9.	24ADX05	Bio Informatics	3	0	0	3
10.	24ADX06	Cognitive Science	3	0	0	3
11.	24ADX07	Customer Analytics and Opinion Mining	3	0	0	3
12.	24ADX08	Human Computer Interaction	3	0	0	3
13.	24ADX09	Explorative and Forecasting Analytics	3	0	0	3
14.	24ADX10	Information Visualization	3	0	0	3
15.	24CSX13	Text and Speech Analysis	3	0	0	3
16.	24CSX20	User Interface Design				

S.No	CourseCode	Course	L	T	P	C
		VERTICAL III **(VIRTUAL AND AUGMENTED REALITY)**				
17.	24CSX17	Augmented Reality and Virtual Reality	3	0	0	3
18.	24CSX18	Data Visualization	3	0	0	3
19.	24CSX19	Game Development	3	0	0	3
20.	24CSX20	User Interface Design	3	0	0	3
21.	24CSX21	Graphics and Multimedia	3	0	0	3
22.	24CSX22	Digital Marketing	3	0	0	3
23.	24CSX23	Visual Effects	3	0	0	3
24.	24CSX24	Film Making and Radio Podcasting	3	0	0	3
		VERTICAL IV **(FULL STACK DEVELOPMENT)**				
25.	24ITX01	Software Testing	3	0	0	3
26.	24ITX02	DevOps	3	0	0	3
27.	24ITX03	C# and .Net Framework	3	0	0	3
28.	24ITX04	Internet of Things	3	0	0	3
29.	24ITX05	UI and UX Design	3	0	0	3
30.	24ITX06	Software Project Management	3	0	0	3
31.	24ITX07	Ubiquitous Computing	3	0	0	3
32.	24ITX08	Graphics and Multimedia	3	0	0	3
		VERTICAL V **(CYBER SECURITY)**				
33.	24CSX01	Security Assessment and Risk Analysis	3	0	0	3
34.	24CSX02	Malware Detection and Analysis	3	0	0	3
35.	24CSX03	Ethical Hacking and Security	3	0	0	3
36.	24CSX04	Digital and Mobile Forensics	3	0	0	3
37.	24CSX05	Crypto currency and Block chain Technologies	3	0	0	3
38.	24CSX06	Security and Privacy in Cloud	3	0	0	3
39.	24CSX07	Social Network Security	3	0	0	3
40.	24CSX08	Web Application Security	3	0	0	3

S.No	CourseCode	Course	L	T	P	C
VERTICAL VI (CLOUD COMPUTING AND DATA PROCESSING TECHNOLOGIES)						
41.	24CSX33	Foundation of Cloud Computing	3	0	0	3
42.	24CSX34	Data Storage and Management in Cloud	3	0	0	3
43.	24CSX35	Virtualization Techniques	3	0	0	3
44.	24CSX36	Security and Privacy in Cloud	3	0	0	3
45.	24CSX37	Data Analysis in Cloud Computing	3	0	0	3
46.	24CSX38	Edge Computing	3	0	0	3
47.	24CSX39	Cloud Service Management	3	0	0	3
48.	24CSX40	Big Data Integration and Processing	3	0	0	3

OPEN ELECTIVES I						
S.No	**Course Code**	**Course**	**L**	**T**	**P**	**C**
1.	24ADY01	Introduction to Data Science	3	0	0	3
2.	24ADY02	Python with Power BI	3	0	0	3
3.	24CSY01	Digital Engineering	3	0	0	3
4.	24CSY02	Assistive Technology	3	0	0	3
5.	24CSY03	Computational Thinking	3	0	0	3
OPEN ELECTIVES II						
S.No	**Course Code**	**Course**	**L**	**T**	**P**	**C**
1.	24CSY06	Graph Theory	3	0	0	3
2.	24CSY07	IT Project Management	3	0	0	3
3.	24CSY08	Recommender Systems	3	0	0	3
4.	24CSY09	Agile Methodologies	3	0	0	3
5.	24CSY10	Software Testing Tools and Techniques	3	0	0	3
OPEN ELECTIVES III						
S.No	**Course Code**	**Course**	**L**	**T**	**P**	**C**
1.	24CSY11	IT in Agricultural System	3	0	0	3
2.	24CSY12	Bockchain Technologies	3	0	0	3
3.	24CSY13	Next Generation Networks	3	0	0	3
4.	24CSY14	Generative AI	3	0	0	3
5.	24CSY15	Robotics	3	0	0	3

S.No.	Category	Credits Per Semester								Total Credit	Credits in%
		I	II	III	IV	V	VI	VII	VIII		
1	HS	5	3				3	3		14	8.6
2	BS	8	8	4						20	12.3
3	ES	7	13							20	12.3
5	PC			21	21	12	8	3		65	40.1
6	PE					6	6	3		15	9.2
7	OE					3	3	3		9	5.5
8	EEC		1	1	1	3	3		10	19	11.7
9	MC				0					0	0
Total		20	25	26	22	24	23	12	10	162	100

HS–Humanities and Social Science

BS–Basic Science

ES–Engineering Science

PC–Professional Core

PE –Professional Elective

OE–Open Elective

EEC–Employability Enhancement Course

MC–Mandatory course

CA–Continuous Assessment

ES–End Semester Examination

R 2024	SCIENCE & HUMANITIES					SEMESTER: I
24HS101	COMMUNICATIVE ENGLISH - I	L	T	P	C	HS
		3	0	0	3	

COMMON TO: ALL PROGRAMS

COURSE OBJECTIVES:

The objectives of learning this course are to:

- ✓ Enable learners to use words appropriately in their communication.
- ✓ Enhance learners' grammatical accuracy in communication.
- ✓ Develop learners ability to read and listen to texts in English.
- ✓ Strengthen the communication skills of the learners.
- ✓ Help learners write appropriately in professional contexts

COURSE OUTCOMES:

At the end of this course, students are able to

CO1: Understand the basic grammatical structures and apply them in right context

CO2: Identify and report cause and effects in events, industrial processes through technical texts.

CO3: Apply appropriate words in a professional context.

CO4: Interpret information presented in tables, charts and other graphic forms.

CO5: Draft effective resumes in the context of job search.

UNIT: I	BASICS OF LANGUAGE	9

Reading - Reading brochures (technical context), telephone messages advertisements, user manuals. **Writing** - Sequential Writing – connecting ideas using transitional words (Jumbled Sentences), **Gramma**r – basics; parts of speech, Simple Tenses – Form, Function and Meaning;
Vocabulary - Synonyms; One word substitution

Pedagogical Tools	Black board, chalk, group discussion, role play, youtube videos, NPTEL videos

UNIT: II	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION	9

Reading - Reading biographies, travelogues, newspaper reports, **Writing** -Cause and Effect Essays, **Grammar**: Continuous Tenses, Subject-Verb Agreement, Idioms; **Vocabulary:** Antonyms,
Language puzzles.

Pedagogical Tools	Black board, chalk, group discussion, role play, youtube videos, NPTEL videos

UNIT: III	NARRATION AND SUMMATION	9

Reading – Reading advertisements, Case Studies, **Writing**- Check-list, Instructions. **Grammar**: Perfect Tenses, Imperatives; Adjectives, **Vocabulary:** Language Games/ Group Discussion.

Pedagogical Tools:	Black board, chalk, group discussion, role play, youtube videos, NPTEL videos

UNIT: IV	REPORTING OF EVENTS AND RESEARCH	9

Reading –Newspaper articles; **Writing** – Recommendations, Transcoding **Grammar** – Reported Speech, Pronouns - Possessive & Relative pronouns, **Vocabulary:** Oral Presentation.

Pedagogical Tools	Black board, chalk, group discussion, role play, youtube videos, NPTEL videos

UNIT: V	THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY	9

Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; **Writing** – Job / Internship application – Cover letter & Resume; **Grammar** – Numerical adjectives, Relative Clauses. Degrees of comparison, Phrasal Verbs; **Vocabulary:** Informal Vocabulary and Formal Substitutes.

Pedagogical Tools	Black board, chalk, group discussion, role play, youtube videos, NPTEL videos

Total Periods :45

TEXT BOOKS:

Sl.No	Authors	Title of the Book	Publisher	Year of publication
1	Raymond, Murphy	English Grammar in Use (5th Edition)	Cambridge Press: New York	2019
2	Dr. KN. Shoba, and Dr. Lourdes Joevani	English for Science & Technology	Cambridge University Press	2021

REFERENCE BOOKS:

Sl.No	Authors	Title of the Book	Publisher	Year of publication
1	Meenakshi Raman & Sangeeta Sharma	Technical Communication Principles And Practices	Oxford Univ. Press	2016
2	Lakshmi Narayanan	A Course Book on Technical English	Scitech Publications (India) Pvt. Ltd.	2017
3	Kulbhusan Kumar	Effective Communication Skill	R S Salaria, Khanna Publishing House.	2018

WEB LEARNING RESOURCES:

1 https://store.acolad.com/products/english-for-engineering

2 https://www.cambridge.es/en/catalogue/business-english/other-titles/cambridge-english-for/engineering

3 https://shipcon.eu.com/english-for-engineers/

4 https://www.udemy.com/course/english-for-engineers/

5 https://store.acolad.com/products/english-for-engineering

CO – PO – PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	1	1	-	-	-	-	3	-	-	-
CO2	-	3	-	-	-	-	3	3	-	3	-	3	-	-	-
CO3	-	-	-	-	2	-	2	-	-	3	-	3	-	-	-
CO4	-	-	-	-	-	3	-	1	2	3	-	3	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	3	3	-	-	-
AVG	-	3	-	-	2	2	2	2	2	3	3	3	-	-	-

R 2024	SCIENCE & HUMANITIES					SEMESTER: I
24BS101	MATRICES AND CALCULUS	L	T	P	C	BS
		3	1	0	4	

COMMON TO: ALL DEPARTMENTS

COURSE OBJECTIVES:

The objectives of learning this course are to:

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- Familiarize the student with functions of several variables. this is needed in many branches of engineering.
- Make the students understand various techniques of integration.
- Acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
- Make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.

