



Teaching and Evaluation Scheme for Academic Year 2024-25
 Program: Information Technology
 S.Y. B. Tech. Information Technology (Semester – III) NCrF Level: 5 w.e.f. 2025-26

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme						
				L	T	P	Contact Hrs/wk		Theory			Practical		Total	
									CIE			ESE	CIE		ESE
									T-I	T-II	ISE				
1	01ITPCL201	Statistics and Fuzzy Logic	PCC	2	1	-	2	3	20	20	10	50	-	-	100
2	01ITPCL202	Computer Network	PCC	3	-	-	3	3	20	20	10	50	-	-	100
3	01ITPCL203	Discrete Mathematical Structure	PCC	2	-	-	2	2	20	20	10	50	-	-	100
4	01ITOEL120X	Open Elective -01	OE	3	-	-	3	3	20	20	10	50	-	-	100
5	01ITLMDX201	Multi-disciplinary Minor - 01	MDM	3	-	-	3	3	20	20	10	50	-	-	100
6	01ITVEL205	Universal Human Values	VEC	2	--	--	2	2	--	--	--	---	50	---	50
7	01ITPCP206	Object Oriented Programming	PCC	2	-	2	3	3	-	-	-	-	50	50	100
8	01ITPCP207	Computer Network	PCC	-	-	2	2	1	-	-	-	-	25	50	75
9	01ITFPP208	Field Project	FP	-	-	4	4	2	-	-	-	-	25	50	75
		Total		17	-	8	24	22	100	100	50	250	150	150	800+100*
Mandatory Courses (Audit Courses)															
10	1ITMCP251	Environment Studies	MC	2	--	--	--	--				50	50		100

	BSC/ESC		Program Courses		Multidisciplinary Courses		Vocational and Skill Enhancement Course	Humanities Social Science and Management (HSSM)				Experiential Learning Courses				Liberal Learning Courses
Course Category	BSC	ESC	PCC	PEC	MDM	OE	VSEC	AEC	Entrp /Mgmt	IKS	VEC	RM	CEP/FP	Proj	Int /OJT	CC
Last Sem Cumulative Sum	16	15	03	--	--	--	02	02	--	02	--	--	--	--	--	04
Semester Credits	--	--	12	--	03	03	--	--	--	--	02	--	02	--	--	--
Cumulative Sum	16	15	15	--	03	03	02	02	--	02	02	--	02	--	--	04

PROGRESSIVE TOTAL CREDITS: 44+22=66



Dr.J.J.MagdumTrust's
Dr. J. J. Magdum College of Engineering, Jaysingpur.
 (An Autonomous Institute)

Teaching and Evaluation Scheme for Academic Year 2024-25
 Program: Information Technology
 S.Y. B. Tech. Information Technology (Semester – IV) NCrf Level: 5 w.e.f. 2025-26

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme						
									Theory			Practical		Total	
									CIE			ESE	CIE		ESE
				L	T	P	Contact Hrs/wk		T-I	T-II	ISE				
1	01ITPCL209	Computer Organization & Architecture	PCC	2	-	-	2	2	20	20	10	50	-	-	100
2	01ITPCL210	Theory of Computation	PCC	3	-	-	3	3	20	20	10	50	-	-	100
3	01ITPCL211	Software Engineering	PCC	2	-	-	2	2	20	20	10	50	-	-	100
4	01ITLMDX202	Multi-disciplinary Minor - 02	MDM	2	-	-	2	2	20	20	10	50	-	-	100
5	01ITLOE220X	Open Elective -02	OE	2	-	-	2	2	20	20	10	50	-	-	100
6	01ITAEL212	Language Enhancement	AEC	1	-	2	3	2	-	-	-	-	25	-	25
7	01ITVEL213	Human Resources Management	VEC	2	-	-	2	2	-	-	-	-	25	-	25
8	01ITEEL214	Digital Marketing	EEMC	2	--	--	2	2	--	--	--	--	25	--	25
9	01ITPCP215	Java Programming	PCC	1	-	2	2	2	-	-	-	-	50	50	100
10	01ITPCP216	Mini Project-I	PCC	--		2	2	1	--	--	--	--	25	25	50
11	01ITVEP217	Web Development-I	VSEC	1	-	2	3	2	-	-	-	-	25	50	75
		Total		18	-	8	26	22	100	100	50	250	175	125	800

	BSC/ESC		Program Courses		Multidisciplinary Courses		Vocational and Skill Enhancement Course	Humanities Social Science and Management (HSSM)				Experiential Learning Courses				Liberal Learning Courses
Course Category	BSC	ESC	PCC	PEC	MDM	OE	VSEC	AEC	Entrp /Mgmt	IKS	VEC	RM	CEP/FP	Proj	Int /OJT	CC
Last Semester Cumulative Credits	16	15	15	--	03	03	02	02	--	02	02	--	02	--	--	04
Semester Credits		--	10	--	02	02	02	02	02	--	02	--	--	--	--	--
Cumulative Sum	16	15	25	--	05	05	04	04	02	02	04	--	02	--	--	04

PROGRESSIVE TOTAL CREDITS: 66+22=88

Dr J J Magdum College of Engineering, Jaysingpur
Information Technology Engineering
SY- B.Tech -SEM-III

Course Name: Statistics and Fuzzy Logic

Course Details: : 01ITL201

Class		S.Y. B.Tech.		Semester		III	
Course Title		Statistics and Fuzzy Logic		Course Code		Theory: 01ITL201	
						Practical:--	
Prerequisites: Knowledge of preliminary statistics							
Teaching scheme:		Theory Hours:	02	Practical Hours:	--	Tutorial Hours:	01
		Credits:	03	Credits:	--	Credits:	--
Evaluation scheme & Marks							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
20	20	10	50	--	--	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
PCC-ITL201.01	To examples on Lines of Regression.
PCC-ITL201.02	To learn the curve fitting.
PCC-ITL201.03	To introduce the core principles of fuzzy logic, including fuzzy sets, membership functions.
PCC-ITL201.04	To equip students with the ability to represent uncertainty using fuzzy numbers and perform arithmetic operations while considering degrees of uncertainty.
PCC-ITL201.05	To understand and solve examples on Binomial Distribution, Fitting of Binomial Distribution, Poisson, Distribution, Fitting of Poisson Distribution
PCC-ITL201.06	To understand and solve examples on assignment problem.

Course Outcomes:

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

Sr No.	Course Outcomes	Levels of Attainment as per Revised Bloom's Taxonomy
PCC-ITL201.01	C01. solve problems on Lines of Regression	3
PCC-ITL201.02	C02. solve on problems curve fitting.	3
PCC-ITL201.03	C03. construct different fuzzy sets using basic definitions of fuzzy sets.	3
PCC-ITL201.04	C04. use the extension principle on fuzzy numbers/sets to develop arithmetic operations.	3
PCC-ITL201.05	C05. solve problems on Probability Distribution	3
PCC-ITL201.06	C06. solve Assignment problem.	3

Course Contents

Unit Number	Unit Title	Hours	Course Outcome No.	Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Unit Title: Lines of Regression. Lines of Regression of bivariate data, correlation using lines of Regression, Lines of Regression by using standard deviation.	6	C01	3
Unit-02	Unit Title: Curve Fitting Fitting of Curves by method of Least-squares: Fitting of Straight lines. Fitting of second degree Parabolic curves. Fitting of Exponential Curve.	6	C02	3

Unit-03	Unit Title: Introduction to Fuzzy sets. Basic concepts of Fuzzy Sets, Crisp Set and Fuzzy Set , Membership Functions, Basic operations on fuzzy sets , Properties of fuzzy sets.	6	C03	3
Unit-04	Unit Title: Fuzzy Arithmetic Fuzzy Numbers, Fuzzy Cardinality, Operations on Fuzzy Numbers , Fuzzy Equations of Type $A + X: B$ and $A.X: B$, $A+B$ & $A- B$, $A.B$ for discrete fuzzy set.	6	C04	3
Unit-05	Unit Title: Probability Distribution Binomial Distribution, Fitting of Binomial Distribution, Poisson, Distribution, Fitting of Poisson Distribution	6	C05	3
Unit-06	Unit Title: Assignment Problem Balanced Assignment Problem Hungarian Method Unbalanced Assignment Problem Assignment problem of maximization	6	C06	3

TextBooks/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1.	Text	A text book of Applied Mathematics	Vol.I by P. N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune	6	2024
2.	Text	Higher Engineering Mathematics by	Dr. B. S. Grewal,	Khanna Publishers, Delhi.	42	2020

3.	Text	Fuzzy Sets & Fuzzy Logic Theory and Applications.	George J. Klir and Bo Yuan	PHI Learning Private.		
4.	Reference	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley India Pvt. Ltd	10	2011
5.	Reference	Advanced Engineering Mathematics	H. K. Dass	S. Chand, New Delhi	23	2024
6.	Reference	Operations Research	S. D. Sharma	Kedar Nath Ram Nath Publisher;	2020	2020

Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	Website Name	URL	Units Covered
1	NPTL	https://onlinecourses.nptel.ac.in/noc23_ma77/preview	1
2	NPTL	https://onlinecourses.nptel.ac.in/noc24_ma37/preview	3,4

Examination Scheme and Guidelines:

T-I :20 Marks	Examination of 20 marks based on Units1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. One question of 05 Marks based on MCQ"s compulsory.
T-I : 20 Marks	Examination of 20 marks based on Units4, 5and 6 should be conducted, and marks should be communicated to the Exam Cell. One questionof05 Marks based on MCQ"s compulsory.
ISE :10 Marks	ISE/CA –In Semester Evaluation/Continuous Assessment
ESE :50 Marks	ESE-End Semester Examination
	Que.1:MCQ"s based on All Units (Carries06 Marks)
	Que.2:based on Unit1,2,3 (Carries11 Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)

	Que.4:based on Unit4,5,6 (Carries11 Marks)
	Que.5:based on Unit4,5,6 (Carries11 Marks)

Course Name: Computer Networks**Course Details:**

Course Details:						
Class		SY		Semester		III
Course Title		Computer Network		Course Code		Theory: 01ITPCL202
						Practical: 01ITPCP207
Prerequisites:						
Teaching scheme:		Theor y Hours :	3	Practical Hours:	2	Tutorial Hours: -----
		Credits:	3	Credits:	1	Credits: -----
Evaluation scheme						
Theory				Practical		Total
T-I	T-II	ISE	ESE	CIE	ESE	
20	20	10	50	25	50	125

