SREENIVASA INSTITUTE OF TECHNOLOGYANDMANAGEMENT STUDIES

(AUTONOMOUS)

Dr.VisweswaraiahRoad,(Bangalore-Tirupathi Bye-passRoad),Murukambattu,Chittoor – 517127, Andhra Pradesh, India.

B.TECH
CourseStructuresandSyllabi Under R23 Regulations

(Applicablefor2023-2024RegularStudents&2024-2025LateralStudents)

DepartmentofComputerScience&Engineering (Artificial Intelligence)

SREENIVASAINSTITUTEOF TECHNOLOGYANDMANAGEMENT STUDIES
(Autonomous)
DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ArtificialIntelligence)

B.TechR23-COURSESTRUCTUREANDSYLLABI

SemesterI(FirstYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23BSC111T	AppliedChemistry	2	0	0	2	30	70	100
2	23BSC113T	EngineeringPhysics	2	1	0	3	30	70	100
3	23BSC114T	LinearAlgebraandCalculus	2	1	0	3	30	70	100
4	23ESC114T	IntroductiontoProgramming	1	0	4	3	30	70	100
5	23ESC111T	BasicCivilandMechanical Engineering	2	1	0	3	30	70	100
6	23BSC115L	AppliedChemistryLab	0	0	2	1	30	70	100
7	23BSC117L	EngineeringPhysics Lab	0	0	3	1.5	30	70	100
8	23ESC115L	ComputerProgrammingLab	0	0	3	1.5	30	70	100
9	23ESC117L	EngineeringWorkshop	0	0	2	1	30	70	100
10	23HSM113L	Healthandwellness,Yogaand Sports	0	0	1	0.5	-	-	100
ContactHoursperweek			9	3	15	-	-	-	-
TotalHoursperweek			27			-	-	-	-
Totalcredits						19.5	-	-	-
TotalMarks							270	630	1000

SemesterII(FirstYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23BSC121T	DifferentialEquationsandVector Calculus	2	1	0	3	30	70	100
2	23HSM111T	CommunicativeEnglish	3	0	0	3	30	70	100
3	23ESC112T	BasicElectricalandElectronics Engineering	3	0	0	3	30	70	100
4	23ESC113T	EngineeringGraphics	3	0	0	3	30	70	100
5	23CSE121T	DataStructures	2	1	0	3	30	70	100
6	23HSM112L	CommunicativeEnglish Lab	0	0	2	1	30	70	100
7	23ESC116L	ElectricalandElectronics EngineeringWorkshop	0	0	2	1	30	70	100
8	23ESC118L	ITWorkshop	0	0	3	1.5	30	70	100
9	23CSE122L	DataStructuresLab	0	0	3	1.5	30	70	100
10	23HSM114L	NSS/NCC/Scouts& Guides/CommunityService	0	0	1	0.5	-	-	100
ContactHoursperweek			13	2	11	-	-	-	-
TotalHoursperweek			26			-	-	-	-
Totalcredits						20.5	-	-	-
TotalMarks							270	630	1000

SemesterIII(SecondYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23BSC232T	DiscreteMathematicsandGraphTheory	2	1	-	3	30	70	100
2	23HSM234T	UniversalHumanValues–Understanding Harmony and Ethical Human Conduct	2	-	-	2	30	70	100
3	23CAI231T	ArtificialIntelligence	2	1	-	3	30	70	100
4	23CSE231T	AdvancedDataStructuresand Algorithm Analysis	2	1	-	3	30	70	100
5	23CSE232T	ObjectOrientedProgramming Through Java	2	1	-	3	30	70	100
6	23CSE233L	AdvancedDataStructuresand Algorithm Analysis Lab	-	-	3	1.5	30	70	100
7	23CSE234L	ObjectOrientedProgramming Through Java Lab	-	-	3	1.5	30	70	100
8	23CSE235L	PythonProgramming (SkillEnhancementCourse)	-	1	2	2	30	70	100
9	23MAC231U	EnvironmentalScience	2	-	-	-	P	-	-
ContactHoursperweek			12	05	08	-	-	-	-
TotalHoursperweek						-	-	-	-
Totalcredits						19	-	-	-
TotalMarks							270	630	900

SemesterIV(SecondYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23BSC242T	OptimizationTechniques	2	1	-	3	30	70	100
2	23BSC243T	ProbabilityandStatistics	2	1	-	3	30	70	100
3	23ESC232T	DigitalLogicandComputerOrganization	2	1	-	3	30	70	100
4	23CSE241T	DatabaseManagementSystems	2	1	-	3	30	70	100
5	23CSM241T	MachineLearning	2	1	-	3	30	70	100
6	23CSE245L	DatabaseManagementSystemsLab	-	-	3	1.5	30	70	100
7	23CSE246L	Full Stack Development –I (SkillEnhancementCourse)	-	1	2	2	30	70	100
8	23CSM242L	ArtificialIntelligenceandMachineLearning Lab	-	-	3	1.5	30	70	100
9	23ESC241I	DesignThinkingandInnovation	1	-	2	2	30	70	100
ContactHoursperweek			11	06	10	-	-	-	-
TotalHoursperweek						-	-	-	-
Totalcredits						22	-	-	-
TotalMarks							270	630	900
MandatoryCommunityServiceProjectInternshipof06-08weeksdurationduringsummerVacation									

SemesterV(ThirdYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI353T	NaturalLanguageProcessing	3	-	-	3	30	70	100
2	23CAI352T	ComputerVisionandImageProcessing	3	-	-	3	30	70	100
3	23CSE353T	OperatingSystems&Systems Programming	3	-	-	3	30	70	100
4	PE-I	ProfessionalElective–I	3	-	-	3	30	70	100
5	OE-I	OpenElective– I	3	-	-	3	30	70	100
6	23ESC351T	IntroductiontoQuantumTechnologiesand Applications	3	-	-	3	30	70	100
7	23CAI357L	ComputerVisionandNaturalLanguage Processing Lab	-	-	3	1.5	30	70	100
8	23CSE357L	OperatingSystems&Systems Programming Lab	-	-	3	1.5	30	70	100
9	23CSE356L	FullStackDevelopment-II (Skill Enhancement Course)	-	1	2	2	30	70	100
10	23MAC351U	TechnicalPaperWriting&IPR	2	-	-	-	P	-	-
11	23CAI351P	EvaluationofCommunityServiceProject	-	-	-	2	-	100	100
ContactHoursperweek			18	01	10	-	-	-	-
TotalHoursperweek			29			-	-	-	-
Totalcredits						26	-	-	-
TotalMarks							300	800	1100

SemesterVI(ThirdYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CSM361T	BigDataAnalytics&AIApplications	3	-	-	3	30	70	100
2	23CAI361T	ArtificialIntelligenceinSoftware Engineering	3	-	-	3	30	70	100
3	23CAI362T	FullStackAIDevelopment	3	-	-	3	30	70	100
4	PE-II	ProfessionalElective–II	3	-	-	3	30	70	100
5	PE-III	ProfessionalElective–III	3	-	-	3	30	70	100
6	OE-I	OpenElective– I	3	-	-	3	30	70	100
7	23CAI365L	BigData&SoftwareEngineeringLab	-	-	3	1.5	30	70	100
8	23CAI366L	FullStackAILab	-	-	3	1.5	30	70	100
9	23HSM241L	SoftSkills(SkillEnhancementCourse)	-	1	2	2	30	70	100
10	23ESC352L	TinkeringLab	-	-	2	1	30	-	P
11	23CAI361P	DomainSpecificWorkshop	-	-	-	-	-	-	-
ContactHoursperweek			20	01	08	-	-	-	-
TotalHoursperweek			29			-	-	-	-
Totalcredits						23	-	-	-
TotalMarks							300	630	900

SemesterVII(FourthYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI471T	GenerativeAIandPromptEngineering	3	-	-	3	30	70	100
2	MSE	ManagementScienceElective	2	-	-	2	30	70	100
3	PE-IV	ProfessionalElective–IV	3	-	-	3	30	70	100
4	PE-V	ProfessionalElective–V	3	-	-	3	30	70	100
5	OE-III	OpenElective– III	3	-	-	3	30	70	100
6	OE-IV	OpenElective– IV	3	-	-	3	30	70	100
7	23CAI474L	PromptEngineering (SkillEnhancementCourse)	-	1	2	2	30	70	100
8	23MAC471U	GenderSensitization	2	-	-	-	30	-	P
9	23CAI471P	EvaluationIndustryInternship	-	-	-	2	-	100	100
ContactHoursperweek			19	01	02	-	-	-	-
TotalHoursperweek			22			-	-	-	-
Totalcredits						21	-	-	-
TotalMarks							240	590	800

SemesterVIII(FourthYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI481P	Internship	-	-	24	4	30	70	100
2	23CAI482P	ProjectWork	-	-	-	8	30	70	100
ContactHoursperweek			-	-	24	12	-	-	-
TotalHoursperweek			24			-	-	-	-
Totalcredits						12	-	-	-
TotalMarks							60	140	200

Note:

1. *AstudentispermittedtoregisterforHonoursoraMinorinIVsemesteraftertheresultsofIII Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to their Minor from V Semester onwards.*
2. *A student shall not be permitted to take courses as Open Electives / Minor / Honours with content substantially equivalent to the courses pursued in the student's primary major.*
3. *Minor & Honour tracks shall be offered for 18 credits over and above 163 Credits 05 theory courses of 3 credits each, practical courses of 1.5 credits each or project for 3 credits for Minors and Honours.*
4. *A student is permitted to select a Minor program only if the institution is already offering a Major degree program in that discipline.*
5. ***OneIndustryVisit****isMandatoryeitherin3rdor4th year*
6. *Student will undergo **ONE WEEK WORKSHOP** (domain specific) after the end of the FIFTH semester examination and it will be reflected in SIXTH semester for zero credits.*
7. ***OneExpertLecturer****ineverysemester(domainSpecific)ismandatory.*

ProfessionalElective–I-SemesterV(ThirdYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI354A	ComputationalIntelligence	3	-	-	3	30	70	100
2	23CSD351A	Data Visualization	3	-	-	3	30	70	100
3	23CSD351B	ExploratoryDataAnalysis	3	-	-	3	30	70	100
4	23CSE354D	SoftComputing	3	-	-	3	30	70	100

ProfessionalElective–II-SemesterVI(ThirdYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI363A	BlockchainforAI	3	-	-	3	30	70	100
2	23CAI363B	GraphNeuralNetworks	3	-	-	3	30	70	100
3	23CSD361T	PredictiveAnalytics	3	-	-	3	30	70	100
4	23CSM363A	RecommenderSystems	3	-	-	3	30	70	100

ProfessionalElective–III-SemesterVI(ThirdYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI364A	AIfor Finance	3	-	-	3	30	70	100
2	23CAI351T	CloudComputingfor AI	3	-	-	3	30	70	100
3	23CSM362T	Deep Learning	3	-	-	3	30	70	100
4	23CSE364C	IntroductiontoQuantumComputing	3	-	-	3	30	70	100

ProfessionalElective–IV-SemesterVII(FourthYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI472A	AIinCybersecurity	3	-	-	3	30	70	100
2	23CAI472B	AI-drivenSoftwareEngineering&DevOps	3	-	-	3	30	70	100
3	23CAI472C	AIfor Robotics	3	-	-	3	30	70	100
4	23CAI472D	ExplainableAI&ModelInterpretability	3	-	-	3	30	70	100

ProfessionalElective–V-SemesterVII(FourthYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23CAI473A	AIforSmart Cities&IoTSystems	3	-	-	3	30	70	100
2	23CSM472A	MLOps&AIModelDeployment	3	-	-	3	30	70	100
3	23CSD473A	DataWrangling	3	-	-	3	30	70	100
4	23CAI473B	HealthcareAI	3	-	-	3	30	70	100

ManagementScienceElective–SemesterVII(FourthYear)

S.No	Course Code	CourseTitle	Scheme of Instructions HoursperWeek				Scheme of Examination MaximumMarks		
			L	T	P	C	I	E	Total
1	23HSM471A	BusinessEthicsandCorporateGovernance	3	-	-	3	30	70	100
2	23HSM471B	E-Business	3	-	-	3	30	70	100
3	23HSM471C	ManagementScience	3	-	-	3	30	70	100

OpenElective–I-SemesterV(ThirdYear)

S.No	CourseCode	Offered Department	CourseTitle	Schemeof Instructios Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE351A	CE	GreenBuildings	3	-	-	3	30	70	100
2	23OCE351B		ConstructionTechnologyand Management	3	-	-	3	30	70	100
3	23OEE351A	EEE	ElectricalSafetyPracticesand Standards	3	-	-	3	30	70	100
4	23OEC351A	ECE	ElectronicCircuits	3	-	-	3	30	70	100
5	23OME351A	ME	SustainableEnergyTechnologies	3	-	-	3	30	70	100
6	23OSH351A	Mathematics	MathematicsforMachineLearning and AI	3	-	-	3	30	70	100
7	23OSH351B	Physics	MaterialsCharacterization Techniques	3	-	-	3	30	70	100
8	23OSH351C	Chemistry	ChemistryofEnergySystems	3	-	-	3	30	70	100
9	23OSH351D	Humanities	EnglishforCompetitiveExaminations	3	-	-	3	30	70	100
10	23OSH351E		EntrepreneurshipandNewVenture Creation	3	-	-	3	30	70	100
11	23OPEN351	OPEN	QuantumTechnologiesand Applications	3	-	-	3	30	70	100

OpenElective–II-SemesterVI(ThirdYear)

S.No	CourseCode	Offered Department	CourseTitle	Schemeof Instructios Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE361A	CE	Disaster Management	3	-	-	3	30	70	100
2	23OCE361B		SustainabilityInEngineering Practices	3	-	-	3	30	70	100
3	23OEE361A	EEE	RenewableEnergySources	3	-	-	3	30	70	100
4	23OEC361A	ECE	DigitalElectronics	3	-	-	3	30	70	100
5	23OME361A	ME	AutomationandRobotics	3	-	-	3	30	70	100
6	23OSH361A	Mathematics	OptimizationTechniquesfor Engineers	3	-	-	3	30	70	100
7	23OSH361B		MathematicalFoundationOf Quantum Technologies	3	-	-	3	30	70	100
8	23OSH361C	Physics	PhysicsofElectronicMaterialsAnd Devices	3	-	-	3	30	70	100
9	23OSH361D	Chemistry	ChemistryofPolymersand Applications	3	-	-	3	30	70	100
10	23OSH361E	Humanities	AcademicWritingandPublic Speaking	3	-	-	3	30	70	100

OpenElective–III-SemesterVII(FourthYear)

S.No	CourseCode	Offered Department	CourseTitle	Scheme of Instructios Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE471A	CE	BuildingMaterialsandServices	3	-	-	3	30	70	100
2	23OCE471B		EnvironmentalImpactAssessment	3	-	-	3	30	70	100
3	23OEE471A	EEE	SmartGridTechnologies	3	-	-	3	30	70	100
4	23OEC471A	ECE	FundamentalsofMicroprocessors and Controllers	3	-	-	3	30	70	100
5	23OME471A	ME	3DPrintingTechnologies	3	-	-	3	30	70	100
6	23OSH471A	Mathematics	Wavelettransformsandits Applications	3	-	-	3	30	70	100
7	23OSH471B	Physics	SmartMaterialsandDevices	3	-	-	3	30	70	100
8	23OSH471C		IntroductiontoQuantumMechanics	3	-	-	3	30	70	100
9	23OSH471D	Chemistry	GreenChemistryandCatalysisfor Sustainable Environment	3	-	-	3	30	70	100
10	23OSH471E	Humanities	EmployabilitySkills	3	-	-	3	30	70	100

OpenElective–IV-SemesterVII(FourthYear)

S.No	CourseCode	Offered Department	CourseTitle	Scheme of Instructios Hoursper Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE472A	CE	Geo-SpatialTechnologies	3	-	-	3	30	70	100
2	23OCE472B		SolidWasteManagement	3	-	-	3	30	70	100
3	23OEE472A	EEE	ElectricVehicles	3	-	-	3	30	70	100
4	23OEC472A	ECE	TransducersandSensors	3	-	-	3	30	70	100
5	23OME472A	ME	TotalQualityManagement	3	-	-	3	30	70	100
6	23OSH472A	Mathematics	FinancialMathematics	3	-	-	3	30	70	100
7	23OSH472B	Physics	SensorsandActuatorsfor Engineering Applications	3	-	-	3	30	70	100
8	23OSH472C	Chemistry	ChemistryOfNanomaterial’sand Applications	3	-	-	3	30	70	100
9	23OSH472D	Humanities	LiteraryVibes	3	-	-	3	30	70	100
10	23OPEN472	OPEN	IntroductiontoQuantumComputing	3	-	-	3	30	70	100

S.No	Subject Area	CreditMapping								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	HSMC	0.5	3.5	3	-	-	-	2	-	9
2	BSC	11	3	3	2	-	-	-	-	19
3	ESC	9	8.5	-	5	3	1	-	-	26.5
4	PCC	-	4.5	12	12	12	12	3	-	55.5
5	SEC	-	-	2	2	2	2	2	-	10
6	PEC	-	-	-	-	3	6	6	-	15
7	OEC	-	-	-	-	3	3	6	-	12
8	PWC	-	-	-	-	2	-	2	12	16
9	AC	-	-	Y	-	Y	-	Y	-	-
TOTAL		20.5	19.5	20	21	25	24	21	12	163

NOTE: ***HSMC*** *– Humanities, Social Science and Management Science Courses;* ***BSC*** *– Basic Science Courses;* ***ESC*** *– Engineering Science Courses;* ***PCC*** *– Professional Core Courses;* ***SEC*** *– Skill Enhancement Course;* ***PEC*** *– Professional Elective Courses;* ***OEC*** *– Open Elective Courses;* ***PWC*** *– Project Work Courses &****AC*** *– Audit Courses*

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING

(ARTIFICIALINTELLIGENCE)

IIIB.Tech.-VSemester

23CAI352T COMPUTER VISION AND IMAGE PROCESSING L T P C
3 0 0 3

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Introduce fundamental concepts of image processing and computer vision.
2. Develop proficiency in applying algorithmsforimageanalysisandinterpretation.
3. Exploretechniquesforfeatureextraction,objectrecognition,andsceneunderstanding.
4. Understand the integration of machine learning methods incomputervisionapplications.

UNIT–1:IntroductiontoComputerVisionandImageProcessing (9)

Overview of Computer Vision and Image Processing: Definitions and scope, Historical development and applications, Image Formation and Representation: Image acquisition methods, Sampling and quantization, Color spaces and models, Fundamentals of Image Processing: Point operations (brightness and contrast adjustments), Histogram processing, Spatial filtering techniques Fourier Transform and Frequency Domain Processing: Discrete Fourier Transform (DFT), Filtering in the frequency domain, Image restoration concept.

UNIT –2: Image Analysis Techniques (9)

Edge Detection and Feature Extraction: Gradient operators (Sobel, Prewitt), Canny edge detector, Corner and interest point detection, Image Segmentation: Thresholding methods, Region-based segmentation, Clustering techniques (K-means, Mean-Shift), Morphological Image Processing: Erosion and dilation, Opening and closing operations, Applications in shape analysis, Texture Analysis, Statistical methods (co-occurrence matrices), Transform-based methods (Gabor filters), Applications in pattern recognition

UNIT –3: 3D Vision and Motion Analysis (9)

StereoVision:Epipolargeometry,Disparitymapping,Depthestimationtechniques,Structure from Motion (SfM): Feature tracking across frames, 3D reconstruction from motion, Applications in scene understanding, Optical Flow and Motion Analysis: Lucas-Kanade method, Horn-Schunck method, Motion segmentation, Camera Calibration and 3D Reconstruction: Intrinsic and extrinsic parameters, Calibration techniques, 3D point cloud generation

UNIT –4: Object Recognition and Machine Learning in Vision (9)

Feature Descriptors and Matching: Scale-Invariant Feature Transform (SIFT), Speeded-Up Robust Features (SURF), Feature matching algorithms, Object Detection and Recognition: Template matching Deformable part models, Convolutional Neural Networks (CNNs), Introduction to MachineLearning for Vision: Supervised and unsupervised learning, Support Vector Machines (SVMs), Decision trees and random forests, Deep Learning Architectures: Autoencoders, Recurrent Neural Networks (RNNs), Generative Adversarial Networks (GANs)

UNIT –5: Applications and Advanced Topics (9)

Image Compression: Lossy and lossless compression techniques, Standards (e.g., JPEG, PNG),Morphological ImageProcessing:Dilation,erosion,opening,andclosingoperations., Applicationsinshapeanalysis,CaseStudies:Facerecognitionsystems.,Automatedvisual inspection,Medicalimageanalysis.

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Describe thestructureandfunctionsofcomputervision systemsandexplainkeyconceptsinimageacquisition, sampling,quantization,enhancementandfiltering	PO1,PO2
CO2	Explainmemorymanagementandvirtualmemoryconcepts, and analyze file and storage system structures and algorithms.	PO1,PO3
CO3	IllustrateI/Osystemoperations,protectionmechanisms, anddemonstratebasicUnix/Linuxcommandsandshell scripting.	PO1,PO2,PO4
CO4	Identify and describe components of system software including language processors, assemblers, macro processors, linkers, and loaders.	PO1,PO2,PO3,PO4
CO5	Analyze thecompilationprocessandimplementbasic system-levelprogrammingconceptslikeprocesscreation, fileI/O,andconcurrencymechanisms.	PO1,PO2,PO4,PO5

TEXTBOOKS:

1. Forsyth,D.A.,&Ponce,J.(2002).ComputerVision:AModernApproach.PrenticeHall.
2. Shapiro,L.G.,&Stockman,G.C.(2001).ComputerVision.PrenticeHall.

REFERENCEBOOKS:

1. Real-Time Systems:TheoryandPracticebyRajibMall,Publisher:Pearson
2. SystemSoftware:AnIntroductionto SystemsProgramming(3rd Edition)by LelandL.Beck&

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VSEMESTER

23CAI353T	**NATURALLANGUAGEPROCESSING**	**L T P C** **3 0 0 3**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Basics of NLP,Morphology,Tokenization,N-gramModels
2. POSTagging,Parsing,Tree bank's,Ambiguity Handling
3. WordSenseDisambiguation,SemanticParsing,Sentiment Analysis
4. MachineTranslation,Transformers,BERT/GPT,EthicalNLP
5. SpeechRecognition,FeatureExtraction,DiscourseAnalysis

UNIT–1:INTRODUCTIONTONLP (9)

Introduction to NLP: Origins and Challenges, Language and Grammar in NLP, Regular Expressions and Finite-State Automata, Tokenization: Text Segmentation and Sentence Splitting, Morphological Parsing: Stemming and Lemmatization, Spelling Error Detection and Correction, Minimum Edit Distance and Applications, Statistical Language Models: Unigram, Bigram, and Trigram Models, Processing Indian Languages in NLP.

UNIT–2:WORD-LEVELANDSYNTACTICANALYSIS (9)

Introduction, Part-of-Speech (POS) Tagging: Rule-Based, Stochastic and Transformation-Based Approaches, Hidden Markov Models (HMM) and Maximum Entropy Models for POS Tagging, Context-Free Grammar (CFG) and Constituency Parsing, Treebanks and Normal Forms for Grammar, Top-Down and Bottom-Up Parsing Strategies, CYK Parsing Algorithm, Probabilistic Context-Free Grammars (PCFGs), Feature Structures and Unification.

UNIT–3:TEXTCLASSIFICATIONANDINFORMATIONRETRIEVAL (9)

Naïve Bayes Classifier for Text Classification, Training and Optimization for Sentiment Analysis,InformationRetrieval:BasicConceptsandDesignFeatures,InformationRetrieval Models: Classical, Non-Classical, and Alternative Models, Cluster Model, Fuzzy Model, and LSTM-Based Information, Retrieval, Word Sense Disambiguation (WSD) Methods: Supervised and Dictionary-Based Approaches.

UNIT–4:MACHINETRANSLATIONANDSEMANTICPROCESSING (9)

Introduction to Machine Translation (MT), Language Divergence and Typology in MT Encoder- Decoder Model for Machine Translation, Translating in Low-Resource Scenarios, MT Evaluation Metrics and Techniques, Bias and Ethical Issues in NLP and Machine Translation, Semantic Analysis and First-Order Logic in NLP, Thematic Roles and Selectional Restrictions in Semantics, Word Senses and Relations Between Senses.

UNIT–5:SPEECH PROCESSING AND ADVANCED NLP MODELS (9)

Speech Fundamentals: Phonetics and Acoustic Phonetics, Digital Signal Processing in Speech Analysis, FeatureExtraction in Speech: Short-Time Fourier Transform (STFT), Mel-Frequency Cepstral Coefficients (MFCC) and Perceptual Linear Prediction (PLP), Hidden Markov Models (HMMs) in Speech Recognition.

Total Hours: 45

COURSEOUTCOMES:

On successful completion of the course,studentswill be able to		Pos
CO1	Understandmorphologicalprocessingandthestructureof words and documents.	PO1,PO2
CO2	Analyze syntactic structures using various parsing algorithms.	PO1,P03
CO3	Applysemanticparsingtechniquestointerpretnatural language text.	PO1,PO2, PO4
CO4	Understandpredicate-argumentstructuresandmeaning representation systems.	PO1,PO2,P03,PO4
CO5	Applycross-linguallanguagemodelsandspeechrecognition techniques in NLP applications	PO1,PO2,P04, PO5

TEXTBOOKS:

1. Daniel Jurafsky & James H. Martin – Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, andSpeech Recognition, Pearson Education, 2023.
2. Tanveer Siddiqui & U.S. Tiwary – Natural Language Processing and Information Retrieval, Oxford University Press.

REFERENCEBOOKS:

1. T.V. Geetha – Understanding Natural Language Processing – Machine Learning and Deep Learning Perspectives, Pearson, 2024.
2. Akshay Kulkarni & Adarsha Shivananda – Natural Language Processing Recipes - Unlocking Text Data with Machine Learning and Deep Learning using Python, Apress, 2019.

REFERENCEWEBSITE:

1. https://www.youtube.com/watch?v=M7SWr5xObkA
2. https://onlinecourses.nptel.ac.in/noc23_cs45/preview
3. https://archive.nptel.ac.in/courses/106/106/106106211/

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (ARTIFICIALINTELLIGENCE)

IIIB.TECH.-VSEMESTER

23CSE353T OPERATING SYSTEM&SYSTEMS PROGRAMMING L T P C 3 0 0 3

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- To introduce the fundamentals of operating systems,process management,and synchronization techniques.
- Toexplainmemory,file,andstoragemanagementtechniquesincludingpaging, segmentation, and file system structures.
- To explore I/O systems, device management, system protection, and provide a practical overview of Unix/Linux systems.
- To understand the architecture and components of system software including language processors, assemblers, macro processors, linkers, and loaders.
- To analyze the concepts of system programming including scanning, parsing, compilation, and process-level system programming in Unix/Linux.

UNIT–1:FundamentalsofOperatingSystemsandProcessManagement(9)

Introduction to Operating Systems: Definition and Basics, Generations and Types of Operating Systems, OS Structure: Layered, Monolithic, Microkernel, OS Services, System Calls, System Boot, System Programs, Virtual Machines, Process Management: Process Concepts, Process States, Process Control Block, Context Switching, Threads and Multithreading, Process Scheduling: Scheduling Criteria and Scheduling Algorithms, Multiprocessor Scheduling: Types and Performance Evaluation, Process Synchronization and Deadlocks: Race Conditions, Critical Section, Mutual Exclusion, Peterson's Solution, Semaphores, Monitors Classic IP, C Problems: Reader-Writers, Dining Philosophers, Deadlocks: Definition, Characteristics, Prevention, Avoidance, Detection and Recovery

UNIT –2: Memory, File, and Storage Management (9)

Memory Management: Logical vs. Physical Address Mapping, Contiguous Memory Allocation, InternalandExternalFragmentation,Compaction,PagingandPageTables,Segmentation, VirtualMemory:DemandPaging,PageFaults,PageReplacementAlgorithms,Thrashingand Working Set Model, File System Management: FileConcepts, Access Methods, File Types and Operations, Directory Structure, File System Structure, Allocation Methods, Free-Space Management, Directory Implementation. Storage Management: Mass Storage: Disk Structure, RAID Levels, Disk Scheduling Algorithms, Swap Space Management, Stable Storage, Tertiary Storage Structure.

UNIT –3: I/O Systems, Security, and Unix/Linux Overview (9)

I/OSystemManagement:I/OHardware:Devices,DeviceControllers,DirectMemoryAccess,I/OSoftware:InterruptHandlers,DeviceDrivers,Device-IndependentI/O Software,SystemProtectionandSecurity:SecurityEnvironment,SecurityDesign Principles, User Authentication, Protection Mechanisms, Protection Domain, Access Control List, Unix/Linux Overview & Case Studies: Development of Unix/Linux, Role of Kernel, System Calls, Elementary Linux Commands, Shell Programming, Directory Structure, System Administration.

UNIT –4: System Software and Language Processing (9)

Overview of System Software: Software and Software Hierarchy, Systems Programming and Machine Structure, Interfaces, Address Space, and Computer Languages, System SoftwareDevelopment andRecentTrends,LanguageProcessors:ProgrammingLanguages and Language Processing, Symbol Tables and Data Structures for Language Processing, Search and Allocation Data Structures, Assemblers and Macro Processors: Elements of Assembly Language Programming, Design and Types of Assemblers, Macro Definitions, Expansion, Nested Macros, and Advanced Macro Features, Design of Macro Assemblersand Macro Processors, Linkers and Loaders: Concept of Linking and Relocation, Linking in MS-DOS, Dynamic Linking, Loading Schemes: Sequential, Direct, Absolute, Relocating,and Linking Loaders, Comparison of Linkers and Loaders

UNIT–5:SystemProgramming (9)

Scanning and Parsing: Programming Language Grammars and Classification, Ambiguity in Grammatic Specification, Scanning, Parsing, Compilers and Interpreters: Compilation Process, Semantic Gap, Binding, and Scope Rules, Memory Allocation, Compilation of Expressions & Control Structures, Code Optimization, Overview of Interpreters and Debuggers, Operating System Command & Shell Basics: C Development Tools, Machine-Level Representation of Data and Programs, System-Level Programming and Concurrency: File I/O, Process Creation & Control (fork, exec), Pipes, Signals, and Basic Threading.

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Describetheprinciples,design,andfunctioning ofoperating systems, including process management, memory management,filesystems,andI/Ooperations.	**PO1,PO2**
CO2	Explainsystemcallinterfacesanddemonstratebasic OS concepts through practical examples	**PO1,P03**
CO3	Construct and apply fundamental system software components, and understand assembler, macro processor, loader, linker, and related tools.	**PO1,PO2, PO4**
CO4	Identify and describe compilers, interpreters, and other system programming tools, and understand the phases of compilation.	**PO1,PO2,P03,PO4**
CO5	Analyzereal-timeapplicationsofoperatingsystemsand evaluatefuturetrends,challenges,andsocietalimpactsof systemsoftware.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. OperatingSystemConcepts(9thor10thEdition)byAbrahamSilberschatz,PeterBaer Galvin, and Greg Gagne in publisher: Wiley
2. OperatingSystems:AConcept-BasedApproach(3rdEdition)byD.M.Dhamdhere publisher:McGraw Hill

REFERENCEBOOKS:

1. Real-TimeSystems:TheoryandPracticebyRajibMall,Publisher:Pearson
2. SystemSoftware:AnIntroductiontoSystemsProgramming(3rdEdition)byLelandL. Beck &D. Manjula, Publisher: Pearson

REFERENCEWEBSITE:

1. https://www.youtube.com/watch?v=M7SWr5xObkA
2. https://onlinecourses.nptel.ac.in/noc23_cs45/preview
3. https://archive.nptel.ac.in/courses/106/106/106106211/

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VSEMESTER

23CAI354A	**COMPUTATIONAL INTELLIGENCE** **(Professional Elective-I)**	**L T P C** **3 0 0 3**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Understand the concepts and foundations of computational intelligence.
- Study neural networks, fuzzy logic systems, and evolutionary algorithms.
- Explore hybrid systems and their applications.
- Apply computational intelligence techniques to real-world problem solving.
- Analyze the effectiveness of various computational intelligence approaches.

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UNIT –1: INTRODUCTION TO COMPUTATIONAL INTELLIGENCE AND ARTIFICIALNEURALNETWORKS (9)

Definition and Scope of Computational Intelligence (CI), Components of CI: Neural Networks, Fuzzy Logic, Evolutionary Computation, Biological Neuron vs. Artificial Neuron, McCulloch-Pitts Model, Perceptron, Adaline and Madaline, Multilayer FeedforwardNetworks, Backpropagation Algorithm, Applications of ANN in Pattern Recognition and Classification.

UNIT–2:FUZZY LOGIC AND FUZZY SYSTEMS (9)

Introduction to Fuzzy Logic and Fuzzy Sets, Membership Functions, Fuzzy Set Operations, Fuzzy Rules and Inference Systems, Fuzzification and Defuzzification, Fuzzy Control Systems, Fuzzy Reasoning and Approximate Reasoning

UNIT–3:EVOLUTIONARY COMPUTATION TECHNIQUES (9)

Basics of Evolutionary Algorithms (EA), Genetic Algorithms (GA): Operators, Encoding, Fitness Function, Selection, Crossover and Mutation, Convergence Criteria, Genetic Programming (GP), Differential Evolution (DE), Applications of GA and GP

UNIT–4:SWARMINTELLIGENCEANDHYBRIDSYSTEMS (9)

Swarm Intelligence: Ant Colony Optimization (ACO), Particle Swarm Optimization (PSO), Behavior of Swarms and Collective Intelligence, Comparison of Evolutionary Algorithmsand Swarm Techniques, Hybrid Systems: Neuro-Fuzzy, Fuzzy-GA, ANN-GA Systems, Case Studies in Hybrid Systems

UNIT–5:APPLICATIONSOFCOMPUTATIONALINTELLIGENCE (9)

CI in Image and Signal Processing, CI for Optimization Problems and Robotics, CI in Biomedical Engineering and Finance, Intelligent Agents and Decision-Making Systems, Real-time Applications and Emerging Trends in CI.

TotalHours: 45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Describe and differentiate neural networks, fuzzy logic, and evolutionary computation	**PO1,PO2**
CO2	Applyneuralandfuzzysystemsforreal-timedecision- making.	**PO1,P03**
CO3	Analyzecomplexproblemsusingsoftcomputingtools.	**PO1,PO2, PO4**
CO4	Develophybridintelligentsystems.	**PO1,PO2,P03,PO4**
CO5	Evaluate and compare the performance of CI-based systems.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. S.RajasekaranandG.A.VijayalakshmiPai,NeuralNetworks,FuzzyLogic,and Genetic Algorithms: Synthesis and Applications, PHI Learning.
2. TimothyJ.Ross,FuzzyLogicwithEngineeringApplications,WileyIndia.

REFERENCEBOOKS:

1. S.N.Sivanandam,S.N.Deepa,PrinciplesofSoftComputing,WileyIndia.
2. SimonHaykin,NeuralNetworksandLearningMachines,Pearson.
3. JamesKennedyandRussellC.Eberhart,SwarmIntelligence,MorganKaufmann.
4. AndriesP.Engelbrecht,ComputationalIntelligence:AnIntroduction,Wiley.

REFERENCEWEBSITE:

1. NPTEL-ComputationalIntelligence
2. Coursera–ComputationalIntelligence
3. YouTube:IITLecturesonSoftComputingandCI

COMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VSEMESTER

23CSD351A	**DATAVISUALIZATION** **(ProfessionalElective-I)**	**L T P C** **3 0 03**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1DiscusstheimportanceofDataVisualization

2.Demonstratestorytelling

3 ExplaintheenvironmentofTableau

UNIT–I: (9)

Introduction,theimportanceofContext,Choosingandeffectivevisual

UNIT-II: (9)

Clutterisyourenemy,Focusyouraudience'sattention,LessonsinStorytelling

UNIT-III: (9)

Communicating data: A step in the process, a model of communication, Three types of communication problems, six principles of communicating data. Introduction to Tableau: Using Tableau, Tableau products, connecting to data. How much and How many: Communicating how much, communicating how many Ratios and Rates: Ratios, Rates

UNIT-IV: (9)

Proportions and Percentages: Part to whole, current to historical, actual to target. Mean and Median Variation and Uncertainty: Respecting variation, Variation over time-Control charts, Understanding uncertainty

UNIT-V: (9)

Multiple Quantities: Scatter plots, Stacked Bars, Regression and Trend Lines, The Quadrant Chart Changes over time: The origin of time charts, the line chart, the dual axis line chart, the connected scatter plot, the date filed type and seasonality, the timeline, the slopegraph Maps and Location: One special map, circle maps, filled maps, dual encoded maps.

TotalHours: 45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Understandtheimportanceofcontextandtheprinciplesof effective visual design for data communication.	**PO1,PO2**
CO2	Identify and eliminate visual clutter to enhance audience focus and storytelling in data presentations.	**PO2,PO3**
CO3	Applyprinciplesofeffectivecommunication tointerpretand present data using visual and narrative techniques in Tableau.	**PO2,PO3,PO4**
CO4	Analyzevariationanduncertaintyusingstatisticaltoolssuch as mean, median, and control charts.	**PO1,PO3,PO4**
CO5	Explore changes over time and geographicpatterns using time-basedchartsandmap-basedvisualizationsinTableau.	**PO2,PO3,PO4, PO5**

TEXTBOOKS:

1. ColeNussbaumerKnaflic,Storytellingwithdata,Wiley13th oct2015
2. BenJones,CommunicatingDatawithTableau,O'ReillyJune2014

REFERENCE BOOKS:

1. AJulieSteeleandNoahIliinsky,DesigningDataVisualizations:Representing InformationalRelationships,O'Reilly.
2. AndyKirk,DataVisualization:ASuccessfulDesignProcess,PAKT.
3. ScottMurray,InteractiveDataVisualizationforWeb,O'Reilly.

REFERENCEWEBSITE:

1. DataAnalysisandVisualizationFoundations|Coursera
2. DataVisualization|Coursera

COMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	3	-	-	-	-	-	-	-	-	-
CO.3	-	3	3	3	-	-	-	-	-	-	-	-
CO.4	3	-	3	3	-	-	-	-	-	-	-	-
CO.5	-	3	3	3	3	-	-	-	-	-	-	-
CO*	3	3	3	3	3	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-VSemester

23CSD351B **EXPLORATORY DATA ANALYSIS** **L T P C**
3 0 0 3

COURSEEDUCATIONALOBJECTIVES:

1. To introduce the principles and practices of Exploratory Data Analysis (EDA) using Python.
2. Toteach techniques for data cleaning, preprocessing, transformation, and visualization.
3. Toapplystatisticaltechniquesandvisualmethodstodiscoverpatternsand relationships.
4. TogainexperienceusingpopularPythonlibrariessuchasNumPy,Pandas, Matplotlib, and Seaborn.
5. Topreparedatasetsforfurthermachinelearningandpredictivemodeling.

UNIT –1:Introduction to EDA and Python Environment (9)

Introduction to Data Science and EDA, Importance of EDA in Data Science Life Cycle, Setting up Python Environment: Jupyter, Anaconda, VS Code, Introduction to NumPy and Pandas: Arrays, Series, Data Frames, Data loading, viewing, basic operations (info, describe, shape)

UNIT –2: Data Wrangling and Preprocessing (9)

Handling Missing Data (mean, median, drop, interpolation), Dealing with Duplicates, Outliers, andAnomalies,EncodingCategoricalVariables(Label,One-hot),DataTransformation: Scaling, Normalization, Binning, Data Types Conversion and Data Type Casting.

UNIT–3:UNIVARIATEANDBIVARIATEANALYSIS (9)

Measures of Central Tendency and Dispersion, Distribution Plots: Histograms, Boxplots, KDE, Bar Charts, Count Plots, Pie Charts, Bivariate Analysis: Scatter Plots, Pair Plots, Heatmaps, Correlation and Covariance Analysis

UNIT –4: Data Visualization Techniques (9)

VisualizationwithMatplotlibandSeaborn,CustomizingPlots:Titles,Legends,Labels, Themes, Advanced Visuals: Violin Plots, Strip Plots, Swarm Plots, Multivariate Visualizationand Subplots, Plotly and Interactive Visualizations (basic overview)

UNIT –5: EDA Case Studies and Real-Time Datasets (9)

Step-by-step EDA on Sample Datasets (Titanic, Iris, Sales, etc.),Outlier Detection Techniques, Feature Engineering Techniques in EDA, EDA Report Generation using Python Notebooks, Preparing Data for Machine Learning Models

TotalHours: 45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Describe the principles, concepts, and importance of Exploratory Data Analysis, including data types, data sources, and data preprocessing techniques.	**PO1,PO2**
CO2	Explain and apply various data cleaning, transformation, and feature engineering techniques through practical examples.	**PO1,PO3**
CO3	Construct and interpret graphical representations of data using plots, charts, and visual analytics tools to identify trends, patterns, and anomalies.	**PO1,PO2,PO4**
CO4	Identifyandcomputesummarystatistics,correlations, distributions,andothernumericalmeasurestoderive meaningfulinsightsfromdatasets.	**PO1,PO2,PO3,PO4**
CO5	Analyze real-world datasets, draw insightful conclusions, and evaluate challenges, limitations, and ethical considerations in data handling and interpretation.	**PO1,PO2,PO4,PO5**

TEXTBOOKS:

1. JakeVanderPlas,PythonDataScienceHandbook:EssentialToolsforWorkingwith Data, O'Reilly, 2016.
2. WesMcKinney,PythonforDataAnalysis,2ndEdition,O'Reilly,2018.

REFERENCEBOOKS:

1. JoelGrus,DataSciencefromScratch,O'Reilly,2019.
2. Aurelien Geron, Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow, 2nd Edition, O'Reilly, 2019.
3. AllenB.Downey,ThinkStats:ProbabilityandStatisticsforProgrammers,O'Reilly, 2014.

CO-POMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VSEMESTER

23CSE354D	**SOFTCOMPUTING** **(ProfessionalElective-I)**	**L T P C** **3 3**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Understandtheconceptsofsoftcomputingtechniquesandhowtheydifferfrom traditional AI techniques.
- Introducethefundamentalsoffuzzylogicandfuzzysystems.
- Familiarizewithartificialneuralnetworksandtheirarchitectures.
- Learngeneticalgorithmsandtheirroleinoptimization.
- Explorehybridsystemsintegratingfuzzylogic,neuralnetworks,andgenetic algorithms.

UNIT–1:INTRODUCTIONTOSOFTCOMPUTINGANDFUZZYLOGIC (9)

Introduction to Soft Computing: Definition, Components, Differences with Hard Computing, Applications of Soft Computing, Fuzzy Logic: Crisp Sets vs Fuzzy Sets, Membership Functions, Fuzzy Set Operations, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems: Mamdani and Sugeno Models, Defuzzification Techniques.