COURSE OUTCOMES:

At the end of this course, students are able to

CO1: Apply the knowledge of matrices with the concepts of eigenvalues to study their problems in core areas

CO2: Apply the basic techniques and theorems function of several variables in other areas of mathematics

CO3: Apply different methods of integration in solving practical problems.

CO4: Apply multiple integral ideas in solving areas, volumes and other practical problems.

CO5: Solve basic application problems described by second and higher order linear differential equations with constant coefficients.

UNIT: I	MATRICES	9+3
Eigen values and Eigenvectors of a real matrix - Properties of Eigen values and Eigenvectors (without proof) - Statement and applications of Cayley- Hamilton theorem (without proof) - Diagonalization of matrices- Reduction of a quadratic form to canonical form by orthogonal transformation-Nature of quadratic forms.		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion	
UNIT: II	**FUNCTIONS OF SEVERAL VARIABLES**	**9+3**
Partial derivatives - Total derivative - Jacobian and properties - Taylor's series expansion for function of two variables - Extreme values of functions of two variables - Lagrange multipliers method.		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion	
UNIT: III	**INTEGRAL CALCULUS**	**9+3**
Definite and indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by Partial fraction, Integration of irrational functions		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion	
UNIT: IV	**MULTIPLE INTEGRALS**	**9+3**
Double integrals - Change of order of integration - Double integrals in polar coordinates - Triple integrals - Applications in area and volume (except spherical , cylindrical coordinates)		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion	
UNIT: V	**ORDINARY DIFFERENTIAL EQUATIONS**	**9+3**
Second and higher order linear differential equations with constant coefficients - Variable coefficients - Euler Cauchy equation - method of variation parameters.		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion	
		Total Periods :60

TEXT BOOKS:				
Sl. No	**Authors**	**Title of the Book**	**Publisher**	**Year of publication**
1	Kreyszig.E	Advanced Engineering Mathematics	John Wiley and sons, New Delhi	2016
2	Grewal B.S	Higher Engineering Mathematics	Khanna Publishers, New Delhi	2018
3	James Stewart	Calculus : Early Transcendentals	Cengage Learning, New Delhi	2015
REFERENCE BOOKS:				
Sl. No	**Authors**	**Title of the Book**	**Publisher**	**Year of Publication**
1	Bali.N, M.Goyal And Watkins.C	Advanced Engineering Mathematics	Lakshmi Publications, New Delhi	2015
2	Ramana B.V	Higher Engineering Mathematics	McGraw Hill Education, New Delhi	2016
3	Narayanan.S, Manicavasagam Pillai.T.K	Calculus	S.Vishwanathan Publishers, Chennai	2009
WEB LEARNING RESOURCES:				
1 https://nptel.ac.in/courses/111108157				
2 https://nptel.ac.in/courses/111104125				
3 https://nptel.ac.in/courses/111105121				
4 https://nptel.ac.in/courses/111104085				
5 https://nptel.ac.in/courses/111104521				
6 https://www.brainkart.com/subject/Matrices-and-Calculus_454/				
7 https://youtu.be/i8FukKfMKCI				
8 https://youtu.be/wRR715IkK-E				
9 https://youtu.be/iGJxxlyqrRM				
10 https://youtu.be/yyc4yhlFATk				
11 https://youtu.be/Ziu0y2kWTCM				

CO – PO – PSO MAPPING															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	3	3	1	1	-	-	-	-	-	-	-	3	-	-	-
CO2	3	3	1	1	-	-	-	-	-	-	-	3	-	-	-
CO3	3	3	1	1	-	-	-	-	-	-	-	3	-	-	-
CO4	3	3	1	1	-	-	-	-	-	-	-	3	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	2	-	-	-
AVG	3	3	1	1	-	-	-	-	-	-	-	3	-	-	-

R 2024	COMPUTER SCIENCE AND ENGINEERING					SEMESTER:I
24ES104	PROGRAMMING IN C	L	T	P	C	ES
		3	0	0	3	

Common to CSE, IT AND AI&DS Departments

COURSE OBJECTIVES:

The objectives of learning this course are:

- To understand the constructs of C Language.
- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop modular applications in C using functions
- To develop applications in C using pointers and structures
- To do input/output and file handling in C

COURSE OUTCOMES:

At the end of this course, students are able to:
CO1: Develop simple applications in C using basic constructs
CO2: Design and implement applications using arrays and strings
CO3: Develop and implement modular applications in C using functions.
CO4: Develop applications in C using structures and pointers.
CO5: Design applications using sequential and random access file processing

UNIT: I	BASICS OF C PROGRAMMING	9

Algorithm, and Flowchart for problem solving with Sequential Logic Structure – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Operators - Input/Output statements, Assignment statements – Control flow statements – Preprocessor directives - Compilation process, Library Functions.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: II	ARRAYS AND STRINGS	9

Introduction to Arrays: Declaration, Initialization - Passing Arrays to Functions – Multidimensional Arrays - String operations – NULL Character - Reading and Writing a String – Processing the Strings – Character arithmetic – Searching and Sorting of Strings - Selection sort, linear and binary search.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: III	FUNCTIONS AND POINTERS	9

Modular programming - Function prototype, function call, Built-in functions (string functions, math functions) - I/O functions - (Formatted scanf() & printf(), getchar (), putchar (), getche(), gets(), puts()) – Recursion – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Pointers as Function Arguments, Functions Returning Pointers - Parameter passing.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: IV	FILE PROCESSING	9

Files – Input/ Output Operations on Files - Error Handling During I/O Operations - Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: V	STRUCTURES AND UNION	9
Structure - Nested structures – Pointer and Structures – Array of structures – Self referential structures – Dynamic memory allocation – typedef – Union - STORAGE CLASSES: Storage classes-Automatic variables - External variables - Static variables.		
Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.	
		Total Periods : 45

TEXT BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	E Balagurusamy	Programming in ANSI C	Tata McGraw Hill	2010
2	Yashwant Kanetkar	Let us C	Notion Press	2020
3	ReemaThareja	Programming in C	Oxford University Press	2016

REFERENCE BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	Paul Deitel and Harvey Deitel	C How to Program with an Introduction to C++	BPB Publications	2018
2	Kernighan, B.W and Ritchie,D.M	The C Programming language	Pearson Education	2015
3	Byron S. Gottfried	Schaum's Outline of Theory and Problems of Programming with C	McGraw-Hill Education	21996

WEB LEARNING RESOURCES:

1. https://en.cppreference.com/w/c/language
2. https://www.programiz.com/c-programming
3. https://www.w3schools.com/c/
4. https://www.geeksforgeeks.org/c-programming-language/
5. https://www.javatpoint.com/c-programming-language-tutorial

CO PO PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	1	1	2	-	3	2	2	2	-
CO2	2	3	2	1	2	1	1	1	2	-	3	2	2	2	-
CO3	3	2	2	1	3	1	1	1	2	-	3	3	2	2	-
CO4	2	3	3	1	2	1	2	1	2	-	3	2	2	3	-
CO5	2	3	3	1	2	1	-	-	2	1	2	2	2	2	-
AVG	2	3	3	1	2	1	1.5	1	2	1	2.5	2.5	2	2.5	-

R 2024	SCIENCE & HUMANITIES					SEMESTER: I
24HS102	தமிழர் மரபு / Heritage of Tamil	L	T	P	C	HS
		1	0	0	1	

COMMON TO: ALL PROGRAMS

COURSE OBJECTIVES:

The objectives of learning this course are to

- ✓ Learn the Extensive literature of classical tamil
- ✓ Review the fine arts heritage of tamil culture
- ✓ Realize the contribution of tamil in Indian freedom struggle

COURSE OUTCOMES:

At the end of this course, students are able to

CO1: Understand the weaving and ceramic technology of ancient tamil people nature.

CO2: Understand the construction technology, building materials in sangam period and case studies.

CO3: Infer the metal process, coin and beads manufacturing with relevant archaeological evidence.

CO4: Realize the agriculture methods, irrigation technology and pearl diving.

CO5: Apply the knowledge of scientific tamil and tamil computing.

UNIT: I	LANGUAGE AND LITERATURE	3

Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan

Pedagogical Tools	Board & Chalk, PPT, NPTEL video, you tube video, Group Discussion

UNIT: II	HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE	3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion

UNIT: III	FOLK AND MARTIAL ARTS	3

Therukoothu, Karakattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather Puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Role Play

UNIT: IV	THINAI CONCEPT OF TAMILS	3

Flora and Fauna of Tamils & Agam and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age -Export and Import during Sangam Age - Overseas Conquest of Cholas.

Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion

UNIT: V	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video, Group Discussion

Total Periods :15

TEXT CUM REFERENCE BOOKS:				
Sl. No	**Authors**	**Title of the Book**	**Publisher**	**Year of publication**
1	Dr.K.K.Pillay	tamilnadu history people and culture	Tamilnadu Textbook and Education works Corporation	2019
2	EL Sundaram	Computer Tamil	Vikatanprasuram	2016
3	Dr.S.Singaravelu	Social Life of the Tamils - The Classical Period	International Institute of Tamil Studies.	2001
4	Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu	Historical Heritage of the Tamils	International Institute of Tamil Studies	2010
5	Dr.M.Valarmathi	The Contributions of the Tamils to Indian Culture	International Institute of Tamil Studies	2001
6		Keeladi - 'Sangam City Civilization on the banks of river Vaigai'	Department of Archaeology& Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu	2019
7	Dr. K. K. Pillay	Studies in the History of India with Special Reference to Tamil Nadu	The Author	1979
8		Porunai Civilization	Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu	2019
9	R.Balakrishnan	Journey of Civilization Indus to Vaigai	RMRL	2019
10	Dr.K.K.Pillay	Social Life of Tamils	A joint publication of TNTB & ESC and RMRL	1975

WEB LEARNING RESOURCES:
https://youtu.be/8J3UJXu4JZ0?si=ekqrc_x3J79C_MwI
https://www.youtube.com/live/WbnNQM2LNQA?si=S5YS3vXjIotIuDxp
https://www.youtube.com/live/10Z7NdBPAYU?si=Xbvjmr9wzfQBCHH6
https://www.youtube.com/live/xkrRTmvPsbY?si=Xdj6zDOA-Wl7Vu9j
https://youtu.be/ByHvsH0l080?si=O2HnEcVubA8tb5h8

CO – PO – PSO MAPPING															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
AVG	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-

R 2024	SCIENCE & HUMANITIES					SEMESTER: I
24BS102	ENGINEERING CHEMISTRY	L	T	P	C	BS
		3	0	2	4	

COMMON TO: AI & DS, CSE, ECE and IT

COURSE OBJECTIVES:

The objectives of learning this course are to:

- ✓ Inculcate sound understanding of water quality parameters and water treatment techniques.
- ✓ Introduce the basic concepts and applications of phase rule and alloys.
- ✓ Facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
- ✓ Familiarize the students with the different energy sources, operating principles, working processes and applications of energy conversion and storage devices.
- ✓ Impart knowledge on the basic principles and preparatory methods of nonmaterial.

