Government College of Engineering, Aurangabad

Chhatrapati Sambhajinagar

(An Autonomous Institute of Government of Maharashtra)

Station Road, Osmanpura, Aurangabad – 431005 (M.S.)
Phone – (0240) 2366101, 2366111, Fax (0240) 2332835

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SY B.TECH. (CSE) CURRICULUM STRUCTURE

FROM ACADEMIC YEAR 2024-25

As per NEP

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

Vision of the Institute

- In pursuit of global competitiveness, the institute is committed to excel in engineering education and research with concern for environment and society.

Mission of the Institute

- Provide conducive environment for academic excellence in engineering education.
- Enhance research and development along with promotion to sponsored projects and industrial consultancy.
- Foster development of students by creating awareness for needs of society, sustainable development and human values.

Vision of the Computer Science & Engineering Department

- To develop cultured and technically competent computer professionals and scholars with sustained growth in employability, high impact research outcome and become genuine asset to industry and society

Mission of the Computer Science & Engineering Department

- Developing Creativity and Logical Reasoning amongst the learner
- Updating curricula according to industry requirements and standards
- Promote leadership quality, social accountability and ethics in disciplined environment, quality Education.
- Creating environment conducive to research

Program Outcomes

Engineering Graduates will be able to:

- PO1: Apply knowledge of mathematics, science and algorithm in solving complex Computer engineering problems.
- PO2: Generate solutions by conducting experiments and applying techniques to analyze and interpret data.
- PO3: Design component, or processes to meet the needs within realistic constraints.
- PO4: Identify, formulate, and solve Software Engineering, Networking and Data Mining problems.
- PO5: Comprehend professional and ethical responsibility in computing profession.
- PO6: Express effective communication skills.
- PO7: Participate in global, economic, environmental, and societal context.
- PO8: Recognize the need for, and an ability to engage in life-long learning.
- PO9: Knowledge of contemporary issues and emerging developments in computing profession.
- PO10: Utilize the techniques, skills and modern computer Engineering tools, Software and techniques necessary for Engineering practice.
- PO11: Function effectively as an individual and as a member or leader in diverse teams

and in multidisciplinary settings.

- PO12: Design research problems and conduct research in computing environment.

Program Specific Outcomes

- PSO1:-Ability to apply probability, statistics, programming applications and science in the development of computing solution in appropriate areas for system software, database, networking, web development, network security & Operating system.
- PSO2 :- Ability to apply standard practices & methods in software project management and development using suitable programming environment & tools to deliver a quality product for the industry.
- PSO3:-Able to apply ethical, social, professional, fields with proper communication skills & team work & pursue lifelong learning

GENERAL COURSE STRUCTURE & THEME

A. Definition of Credit

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

B. Total Credits for the completion of B.Tech. in Computer Science & Engineering:

The total number of credits proposed for the four-year B.Tech in Computer Science & Engineering **(**CSE) with 1 Multidisciplinary minor (Compulsory) degree is **176** as per the structure given below**:**

A. Semester wise Credit Distribution Structure for Four Year UG Program in Computer Science & Engineering with One Multidisciplinary Minor

Semester	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**Total Credits**

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Basic Science Course	BSC/ESC	8	8		--	--	--	--	--	16
Engineering Science Course		7	7		--	--	--	--	--	14
Programme Core Course (PCC)	Program Courses	--	02	11	11	6	12	8	0	50
Programme Elective Course (PEC)		--	--			04	08	08	0	20
Multidisciplinary Minor (MD M)	Multidisciplinary Courses		-	04	03	04	03	0	00	14
Open Elective (OE) Other than a particular program		--	--	03	03	02	--	--	--	08
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	02	02	--	02	--	02	--	--	08
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)		02		02	--	--	--	--	04
Entrepreneurship/Economics/ Management Courses		--		02	02	--	--	--	--	04
Indian Knowledge System (IKS)		02			--	--	--	--	--	02
Value Education Course (VEC)		--	--	02	02	--	--	--	--	04
Research Methodology	Experiential Learning Courses	--	--	--	--	--	--		04	04
Comm. Engg. Project (CEP)/Field Project (FP)		--	--	02	--	--	--	-	-	02
Project		--	--	--	--	--	--	04		04
Internship/ OJT		--	---			--	--		12-	12
Co-curricular Courses (CC)	Liberal Learning Courses	02	02		--	--	--	--	-	04
Total Credits (Major)		**21**	**23**	**27**	**24**	**20**	**25**	**20**	**16**	**170**

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Students can opt for any of the following as per the rules 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 / programming paradigm = 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

VOCATIONAL AND SKILL ENHANCEMENT COURSE (VSEC)

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	VSEC	Computer Workshop	I	0	0	4	**02**
2	VSEC	Engineering Exploration	II	0	0	4	**02**
3	VSEC	Software Laboratory - I (Python Programming)	IV	0	0	4	**02**
4	VSEC	Competative programming/SDL-2(Java programming/WT)	VI	0	0	4	**02**
Total Credits							**08**

4.HUMANITIES & SOCIAL SCIENCES COURSES [HSSM]

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1.	Indian Knowledge System (IKS)	Indian Knowledge System	I	2	0	0	**02**
2.	Ability Enhancement Course (AEC)	Communication Skills	II	2	0	0	**02**
3.	Entrepreneurship/Economics/ Management Courses	Psychology	III	2	0	0	**02**
4.	Value Education Course (VEC)	Universal Human values	III	2	0	0	**02**
5.	Ability Enhancement Course (AEC)	Technical Communication	IV	2	0	2	**02**
6.	Entrepreneurship/Economics/ Management Courses	Personality Development	IV	2	0	0	**02**
7.	Value Education Course (VEC)	Environmental studies(EVS)	IV	2	0	0	**02**
Total Credits							**14**

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5. EXPERIENTIAL LEARNING COURSES (ELC)

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	Comm. Engg. Project (CEP)/Field Project (FP)	Mini Project	III	0	0	4	**02**
2	Project	Project	VII	0	0	8	**04**
3	Research Methodology	Research Methodology	VIII	4		0	**04**
4	Internship/ OJT	Internship	VIII	-	-	24	**12**
Total Credits							**22**

6. LIBERAL LEARNING COURSES (CO-CURRICULAR COURSES (CC))

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	CC	Yoga	I	0	0	4	**02**
2	CC	NSS/ Sports/ Clubs Activities	II	0	0	4	**02**
Total Credits							**04**

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7. MULTIDISCIPLINARY MINOR (MD M)and OPEN ELECTIVE (OE) OTHER THAN A PARTICULAR PROGRAM

List of Multidisciplinary Minor Courses from other faculties: Total 14 Credits as per GR
Two courses of 4 credits and two courses of 3 credits.
Open electives of 8 credits can be offered from these other faculties.
Two courses of 3 credits and 01 course of 02 credits.

Specialization	Dramatics	Film Making	Fine Art	Music
Multi-disciplinary Minor - 01	Dramatic Theory, Literature	Videography + Cinematography	Applied Art (Digital Art)	Theory of Indian Music
Multi-disciplinary Minor – 02	Acting	Video Editing and Lighting	Painting (Generative Art)	Ancient and Modern Poetry
Multi-disciplinary Minor – 03	Directing	Story telling Story Boarding	Sculpture (3D-Space)	The Evolution of music
Multi-disciplinary Minor – 04	Playwriting	UI/UX and Animation	Visual Communication (Evolutionary Art)	Music and Film
Multi-disciplinary Minor – 05	Applied Interactive Theatre	Art of Visual Communication	Graphics Art (Print & Printing Art)	Introduction to Electronic and Computer Music
Multi-disciplinary Minor - 06	Technical Theatre	Film & TV Directing	Art Culture	Analysis of Tonal Music

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Specialization	Management & Finance	Law	Social Science	Journalism
Multi-disciplinary Minor - 01	Microeconomics	Constitutional Law	Indian Economics	Principles of Communication
Multi-disciplinary Minor – 02	Corporate Social Responsibility	Human Rights & International Law	Introduction to Sociology	Fundamentals of Journalism
Multi-disciplinary Minor – 03	Principles of Accounting	Environmental Law	Geo-Informatics	Cyber Journalism
Multi-disciplinary Minor – 04	Business Intelligence	Civil Procedure Code (CPC)	Introduction to Political Sciences	Basics of Design & Graphics
Multi-disciplinary Minor – 05	Marketing Research	Land Laws including ceiling and other local laws	Corporate sociology	Mass Communication: Concepts and Processes
Multi-disciplinary Minor - 06	Corporate Governance and Business Ethics	Cyber Law	Modern India- Political, Economic & Social Ethos	IT and Online Journalism

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In addition to above courses following Groups are offered as Multidisciplinary Minor by Computer Science & Engineering Department

A) Artificial intelligence / Machine learning Group

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	MDM 5001/ 5002	Introduction to Data Science	III	3	0	1	**04**
2	MDM 5003	Introduction To Machine Learning	IV	3	0	0	**03**
3	MDM 5004/5005	Artificial Intelligence	V	3	0	1	**04**
4	MDM 5006	Neural network	VI	3	0	0	**03**
Total Credits							**14**

B) Programming Group

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	MDM 6001/6002	C programming	III	3	0	1	**04**
2	MDM 6003	Object oriented programming	IV	3	0	0	**03**
3	MDM 6004/6005	Java programming	V	3	0	1	**04**
4	MDM 6006	Python Programming	VI	3	0	0	**03**
Total Credits							**14**

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Tentative Teaching and Evaluation Scheme from year 2024-25 as per NEP

Second Year B. Tech. Program in Computer Science and Engineering Multidisciplinary Minor

Semester III

Course				**Teaching Scheme**			**Continuous Evaluation in terms of Marks**					
Sr no	**Category**	**Course Code**	**Course Name**	**TH**	**T**	**PR**	**Credits**	**ISE I**	**ISE II**	**ISE III**	**ESE**	**Total**
1	PCC	CSPCC2001	Engineering Mathematics III(Statistical Differential Calculus)	3	-	-	3	15	15	10	60	100
2	PCC	CSPCC2002	Data Structure	3	-	-	3	15	15	10	60	100
3	PCC	CSPCC2003	Operating system	3	-	-	3	15	15	10	60	100
4	MDM	CSMDM5001 /CSMDM6001	Multidisciplinary Minor	3		-	3	15	15	10	60	100
5	PCC	CSPCC2004	Lab DataStructure	-	-	2	1	-	-	25	25	50
6	PCC	CSPCC2005	Lab Operating System	-	-	2	1	-	-	25	25	50
	MDM	CSMDM5002 /CSMDM6002	Lab Multidisciplinary Minor	-	-	2	1			25	25	50
8	OE1	CSOEC0010	Open Elective-1	3	-	-	3	15	15	10	60	100
9	VEC	INVEC0010	Universal Human Value	2	-	-	2	10	10	-	30	50
10	EECM/HSSM	CSEEM0010	Psychology	2	-	-	2	10	10	-	30	50
11	CEP/FP	CSEP2001	Mini Project			4	2			50	50	100
12												
Total				**19**	**0**	**10**	**24**	**95**	**95**	**175**	**485**	**850**

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Tentative Teaching and Evaluation Scheme from year 2024-25 as per NEP

