

Scheme – 2020

Department of Computer Science & Engineering

G. Pulla Reddy Engineering College (Autonomous): Kurnool

Accredited by NBA of AICTE and NAAC of UGC

Affiliated to JNTUA, Anantapuramu

Scheme and Syllabus for II, III & IV Year of FOUR YEAR B.Tech. Degree Course in

Computer Science and Technology

(With Effect from the Batch Admitted in 2020-21)

COMPUTER SCIENCE AND ENGINEERING (CSE & CST) FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

III SEM	I CSE & CS	Г						Sc	heme-2020	
S No	Cotogom		Credite	S In per	cheme structi ·iods/w	of on eek	Schen Ma	Scheme of Examination Maximum Marks		
5. NU	Category	Course Title	Creuits	L	Т	P/D	End Exam Marks	CIA Marks	Total Marks	
Ι		Theory								
1	HSSC	Managerial Economics & Financial Accountancy	3	3			60	40	100	
2.	PCC	Switching Theory & Logic Design	3	3			60	40	100	
3	PCC	Advanced Data Structures	3	3			60	40	100	
4.	PCC	Database Systems	3	3			60	40	100	
5.	PCC	Object Oriented Programming through Java	3	3			60	40	100	
	MC	Constitution of India		2			-	100	100	
Π		Practical								
6	PCL	Advanced Data Structures Lab	1.5			3	60	40	100	
7	PCL	Database Systems Lab	1.5			3	60	40	100	
8	PCL	Object Oriented Programming through Java Lab	1.5			3	60	40	100	
	SC	Soft Skills	2	-		4	60	40	100	
		Total	21.5							

IV SEM CSE & CST

Scheme-2020

C.N.	Cotoron		Gudita	So In per	cheme structi iods/w	of ion veek	Scheme of Examination Maximum Marks			
5. 110	Category	Course Title	Creuits	L	Т	P/D	End Exam Marks	CIA Marks	Total Marks	
Ι		Theory								
1	PCC	Operating Systems	3	3			60	40	100	
2.	PCC	Software Engineering & Applications	3	2	1		60	40	100	
3.	PCC	Computer Organization	3	3			60	40	100	
4.	PCC	Design and Analysis of Algorithms	3	3			60	40	100	
5.	BSC	Discrete Structures	3	3			60	40	100	
	SC	Python Programming	2	1		2	60	40	100	
П		Practical								
6.	PCL	Operating Systems Lab	1.5			3	60	40	100	
7.	PCL	Software Engineering & Applications Lab	1.5			3	60	40	100	
8.	PCL	Design and Analysis of Algorithms Lab	1.5			3	60	40	100	
		Total	21.5							

MANAGERIAL ECONOMICS & FINANCIAL ACCOUNTANCY (MEFA)

III Semest	er: Common for	r CSE,	CST &	& ECE			S	cheme : 2020			
Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	ks			
HU201	HSSC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duration :	1½ Hi	*S			En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes : At the e	nd of tl	ne cour	se the st	udent will	be able to					
CO1: Unde	CO1: Understand the nature and scope of managerial economics and the concepts of demand analysis.										
CO2: Unde	CO2: Understand the significance of demand elasticity and the concepts of demand forecasting.										
CO3: Unde	CO3: Understand the concepts of production and cost analysis and different market structures and their										
competitive	situations.		: <u>c</u>	6	<u></u>						
CO5: Under	CO4: Understand the concept and significance of capital budgeting.										
	Understand the principles and significance of accountancy and preparation of final accounts.										
	UNIT – I										
Introduction Managerial Determinant curve.	Introduction to Managerial Economics & Demand : Managerial Economics- Definition, Nature and Scope; Demand -Meaning, Types of Demand, Demand Determinants, Law of Demand and its exceptions, Law of Diminishing Marginal Utility, Indifference curve.										
					<u> </u>						
Elasticity o Elasticity o	f Demand and D f Demand-Types	emano Meas	i Fore uremei	casting: nt and Si	gnificance:						
Demand fo	recasting –Impor	tance,	Factors	s, Purpos	ses, Method	ds of Demand Fore	ecasting				
				UN	III – III						
Theory of r	production & cos	st anal	vsis an	d Mark	et Structu	res					
 Theory of production & cost analysis and Market Structures Production Analysis: Meaning, Isoquants & Isocosts, The law of diminishing Marginal Returns, Law of Returns to Scale, Internal and External Economies of scale, Optimum combination of inputs and Producer's equilibrium Cost Analysis – Cost concepts, Cost output relationship for Short Run and Long Run, Break Even Analysis – Its Importance, Limitations and Managerial uses Market Structures: Types and Features of different market structures–Perfect Competition – Monopoly – Monopolistic and Oligopolistic; Price output determination in case of perfect competition and Monopoly. 											
				UN	IT – IV						
Capital and Capital Budgeting Introduction; Definition; Significance of Capital Budgeting; Complications involved in capital budgeting decisions; Need for capital budgeting decisions; steps in capital budgeting; Methods of Capital budgeting-Traditional methods-Payback period and Accounting rate of return methods, Discounted Cash flow methods- Net present value method, Internal Rate of return method and											

Profitability index method

UNIT – V

Introduction to Financial Accountancy:

Principles of Accountancy: Introduction, Double Entry System of Book Keeping-, Journal, Ledger, Preparation of Trial balance.

Preparation of Final Accounts: Trading Account, Profit & Loss Account, and Balance Sheet with adjustments, Final Accounts problems.

Text Books:

A.R. Aryasri A.R. Aryasri, Managerial Economics and Financial Analysis, McGrawHill Education
 Varshiney and Maheswari, Managerial Economics, Sultan Chand & Co, New Delhi

Reference Books:

1) Vanita Agarwal, Managerial Economics, Pearson Education

2) Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Thomson

3) S.P.Jain and K.L.Narang, Financial Accounting

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

SWITCHING THEORY & LOGIC DESIGN (STLD)

III Semester : Common for CSE & CST							S	cheme : 2020	
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks	
CS201	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	I	I	3	40	60	100	
Sessional E	xam Duration 1	1/2 Hrs				End	d Exam Du	ration: 3 Hrs	
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will ł	be able to			
CO1: Under	rstand number co	nversio	ons, Err	or detec	tion and co	rrection mechanis	sms.		
CO2: Apply	v axioms and theo	orems o	f Bool	ean Alge	ebra for min	nimization of Boo	lean functio	ns.	
CO3: Apply	/ Karnaugh map a	and Tał	oulation	n metho	d to obtain :	minimal SOP and	POS.		
CO4: Imple	ment combinatio	nal circ	uits: E	ncoders	, Decoders,	Multiplexers, RO	M, PLA.		
CO5: Desig	n Sequential circ	uits usi	ng Flip	-flops a	nd sequenti	al logic.			
CO6: Desig	n registers and co	ounters.							
				UN	I – TI				
Number Sy Base Conve Weighted B Boolean Al Boolean Al Standard Fo Simplificati Product of S Don't Care Implicants.	Number System & Binary Codes: The Decimal, Binary, Octal, Hexadecimal Number System, Number Base Conversions, Complements, Binary Arithmetic in Computers, Weighted Binary codes, Non- Weighted Binary codes, Error Detecting Codes, Error Correcting Codes, Parity Checking. Boolean Algebra & Minimization of Boolean Functions: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic gates. UNIT – II Simplification of Boolean Functions: The Map Method, Two, Three, Four, Five and Six variable maps, Product of Sums Simplification, NAND and NOR Implementations, Other two-Level Implementations, Don't Care Conditions, The Tabulation Method, Determination of Prime Implicants, Selection of Prime								
				UN	IT – III				
Combination Procedure, Functions. Comparator	Dal Logic : Intro Multilevel NAN Combinational Le , Decoders, Multi	duction ND Cir ogic wi	, Desig rcuits, ith MS s, Read	n Proce Multile I & LS Only M	edure, Adde evel NOR I: Binary P Iemory (RC	rs, Subtractors, Co Circuits, Exclus Parallel Adder, De DM), Programmab	ode Convers sive-or and ecimal Adde le Logic Ar	sion, Analysis Equivalence er, Magnitude ray (PLA).	
				UN	IT – IV				
Sequential Circuits, Sta Counters, D	Logic : Introduct ate Reduction an esign with State	ion, Fli d Assi Equatio	ip Flop gnment ns.	os, Trigg t, Flip I	gering of F Flop Excita	lip Flops, Analys tion Tables, Desi	is of Clock gn Procedu	ed Sequential re, Design of	
				UN	IT – V				
Registers: I	ntroduction, Reg	isters -	Regist	ers with	parallel loa	ad, Sequential Log	gic Impleme	entation, Shift	

Registers - Serial Transfer, Bi-directional Shift Register with parallel load, Serial Addition. Counters: Ripple Counters - Binary Ripple Counter, BCD Ripple Counter, Synchronous Counters - Binary Counter, Binary Up-Down Counter, Johnson Counter.

Text Books:

1. M.Morris Mano, Digital Logic and Computer Design, Pearson Education, IV Edition, 2016

Reference Books:

1. ZviKohavi [4rd Edition], Switching and Finite Automata Theory, TMH.

2. F.J.Hill and G.R.Peterson, [4th Edition], Introduction to switching theory and logic Design.

3. Donald D. Givone [4rd Edition], Digital Principles and Applications, Tata McGraw Hill.

4. Digital Logic Design 4th Edition, by Brian Holdsworth, Clive Woods.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	AD	VANC	ADVANCED DATA STRUCTURES (ADS)										
III Semeste	r : Common for	CSE &	& CST			<u>, , , , , , , , , , , , , , , , , , , </u>	S	cheme : 2020					
Course Code	Category	Но	ours/W	'eek	Credits	Max	imum Mar	ks					
CS202	РСС	L 3	T	P	C 3	Continuous Internal Assessment 40	End Exam 60	TOTAL					
Sessional E	xam Duration :			_	5	En	d Exam Du	ration: 3 Hrs					
Course Outcomes : At the end of the course the student will be able to CO1: Illustrate the applications of Linked Lists, Stacks and Queues.													
CO2: Com	prehend the opera	ations p	berform	ned on B	inary Searc	h Tree and AVL	Tree.						
CO3: Unde	erstand Heap Opera	ations a	nd App	lications									
CO4: Urga	nize the data usin	ig Hasr	ung Te recial T	cnnique	s for efficie	nt Searching.	,						
		5 011 01		UN	IT – I		•						
Linear Data Applications Applications notation, Po Applications	a Structures-Apj s of Linked lists- s of Stacks- Recu stfix expression e s of Queues- Brea	plication Polyno Irsion, Evaluation Adth Fin	ons: omial m Quick on. rst Seau	anipulat sort, Po rch.	tion. lish notatio	ns, Conversion o	f infix notat	ion to postfix					
				UN	IT – II								
Non Linear Operations of AVL Trees	• Data Structures on Binary Search and their operation	s: Trees- ons, Th	Inserti readed	on, Dele Binary 7	etion and Ti Trees.	aversals.							
	•			UNI	IT – III								
Priority Qu Simple Prior Applications d-heaps, Lef	ieues (Heaps): rity Queues - Usin s of Binary heap- I tist Heaps, Skew I	g array Heap S Heaps a	s and li ort. and Bir	inked list	ts , Binary H Pueues.	Ieaps- Max heap,	Min heap,						
				UN	IT – IV								
Hashing Te Hashing De Addressing) Rehashing	Hashing Techniques: Hashing Definition, Hash functions, Open Hashing (Separate Chaining), Closed Hashing (Open Addressing) - Linear Probing, Quadratic Probing, Double Hashing. Rehashing and Extendible Hashing.												
				UN	IT – V								
Special Trees: Splay Trees, B-Trees and their operations. String Searching Algorithms: Brute-Force algorithm, Boyer-Moore algorithm and RabinKarp algorithm													

Text Books:

- 1. An introduction to Data Structures with Applications, Jean Paul Tremblay and Paul G.Sorensen, McGraw Hill Education, Second Edition, 2017
- 2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Pearson, Second Edition 2005

Reference Books:

1. Algorithms in C, Robert Sedgewick, Addison-Wesley Publishing Company, 2016.

2. Classic Data Structures- Debasis Samanta, PHI Publications, Second Edition, 2009.

3. Data Structures and Algorithms, GAV Pai, Tata McGraw Hill Publications, 2008

Question Paper Pattern:

Sessional Examination:

The Question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The Question paper shall consists of 3 sections with Two Questions (EITHER/OR type) in each section. The student shall answer one question from each section.

End Examination:

The Question paper for end examination is for 60 marks. The Question paper shall consists of 5 units with Two Questions (EITHER/OR type) in each unit. Each of these questions may contain sub questions and the student shall answer one question from each unit. Each question carries 12 marks.

