GovernmentCollegeofEngineering,Aurangabad

ChhatrapatiSambhajinagar

(AnAutonomousInstituteofGovernmentofMaharashtra)

Station Road, Osmanpura, Aurangabad – 431005 (M.S.)
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DEPARTMENTOFCOMPUTERSCIENCEAND ENGINEERING

SYB.TECH.(CSE)CURRICULUM STRUCTURE

FROM ACADEMIC YEAR 2024-25

AsperNEP

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.

VisionoftheComputerScience&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 oftheComputerScience&Engineering Department

- Developing Creativity and LogicalReasoning 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

ProgramOutcomes

EngineeringGraduateswillbeableto:

- PO1:Apply knowledge of mathematics,science and algorithm insolving 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 SoftwareEngineering, 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 societalcontext.
- PO8:Recognize the need for,and an ability to engage inlife-long learning.
- PO9:Knowledge of contemporary issues and emerging developments incomputing 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 memberor 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, programmingapplications and science in thedevelopmentofcomputingsolutioninappropriateareasforsystemsoftware,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:-Abletoapplyethical,social,professional,fieldswithpropercommunicationskills & team work & pursue lifelong learning

GENERAL COURSES TRUCTURE & THEME

A.Definitionof Credit

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

B.TotalCreditsforthe completion of B.Tech.inComputerScience&Engineering:

The total number of credits proposed for the four-year B.Tech in Computer Science & Engineering(CSE) with 1Multidisciplinaryminor(Compulsory) degreeis **170** asper the structure given below**:**

A.SemesterwiseCreditDistributionStructureforFourYearUGPrograminComputer Science & Engineering with One Multidisciplinary Minor

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
BasicScience Course	BSC/ESC	8	8		--	--	--	--	--	16
EngineeringScienceCourse		7	7		--	--	--	--	--	14
ProgrammeCoreCourse (PCC)	Program Courses	--	02	11	11	6	12	8	0	50
ProgrammeElectiveCourse (PEC)		--	--			04	08	08	0	20
MultidisciplinaryMinor (MD M)	Multidisciplinary Courses		-	04	03	04	03	0	00	14
OpenElective(OE)Other than a particular program		--	--	03	03	02	--	--	--	08
Vocational and Skill EnhancementCourse (VSEC)	SkillCourses	02	02	--	02	--	02	--	--	08
AbilityEnhancementCourse (AEC -01, AEC-02)	Humanities SocialScience and Management (HSSM)		02		02	--	--	--	--	04
Entrepreneurship/Economics/ Management Courses		--		02	02	--	--	--	--	04
IndianKnowledgeSystem (IKS)		02			--	--	--	--	--	02
ValueEducationCourse (VEC)		--	--	02	02	--	--	--	--	04
ResearchMethodology	Experiential Learning Courses	--	--	--	--	--	--		04	04
Comm. Engg. Project (CEP)/FieldProject(FP)		--	--	02	--	--	--	-	-	02
Project		--	--	--	--	--	--	04		04
Internship/OJT		--	---			--	--		12-	12

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Co-curricularCourses(CC)	Liberal Learning Courses	02	02		--	--	--	--	-	04
TotalCredits(Major)		**21**	**23**	**27**	**24**	**20**	**25**	**20**	**16**	**170**

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Studentscanoptforanyof thefollowingasperthe rulesand regulationsgivenby institute:

1. B.TechwithoneMultidisciplinary Minor=Total170 Credits
2. B.TechwithoneMultidisciplinaryMinorandHonorinA.I.M.L/programmingparadigm =Total 188 Credits
3. B.TechwithoneMultidisciplinaryMinorandHonorbyResearch=Total188 Credits
4. B.TechwithtwoMultidisciplinary Minors=Total184 Credits

VOCATIONALANDSKILL ENHANCEMENTCOURSE (VSEC)

S. No	Category	Course Title	Semester	Hoursperweek			Total Credits
				Lecture	Tutorial	Practical	
1	VSEC	ComputerWorkshop	I	0	0	4	**02**
2	VSEC	Engineering Exploration	II	0	0	4	**02**
3	VSEC	SoftwareLaboratory- 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&SOCIALSCIENCESCOURSES[HSSM]

S.No	Category	CourseTitle	Semester	Hoursper week			Total Credits
				Lecture	Tutorial	Practical	
1.	IndianKnowledge System (IKS)	Indian Knowledge System	I	2	0	0	**02**
2.	AbilityEnhancement Course (AEC)	Communication Skills	II	2	0	0	**02**
3.	Entrepreneurship/Economics/ Management Courses	Psychology	III	2	0	0	**02**
4.	ValueEducationCourse (VEC)	UniversalHuman values	III	2	0	0	**02**
5.	AbilityEnhancement Course (AEC)	Technical Communication	IV	2	0	2	**02**
6.	Entrepreneurship/Economics/ Management Courses	Personality Development	IV	2	0	0	**02**
7.	ValueEducationCourse (VEC)	Environmental studies(EVS)	IV	2	0	0	**02**
TotalCredits							**14**

5. EXPERIENTIALLEARNINGCOURSES(ELC)

S. No	Category	CourseTitle	Semester	Hoursper week			Total Credits
				Lecture	Tutorial	Practical	
1	Comm.Engg.Project (CEP)/Field Project (FP)	MiniProject	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**
TotalCredits							**22**

6. LIBERALLEARNINGCOURSES(CO-CURRICULARCOURSES(CC))

S. No	Category	CourseTitle	Semester	Hoursper week			Total Credits
				Lecture	Tutorial	Practical	
1	CC	Yoga	I	0	0	4	**02**
2	CC	NSS/ Sports/ ClubsActivities	II	0	0	4	**02**
TotalCredits							**04**

7. MULTIDISCIPLINARYMINOR(MDM)andOPENELECTIVE(OE)OTHERTHAN A PARTICULAR PROGRAM

ListofMultidisciplinaryMinorCoursesfromother faculties:Total14Creditsasper GR
Twocoursesof4creditsandtwocoursesof3credits.
Openelectivesof8 creditscanbeoffered fromtheseother faculties.
Twocoursesof3 creditsand01 courseof02credits.

Specialization	Dramatics	FilmMaking	FineArt	Music
Multi-disciplinary Minor - 01	DramaticTheory, Literature	Videography + Cinematography	AppliedArt (DigitalArt)	Theory of IndianMusic
Multi-disciplinary Minor – 02	Acting	VideoEditingand Lighting	Painting (GenerativeArt)	Ancient and ModernPoetry
Multi-disciplinary Minor – 03	Directing	Story telling StoryBoarding	Sculpture(3D-Space)	TheEvolutionof music
Multi-disciplinary Minor – 04	Playwriting	UI/UXand Animation	Visual Communication (Evolutionary Art)	MusicandFilm
Multi-disciplinary Minor – 05	Applied Interactive Theatre	Art of Visual Communication	Graphics Art (Print&Printing Art)	Introduction to Electronic and ComputerMusic
Multi-disciplinary Minor - 06	TechnicalTheatre	Film&TV Directing	ArtCulture	AnalysisofTonal Music

Specialization	Management& Finance	Law	SocialScience	Journalism
Multi-disciplinary Minor - 01	Microeconomics	ConstitutionalLaw	Indian Economics	Principles of Communication
Multi-disciplinary Minor – 02	CorporateSocial Responsibility	Human Rights& InternationalLaw	Introductionto Sociology	Fundamentalsof Journalism
Multi-disciplinary Minor – 03	Principlesof Accounting	EnvironmentalLaw	Geo-Informatics	Cyber Journalism
Multi-disciplinary Minor – 04	BusinessIntelligence	CivilProcedure Code (CPC)	Introduction to PoliticalSciences	BasicsofDesign&Graphics
Multi-disciplinary Minor – 05	MarketingResearch	Land Lawsincludingceilingand other local laws	Corporatesociology	Mass Communication: Concepts and Processes
Multi-disciplinary Minor - 06	Corporate Governanceand BusinessEthics	Cyber Law	Modern India-Political,Economic & Social Ethos	ITandOnline Journalism

InadditiontoabovecoursesfollowingGroupsareofferedasMultidisciplinaryMinorbyComputer Science & Engineering Department

A) Artificialintelligence/MachinelearningGroup

S. No	Category	CourseTitle	Semester	Hoursper week			Total Credits
				Lecture	Tutorial	Practical	
1	MDM 5001/5002	Introductionto Data Science	III	3	0	1	**04**
2	MDM 5003	IntroductionTo Machine Learning	IV	3	0	0	**03**
3	MDM 5004/5005	Artificial Intelligence	V	3	0	1	**04**
4	MDM 5006	Neuralnetwork	VI	3	0	0	**03**
TotalCredits							**14**

B) Programming Group

S. No	Category	CourseTitle	Semester	Hoursper week			Total Credits
				Lecture	Tutorial	Practical	
1	MDM 6001/6002	Cprogramming	III	3	0	1	**04**
2	MDM 6003	Objectoriented 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**
TotalCredits							**14**

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TentativeTeachingand EvaluationSchemefrom year2024-25asper NEP

SecondYearB.Tech.PrograminComputerScienceand EngineeringMultidisciplinary Minor

SemesterIII

Course				**Teaching Scheme**			**ContinuousEvaluationintermsofMarks**					
Sr no	**Category**	**CourseCode**	**Course Name**	**TH**	**T**	**PR**	**Credits**	**ISEI**	**ISEII**	**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 HumanValue	2	-	-	2	10	10	-	30	50
10	EECM/HSSM	CSEEM0010	Psychology	2	-	-	2	10	10	-	30	50
11	CEP/FP	CSEP2001	MiniProject			4	2			50	50	100
12												
Total				**19**	**0**	**10**	**24**	**95**	**95**	**175**	**485**	**850**

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TentativeTeachingand EvaluationSchemefrom year2024-25asper NEP

SecondYearB.Tech.PrograminComputerScienceandEngineeringMultidisciplinary Minor

SemesterIV

Course				Teaching Scheme			ContinuousEvaluationintermsofMarks					
Sr No	**Category**	**CourseCode**	**Course Name**	**TH**	**T**	**PR**	**Credits**	**ISEI**	**ISEII**	**ISEIII**	**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 Programmin g	3			3	15	15	10	60	100
4	OE2	CSOEC1020	OpenElectiv e-II	3	-		3	15	15	10	60	100
6	(MDM)	CSMDM5003/ CSMDM6003	Multidiscipli nary Minor	3	-	-	3	15	15	10	60	100
7	PCC	CSPCC2009	LabDatabase Management System	-	-	2	1	-	-	25	25	50
8	PCC	CSPCC2010	Lab Object Oriented Programmin g			2	1			25	25	50
9	VSEC/	CSVSE2001	Software Laboratory- I (Python Programmin g)			4	2			50	50	100
10	VEC	CEVEC0010:	Environmental Science	2			2	10	10	--	30	50

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11	HSSM	CSEEM1020	Personality Developmen t	2			2	10	10	--	30	50
12	AEC	EEAEC2010	Technical Communicat ion	2	-	-	2	10	10	-	30	50
			Total	**21**	**00**	**8**	**25**	**105**	**105**	**150**	**490**	**850**

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Semester-III

CSPCC2001:EngineeringMathematics-III(StatisticalDifferential Calculus)			
TeachingScheme		**ExaminationScheme**	
Lectures	3 Hrs/Week	**ISE-I**	15 Marks
Tutorial	0 Hr/Week	**ISE-II**	15 Marks
Total Credits	03	**ISE-III**	10 Marks
		EndSemesterExam	60 Marks

Perquisites:Nil

CourseDescription:Thecourseaimstoequipthestudentswithstatisticaltoolsandconceptsthat 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:

Createinterestinstudentsinstatisticalthinking.

