

GOVERNMENT COLLEGE OF ENGINEERING AURANGABAD

(An Autonomous Institute of Govt. of Maharashtra) Station Road, Osmanpura, Aurangabad- 431005 (M.S.) (0240) 2366101, 2366111, Fax: (0240) 2332835

Department of Information Technology NEP

Second Year IT Curriculum Structure & Detailed Syllabus (UG Program)

(Effective from: A.Y. 2022-2023)



Program Specific Outcomes (PSOs)

After successful completion of the program graduates would:

- **PSO I** Apply core IT Knowledge to identify, formulate and solve emerging engineering problems.
- **PSO II** Design, develop and deploy quality software products by applying knowledge of modern IT concepts and tools.
- **PSO III** Apply the skills of IT professionals to develop novel solutions in societal and environmental contexts

Program Educational Objective(s)

After graduation and few years of graduation, the (Information Technology) graduates would

- **PEO I** Interpret, design and analyze data for effective problem solving
- **PEO II** Pursue advanced studies to adapt to current trends
- **PEO III** Attain professional careers and provide services in societal and environmental context for sustainable development
- **PEO IV** Work successfully with effective communication skills, professionalism, team work and ethical attitude

Program Outcome(s)

The program enables students to achieve by the time of graduation:

- **PO1** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2 Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3 Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4 Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO5** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Approved in XXV IIIth Academic Council

- **PO10 Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11 Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of PEOs and POs

	Programme Educational Objective(s)	Program Outcome(s)
PEO I	Interpret, design and analyze data for effective	1,2,3
	problem solving	
PEO II	Pursue advanced studies to adapt to current trends	3,4,5,6,7,9
PEO III	Attain professional careers and provide services in	4,5,6,7,8,9,10,11,12
	societal and environmental context for sustainable	
	development	
PEO IV	Work successfully with effective communication	6,8,10,11,12
	skills, professionalism, team work and	
	ethical attitude	



GENERALCOURSESTRUCTURE& THEME

A. DefinitionofCredit:

1Hr.Lecture(L) per week	1Credit
1Hr. Tutorial(T) per week	1Credit
1Hr.Practical(P) per week	0.5 Credit
2Hours Practical(P) per week	1Credit

B. <u>Tentative Credit Distribution and Second Year to Final Year tentative</u> curriculum structure for the completion of B.Tech. in Information Technology degree with one Minor/Honors/Research:

Structure of B.Tech. in Information Technology with multidisciplinary minor:

Course Types/ Semester	I	Π	III	IV	V	VI	VII	VIII	Total
Basic Science Course	8	8							16
Engineering Science Course	7	7							14
Programme Core Course (PCC)		2	15	11	11	11			50
Programme Elective Course (PEC)					7	10	3	-	20
Multidisciplinary Minor (MD M)		-	4	3	4	3			14
Open Elective (OE) Other than a particular program			3	3	2				8
Vocational and Skill Enhancement Course (VSEC)	2	2		2		2			8
Ability Enhancement Course (AEC - 01, AEC-02)		2		2					4
Entrepreneurship/Economics/ Management Courses			2	2					4
Indian Knowledge System (IKS)	2								2
Value Education Course (VEC)			2	2					4
Research Methodology								4	4
Comm. Engg. Project (CEP)/Field Project (FP)			2						2
Project							4		4
Internship/ OJT							6	6	12
Co-curricular Courses (CC)	2	2						-	4
Total Credits / Semester with MDM	21	23	28	25	24	26	13	10	170
Total Credits / Semester with Double MDM	21	23	32	28	28	29	13	10	184
Honors Credits/ Semester						4	8	6	18
Total Credits / Semester with MDM +Honors	21	23	28	25	24	30	21	16	188
Research Credits/ Semester							9	9	18
Total Credits / Semester with MDM+Research	21	23	28	25	24	26	22	19	188

Students can opt for any of the following a sperther ules and regulations given by institute:

1. B.Tech with one Multidisciplinary Minor=Total 170 Credits

2. B.Tech with one Multidisciplinary Minor and Honor in A.I.M.L. = Total 188 Credits

3. B. Tech with one Multidisciplinary Minor and Honor by Research=Total 188 Credits

4.B.Tech with two Multidisciplinary Minors=Total 184 Credits

Government College of Engineering, Aurangabad

(An Autonomous Institute)

Teaching and Evaluation Scheme from year 2022-2023

B. Tech. Program in Information Technology with Semester– III and IV

			SEM	ESTER	- III							
Sr.	Cate	Course	Course Title	Hour	s per w	eek	Cre	Con	tinuous terms o	Evaluation F Marks	on in	Tota l
No	gory	Code		L	Т	Р	dits	ISE I	ISEI I	ISE III	ES E	
1	PCC	ITPCC2001	Discrete Mathematical Structures	3	0	0	3	15	15	10	60	100
2	PCC	ITPCC2002	Data Structures	3	0	0	3	15	15	10	60	100
3	PCC	ITPCC2003	Object Oriented Programming	3	0	0	3	15	15	10	60	100
4	PCC	ITPCC2004	Computer Networks	3	0	0	3	15	15	10	60	100
5	PCC	ITPCC2005	Lab Data Structures	0	0	2	1	-	-	25	25	50
6	PCC	ITPCC2006	Lab Object Oriented Programming	0	0	2	1	-	-	25	25	50
7	PCC	ITPCC2007	Lab Computer Networks	0	0	2	1	-	-	25	25	50
8	MDM	ITMDM5001/ ITMDM6001	Data Structures and Algorithm	3	0	0	3	15	15	10	60	100
9	MDM	ITMDM5002/ ITMDM6002	Lab Data Structures and Algorithm	0	0	2	1	-	-	25	-	25
10	OE	ITOEC0010	Data Structures and Algorithm	3	0	0	3	15	15	10	60	100
11	VEC	INVEC1001	Universal Human Values -II Understanding Harmony	2	0	0	2	10	10	0	30	50
12	HSSM	ITEEM0010	Professional Ethics and Cyber Laws	2	0	0	2	10	10	0	30	50
13	EXL	ITEXL2001	Community based Project	0	0	4	2	-	-	50	-	50
		Т	otal	22	0	12	28	110	110	210	495	925

	SEMESTER- IV													
Sr.	Categor	Course Code	Comment Title	Hour	s per w	eek	Cre	Con	tinuous terms o	Evaluatio of Marks	on in	Tota l		
No	у	Course Code	Course Thie	L	Т	Р	dits	ISE I	ISEI I	ISEII I	ES E			
1	PCC	ITPCC2010	Statistics, random variables and Linear Algebra	3	0	0	3	15	15	10	60	100		
2	PCC	ITPCC2011	Database Management System	3	0	0	3	15	15	10	60	100		
3	PCC	ITPCC2012	Operating Systems	3	0	0	3	15	15	10	60	100		
4	PCC	ITPCC2013	Lab Database Management System	0	0	2	1	-	-	25	25	50		
5	PCC	ITPCC2014	Lab Operating Systems	0	0	2	1	-	-	25	25	50		
6	MDM	ITMDM5003 ITMDM6003	Introduction to Database Management Systems	3	0	0	3	15	15	10	60	100		
7	OE	ITOEC1020	Introduction to Database Management Systems	3	0	0	3	15	15	10	60	100		
8	VSEC-3	ITVSE2001	Lab Computer Programming I(Python Programming)	0	0	2	1	-	-	25	-	25		
9	VSEC-3	ITVSE2002	Lab Computer Programming II (FSD - I)	0	0	2	1	-	-	25	-	25		
9	AEC02	EEAEC2010	Technical Communication	2	0	0	2	10	10	0	30	50		
10	HSSM	ITEEM1020	Business Intelligence	2	0	0	2	10	10	0	30	50		
11	VEC	CEVEC0010	Environmental Science	2	0	0	2	10	10	0 ,	-30.a	- 50 s		
				21	0	8	25	105	105	150 AD	440 proved in XXV IIII	800 h Academic Counc		

ITPCC2001: Discrete Mathematical Structures										
Teaching Scheme Examination Scheme										
Lectures: 03 hrs/ week	ISE I	15 Marks								
Tutorial: -	ISE II	15 Marks								
Credits: 03	ISE III	10 Marks								
	End Semester Examination	60 Marks								

Prerequisites: - None

Course description:

This course covers fundamental concepts in discrete mathematics with applications to computer science and information technology. Topics include sets, functions, relations, logical connectives, analysis techniques based on counting methods and recurrence relations, trees and graphs and algebraic systems.

Course Outcomes: After completing the course, students will able to:

- CO1 Explain the fundamental concepts of sets, logical connectives, relations, functions and algebraic systems
- CO2 Solve mathematical problems using mathematical reasoning methods
- **CO3** Demonstrate discrete problems using sequences, combinatorics and counting techniques
- **CO4** Apply information theory and non linear data structures for finding effective solutions to a variety of problems.

Detailed Syllabus:

- Unit 1 Sets, Combinations of sets, Finite and Infinite sets, Uncountably infinite sets, Mathematical Induction, Principle of inclusion and exclusion, Multisets, Propositions, Logical Connectives, Conditionals and Biconditionals, Logical equivalences, Euclidean Algorithm
- **Unit 2** Permutations and Combinations: rule of sum and product, Permutations, Combinations, Algorithms for generation of Permutations and Combinations.
- Unit 3 Discrete Probability, Conditional Probability, Bayes' Theorem, Information theory and Mutual Information
- Unit 4 Relations, Properties of Binary Relations, Closure of relations, Warshall's algorithm, Equivalence relations and partitions, Partial ordering relations and lattices, Chains and Anti chains, Functions, Recursive functions, Pigeon hole principle., Recurrence relation, Linear Recurrence Relations with constant Coefficients, Homogeneous Solutions, Total solutions, solutions by the method of generating functions
- Unit 5 Algebraic Systems: Algebraic Systems, Groups, Semi Groups, Monoids, Subgroups, Permutation Groups, Codes and Group codes, Isomorphism and Automorphisms, Homomorphism and Normal Subgroups, Rings, Integral domain and Fields.



Text and Reference Books

- 1. 1.C. L. Liu, D. P.Mohapatra, "Elements of Discrete Mathematics", 3rd Edition, Tata McGraw Hill, 2008, ISBN 978-0-07-066913-0
- 2. R. Johnsonbaugh, "Discrete Mathematics", 5th Edition, Pearson Education, 2001, ISBN 81-7808-279-9
- 3. G. Shanker Rao, "Discrete Mathematics and Structure", 1st Edition, New Age International publisher, 2003, ISBN 81-224-1424-9
- 4. B. Kolman, R. Busby and S. Ross, "Discrete Mathematical Structures", 4th Edition, Pearson Education, 2002, ISBN 81-7808-556-9
- 5. J. Tremblay, R. Manohar, "Discrete Mathematical Structures with application to Computer Science", McGraw-Hill, 2002, ISBN 0-07-065142-6
- 6. Kenneth H. Rosen: Discrete Mathematics and Its Applications, 5th Edition, Tata McGraw-Hill, 2003, ISBN 0-07-053047-5

Web Resources

- 1. Introduction to Discrete Mathematics for Computer Science Specialization, offered by University Of California San Diego HSE University, Platform Coursera
- 2. Discrete Mathematics, by Prof. Sudarshan Iyengar, Prof. Prabuchandran K.J, IIT Ropar, IIT Dharwad <u>https://nptel.ac.in/courses/106/106106183/</u>
- 3. Discrete Mathematics IIITB, by Prof. Ashish Choudhury, IIIT Bangalore, https://nptel.ac.in/courses/106/108/106108227/
- 4. Discrete Structures, Prof. Dipanwita Roychowdhury, IIT Kharagpur. https://Nptel.Ac.In/Courses/106/105/106105192/

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes

Course outcome		Program Outcomes													Program Specific Outcomes		
S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	РО	PO	PSO	PSO	PSO		
											11	12	1	2	3		
CO1	3	2	1	1									3	1			
CO2		3			2							1	3	1			
CO3	3	2	1	1									3	1			
CO4	3	2	1	1								1	3	1			

3 – High 2 – Medium 1 - Low

Assessment:

ISE I: Class Test-I of Maximum Marks-15

ISE II: Class Test-II of Maximum Marks-15

ISE III: Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following

- 1) Surprise test
- 2) Assignment
- 3) Quizzes
- 4) Any other activity suggested by course coordinator

ESE: End Semester Examination of Maximum Marks-60

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	5	5	2	10
K2	Understand	7	7	3	20 Ang

pproved in XXV III th Academic Cou Dated: 25th Jun 2024

K3	Apply	3	3	5	20
K4	Analyze	-	-	-	10
K5	Evaluate	-	-	-	-
K6	Create	-	-	-	-
Total Marks 1	00	15	15	10	60

Assessment table:

Assessment Tool	K2	K3	K3	K3
	CO1	CO2	CO3	CO4
ISE I(15 Marks)	6	5	2	2
ISEII (15 Marks)	2	3	5	5
ISEIII (10 Marks)	2	2	3	3
ESE Assessment (60 Marks)	10	20	20	10
Total Marks 100	20	30	30	20

ITPCC2002 : Data Structure									
Teaching Scheme Examination Scheme									
Lectures: 03 hrs/ week	ISE I	15 Marks							
Tutorial: 0	ISE II	15 Marks							
Credits:03	ISE III	10 Marks							
	End Semester Examination	60 Marks							

Course Description: This course covers some of the general-purpose data structures and algorithms, and software development. It is aimed at helping you understand the reasons for choosing structures or algorithms. This course covers concepts of various data structures like stack, queue, list, tree and graph. Additionally, the course includes idea of sorting and searching.

