

**FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS
COLLEGE OF ENGINEERING & RESEARCH,
SANGOLA**

(An Autonomous Institute)

Affiliated to Dr. Babasaheb Ambedkar Technological University (BATU), Lonere



**In line with the
National Education Policy (NEP) 2020 Compliant
Curriculum
For**

**DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA
SCIENCE**

First Year B. Tech. to Fourth Year B. Tech.

(Sem. III to Sem. VIII)

(w.e.f. A.Y. 2026-27)

Semester Wise Credit Distribution as per NEP

Semester/Courses		I	II	III	IV	V	VI	VII	VIII	Total
Basic Science Course	BSC/ESC	06-08	08-10	-	-	-	-	-	-	14-18
Engineering Science Course		08-10	04-06	-	-	-	-	-	-	16-12
Programme Core Course (PCC)	Program Courses	-	02	08-10	08-10	10-12	08-10	04-06	04-06	44-56
Programme Elective Course (PEC)		-	-	-	-	04	08	02	06	20
Multidisciplinary Minor (MDM)	Multidisciplinary Courses	-	-	02	02	04	02	02	02	14
Open Elective (OE) Other than a particular program		-	-	04	02	02	-	-	-	08
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	02	02	-	02	-	02	-	-	08
Ability Enhancement Course (AEC-01, AEC-02)	Humanities	02	-	-	02	-	-	-	-	04
Entrepreneurship/Economics/Management Courses	Social Science and Management (HSSM)	-	-	02	02	-	-	-	-	04
Indian Knowledge System (IKS)	Management (HSSM)	-	02	-	-	-	-	-	-	02
Value Education Course (VEC)		-	-	02	02	-	-	-	-	04
Research Methodology	Experiential Learning Courses	-	-	-	-	-	-	-	04	04
Comm. Engg. Project (CEP)/Field Project (FP)		-	-	02	-	-	-	-	-	-
Project		-	-	-	-	-	-	-	04	04
Internship/ OJT		-	-	-	-	-	-	-	12	12
Co-curricular Courses (CC)	Liberal Learning Courses	02	02	-	-	-	-	-	-	04
Total Credits (Major)		20-22	20-22	20-22	20-22	20-22	20-22	20-22	20-22	160-176

Course Category Wise Credit Distribution

Semester/Courses		I	II	III	IV	V	VI	VII	VIII	Total
Basic Science Course	BSC/ESC	08	07	-	-	-	-	-	-	15
Engineering Science Course		08	07	-	-	-	-	-	-	15
Programme Core Course (PCC)	Program Courses	-	02	10	10	12	08	12	-	54
Programme Elective Course (PEC)		-	-	-	-	04	08	02	06	20
Multidisciplinary Minor (MDM)	Multidisciplinary Courses	-	-	03	03	03	03	02	-	14
Open Elective (OE) Other than a particular program		-	-	03	03	02	-	-	-	08
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	02	02	-	02	-	02	-	-	08
Ability Enhancement Course (AEC-01, AEC-02)	Humanities Social Science and Management (HSSM)	02	-	01	01	-	-	-	-	04
Entrepreneurship/Economics/Management Courses		-	-	02	02	-	-	-	-	04
Indian Knowledge System (IKS)		-	02	-	-	-	-	-	-	02
Value Education Course (VEC)		-	-	02	02	-	-	-	-	04
Research Methodology	Experiential Learning Courses	-	-	-	-	-	-	04	-	04
Comm. Engg. Project (CEP)/Field Project (FP)		-	-	02	-	-	-	-	-	02
Project		-	-	-	-	-	02	02	-	04
Internship/ OJT		-	-	-	-	-	-	-	12	12
Co-curricular Courses (CC)	Liberal Learning Courses	02	02	-	-	-	-	-	-	04
Total Credits (Major)		22	22	23	22	21	23	22	22	176



**FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH
(An Autonomous Institute)**

Curriculum for Second Year B. Tech. (Artificial Intelligence & Data Science) with effect from A.Y. 2026-27

Semester III

Course Type	Course Code	Name of the Course	Engagement Hours			Credits	In Semester Evaluation Scheme			End Semester Evaluation Scheme		Total Marks
			L	T	P		ISE	ICA	Total	ESE	OE/POE	
							M	M	M	M	M	
PCC	26UAI21101	Discrete Mathematics	03	-	-	03	30	10	40	60	-	100
	26UAI21102	Software Engineering and Project Management	03	-	-	03	30	10	40	60	-	100
	26UAI21103	Python Programming Laboratory	-	-	02	01		25	25		25	50
	26UAI21104	Principles of Artificial Intelligence	02	-	-	02	30	10	40	60	-	100
	26UAI21105	Principles of Artificial Intelligence Laboratory	-	-	02	01		25	25	-	25	50
MDM	-	Multidisciplinary Minor- I	03	-	-	03	30	10	40	60	-	100
OE	-	Open Elective-I	03	-	-	03	30	10	40	60	-	100
AEC	26UGS21403	Basic Quantitative Ability	01	-	-	01	-	50	50	-	-	50
EMC	26UET21806	Economics for Engineers	01			01	-	25	25	-	-	25
	26UET21807	Economics for Engineers Laboratory	-	-	02	01		25	25			25
VEC	26UGS21801	Universal Human Values	02	-	-	02	-	50	50	-	-	50
FP	26UA121741	Mini Project- I	-	-	04	02	-	50	50	-	-	50
Audit	26UCE21901	Environment Studies	01	-	-	00	-	50	50	-	-	50
Audit	26UA121901	Technical Aptitude I	-	-	02	00	-	50	50	-	-	50
		Total	19	-	12	23	150	400	550	300	50	900

Abbreviations: L= Lecture, T= Tutorial, P= Practical, M= Marks

Note: A minimum of 40% marks is required to pass in the 'In Semester Evaluation Scheme Total', which is the sum of MSE and ICA scores.

		FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING &RESEARCH (An Autonomous Institute)											
		Curriculum for Second Year B. Tech (Artificial Intelligence & Data Science) with effect from A.Y. 2026-27											
		Semester-IV											
Course Type	Course Code	Name of the Course	Engagement Hours			Credits	In Semester Evaluation Scheme			End Semester Evaluation Scheme		Total Marks	
			L	T	P		MSE	ICA	Total	ESE	OE/POE		
							M	M	M	M	M		
PCC	26UAI22106	Probability and Statistics	03	-	-	03	30	10	40	60	-	100	
	26UAI22107	Data Analytics	02	-	-	02	30	10	40	60	-	100	
	26UAI22108	Database Management System	03	-	-	03	30	10	40	60	-	100	
	26UAI22109	Database Management System Laboratory	-	-	02	01	-	25	25	-	25	50	
	26UAI22110	Object-Oriented Programming using JAVA	-		02	01		25	25	-	25	50	
MDM	-	Multidisciplinary Minor-II	03	-	-	03	30	10	40	60	-	100	
OE	-	Open Elective-II	03	-	-	03	30	10	40	60	-	100	
VSEC	26UAI22651	Prompt Engineering	-	-	02	01	-	50	50	-	-	50	
AEC	26UGS22404	Advance Quantitative Ability	01	-	-	01	-	50	50	-	-	50	
EMC	26UET22802	Start-up Ecosystem	01	-		01	-	25	25	-	-	25	
	26UET22803	Start-up Ecosystem Laboratory			02	01		25	25			25	
VEC	26UET22804	Professional Ethics Laboratory	01	-	-	01	-	25	25	-	-	25	
	26UET22805	Professional Ethics			02	01		25	25	-	-	25	
AUDIT	26UME22901	Constitution of India	01	-	-	0	-	50	50	-	-	50	
AUDIT	26UAI22902	Technical Aptitude-II	-	-	02	0	-	50	50	-	-	50	
		Total	18	-	12	22	150	400	550	300	50	900	
Abbreviations: L=Lecture, T=Tutorial, P=Practical, M=Marks													
Note: A minimum of 40% marks is required to pass in the ‘In Semester Evaluation Scheme Total’, which is the sum of MSE and ICA scores.													

Note- Industrial Training will be conducted after Semester IV and evaluated in Semester V.

		FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)										
		Curriculum for Third Year B. Tech (Artificial Intelligence & Data Science) with effect from A.Y. 2027-28										
		Semester V										
<i>Course Type</i>	Course Code	Name of the Course	<i>Engagement Hours</i>			<i>Credits</i>	In Semester Evaluation Scheme			End Semester Evaluation Scheme		Total Marks
			<i>L</i>	<i>T</i>	<i>P</i>		MSE	ICA	Total	ESE	OE/POE	
							M	M	M	M	M	
PCC	27UAI31111	Machine Learning	03	-	-	03	30	10	40	60	-	100
	27UAI31112	Machine Learning Laboratory	-	-	02	01		25	25	-	25	50
	27UAI31113	Data Science	03	-	-	03	30	10	40	60	-	100
	27UAI31114	Data Science Laboratory		-	02	01		25	25	-	25	50
	27UAI31115	Software Testing and Quality Assurance	03	-	-	03	30	10	40	60	-	100
	27UAI31116	Software Testing and Quality Assurance Laboratory	-	-	02	01		50	50			50
PEC	-	Program Elective Course- I	03	-	-	03	50	50	100	-	-	100
PEC	-	Program Elective Course- I (Laboratory)	-	-	02	01	-	50	50	-	-	50
MDM	-	Multidisciplinary Minor-III	03	-	-	03	30	10	40	60	-	100
OE	-	Open Elective –III	02	-	-	02	30	10	40	60	-	100
AUDIT	27UA131903	Technical Aptitude-III	-	-	02	-	-	50	50	-	-	50
AUDIT	27UGS31901	Logical Reasoning	01	-	-	-	-	50	50	-	-	50
AUDIT	27UA131904	Industrial Training						50	50			50
		Total	18	-	10	21	200	350	550	300	50	950
Abbreviations: L=Lecture, T=Tutorial, P=Practical, M=Marks												
Note: A minimum of 40% marks is required to pass in the 'In Semester Evaluation Scheme Total', which is the sum of MSE and ICA scores												

		FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)										
		Curriculum for Third Year B. Tech. (Artificial Intelligence & Data Science) with effect from A.Y. 2027-28										
		Semester VI										
Course Type	Course Code	Name of the Course	Engagement Hours			Credits	In Semester Evaluation Scheme			End Semester Evaluation Scheme		Total Marks
			L	T	P		ISE	ICA	Total	ESE	OE/PO E	
							M	M	M	M	M	
PCC	27UAI32117	Cloud Computing	02			02	30	10	40	60		100
	27UAI32118	Deep Learning	02			02	30	10	40	60		100
	27UAI32119	Deep Learning & Advanced Machine Learning Laboratory			02	01		50	50		50	100
	27UAI32120	Advanced Machine Learning	03			03	30	10	40	60		100
PEC	-	Program Elective Course- II	03	-	-	03	30	10	40	60	-	100
	-	Program Elective Course- II Laboratory	-	-	02	01	-	25	25	-	-	25
	-	Program Elective Course- III	03	-	-	03	50	50	100			100
	-	Program Elective Course- III Laboratory	-	-	02	01	-	25	25	-	-	25
MDM	-	Multidisciplinary Minor- IV	03	-	-	03	30	10	40	60	-	100
VSEC	27UCE32603	Reasoning Skill- II	02	-	-	02	-	50	50	-	-	50
Project	27UAI32751	Project Phase - I			04	02	-	50	50	-	50	100
AUDIT	27UAI32905	Technical Aptitude -IV	-	-	02	-	-	50	50	-	-	50
AUDIT	27UGS32902	Data Interpretation	01	-	-	-	-	50	50	-	-	50
		Total	19	-	12	23	200	400	600	300	100	1000
Abbreviations: L= Lecture, T= Tutorial, P= Practical, M= Marks												
Note: A minimum of 40% marks is required to pass in the 'In Semester Evaluation Scheme Total', which is the sum of MSE and ICA scores.												

		FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)										
		Curriculum for Fourth Year B. Tech. (Artificial Intelligence & Data Science) with effect from A.Y. 2028-29										
		Semester VII										
Course Type	Course Code	Name of the Course	Engagement Hours			Credits	In Semester Evaluation Scheme			End Semester Evaluation Scheme		Total Marks
			L	T	P		ISE	ICA	Total	ESE	OE/POE	
							M	M	M	M	M	
PCC	28UAI41122	Advanced Computer Vision	03			03	30	10	40	60		100
	28UAI41123	Block Chain Technology	03			03	30	10	40	60		100
	28UAI41124	Information and Cyber Security	02			02	30	10	40	60		100
	28UAI41125	Natural Language Processing	03			03	30	10	40	60		100
	28UAI41126	Natural Language Processing Laboratory			02	01		25	25		25	50
PEC	-	Program Elective Course- IV	02	-	-	02	30	10	40	60	-	100
MDM	-	Multidisciplinary Minor- V	02	-	-	02	30	10	40	60	-	100
RM	28UAI41752	Research Methodology	03	01	-	04	-	50	50	-	-	50
Project	28UAI41752	Project Phase-II	-	-	04	02	-	50	50	-	50	100
AUDIT	28UAI41906	Technical Aptitude -V	-	-	02	00	-	50	50	-	-	50
		Total	18	01	08	22	180	260	440	360	75	850
Abbreviations: L= Lecture, T= Tutorial, P= Practical, M= Marks												

		FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)										
		Curriculum for Fourth Year B. Tech. (Artificial Intelligence & Data Science) with effect from A.Y. 2028-29										
		Semester VIII										
Course Type	Course Code	Name of the Course	Engagement Hours			Credits	In Semester Evaluation Scheme		Total	End Semester Evaluation Scheme		Total Marks
			L	T	P		ISE	ICA		ESE	OE/POE	
							M	M		M	M	
PEC	-	Program Elective Course- IV -Self-Learning 1#	-	-	-	03	-	-	-	60	40	100
	-	Program Elective Course- VI-Self-Learning 2#		-	-	03	-	-	-	60	40	100
Internship/OJT	28UAI42761	Internship \$	-	-	24	12	-	100@	100@	-	100	200
		Total	-	-	24	18		100	100	120	180	400
Abbreviations: L= Lecture, T= Tutorial, P= Practical, M= Marks												
Note: A minimum of 40% marks is required to pass in the 'In Semester Evaluation Scheme Total', which is the sum of MSE and ICA scores.												

These subjects are to be studied using SWAYAM/NPTEL (8 weeks)) (The list may alter and modify as per the availability of the subjects on the NPTEL/ SWYAM platform and usefulness, every year). Students who fail to satisfy the passing criteria of the course shall be required to appear for an offline examination for the same course and secure the minimum passing marks/grade as prescribed by the Institute.

\$ Twelve weeks of Internship in the industry.

@ Student has to submit monthly internship activity report as per prescribed format to department internship coordinator.

List of Program Core Course (PCC)

<i>Course Type</i>	<i>Course Code</i>	<i>Name of the Course</i>
PCC	26UAI21101	Discrete Mathematics
	26UAI21102	Prompt Engineering
	26UAI21103	Python Programming Lab
	26UAI21104	Principles of Artificial Intelligence
	26UAI21105	Principles of Artificial Intelligence Lab
	26UAI22106	Probability and Statistics
	26UAI22107	Data Analytics
	26UAI22108	Programming in JAVA Lab
	26UAI22109	Database Management System
	26UAI22110	Database Management System Lab
	27UAI31111	Machine Learning
	27UAI31112	Machine Learning Lab
	27UAI31113	Data Science
	27UAI31114	Data Science Lab
	27UAI31115	Software Testing and Quality Assurance
	27UAI31116	Software Testing and Quality Assurance Lab
	27UAI32117	Cloud Computing
	27UAI32118	Deep Learning
	27UAI32119	Deep Learning Lab
	27UAI32120	Advanced Machine Learning
	27UAI32121	Advanced Machine Learning Lab
	28UAI41122	Advanced Computer Vision
	28UAI41123	Block Chain Technology
	28UAI41124	Information and Cyber Security
	28UAI41125	Natural Language Processing
	28UAI41126	Natural Language Processing Lab

Instructions for Students – Self-Learning Courses (Semester VIII)

Self-Learning Courses (Mandatory)

As per the NEP Curriculum and the Semester VIII Scheme, every student is required to successfully complete TWO Self-Learning Courses through the SWAYAM/NPTEL platform.

Course Requirements

- Select any TWO courses from the list of approved SWAYAM/NPTEL courses provided by the Department.
- Each course should be an 8-week SWAYAM/NPTEL certification course.
- Students must register within the stipulated registration period announced by NPTEL.
- Complete all weekly assignments, quizzes, and activities as prescribed by NPTEL.
- Appear for the NPTEL online certification examination conducted at the designated examination centre.

Submit the following to the Department after completion:

- NPTEL Course Completion Certificate
- Final Grade/Score Card
- Assignment Performance Report (if applicable)

Evaluation Scheme

Component	Marks
NPTEL Certification / Institute Evaluation (ISE)	60
Oral/Presentation (OE/POE)	40
Total	100

Passing Criteria

- Students must obtain the minimum passing marks/grade as prescribed by the Institute.
- If a student fails to qualify the NPTEL certification or does not satisfy the passing criteria, he/she must appear for the Institute's offline examination for the respective Self-Learning course.
- The Institute's decision regarding evaluation and passing shall be final.

Important Guidelines

1. Select two different courses only.
2. Course selection is first-come, first-served and subject to Department approval.
3. Students should choose courses relevant to their specialization and career goals.
4. Registration fees (if applicable) shall be borne by the student.
5. Students must maintain all registration details and payment receipts.
6. No change of selected course will be permitted after the registration deadline except with prior approval from the HoD.
7. Students are advised to complete all weekly assignments before the due dates to become eligible for the final examination.
8. The list of approved courses may change every academic year depending on the availability of courses on the SWAYAM/NPTEL platform.

NPTEL / SWAYAM Course List

<i>Sr. No.</i>	<i>Course Code</i>	<i>Name of Course</i>
1		Data Science Using Python https://onlinecourses.swayam2.ac.in/ini25_cs04/preview
2		Advanced R Programming for Data Analytics in Business https://onlinecourses.nptel.ac.in/noc25_mgl154/preview
3		Artificial Intelligence: Search Methods for Problem Solving https://onlinecourses.nptel.ac.in/noc25_cs88/preview
4		Deep Learning for Computer Vision https://onlinecourses.nptel.ac.in/noc25_cs93/preview
5		Cyber Security and Privacy https://onlinecourses.nptel.ac.in/noc25_cs116/preview
6		Reinforcement Learning https://onlinecourses.nptel.ac.in/noc25_cs92/preview
7		Responsible & Safe AI Systems https://onlinecourses.nptel.ac.in/noc25_cs118/preview
8		Social Network Analysis https://onlinecourses.nptel.ac.in/noc25_cs100/preview
9		Privacy and Security in Online Social Media https://onlinecourses.nptel.ac.in/noc25_cs117/preview

List of Program Elective Course (PEC)

Semester	Sem-V	Sem-VI	Sem-VI	Sem-VII	Sem-VIII	Sem-VIII
PEC	PEC-I	PEC-II	PEC-III	PEC-IV	PEC-V	PEC-VI
Credits	Credit-4 (Th=03, Lab=01)	Credit-4 (Th=03, Lab=01)	Credit-4 (Th=03, Lab=01)	Th=02	Th=02	Th=02
Choice 1	Generative AI (27UA131201-A) Generative AI Lab (27UA131202-A)	Intelligent Learning Systems (27UAI32203-A) Intelligent Learning Systems Lab (27UAI32204-A)	Vision-Based AI Systems (27UAI32205-A) Vision-Based AI Systems Lab (27UAI32206-A)	Reinforcement Learning (28UAI41207- A)	MOOC- NPTEL Course of 4 Week (28UAI42208- A)	MOOC-NPTEL Course of 4 Week (28UAI42209-A)
Choice 2	Data Visualization with Python (27UA131201-B) Data Visualization with Python (27UA131202-B)	Time Series Forecasting (27UAI32203-B) Time Series Forecasting Lab (27UAI32204-B)	Data Mining & Warehousing (27UAI32205-B) Data Mining & Warehousing Lab (27UAI32206-B)	Reinforcement Learning (28UAI41207- B)	MOOC- NPTEL Course of 4 Week (28UAI42208- B)	MOOC-NPTEL Course of 4 Week (28UAI42209-B)
Choice 2	Cloud Computing for AI (27UA131201-C) Cloud Computing for AI (27UA131202-C)	Big Data Analytics (27UAI32203-C) Big Data Analytics Lab (27UAI32204-C)	MLOps (27UAI32205-C) MLOps Lab (27UAI32206-C)	Reinforcement Learning (28UAI41207- C)	MOOC- NPTEL Course of 4 Week (28UAI42208- C)	MOOC-NPTEL Course of 4 Week (28UAI42209-C)

LIST OF MULTIDICIPLINARY MINOR COURSES:

Offered by AI&DS Department

<i>Sr No.</i>	<i>Name of Minor Domain</i>	<i>Courses Offered</i>	<i>Course Code</i>
1	Web Engineering	Fundamentals of Web Technologies	26UAI21401
		Frontend Development using HTML, CSS & JS	26UAI22402
		Backend Web Development using Node.js / Django	27UAI31403
		Full Stack Development with MERN/MEAN Stack	27UAI32404
		UI/UX Design & Web Deployment (Cloud + DevOps)	28UAI41405
2	IT & Security Professional	Fundamentals of Computer Networks & Protocols	26UAI21401
		Linux Essentials & System Administration	26UAI22402
		Cyber Security Principles & Best Practices	27UAI31403
		Ethical Hacking & Penetration Testing	27UAI32404
		Network & Web Security using Tools (Wireshark, Metasploit)	28UAI41405

LIST OF OPEN ELECTIVE COURSES

Sr. No	Elective Type	OE-I with 3 Credit Sem-III	OE-II with 3 Credit Sem-IV	OE-III with 2 Credit Sem-V	Course offered by Department
1	Health & Management	Emotional Intelligence (26UOE21501-A)	Leadership Skills (26UOE22502-A)	Stress Management (27UOE31503-A)	AI&DS
2	Environment & Sustainability	Climate Change & Mitigation (26UOE21501-B)	Waste Management & Recycling (26UOE22502-B)	Green Technology (27UOE31503-B)	Civil
3	Sustainable Development	Agriculture Systems and Digital Enablers (26UOE21501-C)	Data-Driven Decision Making in Agriculture (26UOE22502-C)	AI Applications for Sustainable Food Systems (27UOE31503-C)	CSE
4	Humanities & Arts	Fundamental of IPR (26UOE21501-D)	Legal Aspects of Innovation & Intellectual Property Rights (26UOE22502-D)	Patent search and Analytics (27UOE31503-D)	Electrical
5	Management & Commerce	Behavioral Economics (26UOE21501-E)	Financial Management for Engineers (26UOE22502-E)	Business Ethics (27UOE31503-E)	E&TC
6	Arts & Design	Design Thinking (26UOE21501-F)	Management Innovation & Entrepreneurship (26UOE22502-F)	Product Development (27UOE31503-F)	Mechanical

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH SANGOLA (An Autonomous Institute)		
	Second Year B. Tech.		
	Semester-III (w.e.f. A.Y. 2026-27)		
	Subject Name: Discrete Mathematics (26UAI21101)		
Teaching Scheme:			Evaluation Scheme:
No. of Hrs./week	No. of Credits		
3	3	MSE:	30 Marks
-	-	ICA:	10 Marks
-	-	ESE:	60 Marks
3	3	OE/POE:	-
Pre-Requisites: Students should possess basic knowledge of mathematics and logical reasoning.			
Course Objectives: To develop logical reasoning and problem-solving skills using the fundamental concepts of Discrete Mathematics.			
1	Understand and apply the principles of propositional logic, predicates, quantifiers, and logical equivalences for mathematical reasoning.		
2	Understand set theory concepts and functions to solve mathematical and computational problems.		
3	Analyze relations, their properties, and ordering structures for modeling and solving discrete problems.		
4	Apply graph-theoretic concepts and algorithms to analyze networks and solve connectivity-related problems.		
5	Understand and apply the properties of algebraic structures such as semigroups, monoids, and groups in abstract mathematical systems.		
Course Outcomes: At the end of this course, students will be able to			BL
CO 1	Explain propositions, logical operators, predicates, and quantifiers, and construct truth tables for logical expressions.		L2
CO 2	Apply set operations, cardinality concepts, and function properties to solve problems related to sets and mappings.		L3
CO 3	Explain properties of relations, equivalence relations, and partial orderings, and represent them using appropriate techniques.		L2
CO 4	Identify different types of graphs and apply graph concepts to determine paths, connectivity, and colorings.		L3
CO 5	Recall and explain algebraic structures such as semigroups, monoids, groups, and normal subgroups.		L1

