KNOWLEDGE INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, Affiliated to Anna University, Chennai.
Accredited by NBA (CSE, ECE, EEE & MECH), Accredited by NAAC with "A" Grade
KIOT Campus, Kakapalayam (PO), Salem – 637 504, Tamil Nadu, India.

B.E. / B.Tech. Regulations 2023

B.TECH. – Artificial Intelligence and Data Science

Curriculum and Syllabi

(For the Students Admitted from the Academic Year 2023-24 Onwards)

Version: 1.0	**Date:** 09.09.2023

	KNOWLEDGE INSTITUTE OF TECHNOLOGY(AUTONOMOUS), SALEM -637504
	Approved by AICTE, Affiliated to Anna University, Accredited by NAAC and NBA (B.E.:Mech., ECE, EEE & CSE)
	Website: www.kiot.ac.in

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	Approved by AICTE, Affiliated to Anna University, Accredited by NAAC and NBA (B.E.:Mech., ECE, EEE & CSE)
	Website: www.kiot.ac.in

B.E. / B.Tech. REGULATIONS 2023 (R 2023)

CHOICE BASED CREDIT SYSTEM AND OUTCOME BASED EDUCATION

B.TECH. – ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

VISION OF THE INSTITUTE
• To be a world class institution to impart value and need based professional education to the aspiring youth and carving them into disciplined world class professional who have the quest for excellence, achievement orientation and social responsibilities.

MISSION OF THE INSTITUTE	
A	To promote academic growth by offering state-of-art undergraduate, postgraduate anddoctoral programs and to generate new knowledge by engaging in cutting – edge research
B	To nurture talent, innovation, entrepreneurship, all-round personality and value system among thestudents and to foster competitiveness among students
C	To undertake collaborative projects which offer opportunities for long-term interaction withacademia and industry
D	To pursue global standards of excellence in all our endeavors namely teaching, research, consultancy, continuing education and support functions

VISION OF THE DEPARTMENT
To create globally competent software professionals with social values to cater the ever-changing Industry requirements.

MISSION OF THE DEPARTMENT	
M1	To inculcate innovation and creativity through experiential learning with the modern infrastructure and technologies.
M2	To collaborate with the industry for enhancing the students' research ability on cutting edge technologies of AI and Data Science.
M3	To develop competent industry-ready professionals with right attitude, values and ethics.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
PEO 1	Perform data processing, analysis and visualization in real time applications for better prediction and data-driven decision making.
PEO 2	Enable multitasking for existing resources and execute complex tasks using Artificial Intelligence.
PEO 3	Carry out fundamental research to cater the critical needs of the society through cutting edge technologies of AI.

PROGRAM OUTCOMES (POs)	
Engineering Graduates will be able to:	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineeringproblems.
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 problemsand design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge andresearch 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 engineeringactivities 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 responsibilitiesrelevant 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, andneed for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities andnorms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member orleader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend andwrite effective reports and design documentation, make effective presentations, and giveand 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 memberand 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 technologicalchange.

Program Specific Outcomes (PSOs)	
After the successful completion of B.Tech. Programme in Artificial Intelligence and Data Science, the graduates will able to	
PSO 1	Apply the concepts of Machine Learning and Data Science to solve the real time business problems.
PSO 2	Exhibit their professional skills in team building, leadership, communication, values and ethics.
PSO 3	Build a suitable model to assist business analytics and helps solving business problems**.**

KNOWLEDGE INSTITUTE OF TECHNOLOGY (AUTONOMOUS), SALEM - 637504											
B.TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE									**Version:** 1.0		
Courses of Study and Scheme of Assessment (Regulations 2023)									**Date:** 09.09.2023		
Sl. No.	**Course Code**	**Course Title**	**Periods / Week**						**Maximum Marks**		
			CAT	**CP**	**L**	**T**	**P**	**C**	**IA**	**ESE**	**Total**
SEMESTER I											
-	-	Induction Programme	-	-	-	-	-	-	-	-	-
	THEORY										
1.	BE23EN101	Communicative English - I	HS	2	1	1	0	2	40	60	100
2.	BE23MA201	Calculus for Engineers	BS	3	2	1	0	3	40	60	100
3.	BE23PH201	Basic and Applied Physics	BS	3	3	0	0	3	40	60	100
4.	BE23CY201	Engineering Chemistry	BS	3	3	0	0	3	40	60	100
5.	BE23GE301	Overview of Engineering andTechnology	ES	3	3	0	0	3	40	60	100
6.	BE23MC901	தமிழர் மரபு / Heritage of Tamils	MC	1	1	0	0	1	40	60	100
	THEORY CUM PRACTICAL										
7.	BE23GE307	Problem Solving using C Programming	ES	5	3	0	2	4	50	50	100
	PRACTICAL										
8.	BE23BS201	Physics and Chemistry Laboratory	BS	4	0	0	4	2	60	40	100
9.	BE23GE305	Engineering Practices Laboratory	ES	4	0	0	4	2	60	40	100
	EMPLOYABILITY ENHANCEMENT										
10.	BE23PT801	Human Excellence and Value Education – I	EEC	2	1	0	1	NC	100	-	100
Total				**30**	**17**	**2**	**11**	**23**	**510**	**490**	**1000**
SEMESTER II											
	THEORY										
1.	BE23EN102	Communicative English - II	HS	2	1	1	0	2	40	60	100
2.	BE23MA202	Vector Calculus and Numerical Methods	BS	3	2	1	0	3	40	60	100
3.	BE23GE304	Engineering Graphics and Network Drawings	ES	5	1	0	4	3	40	60	100
4.	BE23CS401	Digital Principles and Computer Organization	PC	3	3	0	0	3	40	60	100
5.	BE23CB403	Design Thinking	PC	3	3	0	0	3	40	60	100
6.	BE23MC902	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	MC	1	1	0	0	1	40	60	100
7.	BE23MC903	Universal Human Values and Ethics	MC	3	2	1	0	3	40	60	100
	THEORY CUM PRACTICAL										
8.	BE23GE310	Object Oriented Programming Using C++	ES	5	3	0	2	4	50	50	100
	EMPLOYABILITY ENHANCEMENT										
9.	BE23PT802	Human Excellence and Value Education – II	EEC	2	1	0	1	NC	100	-	100
10.	BE23PT804	Engineering Clinic – I	EEC	2	0	0	2	1	100	-	100
11.	BE23PT806	Aptitude Skills – I	EEC	1	0	0	1	0.5	100	-	100
Total				**30**	**17**	**3**	**10**	**23.5**	**630**	**470**	**1100**

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B.TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE											
Courses of Study and Scheme of Assessment (Regulations 2023)											
Sl. No.	**Course Code**	**Course Title**	**Periods / Week**						**Maximum Marks**		
			CAT	**CP**	**L**	**T**	**P**	**C**	**IA**	**ESE**	**Total**
	SEMESTER III										
	THEORY										
1.	BE23MA203	Discrete Mathematics	BS	3	2	1	0	3	40	60	100
2.	BE23AD401	Artificial Intelligence	PC	3	3	0	0	3	40	60	100
	THEORY CUM PRACTICAL										
3.	BE23GE309	Python Programming	ES	5	3	0	2	4	50	50	100
4.	BE23CS404	Data Structures and Algorithms	PC	5	3	0	2	4	50	50	100
5.	BE23CS405	Database Management Systems	PC	5	3	0	2	4	50	50	100
6.	BE23CS406	Operating Systems	PC	5	3	0	2	4	50	50	100
	PRACTICAL										
7.	BE23EN103	Professional Communication Laboratory – I	HS	2	0	0	2	1	60	40	100
8.	BE23AD402	Artificial Intelligence Laboratory	PC	4	0	0	4	2	60	40	100
	EMPLOYABILITY ENHANCEMENT										
9.	BE23PT807	Aptitude Skills – II	EEC	1	0	0	1	0.5	100	-	100
Total				**33**	**17**	**1**	**15**	**25.5**	**500**	**400**	**900**
SEMESTER IV											
	THEORY										
1.	BE23MA206	Mathematics for Business Analytics	BS	3	2	1	0	3	40	60	100
2.	BE23AD403	Machine Learning	PC	3	3	0	0	3	40	60	100
3.	BE23CS407	Design and Analysis of Algorithms	PC	3	3	0	0	3	40	60	100
4.	BE23MC904	Environmental Science and Sustainability	MC	2	2	0	0	NC	100	-	100
	THEORY CUM PRACTICAL										
5.	BE23AD404	Foundations of Data Science and Visualization	PC	5	3	0	2	4	50	50	100
6.	BE23CS315	Java Programming	ES	5	3	0	2	4	50	50	100
	PRACTICAL										
7.	BE23EN104	Professional Communication Laboratory – II	HS	2	0	0	2	1	60	40	100
8.	BE23AD405	Machine Learning Laboratory	PC	4	0	0	4	2	60	40	100
	EMPLOYABILITY ENHANCEMENT										
9.	BE23PT805	Engineering Clinic – II	EEC	2	0	0	2	1	100	-	100
10.	BE23PT808	Aptitude Skills – III	EEC	1	0	0	1	0.5	100	-	100
		Total		**30**	**16**	**1**	**13**	**21.5**	**640**	**360**	**1000**

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B.TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE											
Courses of Study and Scheme of Assessment (Regulations 2023)											
Sl. No.	**Course Code**	**Course Title**	**Periods / Week**						**Maximum Marks**		
			CAT	**CP**	**L**	**T**	**P**	**C**	**IA**	**ESE**	**Total**
	SEMESTER V										
	THEORY										
1.	BE23AD406	Cloud Computing	PC	3	3	0	0	3	40	60	100
2.	BE23XX6XX	Open Elective – I	OE	3	3	0	0	3	40	60	100
3.	BE23AC905	Indian Constitution	AC	2	2	0	0	NC	100	-	100
	THEORY CUM PRACTICAL										
4.	BE23CS402	Computer Networks	PC	5	3	0	2	4	50	50	100
5.	BE23CS412	Embedded Systems and IoT	PC	5	3	0	2	4	50	50	100
6.	BE23AD5XX	Professional Elective – I	PE	5	3	0	2	4	50	50	100
7.	BE23AD5XX	Professional Elective – II	PE	5	3	0	2	4	50	50	100
	EMPLOYABILITY ENHANCEMENT										
9.	BE23PT809	Aptitude Skills – IV	EEC	1	0	0	1	0.5	100	-	100
10.	BE23PT810	Coding Skills – I	EEC	2	0	0	2	1	100	-	100
11.	BE23PT812	Technical Comprehension and Mock Interview – I	EEC	1	0	0	1	0.5	100	-	100
Total				**32**	**20**	**0**	**12**	**24**	**680**	**320**	**1000**
SEMESTER VI											
	THEORY										
1.	BE23AD407	Deep Learning	PC	3	3	0	0	3	40	60	100
2.	BE23XX6XX	Open Elective – I	OE	3	3	0	0	3	40	60	100
	THEORY CUM PRACTICAL										
3.	BE23AD409	R Programming for Data Science	PC	5	3	0	2	4	50	50	100
4.	BE23AD5XX	Professional Elective – III	PE	5	3	0	2	4	50	50	100
5.	BE23AD5XX	Professional Elective – IV	PE	5	3	0	2	4	50	50	100
	PRACTICAL										
6.	BE23AD408	Deep Learning Laboratory	PC	4	0	0	4	2	60	40	100
7.	BE23PW701	Make A Product	PW	2	0	0	2	1	100	-	100
	EMPLOYABILITY ENHANCEMENT										
8.	BE23PT803	Human Excellence and Value Education – III	EEC	2	1	0	1	NC	100	-	100
9.	BE23PT811	Coding Skills – II	EEC	2	0	0	2	1	100	-	100
10.	BE23PT813	Technical Comprehension and Mock Interview – II	EEC	1	0	0	1	0.5	100	-	100
Total				**32**	**16**	**0**	**16**	**22.5**	**690**	**310**	**1000**

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B.TECH. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE											
Courses of Study and Scheme of Assessment (Regulations 2023)											
Sl. No.	**Course Code**	**Course Title**	**Periods / Week**						**Maximum Marks**		
			CAT	**CP**	**L**	**T**	**P**	**C**	**IA**	**ESE**	**Total**
	SEMESTER VII										
	THEORY										
1.	BE23HS105	Project Management and Finance	HS	3	2	1	0	3	40	60	100
2.	BE23XX6XX	Open Elective – III	OE	3	3	0	0	3	40	60	100
	THEORY CUM PRACTICAL										
3.	BE23AD410	Big Data Analytics	PC	5	3	0	2	4	50	50	100
4.	BE23AD5XX	Professional Elective – V	PE	5	3	0	2	4	50	50	100
	PRACTICAL										
4.	BE23AD702	Project Work Phase – I	PW	2	0	0	2	1	100	-	100
	EMPLOYABILITY ENHANCEMENT										
5.	BE23PT814	Industrial Training / Entrepreneurship / Undergraduate Research Activity / Company Certification	EEC	6	0	0	6	3	100	-	100
Total				**24**	**11**	**1**	**12**	**18**	**380**	**220**	**600**
SEMESTER VIII											
	PRACTICAL										
1.	BE23CS703	Project Work Phase – II	PW	18	0	0	18	9	60	40	100
	Total			**18**	**0**	**0**	**18**	**9**	**60**	**40**	**100**
			Total Number of Credits: 167								

SEMESTER-WISE CREDITS DISTRIBUTION

SUMMARY										KIOT	
Sl. No.	Course Category	Credits per Semester								Credits	Credit %
		I	II	III	IV	V	VI	VII	VIII		
1	HS	2	2	1	1	-	-	3	-	9	**5.4**
2	BS	11	3	3	3	-	-	-	-	20	**11.9**
3	ES	9	7	4	4	-	-	-	-	24	**14.4**
4	PC	-	6	17	12	11	9	4	-	59	**35.3**
5	PE	-	-	-	-	8	8	4	-	20	**12.0**
6	OE	-	-	-	-	3	3	3	-	9	**5.4**
7	PW	-	-	-	-	-	1	1	9	11	**6.6**
8	EEC	-	1.5	0.5	1.5	2	1.5	3	-	10	**6.0**
9	MC\NC\AC	1	4	-	-	-	-	-	-	5	**3.0**
	Total	**23**	**23.5**	**25.5**	**21.5**	**24**	**22.5**	**18**	**9**	**167**	**100**

CAT	Category of Course	HS	Humanities, Social Sciences and Management Courses	PW	Project Work Courses
CP	Contact Periods	BS	Basic Science Courses	EEC	Employability Enhancement Courses
L	Lecture Hours	ES	Engineering Science Courses	MC/NC/AC	Mandatory Courses/Non-Credit Courses/Audit Courses
T	Tutorial Hours	PC	Professional Core Courses	CIA	Continuous Internal Assessment
P	Practical Hours	PE	Professional Elective Courses	ESE	End Semester Examination
C	Credits	OE	Open Elective Courses		

BE23EN101	COMMUNICATIVE ENGLISH - I	Version : 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		2	1	1	0	2

Course Objectives:

1	To enable learners use words appropriately in their communication.
2	To enhance learners grammatical accuracy in communication.
3	To develop learners ability to read and listen to texts in English.
4	To strengthen the communication skills of the learners.
5	To help learners write appropriately in professional contexts.