Course Objectives:

The course aims to:

Sr. No.	Course Objectives
PCC-01ITL202.01	To provide knowledge about local area networks, types of computer networks.
PCC-01ITL202.02	To understand computer network protocols and wireless protocols.
PCC-01ITL202.03	To understand functionalities of different layers
PCC-01ITL202.04	To provide knowledge about internet layer protocol
PCC-01ITL202.05	To provide knowledge about routing protocol and functionality of application layer

Course Outcomes:

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

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
01ITPCL202.01	Explain the functionalities of different network, communication & different layer of OSI & TCP/IP	L2

	models.	
01ITPCL202.02	Categorize the types of transmission media	L2
01ITPCL202.03	Explain the data link layer concepts, design issues & protocols.	L3
01ITPCL202.04	Describe network layer of OSI model & select an appropriate routing strategy/ addressing scheme to design a network	L3
01ITPCL202.05	Describe transport layer with its functionality.	L3
01ITPCL202.06	Explain application layer of OSI model	L3

Course Contents			
Unit Number	Unit Title	Hours	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Unit Title: Fundamentals of communication 1.1 Introduction to data communications 1.2 Data and signals : digital & analog signals 1.3 Transmission impairment 1.4 Transmission Modes- Parallel and Serial 1.5 Network Representations and Topologies 1.6 Network Technology 1.7 Rules for communication 1.8 Multiplexing & switching 1.9 Network Models – OSI, TCP/IP, Data Encapsulation Data Access 1.10 Protocol & Standards	07	L2
Unit-02	Unit Title : Physical layer & Ethernet 2.1 Purpose of the Physical Layer 2.2 Transmission media: - Guided and Unguided media 3 Network Hardware components 2.4 wireless media 2.5 Ethernet – Ethernet Frame	05	L2
Unit-03	Unit Title : Data Link Layer & Medium Access Control 3.1 Purpose of data link layer 3.2 Error detection & correction: cyclic codes, hamming code 3.3 Data Link Control : Framing, Error & flow control 3.4 Sliding Window Protocol – Stop & wait, Go-Back N, Selective repeat protocol 3.5 MAC- Channel allocation Problem 3.6 MAC Protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA	06	L3
Unit-04	Unit Title : Network Layer & Addressing 4.1 Network Layer Characteristics		

	4.2 IPv4 Address Structure 4.3 Types of IPv4 Addresses 4.4 Network Segmentation 4.5 Subnet an IPv4 Network 4.6 IPv4 Issues 4.7 IPv6 Address Representation 4.8 IPv6 Address Types 4.9 ICMP messages and message formats 4.10 Functions of a Router: Forwarding and Routing, NAT 4.11 Routing algorithms: Shortest path routing, Flow-based routing, Distance Vector Routing	08	L3
Unit-05	Unit Title : Transport Layer 5.1 Transportation of Data 5.2 TCP Overview 5.3 UDP Overview 5.4 Port Numbers 5.5 TCP Communication Process 5.6 Reliability and Flow Control 5.7 UDP Communication	05	L3
Unit-06	Unit Title : Application Layer 6.1 Name space 6.2 Domain Name Space 6.3 Distribution of Name Space 6.4 DNS in the Internet 6.5 Resolution 6.6 DNS message 6.7 Remote Login (SSH) 6.8 Electronic mail 6.9 FTP 6.10 WWW 6.11 HTTP	05	L3

Text Books/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Text	Data communication and networking	Behrouz A Forouzan	The McGraw Hill	4th Edition	2007
2.	Reference	Computer Networks	A. S. Tenenbaum	PHI	3rd Edition	1996
3	Reference	Data and Computer communications	William Stallings	Pearson Education	8th Edition	2007
4	Reference	Data communication and Computer Networks	- Ajit Pal	PHI Learning	Eastern Economy Edition	2014

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	Network Academy (Cisco)	https://www.netacad.com	1 -6
2	Tutorials point	https://www.tutorialspoint.com/data_communication_computer_network	1-6

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Suggested List of Practical/Experiment for CIE/ESE:

- Minimum 10 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic /Design/Advanced/Mini/ Minor Projects/ Seminar/ Case Studies)	Experiment Title	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Basic	Install Cisco Packet Tracer on Windows	L2
2.	Basic	Study and demonstration of LAN, WAN and various connecting devices and components. List out component and devices required for a std. LAN, WAN	L3
3.	Basic	Implementation of framing using one of different framing techniques.	L3
4.	Basic	Implementation of Error Detecting Code (CRC).	L3
5.	Basic	Implementation of Error Correcting Code (Hamming Code).	L3
6.	Basic	Write a program to understand IP classfull addressing	L3
7.	Basic	Study of basic network command and Network configuration commands	L3
8.	Basic	Implementation of shortest path algorithm	L3
9.	Design	Implementation of Client-Server Programs Using Iterative UDP Server	L3

10.	Design	Implementation of Client-Server Programs Using Iterative TCP Server	L3
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Examination Scheme and Guidelines:

T1 20 Marks	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
T2 20 Marks	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
ISE 10 Marks	ISE/CA -In Semester Evaluation/Continuous Assessment
CIE (Practical) (25/50 Marks)	Continuous Assessment ,As per institute policy

Course Name: Discrete Mathematical Structure**Course Details:**

Class:		S.Y.B.Tech		Semester: -		III	
Course Title		Discrete Mathematical Structure		Course Code:		Theory: 01ITPCL203	
						Practical: --	
Prerequisites:				Basic Mathematical Skills			
Teaching scheme:		Theory Hours:	02/week	Practical Hours:	--	Tutorial Hours:	--
		Credits:	02	Credits:	--	Credits:	--
Evaluation scheme & Marks							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
20	20	10	50	--	--	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
PCC-04 - 1ITL203.01	To provide a solid foundation in mathematical logic and set theory, enabling students to analyze and interpret statements, tautologies, logical equivalences, and set operations for problem-solving in computer science applications
PCC-04 - 1ITL203.02	To develop understanding of relations and functions, including equivalence relations, partial ordering, and composition, with emphasis on their application in data organization and discrete structures.
PCC-04 - 1ITL203.03	To introduce algebraic structures like groups, monoids, lattices, and posets, helping students understand their properties, homomorphisms, and isomorphisms for structuring abstract data models.
PCC-04 - 1ITL203.04	To equip students with the concepts of graph theory, including paths, circuits, graph coloring, and representation, enabling them to model and solve real-world problems involving networks and relationships

Course Outcomes:

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

Sr. No.	Course Outcome (CO)Statement	Bloom's Taxonomy Level
PCC-04 - 1ITL203.01	Apply principles of mathematical logic, set theory, relations, and functions to analyze and design solutions for computing problems.	Level 3
PCC-04 - 1ITL203.02	Demonstrate understanding of algebraic structures and lattices and apply these concepts in the development of abstract models and system designs.	Level 2, 3
PCC-04 - 1ITL203.03	Utilize graph theory concepts such as paths, circuits, and graph coloring to model networks and solve problems related to computer science and engineering.	Level 3
PCC-04 - 1ITL203.04	Analyze and apply principles of discrete structures to support algorithm design, formal language processing, and automata theory in computational systems.	Level 4

Course Contents				
Unit Number	Unit Title	Hours	Course Outcome No.	Bloom's Taxonomy Level
	Unit Title: Mathematical Logic			
Unit-01	1.1 Statement and Notation, Logical Connectives 1.2 Truth Tables, Tautologies 1.3 Principle of Duality, Well-formed Formulas 1.4 Logical Equivalences 1.5 Inference of Theory for Statement Calculus 1.6 Validity using Truth Table, Rules of Inference	6	CO1	Level 1,2
	Unit Title: Sets			
Unit-02	1.1 Set definitions, Different types of sets (finite, infinite, equal, null, singleton, universal etc.) 1.2 Operations on sets (union, intersection, difference, complement), Venn diagrams	4	CO1	Level 1, 2

	1.3 Ordered pairs, Cartesian product of two sets 1.4 Principle of Inclusion and Exclusion			
	Unit Title: Relations & Function			
Unit-03	1.1 Definition of relation, Types of relation (reflexive, symmetric, transitive, etc.) 1.2 Domain and range of a relation, Composition of relations 1.3 Equivalence relations and partitioning 1.4 Partial ordering relations Definition of function, Composition of functions, Inverse functions	4	CO2	Level 2,3
	Unit Title: Lattice			
Unit-04	1.1 Partially Ordering (Poset): Definition, examples 1.2 Properties of Posets, minimal/maximal elements 1.3 Hasse Diagrams: Construction, interpretation 1.4 Introduction to Lattices: basic concepts, examples	4	CO2	Level 3
	Unit Title: Algebraic Structures			
Unit-05	1.1 Semi Groups, Monoid, 1.2 Groups, subgroups, 1.3 Homomorphism 1.4 Isomorphism	4	CO3	Level 3 ,4
	Unit Title: Graph Theory			
Unit-06	1.1 Basic Terminology, 1.2 Multi graph and weighted graphs, 1.3 Diagraphs and relations, 1.4 Representation of graphs, 1.5 Paths and circuits, Eulerian and Hamiltonian 1.6 Paths and Circuits, Graph Coloring	6	CO4	Level 3, 4

Textbooks/Reference Books:

Sr. No.	Type	Name of the Book	Author(s)	Publisher	Edition	Year
1	Textbook	Discrete Mathematical Structures with Applications to Computer Science	J.P. Tremblay, R. Manohar	McGraw-Hill; Rainbow-Bridge Book Co.	1st	1975
2		Discrete Mathematics and its Applications	Kenneth H. Rosen	McGraw-Hill Education	8th	2019 (8th ed.)
3		Elements of Discrete Mathematics	C.L. Liu	McGraw-Hill (Tata McGraw-Hill for India)	2nd	1977 (ed.2 ~1985)
4		Discrete Mathematics	Seymour Lipschutz, Marc Lipson	McGraw-Hill (Schaum's Outline Series)	3rd	2007 (3rd ed.)
5		Discrete Mathematical Structures	Bernard Kolman, Robert C. Busby	Pearson (Prentice Hall)	5 th /6 th	2004 (5th ed.) / 2009 (6th ed.)
6	Reference	Discrete Mathematics for Computer Scientists and Mathematicians	J.L. Mott, A. Kandel, T.P. Baker	Prentice Hall	2nd	1986 (2nd ed.)
7		Introduction to Graph Theory	Narsingh Deo	Prentice Hall / Dover Publications	1st	1974