COURSE OUTCOMES:

At the end of this course, students are able to

CO1: Understand the quality of water from quality parameter data, analyze and propose the suitable treatment methodologies to treat water.

CO2: Recognize different forms of energy resources and apply them for suitable applications in energy sectors.

CO3: Apply the knowledge of phase rule and alloys for material selection requirements.

CO4: Analyze and recommend suitable fuels for engineering processes and applications.

CO5: Apply basic concepts of nano science and nanotechnology in designing the synthesis of Nano materials.

UNIT: I	WATER TECHNOLOGY	9

Water: Sources, impurities and water quality parameters, Hardness of water – types – expression of hardness – units, Boiler troubles: Scale and sludge, Priming &foaming. Need for water treatment, Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment (Ion exchange or demineralization and zeolite process), Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis.

Pedagogical Tools	Chalk & Board, PPT, NPTEL Videos, youtube videos, Group Discussion

UNIT: II	ENERGY SOURCES AND STORAGE DEVICES	9

Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solarcells; Recent developments in solar cell materials. Wind energy; Basic Electrochemical Terminologies, Batteries: Types of batteries, Primary battery (dry cell), Secondary battery (lead acid battery and lithium-ion-battery);Electric vehicles– working principles; Fuel cells: H_2-O_2 fuel cell, Bio Fuel,microbial fuel cell; Super capacitors: Storage principle, types and examples.

Pedagogical Tools	Chalk & Board, PPT, NPTEL Videos, youtube videos, Group Discussion

UNIT: III	PHASE RULE AND ALLOYS	9

Phase rule: Introduction, definition of terms with examples. One component system - water system, sulphur system; Reduced phase rule; Construction of a simple eutectic phase diagram – Two component system: lead-silver system-Pattinson's process, $FeCl_3$-H_2O system.

Alloys: Introduction- Definition- properties of alloys- significance of alloying, Alloys-Nichrome and stainless steel (18/8) – heat treatment of steel. Introduction to composites – definition-types-uses.

Pedagogical Tools	Chalk & Board, PPT, NPTEL Videos, youtube videos, Group Discussion

UNIT: IV	FUELS AND COMBUSTION	9

Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Property - Knocking, Power alcohol and biodiesel (trans - esterification).

Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Flue gas analysis-ORSAT Method.CO_2 emission and carbon footprint.

Pedagogical Tools	Chalk & Board, PPT, NPTEL Videos, youtube videos, Group Discussion, Role Play

UNIT: V	NANO TECHNOLOGY	9

Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials: Definition, properties and uses of - nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, laser ablation, chemical vapour deposition, Analytical techniques- SEM, TEM, Applications of nanomaterials

Pedagogical Tools	Chalk & Board, PPT, NPTEL Videos, youtube videos, Group Discussion

	Total Periods :45
Practical Exercises: (Any six experiments to be conducted)	**Total Periods:30**
1. Preparation of Na_2CO_3 as a primary standard and determination of types and amount of alkalinity in water sample	
2. Determination of total, temporary & permanent hardness of water by EDTA method.	
3. Determination of chloride content of water sample by Argentometric method.	
4. Estimation of sodium /potassium present in water using a flame photometer.	
5. Estimation of copper content of the given solution by Iodometry	
6. Determination of strength of given hydrochloric acid using pH meter.	
7. Determination of strength of acids in a mixture of acids using conductivity meter.	
8. Estimation of iron content of the given solution using potentiometer	
9. Estimation of Nickel in steel	
	Total Periods :75

TEXT BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	P.C.Jain and Monica Jain	Engineering Chemistry	16th Edition,Dhanpat Rai Publishing Company (P) Ltd, New Delhi	2018
2	S.S. Dara	A Text book of Engineering Chemistry	S.Chand Publishing,12thEdition	2018
3	Vairam S, Kalyani P and Suba Ramesh	Engineering Chemistry	2nd Edition, Wiley India Pvt. Ltd., New Delhi	2014
4	J Mendham RC Denn MJK Thomas David J Barnes	Vogel's Textbook of Quantitative Chemical Analysis	Pearson Education	2018

REFERENCE BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	B.S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday	Text book of nano science and nanotechnology	Universities Press-IIM Series in Metallurgy and Materials Science	2018
2	Shikha Agarwal	Engineering Chemistry-Fundamentals and Applications	Cambridge University Press, Delhi, Second Edition	2019
3	O.G.Palanna	Engineering Chemistry	McGraw Hill Education (India) Private Limited, 2ndEdition	2017
4	Prasanta Rath	Engineering Chemistry	Cengage Learning India, Pvt., Ltd., Delhi. 1st Edition	2015

WEB LEARNING RESOURCES:

https://nptel.ac.in/courses/105106119 (Unit 1)
https://nptel.ac.in/courses/103103206 (Unit 2)
https://www.brainkart.com>article phase rule (Unit 3)
https://nptel.ac.in/courses/113/104/113104008/ (Unit 4)
https://nptel.ac.in/courses/104103019 (Unit 5)
https://www.brainkart.com/subject/engineering-chemistry_264/ (All Units)
https://www.youtube.com/watch?v=4RDA_B_dRQ0(Reverse Osmosis)
https://www.youtube.com/watch?v=XUzpG1-rJLA Bergius Process)
https://www.youtube.com/watch?v=2bDf7JSRvf8

https://www.youtube.com/watch?v=Pme64aNaE5A (Otto-Hoffmman Method)
https://www.youtube.com/watch?v=VxMM4g2Sk8U (Lithium ion Batteries)

CO – PO – PSO MAPPING															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
CO2	3	1	2	1	-			-	-	-	-	2	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	1	1	-	-	1	2	-	-	-	-	-	-	-	-
CO5	2	1	1		-	-	-	-	-	-	-	-	-	-	-
AVG	3	1	2	1	-	1	2	-	-	-	-	2	-	-	-

R 2024	SCIENCE & HUMANITIES					SEMESTER: I
24HS103	COMMUNICATIVE ENGLISH LABORATORY	L	T	P	C	BS
		0	0	2	2	

COMMON TO: ALL PROGRAMS

COURSE OBJECTIVES:

The objectives of learning this course are to:

- ✓ Improve the communicative competence of learners
- ✓ Help learners use language effectively in academic /work contexts
- ✓ Develop various listening strategies to comprehend various types of audio materials like
- ✓ Build on students' English language skills by engaging them in listening, speaking
- ✓ Use language efficiently in expressing their opinions via various media.

COURSE OUTCOMES:

At the end of this course, students are able to

CO1: Identify varied group discussion skills and apply them to take part in effective

CO2: Listen to and understand different points of view in a discussion

CO3: Speak fluently and accurately in formal and informal communicative contexts

CO4: Describe products and processes and explain their uses and purposes clearly and accurately

CO5: Express their opinions effectively in both formal and informal discussions

LIST OF EXPERIMENTS

1. Write about a self introduction for your future job opportunities
2. Write a telephonic conversation between a father and a son on "career"
3. Write a product description for a fire extinguisher
4. Give any one product user manual
5. Prepare a TED talk about artificial intelligence
6. Describe a famous person's inspirational you heard before in your life
7. Write about panel discussion
8. Write your view and opinion the solve the water scarcity

Total Periods :30

CO – PO – PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	1	-	-	-	-	3	-	-	-
CO2	-	3	-	-	-	-	3	3	-	3	-	3	-	-	-
CO3	-	-	-	-	2	-	2	-	-	3	-	3	-	-	-
CO4	-	-	-	-	-	3	-	1	2	3	-	3	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	3	3	-	-	-
AVG	-	3	-	-	-	1	-	1	1	-	3	3	-	-	-

R 2024	COMPUTER SCIENCE AND ENGINEERING					SEMESTER:I
24ES105	PROGRAMMING IN C LABORATORY	L	T	P	C	ES
		0	0	4	2	

Common to CSE,IT and AI&DS Departments

COURSE OBJECTIVES:

The objectives of learning this course are:

- To familiarize with C programming constructs.
- To develop programs in C using basic constructs.
- To develop programs in C using arrays.
- To develop applications in C using strings, pointers, functions.
- To develop applications in C using structures.
- To develop applications in C using file processing.

COURSE OUTCOMES:

At the end of this course, students can able to

CO1: Demonstrate knowledge on C programming constructs.
CO2: Develop programs in C using basic constructs.
CO3: Develop programs in C using arrays and strings.
CO4: Develop applications in C using pointers, functions.
CO5: Develop applications in C using structures.
CO6: Develop applications in C using file processing.

LIST OF EXPERIMENTS:

Group A:

1. Write a C Program to find the sum of digits.
2. Write a C Program to check whether a given number is Armstrong or not.
3. Write a C Program to check whether a given number is Prime or not.
4. Write a C Program to generate the Fibonacci series.
5. Write a C Program to display the given number is Adam number or not.
6. Write a C Program to print reverse of the given number and string.
7. Write a C Program to find minimum and maximum of ‘n’ numbers using array.
8. Write a C Program to arrange the given number in ascending order.
9. Write a C Program to add and multiply two matrices.
10. Write a C Program to calculate NCR and NPR.
11. Write a C program to count the total number of vowels or consonants in a string.
12. Write a C program in C to read a sentence and replace lowercase characters with uppercase and vice versa.