UNIT–2:ARTIFICIALNEURALNETWORKS-I (9)

Introduction to Neural Networks: Biological Neurons vs Artificial Neurons, Architecture of Neural Networks: Feedforward, Feedback, Learning Rules: Hebbian, Delta, Perceptron Learning Rule, Single Layer Perceptron and its Limitations, Multi-Layer Perceptron: Backpropagation Algorithm, Applications of Neural Networks

UNIT–3:ARTIFICIALNEURALNETWORKS-II (9)

Hopfield Networks and Associative Memories, Radial Basis Function Networks, Self-Organizing Maps (SOM), Recurrent Neural Networks (RNNs) – Basic Concepts, Convolutional Neural Networks(CNNs) – Overview and Applications, Practical Use Cases in Image and Pattern Recognition,

UNIT–4:GENETICALGORITHMSANDOPTIMIZATION (9)

IntroductiontoGeneticAlgorithms,GAOperators:Selection,Crossover,Mutation,Fitness FunctionandEvaluation,SchemaTheorem,Elitism,ApplicationsinFunctionOptimization, Scheduling, and Robotics, Introduction to Particle Swarm Optimization (PSO).

UNIT–5:HYBRIDSYSTEMSANDADVANCEDTOPICS (9)

Hybrid Systems: Neuro-Fuzzy Systems, Fuzzy-GA, GA-ANN, ANFIS: Architecture and Learning, Case Studies on Hybrid Systems, Introduction to Deep Learning in Soft Computing, Real-World Applications: Forecasting, Control Systems, Medical Diagnosis, Image Processing.

TotalHours: 45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Understandthecomponentsandapplicationsofsoft computing.	**PO1,PO2**
CO2	Applyfuzzylogicconceptstoreal-worldproblems.	**PO1,P03**
CO3	Buildandtrainvariousneuralnetworkmodels.	**PO1,PO2, PO4**
CO4	Implement geneticalgorithms for problem-solving and optimization.	**PO1,PO2,P03,PO4**
CO5	Design hybrid systems using soft computing techniques.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. S.N.Sivanandam,S.N.Deepa,—PrinciplesofSoftComputing‖,WileyIndia,3rd Edition
2. TimothyJ.Ross,—FuzzyLogicwithEngineeringApplications‖,Wiley,4thEdition
3. S.RajasekaranandG.A.VijayalakshmiPai,—NeuralNetworks,FuzzyLogicand Genetic Algorithm: Synthesis and Applications‖, PHI

REFERENCEBOOKS:

1. LaureneFausett,—FundamentalsofNeuralNetworks:Architectures,Algorithmsand Applications‖, Pearson
2. DavidE.Goldberg,—GeneticAlgorithmsinSearch,OptimizationandMachine Learning‖, Pearson
3. SimonHaykin,—NeuralNetworksandLearningMachines‖,Pearson,3rdEdition
4. BartKosko,—NeuralNetworksandFuzzySystems‖,PrenticeHall

REFERENCEWEBSITE:

1. NPTEL–SoftComputingbyProf.S.Sengupta(IITKharagpur)
2. Coursera–NeuralNetworksandDeepLearning(AndrewNg)

COMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

III B.Tech. - I Semester

230CE351A	**GREENBUILDINGS(OPENELECTIVE-I)** **(CivilBranch)**	**L** **3**	**TP** **00**	**C** **3**

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

1. To understandthe fundamentalconcepts of green buildings, their necessity, and sustainable features.
2. Toanalyzegreenbuildingconcepts,ratingsystems,andtheirbenefitsinIndia.
3. Toapplygreenbuildingdesignprinciples,energyefficiencymeasures,and renewable energy sources.
4. Toevaluate air conditioning systems, HVAC designs, and energy modeling for sustainable buildings.
5. Toassessmaterialconservationstrategies,wastemanagement,andindoor environmentally quality in green buildings.

UNIT–I **(9)**

Introduction to Green Building– Necessity of Green Buildings, Benefits of Green Buildings, Green Building Materials and Equipment in India, Key Requisites for Constructing a Green Building, Important Sustainable Features for Green Buildings.

UNIT–II **(9)**

Green Building Concepts and Practices– Indian Green Building Council, Green Building Movement in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities and Benefits: Opportunities of Green Buildings, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy-Saving Approaches in Buildings, LEED India Rating System, and Energy Efficiency.

UNIT–III **(9)**

Green Building Design– Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximizing System Efficiency, steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources, Eco-Friendly Captive Power Generation for Factories, Building Requirements.

UNIT–IV **(9)**

Air Conditioning– Introduction, CII Godrej Green Business Centre, Design Philosophy, Design Interventions, Energy Modeling, HVAC System Design, Chiller Selection, Pump Selection, Selection of Cooling towers, Selection of Air Handling Units, Pre-Cooling ofFresh Air, Interior Lighting Systems, Key Features of the Building, Eco-Friendly Captive Power Generation for Factories, Building Requirements.

UNIT–V **(9)**

Material Conservation– Handling of Non-Process Waste, Waste Reduction During Construction, Materials with Recycled Content, Local Materials, Material Reuse, Certified Wood, Rapidly Renewable Building Materials and Furniture. Indoor Environment Quality and Occupational Health– Air Conditioning, Indoor Air Quality, Sick Building Syndrome, tobacco Smoke.

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

TotalHours:45

COURSEOUTCOMES:

Uponsuccessfulcompletionofthecourse,studentswillbeableto:		**POS**
CO1	Understandtheimportanceofgreenbuildings,theirnecessity,and sustainable features.	**PO1,PO6,PO7**
CO2	Analyzevariousgreenbuildingpractices,ratingsystems,andtheir impact on environmental sustainability.	**PO2,PO5,PO7**
CO3	Applyprinciplesofgreenbuildingdesigntoenhanceenergyefficiency and incorporate renewable energy sources.	**PO3,PO5,PO4, PO7**
CO4	EvaluateHVACsystems,energy-efficientairconditioningtechniques, and their role in sustainable building design.	**PO3,PO5,PO4, PO7**
CO5	Assessmaterialconservationtechniques,wastereductionstrategies, and indoor air quality management in green buildings.	**PO6,PO7,PO8, PO9**

TEXT BOOKS:

1. HandbookonGreenPracticespublishedbyIndianSocietyofHeatingRefrigeratingandAir Conditioning Engineers, 2009.
2. GreenBuildingHandBookbytoMolleyandSkimming's,2009.

REFRENCEBOOKS:

1. CompleteGuidetoGreenBuildingsbyTrishriley
2. StandardforthedesignforHighPerformanceGreenBuildingsbyKentPeterson,2009
3. EnergyConservationBuildingCode–ECBC-2020,publishedbyBEE

ONLINELEARNINGRESOURCES:

1. https://archive.nptel.ac.in/courses/105/102/105102195/

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	2	3	-	-	-	-	-
CO2	-	3	-	-	2	-	3	-	-	-	-	2
CO3	-	-	3	3	3	-	3	-	-	-	-	-
CO4	-	-	3	3	3	-	3	-	-	-	-	-
CO5	-	-	-	-	-	3	3	3	2	-	-	-
CO	3	3										

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)
IIIB.Tech.-ISemester

		L	TP	C
230CE351B	**CONSTRUCTIONTECHNOLOGYANDMANAGEMENT (OPENELECTIVE–I) (CivilBranch)**	**3**	**00**	**3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandthefundamentalconceptsofgreenbuildings,theirnecessity, and sustainable features.
2. Toanalyzegreenbuildingconcepts,ratingsystems,andtheirbenefitsinIndia.
3. Toapplygreenbuildingdesignprinciples,energyefficiencymeasures,and renewable energy sources.
4. To evaluate air conditioning systems, HVAC designs, and energy modelingfor sustainable buildings.
5. To assess material conservation strategies, waste management, and indoor environmentally quality in green buildings.

UNIT–I **(9)**

Introduction: Project forms, Management Objectives and Functions; Organizational Chart of a Construction Company; Manager's Duties and Responsibilities; Public Relations;LeadershipandTeam - Work; Ethics,Morale,DelegationandAccountability

UNIT–II **(9)**

Man, and Machine: Man-Power Planning, Training, Recruitment, Motivation, Welfare Measures and Safety Laws; Machinery for Civil Engineering., Earth Movers and Hauling Costs, Factors Affecting Purchase, Rent, and Lease of Equipment, and Cost Benefit Estimation.

UNIT–III **(9)**

Planning, Scheduling and Project Management: Planning Stages, Construction Schedules and Project Specification, Monitoring and Evaluation; Bar-Chart, CPM, PERT, Network- formulation and Time Computation.

UNIT–IV **(9)**

Contracts:Types ofContracts, formation ofContract – Contract Conditions – Contract for Labour,Material,Design,andConstruction–DraftingofContractDocumentsBased On IBRD/ MORTH Standard Bidding Documents – Construction Contracts – Contract Problems –Arbitration andLegal RequirementsComputerApplications inConstruction Management: Software for Project Planning, Scheduling and Control.

UNIT–V **(9)**

Safety Management – Implementation and Application of QMS in Safety Programs, ISO9000Series,AccidentTheories,CostofAccidents,ProblemAreasin Construction Safety, Fall Protection, Incentives, Zero Accident Concepts, Planning for Safety, Occupational Health and Ergonomics

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	Understandprojectmanagementfundamentals,organizational structures, and leadership principles in construction.	**PO1,PO6,PO8, PO9**
CO2	Analyze manpower planning, equipment management, and cost estimation in civil engineering projects.	**PO2,PO5,PO12**
CO3	Applyplanning, scheduling,and projectmanagement techniques such as CPM and PERT.	**PO3,PO5,PO4, PO10**
CO4	Evaluatevariouscontracttypes,contractformation,andlegal aspects in construction management.	**PO3,PO5,PO4, PO8**
CO5	Assess safety management practices, accident prevention strategies,and quality management systems in construction.	**PO6,PO7,PO8, PO9**

TEXTBOOKS:

1. ConstructionProjectManagement,SK.Sears,GA.Sears,RH.Clough,JohnWileyand Sons, 6th Edition, 2016.
2. ConstructionProjectSchedulingandControlbySalehMubarak,4thEdition,2019
3. Pandey, I.M (2021) Financial Management 12th edition. Pearson India Education Services Pvt. Ltd.

REFRENCEBOOKS:

1. Brien,J.O.andPlotnick,F.L.,CPMinConstructionManagement,McGrawHill,2010.
2. Punima, B.C., andKhandelwal, K.K., Project Planning and control with PERT and CPM,Laxmi Publications, 2002.
3. Construction Methods and Management: Pearson New International Edition 8th Edition Stephens Nominally.
4. Rhoden, M and Cato B, Construction Management and Organizational Behavior, Wiley-Blackwell, 2016.

ONLINE LEARNING RESOURCES:

1.https://archive.nptel.ac.in/courses/105/104/105104161/
2.https://archive.nptel.ac.in/courses/105/103/105103093/

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	2	-	2	2	-	-	-
CO2	-	3	-	-	2	-	-	-	-	-	-	2
CO3	-	-	3	3	3	-	-	-	-	2	-	-
CO4	-	-	3	3	3	-	-	2	-	-	-	-
CO5	-	-	-	-	-	3	3	3	2	-	-	-
CO	3	3	3	3	2.6	2.5	3	3.5	2	2	-	2

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-ISemester

23OME351A	**SUSTAINBLEENERGYTECHNOLOGIES (OPENELECTIVE–I)**	**L**	**TP**	**C**
		3	**00**	**3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Todemonstratetheimportancetheimpactofsolarradiation,solarPVmodules
2. TounderstandtheprinciplesofstorageinPVsystems
3. Todiscusssolarenergystoragesystemsandtheirapplications.
4. Togetknowledgeinwindenergyandbio-mass
5. Togaininsightsingeothermalenergy,oceanenergyandfuelcells.

UNIT–1:SOLARRADIATION: (9)

Roles and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solarradiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems.

SOLAR PV MODULES AND PV SYSTEMS: PV Module Circuit Design, Module Structure, Packing Density, Interconnections, Mismatch and Temperature Effects, Electrical and MechanicalInsulation,LifetimeofPVModules,DegradationandFailure,PVModuleParameters, Efficiency of PV Module, Solar PV Systems-Design of Off Grid Solar Power Plant. Installation and Maintenance

UNIT–2:STORAGEINPVSYSTEMS: (9)

Battery Operation, Types of Batteries, Battery Parameters, Application and Selection of Batteries forSolarPVSystem,BatteryMaintenanceandMeasurements,BatteryInstallation for PVSystem.

UNIT–3: (9)

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation.

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

UNIT–4: (9)

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

UNIT–5: (9)

GEOTHERMAL ENERGY: Origin, Applications, Types of Geothermal Resources, Relative Merits. **OCEAN ENERGY**: Ocean Thermal Energy; Open Cycle & Closed Cycle OTEC Plants, Environmental Impacts, Challenges.

FUEL CELLS: Introduction, Applications, Classification, Different Types of Fuel Cells Such asPhosphoric Acid Fuel Cell, Alkaline Fuel Cell, PEM Fuel Cell, MC Fuel Cell.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**Pos**
CO1	Defineandexplaintheevolutionandneedforrapidprototyping in modern product development.	**L1,L2,L6**
CO2	Compareandcontrastvarious3Dprintingtechnologiesbasedon working principles, materials, and limitations.	**L2,L4**
CO3	Applyknowledgeofrapidtoolingandreverseengineeringtechniques for industrial and design applications.	**L3,L5,L6**
CO4	Diagnoseandinterpretdifferenttypesoferrorsencounteredin 3D printing processes and recommend solutions.	**L2,L3,L5,**
CO5	UseRP-specificsoftwaretoolstomanipulateSTLfilesand prepare models for printing in real-world scenarios.	**L1,L3,L6**

TEXTBOOKS:

1. SolarEnergy–PrinciplesofThermalCollectionandStorage/SukhatmeS.P.and J.K.Nayak/TMH
2. Non-ConventionalEnergyResources-KhanB.H/TataMcGrawHill,NewDelhi,2006

REFERENCEBOOKS:

1. FrankW.Liou,—RapidPrototyping&EngineeringApplications‖,CRCPress, Taylor & Francis Group, 2011.
2. Rafiq Noorani, —Rapid Prototyping: Principles and Applicationsin Manufacturing‖,John Wiley&Sons, 2006.

REFERENCEWEBSITE:

1. PrinciplesofSolarEngineering-D.YogiGoswami,FrankKrieth&JohnFKreider Taylor & Francis
2. Non-ConventionalEnergy-AshokVDesai/NewAgeInternational(P)Ltd
3. RenewableEnergyTechnologies-Ramesh&Kumar/Narosa
4. Non-conventionalEnergySource-G.DRoy/Standard Publishers

CO-POMAPPING

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-ISemester

		L	TP	C
23OEE351A	**ELECTRICALSAFETYPRATICESANDSTANDARDS (OPENELECTIVE–I)**	**3**	**00**	**3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstand fundamental concepts of electrical safety, hazards,and riskassessment in electrical systems.
2. Tocreateawarenessaboutelectricalaccidents,theircauses,andpreventivesafety measures.
3. Tofamiliarizestudentswithnationalandinternationalelectricalsafetycodes,standards, and regulations.
4. To apply safe practices in installation, operation, maintenance, and troubleshooting of electrical equipment.
5. Todeveloptheabilitytoidentifyunsafeconditionsandimplementappropriate protective techniques.

UNIT–1:INTRODUCTIONTOELECTRICALSAFETY: (9)

Fundamentals of Electrical safety-Electric Shock-physiological effects of electric current- Safety requirements–Hazardsofelectricity-Arc-Blast-Causesforelectricalfailure.

UNIT–2:SAFETYCOMPONENTS: (9)

Introduction to conductors and insulators- voltage classification -safety against over voltages- safety against static electricity-Electrical safety equipment‘s- Fire extinguishers for electrical safety.

UNIT–3:GROUNDING: (9)

General requirements for grounding and bonding- Definitions- System grounding- Equipment grounding – The Earth-Earthing practices-Determining safe approach distance- Determining archazard category.

UNIT–4:SAFETYPRACTICE: (9)

General first aid-Safety in handling hand held electrical appliances tools-Electrical safety in trainstations-swimmingpools,externallightinginstallations,medicallocations-Casestudies.

UNIT–5:STANDARDSFORELECTRICALSAFETY: (9)

Electricity Acts- Rules & regulations- Electrical standards-NFPA 70 E-OSHA standards- IEEE standards-National Electrical Code 2005 – National Electric Safety code NESC- Statutory requirements from electrical inspectorate

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**Pos**
CO1	UnderstandingtheFundamentalsofElectricalSafety.	**L1,L2,L6**
CO2	IdentifyingandApplyingSafetyComponents.	**L2,L4**
CO3	AnalyzingGroundingPracticesandElectricalBonding	**L3,L5,L6**
CO4	ApplyingSafetyPracticesinElectrical Installationsand Environments	**L2,L3,L5,**
CO5	EvaluatingElectricalSafetyStandardsandRegulatoryCompliance	**L1,L3,L6**

TEXTBOOKS:

1. MassimoA.G.Mitolo,"ElectricalSafetyofLow-VoltageSystems",McGrawHill,USA,2009.
2. MohamedEl-Sharkawi,"ElectricSafety-PracticeandStandards",CRCPress,USA,2014

REFERENCEWEBSITE:

1. KennethG.Mastrullo,RayA.Jones,"TheElectricalSafetyProgramBook",Jonesand Bartlett Publishers, London, 2nd Edition, 2011.
2. PalmerHickman,"ElectricalSafety-RelatedWorkPractices",Jones&BartlettPublishers, London, 2009.
3. Fordham Cooper,W.,"Electrical Safety Engineering",Butter worth and Company, London,1986.
4. John Cadick, Mary Capelli-Schellpfeffer, DennisK. Neitzel, "Electrical Safety Handbook, McGraw-Hill, NewYork, USA,4th edition, 2012.

CO-POMAPPING

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)
IIIB.Tech.-ISemester

		L	TP	C
23OEC351A	**ELECTRONICCIRCUITS (OPENELECTIVE– I)**	**3**	**00**	**3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandsemiconductordiodes,theircharacteristicsandapplications.
2. Toexploretheoperation,configurations,andbiasingofBJTs.
3. Tostudytheoperation,analysis,andcouplingtechniquesofBJTamplifiers.
4. Tolearntheoperation,applicationsandusesoffeedbackamplifiersandoscillators.
5. Toanalyzethecharacteristics,configurations,andapplicationsofoperationalamplifiers.

UNIT–1: **(9)**

Semiconductor Diode and Applications: Introduction, PN junction diode – structure, operation and VI characteristics, Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Positive and Negative Clipping and Clamping circuits (Qualitative treatment only).

Special Diodes: Zener and Avalanche Breakdowns, VI Characteristics of Zener diode, Zener diode as voltage regulator, Construction, operation and VI characteristics of Tunnel Diode,LED,Varactor Diode, Photo Diode.

UNIT–2: **(9)**

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch and Amplifier, Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diodes.

UNIT–3: **(9)**

Single stage amplifiers: Classification of Amplifiers -Distortion in amplifiers,Analysis of CE, CC and CB configurations with simplified hybrid model.

Multistage amplifiers: Different Coupling Schemes used in Amplifiers - RC coupled amplifiers, Transformer Coupled Amplifier, Direct Coupled Amplifier; Multistage RC coupled BJT amplifier (Qualitative treatment only).

UNIT–4: **(9)**

Feedback amplifiers: Concepts of feedback, Classification of feedback amplifiers, Effect of feedback on amplifier characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations (Qualitative treatment only).

Oscillators: Classification of oscillators, Condition for oscillations, RC Phase shift Oscillators, Generalized analysis of LC Oscillators-Hartley and Colpitts Oscillators, Wien Bridge Oscillator.

UNIT–5: **(9)**

Op-amp: Classification of IC'S, basic information of Op-amp, ideal and practical Op-amp, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.
Applications ofop-amp:Summing,scalingandaveragingamplifiers, Integrator, Differentiator, phase shift oscillator and comparator.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	Understandsemiconductordiodes,theircharacteristicsand applications.	L1,L2,L6
CO2	Exploretheoperation,configurations,andbiasingofBJTs.	L2,L4
CO3	Gainknowledgeabouttheoperation,analysis,andcoupling techniques of BJT amplifiers.	L3,L5,L6
CO4	Learntheoperation,applicationsandusesoffeedbackamplifiers and oscillators.	L2,L3,L5,
CO5	Analyzethecharacteristics,configurations,andapplicationsof operational amplifiers.	L1,L3,L6

TEXTBOOKS:

1. ElectronicsDevicesandCircuits,J.MillmanandChristos.C.Halkias,3rdedition,Tata McGraw Hill, 2006.
2. Electronics Devices and Circuits Theory, David A. Bell, 5thEdition, OxfordUniversity press. 2008.

REFERENCEBOOKS:

1. ElectronicsDevicesandCircuitsTheory,R.L.Boylestad,LousisNashelskyandK.Lal Kishore, 12thedition, 2006, Pearson, 2006.
2. Electronic Devices and Circuits, N.Salivahanan, andN.Suresh Kumar, 3rdEdition,TMH, 2012
3. MicroelectronicCircuits,S.SedraandK.C.Smith,5thEdition,OxfordUniversityPress.

CO-POMAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)
IIIB.Tech.-ISemester

		L	TP	C
23OSH351A	**MATHEMATICSFORMACHINELEARNINGANDAI (OPENELECTIVE–I)**	**3**	**00**	**3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES

1. To provide a strong mathematical foundation for understanding and developing AI/MLalgorithms.
2. Toenhancetheabilitytoapplylinearalgebra,probability,andcalculusinAI/MLmodels.
3. To equip students with optimization techniques and graph-based method susedin AI applications.To develop critical problem-solvings kills for analysing mathematical formulations in AI/ML

UNITI:LINEARALGEBRAFORMACHINELEARNING (9)

Review of Vector spaces, basis, linear independence, Vector and matrix norms, Matrix factorization techniques, Eigen values, eigen vectors, diagonalization, Singular Value Decomposition (SVD) and Principal Component Analysis (PCA).

UNITII:PROBABILITYANDSTATISTICSFORAI (9)

Probability distributions: Gaussian, Binomial, Poisson. Bayes' Theorem, Maximum Likelihood Estimation (MLE), and Maximum a Posteriori (MAP).Entropy and Kullback - Leibler (KL) Divergence in AI, Cross entropy loss, Markov chains.

UNITIII:OPTIMIZATIONTECHNIQUESFORML (9)

Multivariable calculus: Gradients, Hessians, Jacobians. Constrained optimization: Lagrange multipliers and KKT conditions. Gradient Descent and its variants (Momentum, Adam) Newton's method, BFGS method.

UNITIV:VECTORCALCULUS&TRANSFORMATIONS (9)

Vectorcalculus: Gradient,divergence,curl.FourierTransform &Laplace TransforminML applications.

UNITV:GRAPHTHEORYFORAI (9)

Graphrepresentations:Adjacencymatrices,Laplacianmatrices.BayesianNetworks& Probabilistic Graphical Models. Introduction to Graph Neural Networks (GNNs).

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswill be able to		**Pos**
CO1	ApplylinearalgebraconceptstoMLtechniqueslike PCA and regression.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO2	Analyzeprobabilisticmodelsandstatisticalmethods for AI applications.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO3	Implementoptimizationtechniquesformachine learning algorithms.	**PO1,PO2,PO3,PO4,PO5,PO6, PO12**
CO4	UtilizevectorcalculusandtransformationsinAI- based models.	**PO1,PO2,PO3,PO4,PO5,PO12**

CO5	Developgraph-basedAImodelsusingmathematical representations.	**PO1,PO2,PO3,PO4,PO5,PO12**

TEXTBOOKS:

1. Mathematics for Machine Learning by Marc Peter Deisenroth, A.Aldo Faisal, Cheng Soon Ong, Cambridge University Press, 2020.
2. PatternRecognitionandMachineLearningbyChristopherBishop,Springer.

REFERENCEBOOKS:

1. GilbertStrang,LinearAlgebraandItsApplications,CengageLearning,2016.
2. JonathanGross,JayYellen,GraphTheoryandItsApplications,CRCPress,2018.

REFERENCEWEBSITE:

1. MIT–MathematicsforMachineLearninghttps://ocw.mit.edu
2. StanfordCS229–MachineLearningCoursehttps://cs229.stanford.edu/
3. DeepAI–MathematicalFoundationsforAIhttps://deepai.org

CO-POMAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	-	-	-	-	-	1
CO2	3	3	2	3	2	-	-	-	-	-	-	2
CO3	3	3	3	3	2	1	-	-	-	-	-	2
CO4	3	3	2	2	1	-	-	-	-	-	-	1
CO5	3	3	3	3	2	-	-	-	-	-	-	2

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)
IIIB.Tech.-ISemester

		L	TP	C
23OSH351B	**MATERIALSCHARACTERIZATIONTECHNIQUES (OPENELECTIVE-I)**	**3**	**00**	**3**

PRE-REQUISITES: Nil

COURSEEDUCATIONALOBJECTIVES:

1. Toprovideexposuretovariouscharacterizationtechniques.
2. Toexplainthefundamentalprinciplesandanalyticalmethodsofdifferent spectroscopic techniques.
3. Todescribetheworkingprinciple,limitations,andapplicationsoftheScanning Electron Microscope (SEM).
4. Toillustrate theoperationoftheTransmissionElectronMicroscope(TEM), including Selected Area Electron Diffraction (SAED)patterns and its applications.
5. To educate on the use of advanced electrical and magnetic instruments in material characterization.

UNIT-I:STRUCTUREANALYSISBYPOWDERX-RAYDIFFRACTION (9)

Introduction, Bragg's law of diffraction, Intensity of Diffracted beams, Factors affecting Diffraction, Intensities, Structure of polycrystalline Aggregates, Determination of crystal structure, Crystallite size by Scherer and Williamson-Hall (W-H) Methods, Small angle X- ray scattering (SAXS) (in brief).

UNIT-II:MICROSCOPY TECHNIQUE -1-SCANNING ELECTRON MICROSC OPY (SEM) (9)

Introduction, Principle, Construction and working principle of Scanning Electron Microscopy, Specimen preparation, Different types of modes used (Secondary Electron and Backscatter Electron), Advantages, limitations and applications of SEM.

UNIT-III: MICROSCOPY TECHNIQUE -2 - TRANSMISSION ELECTRON MICROSCOPY (TEM) (9)

Construction and Working principle, Resolving power and Magnification, Bright and dark fields, Diffraction and image formation, Specimen preparation, Selected Area Diffraction, Applicationsof Transmission Electron Microscopy, Difference between SEM and TEM, Advantage and Limitations of Transmission Electron Microscopy

UNIT-IV:SPECTROSCOPYTECHNIQUES (9)

Principle,Experimentalarrangement,Analysisandadvantagesofthespectroscopictechniques– (i)UV-Visiblespectroscopy(ii)RamanSpectroscopy,(iii)Fourier Transforminfrared(FTIR) spectroscopy, (iv) X-ray photoelectron spectroscopy (XPS).

UNITVELECTRICAL&MAGNETICCHARACTERIZATIONTECHNIQUES (9)

Electrical Properties analysis techniques (DC conductivity, AC conductivity) Activation Energy, Effect of Magnetic field on the electrical properties (Hall Effect). Magnetization measurement by induction method, Vibrating sample Magnetometer (VSM) and SQUID.

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

TotalHours:45

COURSEOUTCOMES

	Onsuccessfulcompletionofthecourse,studentswillbe able to	**PO2**
CO1	Employdifferentanalyticalmethodstoanalyzethecrystal structure and crystallite sizes	PO1, PO2,PO3,PO4,PO5
CO2	InvestigatethemorphologyofthesamplebyusingaScanning Electron Microscope	PO1, PO2,PO3,PO4,PO5
CO3	Analyzethemorphologyandcrystalstructureofthesampleby using Transmission Electron Microscope	PO1, PO2,PO3,PO4,PO5
CO4	Describetheprincipleandexperimentalarrangementofvarious spectroscopic techniques	PO1,PO2,PO3,Po4
CO5	Understandtheconstructionandworkingprincipleofvarious Electrical & Magnetic Characterization technique	PO1,PO2,PO3,PO4

TEXTBOOKS:

1. MaterialCharacterization:IntroductiontoMicroscopicandSpectroscopicMethods–YangLeng–JohnWiley&Sons(Asia)Pvt.Ltd.2013.
2. MicrostructuralCharacterizationofMaterials-DavidBrandon,WayneDKalpan,John Wiley & Sons Ltd., 2008

REFERENCEBOOKS:

1. FundamentalsofMolecularSpectroscopy–IVEd.–ColinNevilleBanwellandElaine M.McCash,TataMcGraw-Hill,2008.
2. ElementsofX-raydiffraction–BernardDennisCullity&StuartRStocks,PrenticeHall ,2001–Science.
3. PracticalGuidetoMaterialsCharacterization:TechniquesandApplications-Khalid Sultan – Wiley – 2021.
4. MaterialsCharacterizationTechniques-SamZhang,LinLi,AshokKumar-CRC Press - 2008

REFERENCELINK:

1. https://nptel.ac.in/courses/115/103/115103030/
2. https://nptel.ac.in/content/syllabus_pdf/113106034.pdf
3. https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-mm0S8/

CO-POMAPPING

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

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-ISemester

		L	TP	C
23OSH351C	**CHEMISTRYOFENERGYSYSTEMS (OPEN ELECTIVE-I)**	**3**	**00**	**3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. To make the student understand basic electrochemical principles such as standardelectrode potentials, emf and applications of electrochemical principles in the design of batteries.
2. To understand the basic concepts of processing and limitations of Fuel cells & their applications.
3. To impart knowledge to the students about fundamental concepts of photo chemical cells, reactions and applications.
4. Necessarily of harnessing alternate energy resources such as solar energy and its basic concepts.
5. To impart knowledge to the students about fundamental concepts of hydrogen storage in different materials and liquification method.

UNIT-1:ELECTROCHEMICALSYSTEMS (9)

Galvanic cell, Nernst equation, standard electrode potential, application of EMF, electrical double layer, polarization, Batteries- Introduction, Lead-acid, Nickel- cadmium, Lithium-ion batteries and their applications.

UNIT-2:FUEL CELLS (9)

Fuel cell- Introduction, Basic design of fuel cell, working principle, Classification of fuel cells, Polymer electrolyte membrane (PEM) fuel cells, Solid-oxide fuel cells (SOFC), Fuel cell efficiency and applications.

UNIT-3:PHOTOANDPHOTOELECTROCHEMICALCONVERSIONS (9)

Photochemical cells Introduction and applications of photochemical reactions, specificity of photo electrochemical cell, advantage of photoelectron catalytic conversions and their applications.

UNIT-4:SOLARENERGY (9)

Introduction and prospects, photovoltaic (PV) technology, concentrated solar power (CSP), Solar cells and applications.

UNIT-5:HYDROGENSTORAGE (9)

Hydrogen storage and delivery: State-of-the art, Established technologies, Chemical and Physical methods of hydrogen storage, Compressed gas storage, Liquid hydrogen storage, other storage methods, Hydrogen storage in metal hydrides, metal organic frameworks (MOF), Metal oxide porous structures, hydrogel, and Organic hydrogen carriers.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbe able to		Pos
CO1	Solvetheproblemsbasedonelectrodepotential,Describe the Galvanic Cell Differentiate between Lead acid and Lithium-ionbatteries,Illustratetheelectricaldoublelayer.	PO1,PO2,PO2,PO4, PO5
CO2	DescribetheworkingPrincipleofFuelcell,Explainthe efficiency of the fuel cell. Discuss about the Basic design of fuel cells, Classify the fuel cell	PO1,PO2,PO2,PO4, PO6
CO3	Differentiate between Photo and Photo electrochemical Conversions, Illustrate the photochemical cells, Identify theapplicationsofphotochemicalreactions,Interpret advantagesofphotoelectroncatalyticconversion.	PO1,PO2,PO2,PO4, PO5
CO4	Applythe photovoltaictechnology,Demonstrateabout solarenergyandprospectsIllustratetheSolarcells, discussaboutconcentratedsolarpower	PO1,PO2,PO2,PO4, PO5
CO5	Differentiate Chemical and Physical methods of hydrogen storage, Discuss the metal organicframe work,Illustrate thecarbonandmetaloxideporousstructuresDescribe the liquificationmethods.	PO1,PO2,PO2,PO4, PO5

TEXT BOOKS:

1. PhysicalchemistrybyIraN.Levine
2. EssentialsofPhysicalChemistry,BahlandBahlandTuli.
3. InorganicChemistry,SilverandAtkins

REFERENCEBOOKS:

1. FuelCellHandBook7thEdition,byUSDepartmentofEnergy(EG&Gtechnicalservices And corporation)
2. HandbookofsolarenergyandapplicationsbyArvindTiwariandShyam.
3. Solarenergyfundamental,technologyandsystemsbyKlausJagaret.al.
4. HydrogenstoragebyLevineKlebonoff

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	1	2	-	-	-	-	-	-	-
CO2	3	3	2	2	-	2	-	-	-	-	-	-
CO3	2	2	3	2	1	-	-	-	-	-	-	-
CO4	2	3	2	2	3	-	-	-	-	-	-	-
CO5	2	3	2	2	3	-	-	-	-	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-ISemester

		L	TP	C
23OSH351D	**ENGLISHFORCOMPETITIVEEXAMINATIONS (OPENELECTIVE-I)**	**3**	**00**	**3**

PRE-REQUISITES:

COURSEOBJECTIVES:

1. ToenablethestudentstolearnaboutthestructureofcompetitiveEnglish
2. Tounderstandthegrammaticalaspectsandidentifytheerrors
3. Toenhanceverbalabilityandidentifytheerrors
4. ToimprovewordpowertoanswercompetitivechallengesTomakethereadytocrack Competitive exams

UNIT-I:GRAMMAR-1 **(9)**

Nouns-classification-errors-Pronouns-types-errors-Adjectives-types-errors-Articles-definite indefinite–DegreesofComparison-Adverbs-types- errors-Conjunctions-usage-repositions-usage-Tag Questions, types-identifying errors-Practice

UNIT-II:GRAMMAR-2 **(9)**

Verbs-tenses-structure-usages-negatives-positives-timeadverbs-Sequenceoftenses-IfClause-Voice-activevoiceandpassivevoice-reportedSpeech-Agreement-subjectandverb-Modals-Spotting Errors - Practices

UNIT-III:VERBALABILITY **(9)**

Sentence completion-Verbal analogies-Word Groups-Instructions-Critical reasoning-Verbal Deduction-Select appropriatepair - Reading Comprehension - Paragraph - Jumbles - Selecting the proper statement byreading a given paragraph.

UNIT-IVREADINGCOMPREHENSIONANDVOCUBULARY **(9)**

Competitive Vocabulary – Word building – Memory Techniques – Synonyms, Antonyms,Affixes - Prefixes&suffix–OneWord Substitutes–Compound words–Phrasal Verbs –Idioms and phrases-Homophones – Linking words – Modifiers – Intensifiers – Mastering Competitive Vocabulary – Cracking the unknowing passage –Speed Read info Techniques–Skimming and Scanning-Types of answering – Elimination methods.

UNIT-V:WRITINGFORCOMPETITIVEEXAMINATIONS **(9)**

Punctuations and Spelling rules –Word order–Sub skills of Writing –paragraph meaning – Salient features – types – Note making – Note taking- Summarizing - precise writing - Expansion of proverbs – Essay Writing – types.

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES

	Onsuccessfulcompletionofthecourse,studentswillbeableto	**POs**
CO1.	IdentifythebasicsofEnglishgrammaranditsimportance	**PO2**
CO2.	Explaintheuseofgrammaticalstructuresinsentences	**PO5**
CO3.	Demonstrate the ability to use various concepts in grammar and vocabularyandtheapplicationsineverydayuseandincompetitive exams	**PO6,PO10**
CO4.	Analyzeanunknownpassageandreachconclusionsaboutit.	**PO10**
CO5.	Choosetheappropriateformofverbsinframing sentences	**PO4**

TEXTBOOKS:

1. WrenMartin,Englishforcompetitiveexaminations,S.hand&Co,2021.
2. ObjectiveEnglishfor competitiveexaminations,TataMcGrawHill,NewDelhi,2014.

REFERENCEBOOKS:

1. HariMohanPrasadobjectiveEnglishforcompetitiveexaminationTata McGrawhill, Delhi,2014.
2. PhilipSunilSolomonEnglishforSuccessincompetitiveexams,Oxford2016.
3. ShaliniVerma,WordpowermadeHandyS.ChandPublications.
4. Neira Anjann a Dev &Co, Creative Writing: A Beginner's Manual PearsonEducation India, 2008.
5. AbhishekJain,VocabularylearningTechniquesVolI&IIRRGlobalPublishers2013.
6. MichaelSwan,PracticalEnglishUsage,Oxford,2006.

ONLINEREFERENCE:

1. https://www.grammar.cl/English/partsofspeech.htm
2. https://academicguides.waldenu.edu/writingcenter/grammar/PartsofSpeech
3. https://learnEnglish.britishcouncil.org/grammar/enlgish-grammar—reference/actIvepassive-voice.
4. https://www.languagetool.org/Insights/post/verb/tenses/
5. https://www.britishcouncil.in/blog/best/freeEnglish-learningresources-Britishcouncil
6. https://www.careerride.com/post/social-essays-for–competitive-exams-586.aspx

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	-	-	-	-	-	1
CO2	3	3	2	3	2	-	-	-	-	-	-	2
CO3	3	3	3	3	2	1	-	-	-	-	-	2
CO4	3	3	2	2	1	-	-	-	-	-	-	1
CO5	3	3	3	3	2	-	-	-	-	-	-	2

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-ISemester

		L	TP	C
23OSH351E	**ENTREPRENEURSHIPANDNEWVENTURE CREATION (OPENELECTIVE-I)**	**3**	**00**	**3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Tofosteranentrepreneurialmind-setforventurecreationandentrepreneurialleadership.
2. Toencouragecreativityandinnovationandalsovalidatingcustomerpersonas.
3. ToenablethestudentsaboutunderstandMVPdevelopmentandvalidationtechniques to determine product-market fit and initiate solution design, prototype for proof of concept.
4. Tomakethestudentstocreateabusinessplan,financialplanningandfeasibility analysis to assess the financial viability of a venture.
5. Toenablethestudentstoidentifypotentialandaspiration forscalevis-à-visyour venture idea.

UNIT–1:ENTREPRENEURSHIPFUNDAMENTALSANDCONTEXT (9)

Meaning and concept, attributes and mindset of entrepreneurial and intrapreneurial leadership, role models and their role in economic development, an understanding of how to build an entrepreneurial mindset, skill sets, attributes, and networks while on campus.

CoreTeachingTool:Simulation,Game,IndustryCaseStudies(Personalizedforstudents–16industriestochoosefrom),VentureActivity

UNIT–2:PROBLEM&CUSTOMERIDENTIFICATION (9)

Understanding and analysing the macro problem and industry perspective – technological, socioeconomic, and urbanization trends and their implications on new opportunities, identifying passion, identifying and defining the problem using design thinking principles, analysing the problem and validating with the potential customer, understanding customer segmentation, creating and validating customer personas.

Core Teaching Tool: Several types of activities including Class, game, Gen AI, Get out of the Building and Venture Activity.

UNIT–3:SOLUTIONDESIGN,PROTOTYPING&OPPORTUNITYASSESSMENT AND SIZING (9)

Understanding customer jobs-to-be-done and crafting innovative solution design to map to customer's needs and create a strong value proposition, understanding prototyping and Minimum Viable Product (MVP), developing a feasibility prototype with differentiating value, features, and benefits, assessing relative market position via competition analysis, sizing the market and assessing the scope and potential scale of the opportunity.

CoreTeachingTool:VentureActivity,no-codeInnovationtools,Classactivity

UNIT–4:BUSINESS&FINANCIALMODEL,GO-TO-MARKETPLAN (9)

Introduction to business model and types, lean approach, 9-block canvas model, riskiest assumptions to business models, importance of Build-Measure-Learn approach. Business Planning: components of business plan – sales plan, people plan, and financial plan. Financial planning:typesofcost,preparingafinancialplanforprofitabilityusingafinancialtemplate,

understanding basics of unit economics, and analysing financial performance. Introduction to marketing and sales, selecting the right channel, creating digital presence, building customer acquisition strategy. Choosing a form of business organization specific to your venture, identifying sources of funds – debt and equity, mapping the start-up life cycle to fundingoptions.

Core Teaching Tool: Founder Case Studies –Samaand Securely Share; Class activity and discussions; Venture Activities.

UNIT–5:SCALEOUTLOOKANDVENTUREPITCHREADINESS(9)

Understand and identify potential and aspiration for scale vis-à-vis your venture idea.Persuasive storytelling and its key components. Build an investor-ready pitch deck.

CoreTeachingTool:Experttalks;Cases;Classactivityanddiscussions;VentureActivities.

TotalHours:45

COURSEOUTCOMES:

COs	Onsuccessfulcompletionofthecourse,studentswillbe able to	POs
CO1	Developanentrepreneurialmindsetandappreciate the conceptof entrepreneurship	PO9,PO12
CO2	Comprehendtheprocessofproblem-opportunityidentification through design thinking, identify market potential and customerswhiledevelopingacompellingvalueproposition Solution	PO2, PO4, PO5, PO9,PO11,PO12
CO3	BuildaprototypeforproofofconceptandvalidatetheMVPof theirpractice venture idea	PO3, PO4, PO5,PO6,PO9, PO11, PO12
CO4	Analyzeandrefinebusinessmodelstoensuresustainability andprofitability of a venture	PO7,PO9,PO10, PO11, PO12
CO5	Prepareanddeliveraninvestiblepitchdeckoftheirpractice venture to attract stakeholders	PO9,PO11,PO12

TEXT BOOKS:

1. RobertD. Hisrich, Michael P. Peters,Dean A. Shepherd, Sabyasachi Sinha. Entrepreneurship, McGraw Hill, 11th Edition (2020).
2. Ries,E.TheLeanStartup:HowToday'sEntrepreneursUseContinuousInnovationto Create Radically Successful Businesses. Crown Business (2011).
3. Osterwalder,A.,&Pigneur,Y.BusinessModelGeneration:AHandbookforVisionaries, Game Changers, and Challengers. John Wiley & Sons (2010).

REFERENCEBOOKS:

1. SimonSinek.StartwithWhy.PenguinBooksLimited(2011).
2. Brown,Tim.ChangebyDesignRevised&Updated:HowDesignThinkingTransforms Organizations and Inspires Innovation. Harper Business (2019).
3. NamitaThapar.TheDolphinandtheShark:StoriesonEntrepreneurship.PenguinBooks Limited (2022).
4. Saras D. Sarasvathy. Effectuation: Elements of Entrepreneurial Expertise. Elgar Publishing Ltd. (2008).

REFERENCEWEBSITE:

1. Ignite5.0Course–WadhwaniPlatform(Includes200+componentsofcustom-created modular content and 500+ components of the most relevant curated content).