Online References: Coursera /NPTEL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	NPTEL (Discrete Mathematics)	https://nptel.ac.in/courses/111106086	Unit 01,02,03,04, 05
2	Coursera (Discrete Mathematics Specialization)	https://www.coursera.org/specializations/discrete-mathematics	Unit 01,02,03,06
3	Brilliant.org (Discrete Mathematics)	https://brilliant.org/courses/discrete-mathematics/	Unit 01,02,03,06
4	Khan Academy (Discrete Math basics)	https://www.khanacademy.org/computing/computer-science/cryptography	Unit 01,02
5	Geeks for Geeks (Discrete Mathematics tutorial)	https://www.geeksforgeeks.org/discrete-mathematics/	All Units (01 to 06)
6	NPTEL -Graph Theory	https://nptel.ac.in/courses/111104078	Unit 06

Evaluation Scheme and Guidelines:

T-I 20 Marks	Examination of 20 marks based on Units1, 2, and 3 should be conducted, and marks should be communicated to the ExamCell. One question of 05 Marks based on MCQ's compulsory.
T-I 20 Marks	Examination of 20 marks based on Units4, 5and 6 should be conducted, and marks should be communicated to the Exam Cell. One questionof05 Marks based on MCQ's compulsory.
ISE 10 Marks	ISE/CA –In Semester Evaluation/Continuous Assessment
ESE 50 Marks	ESE-End Semester Examination
	Que.1:MCQ's based on All Units (Carries06 Marks)
	Que.2:based on Unit1,2,3 (Carries16 Marks)
	Que.3:based on Unit1,2,3 (Carries16 Marks)
	Que.4:based on Unit4,5,6 (Carries16 Marks)
	Que.5:based on Unit4,5,6 (Carries16 Marks)

Course Name: Business Law

Course Details:

Course Details:						
Class		S.Y. B. Tech		Semester		III
Course Title		Business Law		Course Code		Theory: 01ITOEL120X
						Practical:
Prerequisites:						
Teaching scheme:	Theory Hours:	02	Practical Hours:	-	Tutorial Hours:	-
	Credits:	03	Credits:	-	Credits:	-
Evaluation scheme & Marks						
Theory				Practical		Total
T-I	T-II	ISE	ESE	CIE	ESE	
20	20	10	50			100

Course Objectives:

The course aims to:

Sr No.	Course Objectives
OE-ITOEL1205.01	Provide a foundational understanding of the Indian Contract Act and related commercial laws.
OE-ITOEL1205.02	Explain the essential elements for the formation, performance, and discharge of valid contracts.
OE-ITOEL1205.03	Examine legal provisions related to consent, capacity, consideration, and legality of object in contract law.
OE-ITOEL1205.04	Discuss special types of contracts such as indemnity, guarantee, bailment, pledge, agency, and quasi-contracts.
OE-ITOEL1205.05	Familiarize students with the legal framework of partnerships, LLPs, and the sale of goods and negotiable instruments.

Course Outcomes:

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

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
OE-ITOEL1205.01	Define and classify various types of contract and explain the essentials of a valid contract.	L2
OE-ITOEL1205.02	Interpret legal rules related to offer, acceptance, capacity of parties, free consent, and consideration in contract formation.	L3
OE-ITOEL1205.03	Analyze the legality of object, performance, discharge, and remedies for breach of contract through case-based scenarios.	L4
OE-ITOEL1205.04	Apply legal concepts related to special contracts such as indemnity, guarantee, bailment, pledge, and agency in practical contexts.	L3
OE-ITOEL1205.05	Examine the legal structure, mutual relations, and dissolution process of partnerships and limited liability partnerships.	L4
OE-ITOEL1205.06	Evaluate the rights, duties, and liabilities of parties under the Sale of Goods Act and the Negotiable Instruments Act.	L5

Course Contents

Unit Number	Unit Title	Hours	Course Outcome No.	Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Essentials of a contract: 1.1 Contract An overview, Classification of contracts, Essentials of a valid contract. 1.2 Offer and acceptance: Offer, Acceptance, Communication of offer and acceptance, Revocation of offer and acceptance.	06	C01	L2

	1.3 Capacity of parties: Who can enter into a contract, Position of minor, 1.4 Agreement by persons of unsound mind. 1.5 Persons disqualified by law.			
Unit-02	Free consent: 2.1 Introduction, meaning of consent Concepts of free consent Coercion, 2.2 Undue influence Distinction between coercion and undue influence Fraud 2.3 Misrepresentation, distinction between fraud and misrepresentation Mistake. 2.4 Consideration and Legality of object: Consideration, Legal Rule for valid consideration, 2.5 Stranger to a contract and stranger to consideration, 2.6 Adequacy of consideration, Legality of Agreement without consideration & Agreements opposed to public policy.	07	C02	L3
Unit-03	Performance and discharge: 3.1 Introduction, meaning of performance, Types of performance, Performance of reciprocal promises, Modes of discharge of a contract. 3.2 Breach of contract, Remedies for breach contract Quasi contract, quantum meruit 3.3 Indemnity and guarantee 3.4 Rights of a surety, Discharge of surety from liability 3.5 Bailment, Pledge.	05	C03	L4
Unit-04	Contract of agency:	06	C04	L3

	4.1 Contract agency, creation agency classifications, Scope authority, substituted agent. 4.2 Agency Ratification Rights, Duties, liabilities termination agency, irrevocable agency Partnership 4.3 Registration of Partnership Mutual relations of partners, property of the firm, property of the firm, Relations of the partners. 4.4 Position of incoming and outgoing. 4.5 Dissolutions of partnership firm and models Consequences of dissolution of firm.			
Unit-05	Limited liability partnership: 5.1 Nature of limited liability partnership Meaning of contract sale, Sale and hire purchase agreement types of goods 5.2 Conditions and warranty Meaning and significance, 5.3 Meaning and significance, Rules transform ownership 5.4 Delivery to carriers, reservation of right of dispersal, sale by nonowners.	06	C05	L4
Unit-06	Rights of an unpaid seller : 6.1 Meaning, rights, goods unpaid seller Rights of the buyer, auction sales 6.2 Negotiable instrument meaning and essentials, 6.3 Capacity and liabilities of various parties Holder 6.4 Promissory note 6.5 Bills of exchange, Hundies, cheque Negotiation models, assignments,	06	C06	L5

	6.6 Liability, Fraud			
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Text Books/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Text Book	Business Law	M.C.Kuchhal, and Vivek Kuchhal,	Vivek publishing house, New Delhi	9 th	2024
2	Reference Book	Business law	Avatar singh	Eastern book company, Lucknow.	12 th	2023
3	Reference Book	Business law	S. N Maheshwari and SK Maheswari,	National Publishing	1 st	2017
4	Reference Book	Business law	P. C. Tulasian and Bharath Tulaian,	McGraw Hill Education	3 th	2014

Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	Website Name	URL	Units Covered
1	NPTL	https://onlinecourses.swayam2.ac.in/nou25_cm10/preview	All

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines:

T-I 20 Marks	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
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T-II 20 Marks	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. One question of 05 Marks based on MCQ"s compulsory.
ISE 10 Marks	ISE/CA -In Semester Evaluation/Continuous Assessment
ESE 50 Marks	ESE-End Semester Examination
	Que.1: MCQ"s based on All Units (Carries 06 Marks)
	Que.2: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.3: based on Unit 1,2,3 (Carries 11 Marks)
	Que.4: based on Unit 4, 5, 6 (Carries 11 Marks)
	Que.5: based on Unit 4, 5, 6 (Carries 11 Marks)

Course Name: Universal Human Values**Course Details:**

Class	S.Y. B.Tech.			Semester	III		
Course Title	Universal Human Values			Course Code	Theory: 01ITVEL205		
					Practical:		
Prerequisites:							
Teaching scheme:	Theory Hours:	1 Hr/ week	Practical Hours:	-	Self-Study	1 Hr/ week	
	Credits:	1	Credits:	-	Credits:	1	
Evaluation scheme							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
--	--	--	--	50	--	50	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
01ITVEL205.01	Appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
01ITVEL205.02	Development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
01ITVEL205.03	Highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

Course Outcomes:

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

Sr No.	Course Outcomes	Revised Bloom's Taxonomy
01ITVEL205.01	Explain the concepts of right understanding, happiness, and prosperity and their relevance to holistic development.	L2
01ITVEL205.02	Distinguish between the needs of the Self and the Body and analyze their interrelationship for achieving harmony.	L4
01ITVEL205.03	Illustrate the foundational values of trust and respect and analyze their role in ensuring harmony in relationships.	L3,L4

01ITVEL205.04	Describe the concept of harmony in nature and interpret co-existence among the four orders of nature.	L2,L4
01ITVEL205.05	Apply the principles of human values and ethics in real-life situations and examine their role in professional conduct.	K ³ , K ⁴

Course Contents			
Unit Number	Unit Title	Hours	Revised Bloom's Taxonomy
Unit-01	Introduction to Value Education Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations	3	L2
Unit-02	Harmony in the Human Being Understanding Human being as the Co-existence of the Self and the Body, distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health	3	L3
Unit-03	Harmony in the Family and Society Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order	3	L4
Unit-04	Harmony in the Nature/Existence Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence	7	L4
Unit-05	Implications of the Holistic Understanding – a Look at Professional Ethics Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics Holistic Technologies, Production Systems and	5	L2

	Management Models-Typical Case Studies, Strategies for Transition towards Value-based Life and Profession		
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Text Books/Reference Books:

Sr. No	Book Type (Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Text	The Textbook A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Asthana, G P Bagaria,	Excel Books, New Delhi	2nd	2019
2	Text	The Teachers Manual for A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Asthana, G			
3	Reference	Fundamentals of Ethics for Scientists & Engineers	E G Seebauer & Robert L. Berry	Oxford University Press		2000

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	You Tube	https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw	ALL
2	Website	https://fdp-si.aicte-india.org/8dayUHV_download.php	ALL

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Evaluation Scheme:

CIE (50 Marks)	• Continuous Assessment, as per institute policy 25 Marks • MCQ (multiple choice questions) for 25 Marks can be conducted
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Course Title: Object Oriented Programming

Course Details:

Class		S.Y		Semester		III	
Course Title		Object Oriented Programming		Course Code		Theory: 01ITPCP206	
						Practical: 01ITPCP206	
Prerequisites:				Basic Knowledge of Programming Concepts, Understanding of Procedural Programming.			
Teaching scheme:		Theory Hours:	2/week	Practical Hours:	2/week	Tutorial Hours:	-
		Credits:	3	Credits:	3	Credits:	-
Evaluation scheme							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
-	-	-	-	50	50	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
PCC-ITP206.01	To introduce the basic principles of Object-Oriented Programming (OOP)
PCC-ITP206.02	To enable students to implement programs using classes and objects
PCC-ITP206.03	To teach students how to design and implement reusable, modular, and flexible software solutions using the principles of inheritance and polymorphism in C++
PCC-ITP206.04	To teach students the use of file handling, exception handling, and advanced features of C++ for efficient programming.