Second Year B. Tech. Program in Computer Science and Engineering Multidisciplinary Minor

Semester IV

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Course				Teaching Scheme			Continuous Evaluation in terms of Marks					
Sr No	**Category**	**Course Code**	**Course Name**	**TH**	**T**	**PR**	**Credits**	**ISE I**	**ISEII**	**ISE III**	**ESE**	**Total (100)**
1	PCC	CSPCC2006	Discrete Mathematic Structure	3	-	-	3	15	15	10	60	100
2	PCC	CSPCC2007	Database Management System	3		-	3	15	15	10	60	100
3	PCC	CSPCC2008	Object Oriented Programming	3			3	15	15	10	60	100
4	OE2	CSOEC1020	OpenElective-II	3	-		3	15	15	10	60	100
6	(MD M)	CSMDM5003/ CSMDM6003	Multidisciplinary Minor	3	-	-	3	15	15	10	60	100
7	PCC	CSPCC2009	Lab Database Management System	-	-	2	1	-	-	25	25	50
8	PCC	CSPCC2010	Lab Object Oriented Programming			2	1			25	25	50
9	VSEC/	CSVSE2001	Software Laboratory - I (Python Programming)			4	2			50	50	100
10	VEC	INVEC1020	Environmental studies(EVS)	2			2	10	10	--	30	50
11	HSSM	CSEEM1020	Personality Development	2			2	10	10	--	30	50
12	AEC	EEAEC2010	Technical Communication	2	-	-	2	10	10	-	30	50
			Total	**21**	**00**	**8**	**25**	**105**	**105**	**150**	**490**	**850**

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Semester-III

CSPCC2001 :Engineering Mathematics-III(Statistical Differential Calculus)			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	**ISE- I**	15 Marks
Tutorial	0 Hr/Week	**ISE-II**	15 Marks
Total Credits	03	**ISE- III**	10 Marks
		End Semester Exam	60 Marks

Perquisites: Nil

Course Description: 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 statistics that form the basis of many engineering analysis tools.

Course objectives:

Create interest in students in statistical thinking.

1. To understand, analyze, and solve problems on random variables statistics, significance testing and goodness of fit tests for probability distributions

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Course Outcomes expected:

On completion of this course student should be able to:

Course Outcomes	
CO1	Define the basic concepts of probability distributions, random variable and sampling.
CO2	Explain the concepts of random variable, probability distributions and population parameters of large or small size sample.
CO3	Apply the regression techniques (least square method) and correlation techniques to the sample data, testing hypothesis for small and large samples.
CO4	Compute and interpret the results of bi-variate regression and correlation analysis, for forecasting.
CO5	to apply non-parametric tests for significance testing and goodness of fit of the probability distribution.

Detailed Syllabus:

Unit-I	Basic 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.
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.
Unit-III	Mathematical Expectations: Mathematical expectation: definition and properties, mean, variance, standard deviation in terms of expectations, moment generating function, characteristics function.
Unit-IV	Probability distribution: Binomial distribution, Poisson distribution, normal distribution, chi-square distribution and student's t distribution.

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Unit-V	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.

Text and Reference Books :

1. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 12th ed. New Delhi: S. Chand & Sons, 2014.
2. S.C. Gupta, *Fundamentals of Statistics*, 7th ed. Maharashtra: Himalaya Publishing House, 2021.
3. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th ed.John Wiley & Sons, New York, 2006.
4. B.S. Grewal, *Higher Engineering Mathematics*, 35th ed., Delhi : Khanna Publishers, 2000.
5. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Reprint, New Delhi: Laxmi Publications, 2010.
6. Ross, S.M., *Introduction to Probability and Statistics for Engineers and Scientists*, 5th ed. New Delhi: Elsevier, 2004.

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Mapping of Course outcome with Program 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
CO1	3	2		2								1
CO2	3	2		2								1
CO3	3	2		2	2							1
CO4	3	3		3								1
CO5	3	3		3								1

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

Teacher's Assessment: Teacher's assessment of 10 marks based on the following.

1) Home assignments
2) Surprise tests with multiple choice questions.

Assessment: ISE-I, ISE-II, ISE-III (Class Test-1, Class Test-2, TA) & ESE

TA: Students will perform one or more of the following activities

1. Surprise Test
2. Assignment using Mathematical tools like Mathematica / MatLab or similar.
3. Quiz
4. Any other activity suggested by course coordinator

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Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I (Class Test-1)	ISE II (Class Test-2)	ISE III (TA+Surprise Test)	End Semester Examination
K1	Remember	01	03		
K2	Understand	14	12	10	60
K3	Apply				
K4	Analyze				
K5	Evaluate				
K6	Create				
Total Marks 100		15	15	10	60

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CSPCC2002: Data Structures			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	**ISE-I**	15 Marks
Tutorial	0	**ISE-II**	15 Marks
Total Credits	03	**ISE-III**	10 Marks
		End Semester Exam	60 Marks

Perquisites: None

CourseDescription:

This course represents a conceptual and practical introduction to organizing data computers so that it can be used efficiently. The course is designed to develop skills to design and analyze simple linear and non linear data structures. It strengthens the ability of the students to identify and apply the suitable data structure for the given real world problem. It enables them to gain knowledge in practical applications of data structures. This course introduces concepts like ADT, stack, queue, linked lists, tree, graph, sorting technique and searching technique.

Course Outcomes:

After Successful Completion The Course,students will be able to:

Course Outcomes	
CO1	Describe the concept of data abstraction and data structures like stack,queue.
CO2	Implement Various Linear Data Structures Like Stacks,queues,linked lists.
CO3	Implement andtraversevariousnonlineardatastructuresliketreesandgraphs.
CO4	Analyze Compare various searching and sorting techniques.
CO5	Develop User defined data structures in a high level language.

Detailed Syllabus:

Unit 1	**Introduction To Data Structure, Stack Queues:** Data structure - linear and nonlinear, abstract data typeAlgorithm, The stack as an ADT, stack applications - Basic Definition and examples: Infix, Postfix, and Prefix, Program to evaluate a Postfix expression, Limitations of the program,The queue and its sequential representation, The queue as an ADT.
Unit 2	**Linear Data Structure & their representation**: Definition, concept, operation on

	linked lists, Circular linked lists, Doubly linked lists, Operations Like Insertion, deletion, insertion order, searching, updating, Application Of linked list such a polynomial manipulation, Comparison Singly Linked, circularly linked list & doubly linked list.
Unit 3	**Trees**: Definition, Basic terminology, operation binary trees,linked storage representation for binary search trees, Basic operation on binary search tree such as creating a binary search tree, searching, modifying an element, inserting & deleting the element, destroy a binary search tree, tree traversals ,in-order, pre-order, post-order ,tree application for expression evaluation & for solving sparse matrices, height balanced trees 2-3 tree, B trees, B+ trees.
Unit 4	**Graphs**: Definition, Basic Terminology, matrix representation implementation of graphs, graph Traversals, DFS, BFS, shortest Path, spanning tree.
Unit 5	**Sorting & searching and hashing techniques**: Different sorting tech, classification on the basis of big-O notation, tech such as straight selection sort, bubble sort, merge sort, quick sort, heap sort, shell sort, radix sort, comparisons between different sorting techniques. Sequential Searching, binary searching, Hashing Techniques.

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

Course outcome	ProgramOutcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3						2					2	2	
CO2	2	3						2		2			3	2	
CO3	2	3						2		2			3	2	
CO4	2	3			1			2	1	2			1	2	
CO5	1	3			1			2	1	2		2	1	2	

3-High 2–Medium 1–Low

Assessment:

ISE I and ISE II: In Semester evaluations(ISE I and ISE II) of 15 marks, each will be based on ClassTest I and Class Test II respectively

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

1. Quiz
2. Assignments
3. Questionand answer
4. PowerPointpresentation

AssessmentPattern:

Assessment Pattern LevelNo.	**Knowledge Level**	**ISE I**	**ISE II**	**ISE III**	**End Semester Examination**
K1	Remember	00	00	00	10
K2	Understand	10	05	02	15
K3	Apply	05	05	02	15
K4	Analyze	00	05	02	15
K5	Evaluate	00	00	02	05
K6	Create	00	00	02	00
TotalMarks100		15	15	10	60

Assessment Tool	**K1,K2**	**K3**
	CO1,CO2	CO2,CO3, CO4,CO5
ISE I(15 Marks)	10	05
ISE II(15 Marks)	00	15
ISE III(10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks100		

Assessment Table:

Special Instructions If Any: Nil **Designed by:**

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CSPCC2003: Operating Systems			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	**ISE-I**	15 Marks
Tutorial	0	**ISE-II**	15 Marks
Total Credits	03	**ISE-III**	10 Marks
		ESE	60 Marks

Prerequsite: None

Course Description: Topics will include what an operating system does, management of the CPU, memory, processes and devices with exposure to android operating system.

Course Outcomes:
After Successful Completion The Course, students will be able to:

Course Outcomes	
CO1	Differentiate Between Multiprocessing, multiprogramming,and multitasking.
CO2	Differentiate Between Programs, processes and threads.
CO3	Apply Segmentation And Paging Techniques
CO4	Compare filenaminginLinuxand Windows.
CO5	ExplainAndroidOperatingSystem

Detailed Syllabus:

Unit 1	**Fundamentals of Operating System:-** OS services and Components, Multitasking, Multiprogramming, Multiprocessing Time Sharing, Buffering, Spooling, Distributed OS.
Unit 2	**Process management and synchronization**: Process concept, process scheduling, operation on process,interprocess communication, example of IPC systems and communication in client-server systems. ProcessScheduling:Basic Concepts,scheduling criteria,scheduling algorithm,algorithm evaluation. Process Coordination Synchronization : Background, the critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of Synchronization. Deadlock:System Model,deadlock characterization,methods for handling deadlocks, deadlock prevention,deadlock avoidance,deadlock detection.
Unit 3	**Memory Management & virtual memory:** Memory partitioning, Swapping, Paging, Segmentation,Virtual memory Overlays, Demand paging, Performance of

	Demand paging, Virtual memory concepts,Page Replacement Algorithms,Allocation Algorithms, ExampleOS : Linux
Unit 4	**I/O Systems** Secondary Storage Structure, Disk Structure,Disk Scheduling,Disk Management, Swap-space management,Disk Reliability, Stable Storage Implementation, Introduction To clock,Clock hardware,Clock software
Unit 5	**File Systems**: File concept,File support, Access methods,Allocation Methods,Directory systems, File protection, Free space management ExampleOS:Linux,Case Study: AndroidOS

Course outcome	**ProgramOutcomes**												**PSO's**		
	PO1	**PO2**	**PO3**	**PO 4**	**PO5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**P S O 2**	**P S O 3**
CO1	2												1		
CO2	1												1		
CO3	2	3	1										2		
CO4	2	1	3		1								1		
CO5	2	1			1								1		

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

3-High 2–Medium 1–Low

ISE I and ISE II: In semester evaluations(ISE I and ISE II) of 15 marks, each will be based on ClassTest I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on one of the/or combination of the following:

1. Quiz
2. Assignments
3. Questionand answer
4. PowerPointpresentation

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Assessment Pattern:

Assessment Pattern LevelNo.	Knowledge Level	ISE I	ISE II	ISE III	EndSemester Examination
K1	Remember	05	00	02	10
K2	Understand	10	00	02	20
K3	Apply	00	05	02	20
K4	Analyze	00	10	02	10
K5	Evaluate	00	00	02	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	**K1,K2**	**K3,K4**
	CO1	CO2,CO3, CO4,CO5
ISE I(15 Marks)	05	10
ISE II(15 Marks)	05	10
ISE III(10 Marks)	05	05
ESEAssessment(60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

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CSMDM5001: Data Science			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	**ISE-I**	15 Marks
Tutorial	00	**ISE-II**	15 Marks
Total Credits	03	**ISE-III**	10 Marks
		ESE	60 Marks

Course Outcome:

After studying this course, students will be able to

Course Outcomes	
CO1	To get an understanding of machine learning techniques for text classification and clustering.
CO2	To study the various probability-based learning techniques.
CO3	To apply the core skills in visualization for time series, data analysis../li>
CO4	Apply statistical and other research tools to analyze and interpret data.
CO5	To understand the role and stages of data science projects.