Course Outcome: After completing the course, students will be able to

- **CO1** Understand basic data structures and their use in fundamental algorithms.
- **CO2** Select appropriate data structure as applied to specified problem definition.
- **CO3** Compare asymptotic notations of algorithms to analyze the consumption of resources
- CO4 Apply searching, sorting, insertion, deletion, traversing mechanism on primitive and non-primitive data structures
- CO5 Apply abstract data types using arrays and linked list

Detailed Syllabus:

- Unit 1 Introduction to data structure: Definition, types of data structure, The Arrays as an ADT: Using One-Dimensional Arrays, Using Two-Dimensional Arrays, Definition and Examples, Searching & Sorting searching classification on the basis of big-O notation, Different sorting techniques, such as selection sort, bubble sort, merge sort, quick sort, heap sort, shell sort, radix sort, comparisons between different sorting techniques, Sequential searching binary searching.
- **Unit 2** The Stacks& Queues : The stack as an ADT, Operations on stack, Stack implementations, Stack applications, The queue and its sequential representation, The queue as an ADT, Basic Definition, types of queue as Circular Queue, priority queue, applications of queue

- Unit 3 Linear Data Structure & their representation : Definition, concept, types of linked lists, singly linked list, Circular linked lists, singly circular linked list, Doubly linked lists, Operations like insertion, deletion, insertion in order, searching, updating, Applications of linked lists such as polynomial manipulation, Comparison of singly linked, circularly linked & doubly linked list
- **Unit 4 Trees:** Definition, Basic terminology, operation on binary trees, linked storage representation for binary search trees, Basic operation on binary search tree such as creating a binary search tree, searching, modifying ,inserting & deleting the element, destroy a binary search tree, tree traversals ,in-order, pre-order, post-order , tree application for expression evaluation , height balanced trees, B trees, B+ trees, AVL trees
- **Unit 5 Graph:** Definitions, basic terminology, matrix representation & implementation of graphs, graph travels, DFS, BFS, Shortest path Dijkstra's algorithm, Floyd's algorithm, spanning tree- Prim's algorithm, Kruskal's algorithm

Text Books & Reference Books

1. Yedidyah Langsam, Moshe J. Augenstein, Aaron M.Tenenbaum, "Data Structures using C and C++", Pearson Pub.

- 2. G.S. Baluja, "Principles of Data Structures using C and C++"
- 3. G. S. Baluja, "Data Structures Through (A Practical approach)Dhanpat Rai & Co(P) LTD.
- 4. Yashavant P Kanetkar, "Data Structures through C", BPB Pub.
- 5. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures"
- 6. Robert L Kruse, "Data Structures and Program Design", PHI

Web Resources

- 1. https://nptel.ac.in/courses/106102064 Data Structures And Algorithms, IIT Delhi
- 2. <u>https://nptel.ac.in/courses/106106127</u> Programming, Data Structures and Algorithms, IIT Madras
- 3. https://repository.dinus.ac.id/docs/ajar/Principles_of_Data_Structures_Using_C_and_ C++.pdf
- 4. <u>https://cse01-iiith.vlabs.ac.in/</u> Virtual Lab Data Structures

Mapping	mapping of Course outcome with riogram Outcomes and riogram Specific Outcomes														
Course	P	PO	PSO	PSO	PSO										
outcome	0	2	3	4	5	6	7	8	9	10	11	12	1	2	3
	1														
CO1	3	2	1	1	2								3	3	3
CO2	2	3	2	2	3								3	3	2
CO3	2	2	3	2									2	2	2
CO4	3	3	2	2	3								3	2	3
CO5	3	2	2	3	3								3	2	2

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

3– High 2 – Medium 1 - Low

Assessment:

ISE I: Class Test-I of Maximum Marks-15

ISE II: Class Test-II of Maximum Marks-15

ISE III: Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following

- 1) Power point presentation
- 2) Question & answer / Numerical solution
- 3) Surprise test
- 4) Any other activity suggested by course coordinator

ESE: End Semester Examination of Maximum Marks-60



Assessment Pattern:

Assessment	Knowledge	ISE I	ISE II	ISE III	End Semester
Pattern	Level				Examination
Level No.					
K1	Remember	05	05	00	10
K2	Understand	10	10	05	25
K3	Apply	00	00	05	25
K4	Analyze	00	00	00	00
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1	K2	K3
	CO1	CO2,CO3	CO4,CO5
ISE I (15 Marks)	05	10	00
ISE II (15 Marks)	05	10	00
ISE III (10 Marks)	00	05	05
ESE Assessment (60 Marks)	10	25	25
Total Marks 100			



ITPCC2003 : Object Oriented Programming							
Teaching Scheme	Examination Scheme						
Lectures: 03 hrs/ week	ISE I	15 Marks					
Tutorial: 0	ISE II	15 Marks					
Credits:03	ISE III	10 Marks					
	End Semester Examination	60 Marks					

Course description: Object Oriented Programming is designed to create sophisticated programs to solve real-world problems using object oriented approach. The course emphasizes to improve the logical thinking of the students.

Course Outcomes: After completing the course, students will able to:

- **CO1** Explain the necessity for Object Oriented Programming paradigm over Procedure Oriented Programming.
- **CO2** Demonstrate the fundamental concepts and principles of object oriented programming.
- CO3 Make use of Java standard API library to write an object oriented system.
- **CO4** Apply Multithreading and Exception handling concepts to develop efficient and error free codes.
- **CO5** Select object oriented principles and techniques to implement real world applications.

Detail Syllabus:

Unit 1 Introduction to Object Oriented Concepts:

Procedure Oriented Programming, Object Oriented Programming, Comparison of Object Oriented Programming with Procedure Oriented Programming, The Byte code, Java Development Kit (JDK), Garbage collection, Console I/O, variables and reference variables, arrays, operators, control statements, type conversion and casting, Function Prototyping, Function Overloading, Introduction to Classes and Objects, member functions and member data, objects and functions, objects and arrays, Constructors, Static block, Static Data, Static Method, String and String Buffer Classes

Unit 2 Inheritance, Polymorphism, Packages and Interfaces:

Basic concepts, Types of inheritance, Member access rules, Usage of this and Super key word, Method Overloading, Method overriding, Abstract classes, Dynamic method dispatch, Usage of final keyword, Defining package, Access protection, importing packages, Defining and Implementing interfaces, and Extending interfaces

Unit 3 Exception handling and Multithreading:

Exception types, Usage of Try, Catch, Throw, Throws and Finally keywords, Built-in Exceptions, Creating own Exception classes, Concepts of Thread, Thread life cycle, creating threads using Thread class and Runnable interface, Synchronization, Thread priorities, Inter Thread communication

Unit 4 JDBC:

Introduction, JDBC Architecture, Types of Drivers, Making the Connection, Statement, Result Set, Prepared Statement, Callable Statement, Executing SQL commands, Executing queries. BLOB & amp; CLOB

Unit 5 Collection Framework:

Introduction, util Package interfaces, List, Set, Map, List interface & amp; its classes, Set interface & amp; its classes, Map interface & amp; its classes, Introduction to Tree, Hash, Stack, Queue.

Text and Reference Books:

- 1. Herbert Schildt, "The Complete Reference Java2", 7th Edition, TMH Publications.
- 2. E Balguruswamy, "Programming with Java A Primer"
- 3. Cay S. Horstmann, Gary Cornell, "Core Java Volume II" Pearson Education.
- 4. StevenHolzner, "Java 2 Black Book", Dreamtech Pub.
- 5. Head First Java, O'rielly publications
- 6. T. Budd (2009), An Introduction to Object Oriented Programming, 3rd edition, Pearson Education, India.
- 7. Y. Daniel Liang (2010), Introduction to Java programming, 7th edition, Pearson education, India.

Web Resources:

NPTEL course : Programming In Java <u>https://onlinecourses.nptel.ac.in/noc22_cs47</u> Virtual Lab: Core Java Programming <u>https://java-iitd.vlabs.ac.in/</u>

Course	Program Outcomes									PS	50's				
outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1														
CO2		1									1	1	1	1	
CO3														2	
CO4									1					2	
CO5	2	2	3	1	1	1		1	2	2	2	1	3	3	1

Mapping of Course outcome with Program Outcomes:

3 – High 2 – Medium 1 – Low

Assessment:

ISE I: Class Test-I of Maximum Marks-15

ISE II: Class Test-II of Maximum Marks-15

ISE III: Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following

1) Course projects

- Powerpoint presentation
- 3) Question & answer

4) Any other activity suggested by course coordinator

ESE: End Semester Examination of Maximum Marks-60

Assessment Pattern:

2)

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	00	00	00
K2	Understand	03	03	05	24
K3	Apply	12	12	05	36
K4	Analyze	00	00	00	00
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 1	00	15	15	10	60

Assessment Table:

	K2	K3
Assessment 1001	CO1, CO2	CO3,CO4, CO5
ISE I (15 Marks)	03	12
ISE II (15 Marks)	03	12
ISE III (10 Marks)	00	10
ESE (60 Marks)	24	36



ITPCC2004: Computer Networks						
Teaching Scheme Examination Scheme						
Lectures: 03 hrs/ week	ISE I	15 Marks				
Tutorial: 0	ISE II	15 Marks				
Credits:03	ISE III	10 Marks				
	End Semester Examination	60 Marks				

Course Description: From conventional small-scale networks to modern high-speed mobile and wireless Internet, the Internet domain has evolved at a rapid pace. To meet the demands for establishing a secure and highly trustworthy information technology infrastructure, a vast number of methodologies, systems, and designs were developed at each protocol level. The course is designed in Top-down approach to understand the network architecture, protocols and their functionalities and also the requirements for the future Internet design.

Course Outcomes: After completing the course, students will able to:

- CO1 Differentiate between layered network architectures and components used in networking
- **CO2** Explain functionalities of various protocols at different layers
- **CO3** Describe the network components, protocols and services used for establishing computer network
- CO4 Use appropriate protocols and algorithms based on the networking requirements
- CO5 Distinguish between different routing, transportation and application strategies for the Internet

Detailed Syllabus:

Unit 1 Introduction to Computer Networks

Types of networks, Topologies, Network Models: ISO-OS and TCP/IP network architectures, Services at the Different Layers, Circuit Switching and Packet Switching, Delay, Loss, and Throughput, Network under Attack

Unit 2 Application Layer:

Principles of Network Applications, The Web and HTTP, File Transfer Protocol (FTP), Electronic Mail in the Internet, DNS-The Internet's Directory Service, Peer-to-Peer Sharing

Unit 3 Transport Layer

Introduction and Transport-Layer Services, Multiplexing and Demultiplexing, Connectionless Transport-UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport, Principles of Congestion Control, TCP Congestion Control Socket Programming

Unit 4 Network Layer

Introduction, Virtual Circuit and Datagram Networks, Working of Router, The Internet Protocol (IP): Forwarding and Addressing in the Internet, Routing Algorithms, Routing in the Internet, Broadcast and Multicast Routing

Unit 5 The Link Layer and Local Area Networks

Link Layer: Introduction and Services, Error-Detection and -Correction Techniques, Flow Control, Error Control, Media Access Control - Channel Access Protocols, Framing, Multiple Access Protocols, Link-Layer Addressing, Ethernet, Link-Layer Switches, PPP: The Point-to-Point Protocol, Link Virtualization: A Network as a Link Layer

Text and Reference Books

- 1. "Computer Networking- a top-down approach featuring the Internet", by James F. Kurose and Keith W. Ross, Person Education, ISBN-10- 0132856204, 6th Edition.
- 2. "Data Communications and Networking", by Forouzan B. A, Tata McGraw-Hill Publications, 2006, ISBN-0-07-063414-9, 4th edition.
- 3. "Computer Networks", by Tanenbaum A. S., Pearson Education , 2008, ISBN- 978-81-7758-165-2, 4th Edition
- 4. "Computer Networks- A Systems Approach", by Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann, ISBN-978-81-312-1045-1, 4th Edition.
- 5. "Computer Networks and Internet", by Comer D., Pearson Education, ISBN-81-297-0330-0, 2nd Edition.