DATABASE SYSTEMS (DBS)

Course Code Category Category Hours/Week Credits Maximum Marks CS203 PCC I T P C Continuous Internal Assessment End Exam TOTAL Gessional Exam Duration : 1½ Hrs - 3 40 60 100 Sessional Exam Duration : 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs CO1: Understand the concepts of Database Management Systems and Entity Relationship Modeling. CO2: Use SQL commands to create, retrieve, update, and delete data from the Data bases. CO4: Understand the properties of Transactions in a Database System. CO5: Understand the properties of Transactions in a Database System. CO4: Understand the properties of Transactions in a Database System. CO5: Understand Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. VINIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations.	III Semeste	r : Common for	CSE &	& CST	I			S	cheme : 2020				
CS203 PCC L T P C Continuous Internal Assessment End Exam TOTAL 3 - - 3 40 60 100 Sessional Exam Duration : 1/3 Hrs End Exam Duration : 1/3 Hrs End Exam Duration : 1/3 Hrs End Exam Duration : 1/3 Hrs Course Outcomes : At the end of the course the student will be able to End Exam Duration : 1/3 Hrs CO2: CO2: Use SQL commands to create, retrieve, update, and delete data from the Data bases. CO3: CO3: CO3: Comprehend the concepts of Normalization techniques and Indexing. CO4: Understand Concurrency Control techniques and Recovery System. CO5: Understand Concurrency Control techniques and Recovery System. UNIT - 1 Introductions, DBMS, Purpose of Database System, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended F-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. E-R Cardinal Query Languages: Relational Agebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect an	Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks				
3 - - 3 40 60 100 Sessional Exam Duration : 1½ Hrs End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand the concepts of Database Management Systems and Entity Relationship Modeling. CO2: Use SQL commands to create, retrieve, update, and delete data from the Data bases. CO3: Comprehend the concepts of Transactions in a Database System. - CO4: Understand the properties of Transactions in a Database System. - CO5: Understand the properties of Transactions in a Database System. - CO5: Understand the properties of Transactions in a Database System. - CO5: Understand the properties of Transactions in a Database System. - Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Models, Database Concepts, Cardinality of Relationship, Rel Diagrams, Reduction of an E-R Schema to Tables. - UNIT – II Introduction Language: Relational Algebra, SQL, Data Definition Language Commands, Data Maipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Uperal Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. - UNIT – II	CS203	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
Sessional Exam Duration : 1½ Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to COI: Understand the concepts of Database Management Systems and Entity Relationship Modeling. CO2: Use SQL commands to create, retrieve, update, and delete data from the Data bases. CO3: Umderstand the concepts of Normalization techniques and Indexing. CO4: Understand the properties of Transactions in a Database System. CO5: Understand Concurrency Control techniques and Recovery System. CO5: Understand Concurrency Control techniques and Recovery System. UNIT – I Introduction: Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Era Schema to Tables. UNIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal F			3	-	-	3	40	60	100				
Course Outcomes : At the end of the course the student will be able to CO1: Understand the concepts of Database Management Systems and Entity Relationship Modeling. CO2: Use SQL commands to create, retrieve, update, and delete data from the Data bases. CO3: Comprehend the concepts of Normalization techniques and Indexing. CO4: Understand the properties of Transactions in a Database System. CO5: Understand the properties of Transactions in a Database System. CO5: Understand Concurrency Control techniques and Recovery System. CO5: Understand Concurrency Control techniques and Recovery System. CO5: Understand Concurrency Control techniques and Recovery Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. UNIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Patterm Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Seriali	Sessional E	xam Duration :	1½ Hr	5	.1	1	En	d Exam Du	ration: 3 Hrs				
 CO2: Use SQL commands to create, retrieve, update, and delete data from the Data bases. CO3: Comprehend the concepts of Normalization techniques and Indexing. CO4: Understand the properties of Transactions in a Database System. CO5: Understand Concurrency Control techniques and Recovery System. UNIT - I Introduction: Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. UNIT - II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Form S - First Normal Form, Second Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. 	Course Out	comes : At the e	$\frac{1}{10000000000000000000000000000000000$	te cour	se the st	udent will	be able to	-1-4'1-' N	M = 1 = 1 ² = =				
CO3: Comprehend the concepts of Normalization techniques and Indexing. CO4: Understand the properties of Transactions in a Database System. CO5: Understand the properties of Transactions in a Database System. UNIT – I Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. UNIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. UNIT – II Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form, Second Normal Form. INT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View		CO2: Use SOL commands to create retrieve update and delete data from the Data bases											
CO4: Understand the concepts of Transactions in a Database System. CO5: Understand Concurrency Control techniques and Recovery System. UNIT – I Introduction: Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. UNIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non- Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	$\frac{\text{CO2: Use S}}{\text{CO3: Comr}}$	rehend the conce	o create	Norma	lization	techniques	and Indexing	Jala Dases.					
COS: Understand Concurrency Control techniques and Recovery System. UNIT – I Introduction: Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. UNIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non- Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	CO4: Unde	rstand the proper	ties of	Transa	ctions in	a Database	e System						
UNIT – I Introduction: Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. UNIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. INTI – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non-Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	CO5: Unde	rstand Concurren	cv Con	trol te	chniques	and Recov	verv Svstem.						
Introduction: Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture. Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables. UNIT – II Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non- Recoverable Schedules, Cascade less Schedules, Testing for Serializability.			2		UN	I – TIV	<i></i>						
Relational Query Languages: Relational Algebra, SQL, Data Definition Language Commands, Data Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non-Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	Introductio View of Dat Entity-Relat Entity-Relat E-R Schema	n: Introduction ta, Data Models, Itionship Model ionship Diagram a to Tables.	to DBI Databa I: Basi Is, Exte	MS, Prese Use: c Con c Con	urpose c rs, Datal cepts, C E-R Feat	of Database base Archite Cardinality tures, Mode	e Systems, Databa ecture. of Relationship, eling using ER D	ase System ER Diagra iagrams, Re	Applications, m Notations, eduction of an				
Manipulation Language Commands and Data Control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations. PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non- Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	Relational	Query Languag	ges: Re	lationa	l Algebi	ra, SQL, D	ata Definition La	nguage Cor	nmands, Data				
PL/SQL: Control Structures, Procedures, Functions, Triggers and Cursors. UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non-Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	Manipulatio key, Foreig Pattern Mar Functions, J	n Language Cor n key, Select Cl tching, Order B oin Operations.	nmand lause, V y, Gro	s and 1 Where up By	Data Co Clause, , Set O	ntrol Lang Logical C perations –	uage Commands, onnectivity's – A - Union, Intersec	Candidate ND, OR, F t and Minu	Key, Primary Range Search, 1s, Aggregate				
UNIT – III Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non- Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	PL/SQL: C	ontrol Structures	, Proce	aures,	Function	is, Triggers	and Cursors.						
Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non-Recoverable Schedules, Cascade less Schedules, Testing for Serializability.					UN	IT – III							
Hashing and Dynamic Hashing. UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non-Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	Relational Normalizati Form, Third Form. Indexing an	Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form (BCNF), Fourth Normal Form and Fifth Normal Form. Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static											
UNIT – IV Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non- Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	Hashing and	l Dynamic Hashi	ng.										
 Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non-Recoverable Schedules, Cascade less Schedules, Testing for Serializability. 	UNIT – IV												
Concurrent Executions. Serializability: Conflict Serializability, View Serializability, Recoverability – Recoverable and Non-Recoverable Schedules, Cascade less Schedules, Testing for Serializability.	Transaction	ns: ACID prope	erties,	Transa	ction $\overline{\mathbf{S}}$	tates, Impl	ementation of A	tomicity an	d Durability,				
	Concurrent Serializabil Recoverable												

UNIT – V

Concurrency Control: Lock-Based Protocols – Locks, Granting of Locks, The Two-Phase Locking Protocol, Timestamp-Based Protocols – Timestamps, The Timestamp-Ordering Protocol, Thomas Write Rule, Deadlock handling – Deadlock Prevention, Deadlock Detection and Recovery.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Shadow Paging Technique.

Text Books:

1. Database System Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw Hill, 7th Edition, 2019.

2. SQL, PL/SQL, Ivan Bayross, 4th Edition, 2020.

Reference Books:

1. Principles of Database and Knowledge - Base Systems, J. D. Ullman, Vol. 1, 2016.

2. Fundamentals of Database Systems. R. Elmasri and S. Navathe, 7th Edition, 2017.

3. Data Base Management Systems, Raghu Ramakrishna and Johnannes Gehrke, McGraw Hill, 3rd Edition, 2014.

Question Paper Pattern:

Sessional Examination :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (OOPJ)

III Semeste	III Semester : Common for CSE & CST Scheme : 2020											
Course Code	Category	Но	ours/W	'eek	Credits	Max	imum Mar	ks				
CS204	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessional E	xam Duration :	1½ Hr	8			En	d Exam Du	ration: 3 Hrs				
Course Out	tcomes :At the en	id of th	e cours	se the stu	udent will b	e able to						
CO1: Unde	rstand Object Ori	ented I	rogran	nming c	oncepts.							
CO2: Demonstrate the concepts of Inheritance, Packages and Interfaces.												
CO3: Under	CO3: Understand String handling methods and Exception handling mechanism.											
CO4: Comp	orehend Multithre	ading a	and Jav	<u>a Data I</u>	Base Conne	ectivity.						
CO5: Unde	CO5: Understand Collection interfaces and Collection classes.											
UNIT – I												
Object Oriented concepts: Overview of Java, Java buzzwords, Data types, Arrays, Operators, Control Statements. Introduction to Classes-Classes and Objects, Methods, Constructors, Reading Console input, Writing												
Console out	put, this keyword	l, Garba	ige col	lection,	finalize and	Wrapper classes						
				UN	IT – II							
Inheritance Inheritance final key wo Packages: Defining a p Interfaces: Defining an	e: basics, super key ord. backage, Access p	word,	Methoo on, Imj	d overlo porting j	ading, Dyna packages.	amic method disp	atch, Abstra	ct classes and				
		picifici	ung m									
				UN.	IT – III							
String Han String const Modifying s Exception I Introduction Creating cus	String Handling: String constructors, String methods-Character extraction, String comparison, Searching strings and Modifying strings. StringBuffer class and its methods. StringBuilder class and its methods. Exception Handling: Introduction, Types of Exceptions, try, catch, throw, throws and finally. Java built-in exceptions, Creating customized exceptions.											
				UN	IT – IV							
Multithread Java thread Thread class	Multithreading: Java thread model, Creating a thread- Extending Thread class and Implementing Runnable interface, Thread class methods, Thread priorities, Synchronization and Inter Thread Communication.											

JDBC:

JDBC Drivers, Driver Manager, Connection, Statement, Result Set and Prepared Statement.

UNIT – V

Collections Framework:

Collection Interfaces- List, Set, SortedSet, Queue, Deque.

Collection Classes-ArrayList, Linked List, HashSet, Linked HashSet, Tree Set, Priority Queue and Array Deque.

Accessing a Collection using an Iterator, The For-Each Alternative to Iterators

Text Books:

Java The Complete Reference, Herbert Schildt, TATA McGraw-Hill, Eleventh Edition, 2019.
 Programming with Java, E Balaguruswamy, A Primer, TATA McGraw-Hill, Sixth Edition, 2019.

Reference Books:

1. Thinking in Java, Bruce Eckel, Pearson Education, Fourth Edition, 2008.

2. Java How to Program, Early Objects, H.Deitel and P.Deitel, Global Edition, 2017

Question Paper Pattern:

Sessional Examination :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

CONSTITUTION OF INDIA (CI)

III Semester :	Common for all	Brai	ıches				Sche	me: 2020			
Course Code	Category	Ηοι	ırs/We	ek	Credits	Μ	Maximum Marks				
						Continuous					
MC201	МС	L	Т	Р	С	Internal	End Exam	TOTAL			
						Assessment					
		2	-	-	-	100	-	100			
Course Outc	omes :At the end	l of th	e cours	se the	student will	be able to					
CO1: Unders	tand the formatic	on and	l princi	ples of	f Indian Coi	nstitution.					
CO2: Unders	tand structure and	d fun	ctions of	of Uni	on governm	ent and State e	xecutive. Dutie	s of			
Preside	Legislature										
Legislature.											
CO3: Understand constitutional amendments of 42, 44,74,76,86 and 91. Central-State relations,											
CO4. Unders	tand Indian socia	1 atm	atura a	ndlon	min an In	dia Dialita of	women SC ST	and than			
weaker	r section	li stru	cture a	nu lan	guages in in	idia. Rights of	women, SC, ST	and then			
CO5. Unders	tand the structure	of I	dicior	v Pole	and functi	ons of Suprem	Court High of	ourt and			
Subord	inate courts Judi	cial r		y, Roit		ons of Supreme	e Court, High G	Juit and			
Subord	inate courts, 5 der			IIN							
Historical ba	ck ground Sign	ifican	ce of	Const	ritution M	aking of the	constitution R	ole of the			
constituent A	ssembly. Salient	t feat	ures. t	he Pre	eamble. Cit	izenship, proc	edure for ame	ndment of			
Constitution I	Constitution Fundamental rights-Derivative principles of state policy-Elections in India.										
Union Execu	Union Executive: Structures of Union Government & Functions President Vice President Prime										
Minister, Cab	oinet, Parliament-	- State	e Exec	utive:S	Structures an	nd Functions, (Governor, Chie	f Minister,			
Cabinet, State	e Legislature					-					
				UN	IT - III						
Central, State	Relations, Presi	ident'	s Rule	, Cons	titutional A	mendments [4	2, 44, 74, 76,	86 & 91]-			
Constitutiona	l functionaries, W	Vorki	ng of P	arliam	entary syste	em in India					
				UN	IT - IV						
Indian Social	Structure, Langu	ages	in Ind	ia-Poli	tical Parties	& Pressure gr	oups, Rights o	f Women-			
S.C"s, S.T"s &	k other weaker see	ctions	•								
				UN	IT - V						
Judiciary: Str	ucture, Organisat	tion o	f Judic	iary, i	ndependenc	e of the Judici	ary, role and fu	nctions of			
Supreme Cou	rt, High Courts &	z Sub	ordina	te cou	rts, Judicial	Review.					
Text Books :											
1. Durga D	as Basu, "Introd	luctio	n to the	e Cons	titution of I	<i>ndia"</i> , Wedwe	& Company				
2. Macivel	, Page, "An Intro	duction	on Ana	lysis",	Society						
3. M.V. Py	3. M.V. Pylee, "Indian Constitution", S. Chand Publications										
4. Subhash	4. Subhash C Kashyao : " <i>Our Constitution</i> ", NationalBank, Trust, India.										
5. Constitu	tional Law of inc	lia by	Dr.S.	M.Raja	n						
Reference Boo	oks:	D	1		01 1						
1. The Con	nstitution of India	a.Byt	he Mir	$\frac{11}{11}$	$\frac{\text{ot Law and}}{1}$	Justice, The Go	ovt. of India.				
2. Constitut	ional Law of Indi	a by l	<u>cash ya</u>	psubha	asah						
3. Indian co	enstitution Law b	<u>y M.F</u>	'Jain	•							
4. Constitut	ional Law of Indi	a by l	H.M Se	eervai							
Web References:											
I. https://w	ww.india.gov.in/	my-g	overnn	ient/co	onstitution-i	ndia					

ADVANCED DATA STRUCTURES LAB (ADS(P))

III Semester : (Common for	CSE	& CST	I	Scheme : 2020							
Course Code	Category	Hou	rs/Wee	k	Credits	Maxi	mum Mar	'ks				
CS205	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		-	-	3	1.5	40	60	100				
Sessional Exam	Duration: 2	2 Hrs				End E	xam Dura	tion: 3 Hrs				
CO1: Implama	nt the emplice	tions	flink	ad lists	Stacks and	Ququas						
CO2: Implement Binary Search Tree and AVL Tree operations												
CO2: Implement Binary Search Tree and AVL Tree operations.												
CO3: Implement Hashing Techniques.												
CO4: Implement String searching algorithms.												
4 4 11	07 1 1 17 1			st of Ex	xperiments							
1. Application of	of Linked List	: Add	ition of	two p	olynomial eq	uations.						
2. Conversion	of Infix expre	ession	to Post	fix exp	ression							
3. Evaluation o	of Postfix Ex	pressi	on									
4. Quick Sort (Recursion).											
5. Application	of Queue: Br	eadth	First Se	arch G	raph travers	al technique.						
6. Insertion, De	eletion and Tr	aversa	l opera	tions o	n a Binary S	earch Tree.						
7. Insertion and	l Traversal op	oeratio	ns on a	n AVL	Tree.							
8. Application of Binary Heap: Heap Sort.												
9. Implementat Chaining me	tion of Hashir thod.	ng Tec	hnique	s - Line	ear Probing,	Quadratic Probin	ng and Sep	parate				
10. Implementation of Brute force String searching technique.												