UNIT–I	BASICS OF LANGUAGE	3+3

Concept: Introduction to Language and Communication (L1) - Parts of Speech (L1) - Vocabulary: Synonyms & Antonyms (L1), Word formation (L1), Prefixes and Suffixes (L1) - One-word substitute (L1) - Gerund and Infinitive (L1) - Tenses: Simple Present, Present Continuous, Present Perfect, Present Perfect Continuous (L2).

Activity: Exercises using worksheets - Word / grammar games – Conducting quiz.

UNIT–II	LANGUAGE DEVELOPMENT	3+3

Concept: Tenses: Simple Past, Past Continuous, Simple Future, Future Continuous (L2) - Active to Passive Voice (L2) - Framing Questions: WH / Yes or No (L2) - Modal Verbs (L1) - Cause and Effect Expressions (L1) - Day to day Idioms & Phrases (L2).

Activity: Practice using worksheets - Role play - Face to face conversation.

UNIT– III	DEVELOPING LISTENING & READING SKILLS	3+3

Concept: Types of listening (L1) - Global accent (L1) - Pronunciation (L2), listening to short talks of celebrities,TV shows, announcements (L1), TED Talks (L2) - Reading: Skimming and Scanning (L1) - Reading Brochures (L2) - Understanding sentence structure (L2) – Punctuation (L2) - News Articles (L2).

Activity: Paraphrasing news article - Listening comprehension - Reading comprehension.

UNIT – IV	SPEAKING FOR EXPRESSION	3+3

Concept: Overcoming Mother Tongue Influence (L1) - Self-Introduction & Introducing others (L1) - Speaking about hobbies, areas of interest, likes and dislikes (L1), Usage of Numerical Adjectives (L2) - Relative pronouns - combining sentences using relative pronouns (L3) - Discussion on social issues (L3) - sharing experience of past and future plans (L3) - Talking about engineering devices (L3).

Activity: Just a minute talk (JAM) – Debate.

UNIT–V	TECHNICAL WRITING	3+3

Concept: Extended definition of Technical Words (L2) - Writing abstracts (L3) - Note making (L3) - Report writing (L3) - Techniques of writing a report - Kinds of report - Industrial report (L3) - Writing Instructions and recommendations (L2) - Formal letters: letter to industry, letter to editor, letter of complaint (L3).

Activity: Writing Industrial report - Project report - Technical report.

	OPEN ENDED PROBLEMS / QUESTIONS	
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total : 30 PERIODS
Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Use appropriate words in all kinds of correspondence.	L3 - Apply
CO2	Demonstrate appropriate language use in extended discussions.	L3 - Apply
CO3	Apply the strategies of listening, reading and comprehending the text appropriately.	L3 - Apply
CO4	Construct ideas to be active participants in all kinds of discussions.	L3 - Apply
CO5	Apply technical information and knowledge in practical documents.	L3 - Apply
TEXTBOOKS:		
1.	Tiwari, Anjana. "Communication Skills in English" Khanna Publication: New Delhi, 2022.	
REFERENCE BOOKS:		
1.	Raymond, Murphy. English Grammar in Use (5th Edition). Cambridge Press: New York, 2019.	
2.	Wren and Martin. High School English Grammar and Composition. S Chand Publishing: India. 2021.	
3.	Kumar, Suresh E. Engineering English. Orient Blackswan: Hyderabad, 2015.	
4.	Kumar, Kulbhusan and RS Salaria. Effective Communication Skill. Khanna Publishing House : New Delhi, 2016.	
WEB REFERENCES:		
1.	https://learnenglish.britishcouncil.org/grammar	
2.	https://www.englishgrammar.org/lessons/	
ONLINE COURSES:		
1.	https://www.coursera.org/specializations/improve-english	
2.	https://www.udemy.com/course/common-english-grammar-mistakes-and-how-to-fix-them-sampl	
VIDEO REFERENCES:		
Any relevant videos like		
1.	https://www.youtube.com/watch?v=aOsILFNgtIo	
2.	https://www.oxfordonlineenglish.com/free-english-grammar-lessons	

Mapping of COs with POs and PSOs															
COs	**Pos**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1									1	3		1			
CO2									1	3		1			
CO3									1	3		1			
CO4									1	3		1			
CO5									1	3		1			
Average									1	3		1			
1–Low, 2 –Medium, 3–High.															

BE23MA201	CALCULUS FOR ENGINEERS	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	2	1	0	3

Use of Calculator - fx991ms are permitted

Course Objectives:

1	To learn the concepts of matrices for analyzing physical phenomena involving continuous change.
2	To study the concepts of differential calculus and various techniques.
3	To understand the various techniques in solving ordinary differential equations.
4	To infer the methodologies involved in solving problems related to fundamental principles of integral calculus.
5	To familiarize the concepts of functions of several variables.

Significance of Mathematical Modelling in Engineering and Technology (Not for Examination)	2

UNIT–I	MATRICES	8

Essential of matrices (L1) - Eigenvalues and Eigenvectors of a real matrix (L3) – Properties of Eigenvalues and Eigenvectors (Excluding proof) (L2) – Problems (L3) – Statement and application of Cayley – Hamilton theorem (Excluding proof) (L2) – Problems (L3) – Reduction of a quadratic form to canonical form by orthogonal transformation (L3) – Nature of quadratic forms (L2) - Engineering Applications (L2).

UNIT–II	DIFFERENTIAL CALCULUS	8

Differentiation an outline (L1) - Limit of a function (L2) - Continuity (L3) - Derivatives (L3) - Differentiation rules (L2) - Maxima and Minima of functions of one variable (L3) - Engineering Applications (L2).

UNIT– III	ORDINARY DIFFERENTIAL EQUATIONS	9

A View on ODE's (L1) - Second and Higher order linear differential equations with constant coefficients (L3) - Method of variation of parameters (L3) – Homogeneous equation of Cauchy's and Legendre's type (L3) - Engineering Applications (L2).

UNIT – IV	INTEGRAL CALCULUS	9

Essential of Integration (L1) - Definite and Indefinite integrals (L2) - Substitution rule (L3) - Integration by parts (L3) – Multiple integral (L2) - simple problems (L3) – Area enclosed by plane curves (L3) – Engineering Applications (L2).

UNIT – V	FUNCTIONS OF SEVERAL VARIABLES	9

Introduction to PDEs (L1) – Classification of PDE's (Elliptic, Parabola, Hyperbola) and its Engineering Application(Laplace, Wave and Heat equations) (L2) – Homogeneous functions and Euler's theorem (L2) – Total derivatives (L3) - Jacobian's (L3)– Maxima and minima of functions of two variables (L3) – Lagrange's method of undetermined multipliers (L3).

	OPEN ENDED PROBLEMS / QUESTIONS	
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total : 45 PERIODS
Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Describe knowledge of matrices with the concepts of eigenvalues to study their problems in core area.	L3 – Apply
CO2	Familiarize differential calculus tools in solving various application problems.	L3 – Apply
CO3	Solve basic application problems described by second and higher order linear differential equations with constant coefficients.	L3 – Apply
CO4	Apply basic concepts of integration to evaluate line, surface and volume integrals.	L3 – Apply
CO5	Apply the basic techniques and theorems of functions of several variables in other area of mathematics.	L3 – Apply
TEXTBOOKS:		
1.	Kreyzig E., "Advanced Engineering Mathematics", Tenth Edition, John Wiley and sons, 2011.	
2.	T.Veerarajan " Engineering Mathematics " , 5th edition ,Tata McGraw hill Education Pvt. Ltd,2006.	
REFERENCE BOOKS:		
1.	Grewal B.S., "Higher Engineering Mathematics", 41st Edition, Khanna Publishers, New Delhi,2011.	
2.	Narayanan S. and Manicavachagom Pillai.T.K., "Calculus", Volume I and II, Viswanathan S ,Printers & Publishers Pvt. Ltd, 2009.	
VIDEO REFERENCES:		
Any Relevant videos like :		
1.	https://youtu.be/4QFsiXfgbzM (Prof.Jitendra kumar IIT Karagpur)	
2.	https://youtu.be/LompT8T-9y4 (Dr.D.N.Panduy , IIT Roorkee)	
WEB REFERENCES:		
1.	https://home.iitm.ac.in/asingh/papers/classnotes-ma1101.pdf	
2.	https://www.coursera.org/learn/differential-equations-engineers	
ONLINE COURSES:		
1.	https://onlinecourses.nptel.ac.in/noc20_ma37/preview	
2.	https://onlinecourses.nptel.ac.in/noc20_ma15/preview	

Mapping of COs with POs and PSOs															
COs	**Pos**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2													
CO2	3	2													
CO3	3	2													
CO4	3	2													
CO5	3	2													
Average	3	2													
1–Low, 2 –Medium, 3–High.															

BE23PH201	BASICS AND APPLIED PHYSICS	Version: 1.0
(COMMON TO CSE, IT, AI&DS AND CSBS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	3	0	0	3

Course Objectives:

1	To introduce electrical properties of the materials.
2	To identify the basic concepts of semiconductors and their applications.
3	To elaborates optics and lasers concepts.
4	To outline about different types of magnetic materials and its applications in data storage.
5	To infer about quantum mechanical law for quantum computer application.

Importance of Physics in Computer Science domain – Course outline (Not for examination).	**2**

UNIT–I	**ELECTRICAL PROPERTIES OF THE MATERIALS**	**8**

Classical free electron theory (L2) – Expression for electrical conductivity (L3) – Thermal conductivity, expression (L3) – Wiedemann-Franz law (L3) – Success and failures (L2) – Fermi- Dirac statistics (L2)– Density of energy states (L2) – Electron in periodic potential (L1) – Energy bands in solids (L1) - Electron effective mass (L2) – Concept of hole (L1).

UNIT–II	**SEMICONDUCTOR PHYSICS AND ITS APPLICATIONS**	**9**

Properties of semiconductor (L1) - Bonds in semiconductors (L2) - Intrinsic Semiconductors (L1) - Extrinsic semiconductors (Qualitatively) (L1) - Carrier concentration in intrinsic semiconductor (L2) – Variation of carrier concentration with temperature (L2) – Variation of Fermi level with temperature and impurity concentration(L2) - Hall effect and devices (L2) – PN diode (L1) - Ohmic contacts (L2) – Schottky diode (L2) – Microprocessor (Qualitatively) (L1).

UNIT– III	**OPTICS AND LASERS**	**8**

Scattering, Refraction (L1) - Theory of refraction and absorption, Reflection and refraction of light waves (L1) - Total internal reflection (L1) – Interference (L1) – Theory and experiment of air wedge (L3) - Laser: Principle of laser (L1) – characteristics (L1) - Spontaneous and stimulated emission (L2) - Einstein's coefficients (L2) - population inversion (L1) - CO_2 laser, semiconductor laser (L2) – Industry applications of laser (L2) – Optical data storage techniques (Qualitatively) (L1).

UNIT – IV	MAGNETIC MATERIALS AND STORAGE DEVICE	9
Introduction to magnetic materials (Qualitatively) (L1) - Magnetic dipole moment (L1) - Magnetic permeability and susceptibility (L3) - Magnetic material classification (L2) – Domain Theory (L2) - M versus H behavior (L2) – Hard and soft magnetic materials (L1) - Magnetic principle in computer data storage (L1) - Volatile and non-volatile memory (L1) – Magnetic hard disc with Giant Magneto Resistance (GMR) (L2).		
UNIT – V	**BASIC AND APPLIED QUANTUM MECHANICS**	**9**
Introduction (L1) - Photons and light waves (L1) - Electrons and matter waves (L3) – The Schrodinger's wave equations (Time dependent and time independent forms) (L3) - Normalization (L2) – Particle in an infinite potential well: 1 Dimensional (D), 2D and 3D boxes (L3) – Nanomaterials (0D, 1D, 2D and 3D) (Qualitatively) (L1) – Single electron transistor (L2) - Quantum states (L2) – Qubits (L1) – CNOT gates (L2) - Quantum computing (Quantum Cellular Automata) and its advantages (L1).		
	OPEN ENDED PROBLEMS / QUESTIONS	
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total : 45 PERIODS

Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Use the electrical properties of the materials to classify them (metal, semiconductor and insulator).	L3 - Apply
CO2	Summarize semiconductor types and find their carrier concentrations.	L2 - Understand
CO3	Relate optics, LASER and their applications.	L2 - Understand
CO4	Differentiate magnetic materials for data storage device.	L3 - Apply
CO5	Illustrate the basics of quantum mechanics and their applications in quantum computing.	L3 - Apply

TEXTBOOKS:

1.	Charles Kittel, Quantum Theory of Solids, Wiley (Second Revised Edition), 1991.
2.	Jasprit Singh, "Semiconductor Devices: Basic Principles", Wiley (Indian Edition), 2007.
3.	Senthil Kumar. G, Murugavel. S: Physics for Information Science, VRB Publishers Private Limited, 2021.
4.	Senthil Kumar. G, Murugavel. S: Engineering Physics, VRB Publishers Private Limited, 2021.
5.	Pillai. S. O: Solid State Physics, New Age International Publishers, 2022.

REFERENCE BOOKS:	
1.	Mitin V. V, Kochelap V.A and Stroscio M.A, Introduction to Nanoelectronics, Cambridge Univ. Press, 2008.
2.	Hanson G.W, Fundamentals of Nanoelectronics, Pearson Education (Indian Edition) 2009.
3.	Band Y. B and Avishai Y., Quantum Mechanics with Applications to Nanotechnology and Information Science, Academic Press, 2013.
4.	Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.

VIDEO REFERENCES: Any relevant videos like	
1.	"Carrier concentration in intrinsic semiconductor" – Dr. Rizwana
2.	"Schrodinger wave equation" - Prof. S. Bharadwaj
WEB REFERENCES:	
1.	https://archive.nptel.ac.in/courses/115/105/115105099/
2.	https://www.brainkart.com/subject/Physics-for-Information-Science_271/
ONLINE COURSES:	
1.	Introduction to semiconductor devices - Prof. Naresh Kumar Emani.
2.	Advanced quantum mechanics and its application - Prof. SaurabhBasu.

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2													2
CO2	3	2													2
CO3	3	2													2
CO4	2	2													2
CO5	2	2													2
Average	2.4	2													2
1–Low, 2 –Medium, 3–High.															

BE23CY201	ENGINEERING CHEMISTRY	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	3	0	0	3

Course Objectives:

1	To illustrate the boiler feed water requirements, related problems and water treatment techniques.
2	To impart knowledge on the Preparation, properties and applications of engineering materials.
3	To elaborate the Principles of electrochemical reactions, redox reactions in corrosion of materials and basics of polymers.
4	To outline the principles and generation of energy in batteries and fuel cells.
5	To introduce the concepts of industry safety precautions and its standards.

UNIT–I	WATER AND ITS TREATMENT	9

Need for water treatment (L1) – applications (L1), Water resources (L1) - Hardness of water (L1) – types – expression of hardness (L1) – units – estimation of hardness of water by EDTA (L2) – numerical problems (L2) - treatment of boiler feed water (L1) – Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) (L2) external treatment(L2) – Ion exchange process, zeolite process (L2) – desalination of brackish water (L2) – Reverse Osmosis (L2).

UNIT–II	NANO MATERIALS AND PREPARATIONS	9

Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis (L2). Optical material for smart screen (LED, LCD & OLED) (L1). Fundamentals of nano science - Basics: Distinction between molecules, nanomaterials and bulk materials (L1) - Size-dependent properties (optical, electrical, mechanical and magnetic) (L1)-Types of nanomaterials-Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube (L2) - Preparation of nanomaterials (L2).