Detailed Syllabus:

Unit 1	**Introduction:** What Is Data Science? Where Do We See Data Science? How Does Data Science Relate to Other Fields? The Relationship between Data Science and Information Science, Computational Thinking, Skills for Data Science, Tools for Data Science, Issues of [Ethics, Bias, and Privacy in Data Science.
Unit 2	**Data:** Introduction, Types of Data, Structured Data, Unstructured Data, Challenges with Unstructured Data, Data Collection, Data Pre-processing, Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization.
Unit 3	**Techniques:** Data Analysis and Data Analytics, Descriptive Analysis, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytics, Exploratory Analysis, Mechanistic Analysis.
Unit 4	**Tools for Data Science:** Introduction to Python Getting Access to Python , Getting Started with Python Basics, Control Structures, Functions, Importing Data, Graphics and Data Visualization, Numpy and jupyter notebook Plotting the Data, Statistics .
Unit 5	**Applications, Evaluations, and Methods:**

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	Data Collection Methods: Introduction to Quantitative and Qualitative Methods **Evaluation:** Comparing Models, Training–Testing and A/B Testing, Cross-Validation **Hands-On with Solving Data Problems:** Collecting and Analyzing Twitter / YouTube Data

Text Books

1. A Hands-On Introduction to Data Science, Second Edition, Chirag Shah, Cambridge Press.
2. Introduction to Data Science, Rafael A. Irizarry, Hardward CRC Press

Reference Books

1. The Data Science Handbook: Advice and Insights from 25 Amazing Data Scientists, Carl Shan, William Chen, Data Science Bookshelf.
2. Data Science (The MIT Press Essential Knowledge series), John D. Kelleher and Brendan Tierney, Part of: The MIT Press Essential Knowledge series.
3. Foundations of Data Science 1st Edition, Avrim Blum , John Hopcroft, Ravindran Kannan Cambridge University Press.

E Books/ Online learning material

1. https://swayam.gov.in/nd1_noc19_cs60/preview

Mapping of COs and POs

PO → CO ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	2											1	1	
CO 2	1	2	3		2								1	1	
CO 3	1	2	1										1	1	
CO 4	1	2	1										1	1	
CO 5	1	2	1										1	1	

Assessment Table

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
ISE I* (Class Test) 20 Marks	5	10	-	5	-
ISE II* 20 Marks	-	-	5	10	5
ESE Assessment 60 Marks	18	18	12	12	-

Assessment Pattern

Level No.	Knowledge Level	ISE I*	ISE II*	End Semester Examination
K1	Remember	5	-	18
K2	Understand	10	5	24
K3	Apply	5	10	18
K4	Analyze	-	5	-
K5	Evaluate	-	-	-
K6	Create	-	-	-
Total		20	20	60

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CSMDM6001: C Programming			
Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/Week	**ISE-I**	15 Marks
Tutorial	00Hrs/Week	**ISE-II**	15 Marks
Total Credits	03 Hrs/Week	**ISE-III**	10 Marks
		ESE	60 Marks

Prerequisites: None

Course Description: C programming covers basic to advanced concepts like variables, arrays, pointers, strings, loops, etc. This C Programming is designed to learn and enhance their knowledge of the C programming language.

Course Outcomes:

After successful completion the course, students will be able to:

	Course Outcomes
CO1	Describe the fundamentals of C programming Language.
CO2	Apply appropriate Control structures to solve problems.
CO3	Describe the concept of Arrays and Strings.
CO4	Write User defined functions and apply the concept of recursion to solve problems.
CO5	Describe the concept of Pointers, Structures and implement operations on files

Detailed Syllabus:

Unit 1	**Overview of C:** History and importance of C, Basic structure of C program, executing a C program. **Constants, Variable and Data Types:** Introduction, Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants. **Operators and Expressions:** Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of operators.
Unit 2	**Decision Making and Branching:** Introduction, Decision Making with IF Statement, Simple IF Statement, the IF-ELSE Statement, Nesting of IF-ELSE Statements, The ELSE IF Ladder, The Switch statement, The ? : Operator, The goto statement. **Decision Making and Looping**: Introduction, The while Statement, The do statement, The for statement, Jumps in LOOPS.
Unit 3	**Arrays:** One-dimensional Arrays, Declaration of One-dimensional Arrays, Initialization of One-dimensional Arrays, Example programs- Bubble sort, Selection sort, Linear search, Binary search, Two-dimensional Arrays, Declaration of Two-dimensional Arrays, Initialization of Two-dimensional Arrays, Example programs-Matrix Multiplication, Transpose of a matrix. **Character Arrays and Strings**: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String-handling Functions, Example Programs (with and without using built-in string functions)
Unit 4	**User-defined Functions:** Need for functions, Elements of User-defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions, No Arguments and no Return Values, Arguments but no Return values, Arguments with Return Values, No Arguments but Returns a Value, Passing Arrays to Functions, Recursion, The Scope, Visibility and Lifetime of variables. **C Pointers:** Introduction, Declaring Pointer Variables, Initialization of Pointer variables, accessing a Variable through its Pointer.
Unit 5	**Structures:** Introduction, Defining a structure, declaring structure variables, accessing structure members, structure initialization. **File Management in C**: Introduction, Defining and opening a file, closing a file, Input/output and Error Handling on Files.

Text and Reference Books:

1.E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN: 978-93-5316-513-0.

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2. Pradip Dey, Manas Ghosh, “Programming in C”, 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
3. Kernighan B.W and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
4. Yashavant P. Kanetkar, “Let Us C”, 16th Edition, 2019, BPB Publications, ISBN: 978- 93 8728-449-4. 4. Jacqueline A Jones and Keith Harrow, “Problem Solving with C”, Pearson Education. ISBN: 978-93-325-3800-9.
5. Dr. Guruprasad Nagraj, “C Programming for Problem Solving”, Himalaya Publishing House. ISBN-978-93-5299-361-1.

Web Resources:
NPTEL course : https://nptel.ac.in/courses/106/105/106105171/

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

Course outcome	Program Outcomes											
	PO1	**PO2**	**PO 3**	**PO4**	**PO 5**	**PO6**	**PO 7**	**PO 8**	**PO9**	**PO 10**	**PO 11**	**PO 12**
CO1									1			
CO2		2							1			
CO3		2							1	3		
CO4		2						3	2	3		
CO5		2						3	2	3		

3 - High 2 – Medium 1 –Low

Assessment:

ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

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

1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

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	05	05	00	10
K4	Analyze	00	05	05	10
K5	Evaluate	00	00	00	20
K6	Create	00	00	05	00
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1, K2	K3
	CO1,CO2	CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	20	40
Total Marks 100		

Special Instructions if any: Nil

Designed by:

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CSPCC2004: Lab Data Structures			
TeachingScheme		**examination scheme**	
Practical	**2 Hrs/Week**	**ISE-I(TermWork)**	**25 Marks**
TotalCredits	**01**	**EndSemesterExam**	**25 Marks**

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

Course Outcomes	
CO1	Implement Linear Data Structures Like Stack, and queue.
CO2	Implement Linear Data Structures Like Linked Lists (Singly, Circular and Double)
CO3	Implement and traverse nonlinear data structures like graphs and trees.
CO4	Demonstrate And Compare Different searching and sorting algorithms.

List of The Experiments: The student shall perform a minimum of the experiments of the following using C or C++

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Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level:Basic(all)				
1	Implement The Stack And Use It To Solve the Postfix expression.	S1	CO1	02
2	Implement The Circular Queue.	S2	CO1	02
3	Implement a Singly Linked List.	S2	CO2	03
4	Implement a Circular Linked List.	S1	CO2	02
5	Implement a Doubly Linked list.	S2	CO2	03
Level:Moderate(all)				
6	Write A Program To Implement Merge Sort And bubble sort.	S2	CO4	02
7	Write A Program To Implement Quicksort.	S2	CO4	02
8	Write A Program To Implement Binary Search tree and apple tree traversal methods.	S2	CO3	02
9	Write A Program To Implement Insertion Sort.	S2	CO4	01
Level:Complex(all)				
10	Write A Program To Implement Graph. And traverse graph by DFS.	S2	CO3	03
11	Write A Program To Implement Graph. And traverse graph by BFS.	S2	CO3	03

Assessment:
ISEI: In-Semester Evaluation of 25 marks based on the performance of students' impractical hours, practical assignments completed, and timely submission
Assessment Table: Assessment Pattern:

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Assessment Tool	S1	S2
	CO1	CO2,C03,CO4
ISE1/Term work(**25 marks**)	04	21
ESE(25 Marks)	04	21

Assessment Pattern Level No.	**Knowledge Level**	**ISEI**	**End Semester Examination**
S1	Imitation	04	04
S2	Manipulation	21	21
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

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

Course outcome	**Program Outcomes**												**PSO's**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3		1		2				1						
CO2	3	2	2		2				1			1	1		
CO3	3	1	1		2				1			1		1	
CO4	3	1	1		2				1			1	1	1	

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3–High 2–Medium 1-Low

CSPCC2005: Lab Operating System			
Teaching Scheme		**Examination Scheme**	
Practical	**2 Hrs/Week**	**ISE-I(TermWork)**	**25 Marks**
TotalCredits	**01**	**EndSemesterExam**	**25 Marks**

Total Hours required for this practical course: 30 Hours.
Prerequisites: Programming Language, Data Structures
Course Outcome:
After completion of this course students will be able to

	Course Outcomes
CO1	Exposure to different OS
CO2	Awareness of concepts of multiprogramming, multithreading and multitasking
CO3	Demonstration of memory management algorithms
CO4	Demonstration of file-handling concepts by implementing suitable algorithms.
CO5	Awareness of computational issues, and resources in distributed environments.

List of Experiments:
The student shall perform a minimum of the experiments of the following

Sr. No.	Title of the experiments
1	Comparative Study of Different Operating Systems
2	Demonstration of multitasking concept.
3	Implementing various process creation algorithms(FCFS, SJF and Round-Robin Scheduling)
4	Implementation of memory allocation policies.