Web Resources:

NPTEL course : Computer Networks And Internet Protocol :

:https://nptel.ac.in/courses/106/105/106105183/

Virtual Lab: Advanced Computer Networks <u>http://vlabs.iitkgp.ac.in/ant/</u>

Virtual Lab: Computer Networks <u>http://vlabs.iitb.ac.in/vlabs-dev/labs_local/computer-networks/labs/explist.php</u>

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcome	P 0 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2						1					1		
CO2	1	2													
CO3	1			1											
CO4	1		2	2								2	2		2
CO5	1		2	3							1	2	2	1	3

3 – High 2 – Medium 1 - Low

Assessment:

ISE I: Class Test-I of Maximum Marks-15

ISE II: Class Test-II of Maximum Marks-15

ISE III: Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following 1) Quiz

- 2) Question & answer / Numerical solution
- 3) Power point presentation
- 4) Simulation
- 5) Mini projects
- 6) Virtual Lab Assignments
- 7) Any other activity suggested by course coordinator

ESE: End Semester Examination of Maximum Marks-60

Assessment Pattern:

Assessment	Knowledge	ISE I	ISE II	ISE III	End Semester
Pattern	Level				Examination
Level No.					
K1	Remember	05	00	00	10
K2	Understand	10	05	00	20
K3	Apply	00	10	05	20
K4	Analyze	00	00	05	10
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 1	.00	15	15	10	60 Antana

Assessment Tool	K2	K2	K3	K4
	CO1,CO2	CO1,C02,CO3	CO3, CO4	CO5
ISE I (15 Marks)	10	05	00	00
ISE II (15 Marks)	10	05	00	00
ISE III (10 Marks)	00	00	05	05
ESE Assessment (60 Marks)	15	15	20	10
Total Marks 100				



ITPCC2005: Lab Data Structure							
Teaching Scheme	Examination Scheme						
Practical: 2Hrs/Week	ISE I (Term Work)	25 Marks					
Credits:01	End Semester Evaluation	25 Marks					

Course Outcomes: After completion of this course students will be able to:						
CO1	Interpret neat code by selecting appropriate data structure					
CO2	Discover the ability to write reusable code and abstract data types in C					
CO3 Identify appropriate data types and algorithms for solving real life problems						
CO4	Design and implement abstract data types with static or dynamic representation.					

List of the Experiments: The student shall perform minimum ten experiments of the following using TURBO C, C++/ Code Blocks.

Sr. No.	Title of the Experiments	Skill / Knowledge Level	СО
1	 Create an array of n integers. Perform following operations on array 1. Accept a value(item) from user and insert it into specified position 2. Delete a value(item) from specified position from given array 3. Display the content of the array 	S2	CO1, CO3
2	Implement following program 1.Sort the following lists in ascending order using selection sort and quick sort Eg.56, 57, 92,38,44,90,61,73,22,87,54,21	S1	CO1, CO2
3	Implement following program 1.Sort the following lists in ascending order using radix sort and bubble sort Eg. 156, 57, 192,38,44,9,1,713,122,87,54,21	S1	CO1, CO2
4	 Accept n array elements, perform following operations: a)Accept a number from user b)Apply following searching techniques on it, if number is found in given array; display the position of the number. 1. Linear search 2. Binary search 	S3	CO2, CO3
5	Implement C program to accomplish the following stack operations. a)Push b)Pop c) Stack empty d)Stack Full e)Stack Empty	S2	CO2, CO3, CO4
6	Write C Program to convert following infix expression into prefix, postfix. Eg.(A+B)*(C^D)/H	S3	CO4, CO3, CO4
7	Implement Simple queue and Circular queue to perform following operations. 1. Insert an elements 2. Deleting an element 3. Queue is Empty 4. Queue is Full 5. Display the element of queue.	S3	CO2, CO3, CO4
8	 Implement Singly linked list to perform following operations. 1. Insert a number in the beginning , Specified position and ending position of the list 2. Delete a number from the beginning , Specified position and ending position of the list 	S3	CO2, CO3, CO4

Approved in XXV III th Academic Cou Dated: 25th Jun 2024

BA

9	 Implement Circular Doubly linked list to perform following operations. 3. Insert a number in the beginning , Specified position and ending position of the list 4. Delete a number from the beginning , Specified position and ending position of the list 	S3	CO2, CO3, CO4
	Any Two		
10	 Create a binary tree to perform following operations 1. Insert a node 2. Search for a node 3. Deletion of a node 4. Traverse tree in inorder, preorder, postorder 	S4	CO2, CO3, CO4
11	Implement a program to Traverse a Given graph using BFS and DFS	S4	CO2, CO3, CO4
12	 Implement a c program to find shortest path using following techniques. 1. Dijkstra's Algorithm 2. Prim's Algorithm 3. Kruskal's Algorithm 	S4	CO2, CO3, CO4

Assessment:

ISE I (Term Work) : In-Semester Evaluation of 25 marks each will be based on practical assignments completed and timely submission

End Semester Evaluation: The ESE will be based on oral / practical performance of the students

Assessment Table:

Assessment Tool	K1	K2	K3	K3
	CO1	CO2	CO3	CO4
Term work (25Marks)	06	07	06	06
Practical Examination & Viva Voce (25 Marks)	06	07	06	06

Assessment Pattern: Use the relevant table for assessment pattern.

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	06	06
S2	Manipulation	07	07
S3	Precision	06	06
S4	Articulation	06	06
S5	Naturalization	00	00
Total Marks		25	25

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course	PO	PSO	PSO	PSO											
outcome	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3		2								3	2	1
CO2	3	3	3		3								3	2	2
CO3	3	3	3	3	2							2	1	3	1
CO4	3	3	3	1	2								2	3	3



ITPCC2006: Lab Object Oriented Programming									
Teaching Scheme	Examination Scheme								
Practical: 2Hrs/Week	ISE I (Term Work)	25 Marks							
Credits:01	End Semester Evaluation	25 Marks							

Course O	Course Outcomes After completion of this course students will be able to:								
CO1	Understand the development environment for compiling, debugging and executing Java program.								
CO2	Implement Object Oriented Programming concepts using Java programming.								
CO3	Make use of Collection framework and streams.								
CO4	Demonstrate exception handling, multithreading and JDBC								

List of the Experiments: The student shall perform minimum ten experiments of the following using Java

Sr. No.	Title of the Experiments	Skill /	CO
		Knowledg	
		e Level	
1	Write a Java program to convert time in seconds to hours,	S1	CO1
	minutes and seconds and display the output in format		
	HH:MM:SS		
2	Write a Java program to rearrange all the elements of a given	S2	CO2
	array of integers so that all the odd numbers come before all the		
	even numbers.		
3	Write a Java program that accepts three integers from the user	S2	CO2
	and return true if two or more of them (integers) have the same		
	rightmost digit. The integers are non- negative.		
4	Create a Java class called Complex with the following details as	S2	CO2
	member variables within it. (1) Real (11) Imaginary. Develop a		
	Java program to perform addition and subtraction of two		
	complex numbers by using the method add() and subtract()		
	voing method display() Initialize the real and imaginary values		
	of the complex number using parameterized constructor. Also		
	demonstrate overloading constructors and methods		
5	Design an Address class with member variables Street num	<u>S2</u>	<u>CO2</u>
	city state and country and appropriate constructor Design a	52	002
	Student class with constructor (Student (String USN, String		
	Name. String addr.)). College class with constructor (College		
	(String Name, String addr)) and Employee class with		
	constructor (Employee (String EmpID, String Name, String		
	addr)). Write a Java program to create 'n' Student objects,		
	College Objects and Employee objects and print the student,		
	college and employee addresses respectively and demonstrate		
	passing of object as a parameter to the constructor.		
	Any Three		
6	JDBC:	S3	CO4
	Develop a Java application to perform CRUD operation using JDBC.		
7	Collection Framework:	S3	CO3
	Demonstrate the concept of different types of Collection Framework		
L	I like List, Map and Set etc.		Angina Bhui

Approved in XXV IIIth Academic Council Dated: 25th Jun 2024

8	Exception Handling:	S3	CO4
	Write a program that creates a user interface to perform integer		
	divisions. The user enters two numbers in the text fields, Num1 and		
	Num2. The division of Num1 and Num2 is displayed in the Result		
	field when the Divide button is clicked. If Num1 or Num2 were not an		
	integer, the program would throw Number Format Exception. If		
	Num2 were Zero, the program would throwan Arithmetic Exception.		
	Display the exception in a message dialog box.		
9	Multithreading:	S3	CO4
	Write a Java program that implements a multithreaded program with		
	three threads. First thread generates a random integer every 1 second		
	and if the value is even, second thread computes the square of the		
	number and prints. If the value is odd the third thread will print the		
	value of cube of the number.		
10	Abstract classes, Inheritance & polymorphism:	S3	CO2
	Write a java program to create an abstract class named shape that		
	contains two integers and an empty method named printArea(). Create		
	three classes named Rectangle, Triangle and Circle such that each one		
	of the classes extends the class shape. Each one of the class contains		
	only the method printArea() that print the area of the given shape		
	Any Two		
11	Write a Java program for the following: i) Create a doubly linked list	S3	CO4
	of elements. ii) Delete a given element from the above list. iii)		
	Display the contents of the list after deletion		
12	Write a java program to simulate a traffic light. The program lets the	S3	CO4
	user select one of the three lights: red, yellow or green. On selecting a		
	button, an appropriate message with "Stop" or "Ready" or "Go"		
	should appear above the buttons selected color.		
13	Write a Java program that implements Quick sort algorithm for	S3	CO4
	sorting a list of names in ascending order.		

Assessment:

ISE I (Term Work) : In-Semester Evaluation of 25 marks each will be based on practical assignments completed and timely submission

End Semester Evaluation: The ESE will be based on oral / practical performance of the students

Assessment Table:

Assessment Tool	S1	S2	S3
	CO1	СО2,	CO4
		CO3	
ISE I (Term Work)	00	10	15
End Semester Evaluation (Practical Examination	00	10	15
& Viva Voce)			

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	05	05
S2	Manipulation	10	10
S3	Precision	10	10
S4	Articulation	00	00
S5	Naturalization	00	00
	Total Marks	25	25 A

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes:

Course	Program Outcomes												PSO's		
outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1		1	2	1								1	1	1
CO2			2	1	1								1	1	1
CO3					2		1		1		2	2	1	1	1
CO4							2		3		2	3			

3 – High 2 – Medium 1 - Low



ITPCC2007 : Lab Computer Networks							
Teaching SchemeExamination Scheme							
Practical: 2Hrs/Week	ISE I	25 Marks					
Credits:01	End Semester Evaluation	25 Marks					

Course Outcomes: After completion of this course students will be able to:

- **CO1** Exercise delay, throughput, addressing and network commands
- CO2 Demonstrate algorithms and protocols used on different layers
- CO3 Develop an ability to simulate LAN, routing, flow control, congestion control and reliable data transfer
- CO4 Analyze network packets using Tools

Suggestive list of the Experiments:

The student shall perform minimum ten experiments of the following using TURBO C/C++/ Java/Python

Sr. No.	Title of the Experiments	Skill / Knowle dge Level	CO
1	 Write a program for data transfer to simulate working of Physical Layer. Write two separate programs for sender and receiver, Sender Side: 1) accept a string, convert each character into ASCII and ASCII to Binary. Receiver Side: 1) Read Binary values sent by the sender, convert into ASCII and further convert ASCII to Character and finally display the string received. 	S1	CO1
2	Use <i>ping</i> command along with at least five options for five different hosts and compare the results ping [-t] [-a] [-n <i>count</i>] [-l <i>size</i>] [-f] [-i <i>TTL</i>] [-v <i>TOS</i>] [- r <i>count</i>] [- s <i>count</i>] [-w <i>timeout</i>] [- R] [-S <i>srcaddr</i>] [- p] [-4] [- 6] <i>target</i> [/?]P Perform a Trace Route for destination on three times hours of the day. a. Find the average and standard deviation of the round-trip delays at each of the three hours. b. Find the number of routers in the path at each of the three hours. Did the paths change during any of the hours? c. Try to find the physical location of the destination and check if the delay is influenced by the distance TraceRoute Command Syntax tracert [-d] [-h <i>MaxHops</i>] [-w <i>TimeOut</i>] [-4] [-6] <i>target</i> [/?]	S1	CO2
3	Write a program to find the Class of an IP address and also check the subnet mask	S1	CO2