CO-POMAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	2	-	-	3
CO.2	-	3	-	3	2	-	-	-	3	-	2	3
CO.3	-	-	3	2	3	2	-	-	3	-	2	3
CO.4	-	-	-	-	-	-	2	-	3	3	2	3
CO.5	-	-	-	-	-	-	-	-	3	-	2	3
CO*	-	3	3	2.5	2.5	2	2	-	2.8	3	2	3

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-VSemester

23ESC351T INTRODUCTION TO QUANTUMTECHNOLOGIESAND APPLICATIONS **LTPC**

3003

COURSEEDUCATIONALOBJECTIVES:

- Introducefundamentalquantumconceptslikesuperpositionandentanglement.
- Understandtheoreticalstructureofqubitsandquantuminformation.
- Exploreconceptualchallengesinbuildingquantumcomputers.
- Explainprinciplesofquantumcommunicationandcomputing.
- Examinereal-worldapplicationsandthefutureofquantumtechnologies.

UNIT–1: Introduction to Quantum Theory and Technologies (9)

The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison, Quantum states and measurement: nature of observation, Overview of quantum systems: electrons, photons, atoms, The concept of quantization: discrete energy levels, Why quantum? Strategic, scientific, and technological significance, A snapshot of quantum technologies: Computing, Communication, and Sensing, National and global quantum missions: India‘s Quantum Mission, EU, USA, China.

UNIT–2: TheoreticalStructureofQuantumInformationSystems (9)

What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bits vs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (non- engineering view),Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract, The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences, Philosophical implications: randomness, determinism, and observer role

UNIT–3: Building a Quantum Computer – Theoretical Challenges and Requirements (9)

What is required to build a quantum computer (conceptual overview)?,Fragility of quantum systems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers: Why maintaining entanglement is difficult, Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison),Superconducting circuits, Trapped ions, Photonics, Visions reality: what‘s working and what remains elusive, The role of quantum software in managing theoretical complexities

UNIT–4: QuantumCommunicationandComputing–TheoreticalPerspective (9)

Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD),Role of Entanglement in Communication, The Idea of the Quantum Internet – Secure Global Networking, Introduction to Quantum Computing, Quantum Parallelism (Many States at Once),Classical vs Quantum Gates, Challenges: Decoherence and Error Correction, Real- World Importance and Future Potential

UNIT–5: Applications,UseCases,andtheQuantumFuture (9)

Real-world application domains: Healthcare (drug discovery),Material science, Logistics and optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum, Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization, Emerging careers in quantum: roles, skillsets, and preparation pathways, Educational and research landscape – India's opportunity in the global quantum race

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Describethestructure,principles,andfunctioningofquantum systems and explain basic quantum concepts such as qubits, superposition, entanglement, and quantum measurement.	**PO1,PO2**
CO2	Explainand analyze quantum hardware architectures, quantum gates,circuitmodels,\andquantumerrorsourcesincluding decoherenceandnoise.	**PO1,PO3**
CO3	Construct, simulate, and demonstrate basic quantum circuits and apply fundamental quantum algorithms such as Deutsch–Jozsa, Grover's search, and QFT.	**PO1,PO2,PO4**
CO4	Identifyanddescribequantumcommunicationconcepts including QKD, quantum channels, teleportation, and quantumcryptographicprotocols.	**PO1,PO2,PO3,PO4**
CO5	Analyze real-time applications of quantum technologies in computing, communication, optimization, AI, and evaluate future trends, challenges, and societal impacts.	**PO1,PO2,PO4,PO5**

TEXTBOOKS:

1. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.

2. Eleanor Rieffel and Wolfgang Polak, Quantum Computing: A Gentle Introduction, MITPress, 2011.

3. ChrisBernhardt,QuantumComputingforEveryone,MITPress,2019.

REFERENCEBOOKS:

1. DavidMcMahon,QuantumComputingExplained,Wiley,2008.
2. PhillipKaye,RaymondLaflamme,MicheleMosca,AnIntroductiontoQuantum Computing, Oxford University Press, 2007.
3. Scott Aaronson,Quantum Computing SinceDemocritus,Cambridge UniversityPress, 2013.

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VSEMESTER

23CAI357L	COMPUTER VISION AND NATURAL LANGUAGE PROCESSING LAB	LTPC 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Toprovidehands-onexperienceinimplementingimageprocessingandcomputervision algorithms.
2. TofamiliarizestudentswithnaturallanguageprocessingtechniquesusingPythonlibraries.
3. ToenabletheintegrationofCVandNLPforbuildingintelligentapplications.

LISTOF EXPERIMENTS

1. LoadanddisplayanimageusingOpenCVandperformbasicoperationslikeresizing, cropping, and rotation.
2. Applyedge detection (Sobel, Canny) and thresholding techniques on grayscale and color images.
3. Implementimagefilteringoperations:Gaussian,Median,andBilateralfilters.
4. Performobjectdetectionusingcontourdetectionandboundingboxes.
5. DetectfacesusingHaarCascadeorDNN-basedpre-trainedmodelsinOpenCV.
6. Implementcolor-basedobjecttrackingusingHSVspaceandCamShiftalgorithm.
7. Preprocess text data (tokenization, stop word removal, stemming, lemmatization) using NLTK/spaCy.
8. ImplementPart-of-Speech(POS)taggingandNamedEntityRecognition(NER) using spaCy.
9. Buildasimple sentiment analysis classifier usingbag-of-words or TF-IDFand Naïve Bayes.
10. PerformtopicmodelingusingLatentDirichletAllocation(LDA).
11. ExtracttextfromanimageusingOpticalCharacterRecognition(OCR)with Tesseract and perform text summarization.
12. FinalMiniProject:IntegrateCVandNLP(e.g.,Readtextfromsignboardsordocuments and translate/summarize it).

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Applyimageprocessingtechniquesforfeatureextraction and classification.	PO1
CO2	ImplementNLPtechniquessuchastokenization,POS tagging, and sentiment analysis.	PO2
CO3	Analyzevisualandtextualdatausingopen-sourcetools.	PO3
CO4	DevelopapplicationsthatcombineComputerVisionandNLP for real- world tasks.	PO4

LABSOFTWAREREQUIREMENTS:

- **Languages/Tools:**Python,OpenCV,NLTK,spaCy,TesseractOCR,scikit-learn, NumPy, Pandas, Matplotlib
- **Platforms:**JupyterNotebook/GoogleColab/PyCharm/VSCode

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	3	-	-	-	-	-	-	-	-
CO.5	-	-	-	-	3	-	-	-	-	-	-	-
CO*	3	3	3	3	3	-	-	-	-	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VSEMESTER

23CAI357L OPERATING SYSTEMS&SYSTEMS PROGRAMMING LAB

LTPC
3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. To provide students with a strong foundation in the principles, architecture, and functioning of operating systems, including process management, memory management, file systems, and I/O operations.
2. To familiarize students with system programming concepts, enabling them to work with assemblers, loaders, linkers, compilers, interpreters, and system-level tools.
3. To develop practical skills in implementing operating system functionalities and system software components, using appropriate programming environments and tools.
4. To enable students to analyze and evaluate modern operating systems, understand real-time OS requirements, and explore current trends, challenges, and advancements in system software.

LISTOF EXPERIMENTS

1. SimulatethefollowingCPUschedulingalgorithmFCFS
2. SimulatethefollowingCPUschedulingalgorithmSJF
3. SimulatethefollowingCPUschedulingalgorithmPriority
4. SimulatethefollowingCPUschedulingalgorithmRoundRobin
5. Writeaprogramtoillustrateconcurrentexecutionofthreadsusingpthreadslibrary.
6. Writeaprogramtosolveproducer-consumerproblemusingSemaphores.
7. ImplementBankersAlgorithmforDeadLockavoidanceandprevention.
8. Designandimplementatwo-passassemblerin C.
9. ImplementaMacroProcessorusingCforassemblylanguageprograms.
10. DevelopasimpleLinuxShell(commandinterpreter)usingC.
11. Writeshellscriptsforfileoperations,processcreation,andmonitoring.

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Implementbasicprocessmanagementoperationssuchas processcreation,termination,inter-processcommunication, andsynchronizationusingsystemcalls.	PO1
CO2	Develop programs to demonstrate memory management techniques including paging, segmentation, and allocation strategies.	PO2
CO3	Implementfilesystemoperationssuchasfilehandling, directory structures, and disk scheduling techniques.	PO3
CO4	Applysystemprogrammingconceptsbywritingprograms for assemblers, macro processors, linkers, and loaders.	PO4

LABSOFTWAREREQUIREMENTS:

- **Languages/Tools:**C,C++,AssemblyLanguage
- **Platforms:**Linux,VScode,Notepad++

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	3	-	-	-	-	-	-	-	-
CO.5	-	-	-	-	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-VSemester

23CSE356L	FULL STACK DEVELOPMENT-II (SKILLENHANCEMENTCOURSE)	L	T	P	C
		3	0	0	3

PRE-REQUISITES:Nil.

COURSEEDUCATIONALOBJECTIVES:CourseObjectives: The main objectives of the course are to

- Make use of Modern- day JavaScript with ES6 standards for designing Dynamic web pages
- Buildingrobust&responsiveUserInterfacesusingpopularJavaScriptlibrary_React.js`. Building robust backend APIs using _Express. js`
- Establishingtheconnectionbetweenfrontend(React)Useinterfaces

Listof Experiments:

1. IntroductiontoModernJavaScriptandDOM
    a) WriteaJavaScriptprogramtolinkJavaScriptfilewiththeHTML page
    b) WriteaJavaScriptprogramtoselecttheelementsinHTMLpageusingselectors
    c) WriteaJavaScriptprogramtoimplementtheeventlisteners
    d) WriteaJavaScriptprogramtohandletheclickeventsfortheHTMLbutton elements
    e) WriteaJavaScriptprogramtoWiththreetypesoffunctions
        i. Functiondeclaration
        ii. Functiondefinition
        iii. Arrowfunctions
2. BasicsofReact.Js

a) WriteaReactprogramtoimplementacounterbuttonusingreactclasscomponents
b) WriteaReactprogramtoimplementacounterbuttonusingreactfunctionalcomponents
c) WriteaReactprogramtohandlethebuttonclickeventsinfunctionalcomponent
d) WriteaReactprogramtoconditionallyrenderacomponentinthebrowser
e) WriteaReactprogramtodisplaytextusingStringliterals

3. ImportantconceptsofReact.js

a) WriteaReactprogramtoimplementacounterbuttonusingReactuseStatehook
b) WriteaReactprogramtofetchthedatafromanAPIusingReactuseEffecthook
c) andbacWriteaReactprogramwithtworeactcomponentssharingdatausingProps.
d) WriteaReactprogramtoimplementtheformsinreact
e) WriteaReactprogramtoimplementtheiterativerenderingusingmap()function.

4. IntroductiontoNode.jsandExpress.js

a) Writeaprogramtoimplementthe_helloworld`messageintheroutethroughthe browserusingExpress
b) Writeaprogramtodevelopasmallwebsitewithmultipleroutesusing Express. Js
c) Writeaprogramtoprintthe_helloworld`inthebrowserconsoleusingExpress.Js
d) WriteaprogramtoimplementtheCRUDoperationsusingExpress.Js
e) Writeaprogramtoestablishtheconnectionbetween APIandDatabaseusingExpress–MySQLdriver

5. IntroductiontoMySQL

a) WriteaprogramtocreateaDatabaseandtableinsidethatdatabaseusingMySQL Command line client
b) WriteaMySQLqueriestocreatetable,andinsertthedata,updatethedatainthetable
c) WriteaMySQLqueriestoimplementthesubqueriesintheMySQLcommandlineclient
d) WriteaMySQLprogramtocreatethescriptfilesintheMySQLworkbench
e) WriteaMySQLprogramtocreateadatabasedirectoryinProjectandinitializea

database.sqlfiletointegratethedatabaseintoAPI

TEXTBOOKS:

1. WebDesignwithHTML,CSS,JavaScriptandJQuerySetBookbyJonDuckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas
2. JohnDean,WebProgrammingwithHTML5,CSSandJavaScript,Jones&Bartlett Learning, 2019.
3. ProMERNStack:FullStackWebAppDevelopmentwithMongo,Express,React,and Node,VasanSubramanian,2ndedition,APress,O'Reilly.
4. LearningPHP,MySQL,JavaScript,CSS&HTML5:AStep-by-StepGuidetoCreating Dynamic Websites by Robin Nixon
5. AZATMARDAN,FullStackJavaScript:LearnBackbone.js,Node.jsandMongoDB.2015

REFERENCEBOOKS:

1. Full-StackJavaScriptDevelopmentbyEricBush.
2. ProgrammingtheWorldWideWeb,7thEdition,RobetWSebesta,Pearson,2013.
3. 3.TomaszDyl,KamilPrzeorski,MaciejCzarnecki,MasteringFullStackReactWeb Development 2017

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**POS**
CO1	Demonstrateknowledgeonwebpagedesignelements	PO1
CO2	Analyzeuserrequirementstodevelopwebapplications.	PO2
CO3	Designclient-serverapplicationsusingwebtechnologies.	PO3
CO4	ManuallyTestthefunctionalityofthewebapplication	PO4
CO5	select appropriate design tools and procedure to implement web applications	PO5
CO6	Followethicalprinciplesindesigning,andimplementing various Technologies.	PO6
CO7	Do experiments effectively as an individual and as a member in a group.	PO7
CO8	Communicateverballyandinwrittenform,theunderstanding about the experiment	PO8
CO9	ContinueupdatingtheirskillrelatedtoNetworkingand routing algorithms	PO9

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COPOMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	3	-	-	-	-	-	-	-	-	-
CO.3	3	3	3	-	-	-	-	-	-	-	-	-
CO.4	3	3	3	3	2	-	-	-	-	-	-	-
CO.5	3	3	3	3	2	-	-	-	-	-	-	-
CO.6	-	-	-	-	-	-	-	3	-	-	-	-
CO.7	-	-	-	-	-	-	-	-	3	-	-	-
CO.8	-	-	-	-	-	-	-	-	-	3	-	-
CO.9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	2	-	-	3	3	3	-	3

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (ARTIFICIAL INTELLIGENCE)

IIIB.Tech.-VSemester

23CAI351P EVALUATIONOFCOMMUNITYSERVICEPROJECT LTPC 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Objectiveistogiveanopportunitytothestudenttogethandsontraininginindustry.
2. Thecourseisdesignedsoastoexposethestudentstoindustryenvironment and to take up on-site assignment as trainees or interns.

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbe able to		**POsrelatedto COs**
CO1	Demonstratein-depthknowledgeontheselectedtopic	**PO1**
CO2	Identify,analyzeandformulatecomplexproblemchosenfor selected work to attain substantiated conclusions.	**PO2**
CO3	Designsolutionstothechosenselectedproblem.	**PO3**
CO4	Undertakeinvestigationofselectedproblemtoprovidevalid conclusions	**PO4**
CO5	Usetheappropriatetechniques,resourcesandmodernengineering tools necessary for selected work	**PO5**
CO6	Applyselected informationforsustainabledevelopmentofthesociety.	**PO6**
CO7	Understandtheimpactofselectedconceptinthecontextof environmental sustainability.	**PO7**
CO8	Understand professional and ethical responsibilities while executing the selected work.	**PO8**
CO9	Functioneffectivelyasindividualandamemberintheinternship.	**PO9**
CO10	Develop communication skills, both oral and written for preparing and presenting internship report.	**PO10**
CO11	Demonstrateknowledgeandunderstandingofcostandtime analysis required for carrying out the internship.	**PO11**
CO12	Engage in lifelong learning toimprove knowledge andcompetence in the chosen area of the selected topic.	**PO12**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

III.BTECH V-SEMESTER

23MAC351U TECHNICALREPORTWRITING&IPR LTPC

3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Toenablethestudentstopracticethebasicskillsofresearchpaperwriting
2. TomakethestudentsunderstandtheimportanceofIPandtoeducatethemonthe basic concepts of Intellectual Property Rights.
3. Topracticethebasicskillsofperformingqualityliteraturereview
4. Tohelptheminknowingthesignificanceofreallifepracticeandprocedureof Patents.
5. Toenablethemlearntheprocedureofobtaining Patents,Copyrights,&TradeMarks

UNIT–1:PrinciplesofTechnicalWriting (9)

Principles of Technical Writing: styles in technical writing; clarity, precision, coherence and logical sequence in writing-avoiding ambiguity- repetition, and vaguelanguage -highlighting your findings- discussing your limitations -hedging and criticizing -plagiarism and paraphrasing.

UNIT–2:TechnicalResearchPaperWriting (9)

TechnicalResearchPaperWriting:Abstract-Objectives-Limitations-ReviewofLiterature- Problems and Framing Research Questions- Synopsis

UNIT–3:Processofresearch (9)

Process of research: publication mechanism: types of journals- indexing-seminars-conferences- proof reading – plagiarism style; seminar & conference paper writing; Methodology-discussion-results- citation rules

UNIT–4:IntroductiontoIntellectualproperty (9)

Introduction to Intellectual property: Introduction, types of intellectual property, International organizations, agencies andties, importance of intellectual property rights

TradeMarks:Purposeandfunctionoftrademarks,acquisitionoftrademarkrights, protectablematter,selectingand rating trade mark, trade mark registration processes.

UNIT–5:Lawofcopy rights (9)

Law of copy rights: Fundamentals of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer. Patent law, intellectual property audits.

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

Total Hours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Describethestructureandfunctionsofoperatingsystems andapplyschedulingandsynchronizationtechniquesto manageprocessesandresolvedeadlocks,	**PO1,PO2**
CO2	Explainmemorymanagementandvirtualmemoryconcepts, andanalyze file and storage system structures and algorithms.	**PO1,PO3**
CO3	IllustrateI/Osystemoperations,protectionmechanisms, anddemonstratebasicUnix/Linuxcommandsandshell scripting.	**PO1,PO2,PO4**
CO4	Identify and describe components of system software including language processors, assemblers, macro processors, linkers, and loaders.	**PO1,PO2,PO3,PO4**
CO5	Analyze the compilation process and implement basic system-level programming concepts like process creation, file I/O, and concurrency mechanisms.	**PO1,PO2,PO4,PO5**

TEXTBOOKS:

1. Deborah.E.Bouchoux,*IntellectualPropertyRights*,CengageLearningIndia,2013
2. MeenakshiRaman,SangeetaSharma.*TechnicalCommunication:Principlesand practices.*Oxford.

REFERENCEBOOKS:

1. .Myneni,*LawofIntellectualProperty*,9thEd,AsialawHouse,2019.
2. PrabuddhaGanguli,*IntellectualPropertyRights*TataMcgrawHill,2001
3. P.Naryan,*IntellectualPropertyLaw*,3rdEd,EasternLawHouse,2007.
4. AdrianWallwork.*EnglishforWritingResearchPapers*SecondEdition.SpringerCham Heidelberg New York ,2016
5. DanJones,SamDragga,*TechnicalWritingStyle*

CO-POMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CSM361T	**BIGDATAANALYTICS&AIAPPLICATIONS (ProfessionalCore)**	**LTPC 3003**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. TointroducethefundamentalsofbigdataanditsroleinAI-drivenapplications.
2. To explore big data tools and technologies such as Hadoop, Spark, and NoSQL databases.
3. ToenablestudentstobuildscalableAIpipelinesfordataanalytics.
4. ToapplyAI/MLalgorithmsforreal-timeandbatchprocessingenvironments.
5. To demonstrate use cases of big data in domains like healthcare, finance, and IoT using AI.

UNIT–1:INTRODUCTIONTOBIGDATAANDANALYTICSECOSYSTEM (9)

Definition and Characteristics of Big Data – Volume, Velocity, Variety, Veracity, Value, Types of Analytics: Descriptive, Diagnostic, Predictive, Prescriptive, Big Data Challenges and Opportunities, Hadoop Ecosystem Overview: HDFS, MapReduce, YARN, NoSQL Databases: Key-Value, Columnar, Document, Graph Models, Data Lake vs. Data Warehouse.

UNIT–2:BIGDATATOOLSANDFRAMEWORKS (9)

Apache Spark Architecture and RDDs, Spark SQL, Data Frames, and Datasets, Spark Streaming for Real-Time Analytics, Kafka for Data Ingestion and Message Queues, Hive, Pig, and Impala for Big Data Querying, Comparative Analysis of Hadoop vs. Spark.

UNIT–3:MACHINELEARNINGONBIGDATA (9)

Introduction to MLlib and Scikit-learn, Data Preprocessing for Big Data ML Pipelines, Supervised Learning: Classification and Regression on Large Datasets, Unsupervised Learning: Clustering and Dimensionality Reduction, Model Evaluation and Validation Techniques, Distributed Training and Optimization Techniques.

UNIT–4:AIAPPLICATIONSONBIGDATA (9)

Predictive Maintenance using Big Data & AI, Fraud Detection in Banking with Machine Learning, AI in Healthcare: Diagnosis, Genomics, Patient Monitoring, Retail and E-commerce Analytics, AI for Smart Cities and IoT Sensor Data Analysis, Evaluation of Real-Time AI Applications on Streaming Data.

UNIT–5:ADVANCEDTOPICSANDCASESTUDIES (9)

Deep Learning on Big Data using TensorFlow on Spark, Explainable AI (XAI) in Big Data Environments, Ethical Issues and Data Governance in Big Data AI, Edge Computing and AI for Low Latency Applications, Case Study 1: AI-Powered Big Data in Healthcare, Case Study 2: Big Data AI Solution in Smart Manufacturing.

TotalHours: 45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	UnderstandthefundamentalsofBigDataecosystems, characteristics(5Vs),architectures,anddataacquisition techniques.	**PO1,PO2**
CO2	Apply data preprocessing, storage, and management techniques using Big Data frameworks such as Hadoop, HDFS, and NoSQL databases.	**PO1,P03**
CO3	Analyze large-scale datasets using Big Data analytics tools (MapReduce, Spark) to extract meaningful insights.	**PO1,PO2, PO4**
CO4	Implement machine learning and AI techniques for predictive analytics, classification, clustering, and recommendation systems on Big Data.	**PO1,PO2,P03,PO4**
CO5	Evaluate and develop real-world AI-driven Big Data applications in domains such as healthcare, finance, IoT, social media, and smart systems, considering ethical and scalability aspects.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. BigData:PrinciplesandParadigmsbyRajkumarBuyya,RodrigoN.alheiros,Amir Vahid Dastjerdi – Wiley
2. LearningSpark:Lightning-FastBigDataAnalysisbyJulesS.Damjietal.–O'Reilly
3. DataScienceandBigDataAnalyticsbyEMCEducationServices–Wiley

REFERENCEBOOKS:

1. DesigningData-IntensiveApplicationsbyMartinKleppmann–O'Reilly
2. MachineLearningwithSparkbyRajdeepDua,TathagataDas–PacktPublishing
3. StreamingSystemsbyTylerAkidau–O'ReillyMedia
4. ArtificialIntelligenceforBigDatabyAnandDeshpande–Packt

REFERENCEWEBSITE:

1. https://www.youtube.com/watch?v=M7SWr5xObkA
2. https://onlinecourses.nptel.ac.in/noc23_cs45/preview
3. https://archive.nptel.ac.in/courses/106/106/106106211/

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CSM361T	ARTIFICIAL INTELLIGENCE IN SOFTWARE ENGINEERING	LTPC 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. To introducebasic conceptsofSoftwareEngineeringandSDLC.
2. Toknowsimplesoftwareprocessmodelslike Waterfall,Incremental,SpiralandAgile.
3. Tounderstand basic AI/MLideasusedin softwareengineering.
4. Tooutline howAIsupportssoftwaretesting and quality.
5. TocreateawarenessofmodernAItoolsandsimpleethicalissues.

UNIT–1:BASICS OF SOFTWARE ENGINEERING (9)

SoftwareandSoftwareEngineering–simpledefinition,need,SDLCPhases:Requirements, Design, Coding, Testing, Deployment, Maintenance Software Myths: few examples of management, customer, developer myths.Very small intro: how AI can help in SDLC

UNIT–2:SOFTWARE PROCESS MODELS (9)

Need of software process model.Waterfall Model – simple diagram, uses, limits. IncrementalModel–buildinsteps.SpiralModel–cycles+riskidea(onlyconcept).Agile –shortidea:sprints,customerfeedback.Onesmallpoint:AItoolsforplanningand estimation.

UNIT–3:INTRODUCTION TO AI&SOFTWARE ENGINEERING (9)

Overview of computer software and software systems. Limitations of traditional software engineering. The software crisis: causes and impact. Need for increased software power. Human–computer responsiveness .Software in dynamic environments.Self-maintainingand adaptive software .Need for AI in modern software systems.

UNIT–4:AI PROBLEMS VS TRADITIONAL SE PROBLEMS (9)

What defines an AI problem."Correct" vs "Good-enough" solutions.Process-focusedproblem solving (HOW vs WHAT).Handling dynamic and context-dependent problems.ModularapproximationsinAI.Classical SEmethodologies: SAV (Specify &Verify) and SAT (Specify & Test).Prototyping as a bridge between specification and implementation.

UNIT–5:MODERN ENGINEERING APPROACHES FOR AISYSTEMS (9)

Incremental & exploratory software development (RUDE cycle).Malleable and flexible softwarestructures.AIcomponentsoverconventionalsoftwareskeletons.Newparadigms: automatic programming, transformational implementation, POLITE methodology.

TotalHours: 45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	RecallbasictermsofSoftwareEngineering,SDLCand software myths	**PO1,PO2**
CO2	Listandcomparesimplesoftwareprocessmodels.	**PO1,P03**
CO3	ExplainbasicAI/MLideasusedinsoftwareprojects.	**PO1,PO2, PO4**
CO4	OutlinehowAIhelpsintestingandquality.	**PO1,PO2,P03,PO4**
CO5	IdentifymodernAItoolsandsimpleethicalissues.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. RogerS.Pressman,BruceR.Maxim, *Software Engineering:APractitioner'sApproach*, McGraw-Hill, Latest Edition.
2. ARTIFICIALINTELLIGENCEandSOFTWAREENGINEERINGUnderstandingthePromiseofthe Future Derek Partridge

REFERENCEBOOKS:

1. TomM.Mitchell,*MachineLearning*,McGraw-Hill.
2. CharuC.Aggarwal,*MachineLearningforText*,Springer.
3. Recentresearcharticles/onlineresourcesonAI-assistedSoftwareEngineeringtools.

REFERENCEWEBSITE:

1. https://www.youtube.com/watch?v=M7SWr5xObkA
2. https://onlinecourses.nptel.ac.in/noc23_cs45/preview
3. https://archive.nptel.ac.in/courses/106/106/106106211/

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CAI362T	**FULLSTACKAIDEVELOPMENT (PROFESSIONAL CORE)**	**LTPC**
		3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- TointroducetheconceptsoffullstackdevelopmentwithintegrationofAI capabilities.
- To provide practical exposure to frontend and backend frameworks suitable for AI applications.
- TobuildintelligentwebapplicationsusingML/DLmodels.
- ToexploreRESTfulAPIs,microservices,anddeploymentstrategiesforAIsolutions.
- Todevelopskillsforscalable,end-to-endAI-poweredapplicationdevelopment.

UNIT–1:INTRODUCTIONTOFULLSTACKAIDEVELOPMENT (9)

Overview of Full Stack Development in AI Context, Components: Frontend, Backend, Database, AI Models, MVC, MVVM Architectures for AI Applications, Introduction to Web Technologies (HTML, CSS, JS, Bootstrap), Role of JavaScript Frameworks in AIDashboards, Full Stack AI Development Life Cycle.

UNIT–2:FRONTENDTECHNOLOGIESFORAIAPPLICATIONS (9)

React.js for Dynamic AI Interfaces, State Management in React (Hooks, Redux), Data Binding and Visualization with Chart.js, D3.js, Integration with AI Results (JSON APIs to UI), UI/UX Designfor Intelligent Apps, Responsive Design and Accessibility.

UNIT–3:BACKENDANDAIMODELINTEGRATION (9)

Node.js and Express.js for Backend Services, Flask API Development for ML Models, REST API Creation and Consumption, Handling File Uploads, JSON Input, Streaming Output, Integration of Pre-trained Models (Sklearn, TensorFlow, PyTorch), Middleware, Error Handling, and Model Response Evaluation.

UNIT–4:DATABASES,AUTHENTICATION,ANDAIWORKFLOWS (9)

MongoDB and PostgreSQL for Storing AI Inputs/Outputs, User Authentication and Session Management (JWT, OAuth),CRUD Operationswith AIInsights,Building AIFeedback Loops with Data Storage, Secure AI Application Workflows, Creating Intelligent Dashboards with Real-Time Data.

UNIT–5:DEPLOYMENT,SCALING&CASESTUDIES (9)

Containerization using Docker for AI Microservices, Deployment to Cloud (AWS, GCP, Azure), CI/CD Pipelines for AI Model Updates, Monitoring and Logging in AI Apps, Performance andLoad Testing of AI APIs, Case Study: End-to-End Full Stack AI Project (Deployment + Demo).

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Understand the fundamentals of full stack web development, including front-end, back-end architectures, RESTful APIs, and database integration.	**PO1,PO2**
CO2	Design and develop responsive user interfaces using modernfront-endframeworks(HTML,CSS,JavaScript, React/Angular) integrated with backend services.	**PO1,P03**
CO3	Apply backend development techniques using frameworks such as Flask/Django/Node.js and manage data using SQL and NoSQL databases.	**PO1,PO2, PO4**
CO4	Implement AI and Machine Learning models using Python libraries (NumPy, Pandas, Scikit-learn, TensorFlow/Keras) and integrate them into full stack applications.	**PO1,PO2,P03,PO4**
CO5	Evaluate, deploy, and maintain end-to-end AI-powered web applications, considering scalability, security, performance optimization, and ethical aspects of AI systems.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. FullStackDevelopmentwithFlaskandReactbyO.Olatunde–PacktPublishing
2. Hands-OnMachineLearningwithScikit-Learn,Keras,andTensorFlowbyAurélien Géron – O'Reilly
3. FlaskWebDevelopmentbyMiguelGrinberg–O'ReillyMedia

REFERENCEBOOKS:

1. Node.jsDesignPatternsbyMarioCasciaro–Packt
2. BuildingMachineLearningPoweredApplicationsbyEmmanuelAmeisen–O'Reilly
3. MasteringReactbyAdamHorton–Packt
4. MongoDB:TheDefinitiveGuidebyKristinaChodorow–O'Reilly

REFERENCEWEBSITE:

- https://fullstackopen.com/en/–FullStackOpen
- https://www.coursera.org/specializations/full-stack–CourseraFullStack Development

COMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CAI363A	**BLOCKCHAIN FOR AI (ProfessionalElective-II)**	**LTPC** **3003**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Tounderstandthefoundationalconceptsofblockchaintechnologyanditsarchitecture.
- Toexploresmartcontracts,consensusalgorithms,anddistributedledgertechnology.
- ToinvestigatetheintegrationofAIwithblockchainforsecure,decentralized applications.
- Todevelopblockchain-enabledAIsolutionsforreal-worldusecases.
- Tounderstandtheethical,security,andscalabilitychallengesinBlockchain-AI ecosystems.

UNIT–1:BLOCKCHAINFUNDAMENTALSANDARCHITECTURE (9)

Introduction to Blockchain Technology, Components: Blocks, Hashing, Merkle Trees, Types of Blockchains: Public, Private, Consortium, Distributed Ledger Technology (DLT) and P2P Networks, Blockchain Structure and Mining, Use Cases and Evolution of Blockchain.

UNIT–2:SMARTCONTRACTSANDCONSENSUSMECHANISMS (9)

Smart Contracts: Definition, Features, Use Cases, Ethereum and Solidity Basics,Consensus Algorithms: PoW, PoS, DPoS, PBFT, Gas, Transactions, and Events inEthereum, HyperledgerFabric: Architecture and Chaincode, Deployment and Testing of Smart Contracts.

UNIT–3:INTEGRATIONOFBLOCKCHAINANDAI (9)

Motivation for Integrating Blockchain with AI, Decentralized AI Models and Federated Learning, Secure Model Sharing and Provenance, Blockchain for Data Integrity in AI Systems, AI for Blockchain (e.g., optimizing consensus), Case Study: Decentralized AI Marketplace.

UNIT–4:APPLICATIONSOFBLOCKCHAININAISYSTEM (9)

Blockchain for Explainable and Trusted AI, Applications in Healthcare and Genomics, Blockchain for Autonomous Vehicles and IoT, Financial AI Systems with Smart Contracts, Supply Chain and Logistics Intelligence, NFT-based AI Applications (Digital Identity, IP).

UNIT–5:SECURITY,PRIVACYANDCHALLENGESINBLOCKCHAIN-AI (9)

Security Challenges:SybilAttacks,51%Attacks,Privacy Preservation andZeroKnowledge Proofs, Scalability and Energy Concerns in Blockchain-AI, Ethical and Legal Concerns in AI with Blockchain, Interoperability of Blockchain Platforms, Future Trends: Quantum-Resistant Blockchain- AI.

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Explainthefundamentalsofblockchainanditscomponents.	PO1,PO2
CO2	Analyze theroleofconsensusmechanismsinmaintaining trust and decentralization.	PO1,P03
CO3	Applyblockchainforsecuredatasharinginsystems.	PO1,PO2, PO4
CO4	Develop and deploy smart contracts using Ethereum/Solidity.	PO1,PO2,P03,PO4
CO5	Evaluateblockchain-basedAIapplicationsinhealthcare, finance, and supply chains.	PO1,PO2,P04, PO5

TEXTBOOKS:

1. ImranBashir,MasteringBlockchain:UnlockingthePowerofCryptocurrencies,SmartContracts, and Decentralized Applications, Packt, 2020.
2. MelanieSwan,Blockchain:BlueprintforaNewEconomy,O'ReillyMedia,2015.
3. JosephHolbrook,ArchitectingAISolutionsonBlockchain,PacktPublishing,2020

REFERENCEBOOKS:

1. ArshdeepBahga,VijayMadisetti,BlockchainApplications:AHands-OnApproach,VPT, 2017.
2. KaramjitSingh,BlockchainforAI:UseCasesandImplementation,Springer,2023.
3. RogerWattenhofer,TheScienceoftheBlockchain,2016.

REFERENCEWEBSITE:

- Coursera:BlockchainSpecialization–UniversityatBuffalo
- edX:BlockchainFundamentals–UCBerkeley
- Coursera:AIandBlockchain–IBM

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CAI363B	**Graph Neural Networks (ProfessionalElective-II)**	**LTPC** 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Tointroducethefundamentalsofgraphtheoryandgraph-structureddata.
- Toexploretheconceptsofneuralnetworksextendedtonon-Euclideandomains.
- Tounderstandarchitecturesandalgorithmsbehindvarioustypesof GNNs.
- ToapplyGNNmodelsinreal-worldapplicationssuchasrecommendation,social networks, and bioinformatics.
- To enable students to build and evaluate GNN models using frameworks like PyTorch Geometric and DGL.

UNIT–1:FUNDAMENTALSOFGRAPHTHEORYANDMACHINELEARNINGON GRAPHS (9)

Introduction to Graphs: Nodes, Edges, Adjacency Matrix, Types of Graphs: Directed, Undirected, Weighted, Bipartite, Graph Traversal Algorithms (BFS, DFS), Graph Representations for ML (Adjacency List, Matrix, Laplacian), Node, Edge, and Graph-level Prediction Problems, Motivation and Challenges for Learning on Graphs.

UNIT–2:SPECTRALANDSPATIALMETHODSFORGRAPHLEARNING (9)

Spectral Graph Theory Basics, Graph Convolution via Spectral Methods, Chebyshev and First-order Approximations, Spatial Graph Convolutions, Comparison of Spectral vs Spatial GNNs, Graph Laplacian and Eigenvalue Properties.

UNIT–3:GRAPHNEURALNETWORKARCHITECTURES (9)

Graph Convolutional Networks (GCNs), Graph Attention Networks (GATs), GraphSAGE: Sampling and Aggregation, Graph Isomorphism Networks (GIN), Message Passing Neural Networks (MPNNs), Inductive vs Transductive GNN Learning.

UNIT–4:APPLICATIONSOFGNNS (9)

Node Classification (e.g., Cora, Citeseer), Link Prediction (e.g., Recommender Systems), Graph Classification (e.g., Molecule Property Prediction), Traffic Forecasting and Social Network Modeling, GNNs in Healthcare and Bioinformatics, Explainability and Interpretability in GNNs.

UNIT–5:IMPLEMENTATION,OPTIMIZATION,ANDRECENTADVANCES(9)

Overview of PyTorch Geometric and DGL, Data Loading and Preprocessing for Graph Datasets, Model Training, Loss Functions, and Evaluation Metrics, Hyperparameter Tuning in GNNs, Recent Research Trends and Architectures (e.g., Heterogeneous GNNs, Graph Transformers), Challenges and Future Directions in GNNs.

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Understandthebasics of graph structuresandtheir significance in machine learning.	PO1,PO2
CO2	LearnandimplementdifferenttypesofGNNarchitectures.	PO1,P03
CO3	ApplyGNNstoreal-worldstructureddataproblems.	PO1,PO2, PO4
CO4	UsemodernlibrariesandtoolstotrainandevaluateGNNs.	PO1,PO2,P03,PO4
CO5	AnalyzetheeffectivenessandlimitationsofGNNsindifferent domains.	PO1,PO2,P04, PO5

TEXTBOOKS:

1. Zonghan Wu, Shirui Pan, Fengwen Chen, Guodong Long, Chengqi Zhang, Philip S. Yu, A ComprehensiveSurveyonGraphNeuralNetworks,IEEETransactions onNeuralNetworks and Learning Systems, 2021.
2. YaoMa,JiliangTang,DeepLearningonGraphs,CambridgeUniversityPress,2021.
3. WilliamL.Hamilton,GraphRepresentationLearning,Morgan&ClaypoolPublishers,2020.

REFERENCEBOOKS:

1. Barrett,JureLeskovec,MiningofMassiveDatasets,CambridgeUniversityPress.
2. ThomasKipf,GCNandrelatedpapersandtutorials(arXiv).
3. PetarVeličković,GraphAttentionNetworks(originalpaperandslides).
4. MichaelBronsteinetal.,GeometricDeepLearning:Grids,Groups, Graphs,Geodesics,and Gauges (arXiv preprint).

REFERENCEWEBSITE:

1. https://pytorch-geometric.readthedocs.io/–PyTorchGeometricDocs
2. https://cs.stanford.edu/people/jure/–StanfordGNNProjects
3. https://www.coursera.org/learn/graph-neural-networks–CourseraGNNCoursebyStanford

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CSD365T **PREDICTIVE ANALYTICS** **LTPC**
(ProfessionalElective-II)

LTPC
3003

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES:

1. **Discuss the concept Predictive Analytics**
2. **Illustrate the uses and applications of Predictive Analytics**
3. **Demonstrate building of Predictive Analytics models**

UNIT–I: (9)

OverviewOfPredictiveAnalytics: What Is Analytics? What Is Predictive Analytics? Business Intelligence Predictive Analytics vs. Business Intelligence, Predictive Analytics vs. Statistics, Predictive Analytics vs. Data Mining, Who Uses Predictive Analytics? , Challenges in Using Predictive Analytics, What Educational Background Is Needed to Become a Predictive Modeler?
Setting Up the Problem: Predictive Analytics Processing Steps: CRISP-DM, Business Understanding, Defining Data for Predictive Modelling, Defining the Target Variable, Defining MeasuresofSuccessforPredictiveModels,DoingPredictiveModellingOutofOrder,Casestudy-Recovering Lapsed Donors, Fraud Detection

UNIT-II: (9)

DataUnderstanding: WhattheDataLooksLike,SingleVariableSummaries,DataVisualization in One Dimension, Histograms, Multiple Variable Summaries, Data Visualization, Two or Higher Dimensions, The Value of Statistical Significance, Pulling It All Together into a Data Audit.
DataPreparation: VariableCleaning,FeatureCreation.

UNIT-III: **(9)**

Item sets and Association Rules: Terminology, Parameter Settings, How the Data Is Organized, Measures of Interesting Rules, Deploying Association Rules, Problems with AssociationRules,BuildingClassificationRulesfromAssociationRules. **Descriptive Modelling:** Data Preparation Issues with Descriptive Modelling, Principal Component Analysis, Clustering Algorithms.**Interpreting Descriptive Models:** Standard Cluster Model Interpretation.

UNIT-IV: **(9)**

PredictiveModelling: DecisionTrees,LogisticRegression,NeuralNetworks,K-Nearest Neighbour,NaïveBayes,RegressionModels,LinearRegression,OtherRegressionAlgorithms.
Assessing Predictive Models: Batch Approach to Model Assessment, Assessing Regression Mode

UNIT-V: **(9)**

ModelEnsembles: MotivationforEnsembles,Bagging,Boosting,ImprovementstoBagging andBoosting,ModelEnsemblesandOccam's Razor,InterpretingModelEnsembles.
Text Mining: Motivation for Text Mining, A Predictive Modelling Approach to Text Mining, structuredvs.UnstructuredData,WhyTextMiningIsHard,DataPreparationSteps,TextMining Features, Modelling with Text Mining Features, Regular Expressions.
ModelDeployment: GeneralDeploymentConsiderations.
CaseStudies: SurveyAnalysisCaseStudy,HelpDeskCaseStudy.

TotalHours: 45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Visualize and explore data to better understand relationships among variables	PO1,PO2
CO2	Understand how ensemble models improve predictions	PO1,P03
CO3	Organize the predictive modelling task and data flow	PO1,PO2, PO4
CO4	Apply predictive models to generate predictions for new data	PO1,PO2,P03,PO4
CO5	Choose and implement appropriate performance measures for predictive models	PO1,PO2,P04, PO5

TEXT BOOKS: 1. Dean Abbott, Applied Predictive Analytics, Published by Jhon Wiley &Sons, Inc,2014.

REFERENCE BOOKS:

1. Eric Siegel, Predictive Analytics, Published by Jhon Wiley & Sons, inc,2013.
2. Data Analytics using Python Kindle Edition by Bharti Motwani, 2020.

REFERENCE WEBSITE:

1. Predictive Analytics: Introduction to Business Forecasting | Udemy

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CSM363A	**RECOMMENDER SYSTEMS (ProfessionalElective-II)**	**LTPC** **3003**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- To understand the theoretical foundations and practical techniques behind recommender systems.
- Toexplorecollaborative,content-based,andhybridrecommendationmethods.
- Toapplymatrixfactorizationanddeeplearningforbuildingintelligentrecommenders.
- Toanalyzesystemperformanceusingstandardevaluationmetrics.
- Todesignandimplementrecommendersystemsforreal-worldapplications.

UNIT–1:INTRODUCTIONTORECOMMENDERSYSTEMS (9)

Introduction to Information Filtering Systems, Types of Recommender Systems: Content-based, Collaborative, Hybrid, Data Sources: Explicit vs Implicit Feedback, Applications and Challenges in Recommendation, User and Item Profiling, Popularity, Personalization, and Serendipity Trade-offs.