DATABASE SYSTEMS LAB (DBS (P))

III Semester :	Common for	CSE	& CS	Г			Sche	eme : 2020			
Course Code	Category	Hou	rs/We	ek	Credits	Maxi	mum Mar	·ks			
CS206	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		-	-	3	1.5	40	60	100			
Sessional Exam	n Duration: 2	Hrs				End E	xam Dura	tion: 3 Hrs			
Course Outcon	Course Outcomes : At the end of the course students will be able to										
CO1: Design En	ntity Relation	ship d	iagran	ns and S	Schema dia	agrams for real l	ife systems	s.			
CO2: Implement	nt SQL querie	s on t	he real	l-life sy	stems.						
CO3: Write PL	/SQL progran	ns for	given	probler	ns.						
CO4: Implement Procedures, Functions, Triggers and Cursors in PL/SQL.											
			Lis	st of Ex	periments						
1. Perform D	DDL, DML an	d DC	L com	mands.							
2. Design an	d create a Un	iversit	y Libr	ary Da	tabase usin	ıg ER diagram a	nd Schema	a diagram.			
3. Design an	d create a Un	iversit Studer	y data	base co g FR M	onsisting of	f the following ta	ables Depa	rtment,			
4. Create var	ious tables li	ke Bra	inch. A	Account	t. Deposito	r. Customer. Lo	an and Bo	rrower for a			
Banking s	ystem with co	onstrai	ints us	ing a So	chema diag	gram.					
5. Perform v and Group	arious SQL q by.	lueries	s on S	elect cl	ause, Whe	re clause, Patter	n matching	g, Order by,			
6. SQL Quer	ries on Set op	eration	ns, Ag	gregate	functions	and Join operati	ons.				
7. PL/SQL program using Control Structures.											
8. Program t	o implement]	Procee	lures a	and Fun	ctions.						
9. Program t	o implement	Curso	rs.								
10. Program t	10. Program to implement Triggers.										

OBJECT ORIENTED PROGRAMING THROUGH JAVA LAB (OOPJ(P))

III Semester :	Common fo	r CSI	E & CST	•	Scheme : 2020								
Course Code	Category	Hou	rs/Week		Credits	Maxii	num Ma	rks					
CS207	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL					
		-	-	3	1.5	40	60	100					
Sessional Example	m Duration:	2 Hrs				End Ex	am Dura	ation: 3 Hrs					
Course Outco	Course Outcomes : At the end of the course students will be able to												
CO1: Implement Method overloading and Constructor overloading.													
CO2: Impleme	CO2: Implement Inheritance, Packages and Interfaces concepts.												
CO3: Impleme	ent String har	ndling	and Exco	eption	handling.								
CO4: Impleme	ent multithrea	ding a	and colle	ctions	5.								
			List of	of Ex	periments								
1. Programs on	Method over	loadir	ig and Co	onstru	ictor overlo	oading.							
2. Program to i	mplement Mu	ıltilev	el and Hi	ierarc	hical Inher	itance.							
3. Program to i	mplement Pa	ckages	s with ac	cess p	protection.								
4. Program to i	mplement Mu	ultiple	inheritar	nce us	ing interfa	ces.							
5. Programs on	String Hand	ling m	ethods.										
6. Programs to	6. Programs to implement built-in exceptions and customized exceptions.												
7. Programs to	implement S	ynchro	onization	and I	nter Thread	d Communicatio	on in Mul	ti-threading.					
8. Programs to	8. Programs to implement ArrayList, LinkedList and HashSet collections.												

SOFT SKILLS LAB (SS(P))

III/IV Sen	nester : Co	ommon for al	ll Branches		Scheme : 2020							
Course Code	Category	Hours/Weel	k		Credits	1	Maximum N	larks				
SCCM01	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		-	-	4	2	40	60	100				
Course	Dutaamaa	• At the end o	f the course	studente	will be al	ala to						
	mmunicat	e effectively a	nd enhance	their int	ernersonal	relationshin hu	uilding skills	with				
rei	newed self	confidence		then m	erpersona	relationship of	inding skins	withi				
CO2: W	ork togethe	er in teams and	d accomplis	h objecti	ives in a co	ordial atmosphe	ere					
CO3: Face interviews, GDs and give presentations												
CO4: Understand and develop the etiquette necessary to present themselves in a professional setting												
CO5: Learn the Principles of Personal effectiveness												
List of Activities												
1. Ice bre	aking Acti	ivities, Princip	oles of Time	and Stro	ess Manag	ement						
2. Art of	speaking											
3. Art of	writing - E	Essay / Picture	/ Story									
4. Busine	ess etiquett	e - Telephone	and email									
5. Presen	tation Skil	ls - Power poi	int making									
6. Group	Discussion	n – Objectives	s and Skills	tested in	a GD, typ	es of GD, Dos	and don'ts &	practice				
7. Team	work - Dra	uma / Skit / Ro	ole play									
8. Paper	Poster Pro	esentation	1 . 1									
9. Proble	m Solving	by lateral thir	$\frac{1 \times 100}{1 \times 100}$	es des Or								
10. Knov	inlos of Po	reral Awarene	ss / Knowle	age – Q	uiz							
11. Fillic	ipies of Fe											
12. 11101	New Skills	•										
Reference	Books .											
1. Stephe	n R. Cove	v. "The Seven	Habits of F	lighly Et	ffective Pe	ople". Pocket F	Books Publisł	ners, London				
2. Priyada	arshani Pat	tnaik, "Group	Discussion	and Inte	rview Skil	ls with VCD", I	Foundation E	Books.				
3. Sangee Learnii	eta Sharma ng Private	&Binod Mish Limited.	nra, "Comm	unicatio	n Skills for	r Engineers and	Scientists",	PHI				
4. Shiv K	hera, "You	u Can Win", N	/lacMillan I	ndia Pub	lishers, Ne	ew Delhi						
5. Campus Connect Portals - TCS - https://campuscommune.tcs.com;												

Infosys http://campusconnect.infosys.com/

OPERATING SYSTEMS (OS)

Iv Semeste	er : Common for	CSE,	CST &	e CSBS			S	cheme : 2020					
Course Code	Category	Н	ours/V	Veek	Credits	Max	imum Mar	ks					
CS208	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL					
		3	-	-	3	40 60 100 End Exam Duration: 3 Hr							
Sessional E	xam Duration :	1½ Hr	S			Enc	l Exam Du	ration: 3 Hrs					
Course Ou	tcomes : At the e	end of t	he cour	rse the stu	dent will b	e able to							
COI: Acqu	aint with the bas	ics of th	ie Ope	rating Sys	tem and th	eir different struc	tures.						
CO2: Comprehend the process management policies, CPU Scheduling and Process synchronization													
techniques													
CO4: Analy	vze memory man	and th	nt schei	mes and a	llocation n	olicies	system.						
CO5 : Demo	onstrate Input / C	Jutnut r	elated S	Software/	Hardware a	and Disk scheduli	ng strategie	5.					
		upur											
				UNI	1-1								
Services, In Machine, R Processes: State transit Thread: I multithread Process Scl CPU utiliza Scheduling: Inter-proce Conditions,	terrupt handling esource Manager Definition, Pr ions, Process Co Definition, Var s. heduling: Found tion, Throughput algorithms: I Real Time sched ess Communica Mutual Exclusio	and Systems view, process ntrol Bl ious s lation a t, Turna Pre-emp luling: I stion: (on, Hard	nd Sch and Sch and Sch around attive a Concur dware	alls, Basic sview and onship, 1 CB), Con Benefits UNI reduling o Time, Wa and non- d EDF. rent proc Solution,	c architectu l hierarchic Different text switch of three T - II bjectives, aiting Time pre-emptive sesses, pre Semaphore	Types of Schedul c, Response Time. redence graphs, es, Strict Alternat	n OS, Conce rocess, Pro f threads, lers, Schedu RR; Mul Critical Se ion, Peterso	concept of Virtual cocess Concept of ling criteria: ti processor ection, Race n's Solution,					
The Produce	cer / Consumer	Proble	em, Ev	vent Cou	nters, Mo	nitors, Message	Passing, C	lassical IPC					
Problems: F	ceader's & Write	r Probl	em, Di	nning Phi	iosopher P	rodiem, Barber's	snop proble	m.					
				UNI	Γ – III								
Deadlocks: Deadlock A Concurren communica File Manag System st managemen hash table),	Definition, Ne voidance: Banke t Programming ting sequential p gement: Concept ructure, Alloca at (bit vecto efficiency and po	ccessary r's algo c Critica rocess (of File ation r, lir erforma	and orithm, al regic (CSP); , Acce methoo ked ince.	sufficient Deadlock on, condit Deadlock ss methoc ds (cont list, gr	condition detection ional critic s - prevent ls, File typ iguous, 1 rouping),	ns for Deadlock and Recovery. al region, monitor ion, avoidance, do es, File operation inked, indexed), directory impler	, Deadlock rs, concurren etection and , Directory s Free-space mentation(li	Prevention, nt languages, recovery. structure, File near list,					

UNIT – IV

Memory Management: Basic concept, Logical and Physical address maps, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page allocation, Partitioning, Paging, Page fault, Working Set, Segmentation, Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

$\mathbf{UNIT} - \mathbf{V}$

I/O Hardware: I/O devices, Device controllers, Direct Memory Access, Principles of I/O. **Disk Management**: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

Case study: UNIX OS file system, shell, filters, shell programming, programming with the standard I/O, UNIX system calls.

Text Books:

1. Operating System Concepts Essentials. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne.

Reference Books:

1. Operating Systems: Internals and Design Principles. William Stallings.

2. Operating System: A Design-oriented Approach. Charles Patrick Crowley.

3. Operating Systems: A Modern Perspective. Gary J. Nutt..

4. Design of the Unix Operating Systems. Maurice J. Bach.

5. Understanding the Linux Kernel, Daniel Pierre Bovet, Marco Cesati.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

SOFTWARE ENGINEERING & APPLICATIONS (SEA)

IV Semeste	r : Common for	CSE &	& CST				S	cheme : 2020			
Course Code	Category	He	ours/W	eek	Credits Maximum Marks						
CS209	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		2	1	-	3	40	60	100			
Sessional E	xam Duration :	1½ Hr	8			En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will l	be able to					
CO1: Identi	fy the key activit	ties in n	nanagi	ng a soft	tware project	et and Process Mo	dels.				
CO2: Under	CO2: Understand the components of Software Requirements Specification document.										
CO3: Apply systematic procedure for software design and deployment.											
CO4: Unde	CO4: Understand the testing strategies to build the test cases.										
CO5: Estim	late project risks	and pro	ject m	etrics.							
				UN	IT – I						
Software P Software, S Model, Spi process-Ext	Software Process and Agile Development: Introduction to Software Engineering, Evolving Role of Software, Software Crisis, Software Process, Process Models: Waterfall Model, Incremental Process Model, Spiral Model, Perspective and Specialized Process Models –Introduction to Agility-Agile process-Extreme programming-XP Process.										
				UN	11 – 11						
Requirement requirement Process: Fea managemen	nts Analysis & S s, System requi asibility Studies, t.	Specific rement Require	e ation: s, Soff ements	Softwar tware R elicitati	re Requiren equirement on and anal	nents: Functional a s Document – H lysis, requirement	and Non-Fu Requirements validation	nctional, User t Engineering , requirements			
				UN	IT – III						
Software D Design - A Interface De components	esign: Design pr rchitectural style esign: Interface a , traditional Com	rocess - es, Arc nalysis ponent	- Desig hitectu , Interf s.	gn Conc ral Patt Tace Des	epts-Design erns, Archi ign –Comp	n Model– Design tectural Mapping onent level Desig	Heuristic – using Dat n: Designin	Architectural a Flow- User g Class based			
				UN	IT – IV						
Testing & box testing Testing – I Implementa	Testing & Maintenance: Software testing fundamentals-Internal and external views of Testing-white box testing - basis path testing-control structure testing-black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing Art of Debugging –Software Implementation Techniques: Coding practices-Refactoring-Maintenance										
				UN	IT – V						
Risk Mana Managemen Products.So	agement & Sof it - Risk Ide ftware Measurer	îtware ntificat nent, N	Metri ion-RN letrics	i cs: Ris /IMM for sof	k Manager Plan-CASE tware quali	ment – Identifica TOOLS. M ty, Types of Met	ation, Proje letrics for rics-Functio	ection - Risk Process & on Point, Size			

Oriented Metrics.

Text Books:

- 1. Roger S. Pressman, -Software Engineering A Practitioner's Approachl, Seventh Edition, Mc Graw-Hill International Edition, 2010.
- 2. Ian Sommerville, -Software Engineering, 9th Edition, Pearson Education Asia, 2011.