4	To explore propagation delay and transmission delay, consider two hosts, A and B, connected by a single link of rate R bps. Suppose that the two hosts are separated by m meters, and suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B. Write a program to calculate i) propagation delay, dprop = m/ s ii) transmission time of the packet, dtrans= L /R. iii) endtoend delay de-to-e = dprop+ dtrans (ignoring processing and queuing delays) (Eg Suppose s = $2.5*10^8$, L = 120 bits, and R = 56 kbps. Find the distance m so that dprop equals dtrans. Check the output	S2	CO1
5	Host A then groups the bits into y-byte packets. There is one link between Hosts A and B; its transmission rate is z Mbps and its propagation delay is d msec. As soon as Host A gathers a packet, it sends it to Host B. As soon as Host B receives an entire packet, it converts the packet's bits to an analog signal. To calculate the time elapse from the time a bit is created (from the original analog signal at Host A) until the bit is decoded (as part of the analog signal at Host B). Write a program to calculate : i) Time required to build the packet = (y/x) msec ii) Time required to transmit the packet= (y/z) msec iii) Consider propagation delay w msec, and calculate Total delay	S2	CO2
6	Leaky bucket consists of a bucket that can hold up to b tokens. If the bucket is filled with less than b tokens when a token is generated, the newly generated token is added to the bucket; otherwise the newly generated token is ignored, and the token bucket remains full with b tokens. Write a program to simulate Leaky bucket algorithm Any three	S2	CO3
7	Write a program for DNS lookup. Given an IP address input,	S2	CO1
8	it should return URL and vice-versa. Write a program for error detection and correction for 7/8 bits ASCII codes using CRC	S3	CO3
9	Write a program to simulate the behavior of link state routing protocol to find suitable path for transmission	S3	CO3
10	Write a program to simulate the behavior of distance vector routing protocol	S3	CO4
	Any two		
11	Simulate a Local Area Network using Network Simulator 2 (Virtual Labs may be used) OR Use Wireshark for Packet sniffing and analysis		
12	Write a program to simulate Go back N Mode of Sliding Window Protocol in peer to peer mode	83	CO3
13	Write a program to simulate Selective Repeat Mode of Sliding Window Protocol in peer to peer mode	S3	CO3
14	Write a program using sockets for wired network to implement Peer to Peer Chat	S3	CO1

Angaina Bhul

Assessment:

ISE I (Term Work) : In-Semester Evaluation of 25 marks each will be based on practical assignments completed and timely submission

End Semester Evaluation: The ESE will be based on oral / practical performance of the students

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	04	04
S2	Manipulation	08	08
S3	Precision	10	05
S4	Articulation	03	03
S5	Naturalization	00	05
Total Marks		25	25

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	3	2										2		3
CO2	1	2	2										2		1
CO3	1		2										2		1
CO4	1	3	1	2	3								2		3

3 – High 2 – Medium 1 - Low

ITOEC0010/ ITMDM5001/ITMDM6001 : Data Structures and Algorithm						
Teaching Scheme	Examination Scheme					
Lectures: 03 hrs/ week	ISE I	15 Marks				
	ISE II	15 Marks				
Credits: 03	ISE III	10 Marks				
	End Semester Examination	60 Marks				

Course description:

The course covers basics of data structures and algorithms. Topics covered in this course include abstraction, stack, queues, lists, trees, and graphs, sorting and complexity of algorithm. The course enables the students to design good efficient solutions to real world problems. **Course Outcomes:** After completing the course, students will able to:

CO1 Describe data structures arrays, stacks and queues

- **CO2** Interpret linked lists, trees and graphs
- **CO3** Demonstrate best-case, average-case and the worst-case running times of algorithms using asymptotic analysis for various sorting and searching problems
- **CO4** Choose the standard design techniques of algorithms and their applications

Detailed Syllabus:

- Unit 1 Introduction to data structures, Concept of Data type, Data object, Need of Data Structure, Types of Data Structure, Linear data structures, Introduction to Arrays, sorting algorithms with efficiency, Stacks, static and dynamic representation of stack, Stack Operations, Applications of stack, Queues, static & dynamic representation of queues, Operations on queues, Circular queue, priority queues
- **Unit 2** Linked List, Implementation of List, Types of Linked List, Operations on List, Applications of Linked List, Trees, basic terminology, operation on binary trees, linked storage representation for binary search trees, basic operations on binary search tree, tree traversals, applications of trees
- **Unit 3** Graphs: basic terminology, matrix representation & implementation of graphs, graph traversals, spanning trees. Algorithm: definition, characteristics, Need for Analysis, Space complexity, time complexity, Asymptotic notations, Space complexities
- **Unit 4** Divide and conquer basic strategy and its complexity, Sorting algorithms such as selection sort, insertion sort, bubble sort, heap sort, binary search, quick sort, merge sort
- Unit 5 Greedy method Basic strategy and its complexity, application to job sequencing with deadlines problem, Knapsack problem. Dynamic Programming Basic strategy and its complexity, principle of optimality, multistage graphs, travelling salesman problem, Backtracking basic strategy, 8-Queen's problem, Hamiltonian cycles

Text and Reference Books

1. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, "Data Structures using C and C++", Pearson Pub.

2. G.S. Baluja, "Principles of Data Structures using C and C++", Dhanpat Rai & Co.,4th Edition

3. Computer Algorithms : Horowitz, Sahani, Rajsekharan , Galgotia Publications Pvt.Ltd

4. Fundamentals of Algorithms: Brassard, Bratley, Prentice Hall

Web Resources

- 1. https://nptel.ac.in/courses/106102064
- 2. https://nptel.ac.in/courses/106106127
- 3. https://www.coursera.org/specializations/data-structures-algorithms

Mapping of Course outcomes with Program Outcomes and Program Specific Outcomes

Course outcomes		Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO	PO	PO	
										10	11	12	
CO1	3	2	1	1	1							1	
CO2	3	2	1	1	1							1	
CO3	3	2	1	1	1								
CO4	3	2	1	1	1							1	

3 – High 2 – Medium 1 - Low

Assessment:

ISE I- Maximum Marks-15

ISE II- Class Test of Maximum Marks-15

ISE III-Teacher's Assessment of Maximum Marks-10

ISE I and ISE III -May be based on one of the / or combination of few of following

1) Class Test/ Surprise test/ MCQ Test

- 2) Assignment
- 3) Quizzes

4) Any other activity suggested by course coordinator

ESE-End Semester Examination of Maximum Marks-60

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	05	2	10
K2	Understand	05	05	3	25
K3	Apply	05	05	5	25
K4	Analyze	-	00	00	00
K5	Evaluate	-	00	00	00
K6	Create	-	00	00	00
Total Marks 1	00	15	15	30	60

Assessment table:

Assessment Tool	K2	K2	K3	K3
	C01	CO2	CO3	CO4
ISE I(15 Marks)	6	5	2	2
ISEII(15 Marks)	2	3	5	5
ISEIII (10 Marks)	2	2	3	3
ESE Assessment (60 Marks)	10	20	20	10
Total Marks 100	20	30	30	20

ITMDM5002/ITMDM6002 : Lab Data Structures and Algorithm							
Teaching Scheme	Examination Scheme						
Practical: 2Hrs/Week	ISE I (Term Work)	25 Marks					
Credits:01							

Course Outcomes: After completion of this course students will be able to:

- CO1 Interpret neat code by selecting appropriate data structure
- **CO2** Discover the ability to write reusable code and abstract data types in C
- CO3 Identify appropriate data types and algorithms for solving real life problems
- CO4 Design and implement abstract data types with static or dynamic representation.

List of the Experiments:

The student shall perform minimum ten experiments of the following using TURBO C, C++/ Code Blokes.

Sr. No.	Title of the Experiments	Skill / Knowle dge Level	СО
1	 Create an array of n integers. Perform following operations on array 1. Accept a value(item) from user and insert it into specified position 2. Delete a value(item) from specified position from given array 3. Display the content of the array 	S2	CO1, CO3
2	Implement following program Sort the lists in ascending order using any sorting method	S1	CO1, CO2
3	Implement C program to accomplish the following stack operations.a)Push b)Pop c) Stack empty d)Stack Full e)Stack Empty	S1	CO1, CO2
4	 Accept n array elements, perform following operations: a)Accept a number from user b)Apply following searching techniques on it, if number is found in given array; display the position of the number. 1. Linear search 	\$3	CO2, CO3
5	Implement Simple queue to perform following operations.1. Insert an elements2. Deleting an element3. Queue is Empty4. Queue is FullDisplay the element of queue.	S2	CO2, CO3, CO4
6	Write C Program to convert following infix expression into prefix, postfix. Eg.(A+B)*(C^D)/H	S3	CO4, CO3, CO4
7	 Implement Singly linked list to perform following operations. 1. Insert a number in the beginning , Specified position and ending position of the list Delete a number from the beginning , Specified position and ending position of the list 	S3	CO2, CO3, CO4
8	plement recursive and iterative algorithms for specific problems.	S2	CO3, CO4
9	Write a program for finding maximum and minimum using divide and	S2	CO3

conquer approach	

Assessment:

ISE I (Term Work) :In-Semester Evaluation of 25 marks each will be based on practical assignments completed and timely submission

Assessment Table:

Assessment Tool	K1	K2	K3	K3
	CO1	CO2	CO3	CO4
Term work(25Marks)	06	07	06	06

Assessment Pattern: Use the relevant table for assessment pattern.

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	06	06
S2	Manipulation	07	07
S3	Precision	06	06
S4	Articulation	06	06
S5	Naturalizatio	00	00
	n		
Total Marks		25	25

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO
outcome	1											12
CO1	3	2	3		2							
CO2	3	3	3		3							
CO3	3	3	3	3	2							2
CO4	3	3	3	1	2							

3 - High 2 - Medium 1 - Low



ITPO	ITPCC2010: Statistics, Random Variables and Linear Algebra											
Teaching Scheme Examination Scheme												
Lectures	: 3 Hrs/Week	Class Test-I	: 15 Marks									
Total Credits	: 03	Class Test-II	: 15 Marks									
		Teachers Assessment	: 10 Marks									
		End Semester Exam	: 60 Marks									

Course Description: MABS 2012 Engineering Mathematics-IV is a compulsory course for second year IT students of the institute. The course aims to equip the students with statistical tools and concepts that help in decision-making. This course is intended to provide engineering students a coherent and balanced account of probability and statisticsthat form the basis of many engineering analysis tools. This course gives exposure on vector spaces and linear mapping.

Course objectives:

- 1. Create interest in students in statistical thinking.
- 2. To understand, analyze, and solve problems on random variables statistics, significance testing and goodness of fit tests for probability distributions
- 3. Understand vector spaces
- 4. Understand concepts of linear mapping and orthogonality.

Course Outcomes expected: On completion of this course student should be able to:

- **CO1** Define the basic concepts of probability distributions, random variable and sampling, vector spaces, subspaces, basis, linear transformation, eigenvalues, eigen vectors.
- **CO2** Explain the concepts of random variable, probability distributions and population parameters of large or small size sample, range and kernel of LT, inverse of LT, symmetric, skew-symmetric, and orthogonal matrices, Gram-Schmidt orthogonalization.
- **CO3** Find lines of regression, best fit of curve by least square methods. probability by using binomial distribution, poisson distribution, normal distribution, variance, standard deviation in terms of expectations, matrix associated with a linear map.
- CO4 Compute and interpret the results of bi-variate regression and correlation analysis, for forecasting
- **CO5** Apply the regression techniques (least square method) and correlation techniques to the sample data, testing hypothesis for small and large samples, non-parametric tests for significance testing and goodness of fit of the probability distribution. Gram-Schmidt orthogonalization to find Orthogonal Basis.

Detailed Syllabus:

- **Unit-I** Statistics: Measures of central tendency, dispersion, moments, skewness and kurtosis, correlation coefficient, lines of regression, curve fitting, method of least square, straight lines, second degree parabola, exponential and power curves, binomial distribution, poisson distribution, normal distribution.
- **Unit-II** Random Variables: Random variable, discrete random variables, continuous random variables, definition of distribution and types of distribution: p.d.f, p.m.f, c.d.f. of random variables, characteristic function of random variables, univariate and bivariate distribution and its marginal distribution. Mathematical Expectations: Mathematical expectation: definition and properties, mean, variance, standard deviation in terms of expectations, moment generating function, characteristics function.

- **Unit-III** Sampling and Tests of Significance: Basic concepts sampling and its type (simple random, stratified and cluster), its needs; types of hypothesis, types of error, critical region; level of significance, procedure of testing hypothesis, test of significance: large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations, test for single mean, difference of means and correlation coefficients, test for ratio of variances chi-square test for goodness of fit and independence of attributes.
- **Unit-IV** Linear Algebra-I: Vector space, linear dependence of vectors, basis, dimension; linear transformations (maps), range and kernel of a linear map, rank and nullity, inverse of a linear transformation, rank-nullity theorem, composition of linear maps, matrix associated with a linear map.
- **Unit-V** Linear Algebra-II: Eigen values, eigenvectors, symmetric, skew-symmetric, and orthogonal matrices, eigen bases, Diagonalization; inner product spaces, Gram-Schmidt orthogonalization.