Course Outcomes:

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

Sr No.	Course Outcomes	Levels of Attainment as per Revised Bloom's Taxonomy
PCC-ITP206.01	Understand basic programming structure and OOP principles in C++.	L2
PCC-ITP206.02	Apply class and object concepts to design simple applications in C++.	L3

PCC-ITP206.03	Develop solutions using inheritance for code reusability and flexibility.	L4
PCC-ITP206.04	Implement code using function overloading for flexible program design.	L4
PCC-ITP206.05	Use file handling concept to build robust and reusable code.	L3
PCC-ITP206.06	Apply exception handling mechanisms and Standard Template Library (STL) components to develop efficient and robust C++ programs.	L3

	Course Contents			
Unit Number	Unit Title	Hours	Course Outcome No.	Cognitive Levels Bloom's Taxonomy
Unit-01	Unit Title: Introduction to - Object Oriented Programming 1.1: Introduction to OOP, Need, Applications, Differences between Procedural and Object-Oriented Programming 1.2: Basic concepts of OOP: Object, Class, Encapsulation, Abstraction, Inheritance, Polymorphism 1.3: Structure of a C++ program, Execution flow of Program, Datatypes, Tokens, Variables(static, const.), input/output (cin, cout), operators 1.4: Control structures (if, switch, loops)	5	CO1	L2
Unit-02	Unit Title: Classes and Objects 2.1: Defining classes and creating objects 2.2: Access Specifiers (public, private, protected), member function & data members, function prototypes, functions with default arguments, inline functions, static function 2.3: Array of objects, passing objects to functions, returning object, Pointer to object, Pointer to data members 2.4: Constructor and destructor, its types	7	CO2	L3
Unit-03	Unit Title: Inheritance 3.1: Introduction, Need of Inheritance, public, private, protected inheritance, Types of inheritance: single, multilevel, multiple, hierarchical, hybrid. 3.2: Constructor and destructor in derived classes 3.3: Virtual base class 3.4: Overriding of member functions 3.5: Friend function and friend function.	7	CO3	L4
Unit-04	Unit Title: Polymorphism 4.1: Need of Polymorphism, concept 4.2: Compile time polymorphism: function overloading and operator overloading, operator overloading using member function and friend function, overloading - unary, binary, relational operators,	6	CO4	L4

	Overloading new and delete operators, insertion and extraction operators 4.3: Runtime polymorphism using virtual functions 4.4: Pointers basics of memory management, New and delete operators			
Unit-05	Unit Title: File Handling 5.1: Concept of Streams, concept of File 5.2: File operations: opening, reading, writing, closing files 5.3: file modes, reading and writing characters, strings and objects to the file 5.4: file pointer & their manipulation- i.e seekg, seekp, tellg, tellp.	5	CO5	L3
Unit-06	Unit Title: Advanced C++ features 6.1 Abstract class and pure virtual function, Exception handling: try, catch, throw blocks, Multiple Exceptions 6.2: Introduction to Generic Programming using Templates: Function template and class template, 6.3: Introduction to Standard Template Library (STL), Vectors, Lists, Stacks, Queues, and Maps 6.4: Iterators and algorithms	6	CO6	L3

Text Books/Reference Books:

Sr. No	Book Type(Text /Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Text Book	C++: The Complete Reference Fourth Edition	Herbert Schildt	(McGraw-Hill)	Fourth Edition	December 2002
2	Text Book	C++ Programming with language	Bjarne Stroustrup	Addison-Wesley	Fourth Edition	2013
3	Reference Book	Object Oriented Programming with C++	E Balguruswamy	(McGraw-Hill)	Eighth Edition	September 24, 2020

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	Swayam-NPTEL	https://onlinecourses.nptel.ac.in/noc25_cs34/preview	5 units
2	Project of Govt. Of India	http://www.spoken-tutorial.org/NMEICT	All units

Suggested List of Practical/Experiment for CIE/ESE:

- Minimum 10 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic / Design / Advanced / Mini / Minor Projects / Seminar / Case Studies)	Experiment Title	Cognitive levels as per Bloom's Taxonomy
1.	Basic	Write a C++ program to demonstrate class and object creation	CO2
2.	Design	Implement a program using constructors (default, parameterized, copy)	CO2
3	Design	Implementation of Multiple and multilevel inheritance using virtual base class	CO3
4	Basic	Write a program to demonstrate function overloading and inline functions	CO4
5	Basic	Write a program using virtual functions and overriding	CO4
6	Basic	Create abstract classes and pure virtual functions	CO4
7	Basic	Program using pointer to object	CO2
8	Design	Use friend function and friend class to access private members	CO3
9	Basic	Demonstrate array of objects and static data members	CO2
10	Design	Implement a program for file read/write operations	CO5
11	Design	Demonstrate exception handling using try, catch, throw	CO6
12	Design	Implement a program using STL	CO6

Examination Scheme and Guidelines :(Sample)

CIE (Practical) (50 Marks)	Continuous Assessment ,As per institute policy
ESE (Practical) (50 Marks)	ESE-End Semester Examination (Practical)

Course Name: Environmental Studies**Course Details:**

Class:	S.Y.B.Tech.	Semester:	III			
Course Title	Environmental Studies	Course Code:	Theory: 1ITMCP251			
			Practical:			
Prerequisites: Basic Science Knowledge, Geography, General Awareness, Observation and Critical Thinking, Data Interpretation, Environmental Sensitivity and Responsibility and Ethical Thinking.						
Teaching scheme:	Theory Hours:	--	Practical Hours:	02	Tutorial Hours:	02
	Credits:	--	Credits:	02	Credits:	02
Evaluation scheme						
Theory				Practical		Total
T-I	T-II	ISE	ESE	CIE	ESE	
--	--	--	50	50	--	100

Course Objectives:

The course aims to:

Sr No.	Course Objectives
1ITMCP251.01	To introduce the scope, importance, and multidisciplinary nature of Environmental Studies, helping students understand the relationship between humans and the environment.
1ITMCP251.02	To explore various types of natural resources, their uses, associated problems, and the importance of sustainable management.
1ITMCP251.03	To provide foundational knowledge on ecosystems and biodiversity, highlighting their structure, function, and significance, and to raise awareness about threats to biodiversity and conservation strategies.
1ITMCP251.04	To examine different types of environmental pollution, their causes, effects, and control measures, and to understand major social issues and policies related to environmental protection.
1ITMCP251.05	To promote hands-on learning through environmental field projects, enabling students to observe, analyze, and report on real-life environmental issues and propose sustainable solutions.

Course Outcomes:

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

Sr No.	Course Outcomes	Levels of Attainment as per Revised Bloom's Taxonomy
1ITMCP251.01	Explain the scope and significance of Environmental Studies and demonstrate an understanding of the interconnectedness between human activities and the environment	L2
1ITMCP251.02	Identify various natural resources, describe their uses and associated challenges, and analyze the need for sustainable resource management practices.	L4
1ITMCP251.03	Describe the structure and functions of ecosystems, classify biodiversity types, and evaluate threats to biodiversity along with conservation strategies.	L5
1ITMCP251.04	Analyze the sources, effects, and control measures of major types of pollution and assess the role of environmental policies and social movements in addressing environmental issues.	L4
1ITMCP251.05	Design and execute a basic environmental field project, involving data collection, interpretation, and presentation of findings to propose feasible environmental solutions.	L6

Course Contents				
Unit Number	Unit Title	Hours	Course Outcome No.	Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Unit Title: Nature of Environmental Studies. 1.1 Definition, scope and importance of Environment. Structure of Environment. 1.2 Need for public awareness. Sustainable Development.	02	CO1	L2
	Unit Title: Natural Resources and Associated Problems 1.1 Introduction, types of Natural Resources. Forest resources: Use and over exploitation, deforestation, Dams: Benefits and its effects. 1.2 Water resources: Use and over - utilization of surface and ground Water, Floods, drought. 1.3 Mineral resources: Usage and exploitation, environmental effects of			

Unit-02	extracting and using mineral resources. Renewable Energy Resources. 1.4 Food Resources: World Food Problems, Changes caused by Modern Agriculture Practices (Fertilizers ,Pesticides Problems) 1.5 Land resources: Land as a resource, Man induced landslides, soil erosion Role of an individual in conservation of natural resources.	05	CO2	L2
Unit-03	Unit Title: Ecosystem /Ecology 1.1 Introduction of Ecosystems, Structure and function of an ecosystem. Producers, consumers and decomposers. 1.2 Food chains, food webs. Energy flow in the ecosystem. 1.3 Ecological pyramids.	03	CO3	L2
Unit-04	Unit Title: Biodiversity & Its Conservation 1.1 Introduction & Types of Biodiversity (Genetic, Species and Ecosystem) 1.2 Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic, National values, India as a mega-diversity nation 1.3 Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Hot-spots of biodiversity. 1.4 Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	04	CO4	L5
Unit-05	Unit Title: Environmental Pollution, Social Issues & Environmental 1.1 Definition of Environmental Pollution, Causes, Effects and Control measures of Air Pollution. 1.2 Water Pollution, Marine Pollution, Soil Noise Pollution. 1.3 Global Warming, Acid Rain. Ozone layer Depletion, 1.4 Solid waste Management (causes, Effects and Control measures of Urban & Industrial waste) Role of an individual in prevention of pollution 1.5 Disaster management: Floods, Earthquake, landslides.	CO105	CO5	L3