Reference Books:

- 1. K.K.Agarwal&Yogesh Singh [2008], Software Engineering, New Age International Publishers.
- James F.Peters, Witoldpedecz, John Wiely [2008], Software Engineering-an Engineering approach
 Pankai Jalote's Software Engineering A Precise Approach Wiley

3. Pankaj Jalote's, Software Engineering - A Precise Approach, Wiley

Question Paper Pattern:

Sessional Examination :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

COMPUTER ORGANIZATION (CO)

IV Semeste	r : Common for	CSE &	& CST				S	cheme : 2020			
Course Code	Category	Но	ours/W	eek	Credits	edits Maximum Marks					
CS210	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duration :	1½ Hr	5	-		En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes : At the e	$\frac{nd \text{ of } tl}{c}$	ne cour	se the st	udent will	be able to					
COI: Unde	erstand the design	of a ba	asic co	mputer.	design of	Miana Dua ang mana	1				
CO2: Acqu	CO2: Acquire the concepts of basic programming, design of Micro Programmed										
CO3. Unde	CO3: Understand the Internal working of CPU Pipelining and Vector Processing										
CO4: Illust	trate the basic Co	mnuter	Arithr	$\frac{1}{1}$	erations. In	nut Output Organ	ization				
CO5: Unde	CO5 : Understand the concepts of Memory system and Secondary Storage devices										
				<u>, , , , , , , , , , , , , , , , , , , </u>							
				UN	1 - 1						
Basic Comp Instruction O Memory Re of Basic Co	Basic Computer Organization and Design Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input/output and Interrupt, Complete Computer Description, Design of Basic Computer.										
				UN	IT – II						
				UI	11 - 11						
Introduction Logic Opera Micro Prog	n, Machine Langu ations. grammed Contro	age, A	ssembl ng Mi	y Langu cro pros	age, The A	ssembler, Program	nming Arith	metic and			
		quener	<u></u>	UN	IT – III						
Control Pr	accesing Unit										
Introduction Modes, Data Pipeline an Parallel Processing.	a, General Register a Transfer and M d Vector Process ocessing, Pipelin Array Processors	er Orga anipula sing ning,	nizatio tion, P Arithm	n, Stack rogram etic and	Organizati Control, RI d Instructi	on, Instruction Fo SC and CISC. on Pipeline, RI	ormats, Add SC Pipelin	ressing e, Vector			
11000000118,	<u> </u>			UN	T IV						
				UIN.							
Computer A Introduction Input/output Peripheral I Interrupt, D	Introduction, Addition and Subtraction, Multiplication, Division algorithms. Input/output Organization Peripheral Devices, Input/output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA.										
				UN	IT – V						
The Memor Basic Conce Memories	ry System epts, Semiconduc Mapping Functio : S Mano [2011] [7	tor RA ns, Vir	M mer tual Me	nories, F emories,	Read-Only 1 Secondary	nemories, Speed, Storage.	Size and Co	ost, Cache			

2. Carl Hamacher, ZvonkoVranesie, SafwatZaky, [5th Edition], Computer Organization, McGraw-Hill

Reference Books:

1. Hayes John .P, Computer architecture & organization, MGH, 1998

2. William Stallings, [6 th Edition], Computer Organization and Architecture Designing for performance, Pearson [PHI], 2003

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

DESIGN AND ANALYSIS OF ALGORITHMS (DAA)

IV Semeste	er : Common for	CSE &	& CST					Scheme : 2020			
Course Code	Category	Ho	ours/W	eek	Credits	s Maximum Marks					
CS211	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duration :	1½ Hrs	6		End Exam Duration: 3 H						
Course Ou	tcomes : At the e	nd of th	ne cour	se the st	udent will	be able to					
CO1: Analy	yze the performan	nce of a	lgorith	ms.							
CO2:.Com	prehend Divide an	nd cong	uer tec	hnique	to solve pro	blems.					
CO4: Apply Greedy method to solve problems.											
CO5: Understand Tree traversal. Graph traversal and Backtracking techniques											
CO6: Understand Branch and Bound technique and Lower bound theory											
Cool. Onderstand Branch and Bound teeningte and Lower bound theory.											
	UNII-1										
Introduction: What is an Algorithm? Performance Analysis: Space & Time Complexities, Asymptotic notations.											
Divide and Conquer: General method, Binary search, Finding Maximum and Minimum, Merge sort,											
Quick sort,	Strassen's Matrix	Multip	olicatio	n.							
				UI	II – TIN						
Greedy Me Deadlines, I Source Shor	thod : The Generation Minimum-Cost Spread	ral Met panning	hod, K g Trees	napsack , Optim	Problem, T al Storage c	Free Vertex splitti on Tapes, Optimal	ng, Job Seq Merge Patt	uencing with erns, Single			
				UN	III – III						
Dynamic P Binary Sear Salesperson	rogramming : T ch Trees, String I Problem.	he Gen Editing	eral M proble	ethod, N m, 0/1-I	Iultistage C Knapsack, F	Graphs, All Pairs S Reliability Design,	Shortest Path The Travel	ns, Optimal ling			
				UN	NIT– IV						
 Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Bi- connected Components and DFS Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, and Hamiltonian cycles. 											
	UNIT – V										
Branch an Salesperson Lower Bou problems.	d Bound: The problem. nd Theory : Com	Methoo	l, 15	Puzzle , Oracle	problem, J s and Adve	ob Sequencing w	vith Deadlin Techniques	nes, Travelling for Algebraic			

Text Books:

- 1. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaz Sahni & Sanguthevar Rajasekaran, Galgotia Publications Second Edition
- 2. Introduction to the Design and Analysis of Algorithms by Anany Levitin, Third Edition, Pearson Education, 2012.

Reference Books:

- 1. Algorithm Design by Jon Kleinberg, Eva Tardos, Pearson Education Seventh Impression
- 2. Introduction to Algorithms by Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, Third Edition, PHI Learning Private Limited, 2012.
- 3. Data Structures and Algorithms by Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, Pearson Education, Reprint 2006.
- 4. Algorithms Design and Analysis by Harsh Bhasin, Oxford university press, 2016.
- 5. Design and Analysis of Algorithms by S. Sridhar, Oxford university press, 2014.

Question Paper Pattern:

Sessional Examination :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

DISCRETE STRUCTURES (DSS)

IV Semeste	r : Common for	CSE &	& CST				S	cheme : 2020			
Course Code	Category	Но	ours/W	eek	Credits	Maximum Marks Continuous Internal End TOTAI					
CS212	BSC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duration: 1	1½ Hrs			End Exam Duration: 3 H						
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will	be able to	1	0			
CO1: Unde	rstand the mather	natical	repres	entation	of statemer	nts using connecti	ves, normal	forms,			
equiv	alence and implic	cations.	outoon	nos of al	omontoryo	ambinatorial prog	25222				
CO3 : Solve homogenous and Inhomogeneous recurrence relations using substitution method and											
generating functions											
CO4: Under	CO4 : Understand the concept of Planar graphs. Hamiltonian graphs. Euler graphs. Spanning trees and										
Binar	Binary trees.										
CO5 : Understand the association between the elements of sets using Digraphs and Warshall's											
Algorithm.											
UNIT – I											
Mathemati	cal Logic:										
Statements	& Notation, Con	nective	s, Wel	l Forme	d Formulas	, Equivalence & i	implications	, Duality law,			
other conne	ctives.										
Normal for	ms:	. ,.	NT	1 0	ъ	1	I 1 C	T1 C			
Normal for	ms-Principle Dis	sjunctiv	/e Noi	mal Ioi	m, Princip	ble conjunctive r	Normal Iorn	n, Theory of			
		lus									
				UN	IT – II						
Elementary	y Combinatorics	:									
Permutation	ns & Combination	ons, Er	numera	tion of	Combinati	ons and Permuta	ations with	out repetition,			
Combinatio	ns with repetition	, Princ	iple of	Inclusio	n-Exclusio	n.					
				UN	IT – III						
Recurrence	e Relations:										
Generating	Functions of Se	equence	es, Ca	lculating	g Coefficie	nts of Generatin	g Functions	s, Recurrence			
Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of											
Characterist	ic Roots, Solutio	ns of Ir	homog	geneous	Recurrence	e Relations.					
UNIT – IV											
Graphs:	.		~ -				• _				
Basic Conce search and B Euler's For	epts, Isomorphisi Breadth First sea nula, Hamiltonia	n and rch, Mi n Grapl	Sub gr nimal hs. Chr	aphs, Tr Spannin comatic 1	ees and Th g Trees, Bi Numbers	eir Properties, Sp nary Trees, Plana	anning Tres r and Non p	ss-Depth First lanar Graphs,			

UNIT – V

Relations and Digraphs:

Introduction, Properties of Binary Relations, Equivalence Relations, Digraphs, partially ordered sets, Special elements of POSET, Hasse Diagram, Transitive Closure, Warshall's algorithm.

Text Books:

- 1. Trembly.J.P and Manohar.R [2011], Discrete mathematical structures with applications to computer science, Mc-Graw-Hill International Editions.
- 2. Joe L.Mott, Abraham Kandel and Theodore P.Baker [2008], [2nd Edition], Discrete Mathematics for Computer Scientists and Mathematicians, PHI.

Reference Books:

1. Dr. S.Chandrasekharaiah, Mathematical foundations of computer science, -Prism books Pvt.Ltd.

2. Ralph P.Grimaldi [2006], [5th Edition], Discrete and Combinational Mathematics-An Applied Introduction, Pearson Education.

3. Liu [2004], Elements of discrete mathematics, McGraw-Hill.

Question Paper Pattern:

Sessional Examination :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

PYTHON PROGRAMMING (PYP)

IV Semeste	r : Common for	CSE &	& CST				S	cheme : 2020			
Course Code	Category	Но	ours/W	'eek	Credits	Maximum Marks					
SCCS01	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		1	-	2	2	40	60	100			
Sessional E	xam Duration :	1½ Hr	5	~~ 41. ~ ~4		En be able to	d Exam Du	ration: 3 Hrs			
Course Ou	Course Outcomes : At the end of the course the student will be able to Col : Understand the python programming constructs, operators and expressions										
CO2: Apply the concepts of functions, decision and control structures to solve problems.											
CO3: Apply the core data structures String, List, Tuple, Set and Dictionaries to solve problems.											
CO4: Understand file operations, exception handling and modules.											
CO5: Apply	y Object Oriented	l Progra	amming	g concep	ots to solve	real life problems	•				
				UN	I – TI						
Installing Py Basics of P; Assigning V Number and Operators and Associ Mathematic: Assignment Decision St Using String Statements, Loop Contr break Statem	Atton, Executing ython, Executing ython Program Value to a Variab l Strings, Python and Expression ativity, Changin ativity, Changi	Python ning: F ile, Mu Inbuilt s: Oper to Equ ean Ty Operato ressions The whee State	Progra Python Itiple A Functi- rators a cedence ivalent pe, Bo rs, Boo s. hile Lo ment	Charact Assignm ons. and Exp e and t Pytho UN colean C blean Exp oop, The	mmenting i mmenting i er Set, Tok ents, Writin pressions, A Associativi n Expressions IT – II Operators, apressions a e range() Fu	n Python, Internal ang Simple Program Arithmetic Operat ty of Arithmetic ions, Bitwise Op Using Numbers and Relational Op unction, The for 1	Working of Data Type, ms in Pytho ors, Operators perator, Th with Boole erators, Dec Loop, Neste	f Python. I/O functions, on, Formatting or Precedence s, Translating e Compound an Operators, cision Making ed Loops, The			
Functions:	Syntax and Bas	sics of	a Fun	ction, U	Jse of a F	function, Paramet	ers and Ar	guments in a			
Function, T Lambda Fur	he Local and Gluction.	obal Sc	cope of	f a Varia	able, The r	eturn Statement,	Recursive F	unctions, The			
				UN	IT – III						
Strings: The with for and Lists: Creat List Slicing List Method a Function. Tuples, Sets	e str class, Basic while Loop, Imr ing Lists, Access with Step Size, I ls, List and String s and Dictionari	Inbuilt nutable sing the Python gs, Spli es: Intr	Pythor String Elem Inbuilt tting a oductio	Functions, The Sents of a Function String in Functions for the String in	ons for Strin String Opera a List, Neg ons for Lista n List, Pass ples, Sets, I	ng, The index[] O ators, String Opera ative List Indices s, The List Operat sing List to a Fund Dictionaries.	perator, Tra ations. , List Slicin tor, List Con etion, Return	versing String g [Start: end], mprehensions, ning List from			

UNIT – IV

Exceptions: When Something Goes Wrong, Classes of Exceptions, A Final Note on Pythonic Exception Handling.

File Handling: Need of File Handling, Text Input and Output, The seek() Function, Binary Files, Accessing and Manipulating Files and Directories on a Disk.

Modules: Reusing Code with Modules and Packages, Understanding Python Modules, Everyday Module Usage, Advanced Module Behavior, Combining Modules into Packages

UNIT – V

Object-Oriented Programming: Class, Objects and Inheritance: Defining Classes, The Selfparameter and Adding Methods to a Class, Display Class Attributes and Methods, Special Class Attributes, Accessibility, The __init__ Method (Constructor), Passing an Object as Parameter to a Method, __del__() (Destructor Method), Class Membership Tests, Method Overloading, Operator Overloading, Inheritance, The Object Class.

Text Books:

- 1. Programming and problem solving with Python by Ashok Namdev Kamthane, Amit Ashok Kamthane (2018): McGraw Hill Education (India) Private Limited.
- 2. Python 3 for Absolute Beginners, Tim Hall and J-P Stacey, Apress.

Reference Books:

1. Python - The Ultimate Beginner's Guide!, Andrew Johansen.

Web References:

- 1. https://www.tutorialspoint.com/python3/
- 2. <u>https://docs.python.org/</u>
- 3. <u>https://realpython.com/</u>

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

Laboratory:
1. Implement operations on numbers.
2. Implement decision making and looping statements.
3. Demonstrate the concept of functions.
4. Demonstrate the working of core data structures.
5. Demonstrate the creation and importing of modules.
6. Implement exception handling concepts.
7. Implement file operations.
8. Demonstrate Object-Oriented Programming concepts.

OPERATING SYSTEMS LAB (OS(P))

IV Semester: C	ommon for C	SE,CS	ST & C	SBS	Scheme : 2020								
Course Code	Category	Ho	urs/We	eek	Credits	Maxi	mum Mai	rks					
CS213	PCL	L	Т	Р	С	Continuous Internal Assessment	ntinuous Iternal End Sessment TOTAI						
		-	-	3	1.5	40	60	100					
Seesional Exam	n Duration: 2 l	Hrs				End Ex	am Durat	tion: 3 Hrs					
Course Outcon	nes: At the end	l of th	e course	e stud	ents will b	e able to							
CO1: Understar	nd the Unix cor	nman	ds and v	vi edit	or.								
CO2: Implement	nt threads and s	chedu	ling coi	ncepts									
CO3: Implement	nt inter-process	comn	nunicati	ion, de	eadlock av	oidance and de	adlock det	ection.					
CO4: Implement	nt the shared me	emory	' concep	ots.									
CO5: Implement	nt the memory 1	nanag	gement 1	techni	ques.								
		List	of Exp	erime	nts (Using	т С)							
1. Basic UNI	X commands.												
2. Shell prog	ramming using	; vi ed	itor.										
3. Program f	or implementat	ion of	thread	and n	nulti thread	ls.							
4. Program f	or implementat	ion of	Schedu	uling A	Algorithms	5.							
5. Program f	or implementat	ion of	Inter P	roces	s Commun	ication							
6. Program f	. Program for implementation of Deadlock Avoidance and Deadlock Detection.												
7. Program f	7. Program for implementation of Shared memory.												
8. Program f	8. Program for implementation of Semaphores.												
9. Program f	or implementat	tion of	f Memo	ory Ma	anagement	•							
10. Program fo	or implementati	on of	Indexin	g and	Hashing.								