UNIT– III	ELECTROCHEMISTRY AND POLYMERS	9

Electro chemistry; Need and applications (L1). Electrochemical cell (L1) – redox reaction (L1) – electrochemical series and its significance (L1) – Nernst equation (L2). Corrosion- causes- factors- types- chemical, electrochemical corrosion (galvanic, differential aeration), corrosion control (L2) – electrochemical protection (L2) – sacrificial anode method (L2). Polymers; Need and applications (L1). - Classification of polymers (L1) – Natural and synthetic; Thermoplastic and Thermosetting (L1). Functionality – Degree of polymerization. Preparation, properties and uses of Nylon 6,6, and Epoxy resin (L2).

UNIT – IV	BATTERIES AND FUEL CELLS	9

Batteries: Need and applications (L1). Energy storage devices classification (L1) – Batteries - Types of batteries, Primary battery (L1) – dry cell, Secondary battery (L1) – lead acid battery (L2) - lithium-ion battery (L2) - Electric vehicles introduction – working principles (L2) - Fuel cells - H_2-O_2 fuel cell (L1) - Microbial fuel cell - Super capacitors (L1) - Storage principle (L1) - types and examples (L2).

UNIT–V	CHEMISTRY, ENVIRONMENT AND WASTE MANAGEMENT	9
Chemical pollution (L2) – Norms and Standards (L1) – Safety Precaution (L2) – Importance of Green chemistry - E-wastes and its management (L2) – Carbon foot print and its calculations (L2) - CO_2 emission and its impact on environment (L2) – Techniques for CO_2 emission reduction (L2).		
	OPEN ENDED PROBLEMS / QUESTIONS	
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total : 45 PERIODS

Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	L2 – Understand
CO2	Identify and understand basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	L2 – Understand
CO3	Outline the basics of electro chemistry and polymers	L2 – Understand
CO4	Summarize about the various advanced power storage devices working principles and its applications.	L2 – Understand
CO5	Illustrate the basic concepts of safety standards in industry and carbon credit.	L2 – Understand

TEXTBOOKS:

1.	R.K. Jain and Prof. Sunil S. Rao Industrial Safety, "Health and Environment Management Systems" khanna publisher, 2000.
2.	S. S. Dara and S. S. Umare, "A Textbook of Engineering Chemistry", S. Chand & Company LTD, New Delhi, 2015.
3.	P. C. Jain and Monika Jain, "Engineering Chemistry" Dhanpat Rai Publishing Company (P) LTD, New Delhi, 2015.

REFERENCE BOOKS:

1.	John Ridley & John Channing, "Safety at Work": Routledge, 7th Edition, 2008.
2.	B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
3.	O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
4.	ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.

VIDEO REFERENCES:	
Any relevant videos like	
1.	https://www.youtube.com/watch?v=v-eltsixu4I
2.	https://www.youtube.com/watch?v=2bDf7JSRvf8
WEB REFERENCES:	
1.	https://nptel.ac.in/courses/104103019
2.	https://www.brainkart.com/subject/Engineering-Chemistry_264/
ONLINE COURSES:	
1.	https://nptel.ac.in/courses/103103206
2.	https://www.coursera.org/learn/battery-comparison-manufacturing-and-packaging

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	1										1			
CO2	2			1		2	2								3
CO3	3	1	2	1		2	2					2			
CO4	3	2	2	1		1	1					1			3
CO5	3	1	2	1		2	2					2			3
Average	2.8	1.25	2	1		1.75	1.75					1.5			1.8
1–Low, 2 –Medium, 3–High.															

BE23GE301	OVERVIEW OF ENGINEERING AND TECHNOLOGY	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	3	0	0	3

Course Objectives:

1	To Outline the basics of the Civil Engineering Program.
2	To learn the fundamentals of Mechanical Engineering.
3	To impart Knowledge on Fundamental Concepts and recent trends in the field of Electrical and Control Systems.
4	To Provide the Overview of the Electronics and Communication Engineering Program.
5.	To Provide a Comprehensive overview of the field of Computer science, from its historical roots to most cutting-edge developments.

Unit – I	INTRODUCTION TO ENGINEERING & TECHNOLOGY (NOT FOR EXAMINATION)	7

Science, Engineering and Technology(E&T), Approaches for a Scientific process vs an Engineering process; Engineering Product Life Cycle, processes in Engineering Design Methodology with few examples; various branches in Engineering and Technology (Traditional and Recent), Impact of E&T on human life, (pros & cons); Activities performed by an Engineer, Interdisciplinary nature of real world problems; Revised Bloom's Taxonomy Levels (BTL) and Engineering Teaching Learning Process (TLP); Structure, Duration and BTL levels in UG, PG & Ph.D. level Education in E&T, History of E&T development and emerging fields in E&T.

Unit – II	OVERVIEW OF CIVIL ENGINEERING	6

Introduction (L1) – Major Areas of Study (L2): Architecture and Town Planning, Structural Engineering, Construction Engineering and Management, Hydrology and Water Resources Engineering, Environmental Engineering, Transportation Engineering – Historical Perspective (L2) – Few Practical Applications* (L2) : (i) Single Story Residential Building, (ii) Roads and Highway Network (iii) Dam, Canals and Irrigation layout, (iv) Sewage System and its Treatment – Recent Developments / Current Areas of Research (L2).

Unit – III	OVERVIEW OF MECHANICAL ENGINEERING	8

Introduction (L1) – Major Areas of Study (L2): World Energy Scenario, CO2 and other Emissions and Climatic Change, Energy Conservation Systems, Mechanical Design, Manufacturing and Industrial Engineering – Historical Perspective (L2) – Few Practical Applications* (L2) : (i) Thermal Power Plant, (ii) Air Conditioning Systems, (iii) Automobile (Car / Truck), (iv) Mechanical Design of a Component using CAD, (v) Assembly Line of a Car manufacturing Plant (vi) Machines in a Textile Spinning Industry – Recent Developments / Current Areas of Research (L2).

Unit – IV	OVERVIEW OF ELECTRICAL AND CONTROL SYSTEMS ENGINEERING	9

Electrical Engineering: Introduction (L1) – Historical Perspective (L2) - Major Areas of Study (L2): Electrical Power Generation, Transmissions and Distributions, Motors, Sensors, Instrumentation & Control System, and Lighting System, Distributed Power Generation and Consumption - Few Practical Applications* (L2) : (i) Generators (ii) Transmission Systems (iii) Home Appliances: Rating, Load Estimations and Wiring (iv) Electrical Appliances: Induction Stove, BLDC Fan vs Ordinary Fan - Electric Vehicle - Recent Developments / Current Areas of Research (L2).

Control Systems Engineering: Introduction (L1) – Control Systems Layout, Open Loop and Closed Loop, System Response or Time Constant, – Few Practical Applications* (L2): Mechanical, Hydraulic, Pneumatic, Electrical, Electronics / Embedded Control Systems and Computer Based Control Systems (PLC and SCADA).

Unit – V	OVERVIEW OF ELECTRONICS AND COMMUNICATION ENGINEERING	9

Introduction (L1) – Major Areas of Study (L2): Electronic Devices and Circuits, Analog Electronics, Digital Electronics, Embedded Systems, Integrated Circuits & VLSI – Historical Perspective (L2) – Few Practical Applications* (L2): (i) Audio Systems, (ii) Automotive Electronic Systems – Recent Developments / Current Areas of Research (L2)

Introduction (L1) – Major Areas of Study (L2): Signal Processing, Analog and Digital Communication, Data Communications and Networking – Historical Perspective (L2) – Few Practical Applications* (L2): (i) Text to Speech / Voice to Text Application in Google Search, (ii) Wired and Wireless Communications Network, (iii) Satellite Communications, (iv) IoT Communications Network – Recent Developments / Current Areas of Research (L2).

Unit – VI	OVERVIEW OF COMPUTER SCIENCE AND ENGINEERING	6

Introduction (L1): Evolution of Computers / Generation Computers – Major Areas of Study (L2): Computer Hardware, Programming Languages, Operating Systems, Application Software , Database Management Systems (DBMS), Computer Networks, Internet and Computer Security, Web Technology, Social Media, Mobile Application– Recent Developments / Current Areas of Research (L2): Artificial Intelligence (AI) and Machine Learning (ML), Internet of Things (IoT), Block Chain, Big Data Analytics,
Cyber Security, Cloud Computing.

* Purpose or Use, Actual System (Photo), Layout or Block Diagram, Description, Operational Aspects and Inputs/Outputs are to be taught (Descriptive level only).

Total: 45 PERIODS

	OPEN ENDED PROBLEMS/QUESTIONS	

Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.

Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy
CO1	Identify the major areas and relate their current trends in Civil Engineering.	L2-Understand
CO2	Explain the principles behind various mechanical systems and components.	L2-Understand
CO3	Identify different Electricals and Control Systems applied in the Engineering field.	L2-Understand
CO4	Relate the various Electronics and Communication Engineering Systems involved in real life.	L2-Understand
CO5	Understand the components of Computer Hardware, Software, and Operating Systems and their applications in real life.	L2-Understand
TEXTBOOKS:		
1.	"Overview of Engineering and Technology", Lecture Notes from KIOT, 2023.	
REFERENCE BOOKS:		
1.	Banapurmath N.R., & Yalliwal V.S., "Basics of Mechanical Engineering",Vikas Publishing House, 2021.	
2.	G Shanmugam, M S Palanichamy, "Basic Civil and Mechanical Engineering", McGraw Hill Education; First Edition, 2018.	
3.	Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.	
4.	Albert Malvino and David J. Bates," Electronic Principles (SIE)", Seventh Education, McGraw Hill 2017.	
5.	Reema Thareja, "Fundamentals of Computer", Oxford University Press, 2016.	

Mapping of COs with POs and PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													3
CO2	3													3
CO3	3													3
CO4	3													3
Average	3													3
1–Low, 2–Medium, 3–High														

BE23MC901	தமிழர் மரபு / HERITAGE OF TAMILS (TAMIL VERSION)	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme &Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		1	1	0	0	1

Students can write the examination either in Tamil or in English

Course Objectives:

1	தமிழ் மொழிக்குடும்பம் மற்றும் இலக்கியங்களைப் பற்றி எடுத்துரைத்தல்.
2	பாறை ஓவியங்கள் மற்றும் நவீன ஓவியங்கள் குறித்த வரலாற்றுச் செய்திகளைக் கூறுதல்.
3	தமிழர்களின் கலைகள் விளையாட்டுகள் ஆகியவற்றைத் தெரியப்படுத்துதல்.
4	தொல்காப்பியம் மற்றும் சங்க இலக்கியத் திணைக் கோட்பாடுகளைப் பற்றியச் செய்திகளை எடுத்துரைத்தல்.
5	தமிழர்களின் தேசிய உணர்வு தமிழ்ப்பண்பாடு ஆகியவற்றை மாணவர்களுக்கு உணர்த்துதல்.

UNIT–I	மொழி மற்றும் இலக்கியம்	3

இந்திய மொழிக்குடும்பங்கள் (L1) – திராவிட மொழிகள் (L1) – தமிழ் ஒரு செம்மொழி (L1) - தமிழ்ச் செவ்விலக்கியங்கள் (L1) – திருக்குறளில் மேலாண்மைக் கருத்துகள் (L2) – தமிழ்க் காப்பியங்கள் (L1) – பக்தி இலக்கியம் ஆழ்வார்கள் மற்றும் நாயன்மார்கள் சிற்றிலக்கியங்கள் (L1) – தமிழிலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு. (L1)

UNIT–II	பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை சிற்பக்கலை	3

நடுகல் முதல் நவீன சிற்பங்கள் வரை (L1) – ஐம்பொன் சிலைகள் பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள் (L2) – சுடுமண் சிற்பங்கள் நாட்டுப்புறத் தெய்வங்கள் (L1) – குமரிமுனையில் திருவள்ளுவர் சிலை (L1) – இசைக்கருவிகள் (L1) – மிருதங்கம் பாறை, வீணை, யாழ், நாதஸ்வரம். (L1)

UNIT– III	நாட்டுப்புறக் கலைகள் வீர விளையாட்டுகள்	3

தெருக்கூத்து கரகாட்டம் (L1) - வில்லுப்பாட்டு (L1) – கணியான் கூத்து (L1) – ஒயிலாட்டம் (L1) – தோல்பாவைக் கூத்து (L1) - சிலம்பாட்டம் (L1) - வளரி (L1) - புலியாட்டம் (L1) – தமிழர்களின் விளையாட்டுகள். (L1)

UNIT – IV	தமிழர்களின் திணைக்கோட்பாடுகள்	3

தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள் தமிழர்கள் போற்றிய அறக்கோட்பாடுகள் (L2) – சங்க காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் (L1) – சங்ககால நகரங்களும் துறைமுகங்களும் (L1) – சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி. (L1)

UNIT–V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்கு தமிழர்களின் பங்களிப்பு	3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு (L1) – இந்தியாவின் பிற பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் (L1) – சுயமரியாதை இயக்கம். (L1)

Total : 15 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
CO1	தமிழ் மொழிக்குடும்பம் மற்றும் இலக்கியங்களை முழுமையாக அறிதல்.	L1 - நினைவில் கொள்ளுதல்
CO2	பாறை ஓவியங்கள் மற்றும் நவீன ஓவியங்கள் குறித்த வரலாற்றை அறிந்துகொள்ளுதல்.	L2 - புரிந்து கொள்ளுதல்
CO3	தமிழர்களின் கலைகள், விளையாட்டுகள் ஆகியவற்றைத் தெரிந்துகொள்ளுதல்.	L1 - நினைவில் கொள்ளுதல்

CO4	தொல்காப்பியம் மற்றும் சங்க இலக்கியத் திணைக் கோட்பாடுகளைப் பற்றி அறிந்துகொள்ளுதல்.	L2 - புரிந்து கொள்ளுதல்
CO5	தமிழர்களின் தேசிய உணர்வு, தமிழ்ப்பண்பாடு ஆகியவற்றை முழுமையாக அறிதல்.	L1 - நினைவில் கொள்ளுதல்

TEXT BOOKS	
1.	டாக்டர் கே.கே. பிள்ளை"தமிழக வரலாறு மக்களும் பண்பாடும்", (வெளியீடு, தமிழ்நாடு பாடநூல் கல்வியியல் பணிகள் கழகம்), 2021.
2.	முனைவர் இல. சுந்தரம், "கணினித்தமிழ்", (விகடன் பிரசுரம்), 2015.
REFERENCE BOOKS:	
1.	"கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்", (தொல்லியல் துறை வெளியீடு).
2.	"பொருநை – ஆற்றங்கரை நாகரிகம்", (தொல்லியல் துறை வெளியீடு), 2021.
3.	Dr.K.K.Pillay, "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL – (in print).
4.	Dr.S.Singaravelu, "Social Life of the Tamils - The Classical Period", (Published by: International Institute of Tamil Studies.
5.	Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", (Published by: International Institute of Tamil Studies).
6.	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", (Published by: International Institute of Tamil Studies.)
7.	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
8.	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", (Published by: The Author).
9.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
10.	R.Balakrishnan, "Journey of Civilization Indus to Vaigai", (Published by: RMRL) – Reference Book.
WEB REFERENCES:	
1.	http://www.news.mowval.in/News/tamilnadu/Nano-9202.html
2.	https://ta.wikipedia.org/wiki

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										2		3			
CO2												2			
CO3								1		2		3			
CO4								1		1		1			
CO5								1		1		3			
Average								1		1.5		2.4			
1–Low, 2 –Medium, 3–High.															