Unit-06	Environmental Field Project – Key Activities: Topic Selection: Choose a relevant environmental issue (e.g., water pollution, waste management, biodiversity, air quality). Site Visit / Field Observation: Visit a local area such as a forest, lake, industrial site, park, landfill, or village. Observe and document environmental conditions. Data Collection: Use surveys, interviews, sampling, photography, and GPS mapping. Collect data on pollution levels, species diversity, waste generation, etc. Interaction with Stakeholders: Talk to local residents, authorities, farmers, workers, or NGOs to gather insights. Data Analysis: Interpret findings using charts, graphs, and tables. Identify patterns, problems, and possible causes. Solution-Oriented Approach: Suggest practical, sustainable, and low-cost solutions or improvements. Report Preparation: Compile observations, analysis, and solutions in a structured report. Include photos, maps, and references. Presentation / Viva: Present the findings to classmates or faculty. Answer questions and reflect on learning outcomes.	05	C05	L6
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Text Books/Reference Books:

Sr. No	Book Type	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
01	Text Books	Textbook of Environmental Studies for Undergraduate Courses	Erach Bharucha	Orient BlackSwan	2nd Edition	2013
02		Environmental Studies	R. Rajagopalan	Oxford University Press	3rd Edition	2016
03		Environmental Science: Toward a Sustainable Future	Richard T. Wright, Dorothy F. Boorse	Pearson Education	13th Edition	2021
04		Principles of Environmental Science: Inquiry and Applications	William P. Cunningham, Mary Ann Cunningham	McGraw Hill Education	9th Edition	2020

05		Environmental Studies	Benny Joseph	McGraw Hill Education	3rd Edition	2017
06		Environment: Problems and Solutions	D.K. Asthana, Meera Asthana	S. Chand Publishing	5th Revised Edition	2018
07		Environmental Science	G. Tyler Miller Jr., Scott Spoolman	Cengage Learning	16th Edition	2020
08		Fundamentals of Environmental Studies	S. Arora	Kalyani Publishers	1st Edition	2015
09		Environmental Studies	Anubha Kaushik, C.P. Kaushik	New Age International Publishers	5th Edition	2019
10		Environmental Studies	Dr.P.D.Raut	Shivaji University, Kolhapur	6th Edition	2014
11	Reference Books	Environmental Chemistry	A.K. De	New Age International Publishers	9th Edition	2018
12		Ecology and Environment	P.D. Sharma	Rastogi Publications	Revised Edition	2020
13		Introduction to Environmental Engineering and Science	Gilbert M. Masters, Wendell P. Ela	Pearson Education	3rd Edition	2013
14		Environmental Pollution Control Engineering	C.S.Rao	New Age International Publishers	3rd Edition	2007
15		Environmental Management	Dr.S.N.Chatterjee	Katson Books	Revised Edition	2015

Online References: Coursera /NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
01	Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India	https://moef.gov.in	Units 2, 4, 5 (Natural resources, Policies, Field-based data)
02	ENVIS – Environmental Information System	http://envis.frlht.org	Units 1, 3 (Biodiversity, Environment basics)
03	United Nations Environment Programme (UNEP)	https://www.unep.org	Units 3, 4 (Global pollution, conservation, sustainability)
04	Centre for Science and Environment (CSE), India	https://www.cseindia.org	Units 2, 4, 5 (Pollution, Environmental laws, Water & air)
05	National Biodiversity Authority (NBA), India	https://nbaindia.org	Unit 3 (Biodiversity, Conservation policies)

06	India Biodiversity Portal	https://indiabiodiversity.org	Unit 3, 5 (Species data, Field projects)
07	Sustainable Development Goals – UN	https://sdgs.un.org/goals	Unit 1, 4 (Global sustainability, Social issues)
08	Pollution Control Boards (CPCB/SPCBs)	https://cpcb.nic.in	Unit 4 (Pollution types, standards, control)

List of Environmental Field project Report (ISE) :

Sr. No.	Name of Subject
01	Survey of Local Biodiversity (Flora and Fauna)
02	Water Quality Assessment of Nearby River/Lake
03	Study of Noise Pollution Levels in Urban Areas
04	Air Pollution Monitoring Near Traffic Zones
058	Study of Noise Pollution Levels in Urban Areas
06	Composting Organic Waste at Institutional Level
07	Awareness Campaign on Plastic Waste Reduction
08	Mapping and Survey of Local Water Bodies
09	Tree Plantation Drive and Carbon Sequestration Estimation
10	Study of Medicinal Plants in the Local Area
11	Rainwater Harvesting Feasibility Study
12	Study of Energy Consumption in Campus/Community
13	E-Waste Collection and Management Survey
14	Soil Quality Analysis from Agricultural Fields
15	Visit and Report on a Wildlife Sanctuary/National Park
16	Study of Local Climate Change Indicators
17	Field Study of a Wetland Ecosystem
18	Household Survey on Environmental Awareness
19	Analysis of Groundwater Quality in Different Areas
20	Eco-Friendly Lifestyle Practices in Community
21	Study of Mangrove or Coastal Ecosystem (if applicable)

22	Environmental Impact Assessment (EIA) of a Small Construction Site
23	Study of Local Transportation and Its Carbon Footprint
24	Biodiversity Index Calculation in a Green Campus
25	Wastewater Treatment Plant Visit and Process Analysis
26	Analysis of Effects of Deforestation in Nearby Area
27	Survey on Use of Renewable Energy in Households
28	Green Audit of School/College Campus
29	Documentation of Traditional Environmental Knowledge
30	Community-Based River or Lake Cleaning Drive

Evaluation Scheme and Guidelines:

T-I 20 Marks	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. ☐ One question of 05 Marks based on MCQ"s compulsory.
T-II 20 Marks	Examination of 20 marks based on Units 4, and 5 should be conducted, and marks should be communicated to the Exam Cell. ☐ One question of 05 Marks based on MCQ"s compulsory.
ISE 10 Marks	ISE-Continuous Assessment of Environmental Field Project based on Units 1-5.
CIE (50 Marks)	Continuous Assessment ,As per institute policy

Course Name: Computer Organization & Architecture

Course Details:

Class		SY- B.Tech		Semester		IV	
Course Title		Computer Organization & Architecture		Course Code		Theory: 01ITPCL209	
						Practical: -	
Prerequisites:				Number systems, Logic Gates, Combinational and Sequential Circuits.			
Teaching scheme:		Theory Hours:	2	Practical Hours:	-	Tutorial Hours:	-
		Credits:	2	Credits:	-	Credits:	-
Evaluation scheme & Marks							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
20	20	10	50	-	-	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
PCC-ITPCL209.01	To introduce the fundamental concepts of digital logic design
PCC-ITPCL209.02	To enable students to understand and construct sequential circuits
PCC-ITPCL209.03	To impart knowledge of computer architecture and system organization
PCC-ITPCL209.04	To explore instruction execution, control unit operations, and pipelining.
PCC-ITPCL209.06	To examine memory hierarchy and I/O operations in computer systems

Course Outcomes:

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

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's

		Taxonomy
PCC-ITPCL209.01	Analyse and design basic combinational logic circuit	L4
PCC-ITPCL209.02	Develop sequential logic circuits using flip-flops and counters.	L6
PCC-ITPCL209.03	Explain the architecture and functional organization of a computer system.	L2
PCC-ITPCL209.04	Analyse instruction execution and control unit operations.	L5
PCC-ITPCL209.05	Evaluate memory systems and data transfer techniques.	L5

Course Contents

Unit Number	Unit Title	Hours	Course Outcome No.	Cognitive Levels of Bloom's Taxonomy
Unit-01	Fundamentals of Logic Design 1.1 Half & Full Adder and subtractor, High speed adders-- A 4-bit carry-look ahead adder 1.2 Four bit ripple carry adder, Design of 4-bit magnitude comparator 1.3 Introduction to Multiplexers and Demultiplexers, Encoders & Decoders. 1.4 Sequential Circuits: Introduction to Flip Flops: SR, JK, D, T, master slave flip flop, Truth Table. 1.5 Flip-Flop conversion, Counter Design.	04	CO1	L1

Unit-02	Overview of Computer Architecture & Organization 2.1 Introduction of Computer Organization and Architecture. 2.2 Basic organization of computer and block level description of the functional units. 2.3 Evolution of Computers, Von Neumann model. Performance measure of Computer Architecture, 2.4 Amdahl's Law Architecture of 8086 Family, 2.5 Instruction Set, Addressing Modes, Assembler Directives, 2.6 Mixed Language Programming, Stack, Procedure, Macro.	05	CO1	L1
Unit-03	Processor Organization and Architecture: 3.1 CPU Architecture, Instruction formats, basic instruction cycle with Interrupt processing. 3.2 Instruction interpretation and sequencing. 3.3 Control Unit: Soft wired (Microprogrammed) and hardwired control unit design methods. Microinstruction sequencing and execution. 3.4 Micro operations, concepts of nano programming.	06	CO2	L2

	Introduction to parallel processing concepts, 3.5 Flynn's classifications, instruction pipelining, pipeline hazards.			
Unit-04	Data Representation and Arithmetic Algorithms: 4.1 Booth's algorithm. 4.2 Division of integers: Restoring and non-restoring division, signed division, 4.3 basics of floating-point representation 4.4 IEEE 754 floating point (Single & double precision) number representation.	04	C03	L4
Unit-05	Memory Organization : 5.1 Introduction to Memory and Memory parameters. 5.2 Classifications of primary and secondary memories. 5.3 Types of RAM and ROM, Allocation policies, Memory hierarchy and characteristics. 5.4 Cache memory: Concept, architecture, mapping techniques. 5.5 Cache Coherency, Interleaved and Associative memory.	05	C04	L4
Unit-06	I/O Organization :	04	C05	L3

	6.1 Input/output systems, I/O module-need & functions.			
	6.2 Types of data transfer techniques: Programmed I/O, Interrupt driven I/O and DMA.			