SOFTWARE ENGINEERING & APPLICATIONS LAB (SEA(P))

IV Semes	ter: Common	for C	SE &	CST			Schem	e: 2020				
Course	Category	He	ours/V	Veek	Credits	May	ximum Mark	KS				
Code							ous End al Eng TOTA					
CS214	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		-	-	3	1.5	40 60 100						
Sessional	Exam Duration	: 2Hr	S			End	Exam Durat	ion: 3 Hrs				
Course O	Course Outcomes : At the end of the course students will be able to											
CO1: Iden	CO1: Identify suitable software development process model for a given scenario											
CO2: Cre	CO2: Create a UML diagrams for a specified problem											
CO3: App	03: Apply testing methodologies for validating design models											
				List of E	Experiments	5						
1. Role	of Software & S	Softw	are D	evelopn	nent Model	: Identify the r	ole of the sof	tware in				
today	's world & suit	able s	oftwar	e develo	opment mod	lel for the give	n scenario.					
2. Requ	irement Develo	opmer	nt: Ide	entify th	e various re	equirement dev	elopment act	tivities viz.				
elicita docui	ation, analysis, s nent.	specifi	catior	and ve	erification for	or the given sc	enario, devel	op an SRS				
3. Intro	duction to UM	L: To	create	a UML	diagram of	ATM APPLIC	CATION					
4. To cr	eate a UML diag	gram o	of LIB	RARY	MANAGEN	MENT SYSTE	М					
5. To cr	eate a UML diag	gram o	of BAl	NKING	SYSTEM							
6. To cr	eate a UML diag	gram o	of RA	LWAY	RESERVA	TION SYSTE	М					
7. Softw	vare Testing: I	Desigr	n the	Test ca	ses for tria	ngle problem	with Softwa	re Testing				
Technique: Boundary Value Analysis using C												
8. Win	Runner is a prog	ram tł	nat is r	esponsi	ble for the a	utomated testin	ng of softwar	e. Win				
Runn	Runner is a Mercury Interactive enterprise functional testing tool for Microsoft windows											
applie	cations.(Calculat	tor Ap	p)									
9. Study	of any web test	ing to	ol (e.g	g. Seleni	um) with a	given scenario						
10. To c	reate GIT account	nt for	Testin	g to Ve	rsion Contro	ol						

DESIGN AND ANALYSIS OF ALGORITHMS LAB (DAA(P))

IV Semester: C	common for C	SE &	CST				Sche	me: 2020					
Course Code	Category	Hou	rs/W	eek	Credits	Maxi	mum Mai	rks					
CS215	PCL	L	Т	Р	С	Continuous Internal AssessmentEnd ExamTOTA4060100							
		-	-	3	1.5	40	60	100					
Sessional Exam	n Duration: 2 l	Hrs				End Ex	am Durat	ion: 3 Hrs					
Correct Orthogram	A 4 4 1 5 5 5 5	1 . 6 41.				1 1. 1							
Course Outcon	Course Outcomes : At the end of the course students will be able to												
CO1: Apply Di	CO1: Apply Divide and Conquer and Greedy methods for problem solving.												
CO2: Apply D	CO2: Apply Dynamic Programming Technique to solve problems.												
CO3: Apply Ba	CO3: Apply Backtracking and Branch and Bound Techniques for problem solving.												
			List a	of Ex	periments								
1. Implement	t Binary Search	1 algo	rithm	using	g Divide and	d Conquer Tecl	nnique.						
2. Implement	t Merge Sort al	gorith	ım usi	ng D	vivide and C	onquer Technie	que.						
3. Implemen	t Knapsack usi	ng Gr	eedy]	Fech	nique.								
4. Implement	t Job Sequenci	ng wit	th Dea	dline	es using Gre	edy Technique							
5. Implemen Technique	t Kruskal's alg 2.	gorithi	n for	find	ing minimu	m cost spannir	ng tree usi	ng Greedy					
6. Implemen	t 0/1 Knapsack	probl	lem us	ing l	Dynamic Pro	ogramming Teo	chnique.						
7. Implemen	7. Implement Travelling Sales Person problem using Dynamic Programming Technique.												
8. Implemen	8. Implement Depth First Search Algorithm.												
9. Implemen	9. Implement N Queens's problem using Backtracking technique.												
10. Implemen	t Travelling Sa	les Pe	rson p	orobl	em using Br	ranch and Bour	d Techniq	ue.					

COMPUTER SCIENCE AND TECHNOLOGY FOUR YEAR B.TECH DEGREE COURSE Scheme of Instruction and Examination (Effective from 2020-2021)

V Somostor CST

v Sen	lester USI							(Scheme-	-2020)
	C t		C I'r	Sc In: peri	heme structi iods/w	of on reek	Scheme of Examination Maximum Marks		
S.No	Category Course Title		Credits	L	Т	Р	End Exam Marks	Internal Assessment Marks	Total Marks
Ι	Theory								
1.	PCC	Theory of Computation	3	3	0	0	60	40	100
2.	PCC	Computer Networks	3	3	0	0	60	40	100
3.	PCC	Artificial Intelligence	3	3	0	0	60	40	100
4.	PEC	Professional Elective – I	3	3	0	0	60	40	100
5.	OEC	Open Elective – I	3	3	0	0	60	40	100
6.	MC	Professional Ethics	0	2	0	0	0	100	100
Π	Practical								
7.	PCL	Computer Networks Lab	1.5	0	0	3	60	40	100
8.	PCL	Artificial Intelligence Lab	1.5	0	0	3	60	40	100
9.	SC	Multimedia and Application Lab	2	0	0	4	60	40	100
10.	INT	Summer Internship - I	1.5	0	0	0	0	100	100
			21.5						

VI Semester CST

VI Se	mester CS	Г						(Scheme	e-2020)
				So In per	cheme struct iods/v	e of ion week	Sche N	me of Examin Iaximum Marl	ation ks
S.No	Category	Course Litle	Credits	L	Т	Р	End Exam Marks	Internal Assessment Marks	Total Marks
Ι	Theory								
1.	PCC	Language Processors	3	3	0	0	60	40	100
2.	PCC	Big Data Technologies	3	3	0	0	60	40	100
3.	PCC	Foundations of Machine Learning	3	3	0	0	60	40	100
4.	PCC	Microprocessors and Microcontrollers	3	3	0	0	60	40	100
5.	PEC	Professional Elective – II	3	3	0	0	60	40	100
6.	OEC	Open Elective – II	3	3	0	0	60	40	100
7.	MC	Essence of Indian Traditional Knowledge	0	2	0	0	0	100	100
II	Practical								
8.	PCL	Language Processors Lab	1.5	0	0	3	60	40	100
9.	PCL	Big Data Technologies Lab	1.5	0	0	3	60	40	100
10.	PCL	Machine Learning Lab	1.5	0	0	3	60	40	100
11.	SC	Android App development Lab	2	0	0	4	60	40	100
			24.5						

(Schomo 2020)

THEORY OF COMPUTATION (TOC)									
V Semester : Common for CST, CSE(AIML)						Scheme : 2020			
& CSE(DS)									
Course Code	Category	Hours/Week			Credits	Maximum Marks			
СТ301	РСС	L	Τ	Р	С	Continuous Internal Assessment	s End Exam	TOTAL	
G : 1E		<u>3</u>	0	0	3	40			
Sessional Exam Duration: 1/2 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to									
CO1: Design the finite automata for a given regular language									
CO2: Understand the regular expressions and pumping lemma of regular languages.									
CO3: Understand the regular grammar, Context Free Grammar and pumping lemma for CFL.									
CO4: Design push down automata and context free grammar for a given context free language.									
CO5: Design the Turing Machine for the given formal language and understand the undecidability.									
UNIT – I									
Basics of Languages and Automata: Alphabets, Strings and operations on Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Representation of Automata, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata.									
UNIT – II									
their precedence, identity rules for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages									
Automata with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine.									
ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure properties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.									
UNIT – IV									
Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG.									
UNIT – V									
Turing Machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Different types of Turing Machine, TM as Computer of Integer functions, Universal TM, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP.									
Text Books:									
 Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education, 3rd edition, 2006 									
Reference Books:

1. Martin J. C., "Introduction to Languages and Theory of Computations", TMH, 4th edition, 2010

2. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Pub. House, 2011

3. Papadimitriou, C. and Lewis, C. L., "Elements of the Theory of Computation", PHI, 1997

Question Paper Pattern: Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one

question from each section. **End Examination:**

COMPUTER NETWORKS (CN)										
V Semester: Co CSE(DS)	ommon for CST,	, CSE	(AIM	L) &			Sche	me: 2020		
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks			
СТ302	РСС	L	Т	Р	С	Continuous Internal End Exam TOTA Assessment				
		3	0	0	3	40	60	100		
Sessional Exan	n Duration: 1½ l	Hrs				End	Exam Duration	n: 3 Hrs		
Course Outcomes: At the end of the course students will be able to CO1: Understand Data Communication Systems, Network models and transmission media. CO2: Study the techniques used in data link layer. CO3: Understand the routing strategies for an IP based networking infrastructure.										
CO4: Study of congestion control and internetworking concepts.										
CO5: Understar	nd connection est	tablisł	nment a	and se	rvices provi	ded by TCP and	d UDP			
UNIT-I Introduction: Data communications, Networks, Protocols and standards, The OSI Model – Layered architecture, Layers in OSI Model, TCP/IP Protocol Suite, Addressing – Physical addresses, Logical addresses, Port Addresses. Transmission Media: Analog and digital signals, Digital signals – Bit rate, Bit length, Transmission of digital signals, Transmission Impairments – Attenuation, Distortion and Noise, Performance – Bandwidth, Throughput, Latency, Jitter. UNIT-II Data Link Layer: Error detection – Introduction, Block coding – error detection, error correction, hamming distance and minimum hamming distance, CRC codes, Checksum.										
Network layer: Connection orie Routing Algoria Link state, Mult	Design Issues: st ented services. <i>thms:</i> The optima ticast Routings.	ore-ai ality p	nd-forv principl	vard, s le, sho	ervices to tr	ransport layer, c uting, Flooding	connection less	and or and		
				UNI	Γ– IV					
Congestion Con and datagram su Internetworkin Gateway routin	<i>ntrol:</i> Principles, ubnets, load shede <i>g:</i> Tunnelling, I g protocols: OSP	cong ding, j nterne F, BG	estion jitter co et wor P.	preven ontrol. k rout	ntion policio ting, Fragm	es, congestion of the tentation. The	control in virtua IP protocol, I	al circuits P address,		
				UNI	T–V					
Transport Layer: UDP, TCP- service model, protocol, segment header, connection management, Transmission Policy. Application Layer: The DNS Name Space, Resource Records, Name Servers. Text Books : 1. Behrouz A. Forouzan [2006][4th Edition], Data communications and Networking, MGH. 2. Andrew S. Tenenbaum [2007]. [4th Edition]. Computer Networks. Pearson Education										
Deference Decks :										
Reference Books : 1. William Stallings ,Data and Computer Communications, Seventh Edition or Eighth Edition 2. An Engineering Approach to Computer Networks, S.Keshar, [II Edition], Pearson Education. 3. Computer Networking: A Top-Down Approach Featuring the Internet, James F, Keith W.Ross, [V Edition], Pearson Education. 4. Computer networks and internets. Douglas E Comer [6th Edition]. Pearson Education.										
			-, 204	0	Joiner Loui	, r v arc				

Web References:

1.https://www.tutorialspoint.com/data_communication_computer_network/index.htm

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ARTIFICIAL INTELLIGENCE (AI)										
V Semester	: Common for	CSE &	CST				S	Scheme : 2020		
Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	ks		
CS303	РСС	L	T	P	CContinuous Internal AssessmentEnd ExamTOT3406010					
Sessional F	xam Duration :	5 1½ Hr	<u> </u>	U	3	40 En	d Exam Du	ration: 3 Hrs		
Course Ou	tcomes : At the er	$\frac{1}{1}$ of th	e cours	se the st	udent will b	e able to				
CO1: Unde	erstand the fundar	nental o	concep	ts of Art	ificial Intel	ligence.				
CO2: Solve problems by applying suitable search method.										
CO3: Solve problems by applying heuristic search method.										
CO4: Unde	erstand constraint	satisfa	ction p	roblems						
CO5: Unde	erstand the Knowl	edge R	eprese	ntation t	echniques.					
				UN	I – TIN					
Introductio	on: What Is AI? F	Risk and	d benef	its of A	I. Intelligen	t Agents: Agents	and Enviro	onments, Good		
Behavior: T	Behavior: The Concept of Rationality, The Nature of Environments and the Structure of Agents.									
UNIT – II										
Solving Pro Uninforme	Solving Problems by Searching: Problem-Solving Agents, Example Problems, Searching for Solutions. Uninformed Search Strategies: BFS, DFS, Depth –limited search, IDA, Bidirectional search.									
				UN	IT – III					
Informed (heuristic sea	Heuristic) Searc arch, learning to s	h Strat search b	tegies:(better.]	Greedy Heuristic	best-first sea c Functions	arch, A* search, N	Iemory-bou	inded		
				UN	IT – IV					
Constraint Inference in Problems.	satisfaction pro	blem: I king Se	Definin arch fo	ig Const r CSPs,	raint Satisfa Backtrackii	action Problems, C ng Search for CSF	Constraint P Ps, The Stru	ropagation: cture of		
				UN	IT – V					
Knowledge and Modal	e Representation Logic, Reasoning	: Onto Syster	logical ns for (Enginee Categori	ering, Categ es, Reasoni	gories and Objects ng with Default Ir	s, Events, N nformation.	Iental Objects		
Text Books	Text Books:									
1. RussellStuart, and Peter Norvig. "Artificial intelligence: a modern approach." (2002).										
Reference l	Books:									
1. Artificial Intelligence, Ritch & Knight, TMH										
2. Artifici	ial Intelligence, S	aroj Ka	ushik.							
3. Introdu	iction to Artificia	l Intelli	gence,	Philip C	Jackson					
4. Artifici	ial Intelligence: T	he Bas	ıcs, Ke	vin Wai	wick					

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

PROFESSIONAL ETHICS (PE)										
V Semeste	er: Commor	n to a	ll Bra	anche	s		Sch	eme: 2020		
Course Code	Category	Но	ours/V	Veek	Credits		Maximum	Marks		
MC104	MC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		2	-	-	-	10 0	-	100		
Course Outcomes: At the end of the course students will be able to										
CO1: Understand the importance of Ethics & Human Values and become Humane.										
CO2: Kno	CO2: Know the moral autonomy and uses of Ethical theories.									
CO 3: Kno	ow the respo	nsibil	ities o	of the	Engineer to	owards the socie	ety.			
CO 4: Ass	sess environi	nenta	l issue	es to ta	ake Protect	tive measures to	evade risk	s.		
CO 5: Det	ermine vario	ous ro	les of	Engin	neer and he	lp them make th	e world a b	petter place.		
					UNIT-I					
Human Va Morals – V Others -Pe Spirituality	Human Values Morals – Values - Ethics – Morals vs Laws - Integrity - Work Ethics - Respect for Others -Peaceful Life - Honesty - Courage - Valuing Time- Empathy - Character - Spirituality									
				١	UNIT-II					
Inquiry – k Professiona Engineerin - Engineerin Law - The	Kohlberg's T al Roles - C ng As Socia s as respons Challenger o	Theory ustom I Exp ible en case s	7 –Gil as and oerimo xperin tudy	ligan' Relig entati nenter	s Theory - jion - Uses JNIT-III on: Engin rs - Codes	Consensus & C of Ethical Theo eering as Social of Ethics - A ba	ontroversy ories Experimen lanced Out	- Models of ntation look on		
Safety, Re Reducing R Occupation (IPR)	sponsibiliti Risk - Colleg nalCrime - P	es & iality rofess	Right and Lo sional	t s: Saf oyalty Right	fety and Ri - Respect : s - Employ	isk - Risk Benef for Authority - C ee Rights - Intel	it Analysis confidentiali lectual Proj	and ity - perty Rights		
				ן	UNIT-V					
Global Issues Multinational Corporations - Environmental Ethics - Computer Ethics -Engineers as Managers - Consulting Engineers - Moral Leadership - Sample Code of Ethics like ASME, ASCE, IEEE, Institute of Engineers, Indian Institute of Materials Management, IETE etc., Text Books:										
1. Jayashree Suresh, B.S.Raghavan, "Human Values and Professional Ethics", S.										
ChandPublications										
1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York., 1996										
2. Charles	D.Fledderm	ann ,	"Engi	neerir	ng Ethics",	prentice Hall, I	New Mexic	o., 1999.		
3. S. Dines	sh Babu, "Pı	ofess	sional	Ethic	s & Huma	n Values", Lax	mi publicat	tions.		