UNIT–2:COLLABORATIVEFILTERINGTECHNIQUES (9)

User-based CollaborativeFiltering,Item-based CollaborativeFiltering, SimilarityMeasures: Cosine, Pearson, Jaccard, Neighborhood Selection and k-NN, Cold-start and Data Sparsity Issues, Memory-based vs Model-based Collaborative Filtering.

UNIT–3:CONTENT-BASEDANDHYBRIDSYSTEMS (9)

Item Feature Extraction and Vector Representation, TF-IDF and Cosine Similarity in Recommendations, User Profile Learning, Limitations of Content-based Filtering, Hybrid Recommender Architectures, Case Study: Netflix, Amazon Hybrid Systems.

UNIT–4:MATRIXFACTORIZATIONANDDEEPLEARNINGAPPROACHES(9)

Latent Factor Models and SVD, ALS and SGD for Matrix Factorization, Non-negative Matrix Factorization (NMF), Neural Collaborative Filtering (NCF), Deep Learning Models: Autoencoders, CNNs, RNNs for Recommendations, Graph-based and Knowledge Graph Recommenders.

UNIT–5:EVALUATION,ETHICS,ANDINDUSTRIALAPPLICATIONS (9)

Evaluation Metrics: Precision, Recall, F1, NDCG, MAP, A/B Testing in Recommender Systems, Explainability in Recommendations, Fairness, Bias, and Privacy in Recommenders, Scalability and Real-time Recommendations, Deploying Recommender Systems at Scale (e.g., Spotify, YouTube).

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Explainthecoreconceptsandtypesofrecommender systems.	PO1,PO2
CO2	Implementbasiccollaborativeandcontent-basedfiltering techniques.	PO1,P03
CO3	Applymatrixfactorizationanddeeplearningmodelstorecommendation problems.	PO1,PO2, PO4
CO4	Evaluate and optimize recommender systems using appropriate metrics.	PO1,PO2,P03,PO4
CO5	Designscalableandcontext-awarerecommendersystems for diverse applications.	PO1,PO2,P04, PO5

TEXTBOOKS:

1. CharuC.Aggarwal,RecommenderSystems:TheTextbook,Springer,2016.
2. FrancescoRicci,LiorRokach,andBrachaShapira,RecommenderSystemsHandbook, Springer, 2nd Ed., 2015.

REFERENCEBOOKS:

1. Jannach, Dietmar et al., Recommender Systems: An Introduction, Cambridge University Press, 2010.
2. MichaelEkstrand,JosephA.Konstan,CollaborativeFilteringRecommenderSystems, Now Publishers, 2011.
3. ResearchpapersfromACMRecSysConferenceproceedings.

REFERENCEWEBSITE:

- https://www.coursera.org/learn/recommender-systems–Coursera:Universityof Minnesota
- https://www.kaggle.com/learn/recommendation-systems–KaggleCourse
- https://developers.google.com/machine-learning/recommendation–GoogleDevelopers

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CAI364A	**AIFORFINANCE** **(ProfessionalElective-III)**	**LTP** **300**	**C** **3**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- TointroducetheroleofArtificialIntelligence(AI)infinancialapplicationsand decision-making.
- Tounderstandfinancialdatatypes,sources,andprocessingmethods.
- Toapplymachinelearninganddeeplearningmodelsinvariousfinancesectors.
- Toanalyzerisk,frauddetection,creditscoring,andportfoliomanagementusingAI.
- ToevaluateethicalandregulatorychallengesinAI-enabledfinance.

UNIT–1:INTRODUCTIONTOFINANCEANDAIAPPLICATIONS (9)

Introduction to Financial Markets and Instruments, Overview of AI Techniques in Finance, Types of Financial Data: Market, Transactional, Customer, Financial Statements and Key Indicators, AI Use Cases in Banking, Insurance, and Investment, FinTech and the Rise of Robo-Advisors.

UNIT–2:MACHINELEARNINGINFINANCE (9)

Supervised Learning for Credit Scoring, Unsupervised Learning for Customer Segmentation,Feature Engineering for Financial Data, Handling Imbalanced Datasets in Fraud Detection, Time Series Forecasting with Regression and ARIMA, Model Validationand Backtesting in Finance.

UNIT–3:DEEPLEARNINGANDNLPINFINANCE (9)

Introduction to Deep Learning for Finance, Stock Price Prediction using LSTM and RNNs, Sentiment Analysis from Financial News and Tweets, NLP for Document Classification: Earnings Reports, Chatbots and Virtual Assistants in Banking, Reinforcement Learning for Portfolio Optimization.

UNIT–4:AI-DRIVENFINANCIALAPPLICATIONS (9)

Fraud Detection Systems using ML and DL, Credit Risk and Loan Default Prediction, AI in Algorithmic and High-Frequency Trading, Robo-Advisors: Architecture and Optimization, Blockchain and AI Integration for Financial Security, Case Studies: AI in Wealth Management & Insurance.

UNIT–5:EVALUATION,ETHICS,ANDFUTUREOFAIINFINANCE (9)

Regulatory Frameworks in AI-based Finance, Explainability and Interpretability of Financial Models, Ethical Issues: Bias, Fairness, Transparency, Data Privacy and GDPR in Financial AI, Responsible AI Practices in Finance, Emerging Trends: Quantum AI, Decentralized Finance (DeFi).

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	DescribethefundamentalsofAItechniquesapplicableto finance.	**PO1,PO2**
CO2	AnalyzefinancialtimeseriesdatausingAI-basedmodels.	**PO1,P03**
CO3	Apply machinelearning for frauddetectionand creditrisk analysis.	**PO1,PO2, PO4**
CO4	Buildpredictivemodelsforstockprices,trading,and customer segmentation.	**PO1,PO2,P03,PO4**
CO5	EvaluatethelimitationsandethicalimplicationsofAIin financial systems.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. YvesHilpisch,ArtificialIntelligenceinFinance:APython-BasedGuide,O'Reilly,2020.
2. YvesHilpisch,PythonforFinance:MasteringData-DrivenFinance,O'Reilly,2018.
3. MarkusLoecher,MachineLearningforFinance,PacktPublishing,2021.

REFERENCEBOOKS:

1. A.W.Lo,TheEvolutionofTechnicalAnalysis,WileyFinance,2010.
2. TonyGuida,BigDataandMachineLearninginQuantitativeInvestment,Wiley,2019.
3. TuckerBalch,AIforTrading–GeorgiaTechSpecialization,Coursera.

REFERENCEWEBSITE:

- Coursera:AIforTrading–byNYIFandGoogleCloud
- edX:ArtificialIntelligenceinFinance–NYIF
- Udemy:MachineLearningandAIinFinance
- DataCamp:FinancialTradingwithPython
- YouTube:AIforFinancebySentdex,TwoMinutePapers,andDataProfessor

COMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CAI351T	**CLOUD COMPUTING FOR AI (ProfessionalCore)**	**LTPC**
		3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. To introduce the concepts, models, and services of cloud computing and its role in AI.
2. ToexplorethearchitectureanddeploymentofAIapplicationsoncloudplatforms.
3. Toequipstudentswithskillsinusingcloud-basedtoolsandservicesforAI/ML workloads.
4. Tounderstanddatastorage,processing,andsecurityincloudforAItasks.
5. Toapplycloudcomputingprinciplestoreal-worldAI-basedsolutions.

UNIT–1:INTRODUCTIONTOCLOUDCOMPUTINGANDAIINTEGRATION(9)

Basics of Cloud Computing: Characteristics, Models, and Services, Cloud Service Models: IaaS, PaaS, SaaS, Deployment Models: Public, Private, Hybrid, Community, AI and Cloud Convergence: Benefits and Challenges, Use Cases of AI in Cloud: NLP, Vision, Analytics, Overview of Cloud Providers for AI: AWS, Azure, GCP.

UNIT–2:STORAGE,COMPUTING,ANDDATAPROCESSINGINTHECLOUD (9)

Cloud Storage Services: S3, Blob, BigQuery, Virtualization and Elastic Computing, Distributed Computing with Hadoop and Spark, Data Ingestion and Processing Pipelines, Data Lakes and Warehousing in the Cloud, Cost Optimization for Storage and Compute Resources.

UNIT–3:CLOUD-BASEDMACHINELEARNINGANDDEEPLEARNING (9)

ML Services on AWS (SageMaker), Azure ML, GCP Vertex AI, Training and Deploying Models on Cloud, Auto ML and Custom ML Model Workflows, GPUs/TPUs for Model Training, Experiment Tracking and Model Evaluation, Integration of Notebooks (Jupyter, Colab) with Cloud Storage.

UNIT–4:ADVANCEDCLOUDCONCEPTSFORAIAPPLICATIONS (9)

Containers and Docker for AI Applications, Kubernetes and Cloud-native AI Workflows, Serverless Computing: AWS Lambda, Azure Functions, CI/CD Pipelines for AI Models in Cloud, Scaling AI Applications using Load Balancers and Auto-Scaling. Monitoring and Logging in Cloud for AI Workflows.

UNIT–5:SECURITY,ETHICS,ANDCASESTUDIESINCLOUDAI (9)

Security and Privacy in Cloud-based AI, Identity and Access Management (IAM) in Cloud, Cost Management and Billing for AI Services, Ethical Issues and Fairness in Cloud AI, Case Study: AIin Healthcare Cloud Solutions, Case Study: Real-Time Analytics in Financial Cloud Services.

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Explain cloud computing architecture, services, and deployment models.	**PO1,PO2**
CO2	Utilize cloud platforms (AWS, GCP, Azure) for training and deploying AI models.	**PO1,P03**
CO3	Handle large-scale data storage and processing inthe cloud environment.	**PO1,PO2, PO4**
CO4	IntegrateAIworkflowsusingserverlessandcontainer-based architectures.	**PO1,PO2,P03,PO4**
CO5	Analyze challenges in security, cost, scalability, and performance of cloud-based AI systems.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. RajkumarBuyya,ChristianVecchiola,S.ThamaraiSelvi,MasteringCloudComputing, McGraw-Hill.
2. JudithHurwitzetal.,CloudComputingforDummies,Wiley.
3. AurélienGéron,Hands-OnMachineLearningwithScikit-Learn,Keras,andTensorFlow, O'Reilly.

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CSM361T	**DEEPLEARNING**	**LTPC 3003**

PRE-REQUISITES: Machinelearning basics

COURSEEDUCATIONALOBJECTIVES:

1. DemonstratethemajortechnologytrendsdrivingDeepLearning
2. Build,train,andapplyfullyconnecteddeepneuralnetworks
3. Implementefficient(vectorized)neuralnetworks
4. Analysethekeyparametersandhyperparametersinaneuralnetwork's architecture
5. DemonstratethesequencemodelingandNetworksofDeepLearning

UNIT–1:LINEARALGEBRA,PROBABILITYANDNUMERICALCOMPUTATION (9)

Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.
Probability and Information Theory: Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory.
Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

UNIT–2:MACHINELEARNINGANDDEEPFEEDFORWARDNETWORKS(9)

Machine Learning: Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges MotivatingDeep Learning.
Deep Feed forward Networks: LearningXOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.

UNIT–3:REGULARIZATIONANDOPTIMIZATIONOFDLMODELS (9)

Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier.
Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta- Algorithms.

UNIT–4:CONVOLUTIONALNETWORKS (9)

Convolutional Networks: The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.

UNIT–5:SEQUENCEMODELING (9)

Sequence Modeling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Demonstratethemathematicalfoundationofneuralnetwork	**PO1,PO2**
CO2	Describethemachinelearningbasics	**PO1,P03**
CO3	Differentiatearchitectureofdeepneuralnetwork	**PO1,PO2, PO4**
CO4	Buildaconvolutionalneuralnetwork	**PO1,PO2,P03,PO4**
CO5	BuildandtrainRNNandLSTMs	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. IanGoodfellow,YoshuaBengio,AaronCourville,"DeepLearning",MITPress,2016.
2. JoshPattersonandAdamGibson,"Deeplearning:Apractitioner'sapproach", O'ReillyMedia,FirstEdition,2017.

REFERENCEBOOKS:

1. FundamentalsofDeepLearning,Designingnext-generationmachine intelligencealgorithms,NikhilBuduma,O'Reilly,ShroffPublishers,2019.
2. DeeplearningCookBook,Practicalrecipestogetstartedquickly,Douwe Osinga,O'Reilly,ShroffPublishers,2019.

REFERENCEWEBSITE:

1. https://keras.io/datasets/
2. http://deeplearning.net/tutorial/deeplearning.pdf
3. https://arxiv.org/pdf/1404.7828v4.pdf
4. https://www.cse.iitm.ac.in/~miteshk/CS7015.html
5. https://www.deeplearningbook.org
6. https://nptel.ac.in/courses/106105215

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CSE364C	**INTRODUCTION TO QUANTUM COMPUTING (ProfessionalElective-III)**	**LTPC**
		3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Tointroducetheprinciplesandmathematicalfoundationsofquantumcomputation.
- Tounderstandquantumgates,circuits,andcomputationmodels.
- Toexplorequantumalgorithmsandtheiradvantagesoverclassicalones.
- Todeveloptheabilitytosimulateandwritebasicquantumprograms.
- Tounderstandreal-worldapplicationsandthefutureofquantumcomputinginAI, cryptography, and optimization.

UNIT–1:FUNDAMENTALSOFQUANTUMMECHANICSANDLINEARALGEBRA (9)

Classical vs Quantum Computation, Complex Numbers, Vectors, and Matrices, Hilbert Spaces and Dirac Notation, Quantum States and Qubits, Superposition and Measurement, Tensor Products and Multi-Qubit Systems.

UNIT–2:QUANTUMGATESANDCIRCUITS (9)

Quantum Logic Gates: Pauli, Hadamard, Phase, Controlled Gates and CNOT, Unitary Operations and Reversibility, Quantum Circuit Representation, Quantum Teleportation, Simulation of Quantum Circuits.

UNIT–3:QUANTUMALGORITHMSANDCOMPLEXITY (9)

Quantum Parallelism and Interference, Deutsch and Deutsch-Jozsa Algorithms, Grover's Search Algorithm, Shor's Factoring Algorithm, Quantum Fourier Transform, Complexity Classes: BQP, P, NP, and QMA.

UNIT–4:QUANTUMPROGRAMMINGANDSIMULATIONPLATFORMS(9)

Introduction to Qiskit and IBM Quantum Experience, Writing Quantum Circuits in Qiskit, Measuring Qubits and Results, Classical-Quantum Hybrid Programs, Noisy Intermediate-Scale Quantum (NISQ) Systems, Limitations and Current State of Quantum Hardware.

UNIT–5:APPLICATIONSANDFUTUREOFQUANTUMCOMPUTING(9)

Quantum Machine Learning: Basics and Models, Quantum Cryptography and Quantum Key Distribution, Quantum Algorithms in AI and Optimization, Quantum Advantage and Supremacy, Ethical and Societal Impact of Quantum Technologies, Future Trends and Research Directions.

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Explainthefundamentalconceptsofquantummechanics used in computing.	**PO1,PO2**
CO2	Constructandanalyzequantumcircuitsusingstandard gates.	**PO1,P03**
CO3	ApplyquantumalgorithmslikeDeutsch-Jozsa,Grover's,and Shor's.	**PO1,PO2, PO4**
CO4	DevelopsimplequantumprogramsusingQiskitorsimilar platforms.	**PO1,PO2,P03,PO4**
CO5	Analyze applications and challenges of quantum computing in real-world domains.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.
2. EleanorRieffelandWolfgangPolak,Quantum Computing:AGentleIntroduction,MIT Press, 2011.
3. ChrisBernhardt,QuantumComputingforEveryone,MITPress,2019.

REFERENCEBOOKS:

1. DavidMcMahon,QuantumComputingExplained,Wiley,2008.
2. PhillipKaye,RaymondLaflamme,MicheleMosca,AnIntroductiontoQuantumComputing, Oxford University Press, 2007.
3. ScottAaronson,QuantumComputingSinceDemocritus,CambridgeUniversityPress, 2013.

REFERENCEWEBSITE:

- IBMQuantumExperienceandQiskitTutorials
- Coursera–QuantumMechanicsandQuantumComputationbyUCBerkeley
- edX–TheQuantumInternetandQuantumComputers
- YouTube–QuantumComputingfortheDeterminedbyMichaelNielsen
- QiskitTextbook–IBMQuantum

COMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OCE361A	**DISASTERMANAGEMENT**	**LTPC**
	OE-II	**3003**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. **Tounderstand**thefundamentalconceptsofnaturaldisasters,theiroccurrence,and disaster risk reduction strategies.
2. **Toanalyze**theimpactofcyclonesonstructuresandexploreretrofittingtechniques for adaptive reconstruction.
3. **Toapply**windengineeringprinciplesandcomputationaltechniquesindesigning wind-resistant structures.
4. **Toevaluate**earthquakeeffectsonbuildingsanddevelopstrategiesforseismic retrofitting.
5. **Toassess**seismic safetyplanning, design considerations, and innovative construction materials for disaster-resistant structures.

UNIT–I **(9)**

IntroductiontoNaturalDisasters–BriefIntroductiontoDifferentTypesofNaturalDisasters, Occurrence of Disasters in different Climatic and Geographical Regions, Hazard Maps (EarthquakeandCyclone) of The World and India,Regulations for Disaster RiskReduction, Post-Disaster Recovery and Rehabilitation (Socioeconomic Consequences).

UNIT–II **(9)**

CyclonesandTheirImpact–ClimateChangeandItsImpactOnTropicalCyclones,Natureof Cyclonic Wind, Velocities and Pressure, Cyclone Effects, Storm Surges, Floods, and Landslides.BehaviorofStructuresinPastCyclonesandWindstorms,CaseStudies.Cyclonic Retrofitting,StrengtheningofStructures,andAdaptiveSustainableReconstruction.Life-Line Structures Such as Temporary Cyclone Shelters.

UNIT–III **(9)**

WindEngineeringandStructural Response– BasicWindEngineering,AerodynamicsofBluff Bodies, Vortex Shedding, and Associated Unsteadiness Along and Across Wind forces. Lab: WindTunnelTestingandItsSalientFeatures.IntroductiontoComputationalFluidDynamics (CFD). General Planning and Design Considerations Under Windstorms and Cyclones. Wind Effects On Buildings, towers, Glass Panels, Etc., and Wind-Resistant Features in Design. Coda Provisions, Design Wind Speed, Pressure Coefficients. Coastal Zoning Regulations for Construction and Reconstruction in Coastal Areas. Innovative Construction Materials and Techniques, Traditional Construction Techniques in Coastal Areas.

UNIT–IV **(9)**

SeismologyandEarthquakeEffects–CausesofEarthquakes,PlateTectonics,Faults,Seismic Waves; Magnitude, Intensity, Epicenter, Energy Release, and Ground Motions. Earthquake Effects– On Ground, Soil Rupture, Liquefaction, Landslides. Performance of Ground and Buildings in Past Earthquakes– Behavior of Various Types of Buildings and Structures, Collapse Patterns; Behavior of Non-Structural Elements Such as Services, Fixtures, and Mountings – Case Studies. Seismic Retrofitting– Weaknesses Existing Buildings, Aging, Concepts in Repair, Restoration, and Seismic Strengthening.

UNIT–V **(9)**

Planning and Design Considerations for Seismic Safety– General Planning and Design Considerations; Building forms, Horizontal and Vertical Eccentricities, Mass and Stiffness Distribution,SoftStory Effects,Etc.;SeismicEffectsRelatedtoBuildingConfiguration.Plan andVertical Irregularities,Redundancy,andSetbacks.Construction Details–VariousTypes of Foundations, Soil Stabilization, Retaining Walls, Plinth Fill, Flooring, Walls, Openings, Roofs, Terraces, Parapets, Boundary Walls, Underground and Overhead Tanks, Staircases, and Isolation of Structures. Innovative Construction Materials and Techniques. Local Practices– Traditional Regional Responses. Computational Investigation Techniques.

TotalHours:45

COURSEOUTCOMES:

	Onsuccessfulcompletionofthecourse,studentswill be able to	**Pos**
CO1	**Understand**thefundamentalconceptsofnaturaldisasters, their occurrence, and disaster risk reduction strategies.	**PO1,PO6,PO8,PO9**
CO2	**Analyze**the impactofcyclonesonstructuresandexplore retrofitting techniques for adaptive reconstruction.	**PO2,PO5**
CO3	**Apply** wind engineering principles and computational techniques in designing wind resistant structures.	**PO1,PO7,PO4**
CO4	**Evaluate**earthquakeeffectsonbuildingsanddevelop strategiesforseismicretrofitting.	**PO3,PO5,PO8**
CO5	**Assess** seismic safety planning, design considerations, and innovative construction materials for disaster-resistant structures	**PO4,PO6,PO7,PO8, PO9**

TEXTBOOKS:

1. DavidAlexander,NaturalDisasters,1stEdition,CRCPress,2017.
2. EdwardA.KellerandDuaneE.DeVecchio,NaturalHazards:Earth'sProcessesas Hazards, Disasters, and Catastrophes, 5th Edition, Routledge, 2019.

REFRENCEBOOKS:

1. BenWisner,J.C.Gaillard,andIlanKelman(Editors),HandbookofHazardsand Disaster Risk Reduction and Management, 2nd Edition, Routledge, 2012.
2. DamonP.Coppola,IntroductiontoInternationalDisasterManagement,4thEdition, Butterworth-Heinemann, 2020.
3. BimalKantiPaul,EnvironmentalHazardsandDisasters:Contexts,Perspectivesand Management, 2nd Edition, Wiley-Blackwell, 2020.

OnlineLearningResources:

1. **https://nptel.ac.in/courses/124107010**
2. **https://onlinecourses.swayam2.ac.in/cec19_hs20/preview**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	-	-	2	-	2	2	-	-	-
CO-2	-	3	-	-	2	-	-	-	-	-	-	2
CO-3	3	-	-	3	-	-	3	-	-	2	-	-
CO-4	-	-	3	-	3	-	-	2	-	-	-	-
CO-5	-	-	-	3	-	3	3	3	2	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OCE361B	SUSTAINABILITYINENGINEERING PRACTICES(OE– II)	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandthefundamentalsofsustainability,thecarboncycle,andthe environmental impact of construction materials.
2. Toanalyzesustainableconstruction materials,theirdurability,andlifecycle assessment.
3. Toapplyenergycalculationsinconstructionmaterialsandassesstheir embodied energy.
4. Toevaluategreenbuildingstandards,energycodes,andperformance ratings.
5. Toassesstheenvironmentaleffectsofenergyuse,climatechange,and global warming.

UNITI:INTRODUCTION (9)

Introduction and Definition ofSustainability - Carbon Cycle- Role ofConstruction Material: ConcreteandSteel,Etc. -CO2Contributionfrom CementandOtherConstruction Materials.

UNIT2:MATERIALSUSEDinSUSTAINABLECONSTRUCTION (9)

CyclonesandTheirImpact–ClimateChangeandItsImpactOnTropicalCyclones,Natureof Cyclonic Wind, Velocities and Pressure, Cyclone Effects, Storm Surges, Floods, and Landslides.BehaviorofStructuresinPastCyclonesandWindstorms,CaseStudies.Cyclonic Retrofitting,StrengtheningofStructures,andAdaptiveSustainableReconstruction.Life-Line Structures Such as Temporary Cyclone Shelters.

UNIT3:ENERGYCALCULATIONS (9)

Components of Embodied Energy - Calculation of Embodied Energy for Construction Materials - Energy Concept and Primary Energy - Embodied Energy Via-A-Vis Operational Energy in Conditioned Building - Life Cycle Energy Use.

UNIT4:GREENBUILDINGS (9)

Control of Energy Use in Building - ECBC Code, Codes in Neighboring Tropical Countries - OTTV Concepts and Calculations – Features of LEED and TERI – GRIHA Ratings – Role of InsulationandThermal Properties ofConstructionMaterials -InfluenceofMoistureContent and Modeling - Performance Ratings of Green Buildings - Zero Energy Building.

UNIT5:ENVIRONMENTALEFFECTS (9)

Non-Renewable Sources of Energy and Environmental Impact– Energy Norm, Coal, Oil, NaturalGas-NuclearEnergy-GlobalTemperature,GreenHouseEffects,GlobalWarming - AcidRain:Causes,EffectsandControlMethods-RegionalImpactsofTemperatureChange.

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswill be able to		**Pos**
CO1	**Understand**thefundamentalsofsustainability,thecarbon cycle, and the environmental impact of construction materials.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO2	**Analyze**sustainableconstructionmaterials,theirdurability, and life cycle assessment.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO3	**Apply**energycalculationsinconstructionmaterialsand assess their embodied energy.	**PO1,PO2,PO3,PO4 ,PO5,PO6,PO12**
CO4	**Evaluate**greenbuildingstandards,energycodes,and performance ratings.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO5	**Assess**theenvironmentaleffectsofenergyuse,climate change, and global warming	**PO1,PO2,PO3,PO4 ,PO5,PO12**

TEXTBOOKS:

1. CharlesJKibert,SustainableConstruction:GreenBuildingDesign&Delivery,4thEdition, Wiley Publishers 2016.
2. SteveGoodhew,SustainableConstructionProcess,WileyBlackwell,UK,2016.

REFRENCEBOOKS:

1. CraigA.Langston&GraceK.C.Ding,SustainablePracticesintheBuiltEnvironment, Butterworth Heinemann Publishers, 2011.
2. WilliamPSpence,ConstructionMaterials,Methods&Techniques(3e),YesDeePublication Pvt. Ltd, 2012

CO-POMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO-1	3	-	-	-	-	2	3	2	-	-	-	-
CO-2	-	3	-	-	2	-	3	-	-	-	-	2
CO-3	-	-	3	3	3	-	2	-	-	2	-	-
CO-4	-	-	3	3	3	-	3	2	-	-	-	-
CO-5	-	-	-	-	-	3	3	3	-	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OEE361A	**RENEWABLEENERGYSOURCES**	**LTPC**
OE-II		**3003**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. To introduce the fundamentals of solar radiation, solar geometry, and solar energy collection and storage systems.
2. Toprovideanunderstandingofphotovoltaic(PV)effect,PVtechnologies,module characteristics, and PV system configurations.
3. To explain the principles, components, design considerations, and performance estimation of wind energy conversion systems.
4. To familiarize students with geothermal energy resources, technologies, applications, and their prospects in India.
5. To expose students to emerging and miscellaneous renewable energy technologies such as ocean energy, biomass energy, and fuel cells along with their advantages, limitations, and applications.

UNITI: SOLARENERGY (9)

Solarradiation -beam anddiffuseradiation, solarconstant,SunatZenith,attenuationand measurement of solar radiation, local solar time, derived solar angles, sunrise, sunset and day length. flat plate collectors, concentrating collectors, storage of solar energy-thermal storage.

UNIT2:PVENERGYSYSTEMS (9)

Introduction, The PV effect in crystalline silicon basic principles, the film PV, Other PV technologies,SolarPVmodulesfromsolarcells,mismatchinseriesandparallelconnections designandstructureofPVmodules,ElectricalcharacteristicsofsiliconPVcellsandmodules, Stand-alone PV system configuration, Grid connected PV systems.

UNIT3:WINDENERGY (9)

Principleofwindenergyconversion;Basiccomponentsofwindenergyconversionsystems; windmillcomponents,varioustypesandtheirconstructionalfeatures;designconsiderations ofhorizontalandverticalaxiswindmachines:analysisofaerodynamicforcesactingonwind mill blades; wind data and energy estimation and site selection considerations

UNIT4:GEOTHERMALENERGY (9)

Estimation and nature of geothermal energy, geothermal sources and resources like hydrothermal, geo pressured hot dry rock, magma. Advantages, disadvantages and application of geothermal energy, prospects of geothermal energy in India..

UNIT5:MISCELLANEOUSENERGYTECHNOLOGIES (9)

Ocean Energy: Tidal Energy-Principle of working, Operation methods, advantages and limitations.

WaveEnergy-Principle of working, energy and powerfrom waves, wave energy conversion devices, advantages and limitations.

BiomassEnergy:Biomassconversiontechnologies,Biogasgenerationplants,Classification, advantages and disadvantages, constructional details, site selection, digester design consideration

Fuelcell:Principleofworkingofvarioustypesoffuelcellsandtheirworking,performance and limitations

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbe able to		**Pos**
CO1	Understandprincipleoperationofvariousrenewableenergysources	**PO1,PO2**
CO2	Identifysiteselectionofvariousrenewableenergysources	**PO1, PO2, P03, PO4**
CO3	Analyze various factors affecting on solar energy measurements, wind energy conversion techniques, Geothermal, Biomasss, Tidal WaveandFuelcellenergies	**PO1,PO2**
CO4	DesignofSolarPVmodulesandconsiderationsofhorizontaland vertical axis Wind energy Systems	**PO1,PO2**
CO5	ApplytheconceptsofGeoThermalEnergy,OceanEnergy,Biomass and Fuel Cells for generation of power	**PO1,PO2**

TEXTBOOKS:

1. G.D.Rai,"Non-ConventionalEnergySources",4thEdition,KhannaPublishers,2000.
2. ChetanSinghSolanki"SolarPhotovoltaicsfundamentals,technologiesandapplications" 2ndEditionPHILearningPrivateLimited.2012.

REFERENCE BOOKS:

1. StephenPeake,"RenewableEnergyPowerforaSustainableFuture",Oxford International Edition, 2018.
2. S.P.Sukhatme,"SolarEnergy",3rdEdition,TataMcGrawHillEducationPvt.Ltd,2008.
3. BHKhan,"Non-ConventionalEnergyResources",2ndEdition,TataMcGrawHill Education Pvt Ltd, 2011.
4. S.HasanSaeedandD.K.Sharma,"Non-ConventionalEnergyResources",3rd Edition,S.K.Kataria&Sons,2012.
5. G.N.TiwariandM.K.Ghosal,"RenewableEnergyResource:BasicPrinciplesand Applications",NarosaPublishingHouse,2004.

CO-POMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	2			-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2			-	-	-	-	-	-	-	-
CO.4	3	2			-	-	-	-	-	-	-	-
CO.5	3	2			-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OEC361A	**DIGITALELECTRONICS**	**LTPC**
OE-II		**3003**

PRE-REQUISITES: BasicMathematics

COURSEEDUCATIONALOBJECTIVES:

1. ToLearnBooleanalgebra,logicsimplificationtechniques,andcombinationalcircuit design.
2. Toanalyzecombinationalcircuitslikeadders,subtractors,andcodeconverters.
3. Toexplorecombinationallogiccircuitsandtheirapplicationsindigitaldesign.
4. Tounderstandsequentiallogiccircuits,includinglatches,flip-flops,counters,and shift registers.
5. TogainknowledgeaboutprogrammablelogicdevicesanddigitalIC's.

UNIT–:1INTRODUCTION (9)

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and DeMorgan'sTheorem, SOP&POSforms,Canonicalforms,IntroductiontoLogicGates,Ex- OR,Ex-NOROperations, MinimizationofSwitchingFunctions:Karnaughmapmethod,Logic function realization: AND-OR, OR-AND and NAND/NOR realizations.

UNIT-2:INTRODUCTIONTOCOMBINATIONALDESIGN1 (9)

Introduction to Combinational Design 1: Binary Adders, Subtractors and BCD adder, Code converters - Binary to Gray, Gray to Binary, BCD to excess3, BCD to Seven Segment display.

UNIT-3:COMBINATIONALLOGICDESIGN2 (9)

Combinational Logic Design 2: Decoders, Encoders, Priority Encoder, Multiplexers, Demultiplexers, Comparators, Implementations of Logic Functions using Decoders and Multiplexers.

UNIT-4:SEQUENTIALLOGICDESIGN (9)

SequentialLogic Design: Latches,Flip-flops, S-R,D, T,JK and Master-Slave JK FF, Edge triggered FF, set up and hold times, Ripple counters, Shift registers.

UNIT-5:PROGRAMMABLELOGICDEVICESANDDIGITALICs (9)

ProgrammableLogicDevices: ROM,ProgrammableLogic Devices(PLAandPAL).

Digital IC's: Decoder (74x138), Priority Encoder (74x148), multiplexer (74x151) and de-multiplexer (74x155), comparator (74x85).

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbe able to		Pos
CO1	Learn Boolean algebra, logic simplification techniques, and combinational circuit design.	**PO1,PO2**
CO2	Analyzecombinationalcircuitslikeadders,subtractors,andcode converters.	**PO1,PO2, PO3**
CO3	Explorecombinationallogiccircuitsandtheirapplicationsindigital design.	**PO1,PO2, PO3**
CO4	Understandsequentiallogic circuits, including latches, flip-flops, counters, and shift registers.	**PO1,PO2, PO3**
CO5	Gainknowledgeaboutprogrammablelogicdevicesanddigital IC's.	**PO1,PO2**

TEXTBOOKS:

1. DigitalDesign,M.MorrisMano&MichelD.Ciletti,5thEdition,PearsonEducation, 1999.
2. SwitchingtheoryandFiniteAutomataTheory,ZviKohaviandNirahK.Jha,2nd Edition, Tata McGraw Hill, 2005.

REFERENCE BOOKS:

1. FundamentalsofLogicDesign,CharlesHRoth,Jr.,5thEdition,Brooks/cole Cengage Learning, 2004.

REFERENCEWEBSITE:

2. https://archive.nptel.ac.in/courses/108/105/108105132/
3. https://archive.nptel.ac.in/courses/108/105/108105113/
4. https://archive.nptel.ac.in/content/storage2/courses/106108099/Digital%20Systems.pdf

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	2	-	-	-	-	-	-	-	-	-
CO.3	3	3	2	-	-	-	-	-	-	-	-	-
CO.4	3	3	2	-	-	-	-	-	-	-	-	-
CO.5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OME361A PRINCIPLESOFAUTOMATIONANDROBOTICS LTPC
(MECHANICALBRANCH) 3003

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Fundamentalsofindustrialautomation,productiontypes,automationstrategies,and hardware elements used in modern manufacturing processes.
2. Understandingofautomatedmanufacturingsystems,andstrategiesforimproving productivity and flexibility in industrial automation.
3. Knowledgeofindustrialautomationandrobotics,sensors,andend-effectordesign for modern manufacturing environments.
4. Explainindustrialautomationandrobotics,andtrajectoryplanningforintelligentand efficient manufacturing applications.
5. Familiarityofindustrialautomationandrobotics,andpracticalapplicationsin manufacturing processes.

UNIT-1:INTRODUCTIONTOAUTOMATION (9)

Introduction to Automation, Need, Types, Basic elements of an automated system, Manufacturing Industries, Types of production, Functions in manufacturing, Organization and information processing in manufacturing, Automation strategies and levels of automation,Hardwarecomponentsforautomationandprocesscontrol,mechanicalfeeders, hoppers, orienters, high speed automatic insertion devices.

UNIT-2:AUTOMATEDFLOW LINES (9)

Automatedflowlines,Parttransfermethodsandmechanisms,typesof Flowlines,flowline with/without buffer storage, Quantitative analysis of flow lines. Assembly line balancing: Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT-3:INTRODUCTIONTOINDUSTRIALROBOTICS (9)

Introduction to Industrial Robotics, Classification of Robot Configurations, functional line diagram, degrees of freedom. Components common types of arms, joints grippers, factors to be considered in the design of grippers. Robot actuators and Feedback components: Actuators,Pneumatic, Hydraulicactuators, Electric &Steppermotors, comparison. Position sensors-potentiometers,resolvers,encoders - velocitysensors,Tactilesensors,Proximity sensors.

UNIT-4:MANIPULATORKINEMATICS: (9)

Manipulator Kinematics: Manipulator Kinematics, Homogenous transformations as applicabletorotationandtransition-D-Hnotation,Forwardinversekinematics.Manipulator Dynamics: Differential transformations, Jacobians, Lagrange - Euler and Newton – Euler formations. Trajectory Planning: Trajectory Planning and avoidance of obstacles path planning, skew motion, joint integrated motion - straight line motion.

UNIT-5:ROBOTPROGRAMMINGANDAPPLICATIONS (9)

Robot Programming: Lead through programming – Robot language structure – Motion commandsofmove,speedcontrol,workplace, path,frames,endeffecteroperation,sensor operationandreactstatement–Programsequenceandsubroutine–Teachpendant programming – VAL II programming. Robot Applications: Material transfer and machine loading / unloading – Processing applications in spray coating, spot and arc welding – Assembly and inspection automation – Selection of robots in industry applications

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbe able to		**Pos**
CO1	Understandandanalyzethestructureandfunctionsofautomated manufacturingsystems,andevaluatehardwarecomponentsfor efficientproduction.	L2,L4,L5
CO2	Analyzeanddesignautomatedflowlineswithorwithoutbuffer storage,performquantitativeevaluations,applyassemblyline balancing techniques.	L4,L5,L6
CO3	Classifyrobotconfigurations,selectsuitableactuatorsand sensors,analyzeandapplyautomation androboticsprinciples to optimizeproductionefficiencyandflexibility	L2,L3,L4
CO4	Apply kinematic and dynamic modeling using D-H notation and select appropriate hardware and control strategies for real-world industrial scenario to analyze and design automated and robotic systems.	L3,L4,L5
CO5	Design,program,andimplementroboticsystems,understandand apply robotics technology to manufacturing tasks.	L1,L3,L6

TEXTBOOKS:

1. Automation,ProductionsystemsandCIM,M.P.Groover/PearsonEdu.
2. IndustrialRobotics-M.P.Groover,TMH.

REFERENCEBOOKS:

1. Robotics,FuKS,McGrawHill,4thedition,2010.
2. AnIntroductiontoRobotTechnology,P.CoiffetandM.Chaironze,KogamPageLtd. 1983 London.
3. RoboticEngineering,RichardD.Klafter,PrenticeHall
4. Robotics,FundamentalConceptsandanalysis–AshitaveGhosal,OxfordPress,1/e, 2006 Robotics and Control , Mittal R K &Nagrath IJ , TMH

REFERENCEWEBSITE:

1. https://www.youtube.com/watch?v=yxZm9WQJUA0&list=PLRLB5WCqU54UJG45UnazSYmnmhl-gt76o
2. https://www.youtube.com/watch?v=6f3bvIhSWyM&list=PLRLB5WCqU54X5Vy4DwjfSODT3ZJgwEjyE

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OSH361A OPTIMIZATIONTECHNIQUES FOR ENGINEERS (OE–II)

L	T	P	C
3	-	-	3

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Impartknowledgeontheoryofoptimizationandconditionsforoptimalityforunconstraint and constraint optimization problems
2. Inculcatemodelingskillsnecessarytodescribeandformulateoptimizationproblemsin design and manufacturing
3. Familiarizewiththeworkingprincipleofoptimizationalgorithmsusedtosolvelinearand non-linear problems
4. Trainthestudentstosolveoptimizationproblemsusingsoftwaretools

UNITI:LINEARPROGRAMMINGI (9)

Introduction, Applications of Linear Programming, Standard form of a Linear Programming Problem, Geometry of Linear Programming Problems, Basic Definitions in Linear Programming. Simplex Method, Simplex Algorithm and Two phase Simplex Method, Big-M method.

UNIT2:LINEARPROGRAMMINGII:DUALITYINLINEARPROGRAMMING (9)

Symmetric Primal-Dual Relations, General Primal-Dual Relations, Duality Theorem, Dual Simplex Method, Transportation Problem and assignment problem, Complementary slackness Theorem

UNIT3: NON - LINEARPROGRAMMING:UNCONSTRAINED OPTIMIZATION TECHNIQUES (9)

Introduction: Classificationof Unconstrainedminimizationmethods,

Direct Search Methods: Random Search Methods: Descent Method and Fletcher Powell Method, Grid Search Method

UNIT 4:NON-LINEARPROGRAMMING:CONSTRAINEDOPTIMIZATION TECHNIQUES (9)

Introduction, Characteristics of a constrained problem, Random Search Methods, complex method, Sequential linear programming, Basic approach in methods of Feasible directions, Zoutendijk'smethodoffeasibledirections: direction findingproblem,determination ofstep length, Termination criteria.

UNIT5:GEOMETRICPROGRAMMING (9)

Unconstrained Minimization Problems: solution of unconstrained geometric programming using differential calculus and arithmetic-geometric inequality.

Constrained minimization Problems: Solution of a constrained geometric programming problem,primal-dualprogrammingincaseofless-thaninequalities,geometricprogramming with mixed inequality constraints.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**Pos**
CO1	Understandthemeaning,purpose,toolsofOperations Research and linear programminginSolvingpracticalproblemsinindustry.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO2	Interpretthetransportationmodels'solutionsandinfer solutionstothereal-worldproblems.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO3	Developmathematicalskillstoanalyzeandsolvenonlinear programming modelsarisingfromawiderangeofapplications.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO4	Applytheconcepttonon-linearprogrammingforsolvingthe problemsinvolvingnon-linearconstraintsandobjectives	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO5	Applytheconceptofunconstrainedgeometricprogramming forsolvingtheproblemsinvolvingnon-linearconstraintsand objectives.	**PO1,PO2,PO3,PO4 ,PO5,PO12**

TEXTBOOKS:

1. SingiresuSRao.,EngineeringOptimization:TheoryandPractices,NewAgeInt.(P)Ltd. Publishers, New Delhi.
2. J.C.Panth,IntroductiontoOptimizationTechniques,(7-e)JainBrothers,NewDelhi.

REFERENCBOOKS:

1. HarveyM.Wagner,PrinciplesofOperationResearch,Printice-HallofIndiaPvt.Ltd.NewDelhi.
2. PeressimiA.L.,SullivanF.E.,VhI,J.J.MathematicsofNon-linearProgramming,Springer –Verlag.

REFERENCEWEBSITE:

1. https://onlinecourses.nptel.ac.in/noc24_ee122/preview
2. https://archive.nptel.ac.in/courses/111/105/111105039/
3. https://onlinecourses.nptel.ac.in/noc21_ce60/preview

CO-POMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO-1	3	3	2	2	-	-	-	-	-	-	-	1
CO-2	3	2	2	2	-	-	-	-	-	-	-	1
CO-3	3	2	2	1	-	-	-	-	-	-	-	1
CO-4	2	2	2	1	-	-	-	-	-	-	-	1
CO-5	3	3	2	1	-	-	-	-	-	-	-	1

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OSH361B	**MATHEMATICALFOUNDATIONOF QUANTUM TECHNOLOGIES (OPENELECTIVE–II)**	**LT**	**P**	**C**
		3-	**-**	**3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Toprovidestudentswithessentiallinearalgebrafoundationsincludingvectorspaces, inner products, and operators for quantum mechanical applications.
2. Todevelopunderstandingofthetransitionfromfinite-dimensionalsystemsto infinite-dimensional function spaces and Hilbert space concepts.
3. Toestablishquantummechanicalformalismincludingmeasurementtheory,uncertaint y relations, and time evolution principles.
4. Toenablestudentstoapplyquantummechanicalprinciplestosolveproblemsin simple quantum systems and understand statistical interpretation.
5. Tointroduceadvancedconceptsincompositesystems,measurementprocesses,and modern perspectives in quantum mechanics.