Text Books/Reference Books:

Sr. No	Book Type	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Text Books	Modern Digital Electronics	R. P. Jain	TMH	5 th	2022
2		Computer Organization	Carl Hamacher, Zvonko Vranesic and Safwat Zaky	Tata McGraw-Hill.	5 th	2001
3		Computer Organization and Architecture: Designing for Performance	William Stallings	Pearson	8 th	2009
4	Reference Book	Computer Architecture and Organization	John P. Hayes	McGraw-Hill	3 rd	2002
5		Computer Architecture and Organization: Design Principles and Applications.	B. Govindarajulu	Tata McGraw-Hill	2 nd	2010
6		Digital Principals & Applications	Donald P Leach, Albert Paul Malvino	TMH	8 th	2014

Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	Website Name	URL	Units Covered
1	SWAYAM-NPTEL	https://onlinecourses.nptel.ac.in/noc25_cs154/preview	1,2,3,4

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines:

T-I 20 Marks	Examination of 20 marks based on Units1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. One question of 05 Marks based on MCQ's compulsory.
T-II 20 Marks	Examination of 20 marks based on Units4, 5and 6 should be conducted, and marks should be communicated to the Exam Cell. One questionof05 Marks based on MCQ's compulsory.
ISE 10 Marks	ISE/CA –In Semester Evaluation/Continuous Assessment
ESE 50 Marks	ESE-End Semester Examination
	Que.1:MCQ's based on All Units (Carries06 Marks)
	Que.2:based on Unit1,2,3 (Carries11 Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)
	Que.4:based on Unit4,5,6 (Carries11 Marks)
	Que.5:based on Unit4,5,6 (Carries11 Marks)

Course Name: Theory of Computation

Course Details:

Class		S.Y. B.Tech.		Semester		IV	
Course Title		Theory of Computation		Course Code		Theory: 01ITPCL210	
						Practical: --	
Prerequisites:				Knowledge of discrete mathematical structures			
Teaching scheme:		Theory Hours:	03/week	Practical Hours:	--	Tutorial Hours:	--
		Credits:	03	Credits:	--	Credits:	--
Evaluation scheme & Marks							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
20	20	10	50	--	--	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
01ITPCL210.01	To introduce fundamentals of computer mathematics.
01ITPCL210.02	To strengthen the students' ability to carry out formal and higher studies in computer science.
01ITPCL210.03	To explain Grammar, Languages and their relationships.
01ITPCL210.04	To develop Automata design ability as language descriptors and recognizers

Course Outcomes:

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

Sr No.	Course Outcomes	Levels of Attainment as per Revised Bloom's Taxonomy
PCC-ITL210.01	Understand the fundamental concepts of formal languages, grammars, and regular expressions used in computer science.	L2
PCC-ITL210.02	Describe deterministic and nondeterministic finite automata, and apply state minimization techniques.	L3

PCC-ITL210.03	Apply and simplify context-free grammars (CFGs), and perform transformations using BNF, CNF, and other grammar operations.	L3
PCC-ITL210.04	Understand the structure, behavior, and equivalence of Pushdown Automata (PDA), and convert between PDA and CFG.	L2
PCC-ITL210.05	Analyze parsing methods and formal properties of context-free languages, including closure properties and the pumping lemma.	L4
PCC-ITL210.06	Apply the foundational concepts of Turing Machines to model computation, recognize languages, and simulate multi-tape and universal TMs.	L3

Course Contents				
Unit Number	Unit Title	Hours	Course Outcome No.	Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Unit Title: Regular Languages 1.1 Recursive Definitions 1.2 Definition & Types of Grammars & Languages 1.3 Regular Expressions and Corresponding Regular Languages 1.4 Examples and Applications 1.5 Union, Intersection & Complements of Regular Languages	6	CO1	L2
Unit-02	Unit Title: Finite State Machines 2.1 Definition and representation of DFA 2.2 Nondeterministic finite automata (NFA) 2.3 NFA with $\wedge$ transitions 2.4 Equivalence of DFAs, NFAs and NFA- $\wedge$ s	6	CO2	L3

	2.5 minimum state FA for a regular language 2.6 Minimizing number of states in an FA.			
Unit-03	Unit Title: Grammars and Languages 3.1 Derivation and ambiguity, 3.2 BNF & CNF notations, 3.3 Union, Concatenation and *'s of CFLs, 3.4 Eliminating production & unit productions from CFG, 3.5 Eliminating useless variables from a context Free Grammar.	6	CO3	L3
Unit-04	Unit Title: Push Down Automata 4.1 Definition, The Language of PDA, 4.2 Deterministic PDA and Non Deterministic PDA, 4.3 Acceptance by Final state and empty stack, 4.4 Equivalence of PDA's 4.5 CFG- CFG to PDA 4.6 PDA to CFG	6	CO4	L2
Unit-05	Unit Title: Parsing & Properties of CFL's 5.1 Parsing – Top-Down, 5.2 Recursive Descent and 5.3 Bottom-Up Parsing, 5.4 Pumping lemma for Context free language, 5.5 intersection and complement of Context free language	6	CO5	L4

Unit-06	Unit Title: Turing Machines	6		
	6.1 Models of computation, 6.2 definition of Turing Machine as Language acceptors, 6.3 combining Turing Machines, 6.4 Computing a function with a TM, 6.5 Turing machines with doubly-infinite tapes, more than one tape, 6.6 Non-deterministic TM and Universal TM.		CO6	L3

Text Books/Reference Books:

Sr. No.	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Text Book	Introduction to languages & Theory of computations	John C. Martin	McGraw-Hill Education	4th	February 2, 2010
2	Text Book	Discrete Mathematical Structures with applications to Computer Science	J.P.Tremblay & R.Manohar	Tata McGraw-Hill	Tata McGraw-Hill (Indian)	Reprint 1997 (35th reprint 2008); copyright 1975
3	Reference Book	Introduction to Automata Theory, Languages and computation	John E. Hopcraft, Rajeev Motwani, Jeffrey D. Ullman	Pearson Edition	3rd	June 29, 2006
4	Reference Book	Introduction to theory of Computations	Michael Sipser	Thomson Books/Cole	3rd	June 27, 2012

5	Reference Book	Theory Of Computation	Vivek Kulkarni	Oxford University Press	1st	August 31, 2013
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Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	Website Name	URL	Units Covered
1	NPTEL	https://onlinecourses.nptel.ac.in/noc25_cs70/preview	1-6

Examination Scheme and Guidelines:

T-I 20 Marks	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. One question of 05 Marks based on MCQ's compulsory.
T-II 20 Marks	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. One question of 05 Marks based on MCQ's compulsory.
ISE 10 Marks	ISE/CA –In Semester Evaluation/Continuous Assessment
ESE 50 Marks	ESE-End Semester Examination
	Que.1: MCQ's based on All Units (Carries 06 Marks)
	Que.2: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.3: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.4: based on Unit 4, 5, 6 (Carries 11 Marks)
	Que.5: based on Unit 4, 5, 6 (Carries 11 Marks)

Course Name: Java Programming**Course Details:**

Class:		S.Y. B.Tech.		Semester:		IV	
Course Title:		Java Programming		Course Code:		Theory: 01ITPCL211	
						Practical: 01ITPCP215	
Prerequisites:				Knowledge of object oriented programing.			
Teaching scheme:		Theory Hours:	01/week	Practical Hours:	02/week	Tutorial Hours:	--
		Credits:	01	Credits:	01	Credits:	--
Evaluation scheme & Marks:							
Theory				Practical		Total	
CIE-I	CIE-II	ISE	ESE	CIE	ESE		
-	-	-	-	50	50	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
01ITPCP215.01	To introduce object-oriented programming concepts using Java.
01ITPCP215.02	To demonstrate multithreading, exception handling, and file I/O.
01ITPCP215.03	To understand robust GUI applications using event handling and Swing with proper exception handling
01ITPCP215.04	To understand I/O concepts, database connectivity and collections framework in JAVA

Course Outcomes:

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

Sr No.	Course Outcomes	Levels of Attainment as per Revised Bloom's Taxonomy
01ITPCP215.01	Understand the structure and model of the Java programming language.	L1
01ITPCP215.02	Develop programs using classes, inheritance, polymorphism, packages and interfaces.	L3
01ITPCP215.03	Apply exception handling, multithreading and I/O techniques to develop reliable Java applications	L3

01ITPCP215.04	Evaluate how GUI components and event handling work in Java applications.	L5
01ITPCP215.05	Apply generic programming concepts using Java Generics to develop type-safe and reusable components.	L3
01ITPCP215.06	Use JDBC to develop applications that interact with databases	L3

Course Contents

Unit Number	Unit Title	Hours	Course Outcome No.	Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Unit Title: Introduction to Java 1.1: History and Features of Java, Difference between C++ & Java 1.2: Java Virtual Machine (JVM), JRE, JDK 1.3: Setting up Java environment, Java program Structure, Access Modifiers, import statement, JavaDoc Comments, command line arguments 1.4: Data Types, Variables, Operators, Type Conversion and Casting, Control Statements	5	CO1	L1
Unit-02	Unit Title: Classes & Object in Java 2.1: Classes and Objects, Nested & Inner classes, Garbage Collection 2.2: Arrays, Command line Arguments, String class, Wrapper classes 2.3: Constructor and Overloading, constructor chaining, this keyword, Static members 2.4: Inheritance: (Single, Multilevel, Hierarchical), Super keyword, final keyword, Abstract Classes, Interfaces, Access Protection, Polymorphism (compile-time and runtime) 2.5: Packages: Defining a package, Built-in and User-defined, creation, import statement	8	CO2	L3
Unit-03	Unit Title: Exception Handling and Multithreading			

	3.1: Concept of error & exception, exception handling, try, catch, finally, throw, throws, custom exception 3.2: Multi-Threading: What are threads? , Thread Life Cycle, Creating Threads (extends Thread / implements Runnable), Thread Priorities and Synchronization, Inter-thread Communication 3.3: I/O: Streams, File Handling using java.io, Reading/Writing Text and Binary Files	7	CO3	L3
Unit-04	Unit Title: GUI Programming and Event Handling 4.1: Introduction to AWT and Swing, introduction to Layout Managers, Creating a frame, choice components menus, dialog boxes 4.2: Event Handling: Basics of Event Handling, Event Listeners, Simple GUI applications using JFrame	4	CO4	L5
Unit-05	Unit Title: Generic Programming 5.1: Why Generic Programming? Definition of a Simple Generic Class, Generic Methods. 5.2: Collections: Collection framework, collection interfaces, concrete collections	4	CO5	L3
Unit-06	Unit Title: Database Programming 6.1: Basics of JDBC, steps to connect to a database, Executing SQL statements 6.2: Deploy application: JAR files.	2	CO6	L3