	С	OMP	UTER	NET	WORKS LA	AB (CN(P))				
V Semester: Comm CSE(DS)	on for CST,	CSE(AIML	.) &			Sche	me : 2020		
Course Code	Category	Hou	rs/We	ek	Credits	M	aximum M	larks		
СТ303	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		0	0	3	1.5	40	60	100		
Sessional Exam Du	Sessional Exam Duration: 2 Hrs						Cnd Exam	Duration: 3 Hrs		
CO1 : Understand th	CO1 : Understand the network models using packet tracer.									
CO2: Implement the error detection, routing and congestion techniques.										
CO3: Implement real time applications.										
	List of Experiments									
1. Study of basic net	twork comma	ind and	l Netwo	ork cor	figuration co	ommands.				
2. Create a network	c models usir	ıg pacl	cet trac	er.						
3. Perform an Initia	l Switch Con	figura	tion us	ing pa	cket tracer.					
4. Investigate the T	CP-IP and O	SI Mc	dels us	sing pa	icket tracer.					
5. Implement Cyclic	c Redundanc	y Cod	e.							
6. Implement Dijkst	tra's algorith	n to fi	nd the	best pa	ath.					
7. Implement the D	istance vecto	r routi	ng algo	orithm						
8. Implement congestion control using leaky bucket algorithm.										
9. Implement Domain name server.										
10. Implement clien	t server mode	el.								

ARTIFICIAL INTELLIGENCE LAB (AI(P))											
V Semester :C	ommon for (CSE &	& CST				Sch	eme: 2020			
Course Code	Category	Hours/Week		ek	Credits	Maxir	num Mar	:ks			
CS305	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		0	0	3	1.5	40	60	100			
Sessional Exam	n Duration:2	2Hrs				End Ex	am Durat	tion: 3 Hrs			
CO1:Implement searching strategies BFS, DFS.											
CO2: Demonstrate the adversarial search techniques.											
CO3: Demonstrate the Constraint satisfaction problem.											
CO4: Design th	CO4: Design the use cases for knowledge representation techniques.										
List of Experiments											
1. Write a program to solve family relationship tree.											
2. Write a program to solve water jug problem.											
3. Write a prog	gram to solve	any p	oroblem	n using	best first se	earch algorithm.					
4. Write a prog	gram to solve	any p	oroblem	n using	depth first	search.					
5. Write a prog	gram to imple	ement	depth]	limit se	earch.						
6. Write a prog	gram to imple	ement	A*algo	orithm							
7. Write a prog	gram to solve	4-Qu	een's p	roblem	1.						
8. Write a prog	gram to solve	const	traint sa	atisfact	tion problem	1.					
9.Solve the logic programming for the mathematical expression using necessary Libraries (Usekanren, sympy)											
10. Demonstrata. Ram, likes mb. Seema is a gic. Bill likes Cin	10. Demonstrate knowledge representation for the following scenario using open source tools.a. Ram, likes mango.b. Seema is a girl.c. Bill likes Cindy.										
d. Rose is red.	-										
e. John owns go	old										

	MULTIM	EDIA	AND .	APPL	ICATIONS	LAB (MAA (F	?))			
V Semester : Co CSE(AIML), CS	ommon for C SE(DS) & CS	CSE, C SBS	CST,				Sch	eme : 2020		
Course Code	Category	Hou	rs/Wee	ek	Credits	Maxii	mum Mai	rks		
SCCS02	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		0	0	4	2	40	60	100		
Sessional Exam	Duration:21	Irs	•	•		End Ex	am Dura	tion: 3 Hrs		
Course Outcom	es: At the en	d of t	he cour	se stuc	lents will be	able to				
CO1: Design th	ne web based	multi	media o	compo	nents					
CO2: Create time-based and interactive multimedia components.										
CO3: Create Ar	nimation Proj	ects fi	rom its	Conce	ptual Stage 1	to the final Prod	uct.			
CO4: Apply Audio and Video Production Techniques to an Animation Project.										
	List of Experiments									
1. Design a web page to display student education details in a tabular format.										
2. Write an HTML code to display the CV on a web page.										
3. Design a Registration Form which includes a multimedia content. On submitting the form, the user should payigate to Home page										
4. Write an and Cont	HTML code act Us. Create	to cre e sepa	ate a H ate we	ome page. b page	age having the s for the thr	hree links: Abou ee links.	ut Us, Our	Services		
5. Design a Institute	web page wh website, Depa	nich ir artmer	ncludes nt Webs	text, g site and	graphics, sou d Tutorial w	nd, video, and a ebsite for specif	nimation ic subject	create your		
6. Procedure	e to create an	anim	ation to	chang	ge a Circle ir	nto a Square usin	ng flash.			
7. Procedure	e to create an	anim	ation fo	or a Bo	y playing w	ith a Football.				
8. Procedure	e to create an	anim	ation to	show	the ripple ef	ffect.				
9. Procedure motion ty	e to create a s veening)	cene	to show	the su	inrise and su	inset (using mul	tiple layer	rs and		
10. Procedure origin por	e to Create a int and the ca	n ani r win	mation ning the	for bu e race.	is, car race	in which both	starts fror	n the same		
11. Procedure	e for creating	a Bai	nner usi	ing Pho	otoshop.					
12. Procedure	e for creating	a Au	dio file	using	free open so	urce tools.				
13. Procedure	e for creating	a vid	eo: Edi	ting, N	lixing, Addi	ng Sound to a v	ideo.			
14. Procedure for Editing an Image using Photoshop/free open source tool.										
15. Procedure	e for working	; with	text us	ing Mi	crosoft pow	er point.				

Additional Experiments

- 1. Procedure to create an Animation to indicate a ball bouncing on the steps.
- 2. Procedure to create a simulation Animation of Moving Clouds.
- **3.** Procedure to draw the fan blades and to give proper Animation.
- 4. Procedure to create an Animation with the following features:
 *Letters should Appear one by one
 *The fill color of the text should change to a different color after the display of full word
- 5. Procedure to simulate a ball hitting another ball.

LANGUAGE PROCESSORS (LPS)										
VI Semester : CST							S	Scheme : 2020		
Course Code	Category	He	ours/W	eek	Credits	Max	kimum Mar	ks		
СТ304	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional Exam Du	ration: 1½ Hrs		41. a. a.ta	1 4	11 h a ah 1 a 4 a	Er	nd Exam Du	iration: 3 Hrs		
Course Outcomes :	At the end of the	ilor and	the student	ident Wi	II be able to)				
CO2: Construct the parse trees using Top down and bottom up parsing methods.										
CO3: Build a type system, syntax directed translation and symbol table.										
CO4: Develop interr	nediate code gen	eration	and co	de optir	nization tec	hniques.				
CO5: Understand tar	rget code generat	ion usii	ng flow	graph a	and DAG re	epresentation Thre	e address co	ode.		
UNIT – I										
Introduction Translators: Language Processors, Phases of compiler, Phases vs Passes, Frontend and backend of compiler, Compiler vs Interpreter, Compiler construction Tools.										
Lexical Analyzer: Introduction to Lexical Analyzer, Role of lexical analyzer, Input buffering Techniques, Specification of tokens, Recognition of tokens, A language for specifying Lexical analyzer, Design of Lexical analyzer generator.										
UNIT – II										
Parser: Role of par rightmost Derivation	rser, Context fre s, Elimination of	e gram left rec	mars,] cursion	Derivati , Left fa	ons, Syntax ctor a gram	x tree, Writing a mar.	Grammar,	Left most and		
Top Down Parsing parser, First and Foll	: Top Down Par ow Functions, Co	rsing, R onstruc	Recursiv tion of	ve dece LL pars	nt parser, H sing Table.	Predictive parser,	Non Recurs	sive predictive		
Bottom up parsing Precedence Table, SI	g: Shift reduce LR parser, LR(0)	parsing items,	using Constr	stack, ucting S	Handles, G LR parsing	Operator preceder Table.	nce parsing,	Construction		
				UNIT -	- III					
Semantic Analysis: expressions, Basic T time environments: Records, Storage All	Role of Sema Types and Constr Activation Tre ocation Strategie	antic A ructor T es, Co s - Stat	Analyze Fypes, ntrol S ic Allo	er, Type a simpl stacks, S cation, S	e Checking e type chec Storage Org Stack Alloc	g, Type conversi cker, equivalence ganization, Rum ation, Heap Alloca	ons, Type of type exp time memo ation.	system, Type pressions. Run ry, Activation		
				UNIT -	- IV					
Intermediate Code trees,Directed Acycl Quadruples,Triples,I	Generation: I lic graphs, Tran ndirect Triples.	ntermed slation	diate la into T	anguage Three A	es, Threes ddress Coc	address code - le, Implementatio	Postfix nota n of three	ations, Syntax address code-		
Code Optimization: Criteria for code improving transformations, An Organization for an Optimizing Compiler, Principal sources of code optimization-Common sub expressions, Copy propagation, Dead code elimination, Loop Optimizations, Peephole optimization, Optimization of basic blocks.										
UNIT – V										
Code Generation: Issues in the design of code generator, Target machine, Basic blocks and flow graphs, Next use information, A simple code generator, DAG representation of basic blocks, Generating code from DAG- Labeling Algorithm.										

Text Books:

1. Compilers: Principles, Techniques and Tools, Second Edition, PHI, V. Aho, R. Sethi and J. Ullman.

Reference Books:

1. Lex & Yacc, Levine R. John, Tony Mason and Doug Brown

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

BIG DATA TECHNOLOGIES (BDT)										
VI Semeste CSE(AIML	r : Common for .)	CSE,	CST &	k			S	cheme : 2020		
Course Code	Category	Ho	ours/W	'eek	Credits	Max	imum Mar	ks		
CS307	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional E	xam Duration 1	<u>1/2 Hrs</u>		~ ~ 41 • ~ ~ 4		En En	d Exam Du	ration: 3 Hrs		
Course Ou	rstand the basics	of Big	Data A	se the st nalytics	Hadoon	be able to				
CO2: Desig	n Map Reduce p	rogram	s for a	given pr	oblem.					
CO3: Write	CO3: Write Pig Scripts on Hadoop that works on large datasets.									
CO4: Perform Data Querying Operations using Apache Hive.										
CO5: Imple	CO5: Implement Data Management using NoSQL Databases									
UNIT – I										
Big Data Analytics: What is Big Data Analytics, why this Sudden Hype Around Big Data Analytics? Classification of Analytics, Top Challenges Facing Big Data Introduction to Hadoop: Introducing Hadoop, HDFS, HDFS Commands, Processing Data with Hadoop, Interacting with Hadoop Eco System.										
Understand	ling Map Reduc	e & YA	ARN:							
The Map Re While Desig	educe Frameworl gning Map Reduc	c Conce e, YAF	ept, De N Bac	velopin kground	g Simple M 1, YARN A	Iap Reduce Appli rchitecture	cation, Poin	ts to consider		
				UN	IT – III					
Analyzing I Introducing Debugging	Data with Pig: PIG, Running pig.	PIG, (Getting	started	l with Pig	Latin, Working	with oper	ators in Pig,		
				UN	IT – IV					
Understand Introducing	ling HIVE: Hive, Hive Servi	ces, Bu	ilt in f	unctions UN	in Hive, H IT – V	ive DDL, Data M	anipulation	in Hive.		
NoSQL Data Management: Introduction to NoSQL, Characteristics of NoSQL, Types of NoSQL Data Models, Schema-less Databases.										
Text Books:										
1. Big Data by Dream	a Black Book: Co mTech,2015.	overs Ha	adoop	2, Map l	Reduce, Hiv	ve, YARN, Pig, R	and Data V	isualization		
Reference Books:										
1. Big Date	a and Analytics h	v Seem	a Ach	arva.Wil	ev Publicat	ion.2015.				
2. Data Sci	ience & Big Data	Analyt	ics: Di	scoverir	ng, Analyzi	ng, Presenting Da	ta Visualizii	ng.		