Text and Reference Books:

- 1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand & Sons.
- 2. S.C. Gupta , Fundamentals of Statistics, Himalaya Publishing House
- 3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- 4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010
- 5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
- 6. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists",

Elsevier, New Delhi, 5th Edition, 2004.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO12
Outcome										0	1	
CO1	3	2										2
CO2	3	2		1								2
CO3	3	2	1	2								2
CO4	3	2	2	2								2
CO5	3	2	2	3								2

Mapping of Course outcome with Program Outcomes (Information Technology)

3 – High, 2 – Medium, 1 – Low

Teaching Strategies:

The teaching strategy planned through the lectures, and team based home works. Exercises assigned weekly to stimulate the students to actively use and revise the learned concepts, which also help the students to express their way of solving the problems fluently in written form. Most critical concepts and mistakes emphasized

Assessment:

ISE I-Class Test-I of Maximum Marks-15 ISE II-Class Test-II of Maximum Marks-15 ISE III-Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following

Surprise test
 Question & answer / Numerical solution
 Quiz
 Assignment using Mathematical tools like Mathematica/MatLab or similar
 Any other activity suggested by course coordinator



Assessment Pattern:

Assessment Pattern	Knowledge Level	ISE I (Class Test-1)	ISE II (Class Test-2)	ISE III (TA + Surprise Test)	End Semester Examination
Level No.		,	,	I	
K1	Remember	01	03		
K2	Understand	14	12	10	60
K3	Apply				
K4	Analyze				
K5	Evaluate				
K6	Create				
Total Marks 1	00	15	15	10	60



ITPCC2	ITPCC2011 : Database Management System											
Teaching Scheme Examination Scheme												
Lectures: 03 hrs/ week ISE I 15 Marks												
Tutorial: 0	ISE II	15 Marks										
Credits:03	ISE III	10 Marks										
	End Semester Examination	60 Marks										

Course Description: Database Management System. In short, a DBMS is a database program.

Technically speaking, it is a software system that uses a standard method of cataloging, retrieving, and running queries on data. The DBMS manages incoming data, organizes it, and provides ways for the data to be modified or extracted by users or other programs. Some DBMS examples include MySQL, PL/SQL, Microsoft Access, SQL Server, FileMaker, Oracle, RDBMS, dBASE, and FoxPro. Since there are so many database management systems available, it is important for there to be a way for them to communicate with each other.

Course Outcome: After completing the course, students will able to

- CO1 Understand the basic concepts and architecture associated with DBMS
- **CO2** Translate entity-relationship diagrams into relational tables, populate a relational database and formulate SQL queries on the data
- **CO3** Apply normalization steps in database design and removal of data anomalies
- CO4 Identify basic database storage structures and access techniques: file and page organizations, indexing methods
- **CO5** Analyze the principles and concepts of information integrity, security, confidentiality and transaction control

Detailed Syllabus:

Unit 1 Introduction: Database defination, Necessity of database, DBMS, Examples, Characteristics of the Database Approach, Advantage of using a Database Approach, Database System Architecture, Data Models, Schemes and Instances, Data Independence, Database Languages and Interfaces, Database System Environment, Classification of Database Management Systems. Database users and administrator.

Unit 2 ER Models, Relational Models: Different types of integrity constraints-Primary Key, Unique, Foreign key, Check, Not Null, Super key, Candidate Key, E-R model- Entity, Entity set, Strong and Weak entity, Entity-Relationship Diagrams, Entity-Relationship Design Issues, Weak Entity Sets, Attributes- Simple, Derived, Composite, Multi valued, Identifier, Relationship, Associative entity, Cardinality constraints, Degree of relationship. E-R diagram naming conventions and design issues. Examples, Extended E_R Features.
 Relational Models:-the Relational Data Model, the Relational Algebra: Fundamental Relational-Algebra Operations, Additional Relational-Algebra Operations, ER-to-Relational Mapping

Unit 3 SQL: Background, Structure of SQL Queries, Data Definition language-Create, alter, Describe, Drop, Truncate clause, create table using Integrity constraints Select clause, Set Operations, Functions-single row functions-general, conversion, date, character, Multiple row functions -Aggregate Functions, Group by clause, Having clause, Nested Sub queries, Complex Queries, Views, Modification of the Data-DML-Insert, Update, Delete, Different types of joins

Advanced SQL :, Authorization and transaction control SQL clauses, Embedded SQL, Introduction to PL/SQL-Cursor, triggers, Procedures.

- Unit 4 Database Designing and Storage: Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Decomposition Using Functional Dependencies, Decomposition using Multivalued Dependencies, More Normal Forms up to BCNF.
- Unit 5 Query Processing and Transaction Processing: Overview of Query Processing, Measures of Query Cost, Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation. Transaction support in SQL Concurrency control techniques, concurrency control based on timestamp based protocol, validation based protocol, deadlock handling, Database Recovery Techniques based on Immediate Update, Failure classification, Shadow Paging, Log based recovery, failure with loss of Nonvolatile Storage

Text Books & Reference Books

- 1. Abraham Silberschatz and Henry Korth, Sudarshan : Database System Concepts, 5th Edition, ISBN : 0-07-120413X, Tata McGraw-Hill. Author, Title of the book, Publisher, Edition, Year of publication
- 2. Elmasri and Navathe : Fundamentals of Data base Systems (5th Ed.), Addison-Wesley, 1999.
- 3. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003.
- 4. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000. 3. Peter Rob and Corlos Coronel- "Database System Concepts", Cengage Learning Edition 2008

Web Resources

- 1. <u>https://onlinecourses.nptel.ac.in/noc19_cs46/preview</u>
- 2. https://onlinecourses.swayam2.ac.in/cec21_cs11/course

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	РО	PO	РО	PSO 1	PSO 2	PSO 3
outcome										10	11	12			
CO1	1	2	2	1									1		
CO2	1	2	2										2	2	2
CO3		2	3	3									2	2	3
CO4		1	1											1	
CO5			2	3									1	1	

3- High 2 - Medium 1 - Low

Assessment:

ISE I-Class Test-I of Maximum Marks-15 ISE II-Class Test-II of Maximum Marks-15 ISE III-Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following

- 1) Surprise test
- 2) Question & answer / Numerical solution
- 3) Quizzes
- 4) Power point presentation
- 5) Any other activity suggested by course coordinator

ESE-End Semester Examination of Maximum Marks-60

Assessment Pattern:

Assessment	Knowledge	ISE I	ISE II	ISE III	End Semester
Pattern	Level				Examination
Level No.					
K1	Remember	05	05	00	05
K2	Understand	10	10	05	25
K3	Apply	00	00	05	18
K4	Analyze	00	00	00	12
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks 1	100	15	15	10	60

Assessment table:

Assessment Tool	K2	K2	K3	K4
	CO1	CO2,CO3	CO4	CO5
ISE I (15 Marks)	05	10	00	00
ISE II (15 Marks)	05	10	00	00
ISE III (10 Marks)	00	02	05	03
ESE Assessment (60 Marks)	10	20	18	12
Total Marks 100				



ITPCC2012: Operating System										
Teaching SchemeExamination Scheme										
Lectures: 03 hrs/ week	ISE I	15 Marks								
Tutorial: 0	ISE II	15 Marks								
Credits:03	ISE III	10 Marks								
	End Semester Examination	60 Marks								

Course Description: This course covers mechanisms, algorithms, and techniques used to build an operating system. It gives description about the operating system structure and the hardware support for building modern operating systems. We will cover processes, threads, inter-process communication, synchronization, and CPU scheduling. We will discuss in detail memory management. Finally, we will introduce I/O, file systems, and OS security issues.

Course Outcome: After completing the course, students will able to

- CO1 Interpret fundamental concepts, structures, layers and types of OS
- CO2 Apply process scheduling using various types of system call to find process states
- CO3 Analyze synchronization techniques for interprocess communication.
- CO4 Classify the mechanisms adopted for memory management and file management
- **CO5** Examine the issues related to security in OS

Detailed Syllabus:

- **Unit 1** Introduction to operating system: introduction to OS, evolution of Oss, functions of OS, OS structure, types of operating systems, basics of system calls.
- Unit 2 Process Management: Concept of a process: states, operations with examples from UNIX (fork, exec) and/or Windows. Process scheduling, interprocess communication (shared memory and message passing), UNIX signals.

Threads: multithreaded model, scheduler activations, examples of threaded programs.

Scheduling: multi-programming and time sharing, Context switch, scheduling algorithms, multiprocessor scheduling, and thread scheduling (examples using POSIX threads).

Unit 3 Process Synchronization: critical sections, classical two process and n-process solutions, hardware primitives for synchronization, semaphores, monitors, classical problems in synchronization (producer-consumer, readers-writer, dining philosophers, etc.).

Deadlocks: characterization, prevention and avoidance, detection and recovery.

- Unit 4 Memory Management: Basic concepts of memory, types of memory, swapping, paging segmentation, fragmentation, demand paging, virtual memory, page replacement algorithms, working set model, implementations from operating systems such as UNIX, windows, current Hardware support for paging e.g. Pentium/ MIPS processor.
- Unit 5 File Management and security of OS: Secondary storage and Input/output, device controllers and device drivers file systems, directory structure, disks, disk space management, disk scheduling, NFS, RAID, other devices, Operations on them, UNIX FS, UFS protection and security, NFS. Protection and security: Illustrations of security model of UNIX and other OSs. Examples of attacks.



Text Books & Reference Books

- 1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 8th Ed., John Wiley, 2008.
- 2. William Stallings, Operating Systems: Internals and Design Principles. Prentice-Hall, 6th Ed., 2008.
- 3. AS Tanenbaum, Modern Operating Systems, 3rd Ed., Pearson, 2009.
- 4. AS Tanenbaum, AS Woodhull, Operating Systems Design and Implementation, 3rd Ed., Prentice Hall, 2006.
- 5. M. J. Bach. Design of the Unix Operating System, Prentice Hall of India, 1986.

Web Resources

- https://nptel.ac.in/courses/106106144
- https://www.os-book.com/OS9/slide-dir/index.html

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course	Р	PO	PSO	PSO	PSO										
outcom	0	2	3	4	5	6	7	8	9	10	11	12	1	2	3
e	1														
CO1	2	3	1	2	2								3	2	2
CO2		1	2	3	2								2	3	2
CO3		1	1	3	3						2		2	3	2
CO4			1	2	3		2						2	2	3
CO5				2	3	2	2	2			2	1	2	2	3

3-High2 - Medium 1 - Low

Assessment:

ISE I-Class Test-I of Maximum Marks-15 ISE II-Class Test-II of Maximum Marks-15 ISE III-Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following

- 1) Surprise test
- 2) Question & answer / Numerical solution
- 3) Quizzes
- 4) Power point presentation
- 5) Any other activity suggested by course coordinator

ESE-End Semester Examination of Maximum Marks-60

Assessment Pattern:

Assessment	Knowledge	ISE I	ISE II	ISE III	End
Pattern	Level				Semester
Level No.					Examinatio
					n
K1	Remember	05	00	00	05
K2	Understand	10	05	05	20
К3	Apply	00	05	05	20
K4	Analyze	00	05	00	10
K5	Evaluate	00	00	00	05
K6	Create	00	00	00	00
Total Marks	Total Marks 100		15	10	60



Assessment table:

Assessment Tool	K1	K2	K3
	CO1	CO2,CO3	CO4,CO5
ISE I (15 Marks)	05	10	00
ISE II (15 Marks)	00	10	05
ISE III (10 Marks)	00	05	05
ESE Assessment (60 Marks)	10	25	25
Total Marks 100			



ITPCC2013: Lab Database Management System				
Teaching Scheme	Examination Scheme			
Practical: 2Hrs/Week	ISE I (Term Work)	25 Marks		
Credits:01	End Semester Evaluation	25 Marks		

Course Outcomes: After completion of this course students will be able to:

- CO1 Identify and test SQL queries using DDL and DML commands
- **CO2** Discover the need for logical operation, set operators, UNION, DISTINCT, LIKE, and use them appropriately
- CO3 Evaluate PL/SQL queries
- CO4 Design ER-models to represent simple database application scenarios

List of the Experiments:

Sr.	Title of the Experiments	Skill /	СО
No		Knowledge	
•		Level	
1	To Study different types of Oracle/ MySQL etc Data types	S1	CO1,CO2
2	To Study and Implement different types of DDL commands.	S1	CO1
3	To study and Implement different types of DML commands.	S2	CO1
4	To study and Implement different integrity constraints	S3	CO1,CO2
5	To Implement different types SQL functions	S3	CO1,CO2
6	To Implement subqueries.	S3	CO1,CO2
			, CO4
7	To study and Implement views.	S3	
8	To Implement different types of joins	S3	CO1,CO2
			, CO4
9	Study of Open Source Databases : MySQL	S4	CO1,CO2
10	Design at least 10 SQL queries for suitable database application	S3,S4	CO1,CO2
	using SQL DML statements: Insert, Select, Update, Delete with		,CO3
	operators, functions, and set operator		
11	To study and Execute cursor and procedure in PL/SQL	S4	CO1,CO2
			, CO3
12	To study and Execute trigger in PL/SQL	S4	CO1,CO2
			, CO4

Assessment:

ISE I (Term Work): In-Semester Evaluation of 25 marks will be based on practical assignments completed and timely submission

End Semester Evaluation: The ESE will be based on oral / practical performance of the students

Assessment Table:

Assessment Tool	S1	S2	S3	S4
	CO1	CO2	CO3	CO4
Term work(25Marks)	06	07	06	06
Practical Examination & Viva Voce(25 Marks)	06	07	06	06

Assessment Pattern: Use the relevant table for assessment pattern.