Text Books/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication

1	Text Book	Core Java- Volume I Fundamentals	Cay Horstman n and Gary Cornell	Pearson	Eight edition	
2	Text Book	Core Java- Volume II Advanced Features	Cay Horstman n and Gary Cornell	Pearson	Eight edition	
3	Reference Book	JAVA-The Complete Reference	Herbert Schildt	Oracle Press, Mcgraw Hill	Ninth edition	
4	Reference Book	Java 2(Black Book)	Steven Holzner	PARAGLYPH, Press,dreamt ech	Fifth edition	

Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	Website Name	URL	Units Covered
1	NMEICT Project of MHRD Govt Of India & IIT Bombay	www.spokentutorial.org	

Suggested List of Practical/Experiment for CIE/ESE:

- Minimum 10 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic /Design/Advanced/Mini/Minor Projects/ Seminar/ Case Studies)	Experiment Title	levels of attainment as per Bloom's Taxonomy
1.	Basic	Installation of JDK	L2
2.	Design	Create a calculator using switch-case.	L3
3.	Design	Implement class with overloading concept	L3
4.	Basic	Implement code using single & multilevel inheritance.	L3
5.	Basic	Implement abstract classes and interfaces	L3
6.	Basic	Create user-defined packages	L3
7.	Basic	Perform string manipulations	L3
8.	Basic	Use try-catch-finally, throw, and throws keywords to handle exception in code.	L3
9.	Design	Implement multithreading concept using Thread and Runnable	L3

10.	Design	Implement a program to merge and sort data from different files in a single file.	L3
11.	Design	Develop a program to create a GUI student registration form. (Swing controls and event handling).	L6
12.	Mini Projects	Create a program to store and retrieve, delete and update Student's information in Database. (Implementation of database connectivity in java).	L6

Examination Scheme and Guidelines:

CIE (Practical) (50 Marks)	Continuous Assessment ,As per institute policy
ESE(Practical) 50 Marks	ESE-End Semester Examination

Course Name: Software Engineering**Course Details:**

Class:		S. Y. B. Tech.		Semester:		IV	
Course Title		Software Engineering		Course Code:		Theory: 01ITPCL212	
						Practical: --	
Prerequisites: Computer Programming, Introduction to programming, SDLC overview, Knowledge of project life cycle,Intro to project management principles, Familiarity with data structures, Basic knowledge of organizational management and QA principles							
Teaching scheme:		Theory Hours:	02	Practical Hours:	--	Tutorial Hours:	--
		Credits:	02	Credits:	--	Credits:	--
Evaluation scheme							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
20	20	10	50	--	--	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
01ITPCL212.01	To understand the fundamental concepts, principles, and problems in software engineering and development processes.
01ITPCL212.02	To analyze software requirements, define scopes, and plan project cost and schedule using modern engineering tools.
01ITPCL212.03	To apply effective software design techniques, including function- and object-oriented methods and quality metrics.
01ITPCL212.04	To evaluate software testing strategies, tools, and quality assurance models to ensure reliable software systems.

Course Outcomes:

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

Sr No.	Course Outcomes	Levels of Attainment as per Revised Bloom's Taxonomy
01ITPCL212.01	Understand the foundational principles, processes, and challenges in software engineering.	L1
01ITPCL212.02	Analyze and define user requirements, scope, and budget estimates for a software project.	L4
01ITPCL212.03	Apply effective project planning, scheduling, staffing, and risk management strategies.	L3
01ITPCL212.04	Design software systems using structured and object-oriented approaches, and evaluate them using quality metrics.	L6
01ITPCL212.05	Perform software coding, testing, and quality assurance using modern tools and techniques.	L3

Course Contents

Unit Number	Unit Title	Hours	Course Outcome No.	Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Unit Title: : Fundamentals of Software Engineering 1.1 Introduction to Software Engineering 1.2 Software Problems, Software Engineering Problems 1.3 Cost, Schedule, Quality, Scale and Change 1.4 Software Development Process Modules 1.5 Project Management Process 1.6 Software Processes: Process & Project	5	CO1	L4
Unit-02	Unit Title: Software Requirements and Cost Planning 2.1 Requirement gathering and analysis 2.2 Software Requirement Specification	7	CO2	L4

	2.3 Collecting requirements and defining scopes 2.4 Creating the work break down structure, validating scope, controlling scope 2.5 Basic principles of cost management 2.6 Planning cost management , estimating costs 2.7 Determining the budget, controlling costs, formal system development techniques			
Unit-03	Unit Title: Software planning and scheduling 3.1 Responsibilities of Software Project Manager 3.2 Project Planning 3.3 Project Scheduling 3.4 Project Staffing 3.5 People CMM 3.6 Risk Management	6	CO3	L3
Unit-04	Unit Title: Software Design and Quality Metrics 4.1 Design Concepts 4.2 Function Oriented Design 4.3 Object Oriented Design 4.4 Detail Design 4.5 Modelling as Design Techniques: Modelling, Abstraction, Three Models 4.6 Overview of UML 4.7 Metrics	6	CO4	L6
Unit-05	Unit Title: Software Coding and Testing Strategies and Tools 5.1 Coding & Code Review 5.2 Software Testing Fundamentals, 5.3 Types of testing: White Box Testing, Black Box Testing, Gray Box Testing, Unit Testing, Integration Testing, 5.4 Verification and Validation 5.5 Modern Tools and Techniques for software Testing	6	CO5	L3

Unit-06	Unit Title: Quality Management 6.1 Importance, Planning Quality Management, 6.2 Performing Quality Assurance, Controlling Quality, 6.3 Tools and Techniques for Quality Control, 6.4 Modern Quality Management, Improving IT Project Quality 6.5 ISO 9000 SEI capability Maturity Model, Six Sigma 6.7 Agile Quality Management	6	CO5	Apply, Evaluate
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Textbooks/Reference Books:

Sr. No	Book Type	Name of the Book	Name of the Author	Publisher
1	Textbook	Software Engineering : A precise Approach	Pankaj Jalote	Wiley India
2		Fundamentals of Software Engineering	Rapit Mall (3rd Edition)	PHI
3		Software Engineering	Jan Sommerville (9th Edition)	Pearson
4		Software Engineering Principles & Practices	RohitKhuranaITLESL	Vikas Publishing House Pvt. Ltd.
1	Reference Books	Software Engineering - Concepts & Practices	Ugrasen Suman (CenageLearning)	--
2		Software Engineering Fundamentals	Behforooz& Hudson (Oxford : Indian Edition 1st)	--

Online References: Coursera /NPTEL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	SWAYAM - Software Engineering	h https://onlinecourses.swayam2.ac.in/cec25_cs08/preview	Unit 1 to Unit 6
2	NPTEL- Software Engineering	https://onlinecourses.nptel.ac.in/noc25_cs108/preview	Unit 1 to Unit 6

Evaluation Scheme and Guidelines:

T-I 20 Marks	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell.
T-II 20 Marks	Examination of 20 marks based on Units 4,5 and 6 should be conducted, and marks should be communicated to the Exam Cell.
ISE 10 Marks	ISE-Continuous Assessment of Administrative Law
ESE (50 Marks)	End Semester Examination
	Que.1:MCQ"s based on All Units (Carries06 Marks)
	Que.2:based on Unit1,2,3 (Carries11 Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)
	Que.4:based on Unit4,5,6 (Carries11 Marks)
	Que.5:based on Unit4,5,6 (Carries11 Marks)

Course Name: Open Elective – (02)-Administrative Law

Course Details:

Course Details:							
Class: S.Y. B.Tech.				Semester: - IV			
Course Title		Administrative Law		Course Code:		Theory: 01ITLOE220X	
						Practical: --	
Prerequisites:.				Basic Science Knowledge.			
Teaching scheme:		Theory Hours:	02	Practical Hours:	--	Tutorial 1 Hours:	--
		Credits:	02	Credits:	--	Credits:	--
Evaluation scheme							
Theory				Practical		Total	
T-I	T-II	ISE	ESE	CIE	ESE		
20	20	10	50	--	--	100	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
OE-01ITLOE220X.01	To provide students with a comprehensive understanding of nature, scope, evolution, and foundational principles of Administrative Law, including its relationship with Constitutional Law.
OE-01ITLOE220X.02	To enable students to critically examine the legislative and judicial powers of the administration, focusing on delegated legislation, administrative discretion, natural justice, and the role of tribunals and writs.
OE-01ITLOE220X.03	To develop analytical skills to evaluate the mechanisms of accountability and control over administrative authorities, such as Public Interest Litigation, Lokpal, Ombudsman, Locus Standi, and doctrinal tools like Legitimate Expectation and Sovereign Immunity.
OE-01ITLOE220X.04	To familiarize students with contemporary challenges and reforms in administrative law, including transparency, good governance, e-governance, and the impact of globalization on administrative processes.