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5	Implementing Page replacement algorithms(FIFO,LIFO)
6	Implementing segmentation algorithms
7	Implementing file-handling algorithms
8	Implementing file-handling algorithms
9	Implementing file-handling algorithms
10	Demonstration of working in a distributed OS environment.

Assessment:
ISE I: In-Semester Evaluation of 25 marks based on performance of students' impractical hours, practical assignments completed, and timely submission
Assessment Table: Assessment Pattern:

Assessment Tool	S1	S2
	CO1	CO2,C03,CO4
ISEI/ Term work(**25 marks**)	04	21
ESE(25 Marks)	04	21

Assessment Pattern :

Assessment Pattern Level No.	**Knowledge Level**	**ISEI**	**End Semester Examination**
S1	Imitation	04	04
S2	Manipulation	21	21
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

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

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Course Outcome	Program Outcomes												PSO's		
	PO 1	PO 2	PO3	PO4	PO5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS O3
CO1	3		1		2				1						
CO2	3	2	2		2				1			1	1		
CO3	3	1	1		2				1			1		1	
CO4	3	1	1		2				1			1	1	1	

3–High 2–Medium 1-Low **Designed By:**

CSMDM5002 : Lab Data Science			
Teaching Scheme		**Examination Scheme**	
Practical	**2 Hrs/Week**	**ISE-I(TermWork)**	**25 Marks**
TotalCredits	**01**	**EndSemesterExam**	**25 Marks**

Total Hours required for this practical course: 20 Hours.
Prerequisites: Programming Language, Data Structures

Course Outcome:

	Course Outcomes
CO1	Explain how data is collected, managed and stored for data science.
CO2	Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists

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CO3	Implement data collection and management scripts using MongoDB

List of Experiments:
The student shall perform a minimum of the experiments of the following

Sr. No.	Title of the experiments
1	Working with Numpy arrays
2	Working with Pandas data frames
3	Develop python program for Basic plots using Matplotlib
4	Develop python program for Frequency distributions
5	Develop python program for Variability
6	Develop python program for Averages
7	Develop python program for Normal Curves
8	Develop python program for Correlation and scatter plots
9	Develop python program for Correlation coefficient
10	Develop python program for Simple Linear Regression

Assessment:
ISE I: In-Semester Evaluation of 25 marks based on performance of students' impractical hours, practical assignments completed, and timely submission
Assessment Table: Assessment Pattern:

Assessment Tool	S1	S2
	CO1	CO2,CO3,CO4
ISE1/ Term work(**25 marks**)	04	21

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ESE(25 Marks)	04	21

Assessment Pattern :

Assessment Pattern Level No.	Knowledge Level	ISEI	End Semester Examination
S1	Imitation	04	04
S2	Manipulation	21	21
S3	Precision	00	00
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

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

Course Outcome	Program Outcomes												PSO's		
	PO 1	PO 2	PO3	PO4	PO5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS O3
CO1	3		1		2				1						
CO2	3	2	2		2				1			1	1		
CO3	3	1	1		2				1			1		1	
CO4	3	1	1		2				1			1	1	1	

3–High 2–Medium 1-Low **Designed By:**

CSMDM6002 :- Lab- C Programming

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Teaching Scheme	Examination Scheme	
Practical: 2Hrs/Week	**ISE I (Term Work)**	**25 Marks**
Credits:01	**Practical/ viva-voce**	**25 Marks**

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Understand the development environment for compiling, debugging, linking and executing a C program.
CO2	Analyzing the complexity of problems related to arrays , Modularize the problems into small modules and then convert them into programs
CO3	Apply the in-built functions and customized functions for solving the problems.
C	Designing programs to use library functions for string handling
C	Demonstrate file handling in C

List of the Experiments:

The student shall perform minimum ten experiments of the following using Oracle databases.

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Sr. No.	Title of the Experiments	CO	Marks for ISE
Level: Basic (all)			
1	a)Write a C program to find sum and average of three numbers. b)Write a C program to find the sum of individual digits of a given positive integer. c) Write a C program to generate the first n terms of the Fibonacci sequence.	CO1	02
2	a)Write a C program to check whether a given number is perfect number or Not. b)Write a C program to check whether a given number is strong number or not.	CO1	02
3	a)Write a C program to find both the largest and smallest number in a list of integers. b) Write a C Program to Sort the Array in an Ascending Order.	CO2,CO3	03
Level: Moderate			
4	a) Write a C program to perform addition of two matrices. b)Write a C program that uses functions to perform Multiplication of Two Matrices.	CO2	03
5	a)Write a C program to use function to insert a sub-string in to given main string from a given position.	CO2, CO3,CO4	03
Level: Complex			

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6	a)Write a C program that uses functions and structures to perform the following operations: i) Reading a complex number ii) Writing a complex number iii) Addition of two complex numbers iv) Multiplication of two complex numbers	CO3,CO4	06
7	a)Write a C program to copy the contents of one file to another. b) Write a C program to merge two files into a third file.	CO5	06

Assessment:

ISEI: In-Semester Evaluation of 50 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Table:

Assessment Tool		
	CO1	CO2,C03, CO4
ISE1/ Term work(25 marks)	4	21
ESE (25 Marks)	4	21

Assessment Pattern:

Assessment Pattern Level No.	**Knowledge Level**	**ISE I**	**End Semester Examination**
S1	Imitation	5	5
S2	Manipulation	10	10
S3	Precision	10	10
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

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CSOEC0010: (OE-I) Design Thinking		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I***	**15 Marks**
Tutorial: 00 hrs/ week	**ISE II***	**15 Marks**
Credits: 03	**ISE III***	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: Basic Knowledge of Science and Technology, English Language
Course description: The objective of this Course is to provide new ways of creative thinking and Learn the innovation cycle of the Design Thinking process for developing innovative products that are useful for a student in preparing for an engineering career.
Course Outcomes:
After completing the course, students will able to:

	Course Outcomes
CO1	1. Compare and classify the various learning styles and memory techniques and Apply them in their engineering education.
CO2	2. Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products.
CO3	3. Develop new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products.
CO4	4. Propose real-time innovative engineering product designs and Choose appropriate frameworks, strategies, and techniques during prototype development.
CO5	5. Perceive individual differences and their impact on everyday decisions and further Create a better customer experience.

Detailed Syllabus:

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Unit 1	**Learning and Memory:** Introduction: Design Thinking, Evolution history, the Business context of innovation for applying design thinking, Sensory learning, Retention, Assessment, Evaluation and Interpretation.Learning and Memory; Kolb's learning styles. Memory process, Problems in retention, Memory enhancement techniques.
Unit 2	**Role of Emotions:** Understanding Emotions; Experience & Expression, Assessing Empathy, Application with Peers. Basics of Design Thinking; Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concept of Brainstorming, Stages of Design Thinking Process (explain with examples) – Empathize, Define, Ideate, Prototype, Test.
Unit 3	**Being Ingenious & Fixing Problem:** Understanding Creative Thinking Process, Understanding Problem Solving, Testing Creative Problem Solving. Process of Product Design; Design Thinking Approach, Stages of Product Design, Examples of best product designs and functions, **Assignment – Engineering Product Design**
Unit 4	**Prototyping & Testing:** What is Prototype? Why Prototype? Rapid Prototype Development Process, Testing; Sample Example, Test Group Marketing, Celebrating the Difference. (Understanding Individual differences & Uniqueness, Group Discussion and Activities to encourage the understanding, acceptance and appreciation of Individual differences)
Unit 5	**Design Thinking & Customer Centricity:** Practical Examples of Customer Challenges, Use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product Design. Feedback, Re-Design & Re-Create Feedback loop, Focus on User Experience, Address ergonomic challenges, User focused design, rapid prototyping & testing, final product. (Final Presentation – "Solving Practical Engineering Problem through Innovative Product Design & Creative Solution".)

Text and Reference Books: E-Books and Guides;

1. Moritz Gekeler, A Practical Guide to Design Thinking
2. Hasso Plattner, Institute Manual, An Introduction to Design Thinking Process Guide.
3. Gavin Ambrose, Paul Harris," Design Thinking" sign
4. Maurício Vianna ,Ysmar Vianna ,Isabel K. Adler ,Brenda Lucena ,Beatriz Russo" Design Thinking"
5. Christian Müller-Roterberg ,Hochschule Ruhr West , " Handbook of Design Thinking "

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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	PSO1	PSO2	PSO3
CO1					1		2				2				3
CO2					1		2				2				2
CO3					1	2	2				3				3
CO4					1	2	3				2				1
CO5					1	3	3				3				1

3 – High 2 – Medium 1 - Low

Assessment: Specify the details of ISEI, II, III & ESE

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05		02	15
K2	Understand	05	05	04	15
K3	Apply	05	05	02	15
K4	Analyze		05	02	15
K5	Evaluate				
K6	Create				
Total Marks 100		15	15	10	60

Assessment table:

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Assessment Tool	K1,K2	K3
	CO1,CO2	CO2,CO3,CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)		15
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: **Designed by**

INVEC0010 : Universal Human Values -II Understanding Harmony		
Teaching Scheme	**Examination Scheme**	
Lectures: 02 hrs/ week	**ISE I Online Examination**	**10 Marks**
	ISE II Online Examination	**10Marks**
Credits: 02	**ISE III**	
No. of Teaching Hours 25-28	**End Semester Examination Online Examination**	**30 Marks**

Course description:

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The objective of the course is fourfold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society andnature/existence.

2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence

3. Strengthening ofself-reflection.

4. Development of commitment and courage to act.

Course Outcomes
By the end of the course, students are expected to become more aware of themselves, andtheirsurroundings(family,society,nature);theywouldbecomemoreresponsibleinlife,andinhandlingproblemswithsustainablesolutions,whilekeepinghumanrelationshipsandhumannatureinmind. 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 theinstitution b) Higher level courses on human values in every aspect of living. E. g. as

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aprofessional

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

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Unit 2	**Understanding Harmony in the Human Being - Harmony inMyself!** Understanding human being as a co-existence of the sentient 'I' and the material'Body'. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding theharmonyofIwiththe Body:SanyamandHealth;correctappraisalofPhysicalneeds, meaning of Prosperity in detail. Programs to ensure Sanyam andHealth. **Home Work :** Include practice sessions to discuss the role others have played in making materialgoods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing withdisease
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 family to world family. **Home Work :** Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with 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 amongthefourordersofnaturerecyclabilityandselfregulationinnature.Understanding ExistenceasCo-existenceofmutuallyinteractingunitsinallpervasivespace.Holistic perception of harmony at all levels of existence.

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	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	**ImplicationsoftheaboveHolisticUnderstandingofHarmonyonProfessionalEthics** Naturalacceptanceofhumanvalues.DefinitivenessofEthicalHumanConduct.Basisfor Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professionalethics: a.Abilitytoutilizetheprofessionalcompetenceforaugmentinguniversalhumanorderb. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and 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:**IncludepracticeExercisesandCaseStudieswillbetakenupinPractice Sessions eg. To discuss the conduct as an engineer or scientistetc.

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..Whileanalysinganddiscussingthetopic,thefacultymentor'sroleisinpointing 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 faculty mentor,inagroupsitting.Tutorials(experiment or practical) 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.It's Recommended That 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.