3. Hadoop: The Definitive Guide, 3rd Edition, By Tom White, O'reilly Media

4. Big Data Now: 2012 Edition Publisher: O'Reilly Media.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	FOUNDATIONS OF MACHINE LEARNING (ML)										
VI Semeste CSE(DS)	er : Common for	CSE,	CST &	ζ			S	cheme : 2020			
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks			
CS308	РСС	L	T	P	С	Continuous Internal Assessment	End Exam	TOTAL			
Sessional F	van Duration 11	3 / Urs	0	0	3	40	60 d Exam Du	100			
Course Ou	Course Outcomes :At the end of the course the student will be able to										
CO1: Understand machine learning systems and data preprocessing techniques											
CO2: A	CO2: Analyze performance measures of a Digit Image Classifier										
CO3: U	nderstand the con	concer	I Linea	r regress working	of Support V	gularization. Vector Machines Γ	Decision trees	3			
CO5: Ill	ustrate Ensemble	metho	$\frac{ds}{ds}$ and	Unsupe	rvised Lear	ning algorithms					
				1		6 6					
Machina I.	anning I andsoa	n a		UN	11 – 1						
Introduction	n Types of Mach	ve ine Lea	rning §	Systems	Challenge	es Testing and Va	lidating				
Data Prepro	Data Preprocessing for Machine Learning Working with Pandas and Numpy Handling Missing Values										
Understanding Data with Visualization											
Classification											
MNIST, Tr	raining a Binary Matrix, Precisio	∉ Class on. R€	sifier, call.F1	Perform	ance meas Precision-	sures – Accuracy Recall Trade o	using Cros ff. K-Near	ss Validation, est Neighbor			
Classificatio	on. Naive Bayes (Classifi	cation	– Naïve	Bayes Clas	sifier	,				
				UN	IT – III						
Training Li	inear Models										
Linear Reg	ression-Normal	Equatio	n, Gra	adient D	Descent, Sto	ochastic Gradient	Descent, E	Batch Gradient			
Descent, Po	lynomial Regres	sion, R	egular	ized Lin	ear Models	s – Lasso, Ridge, I	Elastic Net.				
Logistic Re	gression- Estimat	ing Pro	babilit	ies, Trai	ning Cost F	Function, Decision	Boundaries	s,			
Softmax Re	gression										
				UN	IT – IV						
Support Ve	ctor Machines										
Linear SVN	I classification, N	Ionlinea	ar SVN	A classif	ication,SVN	M Regression					
Decision Tr	rees										
Training and visualizing a Decision tree, Making predictions, Estimating Class probabilities,											
Computational complexity, Gini Impurity or Entropy, Regularization of Hyper parameters											
UNIT – V											
Ensemble L	Learning and Rai	ndom I	⁷ orests								
Voting class	sifiers, Bagging a	nd past	ing, Ra	andom p	atches and	Random sub space	es, Random	forests			
Unsupervis	ed Learning Tech	hnique	S								
Clustering a	lgorithms - K-M	eans, D	B Scar	ı							

Text Books:

 Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and Tensor Flow: Concepts, Tools, and Techniques to build Intelligent Systems", OReilly Publications, First Edition, 2017
 Ethem Alpaydin "Introduction to Machine Learning" The MIT Press, Third Edition, 2014

2. Ethem Alpaydin," Introduction to Machine Learning", The MIT Press, Third Edition, 2014

Reference Books:

- 1. Tom M.Mitchell, "Machine Learning", Mc Graw Hill Education, Indian Edition, 2013
- 2. Oliver Theobald, "Machine Learning for Absolute Beginners", Second Edition, 2017
- 3. Machine Learning with python Tutorial Point.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	MICROPRO	CESSO	RS AN	ND M	ICROCO	NTROLLERS (M	MC)		
VI Semester :	Common for CS	E & CS	ST				Scheme	e: 2020	
Course Code	Course Category	Hours/	Week		Credits	Maxi	mum Marks		
EC320	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	0	0	3	40	60	100	
Sessional Exa	m Duration 1/2 I	<u>Irs</u>	.1		1	End Exa	m Duration: 3	5 Hrs	
Course Outco	omes: At the end	of the c	ourse th	ne stu	dent will b	e able to			
CO1: Unders	stand the pin struc	ture, arc	nitectu	re of a	docorintio	processor.	****		
CO_2 : Unders	ha programming	model e	f 2026	mioro	rescriptio	for Assembly long			
CO4: Unders	tand the pin struct	hire arc	itectur	re and	operations	s of 8051 microcon	troller		
CO5: Apply 1	the programming	model o	f 8051	micro	ontroller fo	or Assembly langu	age programs		
UNIT - I									
Basics of Microprocessors: Block Diagram and Features of 8085 microprocessor, 8086 CPU architecture,									
Pin Diagram of	8086 microproces	ssor, con	npariso	n of 8	3085 and 8	086 microprocesso	rs.		
0	1	,	1	UNI	T - II	1			
8086 Operatio	ns: Segmented r	nemory,	Physic	cal M	lemory Or	ganization, Opera	ting modes, A	ddressing	
modes, 8086 ins	struction set								
				UNI	Г - III				
Programming and Interfacing using 8086: Simple programs on Arithmetic operations, Sorting, Searching. Introduction to 8255 (Programmable Peripheral Interface) and it's CWR, 8251(USART), 8259 (Programmable Interrupt Controller).									
UNIT - IV									
Introduction to External memor	8051 Microconf y, counters and T	roller: I imers, S	Pin Dia erial da	gram, ata ing	Architectu out/output,	ire, Input / Output	ports and circu	its,	
		,		UNI	T - V	<u> </u>			
8051 Programme Interfacing LED	ning: Addressing Ds, Switches.	Modes,	Instruc	tion s	et. Basic P	Programming with 8	8051 Micro con	ntroller.	
Text Books :									
1. A K Ray Hill Edu	v, K M Bhurchand cation Private Lto	li, <i>Advar</i> I, 2010.	iced Mi	icropr	ocessors a	und Peripherals, 2n	d Edition, Tata	n McGraw	
2. Mazidi Mazidi Market 2. Mark	Muhammad Ali, N bedded Systems, 2	/lazidi Ja nd Editi	anice G on, Pea	illesp rson l	ie & McKi Education,	nlay Rolin D, <i>The</i> 2008.	8051 Microcor	ntroller	
Reference Boo	ks :								
<i>1</i> . John Uff Pearson	fenbeck, <i>The 8080</i> Ed, 2006.	5/8088 F	'amily:	Desig	gn, Prograi	mming, and Interfa	cing, 3rd Edition	on,	
2. Barry B. Brey, <i>The Intel Microprocessors-Architecture, Programming and Interfacing</i> , 8th Edition, Princeton Hall India, 2009.									
3. Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publication Ltd, 2006.									
4. Gaonkar 5th Edit	Ramesh, <i>Microp</i> ion, Penram Intern	<i>rocessoi</i> national	<i>rs Archi</i> publica	<i>itectu</i> tion I	<i>re, Progra</i> Ltd, 2010.	mming & Applicati	ions with 8085/	′8080A,	
5. N. Senth 2012.	 Stil Edition, Feinan International publication Etd, 2010. N. Senthil Kumar, M. Saravanan, S. Jeevananthan, <i>Microprocessors and Interfacing</i>, OUP India, 2012. 								
Web Reference	es:								

1. www.nptel.onlinecourseac.in/.microprocessorsandmicrocontrollers

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

-	ESSENCE OF	IND	IAN 7	FRAD	TIONAL	KNOWLEDGE (EITK)			
VI Semester: Co	ommon to all E	Branc	hes				Scheme	:2020		
Course Code	Category	Нот	urs/W	eek	Credits	Maxim	um Marks			
MC105	МС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		2	-	-	-	100	-	100		
Course Outcom	es: At the end of	of the	cours	se stude	ents will b	e able to				
CO1: Understand	the concept of	Trad	itiona	l know	ledge and	its importance.				
CO2: Explain the	need and impo	rtanc	e of p	rotectir	ng traditio	nal knowledge.				
CO 3: Illustrate tl	he various enact	tment	s rela	ted to t	he protect	ion of traditional kn	owledge.			
CO 4: Interpret th	ne concepts of I	ntelle	ctual	propert	y to prote	ct the traditional kn	owledge.			
CO 5: Understand	d the traditional	knov	vledg	e in dif	ferent sect	cors.				
				UN	I-TIN					
Define tradition knowledge, the impact of soc characteristics, western knowle Protection Of 7 Protection of tra TK Protection, v Legal Frame A. The Schedu 2006, The H B. The Biolog 2016. Geog	al knowledge, physical and second change of traditional knowledge traditional knowledge traditional la construction of TK in generation of TK in generation of TK in generation of Platical Diversity Araphical indicat	natur ocial n tra owled know owled ledge: global Other ant Va Act 20 tors ac	e and conte dition ge vi ledge dge The l econ r Trad arietic	charac exts in v nal kn s-à-vis vis-à-v UN need f nomy, R UNI litional es and F nd Rule 03. UN	teristics, s which trac owledge indigenou is formal IT-II For protect cole of Go F-III Forest Dy Farmers' R s 2004, th IT-IV	scope and importan ditional knowledge systems. Indigenous knowledge, track knowledge ing traditional know vernment to harness vellers (Recognition lights Act, 2001 (PP he protection of track	ce, kinds of develop, th ous Knowle litional kno wledge Sign s TK. n of Forest F VFR Act). litional know	traditional e historical edge (IK), wledge Vs nificance of Rights) Act, wledge bill,		
Traditional K Systems of tra knowledge, Cer knowledge, Str increasing prote Traditional Kn Traditional know	nowledge And ditional knowl tain non IPR m ategies to incr ction of Indian nowledge In Dif wledge and eng	Intel edge echar rease Tradi fferen	llectu prote nisms prote tional nt Sec ing, T	al Prop ection, of trad ection of l Know UN etors Fraditio	Derty Legal co itional kno of tradition ledge. NT-V nal medic	oncepts for the pro owledge protection, onal knowledge, gl	otection of Patents and obal legal	traditional l traditional FORA for		
conservation ar security of the c	nd sustainable ountry and prot	es de deve ection	pena lopme n of T	ent of K . 139	environm	ent, Management	of biodiver	rsity, Food		

TextBooks:

1. 'Traditional Knowledge System in India' by Amit Jha, 2009.

ReferenceBooks:

1. 'Traditional Knowledge System and Technology in India' by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.

2. 'Traditional Knowledge System in India' by Amit Jha Atlantic publishers, 2002.

3. 'Knowledge Traditions and Practices of India' by Kapil Kapoor and Michel.

Web References:

- 1. www.youtube.com/watch?v=LZP1StpYEPM
- 2. https://nptel.ac.in/courses/121106003

	LANGUAGE PROCESSOR LAB (LPS (P))											
VI Semester : CST							Sch	eme: 2020				
Course Code	Category	Hou	rs/We	ek	Credits	Maxi	mum Ma	rks				
СТ305	CT305 PCL L				С	Continuous Internal Assessment	End Exam	TOTAL				
		0	0	3	1.5	40	60	me : 2020 ks TOTAL 100 ion: 3 Hrs				
Sessional Exam Dura	ation: 2 Hrs					End Ex	am Dura	tion: 3 Hrs				
CO1: Implement DFA	CO1: Implement DFA and Lexical Analyzer.											
CO2: Construct parse trees using Top down and Bottom up parsing methods.												
CO3: Implement Intermediate code generation.												
List of Experiments												
1. Implementation of	DFA to accept	ot strin	gs endi	ng wit	h abc.							
2. Implementation of	Lexical Ana	alyzer										
3. Implement Elimina	ation of Left	Recu	rsion.									
4. Implementation of	Finding a L	.eft Fa	ctoring	g.								
5. Implementation of	First and Fo	ollow	functio	ns.								
6. Implementation of	Non-Recurs	ive Pr	edictiv	e Pars	er.							
7. Implementation of	Shift Reduc	e pars	ing usi	ng sta	ck.							
9. Incelementation of Onerator Dress dance Densing												
8. Implementation of Operator Precedence Parsing.												
9. Implementation of Stack Allocation Strategy.												
10. Implementation of	f Intermediat	e Cod	e Gene	ration	•							

BIG DATA TECHNOLOGIES LAB (BDT(P))											
VI Semest	er Common	for	CSE	,		S	cheme : 2	2020			
CST,CSE(AIML)		/**	7 1	C. III						
Course	Category	Ηοι	irs/ W	eek	Credits	Maximum	Maximum Marks				
Coue						Continuous Internal	End				
CS310	PCL	L	Τ	Р	С	Assessment	Exam	TOTAL			
		0	0	3	1.5	40	60	100			
Sessional I	Exam Durat	tion:	2 Hrs	8		End Exa	m Durati	on: 3 Hrs			
Course Ou	Course Outcomes: At the end of the course students will be able to										
CO1: Demonstrate Hadoop Commands in Ubuntu environment.											
CO2: Design Map Reduce Programs to different problems.											
CO3: Imp	lement Pig c	on Ha	doop	Fram	nework and	l perform basic operations	s.				
CO4: Perform DDL operations using Hive on Hadoop.											
List of Experiments											
1. Perform Hadoop Setup in Local and Pseudo mode and monitor through Web Based UI.											
2. Implem	entation of I	Hado	op Sh	ell C	ommands	on files.					
3. Implem	entation of v	word	coun	t Exa	mple using	g Hadoop Map Reduce.					
4. Write a	Map Reduc	e Pro	gram	that	works on (Gutenberg dataset.					
5. Write P	ig Latin Scri	ipts o	n Des	scribe	, for each a	and order by operator.					
6. Write P	ig Latin scri	pts to	perf	orm s	et and sort	operation.					
7. Perform	n DDL Oper	ation	s on l	Hive.							
8. Perform	n DML Oper	ratior	is on	Hive.							
9. Implem	entation of l	Data 1	Mana	geme	nt using N	oSQL Databases					
Reference	Books:										
1. Big and 2018	l Hadoop Le	arn b	y exa	mple	s by Maya	nk Bhushan, BPB Publica	ations, Fir	st Edition			
Web re	eferences:										
1. <u>https://v</u>	www.youtub	e.com	n/wa	tch?v	=G0xyw10	ODi5A					
2. <u>https://v</u>	www.youtub	e.com	n/wa	tch?v	=q8INOC1	U9HE					
3. <u>https://v</u>	<u>www.yo</u> utub	<u>e.c</u> or	<u>n/w</u> a	t <u>ch?</u> v	=2 <u>N9g</u> P11	9 F4					
	-				<u>0</u>						

	MACHINE LEARNING LAB (ML(P))											
VI Semester : CSE(DS)	Common fo	or CS	E, CS	Г &	Scheme : 2020							
Course Code	Category	Hou	rs/We	ek	Credits	Maxir	Maximum Marks					
CS311	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		0	0	3	1.5	40	60	100				
Sessional Exam Duration: 2 Hrs End Exam Duration: 3 Hrs												
Course Outcomes: At the end of the course students will be able to												
CO1:Apply Data Preprocessing techniques using Numpy and Pandas												
CO2:Build binary classifier on Image Dataset												
CO3:Implement Classification and Regression Models												
CO4:Apply En	semble Lear	ming	and Cl	usterir	ng technique	ŚŚ						
4 117 1	4.57		Lis	t of Ex	xperiments							
1. Working wi	th Numpy											
2. Working w	ith Pandas											
3. Build a digit	image classif	ier on	MNIS	T datas	set.							
4. Implement I	KNN Classifi	ier										
5. Implement 1	Naïve Bayes	Class	ifier									
6. Implement S	Simple Linea	r Reg	ression	mode	l							
7. Implement	Support Vec	tor m	achines	s on IR	RIS Dataset							
8. Perform Training and Visualizing a decision tree												
9. Apply Ense	9. Apply Ensemble Learning											
10. Implement	K-Means C	luster	ing Alg	gorithn	n							

ANDROID APP DEVELOPMENT LAB (AAD(P))										
VI Semester : CSE(AIML) &	Commor z CSE(DS)	n for (CSE, C	CST,	Scheme : 2020					
Course Code	Category	Hou	rs/We	ek	Credits	Maxir	Maximum Marks			
SCCS03	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		0	0	4	2	40	60	100		
Sessional Exam	n Duration:	2 Hrs				End Ex	am Dura	tion: 3 Hrs		
Course Outcomes : At the end of the course the student will be able to										
CO1: Install and configure Android application development tools.										
CO2: Design and develop user Interfaces for the Android platform.										
CO3:. Save state information across important operating system events.										
CO4: Apply Java programming concepts to Android application development.										
	0 + 1 + 1		Lis	st of Ex	xperiments					
1. Installation of	of Android st	udio.								
2. Developmen	t of Hello W	orld A	Applica	tion						
3. Create an ap with the nam	plication that the entered in	at take text b	es the 1 ox, wh	name f	rom a text user clicks t	box and shows he OK button	hello mes	ssage along		
4. Create a sci	reen that has	s inpu	it boxe	es for	User Name	e, Password, Ad	ldress, G	ender(radio		
buttons for 1	male and fer	nale),	Age (1	numeri	c), Date of	Birth (Date Pic	ket), Stat	e (Spinner)		
and a Subm	it button. Of	n clic	king th	e subr	nit button,	print all the dat	ta below	the Submit		
5. Design an an	ally layour)	ation	o creat	e nage	using Inten	t and one Buttor	and pass	the Values		
from one Ac	tivity to seco	ond Ac	tivity	e puge	using men		r una pass			
6. Design an an	ndroid applic	ation	Send S	MS usi	ing Intent					
7. Create an an	droid applica	tion u	sing Fi	ragmer	nts					
8. Design an ar	ndroid applic	cation	Using	Radio	buttons					
9. Design an a	ndroid applic	cation	for me	nu.						
10. Create a us	er registratio	n app	lication	that st	tores the use	er details in a dat	abase tab	le.		