Course Contents		No. of lectures (hrs.)
Unit 1	Propositional Logic Propositions, truth values, Truth tables for operators, Truth Tables of Compound Propositions, Precedence of Logical Operators. Propositional Equivalences: Logical Equivalences, Predicates and Quantifiers: Predicates, Quantifiers: Universal and Existential, Quantifiers with Restricted Domains, Precedence of Quantifiers, Binding Variables	7
Unit 2	Set Theory Sets, Venn Diagrams, Subsets, The Size of a Set, Power Sets, Cartesian Products, Set operations, Set Identities, Generalized Unions and Intersections, Cardinality of Sets, Functions: Introduction, Subjective, Injective, Bijective, inverse functions	7
Unit 3	Relations Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Equivalence classes and partitions, Partial Ordering, Hasse Diagram, Topological Sort.	8
Unit 4	Graph Some Special Simple Graphs, Bipartite Graphs, New Graphs from Old, Shortest path problems, Euler and Hamiltonian paths, Isomorphic graphs, Planar graphs, Connectivity, Matching Coloring.	8
Unit 5	Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups	7
Text Books:		
1.	C. L. Liu, Elements of Discrete Mathematics, McGraw-Hill Publication, 3 rd Edition, 2008.	
Reference Books:		
1.	Lipschutz, Discrete Mathematics, McGraw-Hill Publication, 3rd Edition, 2009.	
2.	V. K. Balakrishnan, Schaum's Outline of Graph Theory, McGraw-Hill Publication, 1 st Edition, 1997.	
3.	Eric Gossett, Discrete Mathematics with Proof, Wiley Publication, 2nd Edition, 2009	
4.	Kenneth H. Rosen, Discrete Mathematics and its Applications, McGraw-Hill Publication, 6 th Edition, 2010.	
5.	Y. N. Singh, Discrete Mathematical Structures, Wiley Publication, 1st Edition, 2010.	
Online Resources:		
1.	NPTEL – Discrete Mathematics: https://nptel.ac.in	
2.	Geeks for Geeks – Discrete Mathematics Tutorials: https://www.geeksforgeeks.org	

CO-PO-PSO Mapping

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



**FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH
(An Autonomous Institute)**

Second Year B. Tech.

Semester-III (w.e.f. A.Y. 2026-27)

**Subject Name: Software Engineering and Project Management
(26UAI21102)**

Teaching Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	3	3	ISE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-

Prerequisite: Fundamentals of Programming and Object-Oriented Programming, understanding of Data Structures and Database Concepts.

Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:

1)	Understand software engineering principles, software process models, and software development methodologies.
2)	Analyze software requirements and apply design principles for developing quality software systems.
3)	Understand software architecture, testing techniques, and quality assurance practices.
4)	Apply project planning, scheduling, risk management, and quality management techniques in software projects.
5)	Explore agile project management practices and software configuration management for modern software development.

Course Outcomes: At the end of this course, students shall be able to

BL

CO 1	Explain software engineering principles, software process models, and software development methodologies.	L2
CO 2	Analyze software requirements and apply software design principles to develop software solutions.	L4
CO 3	Apply software architecture concepts and testing techniques to ensure software quality.	L3
CO 4	Apply project planning, estimation, scheduling, risk management, and quality management techniques in software projects.	L3
CO 5	Apply agile project management and software configuration management practices in software development environments.	L3

Unit	Course Contents	No. of Lectures (hrs.)
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Unit 1	Introduction to Software Engineering Introduction to Software Engineering, The Problem Domain, Software Engineering Challenges and Approaches, Software Process and Characteristics of Software Process Software Development Process Models: Waterfall Model, Prototype Model, Incremental Model, Spiral Model, Rational Unified Process (RUP), Time Boxing Model, Agile Process Model	7
Unit 2	Software Requirement Analysis and Design Need for Software Requirement Specification (SRS), Characteristics of Good SRS, Requirement Engineering Process, Requirements Specification, Functional Specification using Use Cases, Data Flow Diagram (DFD), Entity Relationship Diagram (ERD), Introduction to Software Design, Design Principles, Conceptual Design and Technical Design, Coupling and Cohesion, Open-Closed Principle	7
Unit 3	Software Architecture and Testing Role of Software Architecture, Architecture Views, Component and Connector View, Architecture Styles, Documenting Architecture Design, Function-Oriented Design, Object-Oriented Design, High-Level Design and Detailed Design, Design Verification and Metrics, Testing Fundamentals and Testing Process, Black-Box Testing and White-Box Testing, Functional Testing, Unit Testing, System Testing, Object-Oriented, software Testing, User Satisfaction Testing	8
Unit 4	Software Project Planning and Management Introduction to Project Management, Project Management Process, Effort Estimation Techniques, Project Scheduling and Staffing, Detailed Scheduling, Risk Management Planning, Project Monitoring Plan, Quality Concepts, Quality Planning and Quality Management, CMM and Project Management Process	7
Unit 5	Agile Project Management and Configuration Management Introduction to Agile Project Management (APM), Agile Project Management Implementation, Iterative Project Management Life Cycle, Adaptive Project Management Life Cycle, Integrating the APM Toolkit, The Science of Scrum, New Management Responsibilities, Software Configuration Management Process, Inspection and Audit Process	7
Text Books:		
1)	Software Engineering: A Practitioner's Approach – Roger S. Pressman and Bruce R. Maxim, McGraw-Hill Education, 9 th Edition.	
2)	Software Engineering – Ian Sommerville, Pearson Education, 10 th Edition.	
3)	Software Project Management – Bob Hughes, Mike Cotterell, Rajib Mall, McGraw-Hill Education, 6 th Editon.	
Reference Books:		
1)	Fundamentals of Software Engineering – Rajib Mall, PHI Learning, 5th Edition.	
2)	Software Engineering: Principles and Practice – Hans van Vliet, Wiley India, 3rd Edition	
3)	Agile Project Management with Scrum – Ken Schwaber, Microsoft Press, 1st Edition.	
4)	Head First Agile – Andrew Stellman and Jennifer Greene, O'Reilly Media, 2nd Edition.	
5)	The Mythical Man-Month – Frederick P. Brooks Jr., Addison-Wesley, Anniversary Edition.	
Online Resources		

1)	Software Engineering Institute (SEI), Carnegie Mellon University https://www.sei.cmu.edu
2)	Agile Alliance https://www.agilealliance.org
3)	Scrum Guides https://scrumguides.org
4)	IEEE Software Engineering Resources https://www.computer.org/technical-committees/software-engineering
5)	Project Management Institute (PMI) https://www.pmi.org
6)	NPTEL – Software Engineering https://nptel.ac.in
7)	NPTEL – Software Project Management https://nptel.ac.in
8)	Atlassian Agile Coach https://www.atlassian.com/agile
9)	Microsoft Learn – Agile and Project Management https://learn.microsoft.com

CO-PO-PSO Mapping

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

	FABTECH EDUCATION SOCIETY’S			
	FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH			
	(An Autonomous Institute)			
	Semester-III (w.e.f. A.Y. 2026-27)			
Subject Name: Python Programming Lab (26UAI21103)				
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	ISE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	25 Marks
Pre-Requisites: Students should possess basic computer literacy and an understanding of fundamental programming concepts, algorithms, flowcharts, conditional statements, and looping constructs.				
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1	To understand the history, features, and applications of Python programming.			
2	To learn Python syntax, variables, input-output operations, and program structure.			
3	To apply data types, operators, expressions, and control flow statements for problem-solving.			
4	To utilize Python data structures, file handling, and exception handling techniques in software development.			
5	To develop data visualization solutions and analyze real-world datasets using Python libraries.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Understand the history and significance of Python and demonstrate basic programming skills using the Python interpreter and scripts.			L2
CO 2	Apply data types, operators, expressions, and control flow statements to develop basic Python programs.			L3
CO 3	Analyze program execution by identifying and handling errors and exceptions.			L3
CO 4	Analyze Python programs using file handling and exception handling			L3
CO 5	Use Python libraries to perform basic data handling and visualization tasks.			L2
Experiment List				
1)	To understand the fundamentals of Python programming			
2)	Implementation of Operators in Python			
3)	Implementation of Decision Making and Looping in Python			
4)	Implementation of Strings and Its operation			
5)	Study and Implementation of Exception Handling in Python Programming			

6)	Study and Implementation of functions in Python Programming
7)	Study and Implementation of Python List, Tuple, Set, Dictionary
8)	Study and Implementation of File Handling Operations in Python
9)	Write a Python program to create a class Student with attributes name and roll_no, and display student details using an object
10)	Write a Python program to read data from a CSV file using Pandas and display the first five records
Text Books:	
1)	Python Programming: An Introduction to Computer Science – John M. Zelle, Franklin, Beedle & Associates Inc., 3 rd Edition.
2)	Core Python Programming – R. Nageswara Rao, Dreamtech Press, 2 nd Edition.
3)	Learning Python – Mark Lutz, O'Reilly Media, 5 th Edition.
Reference Books	
1)	Python Programming: A Modern Approach – Vamsi Kurama, Pearson Education India, 1 st Edition
2)	Learning Python – Mark Lutz, O'Reilly Media, 5 th Edition.
3)	Think Python: How to Think Like a Computer Scientist – Allen B. Downey, Green Tea Press, 2 nd Edition.
4)	Introduction to Python Programming – Kenneth A. Lambert, Cengage Learning, 2 nd Edition.
Online Resources:	
1	Open Access E-Books
1)	Think Python: How to Think Like a Computer Scientist – Allen B. Downey https://greenteapress.com/wp/think-python-2e/
2)	Python for Everybody – Charles R. Severance https://www.py4e.com/book
3)	Automate the Boring Stuff with Python – Al Sweigart https://automatetheboringstuff.com/
4)	The Python Tutorial (Official Python eBook) https://docs.python.org/3/tutorial/
2	Online Courses / Video Resources
1)	NPTEL – The Joy of Computing Using Python https://nptel.ac.in/
2)	NPTEL – Programming, Data Structures and Algorithms Using Python https://nptel.ac.in/
3)	Free Code Camp Python Course https://www.freecodecamp.org/learn/
3	Journals (for Data Visualization and Applications)
1)	Journal of Open Source Software (JOSS) https://joss.theoj.org/
2)	IEEE Xplore Digital Library https://ieeexplore.ieee.org/
3)	Springer Computer Science Journals https://link.springer.com/
4)	Elsevier – Data Science and Analytics Journals https://www.sciencedirect.com/
4	Other Online Resources
1)	Python Official Documentation https://docs.python.org/3/
2)	Python Official Tutorial https://docs.python.org/3/tutorial/

3)	W3Schools Python Tutorial https://www.w3schools.com/python/
4)	NumPy Documentation https://numpy.org/doc/
5)	Pandas Documentation https://pandas.pydata.org/docs/
6)	Matplotlib Documentation https://matplotlib.org/stable/users/index.html
7)	Seaborn Documentation https://seaborn.pydata.org/
8)	Kaggle Datasets Repository https://www.kaggle.com/datasets

CO-PO-PSO Mapping Table

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject Name: Principles of Artificial Intelligence (26UAI21104)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	ISE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	2	2	OE/POE:	-
Pre-Requisites: Students should possess basic knowledge of Programming Fundamentals, Data Structures and Algorithms, Discrete Mathematics, Probability and Statistics, Mathematical Logic, and Database Management Systems.				
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1	Understand the fundamentals of AI and intelligent agents.			
2	Apply AI problem-solving and search techniques.			
3	Explain knowledge representation and reasoning methods.			
4	Understand probabilistic reasoning and AI planning concepts.			
5	Describe the fundamentals of NLP, Machine Learning, Neural Networks, and Expert Systems.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Explain AI concepts and intelligent agents.			L2
CO 2	Apply AI search algorithms.			L3
CO 3	Apply knowledge representation techniques.			L3
CO 4	Explain probabilistic reasoning and planning.			L2
CO 5	Explain NLP and Machine Learning concepts.			L2
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Introduction to AI: What is AI, Characteristics of AI , Applications of AI, Foundations of AI, Types of AI , History of AI, Intelligent Agents: Agents and Environment, Rational Agents, Types of Agents, Structure of Intelligent Agents.			7
Unit 2	Problem Solving and Search Techniques: Problem-Solving Agents, Problem Formulation, State Space Search, Searching for Solutions, Uninformed Search (BFS, DFS), Informed Search (Greedy Best First Search, A* Search), Heuristic Functions, Introduction to Game Playing, Minimax Algorithm.			7