1. Tounderstand,analyze,andsolveproblemsonrandomvariablesstatistics,significance testing and goodness of fit tests for probability distributions

CourseOutcomes expected:

Oncompletion ofthiscoursestudent shouldbeable to:

Course Outcomes	
CO1	Definethebasicconceptsofprobabilitydistributions,randomvariableandsampling.
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	Computeandinterprettheresultsofbi-variateregressionandcorrelationanalysis, for forecasting.
CO5	to apply non-parametrictests for significance testing and goodness of fitof theprobability 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 andbivariatedistribution and its marginal distribution.
Unit-III	Mathematical Expectations: Mathematical expectation: definition and properties,mean,variance,standarddeviationintermsofexpectations,moment generating function, characteristics function.
Unit-IV	Probabilitydistribution:Binomialdistribution,Poissondistribution,normal distribution, chi-square distribution and student's t distribution.

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,criticalregion;levelofsignificance.Procedureoftestinghypothesis,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.

Textand ReferenceBooks :

1. S.C.GuptaandV.K.Kapoor,*FundamentalsofMathematicalStatistics*,12thed.New Delhi: S. Chand & Sons, 2014.
2. S.C.Gupta,*FundamentalsofStatistics*,7th ed.Maharashtra:HimalayaPublishingHouse, 2021.
3. ErwinKreyszig,*AdvancedEngineeringMathematics*,9thed.JohnWiley&Sons,New York,2006.
4. B.S.Grewal,*HigherEngineeringMathematics*,35th ed.,Delhi :KhannaPublishers, 2000.
5. N.P.BaliandManishGoyal,*AtextbookofEngineeringMathematics*, Reprint,New Delhi:Laxmi Publications, 2010.
6. Ross,S.M.,*IntroductiontoProbabilityandStatisticsforEngineersand Scientists*, 5th ed. New Delhi: Elsevier, 2004.

MappingofCourseoutcomewithProgram 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

TeachingStrategies:

Theteachingstrategyplannedthroughthelectures,andteambasedhomeworks.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'sAssessment:Teacher'sassessmentof10marksbasedonthe following.

1) Homeassignments
2) Surprisetestswithmultiplechoice questions.

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

Students will perform one or more of the following activities

1. SurpriseTest
2. AssignmentusingMathematicaltoolslikeMathematica/MatLaborsimilar.
3. Quiz
4. Anyotheractivitysuggestedbycourse coordinator

Assessment Pattern:

Assessment Pattern Level No.	KnowledgeLevel	ISEI (Class Test-1)	ISEII (Class Test-2)	ISEIII (TA+Surprise Test)	End Semester Examination
K1	Remember	01	03		
K2	Understand	14	12	10	60
K3	Apply				
K4	Analyze				
K5	Evaluate				
K6	Create				
TotalMarks100		15	15	10	60

CSPCC2002:Data Structures			
TeachingScheme		**ExaminationScheme**	
Lectures	3 Hrs/Week	**ISE-I**	15 Marks
Tutorial	0	**ISE-II**	15 Marks
Total Credits	03	**ISE-III**	10 Marks
		EndSemesterExam	60 Marks

Perquisites: None

CourseDescription:

This course represents a conceptual and practical introduction to organizing data computers so thatitcanbeusedefficiently.Thecourseisdesignedtodevelopskillstodesignandanalyzesimple linearandnonlineardatastructures.Itstrengthenstheabilityofthestudentstoidentifyandapply thesuitabledatastructureforthegivenrealworldproblem. It enablesthem togainknowledgein practical applicationsof datastructures.Thiscourseintroduces conceptslikeADT,stack,queue, linked lists, tree, graph, sorting technique and searching technique.

Course Outcomes:

AfterSuccessfulCompletionTheCourse,studentswillbeableto:

Course Outcomes	
CO1	Describetheconceptofdataabstractionanddatastructureslikestack,queue.
CO2	ImplementVariousLinearDataStructuresLikeStacks,queues,linkedlists.
CO3	Implementandtraversevariousnonlineardatastructuresliketreesandgraphs.
CO4	AnalyzeComparevarioussearchingandsorting techniques.
CO5	DevelopUserdefineddatastructures inahighlevel language.

DetailedSyllabus:

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	**LinearDataStructure&theirrepresentation**:Definition,concept,operationon

	linked lists, Circular linked lists, Doubly linked lists, Operations Like Insertion, deletion, insertion order, searching, updating, Application Of linked list such a polynomialmanipulation,ComparisonSinglyLinked,circularlylinkedlist&doubly linked list.
Unit 3	**Trees**: Definition, Basic terminology, operation binary trees,linked storage representationforbinarysearchtrees,Basicoperationonbinarysearchtreesuchas creatingabinarysearchtree,searching,modifyinganelement,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,BasicTerminology,matrixrepresentationimplementationof graphs, graph Traversals, DFS, BFS, shortest Path, spanning tree.
Unit 5	**Sorting&searchingandhashingtechniques**:Differentsortingtech,classification onthebasisofbig-Onotation,techsuchasstraightselectionsort,bubblesort,merge sort,quicksort,heapsort,shellsort,radixsort,comparisonsbetweendifferentsorting techniques. Sequential Searching, binary searching, Hashing Techniques.

MappingofCourseoutcomeswithProgram OutcomesandProgramSpecificOutcomes:

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-High2–Medium1–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 thefollowing:

1. Quiz
2. Assignments
3. Questionandanswer
4. PowerPointpresentation

AssessmentPattern:

Assessment Pattern LevelNo.	Knowledge Level	ISE I	ISE II	ISE III	EndSemester 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

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

AssessmentTable:

SpecialInstructionsIfAny:Nil **Designedby:**

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Dated: 25th Jun 2024

CSPCC2003:OperatingSystems			
TeachingScheme		**ExaminationScheme**	
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

CourseDescription: Topicswillincludewhatanoperatingsystemdoes,managementoftheCPU, memory, processes and devices with exposure to android operating system.

Course Outcomes:
AfterSuccessfulCompletionTheCourse,studentswillbeable to:

Course Outcomes	
CO1	DifferentiateBetweenMultiprocessing,multiprogramming,and multitasking.
CO2	DifferentiateBetweenPrograms,processesandthreads.
CO3	ApplySegmentation AndPaging Techniques
CO4	ComparefilenaminginLinuxand Windows.
CO5	ExplainAndroidOperatingSystem

DetailedSyllabus:

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,synchronizationhardware,semaphores,classicproblemsofSynchronization. Deadlock:System Model,deadlock characterization,methods for handling deadlocks, deadlock prevention,deadlock avoidance,deadlock detection.
Unit 3	**MemoryManagement &virtualmemory:**Memorypartitioning,Swapping, Paging,Segmentation,VirtualmemoryOverlays,Demandpaging,Performanceof

	Demandpaging,Virtualmemoryconcepts,PageReplacementAlgorithms,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		

MappingofCourseoutcomeswithProgramOutcomesandProgramSpecificOutcomes: 3-

High 2–Medium 1–Low

ISEIandISEII: Insemesterevaluations(ISEIand ISE II)of15marks,eachwillbebasedon ClassTestIandClass TestIIrespectively.

ISEIII: Teachers Assessment of10marksisbased ononeofthe/orcombination ofthe following:

1. Quiz
2. Assignments
3. Questionandanswer
4. PowerPointpresentation

AssessmentPattern:

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
TotalMarks100		15	15	10	60

Assessmenttable:

AssessmentTool	**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(60Marks)	30	30
TotalMarks100		

Special Instructionsifany:Nil

DesignedBy:

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

CSMDM5001:DataScience			
TeachingScheme		**ExaminationScheme**	
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:

Afterstudying thiscourse, studentswill beable to

Course Outcomes	
CO1	Togetanunderstandingofmachinelearningtechniquesfortextclassificationand clustering.
CO2	Tostudythevariousprobability-basedlearning techniques.
CO3	Toapplythecoreskillsin visualizationfortimeseries,dataanalysis../li>
CO4	Applystatisticalandotherresearchtoolstoanalyzeandinterpretdata.
CO5	Tounderstandthe roleandstages ofdatascienceprojects.

DetailedSyllabus:

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 InformationScience,ComputationalThinking,SkillsforDataScience,ToolsforData Science, Issues of [Ethics, Bias, and Privacy in Data Science.
Unit 2	**Data:** Introduction, Types of Data, Structured Data, Unstructured Data, Challenges withUnstructuredData,DataCollection,DataPre-processing,DataCleaning,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 PythonGetting Access to Python , Getting Started with PythonBasics, Control Structures, Functions, Importing Data, Graphics and Data Visualization, Numpy and jupyter notebookPlotting the Data, Statistics .
Unit 5	**Applications,Evaluations,andMethods:**

	Data Collection Methods: Introduction to Quantitative and Qualitative Methods **Evaluation:**ComparingModels,Training–TestingandA/BTesting,Cross- Validation **Hands-OnwithSolvingDataProblems:**CollectingandAnalyzingTwitter/ YouTube Data

TextBooks

1. AHands-OnIntroductiontoDataScience,SecondEdition,ChiragShah,Cambridge Press.
2. IntroductiontoDataScience,RafaelA.Irizarry,HardwardCRCPress

ReferenceBooks

1. TheDataScienceHandbook:AdviceandInsightsfrom25AmazingData Scientists,Carl Shan, William Chen, Data Science Bookshelf.
2. DataScience(TheMITPressEssentialKnowledgeseries),JohnD.Kelleherand Brendan Tierney, Part of: The MIT Press Essential Knowledge series.
3. FoundationsofDataScience1stEdition,AvrimBlum,JohnHopcroft,Ravindran Kannan Cambridge University Press.