BE23MC901	Heritage of Tamils (ENGLISH VERSION)	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		1	1	0	0	1

Course Objectives:

1	To Learn about the Indian language family and Tamil literature.
2	To acquire knowledge on the history of rock paintings and modern paintings.
3	To Learn about the arts and games of Tamils.
4	To learn knowledge on Thinai Theory in Tolkappiyam and Sanga Literature.
5	To learn the national consciousness of Tamils and Tamil culture.

UNIT–I	LANGUAGE AND LITERATURE	3

Language Families in India (L1) - Dravidian Languages (L1) – Tamil as a Classical Language (L1) - Classical Literature in Tamil (L1) – Secular Nature of Sangam Literature (L1) – Distributive Justice in Sangam Literature (L1) - Management Principles in Thirukural (L2) - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land (L1) - Bakthi Literature Azhwars and Nayanmars (L1) - Forms of minor Poetry (L1) - Development of Modern literature in Tamil (L1) - Contribution of Bharathiyar and Bharathidhasan. (L1)

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

Hero stone to modern sculpture (L1) - Bronze icons - Tribes and their handicrafts (L2) - Art of temple car making (L1) - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments (L1) - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram (L1) - Role of Temples in Social and Economic Life of Tamils. (L1)

UNIT– III	FOLK AND MARTIAL ARTS	3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance (L1) - Sports and Games of Tamils. (L1)

UNIT – IV	THINAI CONCEPT OF TAMILS	3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature (L2) - Aram Concept of Tamils (L1) - Education and Literacy during Sangam Age (L1) - Ancient Cities and Ports of Sangam Age (L1) - Export and Import during Sangam Age (L1) - Overseas Conquest of Cholas.

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

Contribution of Tamils to Indian Freedom Struggle (L1) - The Cultural Influence of Tamils over the other parts of India (L1) - Self-Respect Movement (L1) - Role of Siddha Medicine in Indigenous Systems of Medicine (L1) – Inscriptions & Manuscripts (L1) – Print History of Tamil Books. (L1)

Total : 15 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
CO1	Find the Indian language family and Tamil literature.	L1 - Remember
CO2	Explain the evolution of contemporary and rock painting arts.	L2 - Understand
CO3	List the games and arts in Tamils.	L1 - Remember
CO4	Interpret the Thinai theories in Tolkappiyam and Sanga literature.	L2 - Understand
CO5	State the need of national consciousness of Tamils and Tamil culture.	L1 - Remember
TEXT BOOKS		
1.	டாக்டர் கே.கே. பிள்ளை, "தமிழக வரலாறு மக்களும் பண்பாடும்", (வெளியீடு, தமிழ்நாடு பாடநூல் கல்வியியல் பணிகள் கழகம்), 2021.	
2.	முனைவர் இல. சுந்தரம், "கணினித்தமிழ்", (விகடன் பிரசுரம்), 2015.	
REFERENCE BOOKS:		
1.	"கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்", (தொல்லியல் துறை வெளியீடு).	
2.	"பொருநை – ஆற்றங்கரை நாகரிகம்", (தொல்லியல் துறை வெளியீடு), 2021.	
3.	Dr.K.K.Pillay, "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL – (in print).	
4.	Dr.S.Singaravelu, "Social Life of the Tamils - The Classical Period", (Published by: International Institute of Tamil Studies.	
5.	Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", (Published by: International Institute of Tamil Studies).	
6.	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", (Published by: International Institute of Tamil Studies.)	
7.	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).	
8.	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", (Published by: The Author).	
9.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).	
10.	R.Balakrishnan, "Journey of Civilization Indus to Vaigai", (Published by: RMRL) – Reference Book.	
WEB REFERENCES:		
1.	http://www.news.mowval.in/News/tamilnadu/Nano-9202.html	
2.	https://ta.wikipedia.org/wiki	

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										2		3			
CO2												2			
CO3								1		2		3			
CO4								1		1		1			
CO5								1		1		3			
Average								1		1.5		2.4			
1–Low, 2 –Medium, 3–High.															

BE23GE307	PROBLEM SOLVING USING C PROGRAMMING	Version: 1.0
(COMMON TO CSE, IT, AIDS, CSBS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		5	3	0	2	4

Course Objectives: Upon completion of the course, students will be able:

1	To learn how to think algorithmically to solve a problem.
2	To gain knowledge of fundamental programming concepts in C language.
3	To explore the basic concept of arrays and pointers.
4	To learn modular programming principles and structures.
5	To gain proficiency in file handling techniques.

UNIT–I	COMPUTATIONAL THINKING	9

Computational Thinking: Overview(L2) - Key Techniques(L2) - Overview of Software Development Life Cycle(L2) - **Algorithmic Thinking:** Introduction(L2) - **Elements:** Sequence - Selection and Repetition(L2) - **Representation:** Flow Chart(L2) - Overview of Flowgorithm Tool(L3) - Pseudo-code(L3) - Programs(L3) - Introduction to programming languages(L2).

UNIT–II	BASICS OF C PROGRAMMING	9

Introduction: Features(L2) - Structure of C Programming(L2) - Compiling(L2) - Executing and Debugging(L3) - Character Set(L2) - **Tokens:** (Keywords – Identifiers – Constants – Strings – Operators - Special Symbols) (L2) - Data Types(L2). Expression(L2) - Precedence and Associativity(L3) - Evaluating Expression(L2) - Type Conversion(L2) - **Input and Output:** Unformatted Input and Output(L2) - Formatted Input and Output(L2) - **Control Flow Statements:** Sequence(L3) - Selection(L3) - Looping(L3) - Jumping Statements(L3).

UNIT– III	ARRAYS AND POINTERS	9

Arrays: Introduction(L2) - Declaration and Initialization of Single Dimensional Arrays(L3) - Array Operations(L3) - Declaration and Initialization of Two-Dimensional Arrays(L3) - Multidimensional Arrays(L3) - **Character Arrays (Strings):** Declaring and Initializing Strings(L3) - Reading and Writing Strings(L3) - String Operations(L3) - Array of Strings(L3).
Pointers: Introduction to Pointers(L2) - Pointer operators(L3) - Pointer arithmetic(L3) - Arrays and pointers(L3) - Array of pointers(L3).

UNIT – IV	FUNCTIONS AND STRUCTURES	9

Function: Need of Function(L2) - Elements(L2) - Types(L3) - **Parameter passing:** Pass by value(L3) - Pass by reference(L3) - Recursion(L3) - Storage Classes(L3).**Structures:** Introduction(L2) - Declaring and Defining Structure Variables(L2) - Accessing Structure Members(L3) - Structure Initialization(L3) - Nested structures(L3) - Array of structure(L3) – typedef (L3)- Union(L3) - Bitfields(L3).

UNIT–V	FILES AND OTHER FEATURES	9

Files: Introduction(L2) - Text Vs Binary Files(L2) - File Modes(L3) - Defining and Opening a File(L3) - Closing a File(L3) - Input/output Operations on Files(L3) - Random Access Files(L3).

Preprocessor Directives: Introduction(L2) - File Inclusion(L3) - Macro Definition(L3) - Conditional Compilation(L3). Command Line Arguments(L3) - Variable Length Arguments List(L3).

TOTAL : 45 PERIODS

LIST OF EXPERIMENTS/EXCERCISES:

1.	Implementation of algorithm, flowchart and pseudo code to solve simple problems.
2.	Implementation of if, if-else, nested if and switch statements.
3.	Implementation of while, do-while and for loops.
4.	Implementation of sorting and searching algorithms.
5.	Implementation of one dimensional array, passing array to functions and array operations.
6.	Implementation of programs for implementing various string operations like "copy", "finding length", "compare", "concatenate" with and without built-in library functions.
7.	Implementation of pointer operators, call by reference, pointers with array.
8.	Implementation of function calls, recursion, call by value.
9.	Implementation of structure and nested structure.
10.	Implementation of array of structures.
11.	Implementation of file operations.

TOTAL: 30 PERIODS

OPEN ENDED PROBLEMS / QUESTIONS

Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.

TOTAL: 75 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		**BLOOM'S Taxonomy**
CO1	Construct algorithmic solutions for a given computational problem.	L3 - Apply
CO2	Demonstrate the understanding of fundamental concepts of C programming.	L3 - Apply
CO3	Utilize appropriate data structures such as arrays and pointers to solve programming problems effectively.	L3 - Apply
CO4	Apply modular programming principles and structures in C language.	L3 - Apply
CO5	Implement file I/O operations to store and retrieve data from files.	L3 - Apply

TEXTBOOKS:

1.	Reema Thareja, "Programming in C", Second Edition, Oxford University Press, New Delhi, 2018.
2.	Susmitha Das, Computer Fundamentals and C Programming, 1st Edition, McGraw Hill, 2018.

REFERENCE BOOKS:	
1.	Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2.	Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3.	Byron S. Gottfried, "Programming with C", Fourth Edition, McGraw- Hill Education, 2018.
4.	Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
5.	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.
VIDEO REFERENCES:	
1.	https://www.youtube.com/watch?v=AV7hmWfptdY
2.	https://www.youtube.com/playlist?list=PLKh-P_-rjZjQkyYmfOToBIe8Ee4wPHbJT
3.	https://www.youtube.com/playlist?list=PLdo5W4Nhv31a8UcMN9-35ghv8qyFWD9_S
WEB REFERENCES:	
1.	https://www.geeksforgeeks.org/c-programming-language/
2.	https://www.tutorialspoint.com/cprogramming/index.htm
3.	https://scratch.mit.edu
ONLINE COURSES:	
1.	https://onlinecourses.nptel.ac.in/noc23_cs121
2.	https://www.udemy.com/course/c-programming-for-beginners-/
3.	https://cppinstitute.org/cla-c-programming-language-certified-associate

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1											
CO2	3	2	2	1											
CO3	3	2	2	1											
CO4	3	2	2	1											
CO5	3	2	2	1											
Average	3	2	2	1											
1–Low, 2 –Medium, 3–High.															

BE23BS201	PHYSICS AND CHEMISTRY LABORATORY	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		4	0	0	4	2

Physics Laboratory

Course Objectives:

1.	To learn the proper use of various kinds of physics laboratory equipments.
2.	To learn problem solving skills related to physics principles and interpretation of experimental data.
3.	To determine error in experimental measurements and techniques used to minimize such error.
4.	To explain all experiments some practical usage in real world.

List of Experiments / Exercises

1.	Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.
2.	Uniform bending – Determination of Young's modulus.
3.	Non-uniform bending - Determination of Young's modulus.
4.	Air wedge - Determination of thickness of a thin sheet/wire.
5.	a) Optical fibre -Determination of Numerical Aperture and acceptance angle b) Compact disc- Determination of width of the groove using laser.
6.	Determination of band gap of semiconductors.
7.	LASER – Determination of the wavelength of the LASER using grating.
8.	Study experiment on application of physics in a real time problem - 1.
9.	Study experiment on application of physics in a real time problem - 2.
10.	Study experiment on application of physics in a real time problem - 3.

Total: 30 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
C01	Experiment the functioning of various physics laboratory equipment.	L3 – Apply
C02	Use the graphical models to analyze laboratory data.	L3 – Apply
C03	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	L3 – Apply
C04	Access, process and analyze scientific information.	L3 – Apply
C05	Solve problems individually and collaboratively.	L3 – Apply

TEXTBOOKS:

1.	Mani. P, Engineering Physics Practicals, Dhanam Publications, Vogel's Textbook of Quantitative Chemical Analysis, 2012.

Mapping of COs with POs and PSOs														
COs	**POs**												**PSOs**	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2												
CO2	3	1												
CO3	3	2												
CO4	2	1												
CO5	2	1												
Average	2.6	1.4												
1–Low, 2 –Medium, 3–High.														

Chemistry Laboratory		
Course Objectives:		
1.	To inculcate experimental skills to test basic understanding of water quality parameters, such as acidity, alkalinity, hardness, DO, chloride and copper.	
2.	To make the students to familiarize with electroanalytical techniques such as pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.	
3.	To demonstrate the analysis of metals and alloys.	
List of Experiments / Exercises		
1.	Estimation of alkalinity in water sample using Na_2CO_3 as primary standard.	
2.	Determination of total, temporary & permanent hardness of water by EDTA method.	
3.	Determination of dissolved oxygen content of water sample by Winkler's method.	
4.	Determination of chloride content of water sample by argentometric method.	
5.	Determination of strength of given hydrochloric acid using pH meter.	
6.	Determination of strength of acids in a mixture of acids using conductivity meter.	
7.	Conductometric titration of barium chloride against sodium sulphate (precipitation titration)	
8.	Study experiment on application of chemistry in a real time problem – 1.	
9.	Study experiment on application of chemistry in a real time problem – 2.	
10.	Study experiment on application of chemistry in a real time problem – 3.	
		Total: 30 PERIODS
Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Identify the quality of water samples with respect to their acidity, alkalinity, hardness and dissolved oxygen.	L2 – Understand
CO2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	L2 – Understand
CO3	Use the graphical models to analyze laboratory data.	L2 – Understand
CO4	Equipped with basic knowledge on conductivity meter for measurement of conductance of water sample.	L2 – Understand
CO5	Make use of the electroanalytical techniques to identify the impurities in solution.	L2 – Understand
TEXTBOOKS:		
1.	J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbook of "Quantitative Chemical Analysis", 2009.	
		Total: 30 + 30 = 60 PERIODS

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3		1			2	2					2			
CO2	3	1	2			1	2					1			
CO3	3	2	1	1			1								
CO4	2	1	2			2	2								2
CO5	2	1	2		1	2	2					1			3
Average	2.6	1.3	1.6	1	1	1.4	1.8					1.3			1
1–Low, 2 –Medium, 3–High.															

BE23GE305	ENGINEERING PRACTICES LABORATORY	Version: 1.0				
(COMMON TO ALL BRANCHES)						
Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		4	0	0	4	2

Course Objectives:

1	To practice welding, sheet metal and machine assembly.
2	To practice basic building plan, pipelining and sheet work.
3	To practice electric wiring and precautions for household applications and Power generation.
4	To practice soldering and develop the electronic device for household applications.