Unit 3	Knowledge Representation and Reasoning: Introduction to Knowledge Representation, Types of Knowledge, Knowledge Representation Techniques, Predicate Logic (Basics), Representing Facts and Relationships, Rule-Based Knowledge Representation, Forward Chaining, Backward Chaining.	7
Unit 4	Probabilistic Reasoning: Introduction to Uncertain Knowledge, Probability Basics, Fuzzy Logic Basics, Introduction to Planning, Components of Planning System, Applications of Planning.	7
Unit 5	Natural Language Processing and Machine Learning: Introduction to NLP, Applications of NLP, Lexical Analysis, Syntactic Analysis, Introduction to Machine Learning, Types of Learning (Supervised, Unsupervised, Reinforcement), Introduction to Neural Networks, Introduction to Expert Systems and their Applications	8
Text Books:		
1)	Artificial Intelligence: A Modern Approach Authors: Stuart J. Russell, Peter Norvig Publisher: Pearson Education Edition: 4th Edition, 2021	
2)	Artificial Intelligence Authors: Elaine Rich, Kevin Knight, Shivashankar B. Nair Publisher: McGraw-Hill Education (India) Edition: 3rd Edition	
3)	Introduction to Artificial Intelligence Author: Wolfgang Ertel Publisher: Springer Edition: 2nd Edition, 2017	
Reference Books:		
1)	Deep Learning Authors: Ian Goodfellow, Yoshua Bengio, Aaron Courville Publisher: MIT Press Edition: 1st Edition, 2016	
2)	Speech and Language Processing Authors: Daniel Jurafsky, James H. Martin Publisher: Pearson (Earlier Editions); 3rd Edition Draft available online	
3)	Machine Learning Author: Tom M. Mitchell Publisher: McGraw-Hill Education Edition: International Edition	1
Online Resources:		
1)	NPTEL – Artificial Intelligence Provider: IIT Madras / NPTEL Website: NPTEL	
2)	Coursera – Artificial Intelligence & Machine Learning Courses Provider: Coursera (Stanford, DeepLearning.AI, Google, IBM, etc.) Website: Coursera	
3)	Scikit-learn Documentation Provider: Scikit-learn Developers Website: Scikit-learn Documentation	

CO-PO-PSO Mapping Table

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject Name: Principles of Artificial Intelligence Lab (26UAI21105)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	ISE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE :	25 Marks
Pre-Requisites: Students should possess basic knowledge of Programming Fundamentals, Data Structures and Algorithms, Discrete Mathematics, Probability and Statistics, Mathematical Logic, and Database Management Systems.				
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1	Understand the fundamentals of AI and intelligent agents.			
2	Apply AI problem-solving and search techniques.			
3	Explain knowledge representation and reasoning methods.			
4	Understand probabilistic reasoning and AI planning concepts.			
5	Describe the fundamentals of NLP, Machine Learning, Neural Networks, and Expert Systems.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Explain AI concepts and intelligent agents.			L2
CO 2	Apply AI search algorithms.			L3
CO 3	Apply knowledge representation techniques.			L3
CO 4	Explain probabilistic reasoning and planning.			L2
CO 5	Explain NLP and Machine Learning concepts.			L2
Experiment List				
1)	Write a program to simulate a simple intelligent agent that responds to user input.			
2)	Write a program to simulate a simple vacuum cleaner intelligent agent.			
3)	Write a program to implement Breadth First Search (BFS).			
4)	Write a program to implement Depth First Search (DFS).			
5)	To implement Forward Chaining using Python			

6)	To implement Backward Chaining using Python
7)	To calculate the probability of getting an even number on a dice using Python..
8)	Design a simple AI planning system.
Text Books:	
1)	Artificial Intelligence: A Modern Approach Authors: Stuart J. Russell, Peter Norvig Publisher: Pearson Education Edition: 4th Edition, 2021 ISBN: 978-0134610993
2)	Artificial Intelligence Authors: Elaine Rich, Kevin Knight, Shivashankar B. Nair Publisher: McGraw-Hill Education (India) Edition: 3rd Edition ISBN: 978-0070087705
3)	Introduction to Machine Learning with Python Authors: Andreas C. Müller, Sarah Guido Publisher: O'Reilly Media Edition: 1st Edition, 2016 ISBN: 978-1449369415
Reference Books	
1)	Deep Learning Authors: Ian Goodfellow, Yoshua Bengio, Aaron Courville Publisher: MIT Press Edition: 1st Edition, 2016 ISBN: 978-0262035613
2)	Speech and Language Processing Authors: Daniel Jurafsky, James H. Martin Publisher: Pearson (Earlier Editions); 3rd Edition Draft available online Edition: 3rd Edition (Draft)
3)	Python Machine Learning Authors: Sebastian Raschka, Vahid Mirjalili Publisher: Packt Publishing Edition: 3rd Edition, 2019 ISBN: 978-1789955750
4)	
Online Resources:	
1	NPTEL – Artificial Intelligence Course Provider: IIT Madras / NPTEL Website: https://nptel.ac.in
2	Coursera – AI and Machine Learning Courses Provider: Coursera (Courses by Stanford, DeepLearning.AI, Google, IBM, etc.) Website: https://www.coursera.org
3	Scikit-learn Documentation Provider: Scikit-learn Developers Website: https://scikit-learn.org/stable/

CO-PO-PSO Mapping Table

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	PS01	PS02	PS03
C01	3	2	–	–	3	–	–	–	–	–	1	3	2	–
C02	2	3	–	2	2	–	–	–	–	–	1	2	3	1
C03	3	3	2	2	3	–	–	–	–	–	1	3	3	1
C04	3	3	2	2	3	–	–	–	–	–	1	3	3	2
C05	3	3	3	2	3	–	–	–	–	–	1	3	3	2

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Second Year B. Tech.			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject Name: Fundamentals of Web Technologies (26UAI21401)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	3	3	ISE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-
Prerequisite: Computer Fundamentals, Computer Networks, and Basic Programming Concepts.				
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1)	Understand Internet and Web technologies.			
2)	Explain web communication protocols and hosting concepts.			
3)	Learn web standards and development technologies.			
4)	Analyze web security and performance optimization techniques.			
5)	Explore modern and emerging web technologies.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Explain the architecture, protocols, and standards of web technologies.			L2
CO 2	Apply Internet and web communication concepts in web-based applications.			L3
CO 3	Analyze client-server interactions and web services.			L4
CO 4	Analyze Client – side scripting web technologies.			L4
CO 5	Design web-based solutions using contemporary web standards.			L5
Unit	Course Contents			No. of Lectures (hrs.)

Unit 1	Introduction to Internet and Web: Internet Fundamentals, Evolution of WWW, Client-Server Architecture, Web Browsers and Web Servers, URL, URI, DNS, Static and Dynamic Websites	7
Unit 2	Web Communication Technologies: HTTP/HTTPS Protocol, HTTP Request message, HTTP response message, web clients, web servers, Cookies and Sessions, Web Hosting Concepts, Domain Registration	7
Unit 3	Web Standards and Technologies: HTML Overview Introduction, history and versions. HTML Elements: heading, paragraphs, line break, colors and fonts, links, frames, list, tables, images and forms. Difference between HTML and HTML5. CSS: Introduction to style sheet, CSS features, CSS core syntax, Style sheets and HTML, Style rule cascading and inheritance, text properties. Bootstrap	8
Unit 4	Client-Side Technologies: JavaScript: JavaScript: Introduction to JavaScript, JavaScript in perspective, basic syntax, variables and data types, statements, operators, literals, functions, objects, arrays, built in objects, JavaScript debuggers.	7
Unit 5	Modern Web Technologies: Progressive Web Applications, Web Services, Microservices Overview, Serverless Computing, Emerging Trends in Web Technology	7
Text Books:		
1)	Web Technologies: Black Book – Kogent Learning Solutions Inc., Dreamtech Press, 2 nd Edition.	
2)	Internet and World Wide Web: How to Program – Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Pearson Education, 5 th Edition.	
3)	Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML and AJAX Black Book Kogent Learning Solutions Inc. 2 nd Edition Dreamtech Press 2009	
Reference Books:		
1)	Web Technologies: A Computer Science Perspective – Jeffrey C. Jackson, Pearson Education, 1 st Edition.	
2)	HTML and CSS: Design and Build Websites – Jon Duckett, Wiley Publications, 1 st Edition.	
3)	RESTful Web Services – Leonard Richardson and Sam Ruby, O'Reilly Media, 1 st Edition.	
4)	JavaScript and JQuery: Interactive Front-End Web Development – Jon Duckett, Wiley Publications, 1 st Edition.	
Online Resources		
1)	MDN Web Docs (HTML, CSS, JavaScript, Web APIs https://developer.mozilla.org	
2)	W3Schools Web Technologies Tutorials https://www.w3schools.com	
3)	Google Web Fundamentals / Chrome Developers: https://web.dev	
4)	Google Search Central (SEO Fundamentals): https://developers.google.com/search	
5)	NPTEL – Web Technology Courses: https://nptel.ac.in	

CO-PO-PSO Mapping Table

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject Name: Emotional Intelligence(26UOE21501)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	3	3	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-
Pre-Requisites:				
• Basic understanding of human behavior and emotions. • Willingness to learn self-awareness and interpersonal skills. • Interest in personal and professional development.				
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1	To understand the concept and importance of Emotional Intelligence (EI).			
2	To develop self-awareness and self-management skills.			
3	To improve interpersonal relationships and communication abilities.			
4	To enhance leadership, teamwork, and stress management capabilities.			
5	To promote emotional well-being for personal and professional success.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Explain the concepts and significance of Emotional Intelligence.			L2
CO 2	Identify personal emotions and regulate them effectively.			L2
CO 3	Demonstrate empathy and positive interpersonal skills.			L3
CO 4	Apply EI principles in teamwork, leadership, and conflict resolution.			L3
CO 5	Practice stress management and emotional well-being strategies.			L3
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Introduction to Emotional Intelligence: Meaning and importance of Emotional Intelligence, IQ vs EQ, Components of EI, Benefits of EI in personal and professional life, Emotional Intelligence in the digital age, Self-assessment of EI, Activities for Self-Study: EI Self-Test, Reflection Exercise			7

Unit 2	Self-Awareness and Self-Management: Understanding emotions, Emotional triggers, Self-confidence and self-esteem, Positive thinking, Managing anger and frustration, Goal setting and self-motivation, Activities for Self Study: SWOT Analysis, Personal Goal Mapping	7
Unit 3	Empathy and Social Skills: Understanding others' emotions, Active listening, Building trust and rapport, Effective communication, Body language, Respecting diversity Activities for Self-Study: Role Plays, Peer Interaction Exercises	7
Unit 4	Emotional Intelligence at Workplace: Teamwork and collaboration, Leadership qualities, Conflict management, Decision making, Workplace ethics, Emotional Intelligence in engineering profession. Activities For Self Study: Case Studies, Group Discussion	8
Unit 5	Stress Management and Well-being: Understanding stress, Sources of stress among students, Work-life balance, Mindfulness techniques, Happiness and emotional wellness, Building resilience, Activities for Self Study: Meditation Practice, Stress Management Plan	7

Text Books:

1)	Emotional Intelligence – by Daniel Goleman.
2)	Emotional intelligence: Theoretical and Cultural Perspectives – by Rabindra Kumar Pradhan
3)	Emotional Intelligence – by Nilanjan Sengupta

Reference Books:

1)	Emotional Intelligence 2.0 – Travis Bradberry and Jean Greaves
2)	The Emotionally Intelligent Manager – David R. Caruso and Peter Salovey
3)	Emotional Intelligence at Work – Hendrie Weisinger
4)	Primal Leadership: Realizing the Power of Emotional Intelligence – Daniel Goleman, Richard Boyatzis, and Annie McKee

Online Resources:

1)	NPTEL/SWAYAM Course: Emotional Intelligence Link: https://onlinecourses.nptel.ac.in
2)	NPTEL Course: Psychology of Emotion – Theory and Application Link: https://onlinecourses.nptel.ac.in
3)	Coursera Course: Emotional and Social Intelligence Link: https://www.coursera.org/learn/emotional-and-social-intelligence

CO-PO-PSO Mapping

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Semester- III (w.e.f. A.Y. 2026-27)			
	Subject Name: Basic Quantitative Ability (26UHS21803)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	1	0	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	1	0	OE/POE:	-
Pre-Requisites: Basic knowledge of arithmetic operations and elementary mathematics studied at the secondary and higher secondary level. Understanding of fractions, decimals, percentages, and simple algebraic concepts. Ability to perform basic calculations and interpret numerical data.				
Course Objectives: - The objectives of this course are to:				
1	Develop students' fundamental numerical and arithmetic skills required for quantitative problem solving.			
2	Familiarize students with number systems, percentages, averages, ratios, and proportions used in aptitude and real-life applications.			
3	Enhance analytical and logical thinking abilities through application-based quantitative problems.			
4	Enable students to apply mathematical concepts and shortcut techniques for efficient problem solving.			
5	Prepare students for competitive examinations, placement aptitude tests, and engineering applications requiring quantitative reasoning.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Apply basic arithmetic operations, surds, indices, and progressions to solve quantitative problems efficiently.			L3
CO 2	Use concepts of HCF, LCM, divisibility, remainders, unit digits, and number Properties in problem-solving.			L3
CO 3	Solve real-life problems involving percentages, successive changes, and proportional increase/decrease.			L3
CO 4	Apply concepts of averages, weighted averages, mixtures, and allegations in quantitative applications.			L3
CO 5	Use ratio, proportion, variation, and scaling concepts to solve aptitude and application-based problems.			L3
Unit	Course Contents			No. of lectures (hrs.)