Group B:

1. Write a C Program to find the grade of a student using else if ladder.
2. Write a C Program to implement the various string handling function.
3. Write a C Program to create an integer file and displaying the even numbers only.
4. Write a C Program to calculate quadratic equation using switch-case.
5. Write a C Program to count number of characters, words and lines in a text file.
6. Write a C Program to generate student mark list using array of structures.
7. Write a C Program to create and process the student mark list using file
8. Write a C Program to create and process pay bill using file
9. Write a C Program to create and process inventory control using file
10. Write a C Program to create and process electricity bill using file
11. Write a C Program to illustrate how a file stored on the disk is read.
12. Write a C program to read the file and store the lines in an array.

Note: One Question from Group A and another one Question from Group B is compulsory for End Semester Examination.

Total Periods : 60

CO PO PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	2	2	2	1	2	1	1	1	2	-	3	2	2	2	-
CO2	2	3	2	1	2	1	1	1	2	-	3	2	2	2	-
CO3	3	2	2	1	3	1	1	1	2	-	3	3	2	2	-
CO4	2	3	3	1	2	1	2	1	2	-	3	2	2	3	-
CO5	2	3	3	1	2	1	-	-	2	1	2	2	2	2	-
CO6	2	2	2	1	2	1	1	1	2	-	3	2	2	2	-
AVG	2	3	2	1	2	1	1	1	2	1	3	2	2	2	-

R 2024	GENERAL ENGINEERING					SEMESTER: I
24 ES 106	ENGINEERING PRACTICES LABORATORY	L	T	P	C	ES
		0	0	2	1	

COMMON TO ALL BRANCHES AIDS, CSE, BME, ECE, IT and EEE

COURSE OBJECTIVES:

The main objectives of this course are to:

- Study the various basic domestic wiring circuits and measure the electrical parameters.
- Impart the Knowledge about the stair case wiring, wiring layout and its connections
- Impart the knowledge of various basic electronic components .
- Know about Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.
- Study about the operation of various Boolean operations in electronics.

COURSE OUTCOMES:

At the end of this course, students are able to:

CO1:Wire various electrical joints in common household electrical wire work.
CO2:Understand the stair case wiring, wiring layout and its connections
CO3:Measure the electrical quantities using ammeter, voltmeter,wattmeter and energy meter
CO4:Study the construction, working principle and wiring of single phase energy meter.
CO5:Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

LIST OF EXPERIMENTS:

I ELECTRICAL ENGINEERING PRACTICE

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fitting and Installation of household appliances- LED TV,Fan
3. Stair case wiring.
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.

II ELECTRONIC ENGINEERING PRACTICE

1. Study of Electronic components and equipments – Resistor, colour coding, Measurement of AC signal parameter (peak-peak, rms period, frequency) using CRO.
2. Verification of logic gates AND, OR, EX-OR and NOT.
3. Generation of Clock Signal.
4. Soldering simple electronic circuits and checking continuity.
5. Assembling and testing electronic components on a small PCB.

Total Periods :30

CO PO PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	2	-		1	1	1	-	-	-	-	2	2	1	1
CO2	3	2	-		1	1	1	-	-	-	-	2	2	1	1
CO3	3	2	-		1	1	1	-	-	-	-	2	2	1	1
CO4	3	2	-		1	1	1	-	-	-	-	2	2	1	1
CO5	3	2	-		1	1	1	-	-	-	-	2	2	1	1
AVG	3	2	-		1	1	1	-	-	-	-	2	2	1	1

1-Low, 2-Medium, 3-High

R 2024	MECHANICAL ENGINEERING					SEMESTER: I
24ES107	WORKSHOP PRACTICE LABORATORY	L	T	P	C	PC
		0	0	2	1	

COMMON TO: AI&DS, BME, CSE, ECE, EEE and IT

COURSE OBJECTIVES:

The main objectives of this course are to:

- Practice few basic engineering operations in welding, and sheet metal works.
- Make the specified skills in fitting operations.
- Perform few basic operations to produce wooden joints
- Make pipe connections for household applications.

COURSE OUTCOMES:

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

CO1-Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work

CO2Saw; plan; make joints in wood materials used in common household wood work.

CO3-Weld various joints in steel plates using arc welding work;

CO4-Make a tray out of metal sheet using sheet metal work.

CO5-Prepare metal joints using fitting tools

PRACTICAL EXERCISES:

1. Plumbing Works: Hands-on-exercise: Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components for pumping water from sump to overhead tank and pipe connections from overhead tank to bath shower and wash basin.
2. Carpentry using modern tools only: Hands-on-exercise: Wood work, joints such as T, Mortise and Tenon and Dove Tail.
3. Welding: Preparation of butt joints, lap joints and T- joints by Arc welding and Gas welding
4. Sheet Metal Work: Model making – Trays and funnels.
5. Fitting: Preparation of Square fitting and V – fitting models.

Total Periods: 30

CO PO PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO5	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
AVG	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

R 2024	DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING					SEMESTER: II
24ES201	DESIGN THINKING	L	T	P	C	ES
		2	0	0	2	

COMMON TO ALL BRANCHES

COURSE OBJECTIVES:

The objectives of learning this course are to:

- ✓ Provide the new ways of creative thinking.
- ✓ Learn the innovation cycle of Design Thinking process for developing innovative products which useful for a student in preparing for an engineering career and to apply them for the prospective entrepreneurial activities.

COURSE OUTCOMES:

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

- ✓ CO1 Understand the Concept of Design Thinking through its principles.
- ✓ CO2 Learn the tools and techniques of Design Thinking and to apply them in real life cases.
- ✓ CO3 Understand the different stages of Structured Models used in Design thinking.
- ✓ CO4 Apply the perspectives of design thinking in the entrepreneurial activities.
- ✓ CO5 Learn from the real world case studies about how to apply the concept of design thinking in product development.

UNIT: I	OVERVIEW OF DESIGN THINKING	6

Introduction to Design Thinking – Conceptual Understanding, Evolution of Design Thinking, Attributes, Principles (Human Rule, Ambiguity Rule, Re-Design Rule and Tangibility Rule) – Cycle of Design Thinking – Resources (3Ps) – Applications.

Pedagogical Tools	Chalk & Board, PPT, Brainstorming, Flipped Class Room

UNIT: II	TOOLS AND TECHNIQUES FOR DESIGN THINKING	6

Personas, Visualization, Stakeholder Mapping, Journey Mapping, Mind Mapping, Star Bursting, Divergent Thinking, Convergent Thinking, Ethnography, Brainstorming, Story Telling, Role Playing, User Interviews. (All these techniques shall be taught only to level of understanding the core concept)

Pedagogical Tools	Chalk & Board, PPT, Brainstorming, Group Discussion, Case Study Method.

UNIT: III	DESIGN THINKING MODELS	6

Double Diamond Model – Phases of Discover, Define, Develop and Deliver – Feedback Mechanism.
Stanford 5 Phase Model – Empathize, Define, Ideate, Prototype and Test.

Pedagogical Tools	Chalk & Board, PPT, Empathy Interviews & User Research

UNIT: IV	DESIGN THINKING FOR ENTREPRENEURS	6

Idea of Growth Design, Comparison of Growth Design and Product Design, Growth Process Model : What is? - What if? - What Wows? - What Works, Principle of Optimism.
Ethics in Design Thinking : 5 Approaches – Utilitarian, Rights, Fairness, Common Good and Virtue - Ethical Issues – Ethical Design Test.

Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video

UNIT: V	CASE STUDIES	6

1. Why Patients were not visiting a healthcare center for a free health checkup - Karnataka Health Promotion Trust
2. Why Sales Officers were not accessing help even though it was available and were still abandoning sales when a difficult objection was raised in a sales call -Shriram Life Insurance Corporation.
3. My City Savior APP - Government of Odisha.
4. Designing of a Banking APP – Kotak Mahindra Bank

Pedagogical Tools	Chalk & Board, PPT, Brainstorming, TEDx like public Speech

TOTAL PERIODS	30

TEXT BOOKS:				
Sl. No	**Authors**	**Title of the Book**	**Publisher**	**Year of publication**
1	E Bala Guruswamy, Bindu Vijayakumar	Design Thinking – A Business Perspective	McGraw Hill Education (India) Private Limited.	2024
REFERENCE BOOK:				
1	David Lee	Design Thinking In the Class Room	Ulysses Press	2018
WEB LEARNING RESOURCES:				
1 NPTEL				
1.https://youtu.be/6-5J6YTrYf4?si=WE9MLo-2tbccTWNG				
2.https://youtu.be/4nTh3AP6knM?si=rdEHE4yGxSJ4zDji				
3.https://youtu.be/j6Ro7TPzRoo?si=wa75cakOWyR0dSZC				
4.https://youtu.be/DmLVfQfxtPU?si=q6NyR6yCmir3Y2ia				
5.https://youtu.be/OE2ooXUEAwc?si=A3yYLYTOKvuYx_Cn				

CO – PO – PSO MAPPING

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2			2							2			
CO2	3	2			2							2			
CO3	3	2			2							2			
CO4	3	2			2							2			
CO5	3	2			2							2			
Avg	3	2			2							2			

R 2024	SCIENCE & HUMANITIES					SEMESTER: II
24BS202	DISCRETE MATHEMATICS	L	T	P	C	BS
		3	1	0	4	

COMMON TO: AI&DS, CSE, IT

COURSE OBJECTIVES:

The objectives of learning this course are:

- ✔ Extend student's logical and mathematical maturity and ability to deal with abstraction.
- ✔ Understand the basic concepts of combinatorics.
- ✔ Understand the basic concepts of graph theory.
- ✔ Familiarize the applications of algebraic structures.
- ✔ Understand the concepts and significance of lattices and Boolean algebra which are widely used in computer science and engineering.