LIST OF EXPERIMENTS/EXERCISES:

GROUP – A (MECHANICAL& CIVIL)		
	MECHANICAL ENGINEERING PRACTICES	**15**
MODULE 1	**HANDS-ON EXPERIMENT**	
1	Make a Steel Chair using Welding Technique.	
2	Make a Plain turning and Facing using Lathe.	
3	Make a given component using sheet metal.	
MODULE 2	**STUDY EXPERIMENTS (IDENTIFICATION OF PARTS, FUNCTIONS OF EACH COMPONENT, INTEGRATION AND OVERALL WORKING)**	
1	Study of Thermal Power Plant (Steam Boiler) or Air-conditioning systems.	
2	Study of Various Machines & Machining Processes.	
3	Study of an Automobile –Two Wheeler/Car.	
	CIVIL ENGINEERING PRACTICES	**15**
MODULE 1	**HANDS-ON EXPERIMENT**	
1	Construct a water flow pipelining network for a residential building.	
2	Fabricate a given truss using wooden planks.	
3	Construct a residential building as per given building drawing using mount board/Thermocol sheet.	
MODULE 2	**STUDY EXPERIMENTS**	
1	Study of an Approved building plan and various details.	
2	Study of a Highway network and various elements.	
3	Study of construction materials and its usage in building construction.	
GROUP – B (ELECTRICAL& ELECTRONICS)		
	ELECTRICAL ENGINEERING PRACTICES	**15**
MODULE 1	**HANDS-ON EXPERIMENT**	
1	House Wiring (3-pin socket, staircase wiring, Lamp load,MCB, Energy meter, fuse)	
2	Series and Parallel Connection of UPS Batteries and Solar Panel.	
3	Assembly of water level indicator using Arduino.	
MODULE 2	**STUDY EXPERIMENTS**	
1	Study of Solar Power Generation.	
2	Study of 22kV/440V Step-down Transformer at Power House.	
3	Study of Electrical Household Appliances (Washing Machine, Electric Kettle, Induction Stove(anyone))	

	ELECTRONICS ENGINEERING PRACTICES	15
MODULE 1	**HANDS-ON EXPERIMENT**	
1	LED brightness changing systems based on ambient light.	
2	Digital thermometer with LCD Display.	
3	Voltage regulator for domestic applications.	
MODULE 2	**STUDY EXPERIMENTS**	
1	Study of Audio system.	
2	Study of AM and FM Transceiver.	
3	Study of LED TV.	
4	Study of overall Information and Communication Technology (ICT) functional structure of KIOT (Internet Infrastructure).	
		Total: 60 PERIODS

Course Outcomes: **Upon completion of this course the students will be able to:**	
CO1	Perform basic welding and sheet metal.
CO2	Perform basic building plan, pipelining and sheet work.
CO3	Perform electric wiring and precautions for household applications.
CO4	Perform soldering to develop an electronic device for household applications.
REFERENCE/LAB MANUAL/SOFTWARE:	
1	Dr.V.Ramesh babu "Engineering Practices Laboratory Manual"", VRB Publisher Pvt. Ltd., Chennai, 11th edition, 2020.
2	Ramesh Singh "Applied Welding: Process, Codes and Standards", Elsevier material, First edition 2012.
3	Michael A Joyce, Ray Holder"Residential Construction Academy: Plumbing" Residential construction Academy USA.
VIDEO REFERENCES:	
1	https://www.youtube.com/watch?v=nGfVTNfNwnk
2	https://www.youtube.com/watch?v=aJp2g1BKXVc&list=PLX2gX-ftPVXU59ggWS3t0sThVF18h5ME2
WEB REFERENCES:	
1	https://nptel.ac.in/courses/112106286
2	https://www.brainkart.com/article/Dynamics-of-Particles_6788/
ONLINE COURSES:	
1	https://nptel.ac.in/courses/112106286
2	https://in.coursera.org/learn/engineering-mechanics-statics

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	1			2				2	2					
CO2	2	1			2				2	2					
CO3	2	1			2				2	2					3
CO4	2	1			2				2	2					3
Average	2	1			2				2	2					1.2
1–Low, 2 –Medium, 3–High.															

BE23PT801	HUMAN EXCELLENCE AND VALUE EDUCATION - I	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		2	1	0	1	NC

Course Objectives:

1	To understand oneself and manage own emotions
2	To learn the essence of goal-setting and time-management techniques
3	To learn stress management techniques for self and professional development
4	To inculcate the Grooming and mannerism
5	To acquire knowledge on social media for professional development

UNIT–I	SELF-AWARENESS – SELF-MOTIVATION & CONFIDENCE	3+3

Concepts: Defining Success (L2) - Importance of Route maps to achieve Success (L2) - Understanding Need vs Want (Biological & Emotional) (L2) - Maslow's Need Theory (L2)- Emotional Intelligence (L2) - Best Practices to improve 5 Realms of EI (L2): Self-Awareness, Self-Regulation, Self-Motivation, Empathy and Social Skills (L2) -Psychometric assessment (L2) - Personality Types (L2) – Pros and Cons (L2) - Action Plan (L2).

Activity: Psychometric Test for Assessing the Personality

UNIT – II	GOAL SETTING AND TIME MANAGEMENT	3+3

Concepts: Defining a Goal (L2) - Understanding Possibility and Feasibility Factors (L2) - Setting an Achievable Goal (L2) - Understanding the Differences between Micro, Small, Mid and Long Term Goals (L2) – Decision Making (L2) - Time Inventory (L2) - Time Wasters (L2) - Prioritization using UI Matrix (L2).

Activity : Preparing Short term and Long Term Goals

UNIT–III	STRESS MANAGEMENT	3+3

Different types of Stress (L2) - Positive vs Negative Stress (L2) - Impacts of Stress (L2) - Situation Handling (L2) - Anxiety & Adversity Management (L2) - Best Practices for Stress Management (L2) - Food for Stress Management (L2).

UNIT–IV	GROOMING & MANNERS	3+3

Concepts: Importance of Grooming and Manners for Image Management (L2) - Corporate Expectations (L2) - Grooming and Manners for achievements (L2) - Etiquettes: Social, Business, Dining, Telephone, Dress, People Transaction and Road (L2) - Personal Hygiene (L2) - Cultural Adaptability (L2).

Activities: Practicing and Demonstrating various Etiquettes

UNIT– V	SOCIAL MEDIA	3+3
Concepts: Understanding the Utility (L2) – Vulnerability (L2) – What(s) of Social Media (L2) – Using and Creating Contents in Blogs, Social Media Platforms, Websites (L2) - LinkedIn Profile (L2) - AI Tools (L2) - Chat GPT (L2) - Social Media for Professional Development (L2) - Do's and Don'ts in Social Media (L2). Activity: Developing a blog, Creating LinkedIn Profile, Practice in AI tools, Developing a webpage		
		Total : 30 PERIODS

Course Outcomes: **Upon completion of this course, the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Be confident and motivated to plan the activities according to personality types	L2 – Understand
CO2	Set their short-term and long-term goals and manage their time effectively.	L2 – Understand
CO3	Practice stress management techniques in their personal life and career.	L2 – Understand
CO4	Practice manners and etiquettes in day-to-day life.	L2 – Understand
CO5	Use social media for professional development.	L2 – Understand
TEXTBOOKS:		
1.	Trainer and Faculty Lecture Notes and PPT	
REFERENCE BOOKS:		
1.	Suresh Kumar E, Sreehari P, Savithri J, "Communication Skills and Soft Skills", Pearson India Education Services, 2011.	
2.	Alex K, "Soft Skills Know yourself and know the world", S. Chand & Company Pvt Ltd., 2014.	
3.	Shiv Khera, "You Can Win A Step-by-Step Tool for Top Achievers", Bloomsbury Publishing, 2013.	
4.	Norman Vincent Peale, "The Power of Positive Thinking", RHUK, 2016.	
5.	Social Media Marketing Liana Li Evans, Pearson India Education Services, 2011	
6.	Brian Tracy, "Goals", Collins, 2020	
7.	Brian Tracy, "Time Management", Amacom, 2019	
8.	Kathryn Critchley, "Stress Management Skills Training Course", Universe of Learning Ltd., 2010	
VIDEO REFERENCES:		
1.	https://www.youtube.com/watch?v=L4N1q4RNi9I	
2.	https://www.youtube.com/watch?v=TQMbvJNRpLE	
3.	https://www.youtube.com/watch?v=wsNzAuYDgy0	
4.	https://www.youtube.com/watch?v=RWZluriQUzE	

WEB REFERENCES:	
1.	https://www.skillsyouneed.com/ps/personal-development.html
2.	https://www.skillsyouneed.com/ps/personal-development.html
3.	https://www.jobscan.co/blog/5-interpersonal-skills-you-need-on-your-resume/#What-are-interpersonal-skills?
ONLINE COURSES:	
1.	NPTEL Course on Enhancing Soft Skills and Personality - https://nptel.ac.in/courses/109104115
2.	NPTEL course on Soft skills - https://nptel.ac.in/courses/109107121

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									2						
CO2											2	3			
CO3									2						
CO4								2	1	2					
CO5						2		2		2					
Average						2		2	1.7	2	2	3			
1–Low, 2 –Medium, 3–High.															

TLP instructions : (i) Unit I, II, III will be taught using External Resource Persons on three working days
(ii) Unit IV and V will be taught by internal faculty, One period/week (in Timetable)

Assessment : (i) It will be an audit course and there is no credit.
(ii) Qualitative assessment will be carried out

BE23EN102	COMMUNICATIVE ENGLISH - II	Version : 1.0
(COMMON TO ALL BRANCHES EXCEPT B.TECH CSBS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		2	1	1	0	2

Course Objectives:

1	To enable learners improve their language competency.
2	To comprehend documents in professional context.
3	To develop learners' writing skills in professional framework.
4	To strengthen learners' public speaking skills.
5	To improve the interpersonal skills of the learners.

UNIT–I	FUNCTIONAL GRAMMAR	3+3

Concept: Usage of Prepositions (L1) - Degrees of Comparison (L2) - Subject–verb Agreement (L2) - If Conditional Clause (L2) - Reported Speech (L2) - Common errors in English usage (L1).
Activity: Practice using worksheets.

UNIT–II	READING FOR INFORMATION	3+3

Concept: Comprehending a passage (L2) - identifying a topic sentence (L2) - find specific information and prepare notes (L3) - classify the information (L2) - reading texts, essays and summarizing, Reading Technical Articles (L2) - Company Profile (L1).
Activity: Reading daily news - Reading comprehension.

UNIT– III	EXTENDED WRITING	3+3

Concept: Interpretation of charts – Pie chart, Bar chart, Flow chart (L3) - Dialogue Writing ((L2) - Writing research article (L3) – Project proposal (L2) - Official letters: Joining report, Placing order, Letter seeking clarification (L3), Acknowledging prompt/quality service (L3).
Activity: letters of inviting guest - accepting / declining offer.

UNIT – IV	FOCUS ON SPEAKING SKILL	3+3

Concept: Conversation Practice in real life situations (L3) - Describing process (L2) - Pronunciation practice (L3) - Strategies of Speaking (L1) - Speaking about Scientists / Celebrities, Narrating the place of visit (L2) - Movie / book review (L2) - Compering an event (L3) - Delivering welcome address / Proposing vote of thanks (L3).
Activity: Conducting mock event.

UNIT–V	FIELD STUDY	1+5

Concept: Over view of field study (L1) **-** Objective(s) of the survey (L1) - Methodology (L2) - Designing a questionnaire (L3) - field survey / interview techniques (L3) - Collection of data (L3) - Summarizing the data (L3) - Presentation (L3).
Activity: Based on certain specific objective(s), 3-5 persons in the society need to be interviewed - team event: 1/2/3 students per team; each team has to make a presentation.

	OPEN ENDED PROBLEMS / QUESTIONS	

Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total : 30 PERIODS
Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Arrange ideas and enhance written skills.	L2 - Understand
CO2	Identify technical context to make fair conversation.	L2 - Understand
CO3	Write official correspondence.	L3 - Apply
CO4	Indicate correct intonation and pronunciation.	L3 - Apply
CO5	Summarise in the form of presentation.	L3 - Apply
TEXTBOOKS:		
1.	"English for Engineers & Technologists", Orient Blackswan Private Ltd. Department of English, Anna University, Chennai.1999.	
REFERENCE BOOKS:		
1.	Raman. Meenakshi, & Sangeeta Sharma, "Professional English".Oxford UP : New Delhi, 2019.	
2.	Arora V.N. and Laxmi Chandra. "Improve Your Writing". Oxford Univ. Press : New Delhi, 2001.	
3.	Chellammal. V, "Learning to Communicate". Allied Publishers : New Delhi, 2003.	
4.	Kumar, Kulbhusan and RS Salaria, "Effective Communication Skill". Khanna Publishing House : New Delhi, 2016.	
5.	Lewis, Norman, "Word Power Made Easy". Goyal Publishers Pvt., Ltd. : New Delhi, 2020	
WEB REFERENCES:		
1.	https://thefluentlife.com/content/steps-to-learn-english-grammar-easily/	
2.	https://www.grammarly.com/grammar#sectionGroup_6iKEWxDNd9Glgyj522RuVP	
ONLINE COURSES:		
1.	https://www.totalsuccess.co.uk/online-letter-writing-course/	
2.	https://onlinecourses.nptel.ac.in/noc23_hs115/preview	
VIDEO REFERENCES:		
	Any relevant videos like	
1.	https://www.perfect-english-grammar.com/learn-english-video.html	
2.	https://www.youtube.com/watch?v=TMYTIL79BWw	

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1									1	3					
CO2										2		2			
CO3										3		2			
CO4									2	3					
CO5									2	3		2			
Average									1.6	2.8		2			
1–Low, 2 –Medium, 3–High.															

BE23MA202	VECTOR CALCULUS AND NUMERICAL METHODS	Version: 1.0
(COMMON TO ALL BRANCHES EXCEPT EEE, ECE & CSBS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	2	1	0	3

Use of Statistical Table and Calculator - fx991ms are permitted

Course Objectives:

1	To enable students to understand and apply vector concepts.
2	To equip students with the ability to comprehend and utilize complex variables.
3	To enable students to understand and apply fundamental methods to solve equations.
4	To provide students with an understanding of interpolation techniques.
5	To equip students with the ability to understand and apply single and multistep methods for solving first order ordinary differential equations.

Significance of Mathematical Modelling in Engineering and Technology (Not for Examination)	**2**

UNIT–I	**VECTOR CALCULUS**	**8**

Vector an introduction (L1) - Gradient and directional derivative (L2) - Irrotational and Solenoidal vector fields (L3) - Green's theorem (Excluding proof) (L2) - Problems (L3), Gauss divergence theorem (Excluding proof) (L2) - Problems (L3) and Stokes theorem (Excluding proof) (L2) - Problems (L3) - Engineering Applications (L2).

UNIT–II	**COMPLEX VARIABLES**	**9**

Need of Complex Variables (L1) - Necessary and sufficient conditions for analytic function in Cartesian and polar coordinates (L2) - Construction of analytic function - Problems (L3) - Conformal mapping (L2) – Cauchy's Integral Theorem (Excluding proof) (L2) – Cauchy's Integral formula (L1) - Problems (L3) – Residue Theorem - Problems (L3) - Engineering Applications (L2).

UNIT– III	**SOLUTION OF EQUATION AND EIGENVALUE PROBLEMS**	**8**

Essential of Solution of Equations (L1) - Fixed point iteration method (L3) – Newton Raphson method (L3) - Solution of linear system of equations (L2) - Gauss elimination and Jordan methods (L3) – Iterative methods of Gauss Jacobi and Gauss Seidel (L3) - Eigenvalues of a matrix by Power method (L3) - Engineering Applications (L1).

UNIT – IV	APPROXIMATE SOLUTION TECHNIQUES	9
A view on Interpolation (L1) - Lagrange's and Newton's forward and backward difference interpolations (L3) – Derivative of Newton's forward and backward difference interpolation (L2) - Problems (L3) - Numerical single and double integration using Trapezoidal and Simpson's 1/3 rules - Problems (L3) - Engineering Applications (L2).		
UNIT–V	**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**	**9**
Single step methods: Taylor's series method (L2) - Problems (L3) - Euler's method (L3) - Modified Euler's method (L3) - Fourth order Runge - Kutta method for solving first order differential equations (L2) - Problems (L3) - Multi step methods: Milne's predictor corrector methods for solving first order differential equations (L2) - Problems (L3) **-** Engineering Applications (L2).		
	OPEN ENDED PROBLEMS / QUESTIONS	
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total : 45 PERIODS

Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Apply vector calculus principles for advanced problem- solving in diverse fields.	L3 - Apply
CO2	Construct analytic functions, showcasing their mastery of complex variables.	L3 - Apply
CO3	Apply direct and iterative methods for solving equations.	L3 - Apply
CO4	Identify and apply interpolation technique on Engineering applications.	L3 - Apply
CO5	Solve the solution of initial value problems using single and multi-step methods.	L3 - Apply

TEXTBOOKS:

1.	Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science",10th Edition, KhannaPublishers, New Delhi, 2015.
2.	T.Veerarajan " Engineering Mathematics " , 5th edition ,Tata McGraw hill Education, Pvt.Ltd-Chennai, 2006.