UNITI:LINEARALGEBRAFOUNDATIONFORQUANTUMMECHANICS (9)

Vector spaces definition and examples (R^2, R^3, function spaces), Inner products (dot product, orthogonality, normalization), Linear operators (matrices, eigenvalues, eigenvectors), Finite-dimensional examples (2×2 matrices, spin-1/2 systems), Dirac notationintroduction($|\psi\rangle$,$\langle\varphi|$,$\langle\varphi|\psi\rangle$),Changeofbasis(transformations,unitarymatrices).

UNIT2:FROMFINITETOINFINITEDIMENSIONS (9)

Functionspaces(L^2space,square-integrablefunctions),Innerproductsforfunctions($\int\psi^*\varphi\, dx$),Orthogonalfunctionsets(Fourierseries,basisfunctions),IntroductiontoHilbertspace concept (complete inner product spaces), Position and momentum representations (wave functions), Operators on functions (d/dx, multiplication by x).

UNIT3:QUANTUMMECHANICALFORMALISM (9)

Mathematical formulation (states as vectors, observables as operators), Measurement theory (Born rule, expectation values, probabilities), Uncertainty relations (mathematical derivation from commutators), Time evolution (Schrödinger equation, unitary evolution).

UNIT4: APPLICATIONSANDSTATISTICALINTERPRETATION (9)

Simple applications (infinite square well, harmonic oscillator), Statistical interpretation (ensembles, pure vs mixed states), Measurement process (von Neumann measurement scheme).

UNIT5:ADVANCEDTOPICS (9)

Composite systems (tensor products basic introduction), Reversibility and irreversibility (unitaryevolutionvsmeasurement),Thermodynamicconnections(equilibriumstates,

entropy),Modernperspectives(decoherence,measurementproblemconceptual).

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**Pos**
CO1	Understandvectorspaces,innerproducts,andlinear operatorswithapplicationstoquantumsystems.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO2	Applylinearalgebraconceptstofunctionspacesandanalyze thetransitionfromfinitetoinfinitedimensionalsystems.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO3	Analyze quantum mechanical formalism including measurement theory, uncertainty relations, and time evolution.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO4	Apply quantum mechanical principles to solve problems in simple quantum systems and evaluate statistical interpretations.	**PO1,PO2,PO3,PO4 ,PO5,PO12**
CO5	Evaluateadvancedconceptsincompositesystemsand synthesizeunderstandingofmeasurementprocessesand modern quantum theory.	**PO1,PO2,PO3,PO4 ,PO5,PO6,PO12**

TEXTBOOKS:

1. David J. Griffiths, Darrell F. Schroeter, "Introduction to Quantum Mechanics", 3rd Edition, Cambridge University Press (2018).
2. R.Shankar,PrinciplesofQuantumMechanics,2ndEdition,KluwerAcademy/Plenum Publishers (1994).

REFERENCE BOOKS:

1. George.F.Simmons,"IntroductiontoTopologyandModernAnalysis",MedTech SciencePress.
2. GilbertStrang,LinearAlgebraandItsApplications,4thEdition,CengageLearning (2006).
3. JohnvonNeumannandRobertTBeyer,MathematicalFoundationsofQuantum Mechanics,Princeton Univ. Press (1996).

REFERENCEWEBSITE:

1. https://eclass.uoa.gr/modules/document/file.php/CHEM248/Griffiths%20-%20Introduction%20to%20Quantum%20Mechanics%203rd%20ed%202018.pdf
2. https://fisica.net/mecanicaquantica/Shankar%20%20Principles%20of%20quantum%20mechanics.pdf

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	1	-	-	-	-	-	-	2
CO-2	3	3	2	3	2	-	-	-	-	-	-	2
CO-3	3	3	3	3	2	-	-	-	-	-	-	2
CO-4	3	3	3	3	2	-	-	-	-	-	-	2
CO-5	3	3	3	3	2	1	-	-	-	-	-	3

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

		L T PC
23OSH361C	**PHYSICSOFELECTRONICMATERIALSAND DEVICES**	**3003**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Tofacilitateadeeperunderstandingofcrystalgrowth,defects incrystals,andthin- films.
2. Toexamineandunderstandtheproperties,characteristics,andapplicationsof various semiconducting materials, and their role in advancing technology.
3. Toestablishasolidfoundationintheprinciplesandpracticesofsemiconductorphysics and devices engineering.
4. Toexaminethefundamentalprinciplesgoverningexcitonicandluminescentprocesses in solid-state materials, and their significance in optoelectronic applications.
5. Togaininsightintotheprinciples,innovations,andapplicationsofmoderndisplay systems.

UNIT–1:FUNDAMENTALSOFMATERIALSSCIENCE (9)

Introduction, Phase rule, Phase Diagram, Elementary idea of Nucleation and Growth, Methods ofcrystal growth.Thebasic idea ofpoint,line,and planar defects.Concept ofthin films, preparation of thin films, Deposition of thin film using sputtering methods (RF and glow discharge).

UNIT–2:SEMICONDUCTORS (9)

Introduction,chargecarriersinsemiconductors,effectivemass,Diffusionanddrift,Diffusion andrecombination,Diffusionlength.TheFermilevel&Fermi-Diracdistribution,Electronand Hole in quantum-well, Change of electron-hole concentration- Qualitative analysis, Temperature dependency of carrier concentration, Conductivity and mobility, Effects of temperature and doping on mobility, High field effects.

UNIT-3:PHYSICSOFSEMICONDUCTORDEVICES (9)

Introduction,Bandstructure,PNjunctionsandtheirtypicalcharacteristicsunderequilibrium andunder bias, Hetero junctions, Transistors, MOSFETs.

UNIT–4:EXCITONSANDLUMINESCENCE (9)

Luminescence: Different types of luminescence, basic definitions, Light emission in solids, Inter-band luminescence, Direct and indirect gap materials. Photoluminescence: General Principlesofphotoluminescence, Excitationandrelaxation, OLED,Quantum-dot.Electro-luminescence: General Principles of electroluminescence, light emitting diode,diode laser.

UNIT–5:DISPLAYDEVICES (9)

LCD, three-dimensional display: Holographic display, light-field displays: Head-mounted display, MOEMS (Micro-Opto-Electro-Mechanical Systems) and MEMS displays.

TotalHours:45

COURSEOUTCOMES:

	Onsuccessfulcompletionofthecourse,studentswill be able to	Pos
CO1	Understandtheprinciplesofcrystalgrowthandtechniquesfor thin film fabrication	**PO1, PO2,PO3,PO4,PO5**
CO2	Summarizefundamentalconceptsofsemiconductorsandtheir classification	**PO1, PO2,PO3,PO4,PO5**
CO3	Illustratetheoperatingprinciplesofvarioussemiconductor devices	**PO1, PO2,PO3,PO4,PO5**
CO4	Analyzedifferentluminescentphenomenaandthefunctioning of devices based on these mechanisms	**PO1, PO2,PO3,PO4**
CO5	Explaintheconstructionandworkingprinciplesofvarious types of display devices	**PO1, PO2,PO3,PO4**

TEXTBOOKS:

1. PrinciplesofElectronicMaterialsandDevices-S.O.Kasap,McGraw-Hill
2. Education(India)Pvt.Ltd.,4th edition,2021.
3. Semiconductorphysics&devices:basicprinciples,4thEdition,McGraw-Hill,
   a. 2012.

REFERENCE BOOKS:

1. SolidStateElectronicDevices-B.G.StreetmanandS.Banerjee,PHILearning, 6th
2. edition.
3. AnIntroductiontoElectronicMaterialsforEngineers-WeiGao,
4. ZhengweiLi,NigelSammes,WorldScientificPublishingCo.Pvt.Ltd.
5. 2ndEdition,2011.

NPTELCOURSELINKS:

1. **https://nptel.ac.in/courses/113/106/113106062/**
2. **https://onlinecourses.nptel.ac.in/noc20_ph24/preview**

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2			-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2			-	-	-	-	-	-	-	-
CO.4	3	2			-	-	-	-	-	-	-	-
CO.5	3	2			-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OSH361D	**CHEMISTRYOFPOLYMERSANDAPPLICATIONS**	**LTP C**
	OPENELECTIVE-II	**3--3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandthebasicprinciplesofpolymers
2. Tounderstandnaturalpolymersandtheirapplications.
3. Toimpartknowledgetothestudentsaboutsyntheticpolymers,theirpreparation and importance.
4. Toenumeratetheapplicationsofhydrogelpolymers
5. Toenumerateapplicationsofconductinganddegradablepolymersinengineering

UNIT–1:POLYMERS-BASICSANDCHARACTERIZATION: (9)

Basicconcepts:monomers,repeatingunits,degreeofpolymerization,linear,branchedand network polymers, classification of polymers, Polymerization: addition, condensation, copolymerization and coordination polymerization. Average molecular weight concepts: number, weight and viscosity average molecular weights, polydispersity and molecular weightdistribution.Measurementofmolecularweight:Endgroup,viscosity,lightscattering, osmotic and ultracentrifugation methods, analysis and testing of polymers.

UNIT–II:NATURALPOLYMERS&MODIFIEDCELLULOSIC (9)

Natural Polymers: Chemical & Physical structure, properties, source, important chemical modifications, applications of polymers such as cellulose, lignin, starch, rosin, shellac, latexes, vegetable oils and gums, proteins.
Modifiedcellulosic:CelluloseestersandetherssuchasEthylcellulose,CMC,HPMC,cellulose acetals, Liquid crystalline polymers; speciality plastics- PES, PAES, PEEK, PEA.

UNIT–III:SYNTHETICPOLYMERS (9)

Addition and condensation polymerization processes– Bulk, Solution, Suspension and Emulsion polymerization. Preparation and significance, classification of polymers based on physicalproperties.Thermoplastics,Thermosettingplastics,Fibersandelastomers,General Applications.PreparationofPolymersbasedondifferenttypesofmonomers,Olefinpolymers (PE, PVC), Butadiene polymers (BUNA-S, BUNA-N), nylons, Urea-formaldehyde, phenol – formaldehyde, Melamine Epoxy and Ion exchange resins.

UNIT-IV:HYDROGELSOFPOLYMERNETWORKS (9)

DefinitionsofHydrogel,polymernetworks,Typesofpolymernetworks,Methodsinvolvedin hydrogel preparation, Classification, Properties of hydrogels, Applications of hydrogels in drug delivery.

UNIT–V:CONDUCTINGANDDEGRADABLEPOLYMERS: (9)

Conducting polymers: Introduction, Classification, Mechanism of conduction in Poly Acetylene, Poly Aniline, Poly Thiophene, Doping, Applications.
Degradablepolymers:Introduction,Classifications,Examples,Mechanismofdegradation,

polylacticacid,Nylon-6,Polyesters,applications.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbe able to		**Pos**
CO1	Classify the polymers, explain polymerization mechanism, differentiate addition, condensation polymerizations, Describe measurement of molecular weight of polymer	PO1,PO2,PO2, PO4, PO5
CO2	Describe the physical and chemical properties of natural polymersandmodified cellulosic.	PO1, PO2, PO2,PO4,PO6
CO3	Differentiate Bulk, solution, Suspension and emulsion polymerization, describe fibers and elastomers, Identify the thermosetting and thermos polymers.	PO1,PO2, PO2, PO4, PO5,PO12
CO4	Identifytypesofpolymernetworks,describemethods involveinhydrogelpreparation,Explainapplicationsofhydrogels in drug delivery.	PO1,PO2,PO2, PO4, PO5
CO5	Explainclassificationandmechanismofconductinganddegradable polymers.	PO1,PO2, PO2,PO4, PO5

TEXTBOOKS:

1. ATextbookofPolymerscience,Billmayer
2. PolymerChemistry–G.S.Mishra
3. PolymerChemistry–Gowarikar

REFERENCEBOOKS:

1. Organicpolymer Chemistry,K.J.Saunders,ChapmanandHall
2. AdvancedOrganicChemistry,B.Miller,PrenticeHall
3. PolymerScienceandTechnologyby Premamoy Ghosh,3rd edition,McGraw-Hill, 2010.

CO-POMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	2	3	3	1	2	-	-	-	-	-	-	-
CO.2	3	3	2	2	-	2	-	-	-	-	-	-
CO.3	2	2	3	2	1	-	-	-	-	-	-	2
CO.4	2	3	2	2	3	-	-	-	-	-	-	-
CO.5	2	3	2	3	2	-	-	-	-	-	-	-
CO*	2	3	3	1	2	-	-	-	-	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.Tech–VISemester

23OSH361E	**ACADEMICWRITINGANDPUBLICSPEAKING**	**LTP C**
	OPENELECTIVE-II	**3003**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Toencourageallrounddevelopmentofthestudentsbyfocusingonwritingskills
2. Tomakethestudentsawareofnon-verbalskills
3. Todevelopanalyticalskills
4. Todelivereffectivepublicspeeches

UNIT-1: Introduction to Academic Writing Lecture (9)

IntroductiontoAcademicWriting–EssentialFeaturesofAcademicWriting–Courtesy– Clarity–Conciseness–Correctness–Coherence–Completeness–Types–Descriptive, Analytical, Persuasive, Critical writing

UNIT-2: Academic Journal Article Lecture (9)

Artofcondensation-summarizingandparaphrasing-AbstractWriting,writingProject Proposal, writing application for internship, Technical/Research/Journal Paper Writing – Conference Paper writing - Editing, Proof Reading – Plagiarism

UNIT-3:ESSAY&WRITINGREVIEWSLECTURE (9)

CompareandContrast–ArgumentativeEssay–ExploratoryEssay–FeaturesandAnalysisof Sample Essays – Writing Book Report, Summarizing, Book/film Review- So P.

UNIT-4:PUBLICSPEAKINGLECTURE (9)

Introduction,Nature,characteristics,significanceofPublicSpeaking–Presentation–4Psof Presentation–StageDynamics–AnsweringStrategies–AnalysisofImpactfulSpeeches-Speechesfor Academic events

UNIT-5: Public Speaking and Non-Verbal Delivery Lecture (9)

BodyLanguage–FacialExpressions–Kinesics–Oculesics–Proxemics–Haptics–Chronomics-Paralanguage-Signs

TotalHours:45

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

	Onsuccessfulcompletionofthecourse,studentswillbe able to	Pos
CO1	UnderstandvariouselementsofAcademicWriting	L1,L2
CO2	Identifysourcesandavoidplagiarism	L1,L2
CO3	DemonstratetheknowledgeinwritingaResearchchapter	L3
CO4	Analysedifferenttypesofessays	L4
CO5	Assess the speeches of other sand know the positive strengths of speakers	L5

TEXT BOOKS:

1. CriticalThinking,AcademicWritingandPresentationSkills:MGUniversityEdition Paperback– 1 January 2010Pearson Education; First edition (1 January 2010)
2. Pease,Allan&Barbara.TheDefinitiveBookofBodyLanguageRHUSPublishers,2016

REFERENCEBOOKS:

1. AliceSavage,MasoudShafieiEffectiveAcademicWriting,2Ed.,2014.
2. ShaliniVerma,BodyLanguage,SChandPublications2011.
3. SanjayKumarandPushpalata,CommunicationSkills2E2015,Oxford.
4. Sharon Gerson, Steven Gerson, Technical Communication Process and Product, Pearson, New Delhi, 2014
5. Elbow,Peter.WritingwithPower.OUPUSA,1998

ONLINESERVICES:

1. https://youtu.be/NNhTIT81nH8
2. phttps://www.youtube.com/watch?v=478ccrWKY-A
3. https://www.youtube.com/watch?v=nzGo5ZC1gMw
4. https://www.youtube.com/watch?v=Qve0ZBmJMh4
5. https://courses.lumenlearning.com/publicspeakingprinciples/chapter/chapter-12-nonverbal-aspects-of-delivery/
6. https://onlinecourses.nptel.ac.in/noc21_hs76/preview
7. https://archive.nptel.ac.in/courses/109/107/109107172/#
8. https://archive.nptel.ac.in/courses/109/104/109104107/

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	3	3	1	2	-	-	-	-	-	-	-
CO.2	3	3	2	2	-	2	-	-	-	-	-	-
CO.3	2	2	3	2	1	-	-	-	-	-	-	2
CO.4	2	3	2	2	3	-	-	-	-	-	-	-
CO.5	2	3	2	3	2	-	-	-	-	-	-	-
CO*	2	3	3	1	2	-	-	-	-	-	-	-

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CAI365L BIGDATA&SOFTWAREENGINEERING LAB LTPC 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Toprovidehands-onexperienceinworkingwithbigdatatoolsandcloudcomputing environments.
2. Toequipstudentswithpracticalskillsindataingestion,transformation,analysis,and visualization using Hadoop and Spark ecosystems.
3. ToenabledeploymentandmanagementofcloudservicesusingAWS,Azure,orGCP.
4. Toexposestudentstocloud-nativestorage,computing,andcontainerorchestration techniques.
5. Tointegratebigdataworkflowswithcloudinfrastructureforscalable, distributeddata processing.

LISTOF EXPERIMENTS

1. InstallationandConfigurationofHadoopCluster(SingleNode&Multi-node)
   - HadoopHDFSsetup,NameNode&DataNodeconfiguration.
2. WorkingwithHDFS:FileOperations
   - Upload,read,delete,andreplicatefilesin HDFS.
3. MapReduceProgrammingBasics
   - Wordcount,sorting,andfilteringexamplesinJava/Python.
4. ApacheHive&PigforQueryingLargeDatasets
   - Creationoftables,dataloading,andrunningqueries.
5. ApacheSparkBasics:RDDsandDataFrames
   - ImplementSparktransformationsandactions.
6. DataPreprocessingandMachineLearningusingPySparkMLlib
   - ClassificationorregressionusingMLlibpipelines(CognitiveLevel:Apply&Evaluate).
7. Developmentofproblemstatement.
8. Preparation of Software Requirement Specification Document, Design Documents and Testing
9. Phaserelateddocuments.
10. PreparationofSoftwareConfigurationManagementandRiskManagementrelated documents.
11. Drawacompleteclassdiagramandobjectdiagramsusing Rationaltools.

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

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DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Applyimageprocessingtechniquesforfeatureextraction and classification.	PO1
CO2	ImplementNaturalLanguageProcessing(NLP)techniques such as tokenization, POS tagging, and sentiment analysis.	PO2
CO3	Analyzevisualandtextualdatausingopen-sourcetools.	PO3
CO4	DevelopapplicationsthatcombineComputerVisionandNLP for real-world tasks.	PO4

LABSOFTWAREREQUIREMENTS:

- **Languages/Tools:**Python,OpenCV,NLTK,spaCy,TesseractOCR,scikit-learn, NumPy, Pandas, Matplotlib
- **Platforms:**JupyterNotebook/GoogleColab/PyCharm/VSCode

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	3	-	-	-	-	-	-	-	-
CO.5	-	-	-	-	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23CAI366L	**FULLSTACKAILAB**	**LTPC 3003**

PRE-REQUISITES:AI

COURSEEDUCATIONALOBJECTIVES:

1. Students will be capable of building complete AI-powered applications that include processing, model training, backend integration, and frontend presentation.
2. Students will learn how to deploy AI models using web frameworks (like Flask or F) integrate with cloud services and databases, and deliver user-centric intelligentsystem.
3. Students also be able to monitor, scale, and maintain deployed AI models in real-wo scenarios.

LISTOFEXPERIMENTS

1. 1. Setting Up a Full Stack AI Project Environment
InstallPython,Node.js,MongoDB,andfrontendstack
2. DataIngestionandPreprocessingUsingPandasandNumPy
Clean and prepare data for training
3. TrainingaBasicMachineLearningModel(e.g.,Classification)
Train a logistic regression or decision tree model
4. CreatingRESTfulAPIsforModelInferenceUsingFlask/FastAPI
Build API endpoints for predictions
5. Frontend Development with React.js or HTML/JS
CreateaUItosubmitinputanddisplaypredictionresults
6. ConnectingFrontendtoBackendviaAPICalls
Use fetch/axios to connect to Python API
7. StoringandRetrievingPredictionsUsingMongoDBorSQL
Save prediction logs to database
8. ModelDeploymentonCloudPlatform(Heroku/AWS/GCP)
Host backend + model + frontend on cloud
9. ContainerizingtheAIAppUsingDocker
WriteDockerfile,buildimage,andruncontainers
10. VersionControlandCI/CDforAIProjects
11. UseGitHub,GitHubActionsforautomateddeployment
12. ModelMonitoringandLogging
Trackusage,inputs,andoutputsfordebugging

BuildaCompleteFullStackAIWebApplication
Example: Sentiment Analyzer, Fake News Detector, AI Chatbot.38. Contactless Attendance via Face Recognition

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	ExplainthefundamentalsofArtificialIntelligence,Machine Learning, and Deep Learning concepts.	**PO1**
CO2	DevelopAI-poweredbackendservicesusingframeworks such as Flask/Django and integrate trained models.	**PO2**
CO3	Build interactive frontend applications to consume AI services using HTML, CSS, JavaScript, or modern frameworks.	**PO3**
CO4	Deploy,monitor,andmaintainend-to-endFullStackAI applications using cloud and DevOps tools	**PO4**

LABSOFTWAREREQUIREMENTS:

- **Languages/Tools:**HTML,CSS,JAVASCRIPT
- **Platforms:**VSCODE

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	3	-	-	-	-	-	-	-	-
CO.5	-	-	-	-	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23HSM241L **SOFTSKILLS** **LTPC**
3003

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

- Toencourageallrounddevelopmentofthestudentsbyfocusingonsoftskills
- Tomakethestudentsawareofcriticalthinkingandproblem-solvingskills
- Toenhancehealthyrelationshipandunderstandingwithinandoutsideanorganization
- Tofunctioneffectivelywithheterogeneousteams

UNIT –1: Soft Skills & Communication Skills (9)

Soft Skills - Introduction, Need - Mastering Techniquesof Soft Skills – Communication Skills - Significance, process, types-Barriers of communication - Improving techniques

Activities:

IntrapersonalSkills-Narrationaboutself-strengthsandweaknesses-clarityofthought–self-expression–articulatingwithfelicity

(The facilitator can guidethe participants before the activity citing examples from the lives of the great, anecdotes and literary sources)

Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace.

Non-verbal communication – Public speaking –Mockinterviews – presentations withan objective to identify non- verbal clues and remedy the lapses on observation

UNIT–2:CriticalThinking (9)

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness –Creative Thinking- Positive thinking - Reflection

Activities:

Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues –placing the problem – finding the root cause - seeking viable solution – judgingwithrationale–evaluating theviews of others -CaseStudy, Story Analysis

UNIT–3:ProblemSolving&DecisionMaking (9)

Meaning&featuresofProblemSolving–ManagingConflict –Conflictresolution–Teambuilding -Effectivedecisionmakinginteams–Methods&Styles

Activities:

Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of thedecision. CaseStudy&GroupDiscussion

UNIT–4:EmotionalIntelligence&StressManagement (9)

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips

Activities:

Providingsituationsfortheparticipantstoexpressemotionssuchashappiness,enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations.

Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNIT–5:CorporateEtiquette

(9)

Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette- Corporate grooming tips - Overcoming challenges.

Activities

Providingsituations totakepartintheRolePlays wherethestudents will learnabout bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study - Business Etiquette Games

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Listoutvarious elementsofsoftskills	**PO1,PO2**
CO2	Describemethodsforbuildingprofessional image	**PO1,P03**
CO3	Applycriticalthinkingskillsinproblemsolving	**PO1,PO2, PO4**
CO4	Analysetheneedsofanindividualandteamforwell-being	**PO1,PO2,P03,PO4**
CO5	Assessthesituationandtakenecessarydecisions	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. Mitra Barun K, *Personality Development and Soft Skills*, Oxford University Press, Pap/Cdr edition 2012
2. DrShikhaKapoor,*PersonalityDevelopmentandSoftSkills:PreparingforTomorrow*,KI2018 ,esuoHgnihsilbuPlanoitanretnI

REFERENCEBOOKS:

1. Sharma,Prashant,*SoftSkills:PersonalityDevelopmentforLifeSuccess*,BPBPublications2018.
2. AlexK,*Soft Skills*S.Chand&Co,2012(Revisededition)
3. GajendraSinghChauhan&SangeethaSharma,*SoftSkills:AnIntegratedApproachtoMaximise Personality*Published by Wiley, 2013
4. Pillai,Sabina&FernandezAgna,*SoftSkillsandEmployabilitySkills*,CambridgeUniversityPress, 2018
5. Dr.RajivKumarJain,Dr.UshaJain,*LifeSkills*(PaperbackEnglish)Publisher:VayuEducationofIndia, 2014

CO-MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (ARTIFICIAL INTELLIGENCE)

IIIB.Tech– VI semester **LTPC 0 O21**

TINKERINGLAB

The aim of tinkering lab for engineering students is to provide a hands-on learningenvironment where students can explore, experiment, and innovate by building and testing prototypes. These labs are designed to demonstrate practical skills that complement theoretical knowledge.

Courseobjectives:Theobjectivesofthecourseareto	
1	**EncourageInnovationand Creativity**
2	**ProvideHands-onLearningandImpartSkillDevelopment**
3	**FosterCollaboration andTeamwork**
4	**Enable Interdisciplinary Learning, Prepare for Industry and Entrepreneurship**
5	**ImpartProblem-Solvingmind-set**

Theselabsbridgethe gap between academiaand industry, providingstudents with thepractical experience. Some students may also develop entrepreneurial skills, potentially leading to start- ups or innovation-driven careers. Tinkering labs aim to cultivate the next generation of engineers by giving them the tools, space, and mind-set to experiment, innovate, and solvereal-world challenges.

List ofexperiments:

1) Make your own parallel and series circuits using breadboard for any application of your choice.
2) Designand3DprintaWalkingRobot
3) Design and3DPrintaRocket.
4) Temperature &HumidityMonitoringSystem (DHT11 + LCD)
5) WaterLevelDetectionandAlertSystem
6) AutomaticPlantWatering System
7) Bluetooth-BasedDoorLockSystem
8) SmartDustbinUsingUltrasonic Sensor
9) FireDetectionandAlarm System
10) RFID-BasedAttendance System
11) Voice-ControlledDevicesviaGoogle Assistant
12) Heart RateMonitoringUsingPulse Sensor
13) SoilMoisture-Based Irrigation
14) SmartHelmetforAccidentDetection
15) MilkAdulterationDetectionSystem
16) WaterPurificationviaActivatedCarbon
17) SolarDehydratorfor FoodDrying
18) Temperature-ControlledChemicalReactor
19) EthanolMini-PlantUsing Biomass
20) SmartFluid Flow Control(Solenoid +pH Sensor)
21) PortableWaterQualityTester

22) AICrop DiseaseDetection
23) AI-basedSmartIrrigation
24) ECGSignalAcquisitionandPlotting

25) AI-PoweredTrafficFlowPrediction
26) SmartGridSimulationwith Load Monitoring
27) SmartCampusIndoor Navigator
28) WeatherStation Prototype
29) FirefightingRobotwithSensorGuidance
30) FacialRecognitionDustbin
31) Barcode-BasedLab InventorySystem
32) GrowthChamberfor Plants
33) BiomedicalWasteAlertSystem
34) SoilClassificationwithAI
35) SmartRailwayGate
36) SmartBin LocatorviaGPSand LoadSensors
37) Algae-BasedWater Purifier
38) ContactlessAttendanceviaFace Recognition

- **Note:** The students can also design and implement their own ideas, apart from the listof experiments mentioned above.
- **Note:**A minimum of8to 10experiments must becompleted bythe students.

IVB.Tech.-VIISemester

PROFESSIONAL CORE

23CAI471T GENERATIVE AI AND PROMPT ENGINEERING LTPC 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. UnderstandthefoundationsandworkingofGenerativeAImodels.
2. ExplorevariousgenerativemodelslikeGANs,VAEs,andLLMs.
3. Learnpromptengineeringtechniquestoeffectivelyinteractwithlanguagemodels.
4. DesignapplicationsusingLLMswithprecisecontrolthroughprompting.
5. UnderstandethicalandsocietalimplicationsofusingGenerativeAI.

UNIT –1: Introduction to Generative AI (9)

OverviewofGenerativeAIandApplications,GenerativevsDiscriminativeModels,Latent Space and Data Generation Concepts, Architectures: GANs, VAEs, Autoregressive Models, GenerativeAIinText,Image,Audio,andVideo,LLMs:PretrainedTransformersas, Generators, Training Challenges and Evaluation of Generative Models, Case Studies: Image Synthesis, Text Generation.

UNIT –2: Prompt Engineering Fundamentals (9)

IntroductiontoPromptEngineering,PromptFormats:Zero-shot,One-shot,Few-shot, Prompt Tuning vs Prompt Programming, In-Context Learning & Chain-of-Thought Prompting, Role of Instructions and Examples in Prompts, Controlling Output Style, Tone, andFormat,PromptFailureCasesandDebugging,PromptEngineeringforCoding,Text Completion, Q&A

UNIT –3: Generative Models in NLP (9)

TransformerArchitectureRecap(BERT,GPT),GPT-3/4,PaLM,Claude,andLLaMA Architectures,TextGenerationPipelinesandAPIs(OpenAI,HuggingFace),Prompt EngineeringwithGPTModels,Fine-tuningvsInstructTuning,Retrieval-AugmentedGeneration (RAG), Evaluation Metrics: BLEU, ROUGE, Perplexity, Building LLM-based Apps with Lang Chain.

UNIT –4: Advanced Prompt Engineering & Tools (9)

Role of Temperature, Top-k, Top-p Sampling, Structured Outputs: Tables, JSON, Function Calls, Agentic Prompting and Multi-step Reasoning, Prompt Chaining and Memory Handling, PromptTemplatesforAutomation(LangChain,LlamaIndex),PromptEngineeringfor MultimodalModels(DALL·E,Gemini,Sora),SafetyLayers&GuardrailsinPrompting, AutoGPT, BabyA GI, and Agentic Workflow Building.

UNIT –5: Ethics, Risks, and Applications of Generative AI (9)

Risks: Hallucination, Toxicity, Bias, Deepfakes and Misinformation Challenges, Copyright, IP, and Data Privacy in Generated Content, Evaluation of Responsible AI Outputs, Red Teaming and Safety Testing, Applications in Education, Medicine, Art, and Law, Regulatory Landscape for GenerativeAI, Future Trends and Research Directions

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Explain the fundamentals of Generative AI, compare model architectures(GANs,VAEs,Transformers),andevaluate theiruseingeneratingtext,images,andothermedia.	PO1,PO2
CO2	Apply prompt engineering techniques including few-shot learning, output formatting, and debugging to control and guide generative model outputs.	PO1,PO3
CO3	Analyze the architecture and capabilities of large language models(LLMs),anbuildNLPapplicationsusingprompt engineeringandfine-tuningtechniques	PO1,PO2, PO4
CO4	Design complex multi-step prompting workflows using tools like Lang Chain and Llama Index, and generate structured or multimodal outputs safely and effectively.	PO1,PO2,PO3,PO4
CO5	Assess the ethical, legal, and societal implications of generative AI, and evaluate its responsible use across fields like healthcare, education, and law.	PO1,PO2,PO4,PO5

TEXTBOOKS:

1. "DeepLearningwithPython",FrançoisChollet,Manning,2ndEdition
2. "GenerativeDeepLearning",DavidFoster, O'Reilly,2ndEdition
3. "BuildingSystemswithChatGPT",EmmanuelAmeisen(O'ReillyShortReads)
4. "TheArtofPromptEngineering",NathanHunter(FreeonlineeBook)

REFERENCEBOOKS:

1. Vaswanietal.,AttentionisAllYouNeed
2. OpenAITechnicalReportsonGPTModels
3. PapersfromNeurIPS,ACL,ICMLrelatedtoXAIandLLMs
4. LangChainDocumentation

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IIIB.TECH.-VISEMESTER

23HSM471A BUSINESS ETHICS AND CORPORATE GOVERNANCE (ManagementScienceElective) **LTPC 3003**

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

1. Tomakethestudentunderstandtheprinciplesofbusinessethics
2. Toenablethemin knowingabouttheethicsinmanagement
3. Tofacilitatethestudent'roleincorporateculture
4. ToimpartknowledgeaboutthelegalFrame-work
5. Toprovideawarenessaboutthecorporategovernance

UNIT–1:INTRODUCTIONTOETHICS (9)

Ethics Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior. Valuesystems-BusinessEthics-Types,Characteristics,Factors,ContradictionsandEthical Practices in Management Corporate Social Responsibility – Issues of Management – Crisis Management.

UNIT–2:ETHICSINMANAGEMENT (9)

Ethicsinproduction,finance,HumanresourcemanagementandMarketingManagement - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures - Culture and Individual Ethics – professional ethics and technical ethics.

UNIT–3:CORPORATECULTURE (9)

Introduction - Meaning, definition, Nature, and significance – Key elements of corporate culture, shared values, beliefs and norms, rituals, symbols and language - Types of corporate culture,hierarchical culture, market driven culture – Organization leadership and corporateculture,leadershipstylesandtheirimpactonculture,transformationalleadership and culture change.

UNIT–4:LEGALFRAMEWORK (9)

Law and Ethics -Agencies enforcing Ethical Business Behavior - Legal Impact – EnvironmentalProtection,FairTradePractices,legalCompliances,SafeguardingHealth andwellbeingofCustomers–Corporatelaw,Securitiesandfinancialregulations, corporate governance codes and principles.

UNIT–5:CORPORATEGOVERNANCE (9)

Introduction - Meaning – Corporate governance code, transparency & disclosure - Role of auditors, board of directors and shareholders. Global issues, accounting and regulatory frame work - Corporate scams - Committees in India and abroad, corporate socialresponsibility.BoDs composition,CadburyCommitteeVariouscommittees-Reports -BenefitsandLimitations.

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	UnderstandtheEthicsanddifferenttypesofethics.	PO1,PO2
CO2	Understandbusinessethicsandethicalpracticesin management	PO1,P03
CO3	Understandtheroleofethicsinmanagement.	PO1,PO2, PO4
CO4	Apply the knowledge of professional ethics & technical ethics.	PO1,PO2,P03,PO4
CO5	Analyzecorporatelaw,ethics,codes&principles, Evaluate corporate governance & corporate scams.	PO1,PO2,P04, PO5

TEXTBOOKS:

1. MurthyCSV:BusinessEthicsandCorporateGovernance,HPHJuly2017
2. BholananthDutta,S.K.Podder–CorporationGovernance,VBH.June2010

REFERENCEBOOKS:

1. Dr. K.Nirmala,KarunakaraReaddy.BusinessEthicsandCorporateGovernance, HPH
2. H.R.Machiraju:CorporateGovernance,HPH,2013
3. K.Venkataramana,CorporateGovernance,SHBP.
4. N.M.Khandelwal.IndianEthosandValuesforManager

REFERENCEWEBSITE:

1. https://onlinecourses.nptel.ac.in/noc21_mg46/
2. https://archive.nptel.ac.in/courses/110/105/110105138/
3. https://onlinecourses.nptel.ac.in/noc21_mg54/
4. https://onlinecourses.nptel.ac.in/noc22_mg54/
5. https://archive.nptel.ac.in/courses/109/106/109106117/

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IIIB.TECH.-VISEMESTER

23HSM471B	**E– BUSINESS (ManagementScienceElective)**	**LTPC 3003**

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

1. Toprovideknowledgeonemergingconceptone-Businessrelatedaspects
2. Tounderstandvariouselectronicmarkets&businessmodels.
3. Toimparttheinformationaboutelectronicpaymentsystems&banking.
4. Tocreateawarenessonsecurityrisksandchallengesine-commerce.
5. Tomakethestudentsawareondifferente-marketingchannels&strategies

UNIT–1:ElectronicBusiness: (9)

Introduction – Nature, meaning, significance, functions and advantages - Definition of Electronic Business - Functions of Electronic Commerce (EC)-Advantages & Disadvantages of E-Commerce –E-Commerce and E-Business, Internet Services, Online Shopping- E-Commerce Opportunities for Industries.

UNIT –2: Electronic Markets and Business Models: (9)

Introduction –E-Shops-E-Malls E-Groceries - Portals - Vertical Portals-Horizontal Portals - Advantages of Portals -Business Models- Business to Business (B2B)-Business toCustomers (B2C) - Business to Government(B2G)-Auctions-B2B Portals in India.

UNIT –3: Electronic Payment Systems: (9)

Introductiontoelectronicpaymentsystems(EPS)-Typesofelectronicpayments- Credit/debit cards, e- wallets, UPI, and crypto currencies -Smart cards and digital wallets: Featuresandusage-ElectronicFundTransfer(EFT):Roleinbusinesstransactions- Infrastructure requirements and regulatory aspects of e-payments

UNIT–4:E-Security: (9)

Security risks and challenges in electronic commerce - Cyber threats - Phishing, hacking, identity theft, and malware - Digital Signatures & Certificates - Security protocols over public networks (HTTP, SSL, TLS) - Firewalls in securing e-business platforms.

UNIT–5:E-Marketing: (9)

Introduction – Online Marketing – Advantages of Online Marketing – Internet Advertisement – Advertisement Methods – Conducting Online Market Research– – E-marketing planning: Online branding, social media marketing, and email marketing - E-business strategies: Digital advertising, content marketing, and analytics E-Customer Relationship Management (e CRM) E-supply chain management (e-SCM)

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	OutlinetheconceptofE-Business&itsscopeand functions.	PO1,PO2
CO2	ApplytheE-market-Modelsinvariousbusinesssituations and organizations	PO1,P03
CO3	Analyze the various E-payment systems & importance of net banking	PO1,PO2, PO4
CO4	DemonstratetheknowledgegainedinE-securityandits Challenges.	PO1,PO2,P03,PO4
CO5	Evaluate market research strategies & amp; E-advertisements.	PO1,PO2,P04, PO5

TEXTBOOKS:

1. AratiOturkar&SunilKhilari.E-Business.EverestPublishingHouse,2022
2. P.T.SJoseph.E-Commerce,FourthEdition,PrenticeHallofIndia,2011

REFERENCEBOOKS:

1. Debjani,KamaleshKBajaj.E-Commerce,SecondEditionTataMcGraw-Hill's,2005
2. DaveChaffey.E-CommerceE-Management,SecondEdition,Pearson,2012.
3. HenryChan.E-CommerceFundamentalsandApplication,Raymond LeathamWileyIndia 2007
4. S.Jaiswal.E-CommerceGalgotiaPublication PvtLtd.,2003.4.S.Jaiswal.E-Commerce Galgotia Publication Pvt Ltd., 2003.

REFERENCEWEBSITE:

11.https://www.slideshare.net/fatimahAlkreem/e-businesspt-67935771

2. https://www.slideshare.net/VikramNani/e-commerce-business-models
3. https://www.slideshare.net/RiteshGoyal/electronic-payment-system
4. https://www.slideshare.net/WelingkarDLP/electronic-security

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IIIB.TECH.-VISEMESTER

23HSM471C	**MANAGEMENTSCIENCE (ManagementScienceElective)**	**LTPC** 3003

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

1. ToprovidefundamentalknowledgeonManagement,Administration, Organization&its concepts;
2. TomakethestudentsunderstandtheroleofmanagementinProduction;
3. ToimparttheconceptofHRMin ordertohaveanideaonRecruitment,Selection, Training & Development, Job Evaluation and Merit Rating concepts;
4. TocreateawarenessonidentifyStrategicManagementareas&thePERT/CPMfor better Project Management;
5. Tomakethestudentsawareofthecontemporaryissuesinmodernmanagement.

UNIT–1:INTRODUCTIONTOMANAGEMENT (9)

Management - Concept and meaning - Nature-Functions - Management as a Scienceand Art and both - Schools of Management Thought - Taylor‘s Scientific Theory - Henry Fayol‘s principles - Elton Mayo‘s Human relations - Organizational Designs - Lineorganization – Line & Staff Organization - Functional Organization - Matrix Organization - Project Organization -Committee form of Organization - Social Responsibilities of Management.

UNIT–2:OPERATIONSMANAGEMENT (9)

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study - Statistical Quality Control- Material Management – Objectives Inventory-Functions - Types, Inventory Techniques – EOQ - ABC Analysis – Marketing Management - Concept - Meaning – Nature - Functions of Marketing - Marketing Mix - ChannelsofDistribution -AdvertisementandSales Promotion -MarketingStrategiesbased on Product Life Cycle.

UNIT–3:HUMANRESOURCESMANAGEMENT(HRM) (9)

HRM-DefinitionandMeaning–Nature-ManagerialandOperativeFunctions-JobAnalysis - Human Resource Planning (HRP) - Employee Recruitment - Sources of Recruitment - Employee Selection - Process - Employee Training and Development - Methods - Performance Appraisal Concept - Methods of Performance Appraisal – Placement – Employee Induction - Wage and Salary Administration.

UNIT–4:STRATEGIC&PROJECT MANAGEMENT (9)

Definition&Meaning-SettingofVision-Mission-Goals-CorporatePlanningProcess-Environmental Scanning - Steps in Strategy Formulation and Implementation – SWOT Analysis - Project Management - Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost- Analysis - Project Crashing (Simple problems).

UNIT–5:CONTEMPORARYISSUESINMANAGEMENT (9)

Customer RelationsManagement(CRM)-TotalQuality Management(TQM)-Six Sigma Concept-SupplyChainManagement(SCM)-EnterpriseResourcePlanning(ERP)- Performance Management – Employee Engagement and Retention - Business Process Re-engineeringandBenchMarking-KnowledgeManagement–ChangeManagement– Sustainability and Corporate Social Responsibility.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Rememberthetheconcepts &principlesofmanagement and designs of organization in a practical world	PO1,PO2
CO2	Understand the knowledge of Work-study principles & Quality Control techniques in industry	PO1,P03
CO3	Apply the process of Recruitment & Selection in organization.	PO1,PO2, PO4
CO4	AnalyzetheconceptsofHRM&differenttraining methods.	PO1,PO2,P03,PO4
CO5	EvaluatePERT/CPM Techniquesforprojectsof an enterprise and estimate time & cost of project & to analyze the business through SWOT	PO1,PO2,P04, PO5

TEXTBOOKS:

1. FrederickS.Hillier,MarkS.Hillier.IntroductiontoManagementScience,October26, 2023.
2. A.RAryasri,ManagementScience,TMH,2019

REFERENCEBOOKS:

1. Stoner,Freeman,Gilbert.Management,PearsonEducation,NewDelhi,2019.
2. IntroductiontoManagementScience,12e,BernardW.Taylor,PearsonEducation, New Delhi, 2016
3. Koontz&Weihrich,EssentialsofManagement,6/e,TMH,2005.
4. KanishkaBedi,ProductionandOperationsManagement,OxfordUniversityPress,2004.
5. SamuelC.Certo,ModernManagement,9/e,PHI,2005
6. R.K.Rajput,"ATextbookofManufacturingTechnology:ManufacturingProcesses",2/e, Laxmi Publications (P) Ltd., New Delhi, 2017.