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CSEEM0010: PSYCHOLOGY		
Teaching Scheme	**Examination Scheme**	
Lectures: 02 hrs/ week	**ISE I***	**10 Marks**
Tutorial: 00 hrs/ week	**ISE II***	**10 Marks**
Credits: 02	**End Semester Examination**	**30 Marks**

Prerequisites: Knowledge of common terminology and basic language

Course description: The course is designed to provide a basic understanding of the psychology of human behavior to the students. The students will be given exposure to various key concepts, terminology, principles and theories that comprise an introductory psychology course.

Course Outcomes:

After successful completion of the course, students will able to:

	Course Outcomes
CO1	Define the term Psychology and demonstrate command of the basic terminology.
CO2	Gain scientific knowledge of data collection and understanding basics of psychology research.
CO3	Differentiate between physical and mental well-being. Manage stress and disorders of health.
CO4	Understand the social and psychological community behaviour.

Detailed Syllabus:

Unit 1	Introduction to Psychology: Concept and definition, Roots of psychology. Key Perspectives; Behavioral, cognitive, psycho-dynamic, humanistic and sociocultural.
Unit 2	Methods in Psychology: Natural observation, survey and case study; Nature advantages and limitations. Experimental and correlational methods; Nature advantages and limitations.
Unit 3	Psychology of Health: Understanding stress and its various causes, manifestation as disorders, depression in social and industrial environments.

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Text and Reference Books:

1. McConnell J.V., psychology 5th ed., New York: Holt., Rinehart & Wiaton, 1986.
2. Morgan C. T., King R. A., Weiss J. R., & Schopler J., Introduction to Psychology, 7th ed. New York: McGraw Hill, 1986.
3. Myers, D.G., Psychology 4th ed. New York: Worth, 1995.
4. Asch, S. E., Social Psychology, OUP Oxford,1987.
5. Baron R. A. & Byrne. D, Social Psychology. 10th ed., New Delhi, Prentice Hall, 2003.

Web Resources:

NPTEL Course: Introduction to Psychology- Course (nptel.ac.in)

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	PSO1	PSO2	PSO3
CO1							2				2				3
CO2							2				2				2
CO3						2	2				2				3
CO4						2	2				2				1

3 – High 2 – Medium 1 - Low

Assessment: Specify the details of ISEI, II, III & ESE

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	End Semester Examination
K1	Remember	CO1,CO2 (5)	CO3,CO4 (5)	CO1to CO4
K2	Understand	CO1,CO2 (5)	CO3,CO4 (5)	CO1to CO4
K3	Apply			
K4	Analyze			
K5	Evaluate			
K6	Create			
Total Marks 50		10	10	30

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Assessment table:

Assessment Tool	CT1	CT2
	CO1,CO2	CO3,CO4
ISE I (10 Marks)	10	
ISE II (10 Marks)		10
ESE Assessment (30 Marks)	15	15
Total Marks 50		

Special Instructions if any:

Designed by

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CSCEP2001: Mini Project			
Teaching Scheme		**Examination Scheme**	
Practical	**4 Hrs/Week**	**ISE-I (Term Work)**	**50 Marks**
TotalCredits	**02**	**End Semester Exam**	**50 Marks**

Course Description:
A mini project is an assignment that you try to complete at the end of every semester, especially in engineering to strengthen the understanding of your fundamentals through effective application of theoretical concepts.

Course Outcomes:
After successful completion of the course, students will be able to:

	Course Outcomes
CO1	Identify area of interest/problem domain.
CO2	Collect related latest standard research papers and analyze them
CO3	Apply & use the required Toolbox/algorithms.
CO4	Apply the functions to solve problems / implement algorithms.
CO5	Develop a solution and test it.

This project should develop one of the following technology which is not limited to:

1. Cloud Computing
2. Android-Based Application
3. Computer Vision System
4. Image Processing
5. Neural Network
6. Bioinformatics
7. Data Analytics
8. Natural Language Processing
9. Soft Computing
10. Big data

Assessment:

ISE I and ESE: In semester evaluations 25 marks, each will be based on evaluation of algorithms & tools or tool box with a group of 3 to 4 students. Final submission will be based on their project evaluation with Output.

Assessment Pattern:

Assessment Pattern Level No.	**Skill Level**	**Term Work**	**Practical Examination & viva voce**
S1	Imitation	10	10
S2	Manipulation	10	10
S3	Precision	10	10
S4	Articulation	10	10
S5	Naturalization	10	10
Total Marks		50	50

Mapping of Course outcomes with Program Outcomes and Program-Specific Outcomes:

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

3 – High 2 – Medium 1- Low

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EEAEC2010:Technical Communication		
Teaching Scheme	**Examination Scheme**	
Lectures: 2 Hrs/Week	ISE I Test	: 10 Marks
Tutorial: 0 Hr/Week	ISE II	: 10 Marks
Credits : 02	End Semester Exam	: 30 Marks

Course Outcomes (COs):

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 I	**Fundamentals of Technical Communication:** 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.

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Unit II	**Forms of Technical Communication:** 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 III	**Technical Presentation:** 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 IV	**Technical Communication Skills and Kinesics & Voice Dynamics:** 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 Books:

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
3. Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi.
4. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
5. A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.

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Semester IV

CSPCC2006: Discrete Mathematical Structure			
Teaching Scheme		**Examination Scheme**	
Lectures	**3 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**03**	**ISE-III**	**10 Marks**
		End Semester Exam	**60 Marks**

Prerequisites: None

Course Description: This course is intended to introduce the students to a coherent and balanced account of major discrete mathematical structures (Group, Rings, Integral Domain), Set theory (Binary relations, partial order relations, Equivalence relations, equivalence classes, partitions), Discrete functions and recurrence relations(Z-transform, generating functions), concepts that form the basis of programming Languages and organization of data structure.

Course Outcomes:

After Successful Completion of The Course, students will be able to:

	Perform operations on discrete structures such as assets functions, relations construct proofs using mathematical induction and apply counting principle.
	Evaluate problems involving recurrence relations and generating functions and combinatorial problems
	Demonstrate knowledge of algebraic structures such as groups, Subgroups, Generators, and Co-sets.
	Demonstrate knowledge of algebraic structures such as rings, Fields, Integral Domains, Polynomial rings, and cyclic codes.

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Unit1	**Set, Relations and Functions:** Combination of sets, finite and infinite sets, unaccountably infinite sets, mathematical induction, multisets, Properties of Binary Relations, Equivalence Relation and partitions, Partial ordering Relations and Lattices. Chain and Antichains, A Job-Scheduling Problem, Functions and Pigeonhole principles
Unit2	**Discrete Numerical Functions and Recurrence Relations:** Manipulation and Numerical Functions, Asymptotic behaviour, Generating functions and Combinatorial Problems, Recurrence relations, Linear 9 recurrence relations with constant coefficients, Homogeneous Solutions, Particular Solutions, Total Solutions, Solutions By The Method of generating functions.
Unit3	**Groups**: Introduction to Algebraic Structures, Groups, Subgroups, Generators and Evaluation of Powers, Cosets and Lagrange's Theorem, Permutation Group, Isomorphism and Automorphism, Homomorphism, Normal subgroup.
Unit4	**RingsandFieldsRings:** Integral domain sandfields.RingHomomorphismus, polynomial rings and cyclic codes.
Unit5	**Graphs**: Graphs types,graphsProperties, Connectivity, Trees, planar graphs, graph colouring application of trees and graphs.

DetailedSyllabus:

Mapping Course Outcomes With Program Outcomes and Program Specific Outcomes:3-High 2–Medium 1–Low

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Course outcome	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO 12	PSO 1	PS O2	PS O3
CO1	3	2	1										1		
CO2	3	2	1												
CO3	2	2	1										1		
CO4	3	2	1										1		
CO5	3	2	1										1		

Assessment:

ISE I and ISE II: In Semester evaluations(ISE I and ISE II) of 15 marks, each will be based on ClassTest I and Class Test II respectively.

ISE III: Teachers' Assessment Of 10 marks is based on the/or combination of the following:

1) Quiz
2) Assignments
3) Question and answer
4) Power Point presentation

Assessment Pattern:

Assessment PatternLevel No.	Knowledge Level	ISE I	ISE II	ISE III	EndSemester Examination
K1	Remember	00	05	02	10
K2	Understand	10	05	02	20
K3	Apply	05	00	02	20
K4	Analyze	00	05	02	10
K5	Evaluate	00	00	02	00
K6	Create	00	00	00	00
Total Marks 100		15	15	10	60

Assessment Table:

AssessmentTool	K1,K2	K3
	CO1	CO2,CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	10	05
ISE III (10 Marks)	05	05
ESE Assessment(60 Marks)	30	30
TotalMarks100		

Special Instructions if any: Nil **Designed by:**

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CSPCC2007: Database Management System		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs/ week	**ISE I**	**15 Marks**
Tutorial: 00 hrs/week	**ISE II**	**15 Marks**
Credits:03	**ISE III**	**10 Marks**
	End Semester Examination	**60 Marks**

Prerequisites: None

Course Description: Database management course involves studying different aspects of computerized data-keeping systems. The fundamentals of the relational database system which is the most widely used system are included in this course. Structured query language and transaction management systems are also included.

Course Outcomes:

After successful completion of the course, students will be able to:

	Course Outcomes
CO1	Apply the basic concepts of relational data model, ER model, relational database design and database query language SQL
CO2	Design and convert E-R diagrams into database tables that satisfy relational theory and provide users with queries, forms, and reports.
CO3	Design a relational database, analyze it and improve the database design by normalization
CO4	Demonstrate knowledge of ACID properties of a transaction and several techniques of concurrency control
CO5	Develop a database for any real-time application considering various design constraints and compare SQL and NoSQL

Detailed Syllabus:

Unit 1	**Introduction to Database Management System** Basic terminologies: Data, Database, Database Management System (DBMS), History of Database Systems, Purpose of Database Systems, Characteristics of Database approach, Comparison of the database system and file system, Data models, Schemas and instances, Three-schema architecture and data independence, Database users and administrators, Database applicationsEntity-Relationship Model, Mapping Constraints, Keys, Strong and Weak Entity types, Refining the ER Design,ER Design Issues,ER Diagrams, Reduction of ER diagram to tables, Generalization, Specialization and Aggregation, Extended Entity Relationship Model (EER).
Unit 2	**Relational Model and SQL** Structure of Relational Databases, Database schema, Relational Database Design Using ER-to-Relational Mapping, Mapping EER Model Constructs to Relations, Relational Query Language, Relational Algebra, Tuple Relational Calculus, Domain Relational Calculus SQL Overview, SQL Data Definition and Data Types, Types of SQL commands- DDL, DML, DCL, TCL, Integrity Constraints, SQL operators, Set operations, Null values, Aggregate functions, Nested and Complex queries, Views, Joins, PL/SQL Overview, Structure of PL/SQL program, Cursors, Stored procedures and functions, Triggers Concept of NoSQL Database, NoSQL using MongoDB, Comparative study of SQL and NoSQL.
Unit 3	**Relational Database Design** Features of good Relational Database Design, purpose of Normalization for Relational Databases, Functional Dependencies, Decomposition: lossless join decomposition and dependency preservation, Normal Forms- First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.
Unit 4	**File Structures, Indexing and Hashing** File Organization, Organization of records in files, Basic File Structures, Operations on Files, Indexing Structures for Files, Ordered Indices, Single-Level Ordered Indexes, Multilevel Indexes, Hashing Techniques- Static and Dynamic Hashing, Comparison of Ordered indices and hashing, Bitmap indices, Index definition in SQL.
Unit 5	**Transactions and Concurrency Control** Transaction concept, Transaction States, A simple Transaction Model, Desirable Properties of Transactions, Concept of schedule, serial & non-serial schedules, Serializability: conflict & view serializable schedules, uses of Serializability, Recoverable and Non-recoverable schedules Concurrency Control Techniques: Lock based protocols, deadlock handling, Timestamp based protocols, Multiple granularity, Validation based protocols Recovery systems, log-based recovery, deferred and immediate database modification, object-oriented database design.