REFERENCE BOOKS:

1.	Kreyzig E., "Advanced Engineering Mathematics", Tenth Edition, John Wiley and sons, 2011.
2.	Ramana B.V., "Higher Engineering Mathematics", Sixth Edition, Tata McGraw Hill Publishing Company, New Delhi, 2008.

VIDEO REFERENCES:

Any Relevant videos like :

1.	https://youtu.be/7-tP3-3JgkA (Prof R Usha, IIT Madras)
2.	https://youtu.be/8wMxDA3lZw0 (Prof Venkata Sonti, IISC Bengaluru)
WEB REFERENCES:	
1.	https://www.brainkart.com/article/Complex-Integration_6461/
2.	https://btechfirstyearnotes.blogspot.com/2020/02/vector-calculus.html
ONLINE COURSES:	
1.	https://onlinecourses.nptel.ac.in/noc19_ma21/preview
2.	https://onlinecourses.nptel.ac.in/noc21_ma57/preview

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2													
CO2	3	2													
CO3	3	2													
CO4	3	2													
CO5	3	2													
Average	3	2													

1–Low, 2 –Medium, 3–High.

BE23GE304	ENGINEERING GRAPHICS AND NETWORK DRAWINGS	Version : 1.0
(COMMON TO CSE, IT, CSBS and AI&DS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		5	1	0	4	3

Use of A3 sheets and Drawing Instruments are Permitted

Course Objectives:

1	To understand the importance of basic concepts and principles of Engineering Drawing.
2	To develop the ability to communicate with others through technical drawings and sketching.
3	To creating simple Engineering designs of Industrial Components using CAD Software.
4	To enable the Knowledge about the components and its forms of interpretation of graphics.
5	To understand the basics of various input and output devices used in computer graphics.

UNIT–I	GEOMETRIC CONSTRUCTION	3+12

Introduction to Engineering Drawing, Lettering, Dimensioning, Drawing instruments, Sheet Layout, Drawing Standards (BIS) (L2) - Basic Geometrical constructions, Conic Sections – Construction of Ellipse, Parabola and Hyperbola by using eccentric method (L3), Special Curves - Construction of Cycloid, Construction of Epicycloid, Construction of Hypocycloid (L3).

UNIT–II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	3+12

Points using first angle projection and third angle projection (L3), Projection of Straight Lines inclined to both the planes (only first angle projection) by using rotating line method (L3) – Projection of Planes (polygonal and circular surfaces) inclined to both principal planes by rotating object method (L3).

UNIT– III	PROJECTION OF SOLIDS AND SECTION OF SOLIDS	3+12

Projection of simple solids like Prism, Pyramid, Cylinder and Cone when the axis is inclined to one principal plane and parallel to other by rotating object method (L3) - Sectioning of solids (Prism, Pyramid, Cylinder and Cone) in simple vertical position when the cutting plane is inclined to one principal plane and perpendicular to the other and obtaining the true shape of the section (L3).

UNIT – IV	DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTIONS	3+12

Development of lateral surfaces of simple sectioned solids (Prism, Pyramid, Cylinder and Cone) (L3) - Principles of Isometric Projection (L3) – Construction of Isometric Views of Prism, Pyramid, Cylinders and Cones (L3) – Combination of two solid objects in a simple vertical position (L3).

UNIT–V (a)	FREE HAND SKETCHING AND NETWORKING DRAWING	2+09

Visualization Concepts (L2) and Free hand sketching (L3) - Free hand sketching of multiple views from pictorial views of object (L3).

UNIT–V (b)	APPLICATIONS (Not for Examination)	4

Study of Computer Networking Diagrams and Computer Graphics (L2).

	OPEN ENDED PROBLEMS / QUESTIONS	
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total : 75 PERIODS
Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Develop Conic Sections in Engineering Drawing.	L2 - Understand
CO2	Construct two dimensional drawing for Engineering applications.	L3 - Apply
CO3	Construct section and projections of solids.	L3 - Apply
CO4	Construct Isomeric projections and development of surfaces.	L3 - Apply
CO5	Identify various Computer Graphics Hardware and display technologies	L3 – Apply
TEXTBOOKS:		
1.	Venugopal K and Prabhu Raja V, Engineering Graphics, New AGE International Publishers, 2018	
2.	Natarajan.K.V, A Textbook of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2015.	
REFERENCE BOOKS:		
1.	Basant Agrawal, Agrawal C.M., "Engineering Drawing", Second Edition, McGraw Hill Education, 2019.	
2.	Gopalakrishnana K.R. "Engineering Drawing", Volume. I & II, Subhas Publications, Bengaluru, 2014.	
3.	Parthasarathy N.S., Vela Murali. "Engineering Drawing", First Edition, Oxford University Press, 2015.	
VIDEO REFERENCES:		
1.	https://archive.nptel.ac.in/courses/112/102/112102304/	
WEB REFERENCES:		
1.	https://nptel.ac.in/courses/112103019	
2.	www.engineeringdrawing.org/2012/04/solids-section-problem-7-4	
3.	en.wikipedia.org/wiki/Plane_curve	
ONLINE COURSES:		
1.	https://nptel.ac.in/courses/124107157	
SPECIAL POINTS APPLICABLE TO UNIVERSITY EXAMINATIONS		
1.	There will be five questions, each of either or type covering all units of the syllabus.	
2.	All questions will carry equal marks of 20 each making a total of 100.	
3.	The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.	

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	1	2		2					3		2	2		1
CO2	3	1	2		2					3		2	2		1
CO3	3	1	2		2					3		2	2		1
CO4	3	1	2		2					3		2	2		1
CO5	3	1	2		2					3		2	2		2
Average	3	1	2		2					3		2	2		1.2
1–Low, 2 –Medium, 3–High.															

BE23CS401	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION	Version:1.0
(COMMON TO CSE,IT & AI&DS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	3	0	0	3

Course Objectives:

1	To introduce the fundamentals of digital circuits and design Combinatorial logic circuits
2	To learn and design the sequential logic circuits
3	To study the basic structure and operation of a digital computer
4	To study the design of data path unit, control unit for processor and to familiarize with the hazards.
5	To explore the concept of various memories and I/O interfacing

UNIT–I	COMBINATIONAL LOGIC	9

Number Systems (L1) - Combinational Circuits (L2) – Karnaugh Map (L2) - Analysis and Design Procedures (L3) – Binary Adder (L3) – Subtractor (L3) – Decimal Adder (L3) - Magnitude Comparator (L2) – Decoder (L2) – Encoder (L2) – Multiplexers (L2) – Demultiplexers (L2)

UNIT–II	SYNCHRONOUS SEQUENTIAL LOGIC	9

Introduction to Sequential Circuits (L2) – Flip-Flops (L2) – operation and excitation tables, Triggering of FF, Design of clocked sequential circuits (L3) – Moore/Mealy models (L3), state minimization (L3), state assignment (L3), circuit implementation (L3) - Registers (L3)– Counters (L3).

UNIT– III	COMPUTER FUNDAMENTALS	9

Functional Units of a Digital Computer: Von Neumann Architecture (L1) – Operation and Operands of Computer Hardware Instruction (L2) – Instruction Set Architecture (ISA) (L2): Memory Location, Address and Operation (L2) – Instruction and Instruction Sequencing (L2) – Addressing Modes (L2), Encoding of Machine Instruction (L2) – Interaction between Assembly and High Level Language (L2).

UNIT – IV	PROCESSOR	9

Instruction Execution – Building a Data Path (L2) – Designing a Control Unit (L2) – Hardwired Control, Microprogrammed Control (L2) – Pipelining (L2) – Data Hazard (L2) – Control Hazards (L2).

UNIT – V	MEMORY AND IO	9
Memory Concepts and Hierarchy – Memory Management (L2) – Cache Memories: Mapping and Replacement Techniques (L2) – Virtual Memory (L2) – DMA – I/O (L2) – Accessing I/O (L2): Parallel and Serial Interface – Interrupt I/O – Interconnection Standards: USB, SATA (L2).		
	OPEN ENDED PROBLEMS/QUESTIONS	
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.		
		Total: 45 Periods

Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Design Combinational Logic Circuits by applying Simplification Procedure.	L3 – Apply
CO2	Design Sequential Logic circuits by using suitable models.	L3 – Apply
CO3	Explain the architecture and Components of Computer.	L2 – Understand
CO4	Identify the various control designs.	L2 – Understand
CO5	Summarize the characteristics of various memory systems and I/O Communication.	L2 – Understand

TEXTBOOKS:

1.	M. Morris Mano, Michael D. Ciletti, "Digital Design : With an Introduction to the Verilog HDL, VHDL, and System Verilog", Sixth Edition, Pearson Education, 2018.
2.	David A. Patterson, John L. Hennessy, "Computer Organization and Design, The Hardware/Software Interface", Sixth Edition, Morgan Kaufmann/Elsevier, 2020.

REFERENCE BOOKS:

1.	Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw-Hill, 2012
2.	William Stallings, "Computer Organization and Architecture – Designing for Performance", Tenth Edition, Pearson Education, 2016.
3.	M. Morris Mano, "Digital Logic and Computer Design", Pearson Education, 2016.

VIDEO REFERENCES:

1.	https://youtube.com/playlist?list=PLBlnK6fEyqRjMH3mWf6kwqiTbT798eAOm&feature=shared
2.	https://youtube.com/playlist?list=PLBlnK6fEyqRgLLlzdgiTUKULKJPYc0A4q&feature=shared

WEB REFERENCES:	
1.	asic-world.com-digital circuits tutorial.
2.	geeksforgeeks.org/Computer Organization and architecture tutorial.
ONLINE COURSES:	
1.	Nptel: Digital Circuits-8 Weeks Course By Prof. Santanu Chattopadhyay,IIT Kharagpur
2.	Udemy: computer organization and architecture-10 hours Course.

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	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
Average	3	2												2	2
1–Low, 2 –Medium, 3–High.															

BE23MC902	தமிழரும் தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY	Version: 1.0

(COMMON TO ALL BRANCHES)

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		1	1	0	0	1

Students can write the examination either in Tamil or in English

Course Objectives:

1	சங்க காலத்தில் தொழில்நுட்பம் பற்றிய அறிவைப் பெறுதல்.
2	சங்க காலத்தில் வீட்டின் புழங்குபொருட்கள், சிற்பங்கள் மற்றும் கோவில்கள் வடிவமைப்பு பற்றி தெரிந்துகொள்ளுதல்.
3	வரலாறு மற்றும் தொல்லியல் சான்றுகளின் ஆதாரமாக உலோகவியல் ஆய்வுகளின் அறிவை வளர்த்துக்கொள்ளுதல்.
4	வேளாண்மை மற்றும் செயலாக்கத்தில் பயன்படுத்தப்படும் பண்டைய தொழில் நுட்பங்கள் பற்றிய அறிவைப் பெறுதல்.
5	கணினி வழி தமிழ் வளர்ச்சியை தெரிந்துக்கொள்ளுதல் மற்றும் தமிழ் அறிவை வளர்த்துக்கொள்ளுதல்.

UNIT–I	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3

சங்க காலத்தில் நெசவுத் தொழில் (L1) - பானைத் தொழில்நுட்பம் (L1) - கருப்பு சிவப்பு பாண்டங்கள் (L1) - பாண்டங்களில் கீறல் குறியீடுகள் (L2)

UNIT–II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் (L1) – சங்க காலத்தில் வீட்டுப் பொருட்களின் வடிவமைப்பு (L1) – சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் (L1) – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் (L2) – மாமல்லபுரச் சிற்பங்களும் கோவில்களும் (L1) – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் நாயக்கர் காலக்கோயில்கள் (L1) – மாதிரி கட்டமைப்புகள் பற்றி அறிதல் மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் (L1) – செட்டிநாட்டு வீடுகள் (L2) – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ – சாரோசெனிக் (L1)

UNIT– III	உற்பத்தித் தொழில்நுட்பம்	3

கப்பல் கட்டும் கலை (L2) – உலோகவியல் (L1) - இரும்புத் தொழிற்சாலை (L1) – இரும்பை உருக்குதல் எஃகு (L2) - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் அச்சடித்தல் (L1) – மணி உருவாக்கும் தொழிற்சாலைகள் (L1) - கல்மணிகள் கண்ணாடி மணிகள் (L1) - எலும்புத்துண்டுகள் (L1) – தொல்லியல் சான்றுகள் (L2) – சிலப்பதிகாரத்தில் மணிகளின் வகைகள் (L1)

UNIT – IV	வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம்	3

அணை, ஏரி, குளங்கள் மதகு (L1) – சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம் (L1) - கால்நடை பராமரிப்பு, கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் (L1) - வோண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் (L1) – கடல்சார் அறிவு மீன்வளம் (L1) - முத்து மற்றும் முத்துக்குளித்தல் (L1) – பெருங்கடல் குறித்த பண்டைய அறிவு (L1) – அறிவுசார் சமூகம் (L1)

UNIT–V	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்	3

அறிவியல் தமிழின் வளரச்சி (L1) – கணினித்தமிழ் வளர்ச்சி (L1) – தமிழ் நூல்களை மின்பதிப்பு செய்தல் (L1) – தமிழ் மென்பொருட்கள் உருவாக்கம் (L1) – தமிழ் இணையக் கல்விக்கழகம் (L2) – தமிழ் மின் நூலகம் (L2) – இணையத்தில் தமிழ் அகராதிகள் (L2) - சொற்குவைத் திட்டம் (L1)

Total : 15 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
CO1	சங்ககால தொழில்நுட்ப அறிவை மாணவர்கள் முழுமையாக அறிந்துணர்தல்.	L1 - நினைவில் கொள்ளுதல்
CO2	வரலாறு மற்றும் தொல்லியல் சான்றுகளை ஆதாரமாக கொண்டு தெரிந்துகொள்ளுதல்.	L2 - புரிந்து கொள்ளுதல்
CO3	உலோகவியல் பயன்பாடு உற்பத்தி குறித்த அறிவைப் பெறுதல்.	L2 - புரிந்து கொள்ளுதல்
CO4	வேளாண்மை செயலாக்கத்தில் பயன்படுத்தப்படும் பழங்கால நுட்பங்களை அறிந்துக்கொள்ளுதல்.	L1 - நினைவில் கொள்ளுதல்
CO5	தமிழ் மொழி புதிய மென்பொருள் உருவாக்கும் திறன் மேம்படுத்துதல்.	L2 - புரிந்து கொள்ளுதல்

TEXTBOOKS:

1.	டாக்டர் கே.கே. பிள்ளை"தமிழக வரலாறு மக்களும் பண்பாடும்", (வெளியீடு, தமிழ்நாடு பாடநூல் கல்வியியல் பணிகள் கழகம்), 2021.
2.	முனைவர் இல. சுந்தரம், "கணினித்தமிழ்", (விகடன் பிரசுரம்), 2015.