COURSE OUTCOMES:

At the end of this course, students are able to

CO1: Have knowledge of the concepts needed to test the logic of a program.
CO2: Be aware of the counting principles.
CO3: Have knowledge of graph theory applications in computer science engineering.
CO4: Have an understanding in identifying structures on many levels.
CO5: Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

UNIT: I	LOGIC AND PROOFS	9+3
Propositional logic – Propositional equivalences - Predicates and quantifiers – Nested quantifiers – Rules of inference - Introduction to proofs – Proof methods and strategy.		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video	
UNIT: II	**COMBINATORICS**	9+3
Mathematical induction– The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions – Inclusion and exclusion principle and its applications.		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video	
UNIT: III	**GRAPHS**	9+3
Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video	
UNIT: IV	**ALGEBRAIC STRUCTURES**	9+3
Algebraic systems – Semi groups and monoids - Groups – Subgroups – Homomorphism's – Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video	
UNIT: V	**LATTICES AND BOOLEAN ALGEBRA**	9+3
Partial ordering – Posets – Lattices as posets – Properties of lattices - Lattices as algebraic systems – Sub lattices– Some special lattices – Boolean algebra – Sub Boolean Algebra.		
Pedagogical Tools	Chalk & Board, PPT, NPTEL video, you tube video	
	Total Periods:60	

TEXT BOOKS:

Sl.No	Authors	Title of the Book	Publisher	Year of publication
1	Rosen. K.H.	Discrete Mathematics and its Applications	7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition	2017

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

2	Tremblay. J.P. and Manohar. R	Discrete Mathematical Structures with Applications to Computer Science	Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint	2011
REFERENCE BOOKS:				
1	Grimaldi. R.P.	Discrete and Combinatorial Mathematics: An Applied Introduction	5th Edition, Pearson Education Asia, Delhi.	2013
2	Koshy. T.	Discrete Mathematics with Applications	Elsevier Publications.	2006
3	Lipschutz. S. and Mark Lipson	Discrete Mathematics	Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition	2010
WEB LEARNING RESOURCES:				
1 https://www.brainkart.com/subject/Discrete-Mathematics_94/				
2 https://nptel.ac.in/courses/111104026				
3 https://nptel.ac.in/courses/111106050				
4 https://nptel.ac.in/courses/111106052				
5 https://nptel.ac.in/courses/111106086				
6 https://nptel.ac.in/courses/111106102				
7 https://nptel.ac.in/courses/111106137				
8 https://youtu.be/HipVU5vz3Q8?si=eJd9WokGLaWgA30R				
9 https://youtu.be/wsvPWTDZXT0?si=5v1SJPl3O4yAe5_z				

CO – PO – PSO MAPPING															
	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	2	-	-	2	-	-	-	3	-	-	-	-	-
CO4	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO5	-	2	2	2	-	-	-	-	-	2	-	-	-	-	-
Avg	3	3	2	2	-	2	-	-	-	3	-	2	-	-	-

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

R 2024	SCIENCE & HUMANITIES					SEMESTER: II
24HS204	German	L	T	P	C	HS
		2	0	0	2	

COMMON TO: ALL PROGRAMS

COURSE OBJECTIVES:

The objectives of learning this course are:

- ✔ To enable learners use words appropriately in their communication.
- ✔ To develop learners ability to read and listen to texts in German.
- ✔ To strengthen the communication skills of the learners.

COURSE OUTCOMES:

At the end of this course, students can able to

CO1: understand the German Language and read

CO2: understand the German Language and listen

CO3: understand the German Language and speak

CO4 :understand the German Language and write

UNIT: I	Reading	8

i. The pupils recognize the following types of text: dialogue; interview; advertisement; programme of a performance (cinema, theatre, concert, sport); a television and radio programme; notice; folder page of books, of audio cassettes, of videocassettes and of CDs; articles in dictionaries and lexica; a form to be filled in; menu; poem, short story, diary, comics, picture novel, greeting card, personal letter, e- mail letter, announcement, invitation.

ii. The pupils can understand the following types of text globally and/or selectively: leaflet, catalogue, label, transport timetable, city map, a programme of a performance (cinema, theatre, concert, sport), T.V. & radio programme, advertisement, notice, article in a dictionary and lexicon, menu, personal letter, e-mail letter, columns in a newspaper and magazine, comics, cuttings of reports, poem, short story, short texts of information.

iii. The pupils understand in detail the type of problem and the instructions in the text book as well as short announcements, signs denoting advice and forbiddings, simple forms, invitations and greeting cards.

iv. The pupils make use of the following strategies while reading:

- they recognise the correlation between text and picture.
- they recognise personal names, numbers and dates.
- they recognise the meaning of punctuation marks and text typography.
- they establish the correlation between the title of a text and main points of information.
- they recognise the parts of speech and clauses, word roots, prefixes, suffixes and endings of words of those learnt as well as internationalisms.
- they look for and mark main points of information in a text.
- they recognise the communicative function of the types of text listed under point (i).
- they work with word card indexing.
- they perceive the foreign culture in that they take a critical look at their own culture in the process.
- they make use of the knowledge, skills and strategies which they have acquired in the lessons of their mother language or their first foreign language, when deducing pieces of information from text or making connections between them.

v. The pupils can handle reference works (e.g., dictionaries, grammars).

Pedagogical Tools	Board & Chalk, PPT, youtube videos

UNIT: II	Listening	8

The pupils are in a position to understand different German language texts globally or in detail through a direct contact or over the media. The texts should follow the standards of level A1 of the *Framework* and observe the phonetical and intonation variants of the German language. Of special significance in the training for the skill of *listening* is the inclusion of sight perception.

i. The pupils understand questions and instructions of the teacher during the lesson.

ii. The pupils can create correlations between hearing texts and pictures.

iii. The pupils can understand short dialogues between two or several partners who refer to themes and situations already dealt with.

iv. The pupils can understand short everyday and especially tourist- related information (e.g., at the post office, in a travel agency, at the railway station / airport).

v. The pupils infer main announcements from conversations on themes and situations already dealt with.

vi. The pupils can infer selective information from news, advertisements and programme information on Radio or in T.V. as well as from easy descriptive texts.

vii. The pupils can understand short literary forms like poems and songs on the basis of directed explanation.

viii. The pupils make use of the following strategies while listening:

- they put forward hypotheses and examine them in the light of the intention of the statement of various types of text.
- they recognise intonation models, linguistic and metalinguistic means of expressing affirmation and negation.
- they make use of already known models of word building.
- theyrecognise the communicative function of varied types of text.
- they work with a dialogue – diagram.
- they draw up the construction plan of a text they have heard.

Pedagogical Tools	Board & Chalk, PPT, youtube videos

UNIT: III	Speaking	7

The pupils realize in their statements ways of speaking which are mentioned in the subsequent part entitled *Contents*.

i. The pupils reproduce the phonetic and intonation pattern correctly.

ii. The pupils ask and answer questions in connection with the themes and situations already dealt with.

iii. The pupils participate in conversation with their teacher and / or with their classmates in the course of the lesson.

iv. The pupils hold short conversations with one or several partners (known or unknown) in the sphere of the themes and situations already dealt with.

v. The pupils make short telephone calls.

vi. The pupils make short announcements in connection with themes already handled.

vii. The pupils make use of appropriate patterns of behaviour (mimics, gesticulations, body distance or nearness, etc) during conversation.

viii. The pupils can make use of the following strategies while speaking:

- they ask for and themselves provide additional / explanatory information.
- they signal lack of understanding and demand from their partner an appropriate reaction.
- they direct the conversation according to their own interests and / or change the subject.
- they make use of clichés in order, e.g., to cope more easily with situations in which they are under pressure of time.
- they make use of paralinguistic means.

Pedagogical Tools	Board & Chalk, PPT, youtube videos

UNIT: IV	Writing	7
i. The pupils fill in tables with key words according to a text they have read or heard. ii. The pupils fill in easy forms, write greeting cards, invitations and short personal announcements. iii. The pupils lay down vocabulary cards according to a preset pattern. iv. The pupils write short texts to photos and pictures. v. The pupils make use of the following strategies while writing: - they employ preset patterns and examples with sense. - they use reference works for self correction of mistakes.		
Pedagogical Tools	Board & Chalk, PPT, youtube videos	
	TOTAL PERIODS:30	

TEXT CUM REFERENCE BOOKS:

The aims, methods and contents, as they are formulated in the syllabus for German as a second foreign language for level 1 (**A1**), are to be adopted in the textbook for this level. While the autonomy of the school in the choice of the textbook and related material is respected, choice is to be made of a work which contains the following basic text material.

3.1. Pupils' book which contains the learning material obligatory for level 1, as well as the grammar overview and an alphabetical word list;

3.2. Work book with exercises, which supplement the learning material of the pupil's book and makes possible a differentiation within the class of pupils and various social forms (single, partner, group work) during the lesson. The book contains tests which help the periodical control of the learning process and success;

3.3. Teacher's book in which the concept of the pupil's book is presented, methodological tips given and alternative lesson schemes suggested, additional cultural (*Landeskunde*) and linguistic information included, as well as indications of possible forms of control and assessment of performance. It includes also I listening comprehension texts, exercises on cassette, keys to the tests and vocabulary to each unit;

3.4. Cassettes with listening comprehension texts from the pupil's book and where possible phonetic and grammar tests as well as further authentic texts which contribute towards the development of listening comprehension.

3.5. I.T. Material which instills in the pupil an awareness of the German-speaking world and encourages him/her to make use of interactive exercises with partners abroad and in one's own country (e-mail) and to satisfy the desire to research and increase one's knowledge of certain aspects of topics treated in class (internet). This medium should make up for the lack of actual resources at school and complete the overall picture of the German-speaking media.

CO – PO – PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	3	1	1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	1	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	1	2	3	1	-	-	-	-	-	-	-	-	-	-	-
CO4	2	1	1	3	-	-	-	-	-	-	-	-	-	-	-
AVG	1.75	1.75	1.75	1.75	-	-	-	-	-	-	-	-	-	-	-

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

R 2024	Languages					SEMESTER: II
24HS205	Italian	L	T	P	C	HS
		2	0	0	2	

COMMON TO: ALL BRANCHES

COURSE OBJECTIVES:

The objectives of learning this course are:

Ø To enable learners use words appropriately in their communication.

Ø To develop learners ability to read and listen to texts in Italian Language.

Ø To strengthen the communication skills of the learners.

COURSE OUTCOMES:

At the end of this course, students can able to

CO1: understand the Italian Language- basics of day-to-day conversation such as talking about your likes, and dislikes, knowing the numbers, alphabet, habitual actions, and more. Learn grammar and its usage

CO2:communicate in simple terms aspects of his/her background, immediate environment & matters in areas of immediate basic need.