Unit 1	Basic Calculation Techniques Squares (1–30), Cubes (1 to 15), Square roots, Cube roots, BODMAS rule, Surds & Indices: Fundamental laws of indices, basic rules of surds, Progressions: Arithmetic Progressions, Geometric Progressions, Harmonic Progressions, Useful results.	3
Unit 2	Number System GCD/HCF and LCM, Rules of divisibility, properties involving fractions, co-primes, and application-based word problems, Unit digit and Power Cycle, Remainder Theorem, Types of Numbers and their Properties, Useful results.	3
Unit 3	Percentage Concept of percentages, fraction to percentage equivalence, successive percentage changes, increase and decrease based on universally proportional, real-world applications	3
Unit 4	Average Concept of arithmetic mean, weighted averages, inclusion/exclusion of elements, and replacement problems, Mixture and Allegations.	3
Unit 5	Ratio and Proportion Ratio and Proportion, Direct proportion, Inverse proportion, Mean proportion, Joint proportion, Scaling Concept, • Problems on Ages Useful results.	3
Text Books:		
1)	Quantitative Aptitude by R. S. Aggarwal, S. Chand Publishing.	
2)	Quantitative Aptitude for Competitive Examinations: Abhijit Guha, McGraw Hill India	
3)	Objective Arithmetic: R. S. Aggarwal, S. Chand Publishing	
Reference Books:		
1)	Fast Track Objective Arithmetic: Rajesh Verma, Arihant Publications.	
2)	Magical Book on Quicker Maths: M. Tyra, BSC Publishing Co. Pvt. Ltd.	
3)	Quantitative Aptitude Quantum CAT: Sarvesh Kumar Verma, Arihant Publications.	
4)	How to Prepare for Quantitative Aptitude for CAT: Arun Sharma, McGraw Hill India.	
Online Resources:		
1)	Khan Academy – Arithmetic and Algebra https://www.khanacademy.org/math	
2)	NPTEL (National Programme on Technology Enhanced Learning):- https://nptel.ac.in	
3)	Aptitude and Reasoning by Unacademy:- https://unacademy.com	

CO-PO-PSO Mapping Table

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject Name: Economics for Engineers(26UHS21807)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	ISE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	2	2	OE/POE:	-
Pre-Requisites: Students should possess basic knowledge of Economics.				
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1	Understand the fundamental concepts of economics and their relevance to engineering and technology.			
2	Develop awareness of economic factors affecting engineering projects, industries, and society.			
3	Apply basic economic principles in decision-making related to cost, resources, productivity, and efficiency.			
4	Understand personal finance and financial planning, including saving, investment, and budgeting.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Understand basic economic principles.			L2
CO 2	Apply economic thinking in engineering decisions.			L3
CO 3	Develop financial awareness and planning skills.			L3
CO 4	Appreciate the role of economics in sustainable development.			L3
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Introduction to Economics: Basic Economic Concepts, Scarcity, Choice, and Opportunity Cost, Microeconomics and Macroeconomics, Role of Engineers in Economic Development			4
Unit 2	Demand, Supply, and Market: Demand and Supply Concepts, Market Equilibrium, Consumer Behavior, Market Structures (Overview)			3
Unit 3	Personal Finance and Financial Awareness: Saving and Investment, Banking System, Digital Payments, Financial Planning for Young Professionals			3
Unit 4	Economics in Engineering Practice: Cost Concepts, Cost-Benefit Analysis, Productivity and Efficiency, Sustainable Development and Green Economy			3
Text Books:				
1)	Engineering Economics – R. Panneerselvam			

2)	Engineering Economics – S. C. Sharma
3)	Engineering Economics, Estimation and Costing by S. K. Bhattacharya
4)	Engineering Economics by S. C. Ahuja and Robert Walsh
<i>Reference Books:</i>	
1)	Engineering Economy – William G. Sullivan et al.
2)	Principles of Economics – N. Gregory Mankiw
3)	Fundamentals of Engineering Economics is a textbook by Chan S. Park
4)	Engineering Economy by Leland Blank and Anthony Tarquin
<i>Online Resources:</i>	
1)	https://wcu.edu.et/FirstYearModule/ECONOMICS%20module.pdf

CO-PO-PSO Mapping Table

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Second Year B. Tech.			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject: Economics for Engineers Lab (26UHS21807L)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
1.	Understand the fundamental concepts of economics, including scarcity, opportunity cost, microeconomics, macroeconomics, and the role of engineers in economic development.			
2.	Apply economic principles such as demand, supply, market equilibrium, and consumer behavior to analyze real-world economic situations.			
3.	Analyze personal financial planning, banking systems, digital payment methods, and cost-benefit aspects of engineering projects for effective economic decision-making.			
4.	Evaluate engineering projects and sustainable development practices using economic principles to support environmentally and socially responsible decision-making.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Explain the concepts of scarcity, choice and opportunity cost, and distinguishes between microeconomics and macroeconomics in the context of economic decision-making.			L2
CO 2	Explain the contribution of engineers to national economic development and analyze the relationship between price and quantity demanded using the principles of demand.			L3
CO 3	Analyze consumer behavior, market equilibrium, and market adjustments by applying the concepts of demand, supply, and equilibrium.			L4
CO 4	Explain modern banking systems, digital payment methods, financial planning, budgeting, and the role of sustainable technologies in promoting economic development.			L2
Any six experiments from the following list				
Ex.	Experiment Details			No. of Ex. Sessions (hrs.)
Ex. 1	Understanding Scarcity and Opportunity Cost			2
Ex. 2	Microeconomics vs Macroeconomics Case Analysis			2
Ex. 3	Engineers and Economic Development Study			2
Ex. 4	Demand Survey and Demand Curve Preparation			2
Ex. 5	Market Equilibrium Simulation			2

Ex. 6	Consumer Behavior Analysis	2
Ex. 7	Personal Budget and Financial Planning	2
Ex. 8	Comparative Study of Banking and Digital Payments	2
Ex. 9	Cost-Benefit Analysis of an Engineering Project	2
Ex. 10	Sustainable Development and Green Economy Assessment	2
Text Books:		
1)	<i>Engineering Economics</i> – R. Panneerselvam	
2)	<i>Engineering Economics</i> – S. C. Sharma	
3)	Engineering Economics, Estimation and Costing by S. K. Bhattacharya	
4)	<i>Engineering Economics</i> by S. C. Ahuja and Robert Walsh	
Reference Books:		
1)	<i>Engineering Economy</i> – William G. Sullivan et al.	
2)	<i>Principles of Economics</i> – N. Gregory Mankiw	
3)	Fundamentals of Engineering Economics is a textbook by Chan S. Park	

CO-PO-PSO Mapping Table

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Second Year B. Tech.			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject Name: Universal Human Values (26UHS21808)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	ISE:	
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	
Total:	2	2	OE/POE:	-
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1.	Understand the need, objectives, and significance of value education, and explain the concepts of happiness, prosperity, self-exploration, natural acceptance, values, ethics, and human conduct.			
2.	Explain harmony within the human being by understanding the relationship between the self and the body, human needs, happiness versus comfort, and the process of achieving inner harmony.			
3.	Understand harmony in family and society through trust, respect, justice, cooperation, mutual relationships, and universal human values.			
4.	Explain harmony in nature and existence by understanding the interdependence among the orders of nature, co-existence, sustainability, and the role of human beings in maintaining ecological balance.			
5.	Apply the principles of universal human values and professional ethics to engineering practice, holistic technologies, management, and responsible decision-making in professional and social life.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Understand the need, content, and process of value education and explore the meaning of <i>happiness and prosperity</i> .			L2
CO 2	Examine the difference between <i>Self</i> and <i>Body</i> and understand harmony within the individual.			L4
CO 3	Apply universal values in human-human relationships and appreciate harmony in family and society.			L3
CO 4	Differentiate the characteristics of nature and identify harmony in nature and existence.			L4
CO 5	Identify implications of harmony on professional ethics and develop ethical competence for value-based decision-making.			L5
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Introduction to Value Education: Need, basic guidelines, and objectives of value education, Meaning of happiness and prosperity, Process of self-exploration and natural acceptance, Relationship between values, ethics, and human conduct.			4

Unit 2	Harmony in the Human Being (Self & Body): Concept of <i>Self</i> and <i>Body</i> , Understanding <i>needs of 'I' and the Body</i> , Sukh (happiness) vs. Suvidha (comfort), Harmony within the self: characteristics and activities, Integration for inner balance and right understanding.	5
Unit 3	Harmony in Family and Society: Human-human relationships and value systems, Meaning of <i>trust</i> and <i>respect</i> , Nine universal values in relationships, Components of harmonious society and family, Justice, dignity, cooperation and mutual respect.	5
Unit 4	Harmony in Nature and Existence: Orders of nature: physical, biological, and human, Mutual fulfillment among orders, Co-existence of all constituents of nature, Participation of humans in harmony and sustainable living.	5
Unit 5	Implications of Harmony on Professional Ethics: Basis for ethical human conduct, Natural acceptance of universal human values, Competence in professional ethics, Holistic technologies, management models, and case studies, Role of values and ethics in profession.	5

Text Books:

1	R. R. Gaur, R. Asthana & G. P. Bagaria , <i>A Foundation Course in Human Values and Professional Ethics</i> , Excel Books, New Delhi (2nd Rev. Ed.) — <i>Primary text covering all units and exercises.</i>
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Reference Books:

1.	R. R. Gaur, R. Sangal, G. P. Bagaria – <i>Human Values and Professional Ethics</i> (Teacher's Manual) – Excel Books.
2.	A. Nagaraj – <i>Jeevan Vidya: Ek Parichaya</i> (Jeevan Vidya Prakashan).
3.	A. N. Tripathi – <i>Human Values</i> , New Age International, New Delhi.
4.	<i>The Story of My Experiments with Truth</i> – M. K. Gandhi (for ethical insights).

CO-PO-PSO Mapping Table

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

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE DEPARTMENT

Guidelines for Mini Project – I

Objectives

- To provide students with hands-on experience in applying Artificial Intelligence and Data Science concepts.
- To develop problem-solving, analytical thinking, and programming skills.
- To encourage teamwork, technical documentation, and presentation abilities.
- To introduce students to the complete project development lifecycle.

Project Scope

- The project should address a real-world problem related to Artificial Intelligence, Data Science, Machine Learning, Data Analytics, Automation, or related domains.
- Projects may be undertaken individually or in groups of 2–4 students.
- The project should involve problem identification, requirement analysis, design, implementation, testing, and documentation.

Project Deliverables

1. Project Proposal
 - a) Title of the project
 - b) Problem statement
 - c) Objectives
 - d) Methodology
 - e) Expected outcomes
2. Project Report
 - a) Abstract
 - b) Introduction
 - c) Literature Review
 - d) System Design
 - e) Implementation Details
 - f) Results and Discussion
 - g) Conclusion and Future Scope
 - h) References
3. Project Demonstration

- a) Working prototype/model/software application
- b) Presentation of project outcomes

Evaluation Criteria

Component	Weightage (%)
Problem Definition and Innovation	10
Design and Methodology	10
Implementation and Functionality	10
Documentation and Report Quality	10
Presentation and Demonstration	10
Total	50

Expected Outcomes

Upon successful completion of Mini Project–I, students will be able to:

- Identify and formulate engineering problems.
- Apply AI and Data Science concepts to develop practical solutions.
- Work effectively in a team environment.
- Prepare technical reports and presentations.
- Demonstrate professional and ethical practices in project development.