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Textbooks & Reference Books

Text and References:

1.Silberschatz, Henry F. Korth, and S. Sudarshan, "Database System Concepts", McGraw-Hill, Sixth edition

2.Elmasri, Navathe, "Fundamentals of Database Systems", Addison-Wesley, Sixth Edition

3.Raghu Ramakrishnan, Johannes Gehrke," Database Management Systems", McGraw-Hill, Third Edition

4.Thomas M. Connolly, Carolyn E. Begg, "Database Systems: A Practical Approach to Design, Implementation and Management", Addison Wesley, Fifth Edition

5.Dr. P. S. Deshpande, "SQL and PL/SQL for Oracle 10g", Black Book, Dreamtech Press

6. C. J. Date "Introduction to Database Systems", Addition Wesley, Seventh Edition AtulKahate," Introduction to Database Management System ", Third Edition, Pearson Education

7. MongoDB: The Definitive Guide by Kristina Chodorow

Web Resources:

1. NPTEL course: Database management system(IITK): https://onlinecourses.nptel.ac.in/noc21_cs04/

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

Course outcome	Program Outcomes														
	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				3											
CO2	3														
CO3				2						3				2	
CO4	3														
CO5													3		

3 - High 2 – Medium 1 –Low

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Assessment:

ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks, each will be based on Class Test I and Class Test II respectively.

ISE III: Teachers' Assessment of 10 marks is based on one of / or a combination of a few of the following:

1) Quiz
2) Assignments
3) Question and answer
4) PowerPoint presentation

Assessment Pattern:

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	05	05	00	10
K4	Analyze	00	05	05	10
K5	Evaluate	00	00	00	20
K6	Create	00	00	05	00
Total Marks 100		15	15	10	60

Assessment table:

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Assessment Tool	K1, K2	K3
	CO1,CO2	CO3, CO4,CO5
ISE I (15 Marks)	10	05
ISE II (15 Marks)	05	10
ISE III (10 Marks)	05	05
ESE Assessment (60 Marks)	20	40
Total Marks 100		

Special

Instructions if any: Nil **Designed by:**

CSPCC2008: 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**

Prerequisites: Nil

Course Description:

This course presents a conceptual and practical introduction to imperative and object-oriented programming, exemplified by Java. As well as providing grounding in the use of Java, the course will cover general principles of programming in object-oriented frameworks. This course introduces concepts like Exception handling, interfaces & multithreading which provides a real time programming approach in object-oriented programming.

Course Outcomes:

After Successful Completion The Course,students will be able to:

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Course Outcomes	
CO1	Define the concept of OOP as well as wellasthepurposeandusage principles of inheritance, polymorphism, encapsulation, and method overloading.
CO2	Identify classes, objects, members of the class and the relationships among them needed for a specific problem.
CO3	UseOOPconceptslikeinheritance, Interface Package Real Time situations.
CO4	Identify Situations For Exceptions And multithreading incorporated in the program.
CO5	DevelopJavaapplicationprogramsusingsoundOOPpractices(e.g.,interfacesandAPIs)and properprogramstructuring(e.g.,by using access control identifies, multithreading,error exception handling)

Detailed Syllabus

Unit 1	**Introduction:** Difference between OOP and other conventional programming – advantages and disadvantages. An overview of OOP concepts: Class, object, message passing, inheritance, encapsulation, polymorphism. Importance of Java in the internet, Java applets and applications, security, portability, the bytecode. An Overview of Java, OOP, Two paradigms, abstraction, the three OOP Principles. **DataTypes, Variables And Arrays:** Simple types, integers, floating point types, characters, Booleans, variables – declaring variable, dynamic initialization, the scope and lifetime of variables, type conversion and casting, arrays-one dimensional arrays and multidimensional arrays. **Operators And Control Statements:** Arithmetic operators, bitwise operators, relational operators, logical operators, assignment operators, ternary operators, operator precedence. Control statements–if, switch, while, do-while, for nested loops, break, continue. All With Examples.
Unit 2	**Classes and Object:** Class fundamentals, declaring objects, assigning object references variables,

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	anonymous object, introducing methods, constructors with types, overloading of constructors, recursion in JAVA, use static final keyword, this keyword, new keyword, an instance of the operator, instance variable, Operator Overloading.
Unit 3	**Inheritance, Aggregation & reusability** Inheritance – basics, using super, creating a multi-level hierarchy, Java polymorphism (Method overloading, Method Overriding, Runtime polymorphism, Dynamic Binding, Aggregation, abstract classes, using final with inheritance, Wrapper classes. Packages, defining a package, package example, access Protection, Interfaces – defining an interface, implementing interfaces, applying interfaces, variables in interfaces, extending interfaces
Unit4	**Exception Handling & Multithreading:** Fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throw, and finally, exception. Basics Of Multithreading, main thread, thread lifecycle, creation multiple threads, naming a thread, sleeping a thread, Encapsulation in Java
Unit5	**Java I/O:** Java I/O classes and Interfaces, File – directories, using filename filter, the stream classes, - input stream, output stream, File I/P stream, file output stream, Java Applets.

Text andTextbooks & Reference Books

Text and References:

1. PatrickNaughton, HerbertSchildt– "The Complete Reference-Java2"8th edition–TMH
2. E.Balagurusamy– "ProgrammingWithJava: APrimer"– 3rdEd.2000–TMH
3. DeitelandDeitel–"JavaHowtoProgram"–6thEd.–Pearson
4. AaronWalshandJohnFronckowiak," JavaProgrammingBible" ,IDGBooks, 1st Edition, 2000, India.
5. PatrickNiemeyer,DanielLeuck,LearningJava, 4thEditionABestselling Hands-On Java Tutorial, O'Reilly Media

WebResources:
NPTELcourse:ProgramminginJavaIITKharagpur
https://nptel.ac.in/courses/108/105/108105113/URl:-
https://www.javatpoint.com/

Mapping of Course Outcomes with Program Outcomes and Program-Specific Outcomes:3-High 2–Medium 1–Low
Assessment:

Course outcome	ProgramOutcomes												PSO's		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2		3			3			3		2	1	
CO2	1	2	2										2	1	
CO3	1	2	2										2	1	
CO4	1	2	2										2	1	
CO5	1				3			3			3		1	1	1

ISEIandISEII: In semester evaluations (ISE I and II) of 15 marks, each will be based on ClassTest I and Class Test II respectively.

ISE III: Teacher assessment of 10 marks is based on of the/or combination of few of the following:

1) Quiz
2) Assignments
3) ClassroomQuestion&answer
4) Powerpoint presentation Topic Which Is related but out of syllabus
5) Overall Approach Towards Learning, creativity.

AssessmentPattern:

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Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	05	05	02	10
K2	Understand	05	05	02	20
K3	Apply	05	05	03	20
K4	Analyze	00	00	03	10
K5	Evaluate	00	00	00	00
K6	Create	00	00	00	00
Total Marks100		15	15	10	60

AssessmentTool	K1,K2	K3,K4
	CO1	CO2,CO3, CO4,CO5
ISEI(15 Marks)	10	05
ISEII(15 Marks)	10	05
ISE III(10 Marks)	05	05
ESE Assessment(60 Marks)	30	30
Total Marks100		

Assessment Table:

Special Instructions If Any: Nil **Designed By:**

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CSOEC1020: (OE-II)Professional Ethics and Cyber Laws			
Teaching Scheme		**Examination Scheme**	
Lectures	**04 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**04**	**ISE-III**	**10 Marks**
		End Semester Exam	**60 Marks**

Total Hours required for this course: 40 Hours.

Prerequisite: NIL

Course description: This course designates the knowledge of professional & philosophical Ethics in the field of Computer, the students will be aware of the process for securing Intellectual Property, the content of this course will enable students on how to recover the Evidence and Investigation. The content demonstrates on how to secure your own presence online and will acquire Cyber Law provision related to all type cyber-crimes.

Course Outcomes Expected:

After completion of this course students will be able to:

CO1: Make defensible decision making based on Professional & Philosophical Ethics.
CO2: Develop process to file an IPR Application.
CO3: Investigate and Recover Cyber Evidence
CO4: Learn the security hardware devices and software in Cyber Security.
CO5: Suggest legal action to be taken against the cyber-crimes.

Detailed Syllabus

UNIT-1	**Computer and Philosophical ethics:** Moral v/s Ethics, Why Computer Ethics, Philosophical Ethics: Distinguishing Descriptive and Normative Claims, Ethical Relativism, Utilitarianism, Deontological Theories, Rights, Virtue Ethics, Professional Ethics: Why Professional Ethics, Characteristics of Professionals, The System of Professionals, is Computing a Profession.., Professional Relationships, Code of Ethics and Professional Conduct, Steps in Ethical Decision Making**.**

UNIT-2	**Ethics & Internet:** Three Morally Significant Characteristics, Hacking & Hacker Et Netiquette Intellectual property issues in cyberspace Introduction to intellectual property Protections via Trade Secrets, Trademarks, Patents, Etc. Contracting to protect intellectual property, Protection options - Encryption / PGP, copyright on web content, Copyright on software, digital contracts, digital signatures.
UNIT-3	**Data and Evidence Recovery**- Introduction to Deleted File Recovery, Formatted Partition Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics, Complete timeline analysis of computer files based on file creation, file modification and file access, Recover Internet Usage Data, Recover Swap Files/Temporary Files/Cache Files, Introduction to Encase Forensic Edition, Forensic Tool Kit (FTK) etc, Use computer forensics software tools to cross-validate findings in computer evidence-related cases.
UNIT-4	**Cyber Security**- Introduction to Cyber Security, Hardware-Based Security, Software Based Firewalls, Security Standards, Assessing Threat Levels, Types of incidents, Stages of incident response Threats in cyberspace, Blended attacks, , incident prevention and detection, Forming an Incident Response Team, Reporting Cyber-crime, Operating System Attacks, Application Attacks, Reverse Engineering & Cracking Techniques and Financial Frauds.
UNIT-5	**IT ACT**: Information Technology Act 2000 Scope, jurisdiction, offense and contraventions, powers of police, adjudication

TEXT/ REFERENCE BOOKS

1. Computers, Ethics, And Social Values, Johnson and Nissenbaum, 1994 Prentice Hall
2. Cyber security operations Handbook, John Rittinghouse,William Hancock
3. Computer ethics, Deborah G.Johnson, third edition, Pearson

Mapping of Course outcome with Program Outcomes

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M		L								
CO2		M	M									L