EBooks/Onlinelearningmaterial

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

Mappingof COs and POs

PO → CO↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2											1	1	
CO2	1	2	3		2								1	1	
CO3	1	2	1										1	1	
CO4	1	2	1										1	1	
CO5	1	2	1										1	1	

AssessmentTable

AssessmentTool	CourseOutcomes				
	CO1	CO2	CO3	CO4	CO5
ISEI*(ClassTest)20 Marks	5	10	-	5	-
ISEII*20Marks	-	-	5	10	5
ESEAssessment60 Marks	18	18	12	12	-

AssessmentPattern

Level No.	KnowledgeLevel	ISEI*	ISE II*	EndSemester 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

CSMDM6001:CProgramming			
TeachingScheme		**ExaminationScheme**	
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.ThisCProgrammingisdesignedtolearnandenhancetheirknowledge of the C programming language.

Course Outcomes:

Aftersuccessfulcompletionthecourse, studentswillbeable to:

	Course Outcomes
CO1	Describethefundamentalsof Cprogramming Language.
CO2	ApplyappropriateControl structurestosolveproblems.
CO3	Describetheconceptof ArraysandStrings.
CO4	WriteUserdefinedfunctionsand applytheconcept ofrecursiontosolve problems.
CO5	Describetheconceptof Pointers,Structuresandimplementoperationsonfiles

DetailedSyllabus:

Unit 1	**Overviewof C:** History andimportance ofC,BasicstructureofCprogram,executinga C program. **Constants,VariableandDataTypes:**Introduction,CharacterSet,CTokens,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, SimpleIFStatement,theIF-ELSEStatement,NestingofIF-ELSEStatements,TheELSE 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,Declarationof One-dimensional Arrays, Initialization of One-dimensional Arrays, Example programs- Bubble sort, Selection sort, Linear search,Binarysearch,Two-dimensionalArrays,DeclarationofTwo-dimensionalArrays, 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,CategoryofFunctions,NoArgumentsandnoReturnValues,Argumentsbut no Return values, Arguments with Return Values, No Arguments but Returns a Value, Passing Arrays to Functions, Recursion, TheScope, Visibility and Lifetime ofvariables. **CPointers:**Introduction,DeclaringPointerVariables,InitializationofPointervariables, accessing a Variable through its Pointer.
Unit 5	**Structures:** Introduction, Defining a structure, declaring structure variables, accessing structure members, structure initialization. **FileManagementinC**:Introduction,Definingandopeningafile,closingafile,Input/output and Error Handling on Files.

TextandReference Books:

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

2. PradipDey,ManasGhosh,"ProgramminginC",2ndEdition,2018,OxfordUniversityPress, ISBN: 978-01-9949-147-6.
3. KernighanB.WandDennisM.Ritchie,"TheCProgrammingLanguage",2ndEdition,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.GuruprasadNagraj,"CProgrammingforProblemSolving",HimalayaPublishingHouse. ISBN-978-93-5299-361-1.

WebResources:
NPTELcourse: https://nptel.ac.in/courses/106/105/106105171/

MappingofCourseoutcomeswithProgram OutcomesandProgramSpecific 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-High2 – Medium1–Low

Assessment:

ISEIandISEII: Insemesterevaluations(ISEIandISEIII)of15marks,eachwill be based on Class Test I and Class Test II respectively.

ISEIII: TeachersAssessmentof10marksisbasedononeofthe/orcombinationof few of the following:

1) Quiz
2) Assignments
3) Questionandanswer
4) PowerPoint presentation

AssessmentPattern:

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
TotalMarks 100		15	15	10	60

Assessmenttable:

AssessmentTool	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
ESEAssessment (60 Marks)	20	40
TotalMarks100		

Special Instructionsifany:Nil

Designedby:

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

CSPCC2004:LabDataStructures			
TeachingScheme		**examinationscheme**	
Practical	**2 Hrs/Week**	**ISE-I(TermWork)**	**25 Marks**
TotalCredits	**01**	**EndSemesterExam**	**25 Marks**

Course Outcomes:
Aftercompletionofthiscoursestudentswill beable to:

Course Outcomes	
CO1	ImplementLinearData StructuresLikeStack,andqueue.
CO2	ImplementLinearDataStructuresLikeLinkedLists(Singly,Circularand Double)
CO3	Implementandtraversenonlineardatastructureslikegraphsandtrees.
CO4	DemonstrateAndCompareDifferentsearchingandsorting algorithms.

ListofTheExperiments: Thestudentshallperformaminimumoftheexperimentsofthe following using C or C++

Sr. No.	TitleoftheExperiments	Skill / Knowledge Level	CO	Marks for ISE
Level:Basic(all)				
1	ImplementTheStackAndUseItToSolvethe Postfix expression.	S1	CO1	02
2	ImplementTheCircular Queue.	S2	CO1	02
3	Implement aSinglyLinkedList.	S2	CO2	03
4	Implement aCircularLinkedList.	S1	CO2	02
5	Implement aDoublyLinkedlist.	S2	CO2	03
Level:Moderate(all)				
6	WriteAProgramToImplementMergeSortAnd bubble sort.	S2	CO4	02
7	WriteAProgramToImplementQuicksort.	S2	CO4	02
8	WriteAProgramToImplementBinarySearch tree andappletreetraversalmethods.	S2	CO3	02
9	WriteAProgramToImplementInsertionSort.	S2	CO4	01
Level:Complex(all)				
10	WriteAProgramToImplementGraph.And traverse graph by DFS.	S2	CO3	03
11	WriteAProgramToImplementGraph.And traverse graph by BFS.	S2	CO3	03

Assessment:
ISEI: In-SemesterEvaluationof25marksbasedontheperformanceofstudents'impracticalhours, practical assignments completed, and timely submission
AssessmentTable:Assessment Pattern:

AssessmentTool	S1	S2
	CO1	CO2,C03,CO4
ISE1/Termwork(**25 marks**)	04	21
ESE(25Marks)	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

MappingofCourseoutcomeswithProgram OutcomesandProgramSpecificOutcomes:

Course outcome	**Program Outcomes**												**PSO's**		
	PO 1	**PO 2**	**PO3**	**PO 4**	**PO5**	**PO 6**	**PO 7**	**PO 8**	**PO9**	**PO 10**	**PO 11**	**PO12**	**PSO 1**	**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	

3–High2–Medium1-Low

CSPCC2005:LabOperating System			
TeachingScheme		**ExaminationScheme**	
Practical	**2 Hrs/Week**	**ISE-I(TermWork)**	**25 Marks**
TotalCredits	**01**	**EndSemesterExam**	**25 Marks**

TotalHoursrequiredforthispracticalcourse:30Hours.
Prerequisites: ProgrammingLanguage,DataStructures
Course Outcome:
Aftercompletionofthiscoursestudentswill beable to

	Course Outcomes
CO1	ExposuretodifferentOS
CO2	Awarenessofconceptsofmultiprogramming,multithreadingandmultitasking
CO3	Demonstrationofmemorymanagementalgorithms
CO4	Demonstrationoffile-handlingconceptsbyimplementingsuitablealgorithms.
CO5	Awarenessofcomputationalissues,andresources indistributedenvironments.

List ofExperiments:
Thestudent shall performa minimum of theexperiments of the following

Sr. No.	**Titleoftheexperiments**
1	ComparativeStudyofDifferentOperatingSystems
2	Demonstrationofmultitaskingconcept.
3	Implementingvariousprocesscreationalgorithms(FCFS,SJFandRound-RobinScheduling)
4	Implementationofmemoryallocationpolicies.

5	ImplementingPagereplacementalgorithms(FIFO,LIFO)
6	Implementingsegmentationalgorithms
7	Implementingfile-handlingalgorithms
8	Implementingfile-handlingalgorithms
9	Implementingfile-handlingalgorithms
10	DemonstrationofworkinginadistributedOSenvironment.

Assessment:
ISEI: In-SemesterEvaluationof25marksbasedonperformanceofstudents'impracticalhours, practical assignments completed, and timely submission
AssessmentTable:Assessment Pattern:

AssessmentTool	S1	S2
	CO1	CO2,C03,CO4
ISE1/Termwork(**25 marks**)	04	21
ESE(25Marks)	04	21

AssessmentPattern:

Assessment Pattern Level No.	**KnowledgeLevel**	**ISEI**	**EndSemester 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

MappingofCourseOutcomeswithProgramOutcomesandProgramSpecific 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–High2–Medium1-Low **DesignedBy:**

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

TotalHoursrequiredforthispracticalcourse:20Hours.
Prerequisites: ProgrammingLanguage,DataStructures

Course Outcome:

	Course Outcomes
CO1	Explainhowdataiscollected, managedandstoredfordata science.
CO2	Understandthekeyconceptsindatascience,includingtheirreal-worldapplications and thetoolkit used by data scientists

CO3	ImplementdatacollectionandmanagementscriptsusingMongoDB

List ofExperiments:
Thestudent shall performa minimum of theexperiments of the following

Sr. No.	Titleoftheexperiments
1	WorkingwithNumpyarrays
2	WorkingwithPandasdataframes
3	DeveloppythonprogramforBasicplotsusingMatplotlib
4	DeveloppythonprogramforFrequencydistributions
5	DeveloppythonprogramforVariability
6	DeveloppythonprogramforAverages
7	DeveloppythonprogramforNormal Curves
8	DeveloppythonprogramforCorrelationandscatterplots
9	DeveloppythonprogramforCorrelationcoefficient
10	DeveloppythonprogramforSimpleLinearRegression

Assessment:
ISEI: In-SemesterEvaluationof25marksbasedonperformanceofstudents'impracticalhours, practical assignments completed, and timely submission
AssessmentTable:Assessment Pattern:

AssessmentTool	S1	S2
	CO1	CO2,C03,CO4
ISE1/Termwork(**25 marks**)	04	21

ESE(25Marks)	04	21

AssessmentPattern:

Assessment Pattern Level No.	KnowledgeLevel	ISEI	EndSemester 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

MappingofCourseOutcomeswithProgramOutcomesandProgramSpecific 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–High2–Medium1-Low **DesignedBy:**

CSMDM6002:-Lab-CProgramming

TeachingScheme	ExaminationScheme	
Practical:2Hrs/Week	**ISEI(TermWork)**	**25 Marks**
Credits:01	**Practical/viva-voce**	**25 Marks**

Course Outcomes:

Aftercompletionofthiscoursestudentswill beable to:

	Course Outcomes
CO1	Understandthedevelopmentenvironmentforcompiling,debugging,linkingand executing a C program.
CO2	Analyzingthecomplexityofproblemsrelatedtoarrays,Modularizetheproblems into small modules and then convert them into programs
CO3	Applythein-builtfunctions andcustomizedfunctions forsolvingtheproblems.
C	Designingprograms touselibraryfunctionsforstring handling
C	DemonstratefilehandlinginC

List ofthe Experiments:

Thestudentshallperformminimumten experimentsofthefollowingusingOracle databases.