REFERENCEWEBSITE:

1. https://www.slideshare.net/slideshow/introduction-to-management-and-organization231308043/23130804
2. https://nptel.ac.in/courses/112107238
3. https://archive.nptel.ac.in/courses/110/104/110104068/
4. https://archive.nptel.ac.in/courses/110/105/110105069/
5. https://onlinecourses.nptel.ac.in/noc24_mg112

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	3	2.8	3	2.3	2	-	-	-	-	-	-	-

IV B.Tech. - VII Semester

PROFESSIONALELECTIVE-IV

23CAI472C	AIinCybersecurity	LTPC 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. TointroducethefundamentalconceptsofAIandtheirapplicationsincybersecurity.
2. TounderstandAI-driventechniquesforthreatdetection,classification,andmitigation.
3. To explore machine learning and deep learning methods used for malware and intrusion detection.
4. Toequipstudentswithskillsinbuildingintelligentsecuritysystems.
5. Toexamineethical,legal,andprivacyaspectsinAI-drivencybersecurity.

UNIT –1: Introduction to AI in Cybersecurity (9)

Role of AI in Modern Cybersecurity, Overview of Cyber Threats and Attack Vectors, Fundamentals of Machine Learning for Security, AI vs Traditional Security Techniques, AI-Based Cyber Defense Lifecycle, Threat Intelligence with AI, Cybersecurity Data Types and Challenges, Case Studies of AI-Driven Attacks and Defenses

UNIT –2: Machine Learning for Cyber Threat Detection (9)

Supervised Learning for Intrusion Detection, Unsupervised Learning for Anomaly Detection,FeatureEngineeringfromNetworkTraffic,ClassificationAlgorithms:SVM,DecisionTrees,RandomForests,ClusteringTechniques:K-Means,DBSCAN,Ensemble ModelsandModelEvaluationMetrics,Real-TimeThreatDetectionPipelines,DataImbalance and Adversarial Sampling

UNIT –3: Deep Learning in Cybersecurity (9)

Neural Networks for Threat Classification, CNNs for Malware Detection from Binary Files, RNNs/LSTMsforSequentialLogAnalysis,AutoencodersforAnomalyDetection,GANsin MalwareEvasionandDefense,TransferLearningforThreatSignatureExtraction,Deep Learning vs Traditional Models:AComparativeStudy,Real-WorldUseCasesandLimitations.

UNIT –4: AI for Specific Security Domains (9)

AI for Phishing and Spam Detection, AI in Cloud Security and Edge Devices, Botnet and DDoS Attack Detection, AI-Driven Endpoint Security, Natural Language Processing for Threat Intelligence, Behavioral Biometrics and Fraud Detection, AI in Social Engineering Attack Prevention, Security Information and Event Management (SIEM) with AI

UNIT –5: Challenges, Ethics & Future of AI in Cybersecurity (9)

Explainable AI (XAI) in Cybersecurity, Adversarial Attacks and Defenses in AI Systems, Data Privacy and Federated Learning, Legal and Ethical Issues in AI Security Solutions, AI Model Bias and Fairness in Security Decisions, Securing AI Models Against Manipulation, Building ScalableAI- Powered SOCs,Futuretrends,Autonomous security,AI- Augumented Threat Hunting

Total Hours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Understand AI principles and their relevance in cybersecurity.	PO1,PO2
CO2	Applymachinelearningtechniquestodetectandrespondto threats.	PO1,PO3
CO3	Analyze security incidents using intelligent tools and models.	PO1,PO2,PO4
CO4	EvaluateandimplementAImodelsformalwaredetection and anomaly analysis.	PO1,PO2,PO3,PO4
CO5	DesignAI-basedcybersecurityframeworksforreal-world scenarios.	PO1,PO2,PO4,PO5

TEXTBOOKS:

1. ClarenceChio&DavidFreeman,—MachineLearningandSecurity‖,O'ReillyMedia.
2. Xiaofeng Chen et al., —Artificial Intelligenceand Big Data Analytics for Cybersecurity‖, Springer.
3. MarkStamp,—InformationSecurity:PrinciplesandPractice‖, Wiley.

REFERENCEBOOKS:

1. Sumeet Dua &Xian Du,—Data Mining and MachineLearning in Cybersecurity‖,CRC Press.
2. ShaiShalev-Shwartz&ShaiBen-David,—UnderstandingMachineLearning‖, Cambridge University Press.
3. ZhiweiLin&YangXiang,—CyberSecurityIntelligenceandAnalytics‖, Springer.
4. BhavaniThuraisingham,—DataMiningforMalwareDetection‖,CRCPress.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.Tech.-VIISemester Professional

Elective-IV

23CAI472A	**AI-Driven Software Engineering&DevOps**	**LTPC 3003**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. TointroducetheprinciplesandpracticesofAI-drivensoftwareengineeringandDevOps.
2. ToexplorehowAItechniquescanautomateandoptimizesoftware development workflows.
3. Tostudyintelligenttoolsforcodegeneration,testing,monitoring,anddeployment.
4. ToequipstudentswithskillsinAI-poweredCI/CDpipelinesandoperations.
5. Tofosteranunderstandingofethicalimplicationsandreliabilityinintelligentsoftware systems.

UNIT –1: Foundations of AI in Software Engineering (9)

Overview of Traditional vs AI-driven Software Development, AI Opportunities in Software LifecyclePhases,Introductionto ML/DLModelsin Engineering Tasks,Code Representation andLearningfromCode,NLPforSourceCodeUnderstanding,SoftwareKnowledgeGraphs and Reasoning, Datasets and Benchmarks for Software Engineering AI, Case Studies of AI-Enhanced Development Tools

UNIT –2: AI Applications in Smart Transportation and Mobility (9)

Program Synthesisand CodeCompletion Models,LargeLanguage Models(e.g.,Codex,Code BERT)inIDEs,CodeCloneDetectionandAutomatedRefactoring,Learning-BasedBug Detection and Code Smell Identification, AI in Software Architecture Recommendations, Embedding Techniques for Source Code, Prompt Engineering for Software Tasks, Reliability and Safety in Generated Code

UNIT–3:AI and IOT for Smart Energy,Waste and Water Management(9) Test Case Generation Using AI, Automated Unit Testing, Regression Testing with ML, Learning Bug Patterns from Repositories, AI-Based Static and Dynamic Code Analysis, Fault Localization and Automated Debugging, Quality Assurance Metrics Enhanced by AI, Reinforcement Learning for Test Prioritization, Ethics and Bias in AI-Driven Testing – (E)

UNIT –4: Smart Healthcare, Surveillance, and Public Safety (9)

DevOps Fundamentals and Integration with AI, Intelligent CI/CD Pipeline Design, Predictive BuildFailureandLogAnalysis,AIinInfrastructure-as-CodeandDeploymentOrchestration, Self-HealingSystemsandAIOpsConcepts,LogAnalyticsandAnomalyDetectionin Production, AI inMonitoring Tracing, and Feedback Loops, Dev SecOps and AI for Security Automation

UNIT –5: A IOT System Design, Deployment, and Governance (9)

Explainability and Transparency in AI-Driven Tools, Ethical and Legal Aspects in Automated Engineering,Human-AICollaborationinSoftwareTeams,RiskManagementinAutonomous CodeDeployment,AIforTechnicalDebtPredictionandManagement,AIforDeveloper Productivity Analytics,ResearchTrendsandChallengesinAIforSE,Capstone:Building aSmartDevOps Workflow

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Understand AI's role in modern software development and operations.	PO1,PO2
CO2	Applymachinelearningtechniquestoautomatesoftware engineering tasks	PO1,PO3
CO3	DesignandmanageintelligentCI/CDandDevOpsworkflows.	PO1,PO2, PO4
CO4	EvaluateAItoolsinsoftwaretesting,refactoring,and monitoring.	PO1,PO2,PO3,PO4
CO5	ImplementAI-basedsolutionsforpredictivemaintenance and decision support in DevOps.	PO1,PO2,PO4,PO5

TEXTBOOKS:

1. TimMenzies,DiomidisSpinellis,andThomas Zimmermann,—PerspectivesonDataScience for Software Engineering‖, Morgan Kaufmann.
2. AndrévanderHoek,ReidHolmes,—SoftwareEngineeringforMachineLearning‖, Springer.
3. LenBass,IngoWeber,LimingZhu,—DevOps:ASoftwareArchitect'sPerspective‖, Addison- Wesley.

REFERENCEBOOKS:

1. CarlosEduardoParninetal.,—AIforSoftwareEngineering:Foundations,Advances, and Trends‖, Springer.
2. LucianoBaresietal.,—MachineLearningTechniquesforSoftware QualityEvaluation‖, Springer.
3. GeneKim,JezHumble,andNicoleForsgren,—Accelerate:TheScienceofLeanSoftware and DevOps‖, IT Revolution.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IV B.Tech. - VII Semester

PROFESSIONALELECTIVE-IV

23CAI472B	AIforRobotics	LTPC 3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Introducethefundamentalprinciplesof roboticsandartificialintelligenceintegration.
- Understandrobotperception,localization,mapping,motionplanning,andcontrolusing AI algorithms.
- Applymachinelearninganddeeplearningtechniquesinroboticenvironments.
- Explore the use of reinforcement learning, behavior-based AI, and neural networks in autonomous robots.
- Enablestudentstobuildintelligentrobotsthatcanperceive,learn,andadaptto dynamic environments.

UNIT–1:FundamentalsofRoboticsandAI (9)

Introduction to Robotics: Types and Components, Overview of Artificial Intelligence and Machine Learning, Relationship between RoboticsandAI, Sensors andActuatorsinRobotics, Embedded Systems and Microcontrollers in Robotics, Architecture of Autonomous Robots, Programming Tools: ROS (Robot Operating System), Python, C++, Applications of AI in Robotics – Overview

UNIT–2:PerceptionandSensorFusion (9)

Computer Vision for Robotics: Basics and Techniques, Depth Sensing, RGB-D Cameras, LIDAR,and Ultrasonic Sensors, Feature Extraction and Object Recognition, Kalman Filterand Extended Kalman Filter, Particle Filter and Sensor Fusion Techniques, SLAM (Simultaneous Localization and Mapping) – Concepts, Visual SLAM and LiDAR-based SLAM, 3D Mapping and Scene Reconstruction.

UNIT–3:MotionPlanningandNavigation (9)

Path Planning Algorithms – Dijkstra, A*, RRT, Obstacle Detection and Avoidance, Robot Kinematics and Dynamics, Trajectory Generation and Optimization, Localization Techniques– GPS, Wi-Fi, Odometry,AutonomousNavigationinIndoorandOutdoorEnvironments,Multi-RobotCoordinationand Swarm Intelligence, Integration of Perception and Planning Systems

UNIT–4:AITechniquesinRobotics (9)

Supervised and Unsupervised Learning for Robotics, Neural Networks and Deep Learning Models for Robot Vision, Reinforcement Learning – Q-Learning and Deep Q Networks, Policy Gradient and Actor- Critic Methods, Behavior-Based Robotics and Finite State Machines, Imitation Learning and Learning from Demonstration, Transfer Learning for Robotic Tasks, Safety and Generalization in AI Models for Robots

UNIT–5:AdvancedApplicationsandEthicalConsiderations (9)

Humanoid and Service Robots with AI, AI in Industrial, Healthcare, and Assistive Robotics, Edge AI and Real-Time Inference in Robots, Human-Robot Interaction and Social Intelligence, Autonomous Vehicles and Delivery Drones, AI in Robotics Competitions (RoboCup, DARPA), Ethical Issues in AI- Enabled Robotics, Future Trends: Neuromorphicand Quantum Robotics

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	DemonstrateanunderstandingofhowAItechniquesare applied in robot control and autonomy	**PO1,PO2**
CO2	Apply vision,perception, andsensorfusiontechniquesfor real-time robotic applications.	**PO1,PO3**
CO3	Implementpathplanningandnavigationalgorithmsin dynamic environments	**PO1,PO2,PO4**
CO4	Analyze and apply learning-based models such as reinforcementlearninganddeepneuralnetworksinrobotics.	**PO1,PO2,PO3,PO4**
CO5	Evaluate AI-enabled robotic systems based on their performance, efficiency, and adaptability	**PO1,PO2,PO4,PO5**

TEXTBOOKS:

1. "ArtificialIntelligenceforRobotics"byRobinR.Murphy
2. "ProbabilisticRobotics"bySebastianThrun,WolframBurgard,DieterFox
3. "IntroductiontoAutonomousRobots"byNikolausCorrell,BradleyHayes,etal.

REFERENCEBOOKS:

1. "RobotOperatingSystem(ROS)forAbsoluteBeginners"byLentinJoseph
2. "ModernRobotics:Mechanics,Planning,andControl"byKevinM.LynchandFrankC. Park
3. "LearningforAdaptiveandReactiveRobotControl"byAudeBillard,Jean-Jacques Slotine
4. IEEETransactionsandSpringerJournalsonRoboticsandIntelligentSystems

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IV B.Tech. - VII Semester

23CAI472D EXPLAINABLEAI&MODELINTERPRETABILITY

PROFESSIONALELECTIVE-IV

LTPC

3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Tointroducetheprinciplesofinterpretabilityandexplainabilityin AI/MLmodels.
2. Toanalyzethetrade-offsbetweenmodelaccuracyandinterpretability.
3. Toexplorepopular post-hocandintrinsicexplainabilitytechniques.
4. Toexaminefairness,accountability,andtransparencyinAIsystems.
5. Todevelophands-onskillswithinterpretabilitytoolsandlibraries.

UNIT –1: Foundations of Explainable AI (9)

Introduction to Explainability and Interpretability, Importance of XAI in Healthcare, Finance, and Law, White-box vs Black-box Models, Desiderata: Fairness, Accountability, Transparency,Human-CenteredAIandTrust,TaxonomyofXAITechniques(Globalvs Local, Post-hoc vs Intrinsic), Regulatory and Ethical Implications (GDPR, AI Bill of Rights),Model Simplicity vs Predictive Power.

UNIT –2: Model-Specific Explainability Techniques (9)

Decision Trees and Rule-based Models, Linear Models and Feature Importance, Generalized AdditiveModels(GAMs),VisualizationofWeightsandCoefficients,LogisticRegression Coefficient Interpretation, Case Study: Credit Scoring using Transparent Models, Comparison of Interpretable ML Models, Use Cases and Trade-offs.

UNIT –3: Model-Agnostic Explainability Techniques (9)

LocalInterpretableModel-agnosticExplanations(LIME),SHAPValues(ShapleyAdditive explanations),PartialDependencePlots(PDPs),IndividualConditionalExpectation(ICE) Plots,AnchorsandCounterfactualExplanations,FeatureInteractionandPermutation Importance,ComparativeAnalysisofSHAP,LIME,PDP,ModelDebuggingwithXAI.

UNIT –4: Deep Learning Explainability (9)

VisualizingCNNs:Filters,FeatureMaps,SaliencyMapsandGrad-CAM,Integrated Gradients,ExplainingRNNsandLSTMOutputs,ConceptActivationVectors(TCAV), Attention-based Interpretability in Transformers, Explaining Language Models (BERT, GPT) Evaluation of Deep Model Explanations

UNIT –5: Fairness, Bias & Tools for XAI (9)

FairnessMetrics:DemographicParity,EqualOpportunity,SourcesofBiasinDataand Models,DiscriminationDetectionand MitigationStrategies,IntroductiontoAIF360,What-If Tool,Fairlearn,CaseStudy:BiasinHiringAlgorithms,ExplainabilityinMLPipelines(ML Flow,Skater),XAIinFederatedandPrivacy-PreservingAI,DesigningInterpretableAI Systems from Scratch.

Total Hours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Understandtheneedforexplainabilityinmodern AIsystems.	PO1,PO2
CO2	Differentiatebetweenblack-boxand white-boxmodels.	PO1,PO3
CO3	Apply interpretability techniques suchas SHAP, LIME, and PDPs	PO1,PO2,PO4
CO4	EvaluatethefairnessandtransparencyofAIsystems	PO1,PO2,PO3,PO4
CO5	Use explainability tools for model auditing and deployment in high- stakes domains.	PO1,PO2,PO4,PO5

TEXTBOOKS:

1. ChristophMolnar,—InterpretableMachineLearning‖,Leanpub.
2. SameerSinghetal.,—ExplainableAI:Interpreting,ExplainingandVisualizingDeep Learning‖, Springer.
3. DanRoth,ZacharyLipton,andBeenKim,—ExplainableAI:Foundations,Developments, Prospects‖, MIT Press (Online forthcoming).

REFERENCEBOOKS:

1. MarcoTulioRibeiroetal.,—WhyShouldITrustYou?‖(LIME)–ResearchPaper
2. ScottLundbergetal.,—AUnifiedApproachtoInterpretingModelPredictions‖(SHAP)– NIPS
3. A.BarredoArrietaetal.,—ExplainableArtificialIntelligence(XAI):Concepts, Taxonomies, Opportunities and Challenges‖, Information Fusion Journal.
4. ZacharyC.Lipton,—TheMythosofModelInterpretability‖ –Communicationsofthe ACM

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.Tech.-VIISemester

23CAI473A	**AI FOR SMART CITIES&IOT SYSTEMS (ProfessionalElective-V)**	**LTPC**
		3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. TounderstandthefoundationalconceptsofsmartcitiesandIoTarchitecturesintegrated with AI technologies.
2. ToexploreAI-drivensolutionsforurbanmobility,transportation,andtraffic management systems.
3. ToapplyAIandIoTtechniquesforefficientenergy,waste,andwatermanagementin smart urban environments.
4. ToexamineAIapplicationsinsmarthealthcare,surveillance,andpublicsafetysystems.
5. Todesign,deploy,andevaluateAIoTsystemswithanunderstandingofreal-time processing, governance, and future challenges.

UNIT –1: Introduction to AI in Smart Cities and IoT Systems (9)

Smart City Concepts: Components, Infrastructure, and Urban Needs, Overview of IoT and AI Integration, Smart City Frameworks (India, Singapore, EU, etc.), IoT Architecture: Sensing, Network, Processing, and Application Layers, Role of AI in Urban Planning and Resource Optimization, Case Studies on AI in Smart Cities, Edge, Fog, and Cloud Computing Concepts for Smart Systems

UNIT –2: AI Applications in Smart Transportation and Mobility (9)

Traffic Monitoring and Congestion Prediction using AI, Intelligent Traffic Signal Control using Reinforcement Learning, Autonomous Vehicles and AI Algorithms, Vehicle Detection and License Plate Recognition using CV, Public Transport Optimization using Predictive Analytics, Smart Parking and Navigation Systems, Use of Drones and AI for Traffic Surveillance

UNIT –3: AI and IOT for Smart Energy, Waste and Water Management (9)

AIforSmartGridsandEnergyConsumptionPrediction,LoadBalancingandDemand Forecasting using ML, Waste Segregation and Collection Automation using CV, Water Quality MonitoringSystemsusingIoT Sensors,Leak Detectionand Anomaly Detection Models,Smart Metering and Energy Theft Detection, Sustainability and Carbon Monitoring AI Models

UNIT –4: Smart Healthcare, Surveillance, and Public Safety (9)

IoT-based Health Monitoring and Alert Systems, Predictive Healthcare and Disease Outbreak Detection,AIforCCTVSurveillance,CrowdMonitoring,andViolenceDetection,NLPfor EmergencyResponseandChatbotAssistance,SmartAmbulanceRoutingandResponse Optimization, COVID-19 Contact Tracing and Monitoring via AI & IoT, Data Privacy, Security & Ethical Issues in Surveillance systems

UNIT –5: A IOT System Design, Deployment, and Governance (9)

AI Model Deployment on Edge Devices (Raspberry Pi, Jetson Nano), Smart City Dashboards and Data Visualization, Real-time Streaming and Analytics Platforms (Apache Kafka, Spark), CloudIntegration:AWSIoT,GoogleCloudAI,AzureIoTSuite,GovernanceFrameworks,

DataPrivacy,and Policy Standards,Evaluation MetricsforSmart City Projects,FutureTrends in A IoT and Smart Urban Living

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Describethearchitectureandcomponentsofsmartcities andexplainhowAIandIoTintegratetooptimizeurban planningandservices.	PO1,PO2
CO2	ApplyAImodelsintransportationsystemstoimprovetraffic flow, public mobility, and autonomous vehicle operations.	PO1,PO3
CO3	Develop AI and IoT solutions for sustainable energy, waste, and water management in smart city ecosystems.	PO1,PO2, PO4
CO4	Analyze AI-based healthcare, surveillance, and emergency response applications, considering privacy and ethical aspects.	PO1,PO2,PO3,PO4
CO5	Design and deploy A IoT systems using edge/cloud platformsandevaluatethemusingappropriategovernance andperformancemetrics.	PO1,PO2,PO4,PO5

TEXTBOOKS:

1. PethuruRaj&AnupamaC.Raman,TheInternetofThings:EnablingTechnologies, Platforms, and Use Cases, CRC Press.
2. JanakaEkanayake,SmartGrid:TechnologyandApplications,Wiley.
3. RajkumarBuyya,FogandEdgeComputing:PrinciplesandParadigms,Wiley.
4. AdrianMcEwen,HakimCassimally,DesigningtheInternetofThings,Wiley.

REFERENCEBOOKS:

1. MahalikN.P.,SensorNetworksandApplications,McGrawHill.
2. KimF.Taylor,UrbanArtificialIntelligenceandGovernance,Springer.
3. Dastbaz,J.&Pattinson,C.,SmartCities:InnovationandSustainability,Springer.
4. ResearchpapersfromIEEESmartCities,AIoTJournal,andSpringerUrbanTech.

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23CSM472A	**MLOps&AIModelDeployment (Professional Elective-V)**	**LTPC**
		3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Tounderstandtheprinciplesandbestpracticesofoperationalizingmachinelearning models in production environments.
- ToexplorethelifecycleofAImodeldevelopment,deployment,monitoring,and maintenance using modern MLOps frameworks.
- TodevelopskillsinCI/CDforML,reproducibility,modelversioning,and containerization using Docker and Kubernetes.
- Todeploymachinelearningmodelsusingcloud-nativeservicesandtracktheir performance using real-time metrics.
- Toaddressscalability,reliability,andethicalconsiderationsinMLmodeldeployment.

UNIT–1:INTRODUCTIONTOMLOPSANDDEPLOYMENTPIPELINES (9)

Definition and need of MLOps, ML system lifecycle and pipeline components, DevOps vs. MLOps: key differences, CI/CD for ML projects, Data versioning and model lineage, Introduction to DVC, Git, and MLFlow, Workflow orchestration using Apache Airflow, Automated testing in ML pipelines,

UNIT–2:MODELPACKINGANDENVIRONMENTMANAGEMENT (9)

Packaging ML models using Pickle, Joblib, ONNX, Python virtual environments, Conda, Pipenv, Introduction to Docker for ML workloads, Building Dockerfiles for ML apps, Using Kubernetes for orchestration, Security, logging, and resource management, Docker Composeand Helm charts fordeployment, Hands-on: Containerizeand deploy a scikit-learn model

UNIT–3:MODELSERVINGANDAPIS (9)

RESTful API design for ML models, Model deployment using FastAPI and Flask, TensorFlow Serving, TorchServe basics, Introduction to gRPC for ML deployment, Asynchronous inference and batch vs real-time serving, Load testing and benchmarking, Authentication and authorization in model APIs, Deploying models on edge devices

UNIT–4:MONITORING,LOGGING,ANDCONTINOUSEVALUATION (9)

Importance of monitoring and alerting in MLOps, Data drift and model drift detection, Logging prediction results and metadata, Prometheus, Grafana, and ELK Stack, A/B testing and canary deployments, Shadow deployments and rollback strategies, Feedback loops for continuous learning, Integration with external monitoring tools

UNIT–5:CLOUD-NATIVEMLOPSANDCASESTUDIES (9)

ML deployment on AWS SageMaker, Azure ML, Google AI Platform, CI/CD using GitHub Actions, Jenkins, and GitLab CI, AutoML and model registry, Real-world case study: End-to-end MLOps pipeline, Challenges and limitations in enterpriseML deployment, ResponsibleAI

inproductionsystems,FuturetrendsinMLOps,CapstoneProjectPlanning

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Illustrate the lifecycle and pipeline components of MLOps and implement basic version control and orchestration for ML workflows.	**PO1,PO2**
CO2	PackageMLmodelsusingappropriatetoolsanddeploythem usingDockerandKubernetesenvironmentswitheffective resource management.	**PO1,P03**
CO3	Develop and deploy machine learning models as APIs using FastAPI/Flask and configure for real-time or batch inference scenarios.	**PO1,PO2, PO4**
CO4	Monitor and log ML systems using modern tools and detect data/model drift with strategies for continuous evaluation and feedback.	**PO1,PO2,P03,PO4**
CO5	Implement end-to-end MLOps solutions using cloud platforms and CI/CD tools, and analyze deployment challengesinreal-worldusecases.	**PO1,PO2,P04, PO5**

TEXTBOOKS:

1. IntroducingMLOps:HowtoScaleMachineLearningProjectswithDevOpsToolsMark Treveil, Alok Shukla, O'Reilly Media.
2. MachineLearningEngineering–AndriyBurkov,TrueShelfPublishing.
3. DesigningMachineLearningSystems–ChipHuyen,O'ReillyMedia.

REFERENCEBOOKS:

1. PracticalMLOps–NoahGift,O'ReillyMedia
2. KubeflowforMachineLearning–TrevorGrantetal.,O'Reilly
3. Hands-OnMLOps:ImplementMachineLearninginProduction–Munn,Meza,Vohra, Packt Publishing
4. ResearchpapersfromarXiv,MLSysConference,andICMLIndustryTrack

REFERENCEWEBSITE:

1. Coursera–MLOpsSpecializationbyDeepLearning.AI
2. GoogleCloud–MLOps:ContinuousDeliveryandAutomationPipelines
3. Udemy–MLOps:MLPipelines,CI/CD,andModelDeployment

COMAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23CSD473A	**DATAWRANGLING** **(ProfessionalElective-V)**	**LTPC** **3003**

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

- Tointroducethefundamentaltechniquesforacquiring,cleaning,transforming,and manipulating data.
- Toenablestudentstohandlereal-worldmessydataforanalysisandmachinelearning.
- ToteachefficientuseoflibrarieslikePandas,NumPy,andSQLfordatawrangling.
- Topromoteunderstandingofhandlingmissingvalues,outliers,andinconsistent formats.
- Toexposestudentstoautomation,reproducibility,andworkflowdesignindata preprocessing.

UNIT–1:INTRODUCTIONTODATAWRANGLINGANDDATAACQUISITION (9)

Introduction to Data Wrangling: Importance and Use Cases, Types of Data: Structured, Semi- Structured, Unstructured, Data Acquisition Techniques: APIs, Web Scraping, Reading Data from CSV, Excel, JSON, XML, Using Python libraries: pandas, requests, BeautifulSoup, Working with Databases using SQLAlchemy and pandas, Loading Large Datasets and Chunking, Exploratory Analysis Before Cleaning.

UNIT–2:HANDLINGMISSING,NOISY,ANDINCONSISTENTDATA (9)

Identifying and Understanding Missing Data, Techniques for Imputing Missing Values, Handling Inconsistent Data: Dates, Texts, Units, Removing Duplicates and Irrelevant Data, Detecting and Treating Outliers, Normalization and Standardization Techniques, Regular Expressions for Text Cleaning, Visualizing Missing/Outlier Data.

UNIT–3:DATATRANSFORMATIONANDFEATUREENGINEERING (9)

Data Type Conversion and Parsing , Feature Extraction from Text, Dates, and Strings,One-Hot Encoding, Label Encoding, Binning and Discretization, Data Aggregation and Grouping, Pivoting, Melting, and Reshaping Data, Handling Imbalanced Data, Creating Derived Features and Feature Selection.

UNIT–4:DATAINTEGRATION,JOINING,ANDWORKFLOWS (9)

Merging and Joining Datasets (Inner, Outer, Left, Right), Concatenation and Appending DataFrames, Data Consistency and Referential Integrity, Resolving Schema Mismatches, Designing Reusable DataWrangling Functions, Automating Workflows with Functions and Pipelines, Data Lineage and Documentation, Case Study: End-to-End Data Wrangling Pipeline.

UNIT–5:TOOLS,LIBRARIES,ANDCASESTUDIESINDATAWRANGLING(9)

Pandas and NumPy Advanced Techniques, Pyjanitor, Dask, and Polars for Efficient Wrangling, Using OpenRefine for Data Cleaning, SQL vs NoSQL in Data Wrangling, Real-world Wrangling Case Studies (Finance, Healthcare, Retail), Best Practices and Common Pitfallsin Data Wrangling,Reproducibility andVersioninginDataPipelines, Final Capstone: Build and Evaluate a Clean Dataset for ML/

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Understandandapplycoredatawranglingtechniques.	PO1,PO2
CO2	Clean,transform,andreshapedatausingPythonandSQL.	PO1,P03
CO3	Handlemissingvalues,datainconsistencies,andoutliers.	PO1,PO2, PO4
CO4	Mergeandjoinmultipledatasetsfromdifferentsources.	PO1,PO2,P03,PO4
CO5	Automatedatapipelinesandpreprocessingworkflowsfor analytics and ML.	PO1,PO2,P04, PO5

TEXTBOOKS:

1. M.Heydt–DataWranglingwithpandas,O'ReillyMedia.
2. HadleyWickham–RforDataScience(DataWranglingChapters),O'Reilly.
3. J.VanderPlas–PythonDataScienceHandbook,O'ReillyMedia

REFERENCEBOOKS:

1. WesMcKinney–PythonforDataAnalysis,O'Reilly.
2. CathyO'NeilandRachelSchutt–DoingDataScience,O'Reilly.
3. DavidMertz–CleaningDataforEffectiveDataScience,Packt.

REFERENCEWEBSITE:

1. Data Wrangling with pandas (Datacamp): https://www.datacamp.com/courses/data- manipulation-with-pandas
2. Coursera:DataWrangling,AnalysisandABTestingwithSQL– *https://www.coursera.org/learn/data-wrangling-analysis-abtesting*
3. edX:DataWranglingwithR–https://online.rice.edu/courses/data-wrangling-r

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

23CAI473B **AI IN HEALTHCARE (ProfessionalElective-V)** **L TPC**

3003

PRE-REQUISITES: ArtificialIntelligence

COURSEEDUCATIONALOBJECTIVES:

1. Toprovideafoundationalunderstandingof AIapplicationsinhealthcare.
2. To familiarize students with medical data types, preprocessing, and ethical considerations.
3. ToexploreMLandDLalgorithmstailoredfordiagnosis,prognosis,andtreatment recommendations.
4. To expose students to real-world healthcare systems and AI solutions like predictivemodeling, EHRs, and medical imaging.
5. Toenablestudentstodesign,evaluate,anddeployAI-drivenhealthcareapplications.

UNIT –1: Introduction to AI in Healthcare (9)

Overview of Healthcare Systems and Data Ecosystem – (U), AIinClinicalDecisionSupport Systems (CDSS) – (U), Types of Medical Data: EHRs, Imaging, Genomic, Sensor Data – (U), Applications of AI in Diagnosis, Prognosis, and Monitoring– (A), Use Cases: Radiology, Pathology, Oncology, Cardiology – (A), Limitations and Challenges of AI in Healthcare , AI for Telemedicine and Remote Patient Monitoring – (A)

UNIT–2: Medical Data Preprocessing and Feature Engineering (9)

Data Cleaning, Imputation, and Normalization for Clinical Data – (A), Handling Missing Values, Outliers, and Bias – (A), Feature Engineering from EHRs and Time-Series Data – (A), Text Mining for Medical Notes using NLP – (A), Encoding Diagnosis and Procedure Codes (ICD, CPT) – (U), Temporal Pattern Extraction from Clinical Sequences,DataPrivacy, Anonymization, and HIPAA Compliance – (AN)

UNIT –3: Machine Learning & Deep Learning in Healthcare (9)

Supervised Learning for Risk Prediction and Classification – (A), Unsupervised Learning for Patient Segmentation – (A),Deep Learning for MedicalImaging: CNNs, Transfer Learning – (A), Recurrent Neural Networks for Time-series Clinical Data ,Survival Analysis and Time-to-Event Prediction – (A), Model Evaluation Metrics: Sensitivity, Specificity, AUC – (E), Handling Imbalanced Datasets in Healthcare – (E), Interpretability in Medical ML Models (LIME, SHAP) – (E)

UNIT–4:SpecializedHealthcareAIApplications (9)

AI forDisease Diagnosis: Diabetes, Cancer, Heart Disease –(A),AIinMedical Imaging:X- ray, MRI, CT Scan Analysis – (A), Predictive Modeling for ICU Admission & Mortality Risk – (A),AIinGenomicsandPersonalizedMedicine,DrugDiscoveryandRepurposingwithAI ,Chatbots and Virtual Health Assistants – (A), Remote Monitoring using IoT & Wearables + AI – (A), Designing an End-to-End AI Solution for a Medical Use Case – (C)

UNIT–5:Ethics,Regulation,andFutureDirections in Healthcare AI(9) Ethical AI in Healthcare: Bias, Fairness, and Accountability ,Regulatory Landscape: FDA Approval, CE Marking – (E)**,** Explainable AI and Clinical Trust – (E)**,** Federated Learning for Privacy-Preserving AI ,Clinical Trials and AI Decision- Support Tools – (E)**,** Case Studies: Google DeepMind, IBM Watson Health, PathAI ,Responsible Deployment of AI inHealthcare Settings – (E)**,** Capstone: Building a Responsible Healthcare AI Proposal – (C)

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		**Pos**
CO1	Understandthescope,challenges,andbenefitsofAIin healthcare.	**PO1,PO2**
CO2	Apply data preprocessing and modeling techniques specific to biomedical data.	**PO1,PO3**
CO3	AnalyzetheperformanceofML/DLmodelsinclinicalcontexts.	**PO1,PO2,PO4**
CO4	DevelopAI-driven applications fortaskslike disease diagnosis, drug discovery, and patient monitoring.	**PO1,PO2,PO3,PO4**
CO5	Evaluateethical,legal,andsocietalimplicationsofAIin healthcare.	**PO1,PO2,PO4,PO5**

TEXTBOOKS:

1. Jiang,Feietal.–ArtificialIntelligenceinHealthcare:Past,PresentandFuture.
2. KevinFrick–IntroductiontoHealthcareAI.
3. EricTopol–DeepMedicine:HowArtificialIntelligenceCanMakeHealthcareHuman Again.

REFERENCEBOOKS:

1. MathiasGoyen–AIinMedicalImaging.
2. BertalanMeskó–TheGuidetotheFutureofMedicine:TechnologyandThe Human Touch.
3. PeterSzolovits–ArtificialIntelligenceinMedicine(MorganKaufmann).

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	3	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IVB.TECH.-VIISEMESTER

23OCE471A	BUILDINGMATERIALSANDSERVICES (OPENELECTIVEIII)	LTPC 3--3

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandtheproperties,classifications,andapplicationsofbuildingmaterialslikestones, bricks, tiles, wood, aluminum, glass, paints, and plastics.
2. Toanalyzethecomposition,manufacturingprocess,andpropertiesofcementandadmixtures.
3. Toapplyknowledgeofbuildingcomponentssuchaslintels,arches,walls,stairs,floors,roofs, foundations, and joinery.
4. Toevaluatemasonry,mortars, finishingtechniques,andformworksystems.
5. Toassessvariousbuildingservicesincludingplumbing,ventilation,airconditioning,acoustics, and fire protection.

UNIT– I **(9)**

Stones and Bricks, Tiles: Building Stones – Classifications and Quarrying – Properties – Structural Requirements – Dressing. Bricks – Composition of Brick Earth – Manufacture and Structural Requirements,FlyAsh,Ceramics.Timber,Aluminum,Glass,PaintsandPlastics:Wood-Structure– TypesandProperties–Seasoning–Defects;AlternateMaterialsforTimber–GI/Fiber–Reinforced Glass Bricks, Steel & Aluminum, Plastics.

UNIT–II **(9)**

Cement &Admixtures: Types of Cement - Ingredients of Cement – Manufacture – Chemical Composition – Hydration - Field & Lab Tests – Fineness – Consistency– Initial &Final Setting – Soundness. Admixtures – Mineral & Chemical Admixtures – Uses

UNIT–III **(9)**

BuildingComponents:Lintels,Arches,Walls,Vaults–StairCases–TypesofFloors,TypesofRoofs – Flat, Curved, Trussed; Foundations – Types; Damp Proof Course; Joinery – Doors – Windows – Materials – Types.

UNIT–IV **(9)**

Mortars,MasonryandFinishing'sMortars:LimeandCementMortarsBrickMasonry–Types–Bonds; Stone Masonry – Types; Composite Masonry – Brick-Stone Composite; Concrete,Reinforced Brick. Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.form Work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT– V **(9)**

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines &Fittings; Ventilations: FunctionalRequirementsSystemsofVentilations.Air-Conditioning-EssentialsandTypes;Acoustics – Characteristic – Absorption – Acoustic Design; Fire Protection – Fire Hazards – Classification of Fire-Resistant Materials and Constructions.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	**Understand**theproperties,classifications,andapplicationsofbuilding materialslike stones, bricks, tiles, wood, aluminum, glass, paints, and plastics.	PO1,PO5
CO2	**Analyze**thecomposition,manufacturingprocess,andpropertiesof cement and admixtures.	PO1,PO2,PO5
CO3	**Apply**knowledgeofbuildingcomponentssuchaslintels,arches,walls, stairs, floors, roofs, foundations, and joinery.	PO3,PO1,PO4, PO5
CO4	**Evaluate**masonry,mortars,finishingtechniques,andformwork systems.	PO3,PO5,PO7,PO4
CO5	**Assess**variousbuildingservicesincludingplumbing,ventilation,air conditioning, acoustics, and fire protection	PO6,PO7,PO8

TEXTBOOKS:

1. BuildingMaterialsandConstruction–Arora&Bindra,DhanpatRoyPublications.
2. BuildingMaterialsandConstructionbyGCSahu,JoyGopalJenaMcGrawhillPvtLtd2015.

REFRENCEBOOKS:

1. BuildingConstructionbyB.C.Punima,AshokKumarJainandArunKumarJain-Laxmi Publications (P) ltd., New Delhi
2. P.C.Varghese,BuildingMaterials,PrenticeHallofIndia,2015.
3. N.Subramanian,BuildingMaterialsTestingandSustainability‖,OxfordHigherEducation,2019.
4. R.Chudleigh,Construction Technology, LongmanPublishingGroup,1973.
5. S.K.Duggal,BuildingMaterials,Oxford&IBHPublishingCo.Ltd.,NewDelhi,2019

ONLINE LEARNINGRESOURCES:

https://archive.nptel.ac.in/courses/105/102/105102088/

CO-POMAPPING:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	-	2	-	-	-	-	-	-	-
CO-2	3	3	-	-	2	-	-	-	-	-	-	2
CO-3	3	-	3	2	3	-	-	-	-	-	-	-
CO-4	-	-	3	3	3	-	2	-	-	-	-	-
CO-5	-	-	-	-	-	3	3	2	-	-	-	-

IVB.TECH.-VIISEMESTER

23OCE471B	**ENVIRONMENTALIMPACTASSESSMENT (OPENELECTIVEIII)**	**L T P C** **3 - - 3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Understandtheprinciples,methodologies,andsignificanceofEnvironmentalImpact Assessment (EIA).
2. Analyzetheimpactofdevelopmentalactivitiesonlanduse,soil,andwaterresources.
3. Evaluatetheimpactofdevelopmentonvegetation,wildlife,andassessenvironmentalrisks.
4. Developenvironmentalauditproceduresandassesscompliancewithenvironmental regulations.
5. Understandandapplyenvironmentalacts,notifications,andlegalframe worksin EIAstudies.

UNIT–ICONCEPTSANDMETHODOLOGIESOFEIA: (9)

InitialEnvironmentalExamination,ElementsofEIA,-FactorsAffectingE-I-AImpactEvaluationand Analysis, Preparation of Environmental Base Map, Classification of Environmental Parameters-Criteria for The Selection of EIA Methodology, E I A Methods, Ad-Hoc Methods, Matrix Methods, Network Method Environmental Media Quality Index Method, Overlay Methods and Cost/Benefit Analysis.

UNIT–IIIMPACTOFDEVELOPMENTALACTIVITIESANDLANDUSE (9)

Introduction and Methodology for The Assessment of Soil and Ground Water, Delineation of Study Area,IdentificationofActives.Procurementof RelevantSoilQuality,ImpactPrediction, Assessment ofImpactSignificance,IdentificationandIncorporationofMitigationMeasures.EIAinSurfaceWater, Air and Biological Environment: Methodology for The Assessment of Impacts on Surface Water Environment, Air Pollution Sources, Generalized Approach for Assessment of Air Pollution Impact.

UNIT– III ASSESSMENT OF IMPACT ON VEGETATION, WILD LIFE AND RISK ASSESSMENT (9)

Introduction - Assessment of Impact of Development Activities on Vegetation and Wildlife, EnvironmentalImpactofDeforestation–CausesandEffectsofDeforestation-RiskAssessmentand TreatmentofUncertainty-KeyStagesinPerforminganEnvironmentalRiskAssessment-Advantages of Environmental Risk Assessment.