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CO3				H						L		M
CO4			H								M	L
CO5			H									L

H – High M – Medium L – Low

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

1) Problem Solving
2) Powerpoint presentation of case studies
3) Question & answer

Assessment Pattern

Assessment Pattern Level No.	**Knowledge Level**	**ISE I & II**	**ISE III**	**End Semester Examination**
K1	Remember	15	5	25
K2	Understand	15	00	25
K3	Apply	00	5	10
K4	Analyze	00	00	00
K5	Evaluate	00	00	00
Total Marks 100		30	10	60

Assessment table

Assessment Tool	K1	K2	K3	K1	K3
	C01	C02	C03	CO4	CO 5
ISE I & II (30 Marks)	15	15	00	00	00
ISE III (10 Marks)	05	00	00	05	00
ESE Assessment (60 Marks)	15	15	10	10	10

Special Instructions if any: Nil

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CSMDM5003: Introduction to Machine Learning			
Teaching Scheme		**Examination Scheme**	
Lectures	**03 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**03**	**ISE-III**	**10 Marks**
		End Semester Exam	**60 Marks**

Course Description:

Course Outcomes:

After successful completion the course, students will be able to:

	Course Outcomes
CO 1	Understand the characteristics of machine learning strategies
CO 2	Apply various supervised learning methods to real life problems
CO 3	Apply probabilistic and unsupervised learning models for handling unknown pattern
CO 4	Identify and integrate more than one techniques to enhance the performance of learning
CO 5	Learn how to define RL tasks and the core principles behind the RL

Detailed Syllabus:

Unit 1	Overview of machine learning concepts and applications, Supervised, unsupervised, and reinforcement learning, Elements of a machine learning system
Unit 2	Supervised Learning Decision Trees Classification and Regression Trees, Regression: Linear Regression, Multiple Linear Regression, Logistic Regression, Support vector machines, evaluation metrics for classification
Unit 3	Unsupervised Learning Introduction to clustering, Hierarchical & Partitioning methods,: Density based methods,K-means clustering, K-Mode Clustering,
Unit 4	Ensemble Learning Model Combination Schemes, Bagging: Random Forest Trees, Boosting: Adaboost. Validation techniques, Random Sampling
Unit 5	Learning Theory, Introduction to Reinforcement Learning, Feature reduction techniques Principal component analysis, Linear Discriminant analysis

Text and Reference Books:

1. Ethem Alpaydin,"Introduction to Machine Learning",MIT Press,Prentice Hall of India, Third Edition2014.
2. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar "Foundations of Machine Learning", MIT Press,2012.
3. Tom Mitchell, "Machine Learning", McGraw Hill, 3rdEdition,1997.
4. Charu C .Aggarwal,"Data Classification Algorithms and Applications",CRCPress,2014.
5. Charu C. Aggarwal, "DATA CLUSTERING Algorithms and Applications", CRC Press, 2014.
6. Kevin P. Murphy "Machine Learning: A Probabilistic Perspective", The MIT Press, 2012
7. Jiawei Han and Micheline Kambers and Jian Pei,"DataMining Concepts andTechniques",3rd edition, Morgan Kaufman Publications, 2012.

Web Resources:

NPTEL course : Machine Learning :https://onlinecourses.nptel.ac.in/noc20_cs74/preview
Reinforcement Learning :https://onlinecourses.nptel.ac.in/noc20_cs74/preview

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

Course outcome	Program Outcomes														
	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	1								2				
CO2	2	1	1					1		1	2	2			
CO3	2	2	1					1	3	2		3	1	2	1
CO4	2	2	1					2	3	2		3		3	1
CO5		1						2	3	1	2	2	3		1

3 - High 2 – Medium 1 –Low

Assessment:

ISE I: In semester evaluations (ISE I) of 20 marks, each will be based on Class Test

ISE II: Teachers Assessment of 20 marks is based on one of the / or combination of few of the following:

1. Quiz
2. Assignments
3. Question and answer
4. PowerPoint presentation

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	End Semester Examination
K1	Remember	05	00	12
K2	Understand	10	10	12

K3	Apply	05	10	12
K4	Analyze	00	00	12
K5	Evaluate	00	00	12
K6	Create	00	00	00
Total Marks 100		20	20	60

Assessment table:

Assessment Tool	**K1, K2**	**K3,K4,K5**
	CO1,CO2	CO3, CO4,CO5
ISE I (20 Marks)	10	10
ISE II (20 Marks)	10	10
ESE Assessment (60 Marks)	24	36
Total Marks 100		

Special Instructions if any: Nil

PO1: Apply knowledge of mathematics, science and algorithms in solving complex Computer engineering problems.
PO2: Generate solutions by conducting experiments and applying techniques to analyze and interpret data.
PO3: Design component, or processes to meet the needs within realistic constraints.
PO4: Identify, formulate, and solve Software Engineering, Networking and Data Mining problems.
PO5: Comprehend professional and ethical responsibility in the computing profession.
PO6: Express effective communication skills.
PO7: Participate in global, economic, environmental, and societal context.
PO8: Recognize the need for, and an ability to engage in life-long learning.
PO9: Knowledge of contemporary issues and emerging developments in the computing profession.
PO10: Utilize the techniques, skills and modern computer Engineering tools, Software and techniques necessary for Engineering practice.
PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
PO12: Design research problems and conduct research in a computing environment.

CSMDM6003: Object Oriented Programming			
Teaching Scheme		**Examination Scheme**	
Lectures	**03 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**03**	**ISE-III**	**10 Marks**
		End Semester Exam	**60 Marks**

Prerequisites: Nil

Course Description:

This course presents a conceptual and practical introduction to imperative and object-oriented programming, exemplified by Java. As well as providing grounding in the use of Java, the course will cover general principles of programming in object-oriented frameworks. This course introduces concepts like Exception handling, interfaces & multithreading which provides a real time programming approach in object-oriented programming.

Course Outcomes:

Course Outcomes	
CO1	Define the concept of OOP as well as wellasthepurposeandusage principles of inheritance, polymorphism, encapsulation, and method overloading.
CO2	Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
CO3	UseOOPconceptslikeinheritance, Interface Package Real Time situations.
CO4	Identify Situations For Exceptions And multithreading incorporated in the program.
CO5	DevelopJavaapplicationprogramsusingsoundOOPpractices(e.g.,interfacesandAPIs)and properprogramstructuring(e.g.,by using access control identifies, multithreading,error exception handling)

After Successful Completion The Course,students will be able to:

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Detailed Syllabus

Unit 1	**C++ Basics & Variables:** What is object-oriented programming? Why do we need object-oriented? Programming characteristics of object-oriented languages. C and C++, Output using cout. Directives. Input with cin. Type bool. The setw manipulator. Type conversion and casting.
Unit 2	**Functions & Data Types:** Introduction of function, Why Do We Need Functions, Function Declaration, Types of function, Parameter Passing to Functions, Function Definition, Methods of Parameter Passing, Function Declaration, Function Prototype, Nested Function, Simple data types, integers, floating point types, characters, Booleans.
Unit 3	**Object & Classes:** Making sense of core object concepts (Encapsulation, Abstraction, Polymorphism, Classes, Messages Association, Interfaces) Implementation of class in C++, C++ Objects as physical object, C++ object as data types constructor. Object as function arguments. The default copy constructor, returning object from function. Structures and classes. Classes objects and memory static class data. Const and classes.
Unit 4	**Arrays and Strings:** Arrays of object, string, The standard C++ String class
Unit 5	**Inheritance:** Concept of inheritance, Derived class and based class, Derived class constructors, member function, inheritance in the English distance class, class hierarchies, inheritance and graphics shapes, public and private inheritance, aggregation : Classes within classes, inheritance and program development.

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

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Course outcome	ProgramOutcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2		3			3			3		2	1	
CO2	1	2	2										2	1	
CO3	1	2	2										2	1	
CO4	1	2	2										2	1	
CO5	1				3			3			3		1	1	1

3- High 2–Medium 1–Low

Assessment:

ISEIandISEII: In semester evaluations(ISE I andISE II) of 15 marks, each will be based on ClassTest I and Class Test II respectively.

ISE III: Teachers Assessment of 10 marks is based on of the/or combination of few of the following:

6) Quiz
7) Assignments
8) ClassroomQuestion&answer
9) Powerpoint presentation Topic Which Is related but out of syllabus
10) Overall Approach Towards Learning, creativity.

AssessmentPattern:

Assessment Pattern LevelNo.	Knowledge Level	ISE I	ISE II	ISE III	EndSemester Examination
K1	Remember	05	05	02	10
K2	Understand	05	05	02	20
K3	Apply	05	05	03	20
K4	Analyze	00	00	03	10
K5	Evaluate	00	00	00	00

K6	Create	00	00	00	00
TotalMarks100		15	15	10	60

Assessment Table:

AssessmentTool	**K1,K2**	**K3,K4**
	CO1	CO2,CO3, CO4,CO5
ISEI(15 Marks)	10	05
ISEII(15 Marks)	10	05
ISE III(10 Marks)	05	05
ESE Assessment(60 Marks)	30	30
Total Marks100		

Special Instructions If Any: Nil **Designed By:**

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CSPCC2009: Lab Database Management System		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE I (Term Work)**	**25 Marks**
Credits:01	**Practical/ viva-voce**	**25 Marks**

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

	Course Outcomes
CO1	Know the scope of SQL and use it to query, update and manage a database
CO2	Use PL/SQL
CO3	Identify functions of a database administrator
CO4	Demonstrate advanced SQL functions
CO5	Design and build a simple database management system.

List of the Experiments:
The student shall perform a minimum of ten experiments of the following using Oracle databases.

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic (all)				
1	To execute all the Basic DDL (Data Definition Language) commands (i.e. Create, Alter, Drop, and Truncate) with example	S1	CO1	04
2	To execute all the Basic DML (Data Manipulation Language) commands (i.e. Insert, Select, Update, and Delete) with example	S2	CO1,CO3	04

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3	To Execute the Database Functions (i.e. Numeric, Date, Group, Character, and count function) with examples.	S2	CO4	04
4	To Execute the join Commands (i.e. Cartesian product, natural join, Inner join, left outer join, right outer join, equi join, non-equi join, and full join).	S1	CO4	04
5	Implement the Program for Arithmetic operations (like addition, Subtraction, Multiplication and Division)' using PL/SQL (programming language in SQL).	S2	CO4	04
Level: Moderate				
6	Implement the concept for cursors in PL/SQL and demonstrate competence for loop constructs	S2	CO1, CO2	06
7	To implement the program for updating the values using cursor.	S2	CO1, CO2	06
Level: Complex				
8	To implement the Concept of Views and Sql Sub-Queries.	S2	CO4	06
9	Mini-project	S2	CO5	06

Assessment:

ISEI: In-Semester Evaluation of 50 marks based on performance of students in practical hours, practical assignments completed, and timely submission.