UNIT: I	Beginner Level A1	15

Learn the basics of day-to-day conversation such as talking about your likes, and dislikes, knowing the numbers, alphabet, habitual actions, and more. Learn grammar and its usage.

Topics

- Introducing yourself
- Saying hello and goodbye
- Nationality
- Asking and Saying how one is
- Apologizing
- Spelling one's name
- Ordering Food
- Reading simple menu
- Asking and telling time

Grammar

- Personal Subject Pronouns
- Definite and indefinite articles
- Nouns
- Adjectives
- Present Tense of a regular verb
- Interrogatives

Tools Required:	Board & Chalk, PPT, youtube videos

UNIT: II	Beginner Level A2	15

Learn to communicate in simple terms aspects of his/her background, immediate environment & matters in areas of immediate basic need

Topics

- Booking a table at a restaurant
- Understanding a menu
- Understanding simple city directions
- Expressing agreements/disagreements
- Adjectives
- Some Italian recipes
- Some expressions of place
- Talking about past events

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

- Writing a greeting card

Grammar
- The verb sapere and potere
- More about the verb piacere
- Prepositions in and a
- Regular and Irregular participles
- The present perfect
- The Adverb fa
- More interrogatives

Tools Required:	Board & Chalk, PPT, youtube videos
	TOTAL PERIODS :30

TEXT CUM REFERENCE BOOKS:

Italian Language Textbooks

1. **Nuovo Espresso 1 (A1-A2)** *(Alma Edizioni)*
   - Covers greetings, introductions, ordering food, and city directions.
   - Grammar focus on articles, present tense, passato prossimo, and prepositions.
   - Includes listening exercises, cultural notes, and interactive practice.
2. **Italian Grammar in Practice (A1-A2)** *(Susanna Nocchi)*
   - Practical grammar explanations with exercises.
   - Good for mastering verbs like *sapere*, *potere*, and *piacere*.
3. **Practice Makes Perfect: Basic Italian** *(Alessandra Visconti)*
   - Focus on conversational phrases, simple dialogues, and essential grammar.
   - Great for pronunciation and everyday vocabulary like time, directions, and ordering food.
4. **Progetto Italiano Junior 1** *(Edilingua)* – if teaching younger learners.

Supplementary Online Resources:
- **BBC Languages – Italian:** Interactive lessons for beginners.
- **Duolingo/Busuu:** For extra vocabulary practice.
- **ItalianPod101:** Great for listening and pronunciation practice.

CO – PO – PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	2	-	-	-	-	-	-	-	-	-	-	-
Avg	2.5	2.5	2.5	2.5	-	-	-	-	-	-	-	-	-	-	-

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

R 2024	Languages					SEMESTER: II
24HS203	Japanese	L	T	P	C	HS
		2	0	0	2	

COMMON TO: ALL BRANCHES

COURSE OBJECTIVES:

The objectives of learning this course are:

Ø To enable learners use words appropriately in their communication.
Ø To develop learners ability to read and listen to texts in Japanese.
Ø To strengthen the communication skills of the learners.

COURSE OUTCOMES:

COURSE OUTCOMES:
At the end of this course, students can able to
CO1 understand the Japanese Language - Topics & Vocabulary
CO2 understand the Japanese Language -Grammar
CO3 understand the Japanese Language - Cultural Content
CO4 understand the Japanese Language - Skills Work

Module 1:	Topics & Vocabulary	8

- Introduce yourself with greetings in Japanese
- Exchanging business card in Japanese
- Asking about of services in stores
- Shopping
- Describing about the whereabouts of things and people
- Transportation
- Time and numbers – telling and asking the time, counting cardinal numbers
- Everyday objects
- Places – shops, important buildings
- Daily life – routines, free time
- Job
- Home
- Culture
- Existence of People and Things
- Ordinal numbers

Tools Required:	Board & Chalk, PPT, youtube videos

Module 2:	Grammar	8

- Basic Japanese grammar rules – particles : か (ka), は (wa), の (no), と (to), を (o),に (ni),も(mo), が (ga), や (ya) .
- Present, Past, Future
- Pronouns – subject, object, possessive
- Singular vs. Plural
- Word order – sentence, question, negative
- Question formation
- Modal verbs

Tools Required:	Board & Chalk, PPT, youtube videos

Module 3:	Cultural Content	7

- Three writing systems in Japanese (Hiragana, Katakana, Kanji)
- How to bow
- Japanese currency

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

- Shops in Japan
- Transportation
- Excursions to Japanese spas (温泉onsen)

Tools Required:	Board & Chalk, PPT, youtube videos

Module 4:	**Skills Work**	**7**

- Lots of speaking-inc. situational exercises & interaction
- Basic pronunciation rules
- Listening activities
- Numbers and Counters rules
- Writing practice (Hiragana)

Tools Required:	Board & Chalk, PPT, youtube videos	

TOTAL PERIODS : 30

TEXT CUM REFERENCE BOOKS:

1. **Genki I: An Integrated Course in Elementary Japanese** (Eri Banno et al.)
   - Covers self-introductions, shopping, daily routines, and transportation.
   - Introduces particles, sentence structure, and essential grammar.
   - Includes cultural notes, listening exercises, and hiragana practice.
2. **Minna no Nihongo Shokyu I**
   - Great for practical conversations like shopping and asking for services.
   - Strong grammar foundation with exercises on particles and verb conjugations.
   - Requires a translation guide unless you're familiar with Japanese.
3. **Japanese for Busy People I** (AJALT)
   - Focused on conversational skills and real-life scenarios like business card exchange.
   - Simple grammar explanations and cultural context.

Supplementary Resources:

- *NHK World: Easy Japanese* (free online lessons with dialogues and videos)
- *Tae Kim's Guide to Japanese Grammar* (online resource for grammar concepts)

CO – PO – PSO MAPPING

	PO 1	PO2	PO 3	PO4	PO5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO 3
CO1	3	1	1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	1	3	1	2	-	-	-	-	-	-	-	-	-	-	-
CO3	1	1	3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	1	1	1	3	-	-	-	-	-	-	-	-	-	-	-
Avg	1.5	1.5	1.5	2.25	-	-	-	-	-	-	-	-	-	-	-

R 2024	SCIENCE & HUMANITIES					SEMESTER: II
24HS201	Tamils and Technology	L	T	P	C	HS
		1	0	0	1	

COMMON TO: ALL PROGRAMS

COURSE OBJECTIVES:

The objectives of learning this course are to:

- ✔ Learn weaving, ceramic and construction technology of Tamil.
- ✔ Understand the agriculture, irrigation and manufacturing technology of tamil.
- ✔ Realize the development of scientific Tamil and computing.

COURSE OUTCOMES:

At the end of this course, students can able to :

CO1: Understand the weaving and ceramic technology of ancient Tamil people nature.

CO2: Understand the construction technology, building materials in sangam period and case studies.

CO3: Infer the metal process, coin and beads manufacturing with relevant archaeological evidence.

CO4: Realize the agriculture methods, irrigation technology and pearl diving.

CO5: Apply the knowledge of scientific Tamil and Tamil computing.

UNIT: I	WEAVING AND CERAMIC TECHNOLOGY	3
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.		
Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos .	

UNIT: II	DESIGN AND CONSTRUCTION TECHNOLOGY	3
Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silapathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study Madurai Meenakshi Temple)- ThirumalaiNayakarMahal - Chettinad Houses, Indo - Saracenic architecture at Madras during British Period		
Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos .	

UNIT: III	MANUFACTURING TECHNOLOGY	3
Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting,steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gemstone types described in SilapathikaramTherukoothu, Karakattam, VilluPattu, KaniyanKoothu, Oyilattam, Leather Puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.		
Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos .	

UNIT: IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3
Flora and Fauna of Tamils &Agam and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas		
Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos .	

UNIT: V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sekai Project.		

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

Total Periods :15

TEXT CUM REFERENCE BOOKS:

Sl.No	Authors	Title of the Book	Publisher	Year of publication
1	Dr.K.K.Pillay	Tamilnadu history people and culture	Tamilnadu Textbook and Education works Corporation	2019
2	EL Sundaram	Computer Tamil	Vikatanprasuram	2016
3	Dr.S.Singaravelu	Social Life of the Tamils - The Classical Period	International Institute of Tamil Studies.	2001
4	Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu	Historical Heritage of the Tamils	International Institute of Tamil Studies	2010
5	Dr.M.Valarmathi	The Contributions of the Tamils to Indian Culture	International Institute of Tamil Studies.	2001
6	Dr. R. Sivanantham	Keeladi - 'Sangam City Civilization on the banks of river Vaigai'	Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu	2019
7	Dr.K.K.Pillay	Studies in the History of India with Special Reference to Tamil Nadu	This Author	1979
8		Porunai Civilization	Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu	2019
9	R.Balakrishnan	Journey of Civilization Indus to Vaigai	RMRL	2019
10	Dr.K.K.Pillay	Social Life of Tamils	A joint publication of TNTB & ESC and RMRL	1975

WEB LEARNING RESOURCES:

1	https://youtu.be/jteRvnNiD6w?si=HmAS7a_gng6hYcL_
2	https://youtu.be/WZwdo20QgP8?si=2oTevNPCiGzTPi0-
3	https://youtu.be/05e3v0xGA9k?si=SHa2vsQG39RpDPtZ
4	https://youtu.be/bxYdHw4rvec?si=Eryg0PF72BPhbRBH
5	https://youtu.be/MRfbeJvJZ0k?si=YpAYFFEpLdV8FIrX
6	https://youtu.be/BS_BSDZp6HA?si=D_QdZn1Zr6X3C95p

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

CO – PO – PSO MAPPING															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
AVG	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-

R 2024	DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING					SEMESTER:II
24ES208	PYTHON PROGRAMMING	L	T	P	C	ES
		3	0	0	3	

Common to AI&DS, CSE and IT

COURSE OBJECTIVES:

The objectives of learning this course are:

- To understand the basics of algorithmic problem solving.
- To learn to solve problems using Python conditionals and loops.
- To define Python functions and use function calls to solve problems.
- To use Python data structures - lists, tuples, dictionaries to represent complex data.
- To do input/output with files in Python

COURSE OUTCOMES:

At the end of this course, students able to

CO1: Develop algorithmic solutions to simple computational problems and execute simple Python programs.
CO2: Write simple Python programs using conditionals and loops for solving problems.
CO3: Decompose a Python program into functions.
CO4: Represent compound data using Python lists, tuples, dictionaries etc.
CO5: Read and write data from/to files in Python programs.