Sr. No.	Titleof the Experiments	CO	Marksfor ISE
Level:Basic(all)			
1	a) WriteaCprogramtofindsumandaverage of three numbers. b) Write a C program to find the sum of individualdigitsofagivenpositiveinteger. c) WriteaCprogramtogeneratethefirstn terms of the Fibonacci sequence.	CO1	02
2	a) WriteaCprogramtocheckwhetheragiven number is perfect number or Not. b) WriteaCprogramtocheckwhethera given number is strong number or not.	CO1	02
3	a) WriteaCprogramtofindboththelargest and smallest number in a list of integers. b) WriteaCProgramtoSorttheArrayinan Ascending Order.	CO2,CO3	03
Level: Moderate			
4	a) WriteaCprogramtoperformadditionof two matrices. b) WriteaCprogramthatusesfunctionsto perform Multiplication of Two Matrices.	CO2	03
5	a) WriteaCprogramtousefunctiontoinserta sub-stringintogivenmainstringfromagiven position.	CO2, CO3,CO4	03
Level:Complex			

6	a) Write a C program that uses functions and structurestoperformthefollowingoperations: i) Readingacomplexnumber ii) Writingacomplexnumber iii) Additionoftwocomplexnumbers iv) Multiplicationoftwocomplexnumbers	CO3,CO4	06
7	a) WriteaCprogramtocopythecontentsof one file to another. b) WriteaCprogramtomergetwofilesinto a third file.	CO5	06

Assessment:

ISEI: In-SemesterEvaluationof50marksbasedonperformanceofstudentsinpracticalhours, practical assignments completed, and timely submission.

AssessmentTable:

AssessmentTool		
	CO1	CO2,C03, CO4
ISE1/Termwork(25marks)	4	21
ESE(25 Marks)	4	21

AssessmentPattern:

Assessment PatternLevel No.	**Knowledge Level**	**ISE I**	**EndSemester 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

CSOEC0010:(OE-I)Design Thinking		
TeachingScheme	**ExaminationScheme**	
Lectures:03hrs/week	**ISE I***	**15 Marks**
Tutorial:00hrs/ week	**ISE II***	**15 Marks**
Credits:03	**ISE III***	**10 Marks**
	EndSemesterExamination	**60 Marks**

Prerequisites: BasicKnowledgeofScienceand Technology,EnglishLanguage
Course description: The objective of this Course is to provide new ways of creative thinking and LearntheinnovationcycleoftheDesignThinkingprocessfordevelopinginnovativeproductsthat are useful for a student in preparing for an engineering career.
Course Outcomes:
Aftercompletingthe course,studentswillableto:

	Course Outcomes
CO1	1.Compareandclassifythevariouslearningstylesandmemorytechniquesand Apply them in their engineering education.
CO2	2.AnalyzeemotionalexperienceandInspectemotionalexpressionstobetter understand users while designing innovative products.
CO3	3.DevelopnewwaysofcreativethinkingandLearntheinnovationcycleof Design Thinking process for developing innovative products.
CO4	4. Propose real-time innovative engineering product designs and Choose appropriateframeworks,strategies,andtechniquesduringprototypedevelopment.
CO5	5.Perceiveindividualdifferencesandtheirimpactoneverydaydecisionsand further Create a better customer experience.

DetailedSyllabus:

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 ProductDesign;DesignThinkingApproach,StagesofProductDesign,Examplesof best product designs and functions, **Assignment – Engineering Product Design**
Unit 4	**Prototyping & Testing:** What is Prototype? Why Prototype? Rapid Prototype DevelopmentProcess,Testing;SampleExample,TestGroupMarketing,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,UseofDesignThinkingtoEnhanceCustomerExperience,Parametersof Product experience, Alignment of Customer Expectations with Product Design. Feedback, Re-Design & Re-Create Feedback loop, Focus on User Experience, Addressergonomicchallenges,Userfocuseddesign,rapidprototyping&testing,final product. (Final Presentation – "Solving PracticalEngineering Problem through Innovative Product Design & Creative Solution".)

TextandReferenceBooks:E-Booksand Guides;

1. MoritzGekeler,APracticalGuidetoDesignThinking
2. HassoPlattner, InstituteManual,An IntroductiontoDesignThinkingProcessGuide.
3. GavinAmbrose,PaulHarris,"DesignThinking"sign
4. MaurícioVianna,YsmarVianna,IsabelK.Adler,BrendaLucena,BeatrizRusso" Design Thinking"
5. ChristianMüller-Roterberg,HochschuleRuhrWest,"HandbookofDesignThinking "

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

MappingofCourseOutcomewithProgram OutcomesandProgram 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– Medium1-Low

Assessment:SpecifythedetailsofISEI,II,III&ESE Assessment

Pattern:

Assessment Pattern Level No.	**Knowledge Level**	**ISE I**	**ISE II**	**ISE III**	**EndSemester 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				
TotalMarks100		15	15	10	60

Assessmenttable:

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

SpecialInstructionsifany: **Designedby**

INVEC0010:UniversalHumanValues-IIUnderstandingHarmony		
TeachingScheme	**ExaminationScheme**	
Lectures:02hrs/week	**ISEIOnline Examination**	**10 Marks**
	ISEIIOnline Examination	**10Marks**
Credits:02	**ISE III**	
No.ofTeaching Hours 25-28	**End Semester ExaminationOnline Examination**	**30 Marks**

Course description:

Theobjectiveof the courseis four fold:

- Developmentofaholisticperspectivebasedonself-explorationaboutthemselves (human being), family, society andnature/existence.
- Understanding(ordevelopingclarity)oftheharmonyinthehumanbeing,family, society and nature/existence
- Strengtheningofself-reflection.
- Developmentofcommitmentandcouragetoact.

Course Outcomes
By the end of the course, students are expected to become more aware of themselves, andtheirsurroundings(family,society,nature);theywouldbecomemoreresponsibleinlife,andi nhandlingproblemswithsustainablesolutions,whilekeepinghumanrelationshipsandhumann atureinmind.Theywouldhavebettercriticalability.Theywouldalsobecomesensitiveto theircommitmenttowardswhattheyhaveunderstood(humanvalues,humanrelationship 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. Thisisonlyanintroductory foundationalinput.Itwouldbe desirabletofollowitup by a) faculty-studentormentor-menteeprogramsthroughouttheirtimewith theinstitution b) Higherlevelcourses onhuman valuesin everyaspect ofliving. E.g. as a professional

DetailedSyllabus:

Unit 1	**CourseIntroduction-Need,BasicGuidelines,ContentandProcessfor 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. ContinuousHappinessandProsperity-AlookatbasicHumanAspirations.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 currentscenario.Methodtofulfiltheabovehumanaspirations:understanding and living in harmony at various levels. **Home Work :** Include practice sessions to discuss natural acceptance in human beingastheinnateacceptanceforlivingwithresponsibility(livinginrelationship, harmonyandco-existence)ratherthanasarbitrarinessinchoicebasedonliking- disliking
Unit 2	**UnderstandingHarmony in the HumanBeing-Harmony inMyself!** Understandinghumanbeingasaco-existenceofthesentient'I'andthe material'Body'.Understandingtheneedsof Self('I')and'Body'-happinessand physicalfacility.UnderstandingtheBodyasaninstrumentof'I'(Ibeingthedoer, seerandenjoyer).Understandingthecharacteristicsandactivitiesof'I'and harmony in 'I'. Understanding theharmonyofIwiththeBody: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. Differentiatebetweenprosperityandaccumulation.Discussprogramforensuring health vs dealing with disease

Un it 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)andco-existenceascomprehensiveHuman Goals. Visualizing auniversal harmonious orderin society-UndividedSociety,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,goalofeducationetc.Gratitudeasauniversalvalueinrelationships. Discuss with scenarios. Elicit examples from students' lives.
Unit 4	**Understanding Harmony in the Nature and Existence - Whole existence as Coexistence** UnderstandingtheharmonyintheNature.Interconnectednessandmutual fulfilment amongthefourordersofnaturerecyclabilityandselfregulationinnature.UnderstandingExistenceasCo-existenceofmutuallyinteractingunitsinallpervasivespace.Holistic perceptionofharmonyatalllevelsofexistence.

	HomeWork: Includepracticesessionstodiscusshumanbeingascauseof imbalance in nature (film "Home" canbeused),pollution,depletion ofresourcesandroleoftechnology etc.
Unit 5	**ImplicationsoftheaboveHolisticUnderstandingofHarmonyonProfessionalEthi cs** Naturalacceptanceofhumanvalues.DefinitivenessofEthicalHumanConduct.BasisforHumanisticEducation,HumanisticConstitutionandHumanisticUniversalOrder. Competence in professionalethics: a.Abilitytoutilizetheprofessionalcompetenceforaugmentinguniversalhumanorderb. Abilitytoidentifythescopeandcharacteristicsofpeoplefriendlyandeco-friendly production systems, c.Abilitytoidentifyanddevelopappropriatetechnologiesand management patterns for above production systems. **Some Case Studies can be given as home work** Case studies of typical holistic technologies,managementmodelsandproductionsystemsStrategyfortransition from the present state to Universal Human Order: a. Atthelevelofindividual:associallyandecologicallyresponsibleengineers, technologists and managers b. Atthelevelofsociety:asmutuallyenrichinginstitutionsandorganizations Sum up. **HomeWork:** IncludepracticeExercisesandCaseStudieswillbetakenupinPractice Sessions eg. To discuss the conduct as an engineer or scientistetc.