Assessment Table:

Assessment Tool	S1	S2
	CO1	CO2,C03, CO4
ISE1/ Term work (25 marks)	10	15
ESE (25 Marks)	10	15

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Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination
S1	Imitation	5	5
S2	Manipulation	10	10
S3	Precision	10	10
S4	Articulation	00	00
S5	Naturalization	00	00
Total Marks		**25**	25

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

Course outcome															
CO1										3					
CO2										2				1	
CO3										2					
CO4									2						
CO5					1	3		2		2	3		3		

3 – High 2 – Medium 1- Low **Designed by:**

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CSPCC2010: Lab Object Oriented Programming			
TeachingScheme		**Examination Scheme**	
Practical	**2 Hrs/Week**	**ISE-I**	**25 Marks**
TotalCredits	**01**	**EndSemesterExam**	**25 Marks**

Course Outcomes:

After Completion Of This Course Students Will be able to:

Course Outcomes	
CO1	Execute JAVA programs based on simple constructs like arrays, loops, decision Statements, functions etc
CO2	In corporate object oriented concepts like classes, objects, inheritance, polymorphism resembling a real time situation.
CO3	Demonstratethe use of packages and interfaces.
CO4	Develop OOP programs containing User created Exception handling Threading.
CO5	Connect with Java development Environment lic has Eclipse,NetBeans, IntelliJ etc.

List of the Experiments: The Student shall perform minimum ten experiments of the following using Notepad/ Eclipse/ Netbeans/ Intellij environment

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic (all)				
1	Demonstrate the installation of JAVA with necessary path settings & Execute " Hello World " Program.	S1	CO1	04
2	Execute simple program based on Basic Syntactic constructs of java like : A. Operators and Expression. B. Looping Statements. C. Decision making statements	S1	CO1	04
3	Construct & Execute a Java Program to define a class, describe its constructors, overload the constructors and instantiate its object.	S1	CO2	04
4	Execute A simple program using Scanner class	S1	CO1	04
Level: Moderate (all)				
5	Implement Inheritance & Its Types By Applying various access controls to its data members and methods.	S2	CO1,CO2	06
6	Demonstrate Use Of Method Overriding.	S2	CO1,CO2	06
7	Demonstrate Use Of Implementing Interfaces.	S2	CO2	06
8	Implement program using Object Classes	S2	CO2	06
Level: Complex (anythree)				
11	Implement PackageandSub-Packages.	S2	CO3	06
12	ImplementanApplet	S2	CO3	06
13	WriteaprogramforExceptionalhandling	S2	CO4	06

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14	Implement aProgramusingMultithreading	S2	CO4	06

Assessment:
ISEI: In Termwork of 25 marks based on performance of students in practical hours, attendance, practical assignments completion , and timely submission.

End Semester Evaluation: In ESE of 25 marks Practical conduction and Oral Examination

AssessmentTable:

AssessmentTool	S1	S2	S3	S3	S2
	CO1	CO2	CO3	CO4	CO5
Term Work(25 Marks)	07	07	05	03	03
Practical Examination & Viva Voce (25 Marks)	05	05	05	05	05

Assessment Pattern:

Assessment Pattern Level No.	**Skill Level**	**TermWork**	**Practical Examination viva voce**
S1	Imitation	05	05
S2	Manipulation	08	10
S3	Precision	12	10
S4	Articulation	00	00
S5	Naturalization	00	00
Total		25	25

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

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Course outcome	ProgramOutcomes												PSO's		
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1		3	3							1			2	3	1
CO2		3	3							1			2	3	1
CO3		3	3							1			2	3	1
CO4		3	3							1		1	2	3	1
CO5		3	3							1		1	2	3	1

3–High 2-Medium 1-Low

CSVSE2001: Software Laboratory - I (Python Programming)			
TeachingScheme		**ExaminationScheme**	
Practical	**04 Hrs/Week**	**ISE-I**	**50 Marks**
TotalCredits	**02**	**EndSemesterExam**	**50 Marks**

Prerequisites: Nil

Course Description: Python is a language with a simple syntax, and a powerful set of libraries. It is an interpreted language, with a rich programming environment, including a robust debugger and profiler. While it is easy for beginners to learn, it is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience.

Course Outcomes: After Completion Of This Course Students Will be able to:

Course Outcomes	
CO1	Understand installation procedure and system requirements for Python
CO2	Apply DataTypes, Variables, Operators and other Conditional blocks in programs
CO3	Apply in build functions of Python and Create User Defined Functions
CO4	Create a program using Strings, Tuples, List etc
CO5	Create and Edit Files using File Handling, Using Exception Handling, Implement OOP Concepts

Detailed Syllabus:
List of the Experiments: Students will perform

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks for ISE
Level: Basic				
1	Introduction To Python And Its Installation	S1	CO1	05
2	Create a simple hello world program using Python	S2	CO1, CO2	05
3	Working with variables and datatypes in Python	S2	CO2	05
Level: Moderate				
4	Studying Various types of operators such as Arithmetic, Comparison,Assignment, Logical, Bitwise and Identity Operators	S2	CO1,CO2	05
5	Studying if statement, if-else, nested if statement and if-elif-else ladder	S2		
6	Studying various kinds of loops such as for loop, while loop and nested loops	S2	CO1,CO2	05
7	Working with Built in Functions	S2	CO1,CO2	05
8	Creating User Defined Functions	S2	CO2	05
Level: Complex				
9	Working with Strings, List, Tuples & sets	S2	CO2	05
10	Using File Handling in Python	S2	CO2	05
11	Implementing Exception Handling in Python	S2	CO4	05
12	Read CSV File	S2	CO4	05
13	Write CSV File	S2	CO4	05
14	Creating Classes, Objects with Python	S2	CO4	05
15	Twitter sentiment analysis using Python	S2	CO2	05

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16	Employee Management System using Python	S2	CO4	05
17	Create a chatbot using BrainShop API	S2	CO4	05
18	Compound Interest GUI calculator using Tkinter	S2	CO4	05

Assessment Pattern:

Assessment Pattern LevelNo.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	00	00	00	00
K2	Understand	05	00	00	05
K3	Apply	05	00	00	05
K4	Analyze	05	00	00	05
K5	Evaluate	05	00	00	05
K6	Create	05	00	00	05
Total Marks 100		25	00	00	25

Assessment table:

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Assessment Tool	S1	S2
	CO1	CO2,C03,CO4
ISEI / **Termwork** (25 marks)	10	15
ESE (25 Marks)	10	15

Special Instructions if any: Nil

	Course Outcomes
CO1	Learn about the basics of environment.
CO2	Understand the harmful effects of human activities o solutions.
CO3	Understand the biodiversity, conservation methods biodiversity.
CO4	Understand the concept of climate change, global w disasters and its mitigation measures.

Detailed Syllabus

INVEC1020: ENVIRONMENTAL STUDIES			
Teaching Scheme		**Examination Scheme**	
Lectures	**02 Hrs/Week**	**ISE-I**	**10 Marks**
Tutorial	**00 Hrs/Week**	**ISE-II**	**10 Marks**
Total Credits	**02**	**End Semester Exam**	**30 Marks**

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	A) Understanding Environment Environment: concept and importance, Components o Ecosystem Concept, Structure and Function, Producers,, web and Ecological pyramids, Energy flew in an Ecosy social, aesthetic and informational. **B) Natural Resources** Land resources: global land use patterns, concept land de Use and consequences of over-utilization, concept of wat energy sources, growing energy needs and alternate energ
Unit 2	**A) Biodiversity and its conservation** Biodiversity definition, levels (genetic, species and ecosy loss, poaching of wildlife, biological invasions, Conce Conservation of biodiversity: In-situ and Ex-situ concepts **B) Environmental Pollution** Causes, effects and control measures of Air, water, soil, Liquid waste management
Unit 3	**Environmental issues, policies and practices** Global environmental issues: Increase in greenhouse gase ozone layer depletion, Salient features of Environment Pr Formal and Informal education, Environmental Moveme Environmental ethics.

Text books & Reference books:

1. A Text Book of Environmental Studies by Bharucha E, Universi
2. A Text Book of Environmental Studies by Nadaf F. M., Pawaska
3. Fundamental of Ecology by Odum E. P, Natraj Publishers, Dehr
4. Introduction to Environmental Engineering and science by Gilbe
2015
5. Environmental Science by S.C Santra, New Central Book Agenc
6. Environmental Education by Sharma R. A, 1998

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Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
CO1	3		1											
CO2	3		1											
CO3	3		1											
CO4	3		1											
CO5	3		1											

3- High 2Medium 1-low

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CSEEM1020: Personality Development			
Teaching Scheme		**Examination Scheme**	
Lectures	**03 Hrs/Week**	**ISE-I**	**10 Marks**
Tutorial	**00 Hrs/Week**	**ISE-II**	**10 Marks**
Total Credits	**02**	**End Semester Exam**	**30 Marks**

Prerequisites: Knowledge of common terminology and basic language

Course Description:

The course intends to provide guidance and direction for overall development of personality to facilitate employ-ability.Aims to make students aware about various skills, their hidden potential and better choices to enhance their performance and quality of various roles and life as well.

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Define the term Personality and know about various theories,concepts and terminology.
CO2	Understand to improve upon attitude and motivation to enhance work performance and quality of personal life.
CO3	Gain knowledge of self to adjust appropriately with the people in the society.
CO4	Identify the behavior, feelings and expectations to correlate with personal development strategy.

Detailed Syllabus:

Unit 1	Introduction to Personality Development: Concept and definition of Personality, Significance of personality development. Theories: Psychoanalytic, Ericson , Carl Roger, Big five dimensions, development of personality.
Unit 2	Attitude and Motivation: Attitude;concept, definition, Dynamic trait; Attitude, Ergs, Sentiments,Factors affecting attitude. Motivation; concept, definition, External and Internal motivation, sources of motivation, Maslow's need hierarchy theory
Unit 3	Understanding Self: Concept, definition, self esteem, kinds of self concept, Aggressive, submissive and assertive behavior, SWOT analysis, Johari window.

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Dated: 25th Jun 2024

Text and Reference Books

1. Elizabeth B. Hurlock (2006). Personality Development, 28th reprint, Tata Mc Graw Hill
2. Calvin S. Hall, Gardner Lindzey, John B. Campbell, Theories of Personality, Willy India, Reprint (2011)
3. Stephen P Robbins and Timothy A. Judge (2014) Organizational Behavior, 16th Edition
4. Mile D. J. Power of Positive Thinking, New Delhi, Rohan Book Company.
5. Smith B. Body Language, New Delhi, Rohan Book Company.

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	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					**1**		**2**				**2**				**3**
CO2					**1**		**2**				**2**				**2**
CO3					**1**	**2**	**2**				**3**				**3**
CO4					**1**	**2**	**3**				**2**				**1**

3 – High 2 – Medium 1 - Low

Assessment: Specify the details of ISEI, II, III & ESE

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	End Semester Examination
K1	Remember	CO1,CO2 (5)	CO3,CO4 (5)	CO1to CO4
K2	Understand	CO1,CO2 (5)	CO3,CO4 (5)	CO1to CO4
K3	Apply			
K4	Analyze			
K5	Evaluate			
K6	Create			
Total Marks 50		10	10	30

Assessment table:

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Assessment Tool	CT1	CT2
	CO1,CO2	CO3,CO4
ISE I (10 Marks)	10	
ISE II (10 Marks)		10

Special Instructions if any:

Designed by

Approved in XXV IIIth Academic Council
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