Recommended Areas

- Machine Learning Applications
- Data Visualization and Analytics
- Chatbots and Virtual Assistants
- Recommendation Systems
- Predictive Analytics
- Image Processing
- Natural Language Processing
- Smart Automation Systems
- Healthcare Analytics
- Educational Technology Solutions

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Second Year B.Tech.			
	Semester-III (w.e.f.A.Y.2026-27)			
	Subject Name: Environmental Studies (26UA121901)			
Teaching B Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	1	1	ISE:	
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	
Total:	1	1	OE/POE:	
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Explain the nature, scope, and importance of environmental studies, including its multidisciplinary approach, need for public awareness, concepts of sustainability, and sustainable development goals in the Indian context.			L2
CO 2	Understanding the importance of ecological balance for sustainable development.			L2
CO 3	Understanding the impacts of developmental activities and mitigation measures.			L2
CO 4	Understand and realize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment			L2
CO 5	Understand the relevance and importance of the natural resources in the sustenance of life on earth and living standard			L2
Unit	Course Contents			No. of lectures (hrs.)
Unit1	Nature of Environmental Studies: Definition, scope and importance. Multidisciplinary nature of environmental studies Need for public awareness. Concept of sustainability. Sustainable development and its goals with Indian context			3
Unit 2	Natural Resources: Introduction, Renewable and non-renewable, Forest, water, mineral, food, energy and land resources, Individual and conservation of resources, Equitable use of resources			3
Unit 3	Ecosystems. Concept, Structure, Function, Energy flow, Ecological succession, Forest, grassland, desert and aquatic ecosystems - Introduction, characteristic features, structure and function			3
Unit 4	Biodiversity: Genetic, Species and ecological diversity, Bio Geographical classification of India, Value and hot spots, Biodiversity at global, national and local levels, Conservation of Biodiversity, Endangered and endemic species, Conservation of biodiversity.			3
Unit 5	Pollution: Definition, Causes, effects and control measures of the pollution Air, soil, Noise, Water, Marine and Thermal and Nuclear Pollution, Solid waste management, Role of Individual in Prevention of Pollution.			3
Text Books:				
1)	Environmental Studies E-Text Book (Marathi and English Medium) S U Kolhapur			

2)	A Textbook of Environmental Studies, January 2006 Ahmed Khan ABD Publishers
<i>Reference Books:</i>	
1)	Barouche, E., Textbook of environmental Studies , Universities Press(2005),ISBN-10:8173715408

CO-PO-PSO Mapping

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

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Second Year B.Tech.			
	Semester-III (w.e.f. A.Y. 2026-27)			
	Subject Name: Technical Aptitude-I(26UA121902)			
Teaching B Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	0	ISE:	
Tutorials:	-	-	ICA:	50 Marks
Practical:		-	ESE:	
Total:	2	0	OE/POE:	
Prerequisite				
- Basic knowledge of Mathematics (Algebra, Coordinate Geometry, and Calculus) - Fundamentals of Computer Programming and Computer Organization - Basic understanding of Data Representation and Database Concepts				
Course Objectives: For completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:				
1)	Understand the fundamental concepts of discrete mathematics, linear algebra, calculus, probability, and statistics relevant to data science and engineering applications.			
2)	Apply mathematical and statistical techniques for modeling, analyzing, and solving computational and engineering problems.			
3)	Understand the principles of database systems, relational models, and database design methodologies.			
4)	Develop skills in database querying, normalization, indexing, and data organization for efficient data management.			
5)	Apply data preprocessing, transformation, and data warehousing techniques for data analytics and decision-making applications.			
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Apply the concepts of propositional logic, predicate logic, sets, relations, functions, partial orders, and lattices to analyze and solve mathematical and engineering problems.			L3
CO 2	Apply appropriate data structures to solve computational and programming problems efficiently.			L3
CO 3	Apply linear search and binary search algorithms to efficiently locate data elements in different data structures.			L3
CO 4	Apply algorithm design paradigms and graph algorithms to develop efficient solutions for complex computational problems and network-based applications			L3
CO 5	Apply conditional statements, loops, functions, and recursion to develop Python programs for solving computational problems.			L3
Unit	Course Contents			No. of Lectures (hrs.)
Unit1	Engineering Mathematics Discrete Mathematics: Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Graphs, Combinatory: counting, recurrence relations,			5

	generating functions, Linear Algebra: Matrices, determinants, system of linear equations,.	
Unit 2	Programming and Data Structures Basic data structures: stacks, queues, linked lists, trees, hash tables .	5
Unit 3	Search algorithms: linear search and binary search, basic sorting algorithms: selection sort, bubble sort and insertion sort; divide and conquer: merge sort, quick sort	5
Unit 4	Introduction to Graph theory; basic graph algorithms: traversals and shortest path.	5
Unit 5	Programming in Python, Basics of Python programming Variables and data types, Input/Output operations, Operators and expressions Conditional statements (if, if-else),Loops (for, while),Functions and recursion Lists, tuples, sets, and dictionaries, Strings, Basic problem-solving using Python Implementation of data structures and algorithms in Python	5
Text Books		
1)	Data Structures Using C - Reema Thareja, Oxford University Press, 2nd Edition.	
2)	Introduction to Algorithms– Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, MIT Press, 4th Edition.	
3)	Discrete Mathematics and Its Applications – Kenneth H. Rosen, McGraw-Hill Education, 8th Edition.	
Reference Books:		
1)	Data Structures and Algorithm Analysis in C – Mark Allen Weiss, Pearson Education, 2nd Edition.	
2)	An Introduction to Database Systems– C. J. Date, Pearson Education, 8th Edition.	
3)	Computer Organization and Design: The Hardware/Software Interface – David A. Patterson and John L. Hennessy, Morgan Kaufmann Publishers (Elsevier), 5th Edition.	

CO-PO-PSO Mapping

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

**B.Tech Artificial
Intelligence and
Data Science
Engineering (S.Y.)
Semester- IV
Syllabus**

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Second Year B. Tech.			
	Semester-IV (w.e.f. A.Y. 2026-27)			
	Subject Name – Probability & Statistics (26UAI22106)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	3	3	ISE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Apply probability rules and Bayes’ theorem to solve practical probability problems.			L3
CO 2	Demonstrate random variable concepts and expectation to compute probabilities and variances.			L5
CO 3	Determine binomial, Poisson, and normal distributions to model and analyze real-world data.			L4
CO 4	Apply correlation techniques to evaluate relationships between variables in datasets.			L3
CO 5	Apply regression methods to develop predictive models and interpret outcomes.			L3
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Foundations of Probability Theory Probability, classical, empirical, and axiomatic approach of probability, addition theorem of probability, multiplication theorem of probability, Bayes’ theorem, numericals and applications of Bayes’ theorem.			7
Unit 2	Random Variables and Mathematical Expectation Random variables: discrete & continuous, probability mass function, probability density function, mathematical expectation, joint and marginal probability distributions, properties of expectation and variance.			7
Unit 3	Standard Probability Distributions Binomial distribution, Poisson distribution, Normal distribution, Fitting of binomial distributions, Properties of binomial, Poisson, and normal distributions, Relation between binomial and normal distributions, Relation between Poisson and normal distributions,			7

Unit 4	Correlation and Relationship Between Variables Correlation, Types of correlation, Methods of studying correlation: scatter diagram, Karl Pearson's correlation coefficient, Spearman's rank correlation coefficient, Properties of correlation coefficients, Probable errors, coefficient of determination, lag and lead correlation.	7
Unit 5	Regression Analysis and Predictive Modeling Regression, Linear and non-linear regression, Lines of regression: regression lines of y on x and x on y .Angle between regression lines, Coefficients of regression, properties of regression coefficient, regression equations for a bivariate frequency, correlation analysis vs. regression analysis.	7
Text Books:		
1)	S. C. Gupta, Fundamentals of Statistics, Himalaya Publishing House, 7 th Revised and Enlarged Edition, 2016.	
2)	G. V. Kumbhojkar Probability and Random Processes, C. Jamnadas and Co.14th Edition, 2010.	
3)	Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006	
Reference Books:		
1)	Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2010.	
2)	Murray Spiegel, John Schiller, R. ALU Srinivasan, Probability And Statistics, Schaum's Outlines, 4th Edition, 2013.	
3)	G. Haribaskaran; Probability, Queuing Theory and Reliability Engineering, Laxmi Publications, 2nd Edition, 2009.	

CO-PO-PSO Mapping

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



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Semester-IV (w.e.f. A.Y. 2025-26)

Subject Name: Data Analytics (26UAI22107)

Teaching Scheme:						Evaluation Scheme:	
	No. of Hrs./week	No. of Credits					
Lectures:	2	2	MSE:	30 Marks			
Tutorials:	-	-	ICA:	10 Marks			
Practical:	-	-	ESE:	60 Marks			
Total:	2	2	OE/POE:	-			
Course Outcomes: At the end of this course, students shall be able to						BL	
CO 1	Apply statistical concepts and methods for data collection, preparation, cleaning, and Exploratory data analysis, addressing bias and errors					L3	
CO 2	Compute and interpret descriptive statistics, measures of central tendency, spread, and distribution shape to summarize datasets					L3	
CO 3	Perform data transformation and standardization techniques to prepare data for statistical modeling and hypothesis testing					L3	
CO 4	Conduct classical statistical tests ,including Z-tests, t-tests, ANOVA, and non-parametric tests, to analyze and compare datasets.					L4	
CO 5	Interpret the results of statistical analyses, assess significance, and evaluate model robustness and validity for data-driven decision-making.					L5	
Unit	Course Contents					No. of lectures (hrs.)	
Unit 1	Unit 1: Statistical Data and Concepts The statistical methods, misuse, misinterpretation, and bias Sampling and sampling size, Data preparation and cleaning, Missing data and data errors, Exploratory Data Analysis, Statistical error, Statistical Modeling, Computational Statistics, Inference ,Bias, Cofounding, Hypothesis testing, Types of error, Statistical significance, Confidence Interval ,Power and robustness, Degrees of freedom, Non parametric analysis.					7	
Unit 2	Unit 2: Descriptive Statistics Descriptive Statistics: Counts and specific values, Measure of central tendency, Measure of spread, Measure of distribution shape, Statistical indices, Moments, Key functions, Measures of complexity and model selection.					5	
Unit 3	Unit 3: Data Transformation and Standardization Box-Cox and power transforms, Freeman-Tukey (square root and arcsine) transforms, Log and Exponential transforms, Logit transforms, Normal transform.					7	

Unit 4	Unit 4: Classical Tests and Contingency Tables Goodness of fit tests: Anderson-Darling, Chi-square test, Kolmogorov-Smirnov, Ryan-Joiner, Shapiro-Wilk, Jarque-Bera, Lilliefors. Z-test: Test of single mean, standard deviation known, Test of the difference between two means, standard deviation known, test for proportions. T-tests: Test of single mean, standard deviation not known, Test of the difference between two means, standard deviation not known, Test of regression coefficients	7
Unit 5	Unit 5: Analysis of Variance and Covariance Variance test: Chi-square test of single variable, F-test of two variables, test of homogeneity; Wilcoxon rank-sum/Mann-Whitney U test; Sign test. Contingency Tables: Chi-square contingency table test, contingency table test, Fisher's exact test, Measures of association, McNemar's test. ANOVA: Single factor or one way ANOVA, Two factor or two-way and higher-way ANOVA, MANOVA, ANCOVA; Non-Parametric ANOVA: Kruskal Wallis ANOVA, Friedman ANOVA test, Mood's median.	7
Text Books:		
1)	Dr. Michael J de Smith, Statistical Analysis Hand book: A Comprehensive Guide to Statistical Concepts, Methods and Tools, The Winchester Press, Drumlin Security Ltd, Edinburgh, 2018 edition. https://www.statsref.com/HTML/index.html	
2)	Dr. J. Ravichandran, Probability And Statistics For Engineers, First Edition, Wiley, 2010.	
Reference Books:		
1)	Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262 018020, 2013.	
2)	Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk from the Front line, O'Reilly. 2014	

CO-PO-PSO Mapping

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



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Second Year B. Tech.
Semester-IV (w.e.f. A.Y. 2026-27)
Subject Name: Programming in JAVA Lab (26UAI22108)

Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	ISE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	25 Marks

Course Outcomes: At the end of this course, students shall be able to		BL
CO 1	Explain the fundamentals of Java programming and object-oriented principles.	L2
CO 2	Develop Java programs using classes, inheritance, packages, and interfaces.	L3
CO 3	Implement exception handling, multithreading, and file handling techniques in Java applications.	L3
CO 4	Design GUI applications and database connectivity using Java APIs.	L4
CO 5	Create complete Java applications for solving real-world problems.	L5

Experiment List		
1.	Write a Java program to perform basic arithmetic operations and demonstrate the use of decision-making and looping statements.	2 hrs.
2.	Develop a Java program to implement arrays and string manipulation operations.	2 hrs.
3.	Write a Java program to demonstrate Object-Oriented Programming concepts such as classes, objects, constructors, method overloading, and method overriding.	2 hrs.
4.	Implement inheritance and polymorphism in Java using single, multilevel, and hierarchical inheritance.	2 hrs.
5.	Write a Java program to demonstrate abstract classes, interfaces, and packages.	2 hrs.
6.	Develop a Java program to implement exception handling using try-catch-finally blocks and user-defined exceptions.	2 hrs.
7.	Create a multithreaded Java application using the Thread class and Runnable interface to demonstrate thread synchronization.	2 hrs.
8.	Write a Java program to perform file handling operations using byte streams, character streams, and serialization.	2 hrs.
9.	Design a GUI application using AWT/Swing components and implement event handling.	2 hrs.
10.	Develop a database application using JDBC to perform CRUD (Create, Read, Update, Delete) operations.	2 hrs.