MODEOF CONDUCT

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.. While analysing and discussing the topic ,thefaculty mentor's role is in pointing to essentialelementstohelpinsortingthemoutfromthesurfaceelements.Inotherwords,helpthestudentsexploretheimportantorcriticalelements.Suchobservationsandtheir analyses are shared and discussed with other students and faculty mentor, in a group sitting. 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/oractivityareincluded.The practice sessions(tutorials)would also provides support to a student in performing actions commensurate to his /her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.It'sRecommended 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, higher courses.

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

Teacher preparation with aminimum exposure to at least one8-day FDP on Universal Human Values is deemed essential.

CSEEM0010: PSYCHOLOGY		
TeachingScheme	**ExaminationScheme**	
Lectures:02hrs/week	**ISE I***	**10 Marks**
Tutorial:00hrs/ week	**ISE II***	**10 Marks**
Credits:02	**EndSemesterExamination**	**30 Marks**

Prerequisites: Knowledgeofcommonterminologyandbasiclanguage
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:
Aftersuccessfulcompletion ofthe course,students willable to:

	Course Outcomes
CO1	DefinethetermPsychologyanddemonstrate commandofthebasicterminology.
CO2	Gainscientificknowledgeofdatacollectionandunderstandingbasicsofpsychology research.
CO3	Differentiatebetweenphysicalandmentalwell-being.Managestressanddisorders of health.
CO4	Understandthesocialandpsychologicalcommunity behaviour.

DetailedSyllabus:

Unit 1	IntroductiontoPsychology:Conceptanddefinition,Rootsofpsychology.Key Perspectives; Behavioral, cognitive, psycho-dynamic, humanistic and sociocultural.
Unit 2	MethodsinPsychology:Naturalobservation,surveyandcasestudy;Natureadvantages and limitations. Experimental and correlational methods; Nature advantages and limitations.
Unit 3	PsychologyofHealth:Understandingstressanditsvariouscauses,manifestationas disorders, depression in social and industrial environments.

TextandReference Books:

1. McConnellJ.V.,psychology5th ed.,NewYork:Holt.,Rinehart&Wiaton,1986.
2. MorganC.T.,KingR.A.,WeissJ.R.,&Schopler J.,IntroductiontoPsychology,7thed.New York: McGraw Hill, 1986.
3. Myers,D.G.,Psychology4thed.NewYork:Worth,1995.
4. Asch,S.E.,SocialPsychology,OUPOxford,1987.
5. BaronR.A.&Byrne.D,SocialPsychology.10thed.,NewDelhi,PrenticeHall,2003.

Web Resources:

NPTELCourse: IntroductiontoPsychology-Course(nptel.ac.in)

MappingofCourseOutcomewithProgram OutcomesandProgram 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– Medium1-Low

Assessment: Specifythedetailsof ISEI, II,III&ESE

AssessmentPattern:

Assessment PatternLevel No.	Knowledge Level	ISE I	ISE II	EndSemester 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			
TotalMarks50		10	10	30

Assessmenttable:

AssessmentTool	CT1	CT2
	CO1,CO2	CO3,CO4
ISE I (10 Marks)	10	
ISEII (10 Marks)		10
ESEAssessment (30 Marks)	15	15
TotalMarks50		

CSCEP2001:MiniProject			
TeachingScheme		**ExaminationScheme**	
Practical	**4 Hrs/Week**	**ISE-I(Term Work)**	**50 Marks**
TotalCredits	**02**	**EndSemesterExam**	**50 Marks**

Course Description:
A mini project is an assignment that you try to complete at the end of every semester, especially inengineeringtostrengthentheunderstandingofyourfundamentalsthrougheffectiveapplication of theoretical concepts.

Course Outcomes:
Aftersuccessfulcompletion ofthe course,studentswill beable to:

	Course Outcomes
CO1	Identifyareaofinterest/problemdomain.
CO2	Collectrelatedlateststandardresearchpapersand analyzethem
CO3	Apply&usetherequiredToolbox/algorithms.
CO4	Applythefunctions tosolveproblems /implement algorithms.
CO5	Developasolution andtest it.

Thisprojectshould develop oneofthefollowingtechnologywhichisnotlimitedto:

1. Cloud Computing
2. Android-BasedApplication
3. ComputerVisionSystem
4. ImageProcessing
5. NeuralNetwork
6. Bioinformatics
7. Data Analytics
8. NaturalLanguage Processing
9. Soft Computing
10. Big data

Assessment:

ISEIandESE: Insemesterevaluations25marks,eachwillbebasedonevaluationofalgorithms &toolsortoolboxwithagroupof3to4students.Finalsubmissionwillbebasedontheirproject evaluation with Output.

AssessmentPattern:

AssessmentPattern Level No.	**SkillLevel**	**TermWork**	**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

MappingofCourseoutcomeswithProgramOutcomesandProgram-SpecificOutcomes:

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– Medium1-Low

SemesterIV

CSPCC2006:DiscreteMathematicalStructure			
TeachingScheme		**ExaminationScheme**	
Lectures	**3 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**03**	**ISE-III**	**10 Marks**
		EndSemesterExam	**60 Marks**

Prerequisites:None

CourseDescription: Thiscourseisintendedtointroducethestudentstoacoherentandbalanced account of major discrete mathematical structures (Group, Rings, Integral Domain), Set theory (Binary relations, partial order relations, Equivalence relations, equivalence classes, partitions), Discretefunctionsandrecurrencerelations(Z-transform,generatingfunctions),conceptsthatform the basis of programming Languages and organization of data structure.

Course Outcomes:

AfterSuccessfulCompletion ofTheCourse,studentswill beable to:

	Performoperationsondiscretestructuressuchasassetsfunctions,relationsconstruct proofs using mathematical induction and apply counting principle.
	Evaluateproblemsinvolvingrecurrencerelationsandgeneratingfunctionsand combinatorial problems
	Demonstrateknowledgeofalgebraicstructuressuchasgroups,Subgroups, Generators, and Co-sets.
	Demonstrateknowledgeofalgebraicstructuressuchasrings,Fields,Integral Domains, Polynomial rings, and cyclic codes.

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 CombinatorialProblems,Recurrencerelations,Linear9recurrencerelationswith constant coefficients, Homogeneous Solutions, Particular Solutions, Total Solutions, Solutions By The Method of generating functions.
Unit3	**Groups**:IntroductiontoAlgebraicStructures,Groups,Subgroups,Generatorsand Evaluation of Powers, Cosets and Lagrange's Theorem, Permutation Group,IsomorphismandAutomorphism,Homomorphism,Normal subgroup.
Unit4	**RingsandFieldsRings:**Integraldomainsandfields.RingHomomorphismus, polynomial rings and cyclic codes.
Unit5	**Graphs**:Graphstypes,graphsProperties,Connectivity,Trees,planargraphs,graph colouring application of trees and graphs.

DetailedSyllabus:

MappingCourseOutcomesWithProgramOutcomesandProgramSpecificOutcomes:3- High 2–Medium 1–Low

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:

ISEIandISEII: InSemesterevaluations(ISEIandISEII)of15marks,eachwillbe based on ClassTest I and Class Test II respectively.

ISEIII: Teachers'Assessment Of10 marksis basedon the/orcombinationof the following:

1) Quiz
2) Assignments
3) Questionandanswer
4) PowerPoint presentation

AssessmentPattern:

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
TotalMarks100		15	15	10	60

AssessmentTable:

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
ESEAssessment(60 Marks)	30	30
TotalMarks100		

SpecialInstructionsifany:Nil **Designedby:**

CSPCC2007:DatabaseManagementSystem		
TeachingScheme	**ExaminationScheme**	
Lectures:03hrs/week	**ISE I**	**15 Marks**
Tutorial:00hrs/week	**ISE II**	**15 Marks**
Credits:03	**ISE III**	**10 Marks**
	EndSemesterExamination	**60 Marks**

Prerequisites:None

Course Description: Database management course involves studying different aspects of computerizeddata-keepingsystems.Thefundamentalsoftherelationaldatabasesystemwhichis themostwidelyusedsystemareincludedinthiscourse.Structuredquerylanguageandtransaction management systems are also included.

Course Outcomes:

Aftersuccessfulcompletion ofthe course,studentswill beable to:

	Course Outcomes
CO1	Applythebasicconceptsofrelationaldatamodel,ERmodel,relationaldatabasedesign 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	Designarelationaldatabase,analyzeitandimprovethedatabasedesignbynormalization
CO4	Demonstrate knowledge of ACID properties of a transaction and several techniques of concurrency control
CO5	Developadatabaseforanyreal-timeapplicationconsideringvariousdesignconstraints and compare SQL and NoSQL

DetailedSyllabus:

Unit 1	**IntroductiontoDatabaseManagement System** Basic terminologies: Data, Database, Database Management System (DBMS), History of Database Systems, Purpose of Database Systems, Characteristics of Databaseapproach,Comparisonofthedatabasesystemandfilesystem,Datamodels, Schemas and instances, Three-schemaarchitecture and data independence, Database users and administrators, Database applicationsEntity-Relationship Model, Mapping Constraints,Keys,StrongandWeakEntitytypes,RefiningtheERDesign,ERDesign Issues,ER Diagrams, Reduction of ER diagram to tables, Generalization, Specialization and Aggregation, Extended Entity Relationship Model (EER).
Unit 2	**RelationalModeland 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/SQLOverview,StructureofPL/SQLprogram,Cursors, Storedprocedures and functions, Triggers Concept of NoSQL Database, NoSQL using MongoDB, Comparative study of SQL and NoSQL.
Unit 3	**RelationalDatabase Design** FeaturesofgoodRelationalDatabaseDesign,purposeofNormalizationforRelational 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	**FileStructures,Indexingand 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, ComparisonofOrderedindicesandhashing,Bitmapindices,IndexdefinitioninSQL.
Unit 5	**TransactionsandConcurrencyControl** 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, RecoverableandNon-recoverableschedulesConcurrencyControlTechniques:Lock basedprotocols,deadlockhandling,Timestampbasedprotocols,Multiplegranularity, Validation based protocols Recovery systems, log-based recovery, deferred and immediate database modification, object-oriented database design.