UNIT: I	COMPUTATIONAL THINKING AND PROBLEM SOLVING	9

Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: Flowchart to find minimum in a list, Flowchart to insert a card in a list of sorted cards, Pseudo code to find an integer number in a range, Pseudo code to find the position of the largest element in an list of n numbers, Towers of Hanoi. Features of Python (Readability, Simplicity, Large ecosystem). Evolution (From 1991 to 2025, Version 0.9.0 to 3.12.3). Installation of Python in Windows.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: II	DATA TYPES, EXPRESSIONS, STATEMENTS	9

Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, packing and unpacking arguments, precedence of operators, comments; Illustrative programs: swap the values of two variables, circulate the values of n variables, distance between two points, reverse the string.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: III	CONTROL FLOW, FUNCTIONS, STRINGS	9

Conditionals: Boolean values and operators, conditional (if), alternative (if-else),chained conditional (if-elif-else);Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, factorial, fibonacci series, palindrome, linear search, binary search.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.	
UNIT: IV	**LISTS, TUPLES, DICTIONARIES**	**9**
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: Bubble sorting, Insertion, selection, merge sort, histogram, Add Two Matrices, Transpose a Matrix, Students marks statement, Retail bill preparation.		
Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.	
UNIT: V	**FILES, MODULES, PACKAGES**	**9**
Files and exceptions: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules (numpy, pandas, scipy, matplotlib, statmodels), packages; Illustrative programs: word count, copy file, check voting eligibility, count the number of each vowel in a string, random number generation, time series analysis, Marks range validation (0-100).		
Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.	

Total Periods : 45

TEXT BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	Allen B. Downey	Think Python: How to Think like a Computer Scientist	O'Reilly Publishers	2016
2	Karl Beecher	Computational Thinking: A Beginner's Guide to Problem Solving and Programming	BCS Learning & Development Limited	2017

REFERENCE BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	Paul Deitel and Harvey Deitel	Python for Programmers	Pearson Education	2021
2	G Venkatesh and Madhavan Mukund	Computational Thinking: A Primer for Programmers and Data Scientists	Notion Press	2021
3	John V Guttag	Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data	MIT Press	2021

WEB LEARNING RESOURCES:

1. https://www.python.org/
2. https://www.geeksforgeeks.org/python-programming-language-tutorial/

3. https://www.w3schools.com/python/

CO PO PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
CO2	3	3	3	3	2	-	-	-	-	-	2	2	3	-	-
CO3	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
CO4	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-

R 2024	SCIENCE & HUMANITIES					SEMESTER: II
24BS204	PHYSICS FOR ENGINEERS	L	T	P	C	BS
		3	0	2	4	

COMMON TO: AI & DS, CSE, ECE and IT

COURSE OBJECTIVES:

The objectives of learning this course are to:

- ✔ Achieve an understanding of rotational dynamics of multi-particles
- ✔ Acquire the knowledge of transfer of heat in conductors and insulators
- ✔ Introduce the basics of oscillations, optics and lasers
- ✔ Equip the students to understand the importance of quantum physics
- ✔ Introduce and classify crystal structures of materials

COURSE OUTCOMES:

At the end of this course, students are able to

CO1: Understand and analyze the rotational dynamics of multi-particles

CO2: Apply the concepts of heat transfer in various applications.

CO3: Demonstrate a strong foundational knowledge in oscillations, optics and lasers

CO4: Recognize the basics of quantum physics.

CO5: Differentiate crystal structures of materials

UNIT: I	MECHANICS	9

Multi-particle dynamics: Center of mass (C.M) – CM of continuous bodies – motion of the CM – kinetic energy of system of particles. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M .I –moment of inertia of continuous bodies – M.I of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope - torsional pendulum – double pendulum –Introduction to nonlinear oscillations.

Pedagogical Tools	Chalk & board, PPT, NPTEL videos and Youtube videos

UNIT: II	THERMAL PHYSICS	9

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints - bimetallic strips - thermal conduction, convection and radiation –rectilinear heat flow – thermal conductivity - Forbe's and Lee's disc method: theory and experiment-conduction through compound media (series and parallel)–thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.

Pedagogical Tools	Chalk & board, PPT, NPTEL videos and Youtube videos

UNIT: III	OSCILLATIONS, OPTICS AND LASERS	9

Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect. Reflection and refraction of light waves - total internal reflection - interference –Michelson interferometer –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, CO_2 laser, semiconductor laser –Basic applications of lasers in industry.

Pedagogical Tools	Chalk & board, PPT, NPTEL videos and Youtube videos

UNIT: IV	BASIC QUANTUM MECHANICS	9

Photons and light waves - Electrons and matter waves – Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle

Pedagogical Tools	Chalk & board, PPT, NPTEL videos and Youtube videos

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

UNIT: V	CRYSTAL STRUCTURE	9
Introduction – Classification of solids –Space lattice –Basis-Lattice parameter – Unit cell – Crystal system –Miller indices –d-spacing in cubic lattice - Calculation of number of atoms per unit cell – Atomic radius-Coordination number – Packing factor for SC, BCC, FCC and HCP structures – crystal imperfection – Burger vector.		
Pedagogical Tools	Chalk & board, PPT, NPTEL videos and Youtube videos	
		Total Periods: 45

Practical Exercises: (Any six experiments to be conducted)	**Total Periods: 30**
1. Non-uniform bending - Determination of Young's modulus	
2. Uniform bending – Determination of Young's modulus	
3.Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.	
4. Laser- Determination of the wave length of the laser using grating	
5. Optical fibre -Determination of numerical aperture (NA) and acceptance angle (AA)	
6. Air wedge - Determination of thickness of a thin sheet/wire	
7. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids	
8. Acoustic grating- Determination of velocity of ultrasonic waves in liquids.	
9. Simple harmonic oscillations of cantilever.	
	Total Periods: 75

TEXT BOOKS:

Sl.No	Authors	Title of the Book	Publisher	Year of publication
1	D.Kleppner and R.Kolenkow	An Introduction to Mechanics	McGraw Hill Education (Indian Edition)	2017
2	Gaur,R.K.andGupta,S.L	Engineering Physics	DhanpatRai Publishers	2018
3	D.Halliday, R.Resnick and J.Walker	Principles of Physics	Wiley (Indian Edition)	2015
4	Arthur Beiser, ShobhitMahajan, S.RaiChoudhury	Concepts of Modern Physics	McGraw-Hill (Indian Edition)	2017
5	M.Arumugam	Engineering Physics	Anuradha publications	2010
6	Gaur,R.K.andGupta,S.L	Engineering Physics	DhanpatRai Publishers	2018

REFERENCE BOOKS:

1	R.Wolfson	Essential University Physics. Volume 1 & 2	Pearson Education (Indian Edition)	2020
2	K.Thyagarajan and A.Ghatak	Lasers: Fundamentals and Applications	Laxmi Publications, (Indian Edition)	2019
3	R.K.Rajput	Thermal Engineering	Laxmi Publications,	2011
4	S.O.Pillai,	Solid State Physics	New Age International, (Multicolour Edition)	2018

WEB LEARNING RESOURCES:

1. https://youtu.be/fDJeVR0o__w?list=PLyQSN7X0ro203puVhQsmCj9qhlFQ-As8e (Rotating Objects, Moment of Inertia, Rotational KE)
2. https://archive.nptel.ac.in/courses/104/104/104104085/ (Lasers)
3. https://www.youtube.com/playlist?list=PL1gyM10tgL1hK9666oGndGlWDQdpQzkY9 (NPTEL: Heat transfer lectures by Dr.Gangesh A. Viswanathan, IITB)

(Recommended by Ist BOS held on 05.09.24 & Approved by Ist Academic Council held on 25.11.24)

4 https://archive.nptel.ac.in/courses/115/101/115101107/ (Quantum mechanics)
5 https://youtu.be/5EiZjZjG-IY (NPTEL lectures: Crystal Structure - 2 (Unit Cell, Lattice, Crystal)
6. https://www.youtube.com/watch?v=mx2P1_M-7UA&list=PLFE3074A4CB751B2B&index=9 (Rotations, Part I: Dynamics of Rigid Bodies)
7. https://www.youtube.com/watch?v=UzrZxpup3rc&list=PLFE3074A4CB751B2B&index=10 (Rotations, Part II: Parallel Axis Theorem)
8. https://youtu.be/7Bj3N1E7vZk?list=PLZOZfX_TaWAHZOgn8CRjpqRElp5Dd-GaY (Introduction to heat transfer, conduction, convection, and radiation)
9. https://youtu.be/dRpyfm66GxM (Particle in an Infinite Potential Well (QUANTUM MECHANICS)

CO – PO – PSO MAPPING															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
CO2	3	-	1	1	-	-	-	-	-	-	-	1	-	-	-
CO3	3	3	2	1	2	1	-	-	-	-	-	-	-	-	-
CO4	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
CO5	3	1	-	-	-	-	-	-	-		-	-	-	-	-
AVG	3	2.5	1.5	1	1.6	1						1			

R 2024	DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING					SEMESTER:II
24ES210	DATA STRUCTURES AND ALGORITHMS	L	T	P	C	ES
		3	0	2	4	

Common to CSE, IT AND AI&DS Departments

COURSE OBJECTIVES:

The objectives of learning this course are:

- To understand the concepts of ADTs
- To design linear data structures – lists, stacks, and queues
- To understand sorting, searching and hashing algorithms
- To apply Tree and Graph structures

COURSE OUTCOMES:

At the end of this course, students are able to:

CO1: Explain abstract data types

CO2: Design, implement, and analyse linear data structures, such as lists, queues, and stacks,according to the needs of different applications.

CO3: Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting.

CO4: Model problems as graph problems and implement efficient graph algorithms to solve them.