	Update, Delete) operations with a MySQL database	
<i>Text Books:</i>		
1.	Herbert Schildt, <i>Java: The Complete Reference</i> , McGraw-Hill Education, 12 th Edition, 2021.	
2.	E. Balagurusamy, <i>Programming with Java</i> , McGraw-Hill Education, 7 th Edition, 2020.	
<i>Reference Books:</i>		
1)	Cay S. Horstmann and Gary Cornell, <i>Core Java Volume I – Fundamentals</i> , Pearson Education, 12th Edition, 2022.	
2)	Cay S. Horstmann and Gary Cornell, <i>Core Java Volume II – Advanced Features</i> , Pearson Education, 12th Edition, 2022	
3)	Kathy Sierra and Bert Bates, <i>Head First Java</i> , O'Reilly Media, 3rd Edition, 2022.	
4)	Paul Deitel and Harvey Deitel, <i>Java How to Program</i> , Pearson Education, 11th Edition, 2018.	



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Second Year B. Tech.

Semester-IV (w.e.f. A.Y. 2026-27)

Subject Name: Database Management System(26UAI22109)

Teaching Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	3	3	ISE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

		BL
CO 1	Explain database concepts, architectures, and applications, and describe data storage, querying, and transaction management	L2
CO 2	Design database schemas using the Entity-Relationship (ER) model, apply constraints and keys, and convert ER diagrams into relational tables	L3
CO 3	Apply relational algebra operations to query and manipulate data in relational databases	L3
CO 4	Use SQL to create, modify, query, and manage databases, including joins, views, transactions, and integrity constraints	L3
CO 5	Evaluate and improve database designs using normalization techniques up to BCNF and Fourth Normal Form	L5

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture	7
Unit 2	Data Modelling using the Entity Relationship Model: ER model concepts, notation for ER diagram, constraints, keys, E-R diagrams, mapping cardinality, concepts of super key, candidate key, primary key, weak entity sets, Codd's rules, extended ER model, generalization, aggregation, reduction of an ER diagrams to tables.	7
Unit 3	Relational Data Model, Relational Algebra: Structure of relational databases, database schema, keys, relational algebra, fundamental operations, additional relational algebra operations, extended relational algebra operations	7
Unit 4	Introduction to SQL: Overview of SQL, SQL data definition, basic structure of SQL queries, additional basic operators, set operations, null values, aggregate functions, nested subqueries, modification of the database. Intermediate SQL: Join expressions, views, transactions, integrity constraints, SQL data types and schema, authorization. Advanced SQL: Assessing SQL from programming language, JDBC, ODBC, embedded SQL, functions and procedures, triggers.	8

Unit 5	Normalization: Features of good relational designs, functional dependencies, normal forms, first normal form, second normal form, third normal form, BCNF, functional dependencies. Dependency Theory, Multivalued Dependencies, Fourth Normal Form, Database Design Process.	7
<i>Text Books:</i>		
1)	Henry Korth, Abraham Silberschatz & S. Sudarshan, <i>Database System Concepts</i> , McGraw-Hill Publication, 6th Edition, 2011.	
<i>Reference Books:</i>		
1)	Raghu Ramakrishnan, Johannes Gehrke, <i>Database Management Systems</i> , McGraw-Hill Publication, 3rd Edition, 2003.	
2)	Joel Murach, <i>Murach's Oracle SQL and PL/SQL for Developers</i> , Mike Murach & Associates, 2nd Edition, 2014.	
3)	Wiederhold, <i>Database Design</i> , McGraw-Hill Publication, 2nd Edition, 1983.	



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Semester-IV (w.e.f. A.Y. 2026-27)

Subject Name: Database Management Lab(26UAI22110)

Teaching Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	-	-	ISE:	-
Tutorials:	-	-	ICA:	25
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	25

Course Outcomes: At the end of this course, students shall be able to

CO 1	Explain database concepts, architectures, and applications, and describe data storage, querying, and transaction management	2
CO 2	Design database schemas using the Entity-Relationship (ER) model, apply constraints and keys, and convert ER diagrams into relational tables	3
CO 3	Apply relational algebra operations to query and manipulate data in relational databases	3
CO 4	Use SQL to create, modify, query, and manage databases, including joins, views, transactions, and integrity constraints	3
CO 5	Evaluate and improve database designs using normalization techniques up to BCNF and Fourth Normal Form	5

Ex.	Experiment Details	No. of Ex. Sessions (hrs.)
Ex. 1	Defining a schema for applications.	2
Ex. 2	Creating tables, renaming tables, data constraints (primary key, foreign key, not null), data insertion into a table.	2
Ex. 3	Grouping data, aggregate functions, Oracle functions (mathematical, character functions).	2
Ex. 4	Sub-queries, set operations, joins.	2
Ex. 5	Creation of databases, writing SQL and PL/SQL queries to retrieve information from the databases.	2
Ex. 6	Assignment on triggers & cursors.	2
Ex. 7	Normal forms: first, second, third, and Boyce-Codd normal forms.	2
Ex. 8	Assignment in design and implementation of database systems or packages for applications such as office automation, hotel management, and hospital management.	2
Ex. 9	Deployment of forms, reports, normalization, and query processing algorithms in the above application project.	4

Ex. 10	Large objects – CLOB, NCLOB, BLOB, and BFILE.	4
<i>Text Books:</i>		
1.	Henry Korth, Abraham Silberschatz & S. Sudarshan, <i>Database System Concepts</i> , McGraw-Hill Publication, 6th Edition, 2011.	
<i>Reference Books:</i>		
1)	Raghu Ramakrishnan, Johannes Gehrke, <i>Database Management Systems</i> , McGraw-Hill Publication, 3rd Edition, 2003.	
2)	Joel Murach, <i>Murach's Oracle SQL and PL/SQL for Developers</i> , Mike Murach & Associates, 2nd Edition, 2014.	
3)	Wiederhold, <i>Database Design</i> , McGraw-Hill Publication, 2nd Edition, 1983.	

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	Second Year B. Tech.			
	Semester-IV (w.e.f. A.Y. 2026-27)			
	Subject Name: Frontend Development using HTML, CSS & JavaScript(27UAI22402)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	ISE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	2	2	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Analyze the concepts of Servlet and JSP			L4
CO 2	Analyze the Web services and frameworks			L4
CO 3	Apply the server-side technologies for web development			L3
CO 4	Analyze and create responsive user interfaces.			L4
CO 5	Design modern frontend applications using advanced JavaScript concepts and Frameworks.			L6
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Java Servlets and XML: Servlet: Servlet architecture overview, A “Hello World” servlet, Servlet generating dynamic content, Servlet life cycle, parameter data, sessions, cookies, URL rewriting, other Servlet capabilities, data storage, Servlets concurrency, databases (MySQL) and Java Servlets			8
Unit 2	JSP and Web Services: JSP: Introduction to Java Server Pages, JSP and Servlets, running JSP applications, Basic JSP, JavaBeans classes and JSP, Support for the Model-View-Controller paradigm, JSP related technologies. Web Services: Web Service concepts, writing a Java Web Service, Writing a Java web service client, Describing Web Services: WSDL, Communicating Object data: SOAP. Struts: Overview, architecture, configuration, actions, interceptors, result types, validations, localization, exception handling, annotations.			8
Unit 3	Server Side Scripting Languages :PHP: Introduction to PHP, uses of PHP, general syntactic characteristics, Primitives, operations and expressions, output, control statements, arrays, functions, pattern matching, form handling, files, cookies, session tracking, using MySQL with PHP, WAP and WML. Introduction to ASP.NET: Overview of the .NET Framework, Overview of C#,			8

	Introduction to ASP.NET, ASP.NET Controls, Web Services. Overview of Node JS.	
Unit 4	Advanced Frontend Development: ES6 Features, AJAX , Fetch API , JSON, handling, Responsive Design, Bootstrap/Tailwind CSS	6
Unit 5	Modern Frontend Applications: JavaScript Modules, SPA Concepts, React Basics, State Management, API Integration, Frontend Project Development	5
Text/Reference Books:		
1)	Web Design with HTML, CSS, JavaScript, and JQuery Set Book by JonDuckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas.	
2)	Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites by Robin Nixon.	
3)	Full-Stack JavaScript Development by Eric Bush	

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	Second Year B. Tech.		
	Semester-IV (w.e.f. A.Y. 2026-27)		
	Subject Name: Leadership Skills (26UOE22507)		
Teaching Scheme:			Evaluation Scheme:
No. of Hrs./week	No. of Credits		
3	3	MSE:	30 Marks
-	-	ICA:	10 Marks
-	-	ESE:	60 Marks
3	3	OE/POE:	-
Course Objectives:			
1.	Understand fundamentals of leadership and personal effectiveness.		
2.	Develop communication, teamwork and decision-making skills		
3.	Enhance leadership qualities for academic and professional success.		
4.	Apply ethical leadership practices in real-life situations.		
Course Outcomes: At the end of this course, students shall be able to			BL
CO1	Explain concepts and styles of leadership.		L2
CO2	Demonstrate self-leadership and personal effectiveness.		L3
CO3	Apply communication and teamwork skills.		L3
CO4	Use leadership techniques for decision making and problem solving.		L3
CO5	Practice ethical and responsible leadership.		L3
Course Contents			No. of lectures (hrs.)
Unit 1:	Introduction to Leadership-I Meaning, importance, qualities of leaders, leadership vs management, leadership styles. Activities: Self-assessment, reflection exercise.		7
Unit 2:	Introduction to Leadership-II Goal setting, time management, confidence building, positive attitude, personal branding. Activities: SWOT analysis.		7
Unit 3:	Communication & Teamwork Effective communication, listening, teamwork, collaboration, conflict handling. Activities: Group discussion and role play.		7
Unit 4:	Decision Making & Problem Solving Creative thinking, decision making, problem solving techniques, case studies. Activities: Case analysis.		7

Unit 5:	Ethical Leadership & Career Readiness Ethics, responsibility, leadership in organizations, entrepreneurship, career planning. Activities: Leadership development plan.	7
<i>Text Books:</i>		
1.	The 21 Irrefutable Laws of Leadership – John C. Maxwell	
2.	Leadership: Theory and Practice – Peter G. Northouse	
<i>Reference Books:</i>		
1.	The 7 Habits of Highly Effective People – Stephen Covey	
2.	Developing the Leader Within You – John C. Maxwell	
3.	Leaders Eat Last – Simon Sinek	
4.	Good to Great – Jim Collins	
5.	Start With Why – Simon Sinek	



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Semester-IV (w.e.f. A.Y. 2026-27)

Subject Name: Advanced Quantitative Ability (26UHS22806)

Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	1	1	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	1	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Apply concepts of work efficiency, time rates, team work, and pipes & cisterns to solve practical work-based problems.			L3
CO 2	Solve problems involving speed, distance, relative motion, trains, boats & streams, and escalators.			L3
CO 3	Solve commercial mathematics problems involving profit-loss, discounts, partnerships, MRP, and faulty weights.			L3
CO 4	Apply simple and compound interest concepts in financial calculations, population growth, and installment-based applications.			L3
CO 5	Use counting techniques, arrangements, selections, and probability concepts to solve analytical and real-life problems involving dice, cards, balls, and coins.			L3
Unit	Course Contents			No. of lectures (hrs.)
Unit 1	Time and Work Time and Work, concept of work efficiency, individual vs. team work, alternate days work schedules, Problems based on number of persons, combinations of two or more different types of persons, Useful results, Pipes and Cisterns.			3
Unit 2	Speed, Time and Distance Unit conversion, Average speed, Inter relation, Relative speed, Useful results, Problems on Trains, Problems on Boats and Streams.			3
Unit 3	Profit and Loss Definitions of cost price and selling price, calculation of markup and discount, successive discounts, and problems involving faulty weights, Partnership.			3

Unit 4	Simple Interest and Compound Interest Simple interest and compound interest, finding the difference between them over multiple years, population growth models, and installment schemes.	3
Unit 5	Permutation and Combinations, Probability Fundamental principle of counting, linear and circular arrangements, selection methods, permutations, combinations and distribution problems, Useful results, basic problems of probability based on Dice, Balls, Playing Cards, Coin.	3