REFERENCE BOOKS:

1.	"கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்", (தொல்லியல் துறை வெளியீடு).
2.	"பொருநை – ஆற்றங்கரை நாகரிகம்", (தொல்லியல் துறை வெளியீடு), 2021.
3.	Dr.K.K.Pillay, "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL – (in print).
4.	Dr.S.Singaravelu, "Social Life of the Tamils - The Classical Period", (Published by: International Institute of Tamil Studies.
5.	Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", (Published by: International Institute of Tamil Studies).
6.	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", (Published by: International Institute of Tamil Studies.)
7.	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
8.	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", (Published by: The Author).
9.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
10.	R.Balakrishnan, "Journey of Civilization Indus to Vaigai", (Published by: RMRL) – Reference Book.

WEB REFERENCES:

1.	http://www.news.mowval.in/News/tamilnadu/Nano-9202.html
2.	https://ta.wikipedia.org/wiki

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	1											1			
CO2								1				2			
CO3							2	1				2			
CO4					2		2	1							
CO5					2							2			
Average	1				2		2	1				1.75			
1–Low, 2 –Medium, 3–High															

BE23MC902	Tamils and Technology (ENGLISH VERSION)	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH-ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		1	1	0	0	1

Course Objectives:

1	To Acquire knowledge of technology during the Sanga age.
2	To learn about household items, sculptures and temple architecture during the Sanga age.
3	To Develop knowledge of metallurgical studies as a source of historical and archaeological evidence.
4	To Acquire knowledge of ancient techniques used in agriculture and agro-processing.
5	To discuss the development of Tamil in computer and to develop knowledge of Tamil.

UNIT–I	WEAVING AND CERAMIC TECHNOLOGY	3

Weaving and Ceramic Technology Weaving Industry during Sangam Age (L1) - Ceramic technology (L1) - Black and Red Ware Potteries (BRW) – Graffiti on Potteries. (L2)

UNIT–II	DESIGN AND CONSTRUCTION TECHNOLOGY	3

Designing and Structural construction House & Designs in household materials during Sangam Age (L1) - Building materials and Hero stones of Sangam age (L1) – Details of Stage Constructions in Silappathikaram (L2) - Sculptures and Temples of Mamallapuram (L1) - Great Temples of Cholas and other worship places (L1) - Temples of Nayaka Period (L1) - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal (L2) - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period. (L1)

UNIT– III	MANUFACTURING TECHNOLOGY	3

Art of Ship Building (L2) – Metallurgical studies (L1) - Iron industry (L1) - Iron smelting,steel -Copper and goldCoins as source of history (L2) - Minting of Coins (L1) - Beads making-industries Stone beads (L1) - Glass beads (L1) - Terracotta beads -Shell beads/ bone beats (L1) - Archeological evidences (L2) - Gem stone types described in Silappathikaram. (L1)

UNIT – IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry (L1) - Wells designed for cattle use (L1) - Agriculture and Agro Processing (L1) - Knowledge of Sea - Fisheries (L1) - Pearl (L1) - Conche diving (L1) - Ancient Knowledge of Ocean(L1) – Knowledge Specific Society.(L1)

UNIT–V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3

Development of Scientific Tamil (L1) - Tamil computing (L1) – Digitalization of Tamil Books (L1) – Development of Tamil Software (L1) – Tamil Virtual Academy (L2) – Tamil Digital Library – Online Tamil Dictionaries (L2) – Sorkuvai Project. (L1)

Total : 15 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
CO1	Familiar with the technological advancements of the Sanga age	L1-Remember
CO2	Explain about household items, sculptures, and temple architecture during the Sanga age.	L2-Understand
CO3	Explain about various manufacturing technologies practiced during Sanga age	L2-Understand
CO4	Remember the ancient techniques used in agricultural processing.	L1-Remember
CO5	State the need of developing new software skills in Tamil language.	L2-Understand

TEXTBOOKS:

1.	டாக்டர் கே.கே. பிள்ளை"தமிழக வரலாறு மக்களும் பண்பாடும்", (வெளியீடு, தமிழ்நாடு பாடநூல் கல்வியியல் பணிகள் கழகம்), 2021.
2.	முனைவர் இல. சுந்தரம், "கணினித்தமிழ்", (விகடன் பிரசுரம்), 2015.

REFERENCE BOOKS:

1.	"கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம்", (தொல்லியல் துறை வெளியீடு).
2.	"பொருநை – ஆற்றங்கரை நாகரிகம்", (தொல்லியல் துறை வெளியீடு), 2021.
3.	Dr.K.K.Pillay, "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL – (in print).
4.	Dr.S.Singaravelu, "Social Life of the Tamils - The Classical Period", (Published by: International Institute of Tamil Studies.
5.	Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu, "Historical Heritage of the Tamils", (Published by: International Institute of Tamil Studies).
6.	Dr.M.Valarmathi, "The Contributions of the Tamils to Indian Culture", (Published by: International Institute of Tamil Studies.)
7.	Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
8.	Dr.K.K.Pillay, "Studies in the History of India with Special Reference to Tamil Nadu", (Published by: The Author).
9.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
10.	R.Balakrishnan, "Journey of Civilization Indus to Vaigai", (Published by: RMRL) – Reference Book.

WEB REFERENCES:

1.	http://www.news.mowval.in/News/tamilnadu/Nano-9202.html
2.	https://ta.wikipedia.org/wiki

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										2		3			
CO2												2			
CO3								1		2		3			
CO4								1		1		1			
CO5								1		1		3			
Average								1		1.5		2.4			

1–Low, 2 –Medium, 3–High.

E23MC903	UNIVERSAL HUMAN VALUES AND ETHICS	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	2	1	0	3

Course Objectives:

1.	To understand the concept of Universal Human Values.
2.	To explain theoretical and practical implications of UHV.
3.	To discuss the use of harmony in the family and society.
4.	To classify the harmony in the nature methods.
5.	To describe effective human values in personal and professional in life.

UNIT–I	INTRODUCTION TO VALUE EDUCATION	9

Right Understanding (L2), Relationship and Physical Facility (L2) (Holistic Development and the Role of Education) (L2) - Understanding Value Education (L2) - Sharing about Oneself (L2) - Self-exploration as the Process for Value Education (L2) - Continuous Happiness and Prosperity (L2) – the Basic Human Aspirations (L1) - Exploring Human Consciousness (L2) - Happiness and Prosperity (L2) – Current Scenario (L2) - Method to Fulfil the Basic Human Aspirations (L2) - Exploring Natural Acceptance (L2).

UNIT–II	HARMONY IN THE HUMAN BEING	9

Understanding Human being as the Co-existence of the Self and the Body (L2) - Distinguishing between the Needs of the Self and the Body (L2)- Exploring the difference of Needs of Self and Body (L2) - The Body as an Instrument of the Self (L2)- Understanding Harmony in the Self (L2)- Exploring Sources of Imagination in the Self(L2) - Harmony of the Self with the Body (L2)- Programme to ensure self-regulation and Health (L2)- Exploring Harmony of Self with the Body (L2).

UNIT– III	HARMONY IN THE FAMILY AND SOCIETY	9

Harmony in the Family (L2) – the Basic Unit of Human Interaction (L2) - 'Trust' – the Foundational Value in Relationship (L2) - Exploring the Feeling of Trust (L2) - 'Respect' – as the Right Evaluation (L3) - Exploring the Feeling of Respect (L2) - Other Feelings (L2), Justice in Human-to-Human Relationship (L2) - Understanding Harmony in the Society (L2)- Vision for the Universal Human Order (L3) - Exploring Systems to fulfil Human Goal (L2).

UNIT – IV	HARMONY IN THE NATURE/EXISTENCE	9

Understanding Harmony in the Nature (L2) – Interconnectedness (L2), self-regulation and Mutual Fulfilment among the Four Orders of Nature (L3) - Exploring the Four Orders of Nature (L2) - Realizing Existence as Co-existence at All Levels (L2) - The Holistic Perception of Harmony in Existence (L2) - Exploring Co-existence in Existence (L2).

UNIT–V	IMPLICATIONS OF THE HOLISTIC UNDERSTANDING - A LOOK AT PROFESSIONAL ETHICS	9

Natural Acceptance of Human Values (L2) - Definitiveness of (Ethical) Human Conduct (L2) - Exploring Ethical Human Conduct (L2) - A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order (L2) - Competence in Professional Ethics (L2) - Exploring Humanistic Models in Education (L2) - Holistic Technologies, Production Systems and Management Models (L2) -Typical Case Studies (L2)- Strategies for Transition towards Value-based Life and Profession (L2) - Exploring Steps of Transition towards Universal Human Order (L2).

OPEN ENDED PROBLEMS / QUESTIONS

Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.

Total : 45 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		**BLOOM'S Taxonomy**
CO1	Recognize the concepts of Universal Human Values.	L2 - Understand
CO2	Describe both theoretical and practical implications of Universal Human Values.	L2 - Understand
CO3	Use the harmony in family and society.	L3 - Apply
CO4	Incorporate harmony in all human existence.	L3 - Apply
CO5	Use human values in both personal and professional life.	L2 - Understand

TEXTBOOKS:

1.	R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019.
2.	A.N. Tripathi, Human Values, New Age Intl. Publishers, New Delhi, 2004.

REFERENCE BOOKS:

1.	R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010.
2.	B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted 2008.
3.	Frankl, Viktor E. Yes to Life In spite of Everything, Penguin Random House, London, 2019.
4.	Van Zomeren, M., & Dovidio, J. F. The Oxford Handbook of the Human Essence (Eds.), New York Oxford University Press, 2018.
5.	B P Banerjee, Foundations of Ethics and Management, Excel Books, 2005.

VIDEO REFERENCES:

Any relevant videos like

1.	https://www.youtube.com/c/UniversalHumanValues
2.	https://www.youtube.com/watch?v=OgdNx0X923I

WEB REFERENCES:	
1.	Story of Stuff, http://www.storyofstuff.com
2.	https://fdp-si.aicte-india.org/UHVII.php
ONLINE COURSES:	
1.	https://nptel.ac.in/courses/109104068
2.	https://uhv.org.in/course

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1						2						2			
CO2								2							
CO3						3									
CO4								3				2			
CO5						3			2						
Average						2.6		2.5	2			2			
1–Low, 2 –Medium, 3–High.															

BE23CB403	DESIGN THINKING	Version: 1.0
(COMMON TO CSE, IT, CSBS and AI&DS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		3	3	0	0	3

Course Objectives:

1	To learn design thinking concepts and principles.
2	To use design thinking methods in every stage of the problem.
3	To learn the different phases of design thinking.
4	To develop a prototype and perform testing.
5	To understand the character and quality of an entrepreneur.

UNIT – I	INTRODUCTION	9

Need for Design(L1) - Four Questions(L1)-Ten Tools(L1)-Principles of Design Thinking(L1) - The process of Design Thinking (L1)- Planning a Design Thinking project(L1).

UNIT – II	UNDERSTAND, OBSERVE AND DEFINE THE PROBLEM	9

Search field determination(L1) – Problem(L1) clarification(L2) - Understanding of the problem(L1) - Problem analysis(L1) - Reformulation of the problem(L2) –Observation Phase(L1) - Empathetic design(L1) - Tips for observing(L1) - Methods for Empathetic Design(L1) - Point-of-View Phase(L1) - Characterization of the target group (L1) - Description of customer needs (L1).

UNIT – III	IDEATION AND PROTOTYPING	9

Ideate Phase (L1) - The creative process and creative principles (L1) - Creativity techniques (L2) - Evaluation of ideas (L1) - Prototype Phase (L1) - Lean Startup Method for Prototype Development (L1) - Visualization and presentation techniques (L3).

UNIT – IV	TESTING AND IMPLEMENTATION	9

Test Phase (L1) - Tips for interviews (L1) - Tips for surveys (L1) - Kano Model (L1) - Desirability Testing (L1) - Conducting workshops (L3) - Requirements for the space (L1) - Material requirements (L1) - Agility for Design Thinking (L1).

UNIT– V	ENTREPRENEURSHIP	9

Entrepreneurship(L1) – Character, Quality of Entrepreneur (L2)-Opportunity (L1)- Entrepreneurial design thinking (L2) – The New Social Contract (L1) – Design Activism (L1) – Designing tomorrow (L1).

	OPEN ENDED PROBLEMS / QUESTIONS	

Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End semester Examinations.

Total: 45 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
CO1	Define key concepts of design thinking.	L1 - Remember
CO2	Describe the phases of design thinking process.	L2 - Understand
CO3	Practice design thinking in all stages of problem solving.	L3 - Apply
CO4	Apply testing methodologies to validate the prototype.	L3 - Apply
CO5	Understand the role of an entrepreneur.	L2 - Understand
TEXTBOOKS:		
1.	Christian Mueller-Rotenberg, Handbook of Design Thinking - Tips & Tools for how to design thinking.	
2.	Jeanne Liedtka and TimOgilvie, "Designing for Growth: A Design Thinking Tool Kit for Managers", Columbia University Press, 2011	
REFERENCE BOOKS:		
1.	Tim Brown, "Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation", HarperCollins e-books, 2009.	
VIDEO REFERENCES:		
1.	https://www.youtube.com/watch?v=4nTh3AP6knM	
2.	https://www.linkedin.com/learning/topics/design-thinking	
3.	https://www.youtube.com/watch?v=MMouHj75YwQ	
4.	https://www.youtube.com/watch?v=gHGN6hs2gZY	
WEB REFERENCES:		
1.	https://www.tutorialspoint.com/hi/design_thinking/design_thinking_tutorial.pdf	
2.	https://www.pvpsiddhartha.ac.in/dep_it/lecture%20notes/FDLD_21/UNIT-1.pdf	
3.	https://www.dasoreabhishek.com/_files/ugd/d9cc94_9d292e811f4f4b4ba8d3524bed496284.pdf	
ONLINE COURSES:		
1.	https://www.udemy.com/course/design-thinking-for-long-term-business-success	
2.	https://www.coursera.org/learn/uva-darden-design-thinking-innovation	
3.	https://www.coursera.org/learn/design-strategy	
4.	https://onlinecourses.nptel.ac.in/noc22_mg32/preview	

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2				2	2	1			1	2	2	1		1
CO2	3				1	3	2			2	1	1	2		2
CO3	3	1			3	3	3			1	1	1		2	2
CO4	3	1	3		2	3	2			2	2	2		1	3
CO5	3				1	3	2			2	1	1	2		3
Average	3	2												2	2

1–Low, 2 –Medium, 3–High

BE23GE310	OBJECT ORIENTED PROGRAMMING USING C++	Version: 1.0
(COMMON TO CSE, IT, AIDS and CSBS)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		5	3	0	2	4

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

1	To Understand the principles of object-oriented programming concepts
2	To Apply the concept classes, objects and encapsulation
3	To Explore the inheritance and abstract classes
4	To Illustrate the polymorphism
5	To Design the applications with exception handlers
6	To Apply various I/O techniques for console and file I/O

UNIT – I	BASICS OF C++ PROGRAMMING	9

Limitation of Structure Oriented Programming (L1) - Need of Object-Oriented Programming (L1) - C++ Introduction(L1) - Structure of C++ Programming (L1) - Compiling (L2) - Executing and Debugging(L2) - Character Set(L2) - Tokens: (Keywords – Identifiers – Constants – Strings – Operators - Special Symbols) (L2) - Data Types (L2). Expression(L2) - Precedence and Associativity (L2) - Evaluating Expression (L2) -

UNIT – II	CLASS, OBJECTS AND ENCAPSULATION	9

Class Definition (L1) - Access Specifiers (L2) - Object Creation (L3) - Array of Objects (L3) – Constructor - Destructor (L2) - this Pointer (L2) - Static variables and Member Functions (L3) - Encapsulation: Introduction(L2) - types (21) - friend function and friend class (L3).