CO5: Apply Graph Structures in real-world application

UNIT: I	ABSTRACT DATA TYPES	9

Abstract Data Types (ADTs) – ADTs and classes – introduction to OOP – classes in Python – inheritance – namespaces – shallow and deep copying, Introduction to analysis of algorithms – asymptotic notations – recursion – analyzing recursive algorithms.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: II	LINEAR STRUCTURES	9

List ADT – array-based implementations – linked list implementations – singly linked lists – circularly linked lists – doubly linked lists – applications of lists – Stack ADT – Queue ADT – double ended queues.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: III	LINEAR STRUCTURES	9

Bubble sort – selection sort – insertion sort – merge sort – quick sort – linear search – binary search – hashing – hash functions – collision handling – load factors, rehashing, and efficiency.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: IV	TREE STRUCTURES	9

Tree ADT – Binary Tree ADT – tree traversals – binary search trees – AVL trees – heaps – multiway search trees.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.

UNIT: V	GRAPH STRUCTURES	9

Graph ADT – representations of graph – graph traversals – DAG – topological ordering – shortest paths – minimum spanning trees.

Pedagogical Tools	Black board, chalk, Group Discussion, Role Play, Youtube Videos,Nptel videos.
	45 Periods

PRACTICAL EXERCISES **30 Periods**

1. Implement simple ADTs as Python classes
2. Implement List ADT using Python arrays
3. Linked list implementations of List
4. Implementation of Stack and Queue ADTs
5. Implementation of sorting and searching algorithms
6. Tree representation and traversal algorithms
7. Implementation of Heaps
8. Implementation of single source shortest path algorithm
9. Implementation of minimum spanning tree algorithms
10. Mini Project
    - Creating a To-do list.
    - Building a Phonebook.
    - Build a simple calculator.
    - Students grade checker.
    - Plagiarism detection system.
    - Banking management system.
    - Travel planner using Graph.
    - Cash flow minimizer.

Total: 75 Periods

TEXT BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser	Data Structures and Algorithms in Python	Wiley	2021
2	**Lee**, Kent D., **Hubbard**, Steve	Data Structures and Algorithms with Python	Springer Edition	2015
3	Narasimha Karumanchi	Data Structures and Algorithmic Thinking with Python	Careermonk	2015

REFERENCE BOOKS:

Sl. No	Authors	Title of the Book	Publisher	Year of publication
1	Rance D. Necaise	Data Structures and Algorithms Using Python	John Wiley & Sons	2011
2	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein	Introduction to Algorithms	PHI Learning	2010
3	Mark Allen Weiss	Data Structures and Algorithm Analysis in C++	Pearson Education	2014

CO PO PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	2	2	2	1	2	-	-	-	-	-	-	2	2	-	-

CO2	2	3	2	1	2	-	-	-	-	-	-	2	2	-	-
CO3	3	2	2	1	3	-	-	-	-	-	-	3	2	-	-
CO4	2	3	3	1	2	-	-	-	-	-	-	2	2	-	-
CO5	2	3	3	1	2	-	-	-	-	-	-	2	2	-	-
AVG	3	2	2	2	2	-	-	-	2	2	2	2	2	2	2

R 2024	DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING					SEMESTER:01
24ES209	PYTHON PROGRAMMING LABORATORY	L	T	P	C	ES
		0	0	4	2	

Common to CSE,IT AND AI&DS Departments

COURSE OBJECTIVES:

The objectives of learning this course are:

- To understand the problem solving approaches.
- To learn the basic programming constructs in Python.
- To practice various computing strategies for Python-based solutions to real world problems.
- To use Python data structures - lists, tuples, dictionaries.
- To do input/output with files in Python.

COURSE OUTCOMES:

At the end of this course, students able to

CO1: Develop algorithmic solutions to simple computational problems
CO2: Implement programs in Python using conditionals and loops for solving problems.
CO3: Deploy functions to decompose a Python program.
CO4: Process compound data using Python data structures.
CO5: Utilize Python packages in developing software applications.

LIST OF EXPERIMENTS:

1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building –operations of list & tuples)
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)
6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)
7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)
8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy. Matplotlib, scipy)
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)
10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)
11. Exploring Pygame tool.
12. Mini Project - Developing a game activity using Pygame like bouncing ball, car race, Cricket alerts etc.

Total Periods : 60

LIST OF COMPONENTS REQUIRED: (For a Batch of 30 Students)

1. INTEL based desktop PC with min. 8GB RAM and 500 GB HDD, 17" or higher TFT Monitor, Keyboard and mouse. – 30 Nos
2. Windows 10 or higher operating system / Linux Ubuntu 20 or higher. – 30 Nos
3. Python 3.9 or above – 30 Nos

CO PO PSO MAPPING

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PS01**	**PS02**	**PS03**
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	1	1	2	-	3	2	2	2	-
CO2	2	3	2	1	2	1	1	1	2	-	3	2	2	2	-
CO3	3	2	2	1	3	1	1	1	2	-	3	3	2	2	-
CO4	2	3	3	1	2	1	2	1	2	-	3	2	2	3	-
CO5	2	3	3	1	2	1	-	-	2	1	2	2	2	2	-
AVG	2	3	2	1	2	1	1	1	2	1	3	2	2	2	-

R 2024	MECHANICAL ENGINEERING					SEMESTER: II
24 ES 205	ENGINEERING DRAWING	L	T	P	C	PC
		0	0	4	2	

COMMON TO : AI&DS, BME, CSE, ECE, EEE and IT

COURSE OBJECTIVES:

The main objectives of this course are to:

- To learn conventions and use of drawing tools in making engineering drawings
- To draw orthographic projection of points and lines
- To understand the projection of planes and simple solids
- To teach the section of solids and obtain the development of surfaces of given solids
- To deliver how to draw isometric and perspective projections of the given solids

COURSE OUTCOMES:

Upon completion of the course, the student are able to

CO1: Recognize the conventions and construct basic engineering curves.

CO2: Draw the projection of points and lines.

CO3: Sketch the projection of planes and simple solids.

CO4: Produce the projection section of solids and development of surfaces of given solids

CO5: Develop the isometric projection and Perspective projections of the given objects

PRACTICAL EXERCISES:

1. Fundamental of drawing: Importance of graphics in engineering applications–Use of drafting instruments–BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning. (Not for examination)
2. Fundamental of drawing: Importance of graphics in engineering applications–Use of drafting instruments–BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning. (Not for examination)
3. Projection of straight lines (only First angle projection) inclined to both the principal planes - Determination of true l lengths and true inclinations by rotating line method.
4. Projection of polygonal plane surface inclined to both the principal planes by rotating object method (Pentagonal and Hexagonal plane surface)
5. Projection of Circular plane inclined to both the principal planes by rotating object method.
6. Projection of simple prisms (Hexagon and pentagon) when the axis is inclined to one of the principal planes.
7. Projection of simple prisms (Hexagon and pentagon) when the axis is inclined to one of the principal planes.
8. Projection of simple pyramids (Hexagon and pentagon), cylinder and cone when the axis is inclined to one of the principal planes.
9. Projection of cylinder and cone when the axis is inclined to one of the principal planes.
10. Projection of sectioned solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section (Prism or Pyramid)
11. Development of lateral surfaces of simple and sectioned solids (Prism or Pyramid)
12. Draw the isometric view of frustum of solids like Prism or Pyramid of pentagonal or hexagonal base.
13. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

Total Periods : 60

CO PO PSO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	3	3	3	2	-	-	-	-	3	-	2	1	3	2
CO2	3	3	3	3	2	-	-	-	-	3	-	2	1	3	2
CO3	3	3	3	3	2	-	-	-	-	3	-	2	1	3	2
CO4	3	3	3	2	2	-	-	-	-	3	-	2	1	3	2
CO5	3	3	3	2	2	-	-	-	-	3	-	2	1	3	2
AVG	3	3	3	2	2	-	-	-	-	3	-	2	1	3	2

R 2024	CAREER DEVELOPMENT AND PLACEMENT CELL M.A.M.SCHOOL OF ENGINEERING					SEMESTER:II
24TP201	Aptitude and Communication Skills - I	L	T	P	C	EEC
		0	0	2	1	

COURSE OBJECTIVES:

The main objectives of this course are to:

- To Learn and Practice Vedic Mathematics Principles and Techniques
- To Understand the Components of Effective Communication
- To understand the components of Presentation Skills and Delivery Techniques that are needed for Individual & Group Presentations.
- To learn about personal grooming, body language and Dress code.

COURSE OUTCOMES:

At the end of this course, students are able to:

CO1: Effectively applying the Vedic Mathematics Techniques to solve the Mathematical Aptitude Questions.

CO2: Learn and Practice the ways of Effective Communication and hence to excel in Public Speaking.

CO3: Present their Ideas in an professional way by learning the Presentation Skills and Delivery Techniques.

CO4: Effectively apply the body language and show case them with better dress code and grooming.

LIST OF ACTIVITIES/EXCERCISES:

1. Squares ending with 5 and 55.
2. Multiplication of Numbers by 5, 25, 50, 125, 9, 99, 999, 9999.
3. Multiplication of Two Numbers where Sum of unit digit is 10
4. Multiplication of Two Numbers where Sum of unit digit is 10, 1000 others digits same
5. Multiplication of Two numbers both having ‘5’ at Unit digits.
6. Multiples of 11, 111 & 22, 33, 44, 55 etc.,
7. Squaring of numbers using Base 10, 100, 1000, 50, 500, 5000.
8. Multiplication of numbers more than or below the Base 10, 100, 1000, 50, 500, 5000.
9. Squares ending with 555.
10. Dividing of 9, 19, 29, 39, 49.
11. Square Root & Cube Root, Decimals, Fractions.
12. Components of Effective Communication and Communication styles of others.
13. Barriers of Communication.
14. Dealing with emotions while communicating
15. Just a Minute (JAM) Session
16. Delivery Techniques & Visual Effects / Individual & Group Presentations
17. SWOT Analysis
18. Personality Enhancement & Body Language.
19. Hand Shaking & Dress Code.
20. Personal Grooming.

Total Periods : 30

CO PO PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
CO3	-	-	-	-	2	-	-	-	3	3	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
AVG	-	1	1	-	2	-	-	-	3	3	-	-	-	-	-