Textbooks&ReferenceBooks

Textand References:

1. Silberschatz,HenryF.Korth,andS.Sudarshan,"DatabaseSystemConcepts", McGraw-Hill, Sixth edition
2. Elmasri,Navathe,"FundamentalsofDatabaseSystems",Addison-Wesley,Sixth Edition
3. RaghuRamakrishnan,JohannesGehrke,"DatabaseManagementSystems",McGraw-Hill, Third Edition
4. ThomasM.Connolly,CarolynE.Begg,"DatabaseSystems:APracticalApproachto Design, Implementation and Management", Addison Wesley, Fifth Edition
5. Dr.P.S.Deshpande,"SQLandPL/SQLforOracle10g",BlackBook,Dreamtech Press
6. C. J. Date "Introduction to Database Systems", Addition Wesley, Seventh Edition AtulKahate,"IntroductiontoDatabaseManagementSystem",ThirdEdition,Pearson Education
7. MongoDB:TheDefinitiveGuideby Kristina Chodorow

WebResources:

1. NPTELcourse:Databasemanagementsystem(IITK): https://onlinecourses.nptel.ac.in/noc21_cs04/

MappingofCourseoutcomeswithProgram OutcomesandProgramSpecific 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	PO12	PSO 1	PSO 2	PSO3
CO1				3											
CO2	3														
CO3				2						3				2	
CO4	3														
CO5													3		

3-High2 – Medium1–Low

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

Assessment:
ISE I and ISE II: In semester evaluations (ISE I and ISEI II) of 15 marks,
eachwill 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) Questionandanswer
4) PowerPoint presentation

AssessmentPattern:

Assessment Pattern Level No.	**Knowledge Level**	**ISE I**	**ISE II**	**ISE III**	**EndSemester 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
TotalMarks100		15	15	10	60

Assessmenttable:

AssessmentTool	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
ESEAssessment (60 Marks)	20	40
TotalMarks100		

Special

Instructionsifany:Nil **Designedby:**

CSPCC2008:Object-Oriented Programming		
TeachingScheme	**ExaminationScheme**	
Lectures:03hrs/week	**ISE I**	**15 Marks**
Tutorial:0	**ISE II**	**15 Marks**
Credits:03	**ISE III**	**10 Marks**
	EndSemesterExamination	**60 Marks**

Prerequisites: Nil

CourseDescription:

This course presents a conceptual and practical introduction to imperative and object-oriented programming,exemplifiedbyJava.AswellasprovidinggroundingintheuseofJava,thecourse 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:

AfterSuccessfulCompletionTheCourse,studentswillbeableto:

Course Outcomes	
CO1	Define the concept of OOP as well as wellasthepurposeandusage principlesofinheritance,polymorphism,encapsulation,andmethod overloading.
CO2	Identifyclasses,objects,membersoftheclassandtherelationshipsamongthem needed for a specific problem.
CO3	UseOOPconceptslikeinheritance,InterfacePackageRealTime situations.
CO4	IdentifySituationsForExceptionsAndmultithreadingincorporatedinthe program.
CO5	DevelopJavaapplicationprogramsusingsoundOOPpractices(e.g.,interfacesandAPIs)and properprogramstructuring(e.g.,byusingaccesscontrolidentifies, multithreading,error exception handling)

DetailedSyllabus

Unit 1	**Introduction:** DifferencebetweenOOPandotherconventionalprogramming–advantagesand 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,VariablesAndArrays:** 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. **OperatorsAndControlStatements:** 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:** Classfundamentals,declaringobjects,assigningobjectreferencesvariables,

	anonymousobject,introducingmethods,constructorswithtypes,overloadingof 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,DynamicBinding,Aggregation,abstractclasses,usingfinalwith 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	**ExceptionHandling&Multithreading:** Fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throw, and finally, exception.BasicsOfMultithreading,mainthread,threadlifecycle,creation multiple threads, naming a thread, sleeping a thread, Encapsulation in Java
Unit5	**JavaI/O:**JavaI/OclassesandInterfaces,File–directories,usingfilenamefilter, the stream classes, - input stream, output stream, File I/P stream, file output stream, Java Applets.

TextandTextbooks&Reference Books

Textand References:

1. PatrickNaughton,HerbertSchildt–"TheCompleteReference-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, 4thEditionABestsellingHands-OnJavaTutorial,O'ReillyMedia

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

MappingofCourseOutcomeswithProgramOutcomesandProgram-SpecificOutcomes: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: Insemesterevaluations(ISEIandII)of15marks,eachwillbebasedon ClassTest I and Class Test II respectively.

ISEIII: Teacherassessmentof10marksisbasedonofthe/orcombinationoffewofthe following:

1) Quiz
2) Assignments
3) ClassroomQuestion&answer
4) Powerpointpresentation TopicWhichIsrelatedbut outofsyllabus
5) OverallApproachTowardsLearning, creativity.

AssessmentPattern:

Assessment Pattern Level No.	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
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(10Marks)	05	05
ESEAssessment(60 Marks)	30	30
Total Marks100		

AssessmentTable:

SpecialInstructionsIfAny:Nil **DesignedBy:**

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

CSOEC1020:(OE-II)ProfessionalEthicsandCyberLaws			
TeachingScheme		**ExaminationScheme**	
Lectures	**04 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**04**	**ISE-III**	**10 Marks**
		EndSemesterExam	**60 Marks**

TotalHoursrequiredforthiscourse:40Hours.

Prerequisite: NIL

Coursedescription:Thiscoursedesignatestheknowledgeofprofessional&philosophicalEthics 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.

CourseOutcomes Expected:

Aftercompletionofthiscoursestudentswill beable to:

CO1: MakedefensibledecisionmakingbasedonProfessional&PhilosophicalEthics.
CO2: Developprocess tofileanIPR Application.
CO3: InvestigateandRecoverCyberEvidence
CO4: Learnthesecurityhardwaredevicesand softwarein Cyber Security.
CO5: Suggestlegal action tobe takenagainst the cyber-crimes.

DetailedSyllabus

UNIT-1	**ComputerandPhilosophicalethics:** 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, isComputingaProfession..,ProfessionalRelationships,CodeofEthicsand Professional Conduct, Steps in Ethical Decision Making**.**

UNIT-2	**Ethics&Internet:**ThreeMorallySignificantCharacteristics,Hacking&HackerE NetiquetteIntellectualpropertyissuesincyberspaceIntroductiontointellectual 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, Completetimelineanalysisofcomputerfilesbased onfilecreation,filemodification and file access, Recover Internet Usage Data, Recover Swap Files/Temporary Files/CacheFiles,IntroductiontoEncaseForensicEdition,ForensicToolKit(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,OperatingSystemAttacks,ApplicationAttacks,ReverseEngineering & Cracking Techniques and Financial Frauds.
UNIT-5	**ITACT**:InformationTechnologyAct2000Scope,jurisdiction,offenseandcontraventions, powers of police, adjudication

TEXT/REFERENCE BOOKS

1. Computers,Ethics,AndSocialValues, JohnsonandNissenbaum,1994PrenticeHall
2. CybersecurityoperationsHandbook,JohnRittinghouse,WilliamHancock
3. Computerethics,DeborahG.Johnson,thirdedition,Pearson

MappingofCourseoutcomewithProgram Outcomes

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

CO3				H						L		M
CO4			H								M	L
CO5			H									L

H – High M– MediumL– Low

Teacher'sAssessment:TeachersAssessmentof10marks isbasedononeofthe/or combination of few of following

1) Problem Solving
2) Powerpointpresentationofcase studies
3) Question&answer

AssessmentPattern

Assessment Pattern Level No.	**KnowledgeLevel**	**ISE I &II**	**ISE III**	**EndSemester 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
TotalMarks100		30	10	60

Assessmenttable

AssessmentTool	K1	K2	K3	K1	K3
	C01	C02	C03	CO4	CO 5
ISEI & II (30 Marks)	15	15	00	00	00
ISE III(10 Marks)	05	00	00	05	00
ESEAssessment(60 Marks)	15	15	10	10	10

SpecialInstructionsifany:Nil

CSMDM5003:IntroductiontoMachineLearning			
TeachingScheme		**ExaminationScheme**	
Lectures	**03 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**03**	**ISE-III**	**10 Marks**
		EndSemesterExam	**60 Marks**

Course Description:

Course Outcomes:

Aftersuccessfulcompletionthecourse, studentswillbeable to:

	Course Outcomes
CO 1	Understandthe characteristicsofmachinelearningstrategies
CO 2	Applyvarioussupervised learningmethodsto real life problems
CO 3	Applyprobabilisticand unsupervisedlearning modelsforhandlingunknown pattern
CO 4	Identifyand integratemorethanonetechniquestoenhancethe performanceof learning
CO 5	Learnhow to defineRL tasks andthecoreprinciples behind theRL

DetailedSyllabus:

Unit 1	Overview of machine learning concepts and applications, Supervised, unsupervised,andreinforcementlearning,Elementsofamachinelearning system
Unit 2	SupervisedLearningDecisionTreesClassification andRegressionTrees, Regression: Linear Regression, Multiple Linear Regression, Logistic Regression,Support vector machines, evaluation metrics for classification
Unit 3	Unsupervised LearningIntroduction to clustering, Hierarchical & Partitioning methods,: Density based methods,K-means clustering, K-Mode Clustering,
Unit 4	EnsembleLearningModelCombinationSchemes,Bagging:RandomForest Trees, Boosting: Adaboost. Validation techniques, Random Sampling
Unit 5	LearningTheory,IntroductiontoReinforcementLearning,Featurereduction techniques Principal component analysis, Linear Discriminant analysis

TextandReference Books:

1. EthemAlpaydin,"IntroductiontoMachineLearning",MITPress,PrenticeHallofIndia, Third Edition2014.
2. MehryarMohri,AfshinRostamizadeh,AmeetTalwalkar"FoundationsofMachine Learning", MIT Press,2012.
3. TomMitchell,"MachineLearning",McGraw Hill,3rdEdition,1997.
4. CharuC.Aggarwal,"DataClassificationAlgorithmsand Applications",CRCPress,2014.
5. CharuC.Aggarwal,"DATACLUSTERINGAlgorithmsandApplications",CRCPress, 2014.
6. KevinP.Murphy"MachineLearning:AProbabilisticPerspective",The MITPress,2012
7. JiaweiHanandMichelineKambersandJianPei,"DataMiningConcepts andTechniques",3rd edition, Morgan Kaufman Publications, 2012.