UNIT – III	INHERITANCE AND ABSTRACT CLASS	9

Inheritance: Needs (L2) - types of inheritance (L2) - Constructors and Destructors in Inheritance (L3) -Constraints of Multiple Inheritance (L3) - Abstract Base Class (L3) - Pure Virtual function (L3).

UNIT – IV	POLYMORPHISM	9

Polymorphism: Introduction (L1) - Compile Time polymorphism: Function Overloading (L3) - Operator Overloading (L3) - Run Time Polymorphism (L3) - Function Overriding (L3) - Virtual Function (L3).

UNIT–V	EXCEPTION HANDLING AND IO STREAMS	9

Exception Handling: Needs (L1) – try – catch - throw (L2) - Handling any type of Exceptions (L4) - User typeof Exceptions (L4). Iostreams (L2) - Manipulators (L2) - overloading Inserters (<<) and Extractors (>>) (L3) - Sequential and Random files(L4) - binary files (L4).

		TOTAL: 45 PERIODS
LIST OF EXPERIMENTS/EXCERCISES:		
1.	Write a C++ program to sort an array of elements using functions.	
2.	Write a C++ program to demonstrate call by value and call by reference.	
3.	Write a C++ program to specify default arguments.	
4.	Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.	
5.	Write a Program to illustrate default constructor, parameterized constructor and copy constructors.	
6.	Write a Program to demonstrate Friend Function and Friend Class.	
7.	Write a Program to demonstrate binary Operator Overloading.	
8.	Write C++ programs that illustrate how the following forms of inheritance are supported: a) Multiple inheritance b) Multi level inheritance.	
9.	Write a Template based program to Sort the Given List of Elements.	
10.	Write a Program to demonstrate the Catching of All Exceptions.	
11.	Write a program to illustrate Abstract Class.	
12.	Write a C++ program to demonstrate virtual function.	
		TOTAL: 30 PERIODS
	OPEN ENDED PROBLEMS / QUESTIONS	
Course specific Open Ended Problems will be solved during the class room teaching. Such problems can be given as Assignments and evaluated as IA only and not for the End Semester Examinations.		
		TOTAL: 75 PERIODS
Course Outcomes: **Upon completion of this course the students will be able to:**		**BLOOM'S Taxonomy**
CO1	Apply the concepts of object - oriented programming	L2 - Understand
CO2	Examine the use of objects and encapsulation to solve the real-worldproblems	L3 - Apply
CO3	Utilize the code reusability for critical applications	L3 - Apply
CO4	Implement the real-time applications with polymorphism	L3 - Apply
CO5	Demonstrate the use of exception handling	L3 - Apply
CO6	Implement the I/O streams for file processing	L3 - Apply
TEXTBOOKS:		
1.	Venugopal.K.R. Raj Buyya, "Mastering C++", 2nd Edition, Tata Mcgraw Hill, 2017	
2.	Bjarne Stroustrup, "The C++ Programming Language"4th Edition, Addison-Wesley,2013	
3.	"Object Oriented Programming with C++" by Balagurusamy, McGraw Hill; Eighth edition.	
REFERENCE BOOKS:		
1.	Herbert Schildt, "C++: The Complete Reference", 5th Edition, McGraw Hill Education, 2012.	
2.	Balagurusamy,E, "Object Oriented Programming with C++", 8th Edition, Tata McGraw-Hill, NewDelhi, 2019.	

VIDEO REFERENCES:	
1.	https://www.youtube.com/watch?v=vLnPwxZdW4Y
2.	https://www.youtube.com/watch?v=wN0x9eZLix4
3.	https://www.youtube.com/watch?v=tvC1WCdV1XU
4	https://www.youtube.com/watch?v=0Zr_0Jy8mWE
WEB REFERENCES:	
1.	https://cplusplus.com/forum/beginner/165465/
2.	https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/
3.	https://www.learncpp.com/cpp-tutorial/welcome-to-object-oriented-programming/
ONLINE COURSES:	
1.	Udemy - "Learn Advanced C++ Programming"
2.	Coursera - "Object-Oriented Data Structures in C++"
3.	Lural sight - "C++ Fundamentals Including C++ 17"
4.	edX - "Object-Oriented Programming in C++"
5.	Codecademy - "Learn C++"

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2					1			2	2	2	
CO2	3	2	2	2					1			2	2	2	
CO3	3	2	2	2					1			2	2	2	
CO4	3	2	2	2					1			2	2	2	
CO5	3	2	2	2					1			2	2	2	
Average	3.0	2.0	2.0	2.0					1.0			2.0	2.0	2.0	

1–Low, 2 –Medium, 3–High .

BE23PT802	HUMAN EXCELLENCE AND VALUE EDUCATION - II					Version: 1.0
(COMMON TO ALL BRANCHES)						
Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		2	1	0	1	NC

Course Objectives:

1	To understand habit development and avoid bad habits for a happy and successful life.
2	To inculcate essential values and ethics.
3	To understand interpersonal skills for good communication.
4	To learn methods, tools, and techniques for effective presentations.
5	To know methods for effective teamwork.

UNIT–I	HABITS FOR PERSONAL DEVELOPMENT	3+3

Health Management (L2) - Becoming an effective adult and handling adolescent issues (L2)- Habit vs Addiction (L2) - Awareness of Human Physiology (L2) - Stay Away Habits (L2): Smoking, Alcohol, Drugs, Violence (L2)- How to Handle Assaults (L2): Physical, Emotional and Social (L2)- Cybercrimes (L2)- Awareness of Road Safety (L2)- Effective Habit Development (L2): Yoga, Meditation, Sports and fitness, Sleep management, food and nutrition (L2).

UNIT–II	VALUES AND ETHICS	3+3

Values (L2) : Self-respect, Punctuality, Respecting Others Nonviolence, Truth, empathy, Honesty and integrity, Inner cleanliness (L2) –Defining Happiness (L2) - Encountering Failures, obstacles, Insults, Criticism (L2) - overcoming fear, jealousy hatred, Greed sorrow and anger (L2) - Desire management (L2) - Understanding Indian Culture & its Scientific Heritage (L2).

UNIT– III	INTERPERSONAL SKILLS	3+3

Types of Relationships (L2) - Factors influencing Relationships (L2) - Barriers in Relationship Management (L2) - Best Practices for Relationship Management (L2) - Effective usage of EQ in Relationship Management (L2) - Understanding Personalities and Style Flexing (L2).

UNIT – IV	PRESENTATION SKILL	3+3

Concepts: Occasions (L2) - Effect Voice Management (L2) - Elements of Presentation (L2) - Developing effective presentation (L2) - Delivering an effective presentation (L2).

Activities: Preparing and Delivering Presentation

UNIT–V	TEAMWORK	3+3

Concepts: Understanding the Roles of a Team Builder (L2) - Team Manager and Team Player (L2) - How to bring Synergy (L2) - Dynamics, Bonding and Alignment (L2) - Best Team Member Qualities (L2)- Characteristics of High-Performance Teams (L2) - Art of Persuasion (L2) - Art of Influencing (L2) - Building Trust (L2).
Activities: Demonstrating an Activity as a Team

Total : 30 PERIODS

Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy
CO1	Overcome the influence of bad habits and develop good habits.	L2 – Understand
CO2	Practice the values and ethics and lead a happy and healthy life.	L2 – Understand
CO3	Demonstrate interpersonal skills and work with others effectively	L2 – Understand
CO4	Deliver effective presentations for better communication.	L2 – Understand
CO5	Work as a team for the successful completion of the projects	L2 – Understand

TEXTBOOKS:	
1.	Trainer and Faculty Lecture Notes / PPT
REFERENCE BOOKS:	
1.	Stephen R. Covey, "The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change", Free Press, 2004
2.	James Clear, "Atomic Habits", Random House Business books, 2018
3.	Suresh Kumar E, Sreehari P, Savithri J, "Communication Skills and Soft Skills, Pearson India Education Services", 2011.
4.	Alex K, "Soft Skills Know yourself and know the world", S. Chand & Company Pvt Ltd., 2014.
5.	Dale Carnegie, "The Art of Public Speaking", Rupa Publications India, 2018
6.	John C. Maxwell, "Teamwork 101: What Every Leader Needs to Know", HarperCollins Leadership, 2009
7.	Christopher Avery, "Teamwork Is an Individual Skill", ReadHowYouWant, 2011

VIDEO REFERENCES:	
1.	https://www.youtube.com/watch?v=OgdNx0X923I&list=PLYwzG2fd7hzc4HerTNkc3pS_IvcCfKznV
2.	https://www.youtube.com/watch?v=XkB8mclNeSI
3.	https://www.youtube.com/watch?v=boCf3iY8qj8
WEB REFERENCES:	
1.	https://fdp-si.aicte-india.org/5day_onlineUHV.php
2.	https://www.skillsyouneed.com/ps/personal-development.html
3.	https://www.jobscan.co/blog/5-interpersonal-skills-you-need-on-your-resume/#What-are-interpersonal-skills?
4.	https://jamesclear.com/articles

ONLINE COURSES:	
1.	NPTEL Course on Developing Soft Skills and Personality - https://nptel.ac.in/courses/109104107
2.	NPTEL Course on Soft Skill Development - https://nptel.ac.in/courses/109105110

3.	NPTEL course on Moral Thinking: An Introduction To Values And Ethics - https://nptel.ac.in/courses/109104206
4.	Communication and Interpersonal Skills at Work https://www.futurelearn.com/courses/communication-and-interpersonal-skills-at-work
5.	Business Etiquette: Master Communication and Soft Skills https://www.futurelearn.com/courses/professional-etiquette

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								3				1			
CO2								3				1			
CO3									3		2	1			
CO4										3					2
CO5									3						3
Average								1.2	1.2	0.6	0.4	0.6			
1–Low, 2 –Medium, 3–High.															

TLP instructions : (i) Unit I, II, III will be taught using External Resource Persons on three working days
(ii) Unit IV and V will be taught by internal faculty, One period / week (in Timetable)

Assessment : (i) It will be an audit course and there is no credit.
(ii) Qualitative assessment will be carried out

BE23PT804	ENGINEERING CLINIC - I	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		2	0	0	2	1

Course Objectives:

1	To understand the basics of real-world applications.
2	To enable students to design, fabricate and demonstrate of a given application using PCB.
3	To take entrepreneurship, product development, startup-related activities and problem-solving skills in higher semesters and final semester project work.

A. CONCEPT

Engineering Clinic laboratory provides hands-on training for students to develop certain simple real-world products or applications with the help of faculty. It is a team activity consisting of maximum 3 students per team. A list of products or applications will be given. Engineering Clinic - I focus on product development involving Electronics Engineering. Apart from electronic system design the course module has the design and fabrication of Printed Circuit Board (PCB) as well. Each team can choose one or more products for a given application. The students have to design, fabricate and demonstrate the working of the product.

B. EXECUTION

Day	Session	Course content / Activity	No. of Periods
1	S 1	Introduction to Electronics components.	4
	S 2	Functioning of Electronic components and circuits.	4
2	S 3	Hands-on Training to design electronic circuits using open-source software.	8
	S 4	Fabrication of PCB.	4
3	S 5	Assembling and Soldering of Electronic components in PCB.	4
	S 6	Testing and Validation of the circuit.	6
		Total	**30 Periods**

A list of sample applications/products is attached.

C. ASSESSMENT

i. Assessment is done by Internal mode only and there is no End Semester Examination.

ii. Marks distribution for Infernal Assessment is,

Method	Review I	Review II	Review III	Review IV
Details	Designing of Electronic circuits using open-source software	Fabrication of PCB	Assembling and Soldering of Electronic components in PCB	Testing, Validation and Demonstration
Marks	25	25	25	25

For Product/Application the student team can choose themselves.

Total: 30 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
CO1	Understand the Basics of electronic components.	L2
CO2	Design, Fabrication and Demonstration of the prototype of Electronic product using PCB.	L4
CO3	Practice the culture of Innovation and Product Development towards Start-ups in an Institution.	L4

Mapping of COs with POs and PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	2	2	2		2	2	2		3	3	3
CO2	3	3	3	2	2	2	1		2	2	3		3	3	3
CO3	3	3	3	2	2	2	1		2	3	3		3	3	3
Average	3	3	3	1.6	2	2	1.3		2	2.3	2.6		3	3	3
1–Low, 2 –Medium, 3–High.															

List of sample Applications / Products for Engineering Clinic I

1. Water level indicator in a tank.
2. Automatic solar light circuit.
3. Rain alarm indicator.
4. Fire alarm sensor.
5. LPG gas leakage detector.
6. Air quality measurement.
7. Automatic sanitizer dispenser.
8. Automatic doorbell ringer.
9. Miniature of Home / Buildings / Bridges.
10. Miniature of Hydraulic Jack / Air Pump / Steam power electricity model.

BE23PT806	APTITUDE SKILLS - I	Version: 1.0
(COMMON TO ALL BRANCHES)		

Programme & Branch	B.TECH. - ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	CP	L	T	P	C
		1	0	0	1	0.5

Course Objectives:

1	To know different methods for faster numerical computations
2	To learn logical reasoning skills.

UNIT–I	SPEED MATHS	6

Squaring numbers and multiplying numbers faster than the conventional methods (L2) - Finding Square roots of numbers faster (L2) - Finding Cube roots faster (L2) - Solving simultaneous equations faster than conventional methods (L2).

UNIT–II	LOGICAL REASONING	9

Alphabet and Number Series (L2) - Odd Man Out Series (L2) – Puzzles -Blood Relations (L2) - Seating Arrangement and Ordering (L2) - Directional Sense Test (L2).

Total : 15 PERIODS

Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy
CO1	Apply different techniques for faster calculations	L2 – Understand
CO2	Solve mathematical problems by applying logical thinking.	L2 – Understand

REFERENCE BOOKS:

1.	Aggarwal R. S., "Quantitative Aptitude for Competitive Examinations", S. Chand Publishing Company Ltd(s), 2022.
2.	Arun Sharma, "How to prepare for Quantitative Aptitude for the CAT" Tata McGraw-Hill Publishing, 2022.
3.	Praveen R. V., "Quantitative Aptitude and Reasoning" PHI Learning Pvt. Ltd., 2016

WEB REFERENCES:

1.	https://www.indiabix.com/online-test/aptitude-test/
2.	https://www.placementpreparation.io/quantitative-aptitude/
3.	https://www.geeksforgeeks.org/aptitude-for-placements/

ONLINE COURSES:

1.	Quantitative Aptitude Test Prep Courses – https://www.udemy.com/topic/quantitative-aptitude-test-prep/
2.	Quantitative Aptitude Basics – https://www.mygreatlearning.com/academy/learn-for-free/courses/quantitative-aptitude-basics
3.	Quantitate aptitude - https://www.btechguru.com/courses--bodhbridge--quantitative-aptitude--22.html

Mapping of COs with POs and PSOs															
COs	**POs**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2														
CO2	2														
Average	2														
1–Low, 2 –Medium, 3–High.															

Note:

Syllabus for the courses offered from 3rd Semester to 8th Semester, will be added after the approval of the Board of Studies (BoS) & Academic Council (AC) in due course.