Assessment	Knowledge	ISE I	End Semester
Pattern	Level		Examination
Level No.			
S1	Imitation	06	06
S2	Manipulation	07	07
S3	Precision	06	06
S4	Articulation	06	06
S5	Naturalization	00	00
Total Marks	·	25	25

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcom	01	02	03	04	05	06	07	08	09	O 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
e															
CO1	1	2	1											1	
CO2	1	2	2	3									1	1	2
CO3	1	2	3	2										2	2
CO4		2	3	3	2									3	3

3 – High 2 – Medium 1 - Low



ITPCC2014 : Lab Operating System					
Teaching Scheme	Examination Scheme				
Practical: 2Hrs/Week	ISE I (Term Work)	25 Marks			
Credits:01	End Semester Evaluation	25 Marks			

Course Outcomes: After completion of this course students will be able to:							
CO1	Make use of different system and I/O calls, UNIX commands and shell						
	programming.						
CO2	Demonstrate algorithms for process scheduling and process synchronization.						
CO3	Determine interprocess communication and memory management schemes.						
CO4	Select and implement security solutions, file handling to manage projects.						

List of the Experiments:

The student shall perform minimum ten experiments of the following using variants of OSs

Sr. No.	Title of the Experiments	Skill / Knowledge Level	СО
1	Installation guidelines of various operating systems.	S1	CO1
2	Basic commands interpretation using OS features.	S1	CO1
3	Implement shell programming.	S1	CO1
4	Implement system calls fork (), exec () etc. and observe process states.	S2	CO1,CO2
5	Simulate the following CPU scheduling algorithms (any two) a) FCFS b) SJF c) Round Robin d) Priority.	S3	CO2
6	Simulate Bankers Algorithm for Dead Lock Avoidance and Dead Lock Prevention	S3	CO3
7	Write a C program to simulate producer-consumer problem using Semaphores.	S3	CO2,CO3
8	Write a C program to simulate the concept of Dining- philosophers problem.	S3	CO2,CO3
9	Write a C program to simulate the following contiguous memory allocation Techniques a) Worst fit b) Best fit c) First fit.	S3	CO3,CO4
10	Simulate all page replacement algorithms (any two) a)FIFO b) LRU c) OPTIMAL	S4	CO3,CO4
11	Write a C program to simulate disk scheduling algorithms(any two) a) FCFS b) SCAN c) C-SCAN	S4	CO3,CO4
12	Simulate all file allocation strategies a) Sequential b) Indexed c) Linked.	S4	CO3,CO4

Assessment:

ISE I (Term Work): In-Semester Evaluation of 25 marks will be based on practical assignments completed and timely submission

End Semester Evaluation: The ESE will be based on oral / practical performance of the students

Assessment Table:

Assessment Tool	S1	S2	S3	S4
	CO1	CO2	CO3	CO4
Term work(25Marks)	06	07	06	06



Practical Examination & Viva Voce(25 Marks)	06	07	06	06

Assessment	Knowledge	ISE I	End Semester
Pattern	Level		Examination
Level No.			
S1	Imitation	06	06
S2	Manipulation	07	07
S3	Precision	06	06
S4	Articulation	06	06
S5	Naturalization	00	00
Total Marks	·	25	25

Assessment Pattern: Use the relevant table for assessment pattern.

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course	PO1	Р	РО	РО	PO	PSO	PSO	PSO							
outcome		Ο	3	4	5	6	7	8	9	10	11	12	1	2	3
		2													
CO1	1		3	2	3								1	3	3
CO2			2	3	3								1	3	3
CO3					2		3		3		2	2	1	3	3
CO4							3		2		1	1			

3 – High 2 – Medium 1 – Low



ITVSE2001: Computer Programming Lab-I							
Teaching Scheme	Examination Scheme						
Practical: 2Hrs/Week	ISE I (Term Work)	25 Marks					
Credits:01							

Course Outcomes: After completion of this course students will be able to:

- CO1 Understand python environment and implement codes with object oriented concepts
- CO2 Identify built-in libraries of Python and requirements appropriate to its solution.
- CO3 Apply appropriate method for data visualization
- CO4 Select and apply appropriate techniques on reading data from a file using Python

Suggested list of Practicals in Python

Sr. No.	Title of the Experiments	Skill / Knowledge Level	СО
1	 Programming List Control Statements A. Write a program to display reverse of the entered number. B. Program to print Fibonacci series upto nth number. C. Write a program to display multiplication tables from 1 to 5. D. Read the String "Hello World" from the user. Make use of <i>continue</i> keyword and remove space. 	S1	CO1, CO3
2	Programming List on Functions A. Program to find the factorial of a number. B. Write a simple program to demonstrate the use of keyword andpositional argument. C. Write a program to pass a number and return square and cut of numbersimultaneously. D. Write a function calc_Distance(x1, y1, x2, y2) to calculate the distancebetween two points represented by Point1(x1, y1) and Point2 (x2, y2). <i>Theformula for calculating distance is</i> given below: Distance = $\sqrt{(x_2 - x_1)^2} + (y_2 - y_1)^2$	S2	CO1, CO2
3	 Programs on List, Tuple and Dictionaries A.Consider the list with 5 different Celsius values. Convert all those Celsiusvalues to Fahrenheit. B. Write a Program to traverse the tuples from a list. C. Consider the following example of tuple, T = (1, 3, 2, 4, 6, 5) Write a program to store numbers present at odd index into the new tuple. D.Write a function histogram that takes string as parameter and generatesa frequency of characters contained in it. Input:S = "AAPPLE". The program should create a dictionary D= {'A': 2, 'E': 1, 'P': 2, 'L': 1}. 	S2	CO2, CO3



4	 Program on Module (Math Module) A. Write a program to calculate the hypotenuse of Right angle triangle givenbelow. B. Programs on String: Write a program to print all the letters fromword1 that also appear in word2. Example: Word1 = USA North AmericaWord2= USA South America. C. Program on Class and Object-Oriented Programming. D. Write a program to calculate the volume of a box. Note: Make use of Constructor, Member variable, and Member Functions. 	S3	CO2, CO3, CO4
5	 To use of Matplotlib library A. Make use of Jupiter Notebook to run the codes to represent the following datain plots. (Line plot,Barplot,scatter plot). B. Draw subplot for following line equations : 1.Y=x 2.Y=x^2 3.Y=X^3. C. Draw sine wave and cosine wave in same plot. 	S3	CO2, CO3, CO4
6	 To use of Matplotlib library A. Make use of Jupyter Notebook to run the codes to represent the following datain plots. (Line plot,Barplot,scatter plot). B. Draw subplot for following line equations : Y=x 2.Y=x^2 3.Y=X^3. C. Draw sine wave and cosine wave in same plot. 	S3	CO2, CO3, CO4
7	To create Graphical User interfaces (GUIs) in python	S4	CO2, CO3, CO4
8	To create connectivity between Python and MySQL DATABASE.	S4	CO2, CO3, CO4

Text and Reference Books

1. Mark Lutz, Programming Python O'REILLY.

2. John M. Zelle Python Programming: Introduction to Computer Science.

3. https://www.geeksforgeeks.org/creating-a-pandas-series/

Cours	PO	PO8	PO	PO	PO1	PO	PS	PS	PS						
e	1	2	3	4	5	6	7		9	10	1	12	01	02	03
Outco															
me															
CO1	3	2	3		2								3	2	1
CO2	3	3	3		3								3	2	2
CO3	3	3	3	3	2							2	1	3	1
CO4	3	3	3	1	2								2	3	3

1 – Low 2 – Medium 3 – High

Mapping of Course outcome with Program Outcomes

Assessment Table

CO1 CO2 CO3 CO4 Term Work (50 Marks) 12 14 12 12 4	Assessment Tool	S1	S2	S3	S4]	
Term Work (50 Marks) 12 14 12 12 1		CO1	CO2	CO3	CO4]	
	Term Work (50 Marks)	12	14	12	12 🔺	ijina	RA

Recommended Assessment pattern

Assessment	Skill Level	Term	End Semester
Pattern Level		Work	Examination
No.			
S1	Imitation	12	12
S2	Manipulation	14	14
S3	Precision	12	12
S4	Articulation	12	12
S5	Naturalization	00	00
Total		50	50

ISE I (Term Work): In-Semester Evaluation of 25 marks will be based on practical assignments completed and timely submission End Semester Evaluation: The ESE will be based on oral / practical performance of the students



ITVSE2002: Computer Programming Lab-II (Full Stack Web Development)								
Teaching Scheme	Examination Scheme							
Practical : 2Hrs/Week	ISE I (Term Work)	25 Marks						
Credits:01								

Course O	Course Outcomes After completion of this course students will be able to:						
CO1	Use HTML,CSS for Front-End Web UI using modern Frameworks and Tools						
CO2	Implement JavaScript and Query for manipulation of the DOM						
CO3	Experiment with Angular, React, NodeJS, Express, and MongoDB for server-side						
	development						
CO4	Develop a fully-functional website						

List of the Experiments:

Sr.	Title of the Experiments	Skill /	CO							
No		Knowled								
•		ge Level								
	Front-End Web UI Development Frameworks and Tools(HTML5, CSS3, BOOTSTRAP5)									
1	Create a webpage with HTML describing your department with following specification:a. Change the background color of page. At the bottom create a link to take user to the top of the page.b. Insert an image and create a link such that clicking on image takes user to other page.c. Also apply font styling like italics, underline, and two other fonts to words you find appropriate. Also use header tags.	S2	CO1							
2	Design a web page using for a Technical Festival, responsive with media queries	S2	CO2							
BASICS OF JS, DOM, JQUERY										
3	Create a web pages of a e-commerce website using Bootstrap framework. 1.Index page 2.Login page with validations.	S2	CO2							
4	Create a simple web page to demonstrate JS, DOM, JQUERY	S3	CO2							
	NODEJS, EXPRESS JS									
5	5 Install node js and create a server using express js and create a weather S3 CO3 application using weather api from rapid api.									
6	Create a news webpage using html, css, bootstrap with node js and expressjs at backend with news api	S3	CO3							
ANGULAR, REACTJS, GIT, GITHUB										
7	Develop angular and react components Or Create a calculator using react and angular	S3	CO3							
8	Upgrade keeper app using react props, react devtools, mapping components, etc	S4	CO3							
	MONGODB, DEPLOYMENT									
9	9 Design and develop MongoDB Queries using CRUD operations \$3,\$4 CO3									

Assessment Table:

Assessment Tool				
	CO1	CO2	CO3	CO4
Term work (25Marks)	03	10	22	15

Approved in XXV IIIth Academic Council Bated: 25% Jun 2024

Assessment Pattern: Use the relevant table for assessment pattern.

Assessment Pattern	Knowledge Level	ISE I
Level No.		
S1	Imitation	00
S2	Manipulation	09
S3	Precision	17
S4	Articulation	09
S5	Naturalization	15
Total Marks		25

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course	Р	PO	PSO	PSO	PSO										
outcom	0	2	3	4	5	6	7	8	9	10	11	12	1	2	3
e	1														
CO1	1			1	3							2		1	
CO2	1	2	2		3							2	3	2	
CO3		2	2	2	3							2	1	2	
CO4		3	3	2	3							2	2	1	3

3 – High 2 – Medium 1 - Low

Assessment Table:

Assessment Tool	S2	S2	S3	S3	S4
	CO1	CO2	CO3	CO4	CO4
Term work	2	3	5	5	5

Assessment:

Assessment Pattern Level	Knowledge Level	ISE I						
No.								
S1	Imitation	00						
S2	Manipulation	05						
S3	Precision	05						
S4	Articulation	10						
S5	05							
Total N	Total Marks							

ISE I (Term Work): In-Semester Evaluation of 25 marks will be based on practical assignments completed and timely submission

End Semester Evaluation: The ESE will be based on oral / practical performance of the students



ITOEC1020/ITMDM5003/ ITMDM6003: Introduction to Database Management System										
Teaching SchemeExamination Scheme										
Lectures: 03 hrs/ week ISE I 15 Marks										
Tutorial: 0	ISE II	15 Marks								
Credits:03	Credits:03 ISE III 10 Marks									
	End Semester Examination	60 Marks								

Course Description: Database Management System. In short, a DBMS is a database program.

Technically speaking, it is a software system that uses a standard method of cataloging, retrieving, and running queries on data. The DBMS manages incoming data, organizes it, and provides ways for the data to be modified or extracted by users or other programs. Some DBMS examples include MySQL, PL/SQL, Microsoft Access, SQL Server, FileMaker, Oracle, RDBMS, dBASE, and FoxPro. Since there are so many database management systems available, it is important for there to be a way for them to communicate with each other.