Course Outcomes:

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

Sr No.	Course Outcomes	Bloom's Taxonomy Levels
OE-01ITLOE220X.01	Explain the nature, scope, and development of Administrative Law and its relationship with Constitutional Law, including foundational doctrines such as Rule of Law and Separation of Powers.	L1
OE-01ITLOE220X.02	Analyze the legislative and judicial functions of the administration, including delegated legislation, administrative discretion, natural justice, and the role of writs and tribunals.	L3
OE-01ITLOE220X.03	Evaluate the effectiveness of control mechanisms like Public Interest Litigation, Lokpal/Lokayukt, Ombudsman, and doctrines such as Locus Standi and Legitimate Expectation in ensuring administrative accountability.	L4
OE-01ITLOE220X.04	Compare and contrast various remedies available against administrative actions, including writs, statutory appeals, and alternative dispute resolution mechanisms.	L3
OE-01ITLOE220X.05	Apply principles of administrative law to contemporary issues, such as e-governance, transparency, and citizen charters, to assess their impact on good governance.	L3
OE-01ITLOE220X.06	Critically assess recent trends and reforms in administrative law, including the influence of globalization and judicial activism on administrative processes.	L4

Course Contents				
Unit Number	Unit Title	Hours	Course Outcome No.	Bloom's Taxonomy Levels
Unit-01	Unit Title: Foundations and Doctrines of Administrative Law			
	1.1 Nature, Scope and Development of Administrative Law. 1.2 Relationship between Administrative Law and Constitutional Law. 1.3 Separation of Powers 1.4 Rule of law	5	CO 1	Level 1,3

Unit-02	Unit Title: Legislative and Judicial Functions of Administration			
	1.1 Legislative Functions of administration: Delegated Legislation 1.2 Legislative functions of Administration: Forms and Requirements 1.3 Legislative Functions of Administration: The control Mechanism 1.4 Judicial Control of Administrative Action	6	CO2	Level 3,4
Unit-03	Unit Title: Administrative Tribunals, Discretion, and Principles of Natural Justice			
	1.1 Administrative Tribunals: Nature, Power, Procedure and Rules of Evidence 1.2 Administrative Discretion: Meaning, Need & Nature. 1.3 Administrative Discretion & Natural Justice 1.4 The Writs	5	CO3	Level 1,2,3
Unit-04	Unit Title: Judicial Doctrines and Public Accountability in Administrative Law			
	1.1 Public Interest Litigation 1.2 Doctrine of Legitimate Expectation. 1.3 Doctrine of Locus Standi. 1.4 Concept & Working of Administrative Tribunals.	5	CO4	Level 3,4
Unit-05	Unit Title: Institutional Mechanisms and Functional Classification of Administration			
	1.1 Working of Administrative Tribunal in India 1.2 Doctrine of Sovereign Immunity	5	CO5	Level 3

	1.3 Classification of Functions of Administration 1.4 Ombudsman: Lokpal and Lokayukt			
Unit-06	Unit Title: Doctrine of Laches: Delay and its Legal Implications			
	1.1 Doctrine of Laches	2	CO6	Level 2

Textbooks/Reference Books:

Sr. No	Book Type (Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Textbook	Comparative Administrative Law	D.D. Basu	Sarkar	1st or Reprint	1969 / Reprint (varies)
2	Textbook	Administrative Law	Wade	Universal, Delhi	11th	2014
3	Textbook	Principles of Administrative Law (Vol. I & II)	Jain & Jain	Universal, Delhi	7th	2017
4	Textbook	Administrative Law	S.P. Sathe	Butterworth, Delhi	7th	2004
5	Reference Book	Administrative Law	Massey	Pitman	7th	2008
6	Reference Book	An Introduction to American Administrative Law	B. Schwartz	Not Specified	3rd	1976
7	Reference Book	Cases & Materials on Indian Administrative Law (Vol. I & II)	M.P. Jain	Universal, Delhi	6th	2011

Online References: Coursera /NPTEL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	NPTEL - Administrative Law by Prof. P. Ishwara Bhat	https://nptel.ac.in/	Unit 1 to Unit 6
2	Coursera - Intro to International Criminal Law (for Rule of Law context)	https://www.coursera.org/learn/international-criminal-law	Unit 1, Unit 4
3	LawTeacher.net - Administrative Law Articles	https://www.lawteacher.net/free-law-essays/administrative-law/	Unit 2, Unit 3, Unit 5
4	LegalServiceIndia.com - Administrative Law Resources	https://www.legalserviceindia.com/legal/article-4555-administrative-law.html	Unit 2 to Unit 5
5	iPleaders Blog (Academike) - Indian Administrative Law	https://blog.ipleaders.in/category/administrative-law/	Unit 1 to Unit 5

Evaluation Scheme and Guidelines:

T-I 20 Marks	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ's compulsory.
T-I 20 Marks	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ's compulsory.
ISE 10 Marks	ISE/CA –In Semester Evaluation/Continuous Assessment
ESE 50 Marks	ESE-End Semester Examination
	Que.1: MCQ's based on All Units (Carries 06 Marks)
	Que.2: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.3: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.4: based on Unit 4, 5, 6 (Carries 11 Marks)
	Que.5: based on Unit 4, 5, 6 (Carries 11 Marks)

Course Name: Web Technology

Course Details:

Course Details:						
Class		SY-IT		Semester		IV
Course Title		Web Technology		Course Code		Theory:
						Practical: 01ITVEP217
Prerequisites: Basic Knowledge of OOP.						
Teaching scheme:		Theory Hours:	01	Practical Hours:	02	Tutorial Hours: --
		Credits:	01	Credits:	01	Credits: --
Evaluation scheme & Marks						
Theory				Practical		Total
T-I	T-II	ISE	ESE	CIE	ESE	
--	--	--	--	25	50	75

Course Objectives:

The course aims to:

Sr No.	Course Objectives
VSEC- ITP218.01	To introduce students to HTML/CSS for front end design.
VSEC- ITP218.02	To introduce students to perform client side form validation
VSEC- ITP218.03	Understand emerging Web technologies concepts and tools.
VSEC- ITP218.04	To enable students to write web applications/services using different technologies

Course Outcomes:

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

Sr. No.	Course Outcomes	Levels of Attainment as per Revised Bloom's Taxonomy
VSEC- ITP218.01	Understand the basics of the internet, web architecture, and build static web pages using HTML5.	L2
VSEC- ITP218.02	Design responsive and styled web pages using CSS3 and implement mobile-friendly layouts.	L3
VSEC- ITP218.03	Develop interactive web applications using JavaScript, DOM manipulation, and client-side scripting techniques.	L3
VSEC- ITP218.04	Apply jQuery to enhance user interaction by manipulating HTML content, handling events, applying animation effects, and traversing the DOM.	L3
VSEC- ITP218.05	Develop dynamic server-side web applications using PHP fundamentals including arrays, functions, and control structures.	L3
VSEC- ITP218.06	Integrate PHP with MySQL to perform database operations and build data-driven web applications.	L3

Course Contents				
Unit Number	Unit Title	Hours	Course Outcome No.	Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	Unit Title: Introduction to Web & HTML Basics 1.1 Overview of Internet, Web	4	CO1	L2

	browsers, servers, and protocols (HTTP, URLs, MIME) 1.2 HTML 5 structure: document layout, semantic tags (header, footer, section), basic text formatting, and links 1.3 Images, lists, tables, forms, multimedia embedding			
Unit-02	Unit Title: CSS3 & Responsive Web Design 2.1 CSS fundamentals: syntax, selectors, properties, cascading rules 2.2 Box model, positioning, display types, layout techniques 2.3 Responsive design: media queries, mobile- first, flexible grids	4	CO2	L3
Unit-03	<i>Unit Title: Client-Side Scripting with JavaScript</i> 3.1 Introduction, Core features - Data types and Variables, Operators, Expressions and Statements, 3.2 Functions & Scope, Objects - Array, Date and Math related Objects, 3.3 Document Object Model, Event Handling, Browser	5	CO3	L3

	Object Model, 3.4 Windows and Documents, Form handling and validations.			
Unit-04	Unit Title: JQuery 4.1 Introducing jQuery, jQuery selector, 4.2 jQuery HTML, Animation effects, 4.3 Event handling, DOM, 4.4 jQuery DOM traversing, DOM manipulation.	4	CO4	L3
Unit-05	Unit Title: Server-Side Web Programming: PHP 5.1 History, General Language Feature PHP Basics : Embedding PHP code in Your Web Pages, Outputting Data to the Browser, 5.2 PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures 5.3 Functions: Invoking a Function, Creating a Function, Function Libraries, 5.4 Array: Creating an array, outputting a Array, Merging, slicing,	4	CO5	L3

Unit-06	Unit title: Using PHP with MySQL 6.1 Installation Prerequisites, Using the MySql Extension, interacting with the Database, Executing Database Transactions 6.2 Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions, Practical Session-Handling Examples, Creating Custom Session Handlers 6.3 Handling File Uploads: Uploading Files with PHP	5	CO6	L3
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TextBooks/Reference Books:

Sr. No	Book Type (Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Reference Book	Pro HTML5 and CSS3 Design Patterns	Michael Bowers, Dionysios Synodinos, Victor Sumner	Apress	2nd	2017
2	Reference Book	JavaScript: The Complete Reference	Thomas A. Powell,	McGraw-Hill (Tata McGraw Hill)	3rd	2012

			Fritz Schneider			
3	Reference Book	Beginning PHP and MySQL: From Novice to Professional	W. Jason Gilmore	Apress	4 th	2010
4	Textbook	JavaScript: The Definitive Guide – Master the World’s Most-Used Programming Language	David Flanagan	O’Reilly Media	7 th	2020
5	Textbook	jQuery in Action	Bear Bibeault, Yehuda Katz, Aurelio De Rosa	Manning Publications	3 rd	2015
6	Textbook	Sams Teach Yourself PHP, MySQL and Apache All-in-One	Julie C. Meloni	Sams / Pearson Education	5 th	2012

Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	Website Name	URL	Units Covered
1	Swayam NPTL	https://onlinecourses.swayam2.ac.in/nou25_cs23/preview	1,2,3
2	Swayam NPTL	https://onlinecourses.swayam2.ac.in/nou25_cs17/preview	1,2,3
3	Swayam NPTL	https://onlinecourses.swayam2.ac.in/aic20_sp32/preview	4,5,6
4	Website	https://www.tutorialspoint.com/Web_technologies/index.asp	1 to 6

Suggested List of Practical/Experiment for ESE:

- Minimum 10 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic /Design/Advanced/Mini/Minor Projects/Seminar/ Case Studies)	Experiment Title	levels of attainment as per Bloom's Taxonomy
1.	Basic	Create a static webpage using HTML5 with proper layout, semantic tags, lists, tables, and images.	L3
2.	Design	Design created pages using CSS.	L3
3	Design	Construct client side scripts to validate HTML form data using JavaScript technology.	L3
4	Design	Create a form and perform client-side validation using JavaScript (required fields, email format).	L3
5	Basic	Installation of Apache and PHP XAMPP.	L2
6	Basic	Hello world Program-Embedded HTML with PHP	L3
7	Design	Implement a PHP program to perform operations on arrays and user-defined functions.	L3
8	Advanced	Create a PHP class with constructor, destructor, and inheritance. Demonstrate OOP concepts.	L4
9	Advanced	Write a PHP-MySQL script to insert, retrieve, update, and delete (CRUD) data from a database.	L3
10	Advanced	Experiment based on session Management (create Login Application)	L4
11	Mini Project	Develop a mini project using PHP and MySQL – Example: Student Portal, Inventory System, Blog, etc.	L6

Examination Scheme and Guidelines:

CIE (Practical) (25 Marks)	Continuous Assessment, As per institute policy
ESE (Practical) 50 Marks	ESE-End Semester Examination