UNIT–IVENVIRONMENTALAUDIT (9)

Introduction - Environmental Audit &Environmental Legislation Objectives of Environmental Audit, Types of Environmental Audit, Audit Protocol, Stages of Environmental Audit, Onsite Activities, Evaluation of Audit Data and Preparation of Audit Report Report

UNIT–VENVIRONMENTALACTSANDNOTIFICATIONS (9)

The Environmental Protection Act, The Water Preservation Act, The Air (Prevention &Control of Pollution Act), Wild Life Act - Provisions in The EIA Notification, Procedure for Environmental Clearance, Procedure for Conducting Environmental Impact Assessment Report- Evaluation of EIA Report. Environmental Legislation Objectives, Evaluation of Audit Data and Preparation of Audit Report. Post Audit Activities, Concept of ISO and ISO 14000.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	ApplyvariousmethodologiesforconductingEnvironmental Impact Assessments.	PO1,PO2,PO3,PO4,PO5,PO6
CO2	Analyzetheimpactofland-usechangesonsoil,water,andair quality.	PO1,PO2,PO3,PO4,PO5,PO6
CO3	Evaluatetheenvironmentalimpactonvegetation,wildlife,and conduct risk assessments.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO4	Developenvironmentalauditreportsandassesscompliance with environmental policies.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO5	Interpretandapplyenvironmentalactsandregulationsrelated to EIA.	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO8

TEXTBOOKS:

1. EnvironmentalImpactAssessmentMethodologies,byY.Anjaneyulu,B.S.Publication,Hyderabad 2nd edition 2011
2. EnvironmentalImpactAssessment,byCanterLarryW.,McGraw-HilleducationEdi(1996)

REFRENCEBOOKS:

1. EnvironmentalEngineering,byPeavy,H.S,Rowe,D.R,Tchobanoglous,G.Mc-GrawHill International Editions, New York 1985.
2. EnvironmentalScienceandEngineering,bySureshK.Dhaneja,S.K.,Katania&Sons Publication, New Delhi
3. EnvironmentalScienceandEngineering,byJ.GlynnandGaryW.HeinKe,PrenticeHall Publishers.
4. EnvironmentalPollutionandControl,byH.S.Bhatia,GalgotiaPublication(P)Ltd,Delhi

ONLINELEARNINGRESOURCES:

https://archive.nptel.ac.in/courses/124/107/124107160/

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	2	2	3	-	-	-	-	-	1
CO-2	3	3	3	2	2	3	-	-	-	-	-	1
CO-3	3	3	3	2	2	3	3	-	-	-	-	1
CO-4	3	3	3	3	2	3	3	-	-	-	-	1
CO-5	2	2	2	2	2	3	3	3	-	-	-	1

IVB.TECH.-VIISEMESTER

23OEE471A	**SMARTGRID TECHNOLOGIES (OPEN ELECTIVE III)**	**L T P C 3--3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Tointroducetheevolution,need,architecture,andenablingtechnologiesofSmart Grids with a focus on Indian and international perspectives.
2. Toprovidefundamentalknowledgeofsynchro-phasortechnologyandWideArea Monitoring Systems using PMUs and PDCs.
3. Tofamiliarizestudentswithsmartmeters,AMR/AMIsystems,andtheirrolein demand-side integration and power quality management.
4. Toimpartunderstandingofcommunicationtechnologiesandprotocolsusedin Smart Grid information and communication infrastructure.
5. ToexposestudentstoSmartGridapplications,renewableanddistributedgeneration integration, advanced energy storage, and cyber security requirements

UNIT–1:INTRODUCTIONTOSMARTGRID: (9)

Evolution of Electric Grid – Need for Smart Grid – Difference between conventional & smart grid – Overview of enabling technologies – International experience in Smart Grid deployment efforts – Smart Grid road map for India – Smart Grid Architecture.

UNIT–2:WIDEAREAMONITORINGSYSTEM: (9)

FundamentalsofSynchrophasorTechnology–conceptandbenefitsofWideAreaMonitoringSystem – Structure and functions of Phasor Measuring Unit (PMU) and Phasor Data Concentrator (PDC) – Road Map for Synchro phasor applications (NAPSI) – Operational experience and Blackout analysis using PMU - Case study on PMU.

UNIT–3:SMARTMETERS: (9)

Features and functions of Smart Meters – Functional specification – category of Smart Meters – AutomaticMeterReading(AMR)andAdvanced Metering Infrastructure (AMI)driversandbenefits – AMI protocol – Demand Side Integration: Peak load, Outage and Power Quality management.

UNIT–4:INFORMATIONANDCOMMUNICATIONTECHNOLOGY: (9)

Overview of Smart Grid Communication system – Modulation and Demodulation Techniques: Radio Communication – Mobile Communication – Power Line Communication – Optical Fibre Communication – Communication Protocol for Smart Grid.

UNIT–5:SMARTGRIDAPPLICATIONSANDCYBERSECURITY (9)

Applications: Overview and concept of Renewable Integration – Introduction to distributed generation - Role of Protective Relaying in Smart Grid – House Area Network – Advanced Energy Storage Technology: Flow battery – Fuel cell – SMES – Super capacitors – Plug – in Hybrid electric Vehicles - Cyber Security: Security issues in DG, Distribution Automation, AMI, Electric Vehicle ManagementSystems–Approachtoassessmentofsmartgridcybersecurityrisks–Methodologies. Cyber Security requirements – Smart Grid Information Model.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	UnderstandingtheConceptandEvolutionofSmartGrids	**PO1,PO2**
CO2	AnalyzingWideAreaMonitoringSystemandSynchrophasor Technology	**PO1,PO2,P03, PO4**
CO3	Applying Smart Metering and Advanced Metering Infrastructure (AMI) Concepts	**PO1,PO2,P03,**
CO4	Evaluating Information and Communication Technology (ICT) Systems in Smart Grids	**PO1,PO2,P03, PO4**
CO5	Designing Smart Grid Applications and Cybersecurity Measures	**PO1,PO2,**

TEXTBOOKS:

1. JamesMomoh,"SMARTGRID:FundamentalsofDesignandAnalysis",JohnWileyandSons,New York, 2012.
2. Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, "SmartGrid: Technology and Applications", John Wiley & Sons, New Jersey, 2012.

REFERENCEBOOKS:

1. PowerGridCorporationofIndiaLimited,"SmartGridPrimer",1stEdition,PowerGrid Corporation of India Limited, Bangalore, India, 2013.
2. Fereidoon.P.Sioshansi,"SmartGrid–IntegratingRenewable,DistributedandEfficientEnergy", 1st Edition, Academic Press, USA, 2011.
3. StuartBorlase,"SmartGrids:Infrastructure,TechnologyandSolutions",1stEdition,CRCPress Publication, England, 2013.
4. PhadkeAG,ThorpJS,"SynchronizedPhasorMeasurementsandTheirApplications",1st Edition, Springer, Newyork, 2012.

ONLINELINKS:

https://nptel.ac.in/courses/108/107/108107113/

CO-POMAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3			-	-	-	-	-	-	-	-
CO.2	3	3	2	2	-	-	-	-	-	-	-	-
CO.3	3	3	2		-	-	-	-	-	-	-	-
CO.4	3	3	2	2	-	-	-	-	-	-	-	-
CO.5	3	3			-	-	-	-	-	-	-	-
CO*	**3**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IVB.TECH.-VIISEMESTER

23OECE471A	**FUNDAMENTALSOFMICROPROCESSORSAND CONTROLLERSOPENELECTIVEIII)**	**LTPC 3-- 3**

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

1. Tocomprehendthearchitecture,operation,andconfigurationsofthe8086microprocessors.
2. Togetfamiliarwith8086programmingconcepts,instructionset,andassemblylanguage development tools.
3. Tostudytheinterfacingof8086withmemory,peripherals,andcontrollersforvarious applications.
4. Tolearnthearchitecture,instructionset,andprogrammingofthe8051microcontrollers.
5. Tounderstandmicrocontrollerinterfacingtechniques,peripheralprogramming,andprocessor comparisons.

UNITI–8085AND8086ARCHITECTURE (9)

8085 Architecture, Pind diagram, Addressing modes, Instruction set, 8086 Architecture: Introduction, Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response.

UNITII-8086PROGRAMMING (9)

8086 Programming: 8086 system timing, minimum mode and maximum mode configuration, Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

UNITIII-8086INTERFACING (9)

Introduction:Intel8255programmableperipheralinterface,InterfacingwithLEDS,Interfacingseven segmentdisplays,softwareandhardwareinterruptapplications,Intel8251USARTarchitectureand interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.

UNITIV-MICROCONTROLLER (9)

Microcontroller:Architectureof8051–SpecialFunctionRegisters(SFRs)-I/OPinsPortsandCircuits - Instruction set - Addressing modes - Assembly language programming, Comparison of Microprocessor, Microcontroller, PIC and ARM processors

UNITV-INTERFACINGMICROCONTROLLER (9)

Interfacing Microcontroller: Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Gain knowledge on the architecture, operation, and configurations of the 8085 and 8086 microprocessors.	PO1
CO2	Getfamiliarwith8086programmingconcepts,instruction set, and assembly language development tools.	PO1,PO2
CO3	Know the interfacing of 8086 with peripherals, and controllers for various applications.	PO1,PO2
CO4	Learnthearchitecture,instructionset,programmingofthe 8051microcontrollersandprocessorcomparisons.	PO1,PO2
CO5	Understandmicrocontrollerinterfacingtechniques,peripheral programming.	PO1

TEXTBOOKS:

1. MicroprocessorsandInterfacing–ProgrammingandHardwarebyDouglasVHall,SSSPRao, Tata McGraw Hill Education Private Limited, 3rdEdition,1994.
2. KMBhurchandi,AKRay,AdvancedMicroprocessorsandPeripherals,3rdedition,McGrawHill Education, 2017.
3. RajKamal,Microcontrollers:Architecture,Programming,InterfacingandSystemDesign,2nd edition, Pearson, 2012.

REFERENCEBOOKS:

1. RameshSGaonkar,MicroprocessorArchitectureProgrammingandApplicationswiththe8085, 6th edition, Penram International Publishing, 2013.
2. KennethJ.Ayala,The8051Microcontroller,3rdedition,CengageLearning,2004.

REFERENCEWEBSITE:

1. https://archive.nptel.ac.in/courses/108/105/108105102/
2. https://archive.nptel.ac.in/courses/106/108/106108100/

CO-POMAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	-	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IVB.TECH.-VIISEMESTER

23OME471A	3D PRINTING TECHNOLOGIES (OPEN ELECTIVE III)	L T P C 3--3

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Understand the fundamentalconcepts of prototyping and distinguishbetweentraditionaland rapid prototyping methods.
2. Demonstratetheworkingprinciples,materials,andapplicationsofsolid-,liquid-,andpowder- based RP systems.
3. Definetheprocessesandclassificationsofrapidtoolingandreverseengineeringtechniques.
4. Identifycommonerrorsin3Dprintingandevaluatepre-processing,processing,andpost- processing issues.
5. FamiliarizeRP-relatedsoftwareanditsroleinapplicationssuchasdesign,manufacturing,and medical fields.

UNIT–1:INTRODUCTIONTO3DPRINTING (9)

Introductionto3DPrintingIntroductiontoPrototyping,TraditionalPrototypingVs.RapidPrototyping (RP), Need for time compression in product development, Usage of RP parts, Generic RP process, Distinction between RP and CNC, other related technologies, Classification of RP.

UNIT–2:SOLIDANDLIQUIDBASEDRPSYSTEM: (9)

WorkingPrinciple,Materials,Advantages,LimitationsandApplicationsofFusionDepositionModelling (FDM), Laminated Object Manufacturing (LOM), Stereo lithography (SLA), Direct Light Projection System (DLP) and Solid Ground Curing (SGC).

UNIT–3:POWDERBASED&OTHERRPSYSTEMS: (9)

Powder Based RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Selective Laser Sintering (SLS), Direct Metal Laser Sintering (DMLS), Laser Engineered Net Shaping(LENS) and Electron Beam Melting (EBM).

Other RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Three Dimensional Printing (3DP), Ballastic Particle Manufacturing (BPM) and Shape Deposition Manufacturing (SDM)

UNIT–4:RAPIDTOOLING&REVERSEENGINEERINGRAPIDTOOLING: (9)

Rapid Tooling & Reverse Engineering Rapid Tooling: Conventional Tooling Vs. Rapid Tooling, ClassificationofRapidTooling,DirectandIndirectToolingMethods,SoftandHardToolingmethods. ReverseEngineering(RE):Meaning,Use,RE–TheGenericProcess,PhasesofREScanning,Contact Scanners and Noncontact Scanners, Point Processing, Application Geometric Model, Development.

UNIT–5:ERRORSIN3DPRINTINGANDAPPLICATIONS: (9)

Pre-processing, processing and post-processing errors, Part building errors in SLA, SLS, etc. Software:Needforsoftware,MIMICS,Magics,SurgiGuide,3-matic,3D-Doctor,Simplant,Velocity2, VoXim,SolidView,3DView,etc.,software,PreparationofCADmodels,ProblemswithSTLfiles,STL filemanipulation,RPdataformats:SLC,CLI,RPI,LEAF,IGES,HP/GL,CT,STEP.Applications:Design, Engineering Analysis and planning applications, Rapid Tooling, Reverse Engineering, Medical Applications of RP.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Defineandexplaintheevolutionandneedforrapid prototyping in modern product development.	L1,L2,L6
CO2	Compareandcontrastvarious3Dprintingtechnologies based on working principles, materials, and limitations.	L2,L4,L5
CO3	Applyknowledgeofrapidtoolingandreverseengineering techniques for industrial and design applications.	L3,L5,L6
CO4	Diagnose and interpret different types of errors encounteredin3Dprintingprocessesandrecommend solutions.	L2,L3,L5
CO5	UseRP-specificsoftwaretoolstomanipulateSTLfilesand prepare models for printing in real-world scenarios	L1,L3,L6

TEXTBOOKS:

1. CheeKaiChuaandKahFaiLeong,—3DPrintingandAdditiveManufacturingPrinciplesand Applications‖ 5/e, World Scientific Publications, 2017.
2. IanGibson,DavidWRosen,BrentStucker,—AdditiveManufacturingTechnologies:3DPrinting, RapidPrototyping,andDirectDigitalManufacturing‖,Springer,2/e,2010.ReferenceBooks:

REFERENCEBOOKS:

1. FrankW.Liou,—RapidPrototyping&EngineeringApplications‖,CRCPress,Taylor&Francis Group, 2011.
2. Rafiq Noorani, —Rapid Prototyping: Principles and Applicationsin Manufacturing‖,John Wiley&Sons, 2006.

COPOMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23OSH471A WAVELETTRANSFORMSANDITSAPPLICATIONS LTPC

(OPENELECTIVEIII) 3-- 3

PRE-REQUISITES:Nill

COURSEEDUCATIONALOBJECTIVES:

UNIT–I:WAVELETS (9)

Wavelets and Wavelet Expansion Systems - Wavelet Expansion-Wavelet Transform-Wavelet System – More Specific Characteristics of Wavelet Systems - Haar Scaling Functions and Wavelets - effectiveness of Wavelet Analysis -The Discrete Wavelet Transform - The Discrete-Time and Continuous Wavelet Transforms.

UNIT–II:AMULTIRESOLUTIONFORMULATIONOFWAVELETSYSTEMS (9)

Signal Spaces -The ScalingFunction -Multiresolution Analysis -The Wavelet Functions -The Discrete Wavelet Transform- A Parseval's Theorem - Display of the Discrete Wavelet Transform and the Wavelet Expansion.

UNIT–III:FILTERBANKSANDTHEDISCRETEWAVELETTRANSFORM (9)

Analysis - From Fine Scale to Coarse Scale- Filtering and Down-Sampling or Decimating - Synthesis - From Coarse Scale to Fine Scale -Filtering and Up-Sampling or Stretching - Input Coefficients -Lattices and Lifting - -Different Points of View.

UNIT–IV:TIME–FREQUENCYANDCOMPLEXITY (9)

Multi resolution versus Time - Frequency Analysis- Periodic versus Non periodic Discrete Wavelet Transforms -The Discrete Wavelet Transform versus the Discrete-Time Wavelet Transform- Numerical Complexity of the Discrete Wavelet Transform.

UNIT-V:BASESANDMATRIXEXAMPLES (9)

Bases, Orthogonal Bases, and Bi orthogonal Bases -Matrix Examples - Fourier Series Example - Sine Expansion Example - Frames and Tight Frames - Matrix Examples -Sine Expansion as a Tight Frame Example.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**Pos**
CO1	Understand wavelets and wavelet basis and characterize continuous and discrete wavelet transforms	PO1,PO2,PO3,PO4, PO12
CO2	Illustratethemultiresolutionanalysisadscalingfunctions	PO1,PO2,PO3,PO4, PO12
CO3	Implementdiscretewavelettransformswithmultiratedigital filters	PO1,PO2,PO3,PO4, PO12
CO4	Understand multi resolution analysis and identify various waveletsandevaluatetheirtime-frequencyresolutionproperties.	PO1,PO2,PO3,PO4 ,PO12
CO5	Designcertainclassesofwaveletstospecificationandjustifythe basis of the application of Wavelet transforms to different fields	PO1,PO2,PO3,PO4, PO12

TEXTBOOKS:

1. C.SidneyBurrus,RameshA.Gopinath,—IntroductiontoWaveletsandWaveletsTransforms‖, Prentice Hall, (1997).
2. JamesS.Walker,—APrimeronWaveletsandtheirScientificApplications‖,CRCPress, (1999).

REFERENCEBOOKS:

1. RaghuveerRao,—WaveletTransforms‖,PearsonEducation,Asia
2. C.S.Burrus,RamoseandA.Gopinath,IntroductiontoWaveletsandWaveletTransform,Prentice Hall Inc.

REFERENCEWEBSITE:

1. http://users.rowan.edu/~polikar/WAVELETS/WTtutorial.html
2. http://www.wavelet.org/
3. http://www.math.hawaii.edu/~dave/Web/Amara's%20Wavelet%20Page.htm
4. https://jqichina.wordpress.com/wp-content/uploads/2012/02/ten-lectures-of-waveletsefbc88e5b08fe6b3a2e58d81e8aeb2efbc891.pdf

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	-	-	-	1
CO2	3	2	2	2	-	-	-	-	-	-	-	1
CO3	3	2	2	1	-	-	-	-	-	-	-	1
CO4	2	2	2	1	-	-	-	-	-	-	-	1
CO5	3	3	2	1	-	-	-	-	-	-	-	1

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23OSH471B	**SMARTMATERIALSANDDEVICES**	**LTPC**
	(OPENELECTIVEIII)	**3-- 3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandtheprinciplesandapplicationsofsmartmaterialsinengineering.
2. Tounderstandthesciencebehindsmartmaterialsandtheirbehavior.
3. Toelucidatetheresponsivecharacteristicsofsmartmaterials
4. Toexploresynthesisandcharacterizationtechniquesforsmartmaterials
5. Todeterminetheappropriatesmartmaterialforagivenapplication.

UNITIINTRODUCTIONTOSMARTMATERIALS (9)

Historical account of the discovery and development of smart materials, Shape memory materials, chromoactive materials, magneto rheological materials, photoactive materials, Polymers and polymer composites (Basics).

UNITIIPROPERTIESOFSMARTMATERIALS (9)

Optical, Electrical, Dielectric, Piezoelectric, Ferroelectric, Pyroelectric and Magnetic properties of smart materials.

UNITIIISYNTHESISOFSMARTMATERIALS (9)

Chemical route: Chemical vapour deposition, Sol-gel technique, hydrothermal method, Mechanical alloying and thin film deposition techniques: Chemical etching, Spray pyrolysis.

UNITIVCHARACTERIZATIONTECHNIQUES (9)

Powder X-ray diffraction, Raman spectroscopy (RS), UV-Visible spectroscopy, Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Atomic force microscopy (AFM).

UNITVSMARTMATERIALSBASEDDEVICES (9)

Devices based on smart materials: Shape memory alloys in robotic hands, piezoelectric based devices, MEMS and intelligent devices.

TotalHours:45

COURSEOUTCOME:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**Pos**
CO1	Describethebreakthroughsthattransformedshapememory materials into practical applications. Describethetwophasesinshapememoryalloys.	PO1,PO2,PO3,PO4,PO5
CO2	Investigatehowsmartmaterialsreacttoexternalinfluenceslike light, electricity, and heat.	PO1,PO2,PO3,PO4,PO5
CO3	Describesynthesisapproachesforsmartmaterials.	PO1,PO2,PO3,PO4,PO5
CO4	Overviewofcharacterizationtechniquesforunderstandingsmart material behavior.	PO1,PO2,PO3,PO4,PO5
CO5	Highlighttheadvantagesofusingsmartmaterialsindevice applications.	PO1,PO2,PO3,PO4

TEXTBOOKS:

1. YaserDahman,NanotechnologyandFunctionalMaterialsforEngineers-,Elsevier,2017
2. E.Zschech,C.Whelan,T.Mikolajick,MaterialsforInformationTechnology:Devices, Interconnects and Packaging Springer-Verlag London Limited 2005.

REFERENCEBOOKS:

1. Gauenzi,P.,SmartStructures,Wiley,2009.
2. MahmoodAliofkhazraei,Handbookoffunctionalnanomaterials,Vol(1&2),NovaPublishers, 2014
3. HandbookofSmartMaterials,Technologies,andDevices:ApplicationsofIndustry,4.0, Chaudhery Mustansar Hussain, Paolo DiSia, Springer, 2022.
4. FundamentalsofSmartMaterials,MohsenShahinpoor,RoyalSocietyofChemistry,2020.

NPTELCOURSELINK:

https://onlinecourses.nptel.ac.in/noc22_me17/preview

COPOMAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1							
CO2	3	3	2	1	1							
CO3	3	3	1	1	1							
CO4	3	2	1	1	1							
CO5	3	3	1	1	-							
	3	2.8	1.4	1.2	1							

IVB.TECH.-VIISEMESTER

23OSH471C	**INTRODUCTON TO QUANTUM MECHANICS (OPENELECTIVEIII)**	**L T P C** **3 -- 3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Tocomprehendthefundamentaldistinctionsbetweenclassicalandquantummechanics.
2. Toanalyzetheconceptsofwave-particledualityandtheuncertaintyprinciple,alongwiththeir physical implications.
3. ToacquireknowledgeandsolvetheSchrödingerequationforsimplequantumsystems.
4. Toapplyoperatorformalismandrelevantmathematicaltechniquesinthestudyofquantum mechanics.
5. Toinvestigatethequantummechanicalrepresentationsofangularmomentumandspin.

UNIT- I: PRINCIPLESOFQUANTUMMECHANICS (9)

Introduction: Limitations of classical Mechanics, Difficulties with classical theories of black body radiation and origin of quantum theory of radiation. Wave-particle duality: de Broglie wavelength, Heisenberguncertaintyprinciple.Schrödingertimeindependentandtimedependentwaveequation, Solution of the time dependent Schrödinger equation, Concept of stationary states, Physical significance of wave function (ψ), Orthogonal, Normalized and Orthonormal functions

UNIT-II:ONEDIMENSIONALPROBLEMSANDSOLUTIONS (9)

Potential step – Reflection and Transmission at the interface.Potential well: Square well potential with rigid walls, Square well potential with finite walls.Potential barrier: Penetration of a potential barrier (tunneling effect). Periodic potential andHarmonic oscillator, Energy eigen functions and eigen values.

UNIT-III: OPERATORFORMALISM (9)

Operators, Operator Algebra, Eigen values and Eigen vectors, Postulates of quantum mechanics, Matrix representation of wave functions and linear operators.

UNIT-IV:MATHEMATICALTOOLSFORQUANTUMMECHANICS (9)

The concept of row and column matrices, Matrix algebra, Hermitian operators – definition. Dirac's bra and ket notation, Expectation values, Heisenberg (operator) representation of harmonic oscillator, Ladder operators and their significance.

UNIT-V:ANGULARMOMENTUMANDSPIN (9)

Angularmomentumoperators:Definition.Eigen functionsandEigen valuesofAM operators.Matrix representation of angular momentum operators, System with spin half(1/2), Spin angular momentum, Pauli's spin matrices. Clebsch-Gordon coefficients. Rigid Rotator: Eigen functions and Eigen values.

TotalHours:45

COURSEOUTCOME:

Aftercompletingthiscourse,studentswillbeableto:		Pos
CO1	Explainthefoundationalprinciplesofquantummechanics	PO1,PO2,PO3,PO4,PO5
CO2	ApplySchrödingerequationstosolveone-dimensional quantum problems	PO1,PO2,PO3,PO4,PO5
CO3	Solvequantummechanicalproblemsusingoperatorand matrix formulations,	PO1,PO2,PO3,PO4,PO5
CO4	EvaluatequantumstatesusingDiracnotationand expectation values.	PO1,PO2,PO3,PO4,PO5
CO5	AnalyzeangularmomentumandspinsystemsusingPauli matrices and operators.	PO1,PO2,PO3,PO4,PO5

BOOKSFORSTUDY:

1. QuantumMechanics.Vol1,A.MessaiaNoth-HollandPub.Co.,Amsterdam,(1961).
2. ATextBookofQuantumMechanics.P.M.MathewsandK.Venkatesam,TataMcGrawHill,New Delhi,(1976).
3. IntroductiontoQuantumMechanics.R.H.DickeandJ.P.Witke,Addison-WisleyPub.Co.Inc., London, (1960).
4. QuantumMechanics.S.L.Gupta,V.Kumar,H.V.SaramaandR.C.Sharma,JaiPrakashNath&Co, Meerut, (1996).

REFERENCEBOOKS:

1. QuantumMechanics.L.I.Schiff,McGrawHillBookCo.,Tokyo,(1968).
2. IntroductiontoQuantumMechanics.RichardL.Liboff,PearsonEducationLtd(FourthEdn.) 2003.

NPTELcourseslink:

1. https://archive.nptel.ac.in/courses/115/101/115101107/
2. https://archive.nptel.ac.in/courses/122/106/122106034/
3. https://nptel.ac.in/courses/115106066

COPOMAPPING:

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

IVB.TECH.-VIISEMESTER

23OSH471D GREENCHEMISTRYANDCATALYSISFORSUSTAINABLE ENVIRONMENT (OPEN ELECTIVE-III) **L T PC 3--3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. ToUnderstandPrincipleandConceptsofGreenChemistry.
2. ToUnderstandtheTypesofCatalysisandIndustrialApplications.
3. ToApplyGreenSolventsinChemical Synthesis.
4. ToEnumerateDifferentSourcedofGreenEnergy.
5. ToApplyAlternativeGreenerMethodsFoeChemicalReactions

UNITI:PRINCIPLESANDCONCEPTSOFGREENCHEMISTRY [9]

Introduction, Green chemistry Principles, sustainable development and green chemistry, E factor, atom economy, atom economic Reactions: Rearrangement and addition reactions and atom un-economic reactions: Substitution, elimination and Wittig reactions, Reducing Toxicity. Waste - problems and Prevention: Design for degradation, Polymer recycling

UNIT2:CATALYSISANDGREENCHEMISTRY [9]

Introduction,Typesofcatalysis,Heterogeneouscatalysis:BasicsofHeterogeneousCatalysis,Zeolite and the Bulk Chemical Industry, Heterogeneous Catalysis in the Fine Chemical and Pharmaceutical Industries,CatalyticConverters,Homogeneous catalysis:TransitionMetal Catalystswith Phosphine Ligands, Greener Lewis Acids, and Phase transfer catalysis, Bio-catalysis andPhoto- catalysis with examples.

UNIT3:GREENSOLVENTSINCHEMICALSYNTHESIS [9]

Green Solvents: Concept, Tools and techniques for solvent selection, supercritical fluids: Super critical carbon dioxide, super critical water, Polyethylene glycol (PEG), Ionic liquids, Recycling of green solvents.

UNIT4:EMERGINGGREENERTECHNOLOGIES [9]

Biomass as renewable resource, Energy: Energy from Biomass, Solar Power, Chemicals from Renewable Feedstock's, Chemicals from Fatty Acids, Polymers from Renewable Resources, Alternative Economies: The Syngas Economy, The Biorefinery, Design for energy efficiency, Mechanochemical synthesis.

UNIT5:ALTERNATIVEGREENERMETHODS [9]

Photochemical Reactions - Examples, Advantages and Challenges, Photo redox catalysis, single electron transfer reactions (SET), Examples of Photochemical Reactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		POS
CO1	Apply the Green chemistry Principles for day-to-day life as well as synthesis, describe the sustainable development and green chemistry, explain economic and un-economic reactions, Demonstrate Polymer recycling.	PO1,PO2, PO3,PO4, PO5, PO7
CO2	Explain Heterogeneous catalyst and its applications in Chemical and Pharmaceutical Industries, Differentiate Homogeneous and Heterogeneouscatalysis,IdentifytheimportanceofBioandPhoto Catalysis, Discuss Transition metal and Phase transfer Catalysis	PO1,PO2, PO3,PO4, PO5, PO7
CO3	DemonstrateGreensolventsandimportance,DiscussSupercritical carbon dioxide, Explain Supercritical water, recycling of green solvents.	PO1,PO2, PO3,PO4, PO5, PO7
CO4	Describe importance of Biomass and Solar Power, Illustrate Sonochemistry, Apply Green Chemistry for Sustainable Development;discusstheimportanceofRenewableresources, mechanochemical synthesis.	PO1,PO2, PO3,PO4, PO5, PO7
CO5	Discuss Alternative green methods like Photo redox catalysis, singleelectrontransferreactions(SET),PhotochemicalReactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.	PO1,PO2, PO3,PO4, PO5, PO7

TEXTBOOKS:

1. M.Lancaster,GreenChemistryanIntroductoryText,RoyalSocietyofChemistry,2002.
2. PaulT.AnastasandJohnC.Warner,GreenChemistryTheoryandPractice,4th Edition, Oxford University Press, Usa

REFERENCEBOOKS:

1. GreenChemistryforEnvironmentalSustainability,FirstEdition,SanjayK.Sharmaand AckmezMudhoo, CRC Press, 2010.
2. EditedbyAlvisePerosaandMaurizioSelva,HandBookofGreenchemistryVolume8:Green Nanoscience, wiley-VCH, 2013.

COPOMAPPING:

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

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23OSH471E	**EMPLOYABILITYSKILLS (OPENELECTIVEIII)**	**L T PC 3-- 3**

PRE-REQUISITES:NILL

COURSEEDUCATIONALOBJECTIVES:

1. Toencourageallrounddevelopmentofthestudentsbyfocusingonproductiveskills
2. TomakethestudentsawareofGoalsettingandwriting skills
3. Toenablethemtoknowtheimportanceofpresentationsskillsinachievingdesired goals.
4. Tohelpthemdeveloporganizationalskillsgroupactivities.
5. Tofunctioneffectivelywithheterogeneousteams

UNIT-I:GOALSETTINGANDSELF-MANAGEMENT (9)

Definition,importance,typesofGoalSetting–SMARTGoalSetting–Advantages–MotivationIntrinsic and Extrinsic Motivation–Self-Management-Knowing about self–SWOC Analysis

UNIT-II:WRITINGSKILLS (9)

Definition,significance,typesofwritingskills–ResumewritingVsCVWriting-E-Mailwriting,Cover Letters- E-Mail Etiquette –So P (Statement of Purpose)

UNIT-III:TECHNICALPRESENTATIONSKILLS (9)

Nature,meaning&significanceofPresentationSkills–Planning,Preparation,Presentation,Stage Dynamics –Anxiety in Public speaking (Glossophobia)- PPT & Poster Presentation

UNIT-IV:GROUPPRESENTATIONSKILLS (9)

BodyLanguage–GroupBehavior–TeamDynamics–LeadershipSkills–PersonalityManifestation -GroupDiscussion-Debate–CorporateEtiquette

UNIT-V:JOBCRACKINGSKILLS (9)

Nature,characteristics,importance&typesofInterviews–JobInterviews–Skillsforsuccess–Job Searching skills – STAR method - FAQs-Answering Strategies–Mock Interviews

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**POS**
CO1	Understandtheimportanceofgoalsandtrytoachievethem	**PO2**
CO2	Explainthesignificanceofself-management	**PO6,PO10**
CO3	Applytheknowledgeofwritingskillsinpreparingeye-catchyresumes	**PO10**
CO4	AnalyzevariousformsofPresentationskills	**PO12**
CO5	Judgethegroupbehaviorappropriately	**PO4**

TEXTBOOKS:

1. SabinaPillai,Agna Fernandez.SoftSkills&EmployabilitySkills,2014.CambridgePublisher.
2. AlkaWadkar.LifeSkills forSuccess,SagePublications,2016.

REFERENCEBOOKS:

1. GangadharJoshi.CampustoCorporatePaperback,SagePublications.2015
2. SherfieldMontogomeryMoody,CornerstoneDevelopingSoftSkills,PearsonPublications.4Ed.2008
3. ShikhaKapoor.PersonalityDevelopmentandSoftSkills-PreparingforTomorrow.1Edition,Wiley, 2017.
4. M.SenGupta,SkillsforEmployability,InnovativePublication,2019.
5. SteveDuckandDavidTMcMahan, TheBasicofCommunicationSkills ARelationalPerspective, Sage press, 2012.

ONLINESERVICES:

https://youtu.be/gkLsn4ddmTs
https://youtu.be/2bf9K2rRWwo
https://youtu.be/FchfE3c2jzc
https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel j2PUy0pwjVUgj7KIJ
https://www.youtube.com/c/skillopedia/videoshttps://onlinecourses.nptel.ac.in/noc2 5 hs96/preview https://onlinecourses.nptel.ac.in/noc21 hs76/preview
https://archive.nptel.ac.in/courses/109/107/109107172/#
https://archive.nptel.ac.in/courses/109/104/109104107/

COPOMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	-	-	-	-	-	1
CO2	3	3	2	3	2	-	-	-	-	-	-	2
CO3	3	3	3	3	2	1	-	-	-	-	-	2
CO4	3	3	2	2	1	-	-	-	-	-	-	1
CO5	3	3	3	3	2	-	-	-	-	-	-	2

IVB.TECH.-VIISEMESTER

23OCE472A	**GEO-SPATIAL TECHNOLOGIES (OPENELECTIVEIV)**	**L T P C 3-- 3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandraster-basedspatialanalysistechniques,includingquery,overlay,andcost- distance analysis.
2. Toanalyzevector-basedspatial analysistechniquessuchastopology,overlay,andproximity analysis.
3. Toapplynetworkanalysistechniquesforgeocoding,shortestpathanalysis,andlocation- allocation problems.
4. Toevaluatesurfaceandgeostatisticalanalysismethods,includingterrainmodeling,watershed analysis, and spatial interpolation.
5. ToassessGIScustomization,WebGIS,andmobilemappingtechniquesforrealworld applications.

UNIT–IRASTERANALYSIS (9)

Raster Data Exploration: Query Analysis - Local Operations: Map Algebra, Reclassification, Logical and Arithmetic Overlay Operations—Neighborhood - Operations: Aggregation, Filtering – Extended Neighborhood-Operations- Zonal Operations - Statistical Analysis – Cost-Distance Analysis-Least Cost Path.

UNIT–IIVECTORANALYSIS (9)

Non-Topological Analysis: Attribute Database Query, Structured Query Language, Co Ordinate Transformation, Summary Statistics, Calculation of Area, Perimeter and Distance – topological Analysis: Reclassification, Aggregation, Overlay Analysis: Point-In-Polygon, Line-In-Polygon, Polygon-On-Polygon: Clip, Erase, Identity, Union, Intersection – Proximity Analysis: Buffering

UNIT–IIINETWORKANALYSIS (9)

Network–Introduction-NetworkDataModel–ElementsofNetwork-BuildingANetworkDatabase -Geocoding–AddressMatching-ShortestPathinANetwork–TimeandDistanceBasedShortest Path Analysis – Driving Directions – Closest Facility Analysis – Catchment / Service Area Analysis-Location-Allocation Analysis

UNIT–IVSURFACEandGEOSTATISTICALANALYSIS (9)

Surface Data – Sources of X, Y, Z Data – DEM, TIN – Terrain Analysis – Slope, Aspect, Viewshed, Watershed Analysis: Watershed Boundary, Flow Direction, Flow Accumulation, Drainage Network, Spatial Interpolation: IDW, Spline, Kriging, Variogram.

UNIT–VCUSTOMISATION,WEBGIS,MOBILEMAPPING (9)

CustomizationofGIS:Need,Uses,ScriptingLanguages –EmbeddedScripts–UseofPython Script - Web GIS: Web GIS Architecture, Advantages of Web GIS, Web Applications- Location Based Services: Emergency and Business Solutions - Big Data Analytics.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	Understandraster-basedspatialanalysistechniques,including query, overlay, and cost- distance analysis.	PO1,PO2,PO3,PO4,PO5,PO6
CO2	Analyzevector-basedspatialanalysistechniquessuchastopology, overlay, and proximity analysis.	PO1,PO2,PO3,PO4,PO5,PO6
CO3	Applynetworkanalysistechniquesforgeocoding,shortestpath analysis, and location- allocation problems.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO4	Evaluatesurfaceandgeostatisticalanalysismethods,including terrain modeling, watershed analysis, and spatial interpolation.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO5	Assess GIS customization, Web GIS, and mobile mapping techniques for real-world applications.	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO8

TEXTBOOKS:

1. Kang–TsungChang,IntroductiontoGeographicalInformationSystem,4thEd.,TataMcGraw Hill Edition, 2008.
2. Lo,C.P.andYeung,AlbertK.W.,ConceptsandTechniquesofGeographicInformationSystems Prentice Hall, 2002.

REFRENCEBOOKS:

1. Michael N. Demers,Fundamentalsof Geographic Information Systems,Wiley,2009
2. IanHeywood,SarahCornelius,SteveCarver,Srinivasaraju,—AnIntroductiontoGeographical Information Systems, Pearson Education, 2nd Edition, 2007.
3. JohnPeterWilson,TheHandbookofGeographicInformationScience,BlackwellPub.,2008

ONLINE LEARNINGRESOURCES:

https://archive.nptel.ac.in/courses/105/105/105105202/https://onlinecourses.nptel.ac.in/noc19_cs76/preview

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	2	2	3	-	-	-	-	-	1
CO-2	3	3	3	2	2	3	-	-	-	-	-	1
CO-3	3	3	3	2	2	3	3	-	-	-	-	1
CO-4	3	3	3	3	2	3	3	-	-	-	-	1
CO-5	2	2	2	2	2	3	3	3	-	-	-	1

IVB.TECH.-VIISEMESTER

23OCE472B	**SOLIDWASTEMANAGEMENT (OPEN ELECTIVE IV)**	**L**	**TP**	**C**
		3	**--**	**3**

PRE-REQUISITES:NILL

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandthetypes,sources,andcharacteristicsofsolidwaste,alongwithregulatory frameworks.
2. Toanalyzeengineeringsystemsforsolidwastecollection,storage,andtransportation.
3. Toapplyresourceandenergyrecoverytechniquesforsustainablesolidwastemanagement.
4. Toevaluatelandfilldesign,construction,andenvironmentalimpactmitigationstrategies.

UNIT– I **(9)**

Solid Waste: Definitions, Types of Solid Wastes, Sources of Solid Wastes, Characteristics, and Perspectives; Properties of Solid Wastes, Sampling of Solid Wastes, Elements of Solid Waste Management - Integrated Solid Waste Management, Solid Waste Management Rules 2016.

UNIT–II **(9)**

Engineering Systems for Solid Waste Management: Solid Waste Generation; On-Site Handling, Storage and Processing; Collection of Solid Wastes; Stationary Container System and Hauled Container Systems – Route Planning - Transfer and Transport; Processing Techniques;

UNIT–III **(9)**

EngineeringSystemsforResourceandEnergyRecovery:ProcessingTechniques;MaterialsRecovery Systems;RecoveryofBiologicalConversionProducts –Composting,PreandPostProcessing,Types of Composting, Critical Parameters, Problems with Composing -Recovery of Thermal Conversion Products;Pyrolisis,Gasification,RDF-RecoveryofEnergyfromConversionProducts;Materialsand Energy Recovery Systems.

UNIT–IV **(9)**

Landfills: Evolution of Landfills – Types and Construction of Landfills – Design Considerations – Life ofLandfills-LandfillProblems–LiningofLandfills–TypesofLiners–LeachatePollutionandControl – Monitoring Landfills – Landfills Reclamation.

UNIT– V **(9)**

Hazardous Waste Management: – Sources and Characteristics, Effects on Environment, Risk Assessment–Disposal of HazardousWastes–Secured Landfills, Incineration -Monitoring–Biomedical Waste Disposal, E-Waste Management, Nuclear Wastes, Industrial Waste Management

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	Understand the types, sources, and characteristics of solidwaste, along with regulatory frameworks.	PO1,PO5,PO7
CO2	Analyze engineering systems for solid waste collection, storage, and transportation.	PO1,PO2,PO5,PO7
CO3	Applyresourceandenergyrecoverytechniquesforsustainable solid waste management.	PO1,PO3,PO4,PO5,PO7
CO4	Evaluate landfill design, construction, and environmental impact mitigation strategies.	PO3,PO4,PO5,PO8,PO7
CO5	Assess hazardous waste management techniques, including biomedical and e-waste	PO5,PO6,PO7,PO8

TEXTBOOKS:

1. TchobanoglousG,TheisenHandVigilSA_IntegratedSolidWasteManagement, EngineeringPrinciplesandManagementIssues`McGraw-Hill,1993.

2. VesilindPA,WorrellWandReinhartD,_SolidWasteEngineering`Brooks/Cole ThomsonLearningInc.,2002.

REFRENCEBOOKS:

1. Peavy,H.S,Rowe,D.R.,andG.Tchobanoglous,_EnvironmentalEngineering`,McGrawHillInc., New York, 1985.

2. QianX,KoernerRMandGrayDH,_GeotechnicalAspectsofLandfillDesignand Construction`PrenticeHall,2002.

ONLINE LEARNINGRESOURCES:

1. https://archive.nptel.ac.in/courses/105/103/105103205/
2. https://archive.nptel.ac.in/courses/120/108/120108005/

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	-	2	-	2	-	-	-	-	-
CO-2	3	3	-	-	2	-	3	-	-	-	-	2
CO-3	3	-	3	2	3	-	3	-	-	-	-	-
CO-4	-	-	3	3	3	-	3	2	-	-	-	-
CO-5	-	-	-	-	3	3	3	3	-	-	-	-

IVB.TECH.-VIISEMESTER

		L	T	P	C
23OEE472A	ELECTRICVEHICLES (OPENELECTIVEIV)	3	--		3

PRE-REQUISITES:NILL

COURSEEDUCATIONALOBJECTIVES:

1. Rememberandunderstandthedifferencesbetweenconventional VehicleandElectricVehicles, electro mobility and environmental issues of EVs.
2. AnalyzevariousEVconfigurations,parametersofEVsystemsandElectricvehicleDynamics.
3. Analyzethebasicconstruction,operationandcharacteristicsoffuelcellsandbatterycharging techniques in HEV systems
4. DesignandanalyzethevariouscontrolstructuresforElectricvehicle

UNIT–1:INTRODUCTIONTOEVSYSTEMSANDENERGYSOURCES: (9)

Past, Present and Future of EV - EV Concept- EV Technology- State-of-the Art of EVs- EV configuration- EV system- Fixed and Variable gearing- Single and multiple motor drive- In-wheel drives- EV parameters: Weight, size, force and energy, performance parameters. Electro mobility and the environment- History of Electric power trains- Carbon emissions from fuels- Green houses and pollutants- Comparison of conventional, battery, hybrid and fuel cell electric systems.

UNIT–2:EVPROPULSIONANDDYNAMICS: (9)

ChoiceofelectricpropulsionsystemBlockdiagramConceptofEVMotorsSingleandmulti-motor configurations-Fixedandvariablegearedtransmission-In-wheelmotorconfiguration-Classification -Electricmotorsusedincurrentvehicleapplications-RecentEVMotors-Vehicleloadfactors-Vehicle acceleration.

UNIT–3:FUELCELLS: (9)

Introductionoffuelcells-Basicoperation-Model-Voltage,powerandefficiency-Powerplantsystem – Characteristics- Sizing - Example of fuel cell electric vehicle - Introduction to HEV- Brake specific fuel consumption - Comparison of Series-Parallel hybrid systems- Examples.

UNIT–4:BATTERYCHARGINGANDCONTROL: (9)

Batterycharging:Basicrequirements-Chargerarchitecture-Chargerfunctions-Wirelesscharging-Power factor correction.