Course	Outcome:
CO1	Understand the basic concepts and architecture associated with DBMS
CO2	Translate entity-relationship diagrams into relational tables, populate a relational database and formulate SQL queries on the data
CO3	Identify basic database storage structures and access techniques: file and page organizations, indexing methods
CO4	Analyze the principles and concepts of information integrity, security, confidentiality and transaction control

Detailed Syllabus:

Unit 1	Introduction: Database defination, Necessity of database, DBMS, Examples, Characteristics of the
	Database Approach, Advantage of using a Database Approach, Database System Architecture, Data
	Models, Schemes and Instances, Data Independence, Database Languages and Interfaces,
Unit 2	ER Models, Relational Models: Different types of integrity constraints-Primary Key, Unique, Foreign
	key, Check, Not Null, Super key, Candidate Key,
	E-R model- Entity, Entity set, Strong and Weak entity ,Entity-Relationship Diagrams, Entity-
	Relationship Design Issues, Weak Entity Sets, Attributes- Simple, Derived, Composite, Multi
	valued, Identifier, Relationship, Associative entity, Cardinality constraints, Degree of relationship. E-R
	diagram naming conventions and design issues.
	Relational Models:- Relational Data Mode and Relational Algebra: Fundamental Relational-Algebra
	Operations, Additional Relational-Algebra Operations, Extended Relational-Algebra operations. ER-to-
	Relational Mapping
Unit 3	SQL: Background, Structure of SQL Queries, Data Definition language-Create, alter, Describe, Drop,
	Truncate clause, create table using Integrity constraints Select clause, Set Operations, Functions-single
	row functions-general, conversion, date, character, Multiple row functions -Aggregate Functions, Group
	by clause, Having clause, Nested Sub queries, Complex Queries, Views, Modification of the
	Data-DML-Insert, Update, Delete, Different types of joins
Unit 4	Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal
	Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Decomposition
	Using Functional Dependencies, Decomposition using Multivalued Dependencies, Normalization
Unit 5	Query Processing and Transaction Processing: Overview of Query Processing, Measures of Query
	Cost, Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent
	Executions, Serializability, Recoverability, Implementation of Isolation. Transaction support in SQL
	Concurrency control techniques

Text Books & Reference Books

- 1. Abraham Silberschatz and Henry Korth, Sudarshan : Database System Concepts, 5th Edition, ISBN : 0-07-120413X, Tata McGraw-Hill. Author, Title of the book, Publisher, Edition, Year of publication
- 2. Elmasri and Navathe : Fundamentals of Data base Systems (5th Ed.), Addison-Wesley, 1999.
- 3. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003.
- 4. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000. 3. Peter Rob and Corlos Coronel- "Database System Concepts", Cengage Learning Edition 2008

Web Resources

https://onlinecourses.nptel.ac.in/noc19 cs46/preview

https://onlinecourses.swayam2.ac.in/cec21_cs11/course

Course	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO
outcome	1											12
CO1	1	2	2	1								
CO2	1	2	2									
CO3		2	3	3								
CO4		1	1									
CO5			2	3								

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

3– High 2 – Medium 1 - Low

Assessment Pattern:

Assessment Pattern	Knowledge Level	nowledge ISE		I ISE II		ISE III			End Semester Examination		
Level No.											
K1	Remember	05		05		00		05			
K2	Understand	10		10		05		25			
K3	Apply	00		00		05		18			
K4	Analyze	00		00		00		12			
K5	Evaluate	00		00		00		00			
K6	Create	00		00		00		00			
Total Marks	100	15		15		10		60			
Assessment table	:										
Assessment T	ool		K2		K2		K3		K4		
			CO1		CO2,C	203	CO4		CO5		
ISE I (15 Mar	05		10		00		00				
ISE II(15 Ma	ISE II(15 Marks)				10		00		00		
ISE III (10 M	arks)		00		02		05		03		

Special Instructions if any: Nil

Total Marks 100

ESE Assessment (60 Marks)

Teacher's Assessment: Teachers Assessment of 10 marks is based on one of the / or combination of few of following

10

20

- 1) Power point presentation
- 2) Question & answer / Numerical solution
- 3) Surprise test



12

18



ITEEM0010 : Professional Ethics and Cyber Laws										
Teaching Scheme Examination Scheme										
Lectures: 02 hrs/ week	ISE I	10 Marks								
Tutorial: 0	ISE II	10 Marks								
Credits: 02	End Semester Examination	30 Marks								

Course Description:

This course is aimed at to make students familiar with the fundamental concepts of computer ethics, ethical decision making, Cybercrimes and cyber laws. Also it covers fundamental; rights, Intellectual Property Issues in Cyber Space and international perspectives of cyber laws and jurisdiction.

Course Outcome: After completion of this course students will be able to:

- CO1 Define the fundamental concepts of computer ethics, ethical decision making, cyber crime and cyber law
- CO2 Illustrate computer ethics, ethical decision making, cyber crime and cyber law
- CO3 Identify and classify various cybercrimes with respect to organizational weaknesses.
- **CO4** Apply Information to individual role and ethics responsibility towards society.
- **CO5** Determine the legal bases for the right to privacy and freedom of expression in one's own nation and how those concepts vary from country to country.

Detailed Syllabus:

- Unit 1 An Overview of Ethics. Moral v/s Ethics, Why Computer Ethics, Philosophical Ethics: Distinguishing Descriptive and Normative Claims, Ethical Relativism, Utilitarianism, Deontological Theories, Rights, Virtue Ethics, Ethics for IT Professionals and IT Users Various Scenarios. Foundations of Information Ethics. Ethical Issues Involving Computer Security: Hacking, Hacktivism, and Counter hacking
- **Unit 2** Ethical Decision Making: Types of ethical choices, Making defensible decisions, Ethical dilemmas, law and ethics. Crime incident Handling Basics: Hacking, cyber activism, Tracking hackers, clues to cyber crime, privacy act, search warrants, common terms, organizational roles, procedure for responding to incidents, reporting procedures, legal considerations Information Technology Act 2000,IT. Scope, jurisdiction, offense and contraventions, powers of police, adjudication
- **Unit 3** Introduction: Cybercrime and Information Security, Cybercriminals, Classifications of Cybercrimes Cyber offenses How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism.
- Unit 4 Fundamental rights and duties in Cyberspace, Right to Privacy, Right to Data Protection, Intellectual Property Issues in Cyber Space: Copyright Law, Patent Law, Trademarks & Domain Names Related issues, right and liabilities of the government and public servant, The judicature.
- Unit 5 Introduction: Perspectives of Various Stakeholders and Challenges for International Law, Jurisdiction and Attribution of State Responsibility in Cyberspace, Regulation of Cyberspace and Human Rights, Cyber Terrorism, Future Prospects of Public International Law of Cyberspace

Text Books & Reference Books

- 1. Deborah G Johnson, "Computer Ethics", Pearson Education Pub., ISBN : 81-7758-593-2
- 2. Nina Godbole, Sunit Belapure, "Cyber Security", Wiley India, New Delhi
- 3. Public International Law of Cyberspace by Kriangsak Kittichaisaree
- 4. Earnest A. Kallman, J.P Grillo, "Ethical Decision making and IT: An Introduction with

Cases", McGraw Hill Pub.

5. Dr. Durga Das Basu introduction to constitution of India

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes	

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						3	1		2		3	
CO2						3	1		2		3	
CO3				2		1	3					
CO4						3					2	
CO5						1			2			

3- High 2 - Medium 1 - Low

Assessment:

- ISE I It shall be based on one of the / or combination of few of: Class test, MCQs test, Surprise test, Mini project, Case studies etc. Maximum marks shall be 15
 ISE II It shall be based on class test of maximum 15 marks
- ISE III It shall be based on one of the / or combination of few of: Power point presentation, Question & answer / Numerical solution, Surprise test/classroom activity, Attendance, punctuality and sincerity throughout semester, assignments etc. Maximum marks shall be 10
- **ESE** It shall be based on written examination of maximum 60 marks

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	00	00	10
K2	Understand	05	05	00	10
K3	Apply	00	05	00	10
K4	Analyze	00	00	00	00
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks	100	10	10	00	30

Assessment Pattern:

Assessment Tool	K2	K2	K3	K4
	C01	C02	C03	CO4
ISE I (10 Marks)	05	05	00	00
ISE II (10Marks)	00	05	05	00
ISE III (00 Marks)	00	00	00	00
ESE Assessment (60 Marks)	05	05	10	10
Total Marks 100	10	15	15	10



ITEEM1020: Business Intelligence			
Teaching Scheme	Examination Scheme		
Lectures: 02hrs/ week	ISE I	10 Marks	
Tutorial: 0	ISE II	10 Marks	
Credits:02	End Semester Examination	30 Marks	

Course Description: To expose the students to the basics of business intelligence system with an understanding of modeling aspects behind Business Intelligence.

Course Outcome:

- **CO1** Understand the need for business intelligence its applications
- **CO2** Know the business intelligence life cycle and its techniques
- **CO3** Explore different tools and techniques for analysis and decision making
- CO4 Discuss modeling and analysis of data

Detailed Syllabus:

- Unit 1 Business Intelligence: Effective and timely decisions Data, information and knowledge Role of mathematical models Business intelligence architectures: Cycle of a business intelligence analysis Enabling factors in business intelligence projects Development of a business intelligence system Ethics and business intelligence.
- Unit 2 Decision Making, Systems, Modeling: Introduction and Definitions, Models, Phases of the Decision-Making Process, Decision Making: The Intelligence Phase, Decision Making: The Design Phase, Decision Making: The Implementation Phase
- **Unit 3 Decision Support System:** How Decisions Are Supported, Decision Support System Configurations, Decision Support System Characteristics and Capabilities, Decision Support System Classifications, Components of Decision Support Systems
- Unit 4 Modeling and Analysis: Management Support Systems Modeling, Structure of Mathematical Models for Decision Support, Certainty, Uncertainty, and Risk Management Support Systems, Mathematical Programming Optimization, Spreadsheet Model, Linear Programming, Multiple Goals, Sensitivity Analysis, What-If Analysis, and Goal Seeking, Decision Analysis with Decision Tables and Decision Trees
- Unit 5 Business Intelligence Applications: Digital Marketing models: Google analytics, Search Engine marketing, Email marketing, Social media marketing, Sales force management, Business case studies, Logistic and Production models – Supply chain optimization, Optimization models for logistics planning, Revenue management system, Business Case studies.

Text Books & Reference Books

- 1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.
- 2. Business Intelligence: Data Mining and Optimization for Decision Making Carlo VercellisPolitecnico di Milano, Italy. A John Wiley and Sons, Ltd., Publication.
- 3. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable, Ian Dodson, Wiley publications
- 4. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
- Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
- 6. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide",

Mapping of Course	outcome with Progr	ram Outcomes and Pro	ogram Specific Outcomes

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1						2	1	1			1	2
CO2		1				1					1	1
CO3						1	3	1	1	2		1
CO4										2		2
CO5						2	1	1			1	2

3- High 2 - Medium 1 - Low

Assessment: ISE I- Maximum Marks-15 ISE II- Class Test-I of Maximum Marks-15

ISE III-Teacher's Assessment of Maximum Marks-10

ISE I and ISE III -May be based on one of the / or combination of few of following

- 1) Class Test/ Surprise test/ MCQ Test
- 2) Assignment
- 3) Quizzes
- 4) Any other activity suggested by course coordinator

ESE-End Semester Examination of Maximum Marks-60

Assessment Pattern:

Assessment	Knowledge	ISE I	ISE II	ISE III	End Semester
Pattern	Level				Examination
Level No.					
K1	Remember	00	00	00	00
K2	Understand	05	05	00	10
K3	Apply	05	05	00	10
K4	Analyze	00	00	00	10
K5	Evaluate				
K6	Create				
Total Marks 100		10	10	00	30

Assessment table:

Assessment Tool	K2	K2	K3	K4
	C01	C02	C03	CO4
ISE I (10 Marks)	05	05	00	00
ISE II(10Marks)	00	05	05	00
ISE III (00 Marks)	00	00	00	00
ESE Assessment (60 Marks)	05	05	10	10
Total Marks 100	10	15	15	10

INVEC0010 : Universal Human Values -II Understanding Harmony				
Teaching Scheme	Examination Scheme			
Lectures: 02 Hrs. / Week	ISE I Online Examination	10 Marks		
Credits: 02	ISE II Online Examination	10Marks		
	End Semester Examination	30 Marks		
	Online Examination			

Course Objective: The objective of the course is fourfold:

- 1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- 2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
- 3. Strengthening of self-reflection
- 4. Development of commitment and courage to act.

Course Outcomes : After completing the course students will be

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to- day settings in real life, at least a beginning would be made in this direction.