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Semester-IV (w.e.f. A.Y. 2026-27)

Subject Name: Start-up Ecosystem (26UHS22809)

Teaching Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	2	2	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

BL

CO 1	Explain the fundamental concepts, characteristics, and importance of entrepreneurship in economic and social development	L2
CO 2	Identify business opportunities and generate innovative ideas to address real-world problems.	L2
CO 3	Understand the process of establishing and managing a new venture, including basic business planning concepts	L2
CO4	Demonstrate awareness of government schemes, startup support systems, incubation centers, and funding opportunities available for entrepreneurs.	L3
CO5	Develop an entrepreneurial mindset with skills related to creativity, innovation, leadership, teamwork, and risk-taking	L5

Unit

Course Contents

**No. of
Lectures (hrs.)**

Unit 1	Introduction to Entrepreneurship: Entrepreneur Vs Employee, characteristics of Entrepreneurs, Success Stories of Indian Entrepreneurs, Start-up Ecosystem in India	7
Unit 2	Business Opportunities: Identifying Problems and Opportunities, Idea Generation Techniques Local Business Opportunities, Innovation and Creativity	6
Unit 3	Basics of Business Planning: What is a Business Model? , Cost and Revenue Concepts, Value Proposition Simple Business Plan	6
Unit 4	Government Support & Funding Startup India, MSME Schemes, Mudra Loan, Incubation Centers	7

Text Book

1.	Entrepreneurship Development by S. S. Khanka
2.	Entrepreneurship Development and Small Business Enterprises by Poornima M. Charantimath.
3.	Entrepreneurship Development by C. B. Gupta and N. P. Srinivasan

4.	Entrepreneurship by Robert D. Hisrich, Michael P. Peters, and Dean A. Shepherd.
Reference Book	
1.	Innovation and Entrepreneurship is a 1985 book by management thinker Peter F. Drucker
2.	The Lean Startup by Eric Ries
3.	Zero to One by Peter Thiel with Blake Masters.
4.	Business Model Generation by Alexander Osterwalder and Yves Pigneur
5.	Start With Why: How Great Leaders Inspire Everyone to Take Action by leadership expert Simon Sinek.



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Semester-IV (w.e.f. A.Y. 2026-27)

Start-up for Ecosystem Lab (26UHS2280L)

Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	ISE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Understand the mindset and responsibilities of both roles and evaluate their entrepreneurial potential			L2
CO 2	Understand entrepreneurial journeys, success factors.			L3
CO 3	Learn opportunity recognition and startup support structures			L3
CO 4	Understand local market opportunities, business model design and aware of government support available for startups.			L3
Any Eight experiments from the following list				
Ex.	Experiment Details		No. of Ex. Sessions (hrs.)	
Ex. 1	Entrepreneur vs Employee Comparison		2	
Ex. 2	Identifying Entrepreneurial Characteristics		2	
Ex. 3	Case Study of an Indian Entrepreneur		2	
Ex. 4	Study of the Indian Startup Ecosystem		2	
Ex. 5	Problem Identification Survey		2	
Ex. 6	Idea Generation Workshop		2	
Ex. 7	Local Business Opportunity Analysis		2	
Ex. 8	Business Model Canvas Preparation		2	
Ex. 9	Cost, Revenue and Profit Estimation		2	
Ex. 10	Government Scheme and Funding Study		2	
Text Books:				
1)	Entrepreneurship Development by S. S. Khanka			
2)	Entrepreneurship Development and Small Business Enterprises by Poornima M. Charantimath			
3)	Entrepreneurship Development by C. B. Gupta and N. P. Srinivasan			
4)	Entrepreneurship by Robert D. Hisrich, Michael P. Peters, and Dean A. Shepherd.			
Reference Books:				
1)	Innovation and Entrepreneurship is a 1985 book by management thinker Peter F. Drucker			
2)	Business Model Generation by Alexander Osterwalder and Yves Pigneur			
3)	Start With Why: How Great Leaders Inspire Everyone to Take Action by leadership expert Simon Sinek.			
4)	Disciplined Entrepreneurship by Bill Aulet			



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Second Year B. Tech.

Semester-IV (w.e.f. A.Y. 2026-27)

Subject Name: Professional Ethics (26UHS22810)

Teaching Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	1	1	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	1	1	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

BL

CO 1	Explain the basic concepts of ethics and professional responsibility	L2
CO 2	Identify ethical issues and apply ethical principles in decision-making.	L3
CO 3	Demonstrate professional behavior, integrity, and accountability in workplace situations	L3
CO4	Understand the social, environmental, and professional responsibilities of engineers	L2
CO5	Develop an ethical mindset and commitment towards sustainable and responsible engineering practices	L5

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Introduction to Ethics Meaning and Importance of Ethics, Values, Morals, and Ethics, Personal and Professional Ethics, Ethical Decision-Making	4
Unit 2	Engineering Profession and Responsibilities Role of Engineers in Society, Professional Responsibilities, Accountability and Integrity, Code of Professional Conduct	4
Unit 3	Workplace Ethics Teamwork and Professional Relationships Workplace Discipline and Etiquette, Conflict of Interest, Respect, Diversity, and Inclusion	4
Unit 4	Ethics, Society, and Sustainability Social Responsibility, Environmental Ethics, Sustainable Development, Case Studies on Ethical Issues in Engineering	4

Text Books

1.	<i>Professional Ethics and Human Values</i> by R. S. Naagarazan
2.	Professional Ethics by R. Subramanian
3,	<i>Engineering Ethics: Concepts and Cases</i> by Charles E. Harris Jr., Michael S. Pritchard, and Michael J. Rabins

Reference Book

1.	Ethics in Engineering is a textbook by Mike W. Martin and Roland Schinzinger
2.	Human Values and Professional Ethics by A. Alavudeen, R. Kalil Rahman, and M. Jayakumaran
3,	The Seven Habits of Highly Effective People is a self-help and leadership book by Stephen R. Covey,
4.	Professional Ethics and Human Values by M. Govindarajan, S. Natarajan, and V. S. Senthil Kumar.

	FABTECH EDUCATION SOCIETY'S FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)			
	Second Year B. Tech.			
	Semester-IV (w.e.f. A.Y. 2026-27)			
	Professional Ethics Lab (26UHS22810L)			
Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	-	-	ISE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	-
Course Outcomes: At the end of this course, students shall be able to				BL
CO 1	Identify personal values and apply professional engineering codes of conduct to ensure workplace accountability.			L3
CO 2	Analyze ethical dilemmas, conflicts of interest, and engineering failures to propose justified, ethical solutions.			L4
CO 3	Evaluate the social, environmental, and safety impacts of engineering projects and sustainable practices.			L5
CO 4	Demonstrate professional communication, teamwork, leadership, and disciplined behavior in workplace scenarios.			L3
CO 5	Assess and promote workplace diversity, gender equality, and inclusive environments using data-driven surveys.			L5
Any Eight experiments from the following list				
Ex.No.	Experiment Details		No. of Ex. Sessions (hrs.)	
Ex. 1	Identifying Personal Values and Ethical Principles		2	
Ex. 2	Ethical Decision-Making Using Case Scenarios		2	
Ex. 3	Role of Engineers in Society		2	
Ex. 4	Study of Professional Code of Conduct		2	
Ex. 5	Teamwork and Professional Communication Activity		2	
Ex. 6	Workplace Ethics Role Play		2	
Ex. 7	Conflict of Interest Analysis		2	
Ex. 8	Diversity and Inclusion Survey		2	
Ex. 9	Environmental Ethics and Sustainable Engineering Study		2	
Ex. 10	Case Study on Ethical Issues in Engineering		2	
Text Books:				
1)	Professional Ethics and Human Values by R. S. Naagarazan			
2)	Professional Ethics by R. Subramanian			
3)	Engineering Ethics: Concepts and Cases by Charles E. Harris Jr., Michael S. Pritchard, and Michael J. Rabins.			

<i>Reference Books:</i>	
1)	Ethics in Engineering is a textbook by Mike W. Martin and Roland Schinzinger
2)	Human Values and Professional Ethics by A. Alavudeen, R. KalilRahman, and M. Jayakumaran
3)	The Seven Habits of Highly Effective People is a self-help and leadership book by Stephen R. Covey.
4)	Professional Ethics and Human Values by M. Govindarajan, S. Natarajan, and V. S. Senthil Kumar



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Second Year B. Tech.

Semester-IV (w.e.f. A.Y. 2026-27)

Subject Name: Constitution of India(26UHS22903)

Teaching Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	2	2	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

BL

CO 1	Explain the historical background, sources, features, and key provisions of the Indian Constitution, including citizenship, fundamental rights, duties, and directive principles	L2
CO 2	Describe the structure, roles, and functions of the Union and State governments, and analyze the relationship between the Centre and States.	L4
CO 3	Interpret the organization and functioning of local self-government institutions and evaluate their role in strengthening grassroots democracy	L5
CO4	Analyze the functions of the Election Commission and other constitutional bodies related to the welfare of marginalized Communities and women.	L4

Unit	Course Contents	No. of Lectures (hrs.)
Unit 1	Introduction: Constitution' meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive, Principles of State Policy.	5
Unit 2	Union Government and its Administration: Structure of the Indian Union: Federalism, Centre- State, relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central ecretariat, Lok Sabha, Rajya Sabha.	6
Unit 3	State Government and its Administration Governor: Role and Position, CM and Council of Ministers, State Secretariat: Organization, Structure and Functions.	6
Unit 4	Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected, Representative, CEO of Municipal Corporation, Pachayati Raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.	7

Unit 5	Election Commission: Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.	5
Text Books		
1.	Sastry, T. S. N., (2005). India and Human Rights: Reflections, Concept Publishing Company India (P Ltd.).	
2.	Nirmal, C.J., (1999). Human Rights in India: Historical, Social and Political Perspectives (Law in India), Oxford India.	
Reference Book		
1.	Ethics in Engineering is a textbook by Mike W. Martin and Roland Schinzinger.	
2.	Human Values and Professional Ethics by A. Alavudeen, R. Kalil Rahman, and M. Jayakumaran	
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Second Year B.Tech.

Semester-IV (w.e.f.A.Y.2025-26)

Subject Name: Technical Aptitude-II(26UHS22904)

Teaching B Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:		2	ISE:	
Tutorials:	-	-	ICA:	50 Marks
Practical:		-	ESE:	
Total:		2	OE/POE:	

Course Outcomes: At the end of this course, students shall be able to

BL

CO 1	Apply the concepts of propositional logic, predicate logic, sets, relations, functions, partial orders, and lattices to analyze and solve mathematical and engineering problems.	L3
CO 2	Apply the concepts of calculus, probability, and statistics to analyze functions, solve Optimization problems, evaluate probabilities, and interpret statistical data in engineering applications.	L3
CO 3	Apply probability distributions and statistical measures to analyze uncertainty, interpret data, and solve engineering and real-world decision-making problems.	L3
CO 4	Explain the fundamentals of database systems, ER modeling, and relational data models for designing structured databases.	L2
CO 5	Apply data preprocessing and transformation techniques such as normalization, discretization, sampling, and compression for data preparation.	L3

Unit

Course Contents

**No. of
lectures
(hrs.)**

Unit1	Engineering Mathematics Discrete Mathematics: Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Graphs, Combinatory: counting, recurrence relations, generating functions, Linear Algebra: Matrices, determinants, system of linear equations.	5
Unit 2	Calculus: Functions of a single variable, limit, continuity and differentiability, Taylor series, maxima and minima, optimization involving a single variable.	5
Unit 3	Probability and Statistics Counting (permutation and combinations), probability axioms, Sample space, events, independent events, mutually exclusive events, marginal, conditional and joint probability, Bayes Theorem, conditional expectation and variance, mean, median, mode and standard deviation	5
Unit 4	Database Management and Warehousing: ER-model, relational model: relational algebra, tuple calculus, SQL, integrity constraints, normal form, file organization,	5
Unit 5	Database : Indexing, data types, data transformation such as normalization, discretization, sampling, compression; data warehouse modeling: schema for multidimensional data models, concept hierarchies, measures: categorization and computations	5

Text Books

1.

Discrete Mathematics and Its Applications – McGraw-Hill Education.

<i>Reference Books:</i>	
1	Advanced Engineering Mathematics – Wiley India.
2	Fundamentals of Digital Logic with Verilog Design – McGraw-Hill.
3.	Henry Korth, Abraham Silberschatz & S. Sudarshan, <i>Database System Concepts</i> , McGraw-Hill Publication, 6th Edition, 2011.