Control:Introduction-Modellingofelectromechanicalsystem-Feedbackcontrollerdesign approach-PIcontroller's designing- Torque-loop, Speed control loop compensation- Acceleration of batteryelectric vehicle

UNIT–5:ENERGYSTORAGETECHNOLOGIES: (9)

Role of Energy Storage Systems- Thermal- Mechanical-Chemical- Electrochemical- Electrical - Efficiency of energy storage systems- Super Capacitors-Superconducting Magnetic Energy Storage (SMES)- SOC- SoH -fuel cells - G2V- V2G- Energy storage in Micro-grid and Smart grid- Energy Management with storage systems- Battery SCADA

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	TounderstandanddifferentiatebetweenConventional Vehicle and Electric Vehicles, electro mobility and environmentalissuesofEVs	PO1,PO2,P03, PO4
CO2	UnderstandVariousdynamicsofElectricVehicles	PO1,PO2,P03
CO3	Torememberandunderstandvariousconfigurationsin parameters of EV system and dynamic aspects of EV	PO1,PO2,P03, PO4
CO4	ToanalyzefuelcelltechnologiesinEVandHEVsystems	PO1,PO2,P03, PO4
CO5	To analyze the battery chargingand controls requiredof EVs	PO1,PO2,P03,

TEXTBOOKS:

1. C.CChan,K.TChau:ModernElectricVehicleTechnology,OxfordUniversityPressInc.,NewYork 2001,1st Edition
2. AliEmadi,"AdvancedElectricDriveVehicles",CRCPress,2017,1stEdition.

REFERENCEBOOKS:

1. ElectricandHybridVehiclesDesignFundamentals,IqbalHusain,CRCPress2021,3rdEdition.
2. FranciscoDíaz-González,AndreasSumper,OriolGomis-Bellmunt,"EnergyStorageinPower Systems"WileyPublication,ISBN:978-1-118-97130-7,Mar2016,1stEdition
3. A.G.Ter-Gazarian,"EnergyStorageforPowerSystems",theInstitutionofEngineeringand Technology (IET) Publication, UK, (ISBN – 978-1-84919-219-4), Second Edition, 2011.
4. MehrdadEhsani,YimiGao,SebastianE.Gay,AliEmadi,"ModernElectric,HybridElectricand FuelCellVehicles:Fundamentals,TheoryandDesign",CRCPress,2004,1stEdition.
5. JamesLarminie,JohnLowry,"ElectricVehicleTechnologyExplained",Wiley,2003,2ndEdition.

ONLINELEARNINGRESOURCES:

1. https://nptel.ac.in/courses/108/102/108102121/
2. https://nptel.ac.in/syllabus/108103009

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	2	2	-	-	-	-	-	-	-	-
CO.2	3	3	2	-	-	-	-	-	-	-	-	-
CO.3	3	3	2	2	-	-	-	-	-	-	-	-
CO.4	3	3	2	2	-	-	-	-	-	-	-	-
CO.5	3	3	2	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IVB.TECH.-VIISEMESTER

23OEC472A	**TRANSDUCERS AND SENSORS (OPENELECTIVEIV)**	**L T P C 3-- 3**

PRE-REQUISITES:NILL

COURSEEDUCATIONALOBJECTIVES:

1. TounderstandcharacteristicsofInstrumentationSystemandtheoperatingprincipleofmotion transducers.
2. Toexploreworkingprinciples,andapplicationsofdifferenttemperaturetransducersand Piezo-electric sensors.
3. Toprovideknowledgeonflowtransducersandtheirapplications.
4. Tostudytheworkingprinciplesofpressuretransducers.
5. Tointroduceworkingprincipleandapplicationsofforceandsoundtransducers.

UNITI-INTRODUCTION (9)

Introduction: General Configuration and Functional Description of measuring instruments, Static and Dynamic Characteristics of Instrumentation System, Errors in Instrumentation System, Active and Passive Transducers and their Classification.

Motion Transducers: Resistive strain gauge, LVDT, RVDT, Capacitive transducers, Piezo-electric transducers, seismic displacement pick-ups, vibrometers and accelerometers.

UNITII-TEMPERATURETRANSDUCERS (9)

Temperature Transducers: Standards and calibration, fluid expansion and metal expansion type transducers - bimetallic strip, Thermometer, Thermistor, RTD, Thermocouple and their characteristics.

Hall effect transducers, Digital transducers, Proximity devices, Bio-sensors, Smart sensors, Piezo-electric sensors.

UNITIII-FLOWTRANSDUCERS (9)

FlowTransducers: Bernoulli'sprincipleandcontinuity,Orificeplate,Nozzleplate,Venturetube, Rotameter,Anemometers,Electromagneticflowmeter,ImpellermeterandTurbidflowmeter.

UNITIV-PRESSURETRANSDUCERS (9)

Pressure Transducers: Standards and calibration, different types of manometers, elastic transducers, diaphragm bellows, bourdon tube, capacitive and resistive pressure transducers, high and low pressure measurement.

UNITV-FORCEANDSOUNDTRANSDUCERS (9)

ForceandSoundTransducers: Provingring,hydraulicandpneumaticloadcell,dynamometerand gyroscopes. Sound level meter, sound characteristics, Microphone**.**

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	Understand characteristics of Instrumentation System and the operating principle of motion transducers.	PO1,PO2
CO2	Exploreworkingprinciples,andapplicationsofdifferenttemperature transducers and Piezo-electric sensors.	PO1,PO2
CO3	Gainknowledgeonflowtransducersandtheirapplications.	PO1,PO2
CO4	Learntheworkingprinciplesofpressuretransducers.	PO1,PO2
CO5	Understandtheworkingprincipleandapplicationsofforceandsound transducers.	PO1,PO2

TEXTBOOKS:

1. A.K.Sawhney,"AcourseinElectricalandElectronicsMeasurementsandInstrumentation", DhanpatRai&Co.3rdeditionDelhi,2010.
2. RanganC.S,SarmaG.RandManiVSV,"InstrumentationDevicesandSystems",TATA McGraw Hill publications, 2007.

REFERENCEBOOKS:

1. Ramesh Doebelin.E.O,"MeasurementSystemsApplicationandDesign", McGrawHill International, New York, 2004.
2. NakraB.CandChaudharyK.K,"InstrumentationMeasurementandAnalysis",SecondEdition, TataMcGraw-HillPublicationLtd.2006.

REFERENCEWEBSITE:

1. https://onlinecourses.nptel.ac.in/noc23_ee105/preview
2. https://onlinecourses.nptel.ac.in/noc25_ee76/preview

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23OME472A	**FUNDAMENTALSOFQUALITYMANAGEMENT (OPENELECTIVEIV)**	**LTPC 3-- 3**

PRE-REQUISITES:NILL

COURSEEDUCATIONALOBJECTIVES:

1. Tointroducethefundamentalconcepts,definitions,anddimensionsofqualityandTotalQuality Management (TQM).
2. Toexploretheevolutionofqualitymanagementthroughhistoricalperspectivesand contributions of quality gurus.
3. ToexplainthecoreprinciplesofTQMincludingcustomersatisfaction,employeeinvolvement, and continuous improvement.
4. ToanalyzethevariousTQMtoolssuchasBenchmarking,QFD,FMEA, SixSigma,andtheirrole in quality enhancement.
5. Toprovideanunderstandingofqualitysystemslike ISO9000,ISO14000,QS9000,andthe processes for their implementation.

UNIT–1:INTRODUCTIONTOQUALITYMANAGEMENT: (9)

Introduction: Definition of Quality, Dimensions of Quality, Definition of Total quality management, Quality Planning, Quality costs – Analysis, Techniques for Quality costs, Basic concepts of Total Quality Management.

UNIT–2:HISTORICALREVIEW: (9)

Historical Review: Quality council, Quality statements, Strategic Planning, Deming Philosophy, Barriers of TQM Implementation, Benefits of TQM, Characteristics of successful quality leader, Contributions of Gurus of TQM, Case studies.

UNIT–3:PRINCIPLESOFQUALITYMANAGEMENT: (9)

TQM Principles: Customer Satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment teams, Continuous Process Improvement – Juran Trilogy, PDSA Cycle, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure Case studies.

UNIT–4:TQMTOOLS: (9)

TQM Tools: Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept,Improvement Needs,FMEA – Stages ofFMEA, The seven tools of quality, Process capability, Concept of Six Sigma, New Seven management tools, Case studies.

UNIT–5:QUALITYSYSTEMS: (9)

NeedforISO9000–ISO9001-2008QualitySystem–BenefitsofISOregistration–ISO9000series of standards – AS 9100, TS16949 and TL 9000 – ISO 9001 Requirements – Implementation – Documentation–Internalandexternalaudits–Registration–TQMimplementationinmanufacturing andservicesectors.EnvironmentalManagementSystem:Introduction–ISO14000SeriesStandards – Concepts of ISO 14001—Requirements of ISO 14001 – Benefits of EMS.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Defineandexplainthebasicconceptsofquality,quality costs, and the scope of Total Quality Management.	L2,L4,L5
CO2	SummarizethephilosophiesandcontributionsofTQM pioneersandevaluatebarriersandenablersforTQM implementation.	L4,L5,L6
CO3	ApplyTQMprinciplessuchasemployeeempowerment, customersatisfaction,andsupplierpartnershipstoreal-worldbusinessscenarios.	L2,L3,L4
CO4	Analyze the application of tools like QFD, FMEA, Six Sigma, andBenchmarkinginimprovingproductandprocessquality	L3,L4,L5
CO5	Evaluate and formulate quality systems like ISO 9000 and ISO 14000, and design documentation and auditing processes.	L1,L3,L6

TEXTBOOKS:

1. DaleHBesterfield,TotalQualityManagement,FourthEdition,PearsonEducation,2015.
2. SubburajRamaswamy,TotalQualityManagement,TataMcgrawHillPublishingCompanyLtd., 2005.
3. JoelE.Ross,TotalQualityManagement,ThirdEition,CRCPress,2017.ReferenceBooks

REFERENCEBOOKS:

1. NarayanaVandSreenivasanN.S,QualityManagement–ConceptsandTasks,NewAge International, 1996.
2. RobertL.Flood,BeyondTQM,FirstEdition,JohnWiley&SonsLtd,1993.
3. RichardS.Leavenworth&EugeneLodewickGrant,StatisticalQualityControl,SeventhEdition, Tata Mcgraw Hill, 2015
4. SamuelHo,TQM–AnIntegratedApproach,KoganPageLtd,USA,1995.

REFERENCEWEBSITE:

- https://www.investopedia.com/terms/t/total-quality-management-tqm.asp
- https://blog.capterra.com/what-is-total-quality-management/
- https://nptel.ac.in/courses/110/104/110104080/

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

IVB.TECH.-VIISEMESTER

23OSH472A	**FINANCIALMATHEMATICS (OPENELECTIVEIV)**	**LT P C 3-- 3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Toprovidemathematicalfoundationsforfinancialmodelling,riskassessmentandassetpricing.
2. Tointroducestochasticmodelsandtheirapplicationsinpricingderivativesandinterestrate modelling.
3. Todevelopanalyticalskillsforfixed-incomesecurities,creditrisk,andinvestmentstrategies.
4. Toequipstudentswithcomputationaltechniquesforpricingfinancialderivatives.

UNIT-I:ASSETPRICINGANDRISKMANAGEMENT (9)

Fundamental financial concepts: Returns, arbitrage, valuation, and pricing. Asset/Liability management,investmentincome,capitalbudgeting, andcontingentcashflows.One-period model: Securities, payoffs, and the no-arbitrage principle.Option contracts: Speculation and hedging strategies, CAP Model, Efficient market hypothesis.

UNIT-II:STOCHASTICMODELSINFINANCE (9)

RandomWalksandBrownianMotion.IntroductiontoStochasticDifferentialEquations(SDEs):Drift anddiffusion.Itocalculus:Ito‘sLemma,ItoIntegral,andItoIsometry.

UNIT-III:INTERESTRATEANDCREDITMODELLING (9)

Interestratemodels andbondmarkets.Short-ratemodels:Vasicek,Cox-Ingersoll-Ross(CIR), Hull & White models, Credit risk modelling: Hazard function and hazard rate.

UNIT-IV:FIXED-INCOMESECURITIESANDBONDPRICING (9)

Characteristicsoffixed-incomeproducts:Yield,duration,andconvexity.Yieldcurves,forwardrates, andzero-couponbonds.Stochasticinterestratemodelsandbondpricing PDE.Yieldcurvefittingand calibration techniques, Mortgage Backed Securities.

UNIT-V:EXOTICOPTIONSANDCOMPUTATIONALFINANCE (9)

StochasticvolatilitymodelsandtheFeynman-Kactheorem.Exoticoptions:Barriers,Asians,andLook backs. Monte Carlo methods for derivative pricing, Black-Scholes-Merton model: Derivation and applications.

TotalHours: 45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	Explainfundamentalfinancialconcepts,includingarbitrage, valuation, and risk.	PO1,PO2,PO5,PO11,PO12
CO2	Apply stochasticmodels,includingBrownianmotionand StochasticDifferential Equations (SDEs), in financial contexts.	PO1,PO2,PO3,PO4,PO5, PO11,PO12
CO3	Analyzemathematicaltechniquesforpricingoptionsand financial derivatives.	PO1,PO2,PO3,PO4,PO5,PO6, PO11,PO12
CO4	Evaluateinterestratemodelsandbondpricingmethodologies.	PO1,PO2,PO3,PO4,PO5, PO11,PO12
CO5	Utilize computational techniques such as Monte Carlo simulations for financial modeling.	PO1,PO2,PO3,PO4,PO5, PO11,PO12

TEXTBOOKS:

1. AlesCerny,*MathematicalTechniquesinFinance:ToolsforIncompleteMarkets*,Princeton University Press.
2. S.R.Pliska,*IntroductiontoMathematicalFinance:Discrete-TimeModels*,CambridgeUniversity Press.

REFERENCEBOOKS:

1. IoannisKaratzas&StevenE.Shreve,*MethodsofMathematicalFinance*,Springer,NewYork.
2. JohnC.Hull,*Options,Futures,andOther Derivatives*,Pearson.

REFERENCEWEBSITE:

- MIT–MathematicsforMachineLearninghttps://ocw.mit.edu
- Coursera – Financial Engineering and Risk Management (Columbia University) https://www.coursera.org/
- NationalStockExchange(NSE)India-FinancialDerivativeshttps://www.nseindia.com/

CO-POMAPPING:

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

IVB.TECH.-VIISEMESTER

23OSH472B	**SENSORS AND ACTUATORS FOR ENGINEERING APPLICATIONS(OPENELECTIVEIV)**	**LTP C 3-- 3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Toprovidecomprehensiveexposuretovarioustypesofsensorsandactuators,alongwiththeir engineering applications.
2. Toimpartfundamentalknowledgeofthelawsandphenomenagoverningtheoperationof sensors and actuators.
3. Toexplaintheworkingprinciplesandfunctionalityofdifferentsensorsandactuators.
4. Toeducatestudentsonthefabricationtechniquesandprocessesinvolvedinsensor development.
5. Toidentifyandexplaintheappropriatesensorsandactuatorsrequiredforinterdisciplinary applications.

UNIT-I-INTRODUCTIONTOSENSORSANDACTUATORS (9)

Sensors: Types of sensors: temperature, pressure, strain, active and passive sensors, General characteristics of sensors (Principles only), Deposition: Chemical Vapor Deposition, Pattern: photolithography and Etching: Dry and Wet Etching.

Actuators:Functional diagram ofactuators,Types ofactuatorsand their basicprinciple ofworking: Pneumatic, Electromagnetic, Piezo-electric and Piezo-resistive actuators, Applications of Actuators.

UNIT-II-TEMPERATUREANDMECHANICALSENSORS (9)

Temperature Sensors: Types of temperature sensors and their basic principle of working: Thermo-resistive sensors: Thermistors, Thermo-electric sensors: Thermocouples, PN junction temperature sensors

MechanicalSensors:TypesofMechanicalsensorsandtheirbasicprincipleofworking:Forcesensors: Strain gauges, Tactile sensors, Pressure sensors: Piezoresistive, Variable Reluctance Sensor (VRP).

UNIT-IIIOPTICALANDACOUSTICSENSORS (9)

Optical Sensors: Basic principle and working of: Photodiodes, Phototransistors and Photoresistors based sensors, Photomultipliers, Infrared sensors: thermal, Passive Infra-Red, Fiber based sensors and Thermopiles Acoustic Sensors: Principle and working of Ultrasonic sensors, Piezo-electric resonators, Microphones

UNIT-IV-MAGNETIC ANDELECTROMAGNETICSENSORS (9)

Motorsasactuators(linear,rotational,steppingmotors),magneticvalves,inductivesensors(LVDT, RVDT,andProximity),HallEffectsensors,Magneto-resistivesensors,Magnetostrictivesensorsand actuators.

UNIT-V-CHEMICALANDRADIATIONSENSORS (9)

ChemicalSensors:PrincipleandworkingofElectro-chemical,Thermo-chemical,Gas,pH,Humidity and moisture sensors.

Radiation Sensors: Principle and working of Ionization detectors, Scintillation detectors, Semiconductor radiation detectors and Microwave sensors (resonant, reflection, transmission)

TotalHours: 45

COURSEOUTCOMES:

	Onsuccessfulcompletionofthecourse,studentswill be able to	POs
CO1	Classifyvarioustypesofsensorsandactuatorsalongwiththeir key characteristics.	PO1,PO2,PO3,PO4,PO5
CO2	Reviewtheworkingprinciplesandapplicationsoftemperature and mechanical sensors.	PO1,PO2,Po3,PO4,PO5
CO3	Explaintheconstructionandfunctionalityofdifferentoptical and mechanical sensors.	PO1,PO2,Po3,PO4,PO5
CO4	Analyzetheoperationalprinciplesandapplicationsofoptical and acoustic sensors.	PO1,PO2,PO3,PO4
CO5	Interpretthesignificanceofsmartmaterialsinthedesignand development of advanced devices.	PO1,PO2,PO3,PO4

TEXTBOOKS:

1. SensorsandActuators–ClarenceW.deSilva,CRCPress,2ndEdition,2015
2. SensorsandActuators,D.A.HallandC.E.Millar,CRCPress,1999

REFERENCEBOOKS:

1. SensorsandTransducers-D.Patranabhis,PrenticeHallofIndia(Pvt)Ltd.2003
2. Measurement,Instrumentation, and SensorsHandbook-JohnG.Webster,CRCpress 1999
3. Sensors–AComprehensiveSensors-HenryBolte,JohnWiley.
4. Handbookofmodernsensors,Springer,StefanJohannRupitsch.

NPTELCOURSELINK:

https://onlinecourses.nptel.ac.in/noc21_ee32/preview

CO-POMAPPING:

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

IVB.TECH.-VIISEMESTER

23OSH472C	**CHEMISTRYOFNANOMATERIALSANDAPPLICATIONS (OPENELECTIVEIV)**	**L**	**T**	**P** **C**
		3	**--**	**3**

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Tounderstandbasicsandcharacterizationofnanomaterials.
2. Tounderstandsyntheticmethodsofnanomaterials.
3. Toapplyvarioustechniquesforcharterizationofnanomaterials.
4. TounderstandStudiesofNano-structuredMaterials
5. Toenumeratetheapplicationsofadvancednanomaterialsinengineering

UNIT–IBASICSANDCHARACTERIZATIONOFNANOMATERIALS [9]

Introduction**,** Scope of nanoscience and nanotechnology, nanoscience in nature, classification of nanostructured materials, importance of nanomaterials.

UNIT–IISYNTHESISOFNANOMATERIALS [9]

Top-Down approach**,** Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling method.
SyntheticMethods**:**Bottom-Upapproach**,**Sol-gelsynthesis,microemulsionsorreversemicelles,co-precipitationmethod,solvothermalsynthesis,hydrothermalsynthesis,microwaveheatingsynthesis and son chemical synthesis.

UNIT-IIITECHNIQUESFORCHARACTERIZATION [9]

Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterizationofnanomaterials,BETmethodforsurfaceareaanalysis,dynamiclightscatteringfor particle size determination.

UNIT-IVSTUDIESOFNANO-STRUCTUREDMATERIALS [9]

Synthesis,propertiesandapplicationsofthefollowingnanomaterials-fullerenes,carbonnanotubes, 2D-nanomaterial (Graphene), core-shell, magnetic nanoparticles, thermoelectric materials, non- linear optical materials.

UNIT-VADVANCEDENGINEERINGAPPLICATIONSOFNANOMATERIALS [9]

ApplicationsofNanoParticle,nanorods,nanowires,Watertreatment,sensors,electronicdevices, medical domain,civilengineering,chemical engineering,metallurgyandmechanical engineering, food science, agriculture, pollutants degradation.

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		POS
CO1	Classifythenanostructurematerials;describescopeofnanoscience and importance technology.	PO1,PO2, PO3,PO4, PO5,PO7
CO2	Describethetop-downapproach,explainaerosolsynthesisandplasma arc technique, differentiate chemical vapor deposition method and electrodepositionmethod,Discussabouthighenergyball milling.	PO1,PO2, PO3,PO4, PO5, PO7
CO3	Discussdifferenttechniqueforcharacterizationofnanomaterial, explain electron microscopy techniques for characterization of nanomaterial, Describe BETmethod for surfacearea analysis.	PO1,PO2, PO3,PO4, PO5,PO7
C04	Explain synthesis and properties and applications of nanomaterials, discuss about fullerenes and carbon nanotubes, Differentiate nanomagneticmaterialsandthermoelectricmaterials,nonlinear opticalmaterials.	PO1,PO2, PO3,PO4, PO5, PO7
CO5	Illustrate advance engineering applications of Water treatment, sensors, electronic devices, medical domain, civil engineering, chemical engineering, metallurgy and mechanical engineering, food science,agriculture,pollutantsdegradation.	PO1,PO2, PO3,PO4, PO5, PO7

TEXTBOOKS:

1. **NANO:TheEssentials:**TPradeep,MaGraw-Hill,2007.
2. **TextbookofNanoscienceandnanotechnology:**BSMurty,PShankar,BaldevRai,BBRath and James Murday, Univ. Press, 2012.

REFERENCES:

1. ConceptsofNanochemistry;LudovicoCademrtiriandGeoffreyA.Ozin&GeoffreyA.Ozin, Wiley-VCH, 2011.
2. **Nanostructures&Nanomaterials;Synthesis,Properties&Applications:**GuozhongCao, Imperial College Press, 2007.

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	-	2	-	-	-	-	-
CO2	2	3	2	2	2	-	1	-	-	-	-	-
CO3	2	2	3	1	2	-	1	-	-	-	-	-
CO4	3	3	2	2	2	-	2	-	-	-	-	-
CO5	2	2	3	1	1	-	1	-	-	-	-	89

IVB.TECH.-VIISEMESTER

23OSH472D	LITERARYVIBES (OPENELECTIVEIV)	L T P C 3 - - 3

PRE-REQUISITES:NIL

COURSEEDUCATIONALOBJECTIVES:

1. Toinculcatepassionforaestheticsenseandreadingskills
2. Toencouragerespectingothers'experiencesandcreativewriting
3. Toexploreemotions,communicationskillsandcriticalthinking
4. Toeducatehowbooksserveasthereflectionofhistoryandsociety
5. Toprovidepracticalwisdomanddutyofrespondingtoeventsofthetimes

UNITI:POETRY

1. Ulysses-Alfred LordTennyson
2. NightoftheScorpion–NissimEzekiel
3. TheSecondComing-W.B.Yeats
4. WheretheMindisWithout Fear-RabindranathTagore

UNITII:DRAMA:TWELFTHNIGHT-WILLIAMSHAKESPEARE

1. Shakespeare-lifeandworks
2. Plot&sub-plotandHistoricalbackgroundoftheplay
3. ThemesandCriticism
4. Styleandliteraryelements
5. Charactersandcharacterization

UNITIII:SHORTSTORY

1. TheLuncheon-SomersetMaugham
2. TheHappyPrince-OscarWild
3. Three Questions–LeoTolstoy
4. Grief–AntonyChekov

UNITIV:PROSE:ESSAYANDAUTOBIOGRAPHY

1. MyEarlyDays–Dr.A.P.J.AbdulKalam
2. TheEnglishTeacher–R.K,Narayan
3. ThestoryofMyLife-HelenKeller
4. StudentMobs-JBPriestly

UNITV:NOVE:ATALEOFTWOCITIES-CHARLESDICKENS

1. CharlesDickens-Lifeandworks
2. PlotandHistoricalbackgroundofthenovel
3. Themesandcriticism
4. Styleandliteraryelements
5. Charactersandcharacterization

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		POS
CO1	Identify genres, literary techniques and creative uses of language in literary texts.	PO1,PO2, PO3,PO4, PO5,PO7
CO2	Explaintherelevanceofthemesfoundinliterarytextstocontemporary, Personal and cultural values and to historical forces	PO1,PO2, PO3,PO4, PO5, PO7
CO3	Applyknowledgeandunderstandingofliterarytextswhen Responding to others' problems and their own and make evidence– based arguments.	PO1,PO2, PO3,PO4, PO5,PO7
C04	Analyzetheunderlying meanings ofthetext by using theelements of literary texts.	PO1,PO2, PO3,PO4, PO5,PO7
CO5	Evaluatetheirownworkandthatofotherscritically	PO1,PO2, PO3,PO4, PO5, PO7

TEXTBOOKS:

1. CharlesDickens.HardTimes.(SangamAbridgedTexts)VantagePress,1983
2. DENTJC.WilliamShakespeare.TwelfthNight.OxfordUniversityPress,2016.

REFERENCES:

1. WJong.HistoryofEnglishLiterature,RupaPublicationsIndia;FirstEdition(4October2015)
2. RKKaushikAndSCBhatia.Essays,ShortStoriesandOneActPlays,OxfordUniversityPress.2018.
3. Dhanvel,SP.EnglishandSoftSkills,OrientBlackswan,2017.
4. NewHorizon,Pearsonpublications,NewDelhi2014
5. VimalaRamarao,ExplorationsVolume-II,PrasarangaBangaloreUniversity,2014.
6. DevNeira,Anjana&Co.CreativeWriting:ABeginner'sManual.PearsonIndia,2008

CO-POMAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	-	2	-	-	-	-	-
CO2	2	3	2	2	2	-	1	-	-	-	-	-
CO3	2	2	3	1	2	-	1	-	-	-	-	-
CO4	3	3	2	2	2	-	2	-	-	-	-	-
CO5	2	2	3	1	1	-	1	-	-	-	-	-

23CAI474L **PROMPT ENGINEERING SKILLENHANCEMENTCOURSE** **LTPC**

0122

PRE-REQUISITES: NIL

COURSEEDUCATIONALOBJECTIVES:

1. This course delves into prompt engineering principles, strategies, and best practices, a crucial aspect in shaping AI models' behavior and performance.
2. Understanding Prompt Engineering is a comprehensive course designed to equip learners with the knowledgeand skills to effectively generateand utilize prompts in natural language processing (NLP) and machine learning (ML) applications.
3. This course delves into prompt engineering principles, strategies, and best practices, a crucial aspect in shaping Al models' behaviour and performance.

MODULE1:INTRODUCTIONTOPROMPTENGINEERING

Lesson1:FoundationsofPromptEngineering

- OverviewofpromptengineeringanditssignificanceinNLPand ML.
- Historicalcontextandevolutionofprompt-basedapproaches.

MODULE2:TYPESOFPROMPTSANDTHEIRAPPLICATIONS

Lesson2:Closed-EndedPrompts

- Understandingandcreatingpromptsforspecificanswers.
- Applicationsinquestion-answeringsystems.

Lesson 3: Open-Ended Prompts

- Craftingpromptsforcreativeresponses.
- Applicationsinlanguagegenerationmodels.

MODULE3:STRATEGIESFOREFFECTIVEPROMPTING

Lesson4:ProbingPrompts

- Designingpromptstorevealmodelbiases.
- Ethicalconsiderationsinusingprobingprompts.

Lesson 5: Adversarial Prompts

- Creatingpromptstostress-testmodels.
- Enhancingrobustnessthroughadversarialprompting.

MODULE4:FINE-TUNINGANDOPTIMIZINGWITHPROMPTS

Lesson6:Fine-TuningModelswithPrompts

- Techniquesforincorporatingpromptsduringmodeltraining.
- Balancingpromptinfluenceandgeneralization.

Lesson 7: Optimizing Prompt Selection

- Methodsforselectingoptimalpromptsforspecifictasks.
- Customizingpromptsbasedonmodelbehavior.

MODULE5:EVALUATIONANDBIASMITIGATION

Lesson8:EvaluatingPromptPerformance

- Metricsandmethodologiesforassessingmodelperformancewithprompts.
- Interpretingandanalyzingresults.

Lesson9: Bias Mitigationin PromptEngineering

- Strategiestoidentifyandaddressbiasesintroducedbyprompts.
- Ensuringfairnessandinclusivityinprompt-basedmodels.

MODULE6:REAL-WORLDAPPLICATIONSANDCASESTUDIES

Lesson10:CaseStudiesinPromptEngineering

- Exploration of successful implementations and challenges in real-world scenarios.
- Guestlecturesfromindustryexpertssharingtheirexperiences

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Understandingthefundamentalsandevolutionofprompt engineering.	PO1,PO2
CO2	Gainingtheabilitytocrafteffectiveclosed-ended,open-ended, and role-based prompts.	PO1,PO3
CO3	Learningtoprobeandstress-testAImodelsforbiasand robustness.	PO1,PO2,PO4
CO4	Applyingpromptoptimizationtechniquesandperformance evaluation methods.	PO1,PO2,P03,PO4
CO5	Mitigatingbias and promotingethical promptingpractices in NLP/ML systems.	PO1,PO2,PO4,PO5

TEXTBOOKS:

1. "PromptEngineeringinAction"—DannyD.Sullivan
2. "TheArtofPromptEngineeringwithChatGPT:AHands-OnGuide"—Nathan Hunter.

REFERENCEBOOKS:

1. "PromptEngineeringinPractice"—MichaelF.Lewis
2. "MasteringAIPromptEngineering:TheUltimateGuideforChatGPTUsers"—AdrianoDamiao
3. "WritingAIPromptsForDummies"—StephanieDiamondandJeffreyAllan
4. "PromptEngineeringGuide"(OnlineResource)—promptingguide.ai

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23MAC471U	**GENDERSENSITIZATION**	**LTPC 0020**

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

- Toenablestudentstounderstandthegenderrelatedissues,vulnerabilityofwomen and men
- Tofamiliarizethemaboutconstitutionalsafeguardforgenderequality
- Toexposethestudentstodebatesonthepoliticsandeconomicsof work
- Tohelpstudentsreflectcriticallyongenderviolence
- To make them understand that gender identities and gender relations are part of culture as they shape the way daily life is lived in the family as well as wider community and the workplace.

UNIT–1:UNDERSTANDINGGENDER (9)

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT–2:GENDERROLESANDRELATIONS **(9)**

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and its Consequences- Declining Sex Ratio- Demographic Consequences-Gender Spectrum -

UNIT–3:GENDERANDLABOUR **(9)**

DivisionandValuationofLabour-Housework:TheInvisibleLabor-—MyMotherdoesn't Work.‖ —Share the Load.‖-Work: Its Politics and Economics -Fact and Fiction-UnrecognizedandUnaccountedwork-GenderDevelopmentIssues-Gender,Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming**UNIT –4: GENDER-BASED VOILENCE** **(9)**

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment - Domestic Violence - Different forms of violence against women - Causes of violence, impact of violence against women - Consequences of gender-based violence

UNIT–5:GENDERANDCULTURE **(9)**

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language- Just Relationships

TotalHours:45

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeable to		Pos
CO1	Understandthebasicconceptsofgenderanditsrelated terminology	PO1,PO2
CO2	Identify the biological, sociological, psychological and legal aspects of gender.	PO1,P03
CO3	Use the knowledge in understanding how gender discrimination works in oursociety and how to counter it.	PO1,PO2, PO4
CO4	Analyzethe gendered division of labour and its relationtopoliticsandeconomics.	PO1,PO2,P03,PO4
CO5	Appraisehowgender-rolebeliefsandsharingbehaviourare associatedwithmorewell-beinginallcultureandgender groups	PO1,PO2,P04, PO5

TEXTBOOKS:

1. A.Suneetha,UmaBhrugubanda,etal.*TowardsaWorldofEquals:ABilingual Textbook on Gender*‖,Telugu Akademi, Telangana, 2015.
2. Butler,Judith.*GenderTrouble:FeminismandtheSubversionofIdentity.*UK Paperback Edn. March 1990

REFERENCEBOOKS:

1. Wtatt,RobinandMassood,Nazia,*BrokenMirrors:ThedowryProblemsin India,*London : Sage Publications, 2011
2. Datt,R.andKornberg,J.(eds),*WomeninDevelopingCountries,Assessing Strategies for Empowerment,* London: Lynne Rienner Publishers, 2002
3. Brush,LisaD.,*GenderandGovernance*,NewDelhi,RawatPublication,2007
4. Singh,Direeti,*WomenandPoliticsWorldWide*,NewDelhi,AxisPublications,2010
5. A.Revathy& Murali, Nandini, *A Life in Trans Activism*(Lakshmi Narayan Tripathi). The University of Chicago Press, 2016

REFERENCEWEBSITE:

1. Understanding Gender chrome-extension://kdpelmjpfafjppnhbloffcjpeomlnpah/https://www.arvindguptatoys.com/arvindgupt a/kamla-gender1.pdf

   https://onlinecourses.swayam2.ac.in/nou24_hs53/preview

2. GenderRolesandRelations

   https://www.plannedparenthood.org/learn/gender-identity/sex-gender-identity/what-are-gender-roles-and-stereotypes

   https://www.verywellmind.com/understanding-gender-roles-and-their-effect-on-our-relationships-7499408

   https://onlinecourses.swayam2.ac.in/cec23_hs29/preview

3. GenderandLabour

   https://www.economicsobservatory.com/what-explains-the-gender-division-of-labour-and-how-can-it-be-redressed

   https://onlinecourses.nptel.ac.in/noc23_mg67/preview

4. Gender-BasedViolence
   https://eige.europa.eu/gender-based-violence/what-is-gender-based-violence?language_content_entity=en

   https://www.worldbank.org/en/topic/socialsustainability/brief/violence-against-women-and-girls

   https://onlinecourses.swayam2.ac.in/nou25_ge38/preview

5. GenderAndCulture
   https://gender.study/psychology-of-gender/culture-impact-gender-roles-identities/

   https://sociology.iresearchnet.com/sociology-of-culture/gender-and-culture/

   https://archive.nptel.ac.in/courses/109/106/109106136/

COMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	-	3	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

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DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

IVB.TECH.-VIISEMESTER

23CAI471P **EVALUATIONINDUSTRYINTERNSHIP** **LTPC 0002**

PRE-REQUISITES: Nill

COURSEEDUCATIONALOBJECTIVES:

1. Objectiveistogiveanopportunitytothestudenttogethandsontrainingfrom industry / research and development center.
2. Thecourseisdesigned soastoexposethestudentstoindustry environment / researchenvironmentandtotakeupon-siteassignmentastraineesorinterns.

INTERNSHIPSCHEME:

1. AttheendoftheIndustrialInternship,thecandidateshallsubmitacertificatefrom the organization where he/she has undergone industrial training and also a brief report.
2. Anindustryinternshipreporttobesubmittedbytheindividualandalongwiththe internshipcertificateprovidedbytheorganization,whichwill bereviewed and evaluated by a Committee constituted by the Head of the Department.
3. The evaluation for 100 marks will be carried out internally based on this internship report and a Viva-Voce Examination will be conducted by a Departmental Committee constituted by the Head of the Department/Institution.

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**POs**
CO1	Demonstratein-depthknowledgeontheprojecttopic	**PO1**
CO2	Identify,analyzeandformulatecomplexproblemchosenforproject work to attain substantiated conclusions.	**PO2**
CO3	Designsolutionstothechosenprojectproblem.	**PO3**
CO4	Undertakeinvestigationofprojectproblemtoprovidevalidconclusions	**PO4**
CO5	Usetheappropriatetechniques,resourcesandmodernengineering tools necessary for project work	**PO5**
CO6	Applyprojectresultsforsustainabledevelopmentofthesociety.	**PO6**
CO7	Understand the impact of project results in the context of environmental sustainability.	**PO7**
CO8	Understandprofessionalandethicalresponsibilitieswhileexecutingthe project work.	**PO8**
CO9	Functioneffectivelyasindividualandamemberintheprojectteam	**PO9**
CO10	Developcommunicationskills,bothoralandwrittenforpreparingand presenting project report.	**PO10**
CO11	Demonstrateknowledgeandunderstandingofcostandtimeanalysis required for carrying out the project.	**PO11**
CO12	Engageinlifelonglearningtoimproveknowledgeand competencein the chosen area of the project.	**PO12**

CO-POMAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	3	-	-	-	-	-	-	-	-
CO.5	-	-	-	-	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

23CAI481P **INDUSTRIAL/RESEARCHINTERNSHIP** **LTPC 0003**

PRE-REQUISITES: Nil

COURSE EDUCATIONALOBJECTIVES:

1. Objectiveistogiveanopportunitytothestudenttogethandsontrainingfromindustry/ research and development center.
2. Thecourseisdesignedsoastoexposethestudentstoindustryenvironment/research environment and to take up on-site assignment as trainees or interns.

INTERNSHIPSCHEME:

1. AttheendoftheIndustrialInternship,thecandidateshallsubmitacertificatefromthe organization where he/she has undergone industrial training and also a brief report.
2. An industry internship report to be submitted by the individual and along with the internshipcertificateprovidedbytheorganization,whichwillbereviewedandevaluated by a Committee constituted by the Head of the Department.
3. The evaluation for100 marks will be carried out internally based on this internship report andaViva-VoceExamination willbeconducted byaDepartmentalCommitteeconstituted by the Head of the Department/Institution.

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		**POs**
CO1	Demonstratein-depthknowledgeon theprojecttopic	**PO1**
CO2	Identify,analyzeandformulatecomplexproblemchosenforproject work to attain substantiated conclusions.	**PO2**
CO3	Designsolutionstothechosenprojectproblem.	**PO3**
CO4	Undertakeinvestigationofproject problemtoprovidevalidconclusions	**PO4**
CO5	Usetheappropriatetechniques,resourcesandmodernengineering tools necessary for project work	**PO5**
CO6	Applyprojectresultsfor sustainabledevelopmentofthe society.	**PO6**
CO7	Understand the impact of project results in the context of environmental sustainability.	**PO7**
CO8	Understandprofessionalandethicalresponsibilitieswhileexecutingthe project work.	**PO8**
CO9	Functioneffectivelyasindividualandamemberintheprojectteam	**PO9**
CO10	Developcommunicationskills,bothoralandwrittenforpreparingand presenting project report.	**PO10**
CO11	Demonstrateknowledgeandunderstandingofcostandtimeanalysis required for carrying out the project.	**PO11**
CO12	Engageinlifelonglearningtoimproveknowledgeandcompetencein the chosen area of the project.	**PO12**

CO-POMAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	3	-	-	-	-	-	-
CO7	-	-	-	-	-	-	3	-	-	-	-	-
CO8	-	-	-	-	-	-	-	3	-	-	-	-
CO9	-	-	-	-	-	-	-	-	3	-	-	-
CO10	-	-	-	-	-	-	-	-	-	3	-	-
CO11	-	-	-	-	-	-	-	-	-	-	3	-
CO12	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

IVB.Tech.-VIIISemester

23CAI482P	PROJECTWORK	LTPC 0010

PRE-REQUISITES: ProjectSkillsLab

COURSE EDUCATIONALOBJECTIVES:

1. DiscoveringpotentialresearchareasinthefieldofMechanicalEngineering.
2. Comparingandcontrasttheseveralexistingsolutionsfortheproblemidentified.
3. Formulatingandproposeaplanforcreatingasolutionfortheresearchplanidentified.
4. Conductingtheexperimentsasateamandinterprettheresults.
5. Reportingandpresentingthefindingsofthework conducted.

PROJECTWORKSCHEME:

1. The aim of the projectwork is to deepen comprehensionof principlesby applying them to a new problem which may be the design / fabrication / analysis for a specific application, a researchprojectwithafocusonanapplicationneededbytheindustry/society,acomputer project, a management project or a design and analysis project. A project topic must be selected by the students in consultation with their guides.
2. Acandidatemay,however,incertaincases,bepermittedtoworkonprojectsinanIndustrial / Research Organization, on the recommendations of the Head ofthe Department Concerned.Insuchcases,theProjectworkshallbejointlysupervisedbyasupervisorofthe departmentandanexpert,asajointsupervisorfromtheorganizationandthestudentshall be instructed to meet the supervisor periodically and to attend the review committee meetings for evaluating the progress.
3. To train the students in preparing project reports and to face reviews and viva voce examination.Theprogressoftheprojectisevaluatedbasedonaminimumofthreereviews.
4. Aspertheguidelinesgiventheprojectreportmustbepreparedandsubmittedtothe Head of the department before the Viva-Voce Examination.
5. Thestudentshallmakepresentationontheprogressmadebeforethe Committee.
6. ThereviewcommitteemaybeconstitutedbytheHeadoftheDepartment.Aprojectreport isrequiredattheendofthesemester.Theprojectworkisevaluatedjointlybyexternaland internal examiners constituted by the Head of the Department based on oral presentation and the project report.

SREENIVASAINSTITUTEOFTECHNOLOGYANDMANAGEMENTSTUDIES

(Autonomous)

DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING
(ARTIFICIAL INTELLIGENCE)

COURSEOUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		POs
CO1	Demonstratein-depthknowledgeon theprojecttopic	PO1
CO2	Identify,analyzeandformulatecomplexproblemchosenforproject work to attain substantiated conclusions.	PO2
CO3	Designsolutionstothechosenprojectproblem.	PO3
CO4	Undertake investigation of project problem to provide valid conclusions	PO4
CO5	Usetheappropriatetechniques,resourcesandmodernengineering tools necessary for project work	PO5
CO6	Applyprojectresultsfor sustainabledevelopmentofthe society.	PO6
CO7	Understandtheimpact ofproject resultsinthecontextof environmental sustainability.	PO7
CO8	Understandprofessionalandethicalresponsibilitieswhileexecuting the project work.	PO8
CO9	Functioneffectivelyasindividualandamemberintheprojectteam	PO9
CO10	Developcommunicationskills,bothoralandwrittenforpreparing and presenting project report.	PO10
CO11	Demonstrateknowledgeandunderstandingofcostandtime analysis required for carrying out the project.	PO11
CO12	Engageinlifelonglearningtoimproveknowledgeandcompetencein the chosen area of the project.	PO12

CO-POMAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	3	-	-	-	-	-	-
CO7	-	-	-	-	-	-	3	-	-	-	-	-
CO8	-	-	-	-	-	-	-	3	-	-	-	-
CO9	-	-	-	-	-	-	-	-	3	-	-	-
CO10	-	-	-	-	-	-	-	-	-	3	-	-
CO11	-	-	-	-	-	-	-	-	-	-	3	-
CO12	-	-	-	-	-	-	-	-	-	-	-	3
CO	3	3	3	3	3	3	3	3	3	3	3	3