WebResources:

NPTELcourse:MachineLearning:https://onlinecourses.nptel.ac.in/noc20_cs74/preview
Reinforcement Learning :https://onlinecourses.nptel.ac.in/noc20_cs74/preview

MappingofCourseoutcomeswithProgram OutcomesandProgramSpecific 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-High2–Medium1–Low

Assessment:

ISEI: Insemester evaluations(ISE I)of20marks, eachwillbebasedonClass Test

ISEII: TeachersAssessmentof20marksisbasedononeofthe/orcombinationoffewofthe following:

1. Quiz
2. Assignments
3. Questionandanswer
4. PowerPoint presentation

AssessmentPattern:

Assessment PatternLevelNo.	Knowledge Level	ISE I	ISE II	EndSemester 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
TotalMarks100		20	20	60

Assessmenttable:

AssessmentTool	**K1, K2**	**K3,K4,K5**
	CO1,CO2	CO3, CO4,CO5
ISE I (20 Marks)	10	10
ISE II (20 Marks)	10	10
ESEAssessment (60 Marks)	24	36
TotalMarks100		

SpecialInstructionsifany:Nil

PO1: Applyknowledgeofmathematics,scienceandalgorithmsinsolvingcomplexComputer engineering problems.
PO2: Generatesolutionsbyconductingexperimentsandapplyingtechniquestoanalyzeand interpret data.
PO3: Design component, or processes to meet the needs within realistic constraints.
PO4: Identify,formulate,andsolveSoftwareEngineering,NetworkingandDataMining problems.
PO5: Comprehendprofessionalandethicalresponsibilityinthecomputingprofession.
PO6: Expresseffectivecommunicationskills.
PO7: Participateinglobal,economic,environmental,andsocietal context.
PO8: Recognizethe needfor, andanability toengageinlife-long learning.
PO9: Knowledgeofcontemporaryissuesandemergingdevelopmentsinthecomputing profession.
PO10: Utilizethetechniques,skillsandmoderncomputerEngineeringtools,Softwareand techniques necessary for Engineering practice.
PO11: Functioneffectivelyasanindividualandasamemberorleaderindiverseteamsandin multidisciplinary settings.
PO12: Designresearchproblemsandconductresearchina computing environment.

CSMDM6003:ObjectOrientedProgramming			
TeachingScheme		**ExaminationScheme**	
Lectures	**03 Hrs/Week**	**ISE-I**	**15 Marks**
Tutorial	**0**	**ISE-II**	**15 Marks**
Total Credits	**03**	**ISE-III**	**10 Marks**
		EndSemesterExam	**60 Marks**

Prerequisites: Nil

CourseDescription:

This course presents a conceptual and practical introduction to imperative and object-orientedprogramming,exemplifiedbyJava.Aswellasprovidinggroundingintheuseof 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 principlesofinheritance,polymorphism,encapsulation,andmethod overloading.
CO2	Identifyclasses,objects,membersofaclassandtherelationshipsamongthem needed for a specific problem.
CO3	UseOOPconceptslikeinheritance,InterfacePackageRealTime situations.
CO4	IdentifySituationsForExceptionsAndmultithreadingincorporatedinthe program.
CO5	DevelopJavaapplicationprogramsusingsoundOOPpractices(e.g.,interfacesandAPIs)a nd properprogramstructuring(e.g.,byusingaccesscontrolidentifies, multithreading,error exception handling)

AfterSuccessfulCompletionTheCourse,studentswillbeableto:

DetailedSyllabus

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:** Introductionoffunction,WhyDoWeNeedFunctions,FunctionDeclaration,Typesof function, ParameterPassing 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	**ArraysandStrings:** Arraysofobject, string, Thestandard 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.

MappingofCourseoutcomeswithProgram OutcomesandProgramSpecific Outcomes:

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-High2–Medium1–Low

Assessment:

ISEIandISEII: Insemesterevaluations(ISEIandISE II)of15marks,eachwillbebasedon ClassTest I and Class Test II respectively.

ISEIII: TeachersAssessmentof10marksisbasedonofthe/orcombinationoffewofthe following:

6) Quiz
7) Assignments
8) ClassroomQuestion&answer
9) PowerpointpresentationTopicWhich Isrelatedbutout ofsyllabus
10) OverallApproachTowardsLearning, 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

AssessmentTable:

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

SpecialInstructionsIfAny:Nil **DesignedBy:**

CSPCC2009:LabDatabaseManagement System		
TeachingScheme	**ExaminationScheme**	
Practical:2Hrs/Week	**ISEI(TermWork)**	**25 Marks**
Credits:01	**Practical/viva-voce**	**25 Marks**

CourseOutcomes: After completionofthiscourse,studentswillbeableto:

	Course Outcomes
CO1	Knowthe scopeof SQL and useit to query,updateandmanageadatabase
CO2	Use PL/SQL
CO3	Identifyfunctionsofadatabase administrator
CO4	DemonstrateadvancedSQL functions
CO5	Designandbuildasimpledatabasemanagement system.

List ofthe Experiments:
Thestudentshallperformaminimumoftenexperimentsofthefollowingusing Oracle databases.

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

3	To Execute the Database Functions (i.e. Numeric,Date,Group,Character,andcount function) with examples.	S2	CO4	04
4	To Execute the join Commands (i.e. Cartesian product, natural join, Inner join, left outer join, rightouterjoin,equijoin,non-equijoin,andfull join).	S1	CO4	04
5	ImplementtheProgramforArithmeticoperations (like addition, Subtraction, Multiplication and Division)' using PL/SQL (programminglanguage in SQL).	S2	CO4	04
Level: Moderate				
6	Implement the concept for cursors in PL/SQL anddemonstratecompetenceforloopconstructs	S2	CO1, CO2	06
7	Toimplementtheprogramforupdatingthe values using cursor.	S2	CO1, CO2	06
Level:Complex				
8	ToimplementtheConceptofViewsandSql Sub-Queries.	S2	CO4	06
9	Mini-project	S2	CO5	06

Assessment:

ISEI: In-SemesterEvaluationof50marksbasedonperformanceofstudentsinpracticalhours, practical assignments completed, and timely submission.

AssessmentTable:

AssessmentTool	S1	S2
	CO1	CO2,C03, CO4
ISE1/Termwork(25marks)	10	15
ESE(25Marks)	10	15

AssessmentPattern:

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

MappingofCourseOutcomeswithProgram OutcomesandProgram-SpecificOutcomes:

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

3 – High 2 – Medium 1- Low **Designedby:**

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

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

Course Outcomes:

AfterCompletion OfThis CourseStudents Willbe able to:

Course Outcomes	
CO1	Execute JAVA programsbasedonsimpleconstructslikearrays,loops,decision Statements, functions etc
CO2	Incorporateobjectorientedconceptslikeclasses,objects,inheritance, polymorphism resembling a real time situation.
CO3	Demonstratetheuseofpackagesandinterfaces.
CO4	DevelopOOPprograms containingUsercreated ExceptionhandlingThreading.
CO5	ConnectwithJavadevelopmentEnvironmentlichasEclipse,NetBeans, IntelliJetc.

ListoftheExperiments: TheStudentshallperformminimumtenexperimentsofthefollowing using Notepad/ Eclipse/ Netbeans/ Intellij environment

Sr. No.	TitleoftheExperiments	Skill / Knowledge Level	CO	Marks for ISE
Level:Basic(all)				
1	Demonstrate the installation of JAVA with necessarypathsettings&Execute“Hello World “ Program.	S1	CO1	04
2	ExecutesimpleprogrambasedonBasic Syntactic constructs of java like : A. Operatorsand Expression. B. Looping Statements. C. Decisionmakingstatements	S1	CO1	04
3	Construct &Execute aJavaProgram todefine a class, describe its constructors, overload the constructors and instantiate its object.	S1	CO2	04
4	ExecuteAsimpleprogramusingScannerclass	S1	CO1	04
Level:Moderate(all)				
5	ImplementInheritance&ItsTypesBy Applying variousaccesscontrolstoitsdatamembersand methods.	S2	CO1,CO2	06
6	DemonstrateUseOfMethod Overriding.	S2	CO1,CO2	06
7	DemonstrateUseOfImplementingInterfaces.	S2	CO2	06
8	ImplementprogramusingObjectClasses	S2	CO2	06
Level:Complex(anythree)				
11	ImplementPackageandSub-Packages.	S2	CO3	06
12	ImplementanApplet	S2	CO3	06
13	WriteaprogramforExceptionalhandling	S2	CO4	06

14	ImplementaProgramusingMultithreading	S2	CO4	06

Assessment:
ISEI: InTermworkof25marksbasedonperformanceofstudentsinpracticalhours, attendance, practical assignments completion , and timely submission.

EndSemesterEvaluation: InESEof 25marksPracticalconductionandOralExamination

AssessmentTable:

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

AssessmentPattern:

Assessment PatternLevelNo.	**SkillLevel**	**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

MappingofCourseoutcomeswithProgram OutcomesandProgramSpecific Outcomes:

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–High2-Medium 1-Low

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

Prerequisites: Nil

CourseDescription: Pythonisalanguagewithasimplesyntax,andapowerfulsetoflibraries.It isaninterpretedlanguage,witharichprogrammingenvironment,includingarobustdebuggerand 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.