This is only an introductory foundational input. It would be desirable to follow it up by a) faculty-student or mentor-mentee programs throughout their time with the institution

b) Higher level courses on human values in every aspect of living. E. g. as a professional

Detailed Syllabus:

Unit 1	Course Introduction - Need, Basic Guidelines, Content and Process for Value	
	Education	
	Purpose and motivation for the course, recapitulation from Universal Human	
	Values-I Self-Exploration-what is it? - Its content and process; 'Natural	
	Acceptance' and Experiential Validation- as the process for self-exploration.	
	Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right	
	understanding, Relationship and Physical Facility- the basic requirements for	
	fulfilment of aspirations of every human being with their correct priority.	
	Understanding Happiness and Prosperity correctly- A critical appraisal of the	
	current scenario. Method to fulfil the above human aspirations: understanding and	
	living in harmony at various levels.	
	Home Work: Include practice sessions to discuss natural acceptance in human being	
	as the innate acceptance for living with responsibility (living in relationship, harmony	
	and co- existence) rather than as arbitrariness in choice based on liking-disliking	
Unit 2	Understanding Harmony in the Human Being - Harmony in Myself!	
	Understanding human being as a co-existence of the sentient 'I' and the	
	material Body'. Understanding the needs of Self ('1') and 'Body' - happiness and	
	physical facility. Understanding the Body as an instrument of '1' (I being the doer,	
	seer and enjoyer). Understanding the characteristics and activities of 1 ⁻ and	
	harmony in T. Understanding	
	theharmonyoflwiththeBody:SanyamandHealth;correctappraisalofPhysicalneeds,	
	meaning of Prosperity in detail. Programs to ensure Sanyam and Health.	
	Home work: Include practice sessions to discuss the role others have played in	
	making material goods available to me. Identifying from one's own life. Differentiate	
	between prosperity and accumulation. Discuss program for ensuring health vs dealing	ina.
	withdisease	in XXV III th Academi

BAred

Unit 3	Understanding Harmony in the Family and Society- Harmony in
	Human- Human Relationship
	1Understanding values in human-human relationship; meaning of Justice (nine
	universal values in relationships) and program for its fulfilment to ensure mutual
	happiness; Trust and Respect as the foundational values of relationship.
	Understanding the meaning of Trust; Difference between intention and competence.
	Understanding the meaning of Respect, Difference between respect and
	differentiation; the other salient values in relationship. Understanding the harmony
	in the society (society being an extension of family): Resolution, Prosperity,
	fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a
	universal harmonious order in society- Undivided Society, Universal Order- from
	Tamily to world family.
	Home work: Include practice sessions to reflect on relationships in family, nostel
	and institute as extended family, real life examples, teacher-student relationship, goal
	scenarios Elicit examples from students' lives
Unit 4	Understanding Harmony in the Nature and Existence - Whole existence as
	Coexistence
	Understanding the harmony in the Nature. Interconnectedness and mutual fulfilment
	amongthefourordersofnaturerecvclabilityandself-regulationinnature.Understanding
	ExistenceasCo-existenceofmutuallyinteractingunitsinallpervasivespace.Holistic
	perception of harmony at all levels of existence.
	Home Work: Include practice sessions to discuss human being as cause of
	imbalance in nature (film
	"Home" can be used), pollution, depletion of resources and role of technology etc.
Unit 5	$\label{eq:constraint} Implications of the above Holistic Understanding of Harmony on Professional Ethics$
	Naturalacceptanceofhumanvalues.DefinitivenessofEthicalHumanConduct.Basisfor
	Humanistic Education, Humanistic Constitution and Humanistic Universal Order.
	Competence in professional ethics:
	a.Abilitytoutilizetheprofessionalcompetenceforaugmentinguniversalhumanorderb.
	Ability to identify the scope and characteristics of people friendly and eco-friendly
	production systems,
	management patterns for above production systems
	Some Case Studies can be given as home work: Case studies of typical holistic
	technologies management models and production systems Strategy for transition
	from the present state to Universal Human Order.
	a. At the level of individual: as socially and ecologically responsible engineers.
	technologists and managers
	b. At the level of society: as mutually enriching institutions and organizations
	Sum up.
	HomeWork: Include practice Exercises and Case Studies will be taken up in
	Practice Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text and Reference Books

- 1. HumanValuesandProfessionalEthicsbyRRGaur,RSangal,GPBagaria,ExcelBooks,New Delhi,2010
- 2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
- 3. HumanValues, A.N. Tripathi, NewAgeIntl. Publishers, NewDelhi, 2004.3. The Story of Stuff (Book).
- 4. The Story of My Experiments with Truth by Mohandas Karamchand Gandhi 5. Small is Beautiful E. FSchumacher.
- 5. Slow is Beautiful CecileAndrews
- 6. Economy of Permanence J CKumarappa
- 7. Bharat Mein Angreji Raj PanditSunderlal
- 8. Rediscovering India byDharampal

- 9. Hind Swaraj or Indian Home Rule by Mohandas K.Gandhi
- 10. India Wins Freedom Maulana Abdul KalamAzad
- 11. Vivekananda Romain Rolland(English)
- 12. Gandhi Romain Rolland(English)

MODE OF CONDUCT

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them. While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements. Such observations and their analyses are shared and discussed with other students and facultymentor, inagroupsitting. Tutorials(experimentsorpractical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of

commitment,namelybehavingandworkingbasedonbasichumanvalues.Itisrecommendedthat this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, highercourses.

This course is to be taught by faculty from every teaching department, including HSS faculty.

Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.



EEAEC2010: Technical Communication				
Teaching Scheme	Examination Scheme			
Lectures: 02Hrs. /Week	ISEI	10 Marks		
Credit: 02	ISEII	10 Marks		
	End Semester Examination	30 Marks		

Course Outcomes: At the end of the course, the student will be able to

CO1	Understand the nature and objective of Technical Communication relevant for the work place
	as Engineers.
CO2	Utilize the technical writing for the purposes of Technical Communication and its exposure in
	various dimensions
CO3	Imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
CO4	Evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.

Detailed Syllabus:

Unit	Fundamentals of Technical Communication:										
Ι	Technical Communication: Features; Distinction between General and Technical										
	Communication; Language as a tool of Communication; Dimensions of Communication:										
	Reading & comprehension; Technical writing: sentences; Paragraph; Technical style:										
	Definition, types & Methods; The flow of Communication: Downward; upward, Lateral or										
	Horizontal; Barriers to Communication.										
Unit	Forms of Technical Communication:										
Π	7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy,										
	correctness, consideration; Technical Report: Definition & importance; Thesis/Project writing:										
	structure & importance; C.V./Resume writing; Technical Proposal: Types, Structure & Draft.										
	Seminar & Conference paper writing.										
Unit	Technical Presentation:										
III	Strategies & Techniques Presentation: Forms; interpersonal Communication; Classroom										
	presentation; style; method; Individual conferencing: essentials: Public Speaking: method;										
	Techniques: Clarity of substance; emotion; Humour; Modes of Presentation; Overcoming Stage										
	Fear: Confident speaking; Audience Analysis & retention of audience interest										
Unit	Technical Communication Skills and Kinesics & Voice Dynamics:										
IV	Interview skills; Group Discussion: Objective & Method; Seminar/Conferences Presentation										
	skills: Focus; Content; Style; Critical thinking; Nuances: Exposition narration & Description;										
	Socio-linguistic competence: Strategic competence: Solution of communication problems with										
	verbal and non verbal means.										
	Definitions; importance; Features of Body Language; Voice Modulation: Quality, Pitch;										
	Rhythm; intonation; Pronunciation; Articulation; stress & accent; Linguistic features of voice										
	control: Vowel & Consonant Sounds.										

Text and Reference Books

- 1. Technical Communication Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, New Delhi.
- 2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., New Delhi.
- 3. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, Delhi.
- Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.

Mapping of Course outcomes with Program outcomesand Program Specific Outcomes:														
Course	PO	PO1	PO1	PO1	PSO	PSO								
Outcome	1	2	3	4	5	6	7	8	9	0	1	2	1	2
s														
CO1										2				
CO2										3				1
CO3										2				
CO4										3				

ning of C outo vith Pr outcomo nd Pi Specific Out М

1 – Low, 2 – Medium, 3 – High



CEVEC0010: Environmental Science									
Teaching Scheme Examination Scheme									
Lectures: 02 Hrs. / Week	ISE I	10 Marks							
Credits: 02	ISE II	10 Marks							
End Semester Examination 30 Marks									

Course Objectives:

- 1. To become aware about the various types of pollution, its sources, effects and control measures
- 2. To become aware about present environmental issues
- 3. To become aware of the importance of natural resources and environmental legislation
- 4. To become aware about environmental biotechnology and bio monitoring
- 5. To become aware of the biodiversity, conservation methods and factors for the loss of biodiversity

Course Outcomes : After completing the course students will able to							
CO1	Learn about the basics of environment.						
CO2	Understand the harmful effects of human activities on environment and their						
	solutions						
CO3	Understand the biodiversity, conservation methods and factors for the loss of						
	biodiversity						
CO4	Understand the concept of climate change, global warming, acid rain, various						
	disasters and its mitigation measures						

Detailed syllabus:

Unit-I	A)Understanding Environment
	- Environment: concept and importance
	- Components of environment: Physical, Biological and Social
	- Ecosystem Concept, Structure and Function
	- Producers, Consumers and Decomposers
	- Food chain, Food web and Ecological pyramids
	- Energy flew in an Ecosystem.
	- Ecosystem services Ecological, economic, social, aesthetic and informational
	B) Natural Resources
	 Land resources: global land use patterns, concept land degradation and desertification Forest resources: Use and consequences of over-exploitation
	- Water resources: Use and consequences of over-utilization, concept of water harvesting and watershed management, water conflicts
	- Energy resources Renewable and non-renewable energy sources, growing energy needs
	and alternate energy sources
Unit-II	A) Biodiversity and its conservation
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear;
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; Solid waste management
Unit-II	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; Solid waste management Liquid waste management
Unit-II Unit-	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; Solid waste management Liquid waste management Environmental issues, policies and practices
Unit-II Unit- III	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; Solid waste management Liquid waste management Environmental issues, policies and practices Global environmental issues: Increase in greenhouse gases, climate change, Acid rain
Unit-II Unit- III	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; Solid waste management Liquid waste management Environmental issues, policies and practices Global environmental issues: Increase in greenhouse gases, climate change, Acid rain and stratospheric ozone layer depletion
Unit-II Unit- III	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; Solid waste management Liquid waste management Environmental issues, policies and practices Global environmental issues: Increase in greenhouse gases, climate change, Acid rain and stratospheric ozone layer depletion Salient features of Environment Protection Act, 1986
Unit-II Unit- III	 A) Biodiversity and its conservation Biodiversity definition, levels (genetic, species and ecosystem) and values Threats to biodiversity: habitat loss, poaching of wildlife, biological invasions Concept of endemism and hot spots of biodiversity Conservation of biodiversity: In-situ and Ex-situ concepts B) Environmental Pollution Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; Solid waste management Liquid waste management Environmental issues, policies and practices Global environmental issues: Increase in greenhouse gases, climate change, Acid rain and stratospheric ozone layer depletion Salient features of Environment Protection Act, 1986 Environmental education: Formal and Informal education

Approved in XXV IIIth Academic Counc Dated: 25th Jun 2024

BA

Text and Reference Books

- 1. A Text Book of Environmental Studies by Bharucha E, University Press (India) Pvt. Ltd
- 2. Text Book of Environmental Studies by Nadaf F. M., Pawaskar V. R., Intellectual Book Bureau, Bhopal
- 3. Fundamental of Ecology by Odum E. P, Natraj Publishers, Dehradun
- 4. Introduction to Environmental Engineering and science by Gilbert M and Wendell P., Pearson Education India
- 5. Environmental Science by S.C Santra, New Central Book Agency
- 6. Environmental Education by Sharma R. A

Mapping of Course outcomes with Program outcomesand Program Specific Outcomes:

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Outcomes												
CO1	3		1									
CO2	3		1									
CO3	3		1									
CO4	3		1									

1 - Low, 2 - Medium, 3 - High

Assessment Pattern

Assessment Pattern Level No.	Knowledge Level	ISE-I	ISE-II	End Semester Examination
K1	Remember	02	02	10
K2	Understand	04	04	10
K3	Apply	04	04	10
K4	Analyze	00	00	00
K5	Evaluate	00	00	00
K6	Create	00	00	00
Total Marks 50		10	10	30

Assessment table

Assessment Tool	CO1	CO2	CO3	CO4
	K1+K3	K1+K3	K1+K3	K1+K3
ISE I (10 Marks)	5	5	5	
ISE II (10 Marks)		5	5	5
ESE Assessment (30 Marks)				



Structure of B. Tech. in Information	Technology with multidise	ciplinary minor for DSY Stud	lents:
--------------------------------------	---------------------------	------------------------------	--------

Course Types/ Semester	III	IV	V	VI	VII	VIII	Total
Programme Core Course (PCC)		11+ 02*	11	11			50
Programme Elective Course (PEC)			7	10	3	-	20
Multidisciplinary Minor (MD M)	4	3	4	3			14
Open Elective (OE) Other than a particular program	3	3	2				8
Vocational and Skill Enhancement Course (VSEC)		2		2			4
Ability Enhancement Course (AEC - 01, AEC-02)		2					2
Entrepreneurship/Economics/ Management Courses	2	2					4
Indian Knowledge System (IKS)							0
Value Education Course (VEC)	2	2					4
Research Methodology						4	4
Comm. Engg. Project (CEP)/Field Project (FP)	2						2
Project					4		4
Internship/ OJT					06	06	12
Co-curricular Courses (CC)						-	-
Total Credits / Semester with MDM	30	25	24	26	13	10	128

Angaina Brud Approved in XXV IIIth Academic Council Dated: 26th Jun 2024