CourseOutcomes: After CompletionOf ThisCourseStudentsWill beable to:

Course Outcomes	
CO1	UnderstandinstallationprocedureandsystemrequirementsforPython
CO2	ApplyDataTypes,Variables,OperatorsandotherConditionalblocksinprograms
CO3	ApplyinbuildfunctionsofPythonandCreateUserDefined Functions
CO4	CreateaprogramusingStrings,Tuples,Listetc
CO5	CreateandEditFilesusingFileHandling,UsingExceptionHandling,ImplementOOP Concepts

DetailedSyllabus:
Listofthe Experiments: Students will perform

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO	Marks forISE
Level: Basic				
1	IntroductionToPythonAndItsInstallation	S1	CO1	05
2	CreateasimplehelloworldprogramusingPython	S2	CO1, CO2	05
3	WorkingwithvariablesanddatatypesinPython	S2	CO2	05
Level: Moderate				
4	StudyingVarioustypesofoperatorssuchasArithmetic, Comparison,Assignment, Logical, Bitwise and Identity Operators	S2	CO1,CO2	05
5	Studyingifstatement,if-else,nestedifstatement and if-elif-else ladder	S2		
6	Studyingvariouskindsofloopssuchasforloop, while loop and nested loops	S2	CO1,CO2	05
7	WorkingwithBuiltinFunctions	S2	CO1,CO2	05
8	CreatingUserDefinedFunctions	S2	CO2	05
Level:Complex				
9	WorkingwithStrings,List,Tuples&sets	S2	CO2	05
10	UsingFileHandlingin Python	S2	CO2	05
11	ImplementingExceptionHandlinginPython	S2	CO4	05
12	ReadCSVFile	S2	CO4	05
13	WriteCSVFile	S2	CO4	05
14	CreatingClasses,ObjectswithPython	S2	CO4	05
15	TwittersentimentanalysisusingPython	S2	CO2	05

16	EmployeeManagementSystemusingPython	S2	CO4	05
17	CreateachatbotusingBrainShopAPI	S2	CO4	05
18	CompoundInterestGUIcalculatorusingTkinter	S2	CO4	05

AssessmentPattern:

Assessment Pattern LevelNo.	**KnowledgeLevel**	**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
TotalMarks100		25	00	00	25

Assessmenttable:

Course Outcomes	
CO1	Learnabout thebasicsof environment.
CO2	Understandtheharmfuleffectsofhumanactivities solutions.
CO3	Understandthebiodiversity,conservationmethods biodiversity.
CO4	Understandtheconceptofclimatechange,globalw disasters and its mitigation measures.

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

Special Instructions ifany :Nil

CEVEC0010: Environmental Science			
Teaching Scheme		**Evaluation Scheme**	
Theory	**02 Hrs/week**	**ISE I**	**10**
Total Credits	**02**	**ISE II**	**10**
		ISE III	**-**
		End Semester Examination	**30**

Pre-requisites: Nil

Course Outcomes

After successful completion of the course the students shall be able to

CO	Course Outcome
CO1	Learn about the basics of environment
CO2	Understand the harmful effects of human activities on environment and their solutions
CO3	Understand the biodiversity, conservation methods and factors for the loss of biodiversity
CO4	Understand the concept of climate change, global warming, acid rains, various disasters and it's mitigation measures

Detailed syllabus:

Unit 1	**A)Understanding Environment** - Environment: concept and importance - Components of environment: Physical, Biological and Social - Ecosystem Concept, Structure and Function

	- Producers, Consumers and Decomposers - Food chain, Food web and Ecological pyramids - Energy flew in an Ecosystem. - Ecosystem services Ecological, economic, social, aesthetic and informational **B) Natural Resources** - Land resources: global land use patterns, concept land degradation and desertification - Forest resources: Use and consequences of over-exploitation - Water resources: Use and consequences of over-utilization, concept of water harvesting andwatershed management, water conflictsEnergy resources Renewable and non-renewable energy sources, growing energy needs and alternate energy sources
Unit 2	**A) Biodiversity and its conservation** - Biodiversity definition, levels (genetic, species and ecosystem) and values - Threats to biodiversity :habitat loss, poaching of wildlife, biological invasions - Concept of endemism and hot spots of biodiversity - Conservation of biodiversity: In-situ and Ex-situ concepts **B) Environmental Pollution** -Causes, effects and control measures of Air, water, soil, noise, thermal, nuclear; -Solid waste management -Liquid waste management
Unit 3	**Environmental issues, policies and practices** - Global environmental issues: Increase in greenhouse gases, climate change, Acid rain and stratospheric ozone layer depletion - Salient features of Environment Protection Act, 1986 - Environmental education: Formal and Informal education - Environmental Movements (Chipko Movement, Silent valley) and Environmental ethics

Recommended Books:

1 . A Text Book of Environmental Studies by Bharucha E, University Press (India) Pvt. Ltd, 2005
2. A Text Book of Environmental Studies by Nadaf F. M., Pawaskar V. R., Intellectual Book Bureau, Bhopal,2006
3. Fundamental of Ecology by Odum E. P, Natraj Publishers, Dehradun, 1996
4. Introduction to Environmental Engineering and science by Gilbert M and Wendell P., Pearson Education India, 2015
5. Environmental Science by S.C Santra, New Central Book Agency, 2011
6. Environmental Education by Sharma R. A, 1998

Mapping of Course outcome with program outcomes:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	**PSO2**
CO1		3		2			3	1		2		1		
CO2		3		2	1		3	1	3	3		1		
CO3		2		2			3	1	2	2		1		
CO4		1		2	1		3	1	2	3		1		

1: Low 2: Moderate 3: Strong

Assessment Pattern

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	End Semester Examination

K1	Remember	5		10
K2	Understand	5	5	10
K3	Apply		5	10
K4	Analyze			
K5	Evaluate			
K6	Create			
Total Marks 50		10	10	30

Assessment Table

Assessment Tool	K1	K2	K3
	CO1, CO2, CO3, CO4	CO1, CO2, CO3, CO4	CO1, CO2, CO3, CO4
ISE I (10 Marks)	00	10	00
ISE II (10 Marks)	00	10	00
ESE Assessment (30 Marks)	00	15	15
Total Marks 50		35	15

CSEEM1020:Personality Development			
TeachingScheme		**ExaminationScheme**	
Lectures	**03 Hrs/Week**	**ISE-I**	**10 Marks**
Tutorial	**00 Hrs/Week**	**ISE-II**	**10 Marks**
Total Credits	**02**	**EndSemesterExam**	**30 Marks**

Prerequisites:Knowledgeofcommonterminologyandbasiclanguage

Course Description:

The course intends to provide guidance and direction for overall development of personalityto 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:

Aftercompletingthe course,studentswillableto:

	Course Outcomes
CO1	DefinethetermPersonalityandknowaboutvarioustheories,conceptsandterminology.
CO2	Understandtoimproveuponattitudeandmotivationtoenhanceworkperformanceand quality of personal life.
CO3	Gainknowledgeof selfto adjust appropriatelywith thepeoplein the society.
CO4	Identifythebehavior,feelingsandexpectationstocorrelatewithpersonaldevelopment strategy.

DetailedSyllabus:

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	UnderstandingSelf:Concept,definition,selfesteem,kindsofselfconcept,Aggressive, submissive and assertive behavior, SWOT analysis, Johari window.

TextandReferenceBooks

1. ElizabethB.Hurlock(2006).Personality Development,28th reprint,TataMcGrawHill
2. CalvinS.Hall,GardnerLindzey,JohnB.Campbell,TheoriesofPersonality,Willy India,Reprint(2011)
3. StephenPRobbinsand TimothyA.Judge(2014)OrganizationalBehavior,16th Edition
4. MileD.J.PowerofPositiveThinking,NewDelhi,Rohan BookCompany.
5. SmithB.BodyLanguage,NewDelhi,RohanBookCompany.

MappingofCourseoutcomewithProgramOutcomesandProgram 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	PS O1	PS O2	PS O3
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–Medium1-Low

Assessment: SpecifythedetailsofISEI, II, III&ESE

AssessmentPattern:

AssessmentPattern Level No.	KnowledgeLevel	ISEI	ISEII	EndSemester 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			
TotalMarks 50		10	10	30

Assessmenttable:

AssessmentTool	CT1	CT2
	CO1,CO2	CO3,CO4
ISEI (10 Marks)	10	
ISEII (10Marks)		10

SpecialInstructionsifany:

EEAEC2010:TechnicalCommunication		
TeachingScheme	**ExaminationScheme**	
Lectures:2 Hrs/Week	ISEITest	: 10 Marks
Tutorial:0 Hr/Week	ISEII	: 10 Marks
Credits: 02	EndSemesterExam	: 30 Marks

CourseOutcomes (COs):

At the end ofthecourse,thestudentwill beable to

CO1	UnderstandthenatureandobjectiveofTechnicalCommunicationrelevant for the work place as Engineers.
CO2	UtilizethetechnicalwritingforthepurposesofTechnicalCommunicationand its exposure in various dimensions
CO3	Imbibeinputsbypresentationskillstoenhanceconfidenceinfaceofdiverse audience.
CO4	Evaluatetheirefficacyasfluent&efficientcommunicatorsbylearningthe voice-dynamics.

DetailedSyllabus:

Unit I	**FundamentalsofTechnical 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.
Unit II	**FormsofTechnicalCommunication:** 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness, consideration; Technical Report: Definition & importance; Thesis/Project writing: structure & importance; C.V./Resumewriting;TechnicalProposal:Types,Structure&Draft.Seminar &Conferencepaperwriting.
Unit III	**Technical Presentation:** Strategies&TechniquesPresentation:Forms;interpersonalCommunication; Classroom presentation; style; method; Individual conferencing: essentials: Public Speaking: method; Techniques: Clarity of substance; emotion; Humour;ModesofPresentation;OvercomingStageFear:Confident speaking;Audience Analysis&retentionofaudience interest
Unit IV	**Technical Communication Skills and Kinesics & Voice Dynamics:** Interview skills; Group Discussion: Objective & Method; Seminar/ConferencesPresentationskills:Focus;Content;Style;Critical thinking;Nuances:Expositionnarration&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.

TextBooks:

2. TechnicalCommunication–PrinciplesandPracticesbyMeenakshiRaman&SangeetaSharma,Oxford Univ. Press, 2007, New Delhi.

3. BusinessCorrespondenceandReportWritingbyProf.R.C.Sharma&KrishnaMohan,TataMcGraw Hill & Co. Ltd., 2001, New Delhi.

4. PracticalCommunication:ProcessandPracticebyL.U.B.Pandey;A.I.T.B.S.PublicationsIndiaLtd.; Krishan Nagar, 2014, Delhi.

5. ModernTechnicalWritingbySherman,TheodoreA(et.al);Apprentice Hall;NewJersey;U.S.

6. ATextBookofScientificandTechnical WritingbyS.D. Sharma;VikasPublication, Delhi.