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING FOUR YEAR B.TECH DEGREE COURSE **Scheme of Instruction and Examination** (Effective from 2020-2021)

VII Semester CST

(Scheme-2020) Scheme of Scheme of Examination Instruction Maximum Marks periods/week S. Course Title Category Credits No End Internal Total Т Ρ L Exam Assessment Marks Marks Marks Ι Theory PEC 3 3 0 40 100 1. 0 60 Professional Elective-III 2. PEC Professional Elective-IV 3 3 0 0 60 40 100 3. PEC Professional Elective-V 3 3 0 0 60 40 100 3 3 0 60 100 4. OEC 0 40 **Open Elective-III** 5. OEC 3 3 0 40 100 **Open Elective-IV** 0 60 3 3 HSSEC 0 100 Universal Human Values-2 0 60 40 6. Practical Π 2 SC 0 0 40 100 7. 4 60 Angular Lab 8. INT Summer Internship - II 3 0 0 0 100 100 0 23

VIII Semester CST

Scheme of Scheme of Examination Instruction Maximum Marks periods/week S. Course Title Category Credits End No Internal Total L Т Р Exam Assessment Marks Marks Marks INT Ι Internship 6 0 0 100 100 0 0 6 40 Π PROJ Project Work 0 0 0 60 100 12

(Scheme-2020)

UNIVERSAL HUMAN VALUES-2 (UHV-2)										
VII Semester :	Common to a	ll brar	ches		Scheme : 2020					
Course Code	Category	Hours/Week			Credits	Maxi	mum Marl	KS		
HSSEC701	HSSEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	0	0	3	40	60	100		
Sessional Exam Duration : 1 ½ HrsEnd Exam Duration: 3 Hrs										
Course Outcor	nes : At the end	l of the	course	e the st	tudent will be	e able to				
CO1: Develop	a holistic persp	ective	based o	on self	-exploration	about themselves	s (human be	ing), family,		
society and natu	ure/existence.									
CO2: Understa	nd the harmony	in the	human	n being	g, family, soc	iety and nature/ex	kistence			
CO3: Strengthen of self-reflection.										
CO4: Develop a commitment and courage towards implementing Human values										

UNIT – I

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Purpose and motivation for the course, recapitulation from Universal Human Values. Self-Explorationwhat is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfil the above human aspirations: understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and coexistence) rather than as arbitrariness in choice based on liking-disliking

UNIT - II

Understanding Harmony in the Human Being - Harmony in Myself

Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT – III

Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship. Understanding the meaning of Trust; Difference between intention and competence. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

UNIT - IV

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

Understanding the harmony in the Nature. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all- pervasive space. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT - V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics. **a**. Ability to utilize the professional competence for augmenting universal human order. **b**. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems. **c**. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order: **a**. At the level of individual: as socially and ecologically responsible engineers, technologists and managers **b**. At the level of society: as mutually enriching institutions and organizations. Sum up. Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Books

1. R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

2. R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.

2. A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.

3. The Story of Stuff (Book).

4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"

5. E. FSchumacher. "Small is Beautiful"

6. Slow is Beautiful –Cecile Andrews

7. J C Kumarappa "Economy of Permanence"

8. Pandit Sunderlal "Bharat Mein Angreji Raj"

9. Dharampal, "Rediscovering India"

10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"

11. India Wins Freedom - Maulana Abdul Kalam Azad

12. Vivekananda - Romain Rolland(English)

13. Gandhi - Romain Rolland (English)

Web References:

1. https://nptel.ac.in/courses/109/104/109104068/

2. https://aktu.ac.in/hvpe/ResourceVideo.aspx

Question Paper Pattern:

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

ANGULAR LAB (AR(P))											
VII Semes	ter : Commo	n for	CSE,	CST,			S	cheme : 2020			
CSE(AIML	a) & CSE(DS)										
Course Code	Category	Hours/Week			Credits	Max	imum Mar	ks			
SCCS04	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		0	0	4	2	40	60	100			
Sessional E	xam Duration 2	2 Hrs				En	d Exam Du	ration: 3 Hrs			
Course Out	comes : At the e	nd of tl	ne cour	se the st	udent will b	be able to					
CO1: Unde	erstand the Angul	ar and	its wor	king							
CO2: Implementing components and templates											
CO3: create single page and custom route applications											
CO4: Build applications that can get data from server											
CO5: Imple	ment available a	nd crea	te user	defined	libraries						
				I. (CI							
				List of E	experiments	S					
1. Knov	wing the Editor										
2. Impl	ementing compo	nents									
3. Impl	ementing Templa	ates									
4. Crea	ting routing appl	ication	s								
5. Disp	laying a list										
6. Addi	ing Services										
7. Addi	ing Navigation										
8. Getti	ing data from a S	erver									
9. Usin	g Published Libr	aries									
10. Crea	ting User Define	d Libra	ries								

List of Open Electives - OEC-I & OEC-II

	Open Elective Courses (OEC-I)									
S.No	Course Title									
1.	Optimization Techniques									
2.	Remote Sensing & GIS									
3.	Introduction to JAVA									
4.	Internet of Things									
5.	Scientific Programming with Python									
6.	Introduction to Database Systems									
7.	Ethical Hacking									
8.	Entrepreneurship Development									
9.	Introduction to Information Systems									
10.	Neural Networks & Fuzzy Logic									

	Open Elective Courses (OEC-II)									
S.No	Course Title									
1.	Renewable Energy Sources									
2.	Industrial Safety									
3.	Web Technologies									
4.	Introduction to Cyber Security									
5.	Nano Technology									
6.	Disaster management									
7.	Project management									
8.	Advanced Information Systems									
9.	Product Lifecycle Management									
10.	Industry 4.0									

OPTIMIZATIONTECHNIQUES (OT)										
V Semest	er: B.Tech				Scheme : 2020					
Course Code	Category	Hou	rs/V	leek	Credi ts	Ma	ximum Ma	rks		
OEC301	OEC - I	L	T	Р	C	Continuous Internal Assessment	End Exam	Total		
Sessional	Evam Duratio	 ວກ • 1	U 5 H#	-	3		d Exam Du	100		
Sessional		JII:1.	5 ПГ	5		EI		Iration: 5 mrs		
Course Outcomes: At the end of the course the student will be able to										
Coll: Und	lerstand the co	e ella		Ontin	inse the s	and solve linear	able to	ing problems		
	the engineeri	ng nr	<u>s or</u>	me 119	ing Inte	and solve inteal	ng techniqu			
CO3: Solv	ve the enginee	ring pi	proh	leme	using K	uhn tucker co	nditions an	d Lagrangean		
multiplier	method	iiig	probl		using K		nuntions an	u Lagrangcan		
CO4: Solv	re the engineer	ing n	roble	ms 11	sing dyn	amic program	ning techniq	านค		
CO5: App	ly non-tradition	nal or	ntimi	zatior	technio	ues to solve en	gineering p	roblems		
	iy non tradition		, , , , , , , , , , , , , , , , , , , ,	Zatioi	UNIT - 1		<u></u>			
Ontimiza	tion. Introdu	otion	Ціс	storic	al Deve	lonment Fng	incering Ar	onlications of		
Optimizat	ion Classificat	ion of	f Ont	imiza	tion prol	olems	incering Ap	phications of		
optimizat		1011 01	opt	miza		5101115.				
Linear Pr	ogramming Pr	oblet	ns:							
Simplex r	nethod. Big-M	meth	nod.	Sensi	tivity Ar	alvsis. Duality	. Dual sim	plex method.		
Interpreta	tion.		,	001101		aijoio, Duairej	, <i>Dua</i> <u>biii</u>	pion method,		
L					UNIT-2					
Integer P	rogramming T	echn	iane	•						
Simple an	nlications of ir	nteger	nro	• orami	ming so	lution methods	of integer	nrogramming_		
Branch ar	nd Bound Algor	rithm	Cut	ting I	Plane Alo	orithm	s of integer	programming		
Dranch a		. 1011111	, cui		IINIT.3	,011(1111				
Classical	Ontimization	Tech	niau	165.	0					
Single var	viable optimizat	ion w	rith a	and w	vithout c	onstraints mu	lti – variabl	e ontimization		
with and	without constr	aints	met	hods	of Lagrai	nge multinliers	Kuhn-Tucl	ker conditions		
with and	without constru		met	lious	IINIT-4	ige multipliers	, ituilli i'uei			
Dynamic	Programming	Tech	nia	1e:						
Elements	of dynamic pr	ogran	nmin	g mo	del Bac	k ward recursi	ve equation	Applications		
of Dynam	ic	ogran		5 1110	uci, Duc	is ward recurd	ve equation	, ripplications		
Programm	ning to Linear r	progra	mmi	ing ar	nd Capita	al budgeting.				
		8			UNIT-5					
Genetic A	lgorithm:									
Introducti	on. Difference	betw	veen	Gene	tic Algor	rithm and Tra	ditional Me	thods. Simple		
Genetic A	lgorithms, Sin	nilari	ty Te	empla	tes (Sch	emata), Genet	ic algorithm	n operators –		
selection,	crossover and	muta	tion.	Sim	ole applic	cations of GA.	8	1		
Evolution	nary Algorithm	ıs:		1	-				
Evolution	ary Algorithum	is: A	nt co	olony	algorith	m, Tabu searc	h algorithm	and Particle		
swam opt	swam optimization algorithm.									
TextBook	TextBooks:									
1.Rao S.S	, -Optimization	, Wile	y Ea	stern	, New De	elhi, 1995				
L	•		~			·				

2. S.D. Sarma, -Operations Research, Kedarnath Ramnath & Co

3. David E.Goldberg,-Genetic Algorithms, Pearson Education

ReferenceBooks:

1. HamdyA.Taha, -Operations Research, Prentice Hall of India.

2. Kalyanmoy Deb,-Optimization for Engineering Design, Prentice Hall, New Delhi, 2000

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain subquestions. The student shall answer one question from each unit.

REMOTE SENSING & GIS (RSGIS)												
V Semester: I	B.Tech.				Scheme : 2020							
Course	Category	Ног	irs/W	'eek	Credits	Maxi	mum Mark	S				
OEC302	OEC-I	L	Т	Р	С	Continuous Internal Assessment	Total					
		3	I	-	3	40	60	100				
Sessional Exa	Sessional Exam Duration: 1.5 Hrs End Exam Duration: 3 Hrs											
Course Outcomes : At the end of the course the student will be able to												
CO1: Understand the Photogrammetry, EDM and Total station surveying principles to solve												
surveying prob	olems using ap	propria	ate too	ols and	technique	s.						
CO2: Underst	and the concep	ots of r	emote	e sensi	ng and inte	rpretation meth	nods.					
CO3: Unders	tand the impor	tance of	$\frac{\text{of mag}}{\text{GIS}}$	$\frac{\text{ps, con}}{\text{and it}}$	cept of ma	ip projections.	data model	s spatial				
analysis.	tand the conco	ept of	015	and n	s applicati	ons, unierent	uata models	s, spatial				
CO5: Under	rstand the prin	nciples	s used	d in C	SNSS and	Drone survey	ving, data c	ollection				
methods, error	in observation	ns and	correc	ctions.								
				UNI	Γ – Ι							
<i>Aerial Photog</i> Bar– Digital E	grammetry:Ste levation Mode	reosco l (DEI	ру– 3 M) – S	3-D M Slope.	lodel – H	eight determin	ation using	Parallax				
<i>Land Surveyi</i> principle – P Traversing – T	<i>ng:</i> Various I Parts of Total Priangulation a	Levels Stationd Tril	– Le on – laterat	velling Capal tion.	g methods- bilities an	-Total Station d applications	– EDM– V s of Total	Working Station–				
				UNIT	- II							
<i>Remote Sens</i> Resolutions – S Sensing Data I and digital inte	Sing: Basic Spectral. Spatia Products – PA erpretation met	concep al, Ten N – M thods.	ot– E nporal lultisp	Electron and R bectral,	magnetic adiometric Microway	spectrum– Sp c – Platforms ar ve, Thermal, Hy	bectral sign nd Sensors – yper spectral	ature – - Remote – Visual				
				UNIT	– III							
<i>Maps:</i> Import Plotting accu geographical,	tance of maps rracy – Map map projectior	s to en sheet is,map	ginee nun datun	ering p nbering n–MS	projects – g – Coor L,Geoid, S	Types of maps dinate system Spheroid,WGS	s– Scales an s – Cartes -84.	nd uses- sian and				
				UNIT	– IV							
<i>GIS:</i> Introdu DBMS – C Interpolation	ction– Data reation of D –Buffer, Over	Source Databas lay – T	es – ses (Ferrai	Data spatia n Moo	Models a: l and no lelling and	nd Data Struc n-spatial) – l Network ana	ctures– Alg Spatial ana lysis.	orithms, alysis –				
<i>Remote Sensing and GIS Applications:</i> Land use / Land cover classification – Rainfall- runoff studies – Flood and drought impact assessment and monitoring – Regional and urban planning and management – GIS based highway alignment.												
	UNIT - V											
<i>GNSS:</i> Principle used – Components of GNSS– Data collection methods – DGPS – Errors in observations and corrections.												

Drone Surveying: Working principle – Benefits of drones in surveying – Applications – Interior and exterior drone surveying – Calculation of length, area and stockpile volume.

Text Books:

1. M. Anji Reddy, *Text Book of Remote Sensing and Geographic Information System*, BSPublication.

2. Lo C.P. &Yeung A.K.W., *Concepts and Techniques of GIS*, Prentice-Hall of India, New Delhi.

3. Thomas Lillesand, Ralph W Kiefer and Jonathan Chipman, *Remote Sensing and Image Interpretation*, John Wiley & Sons, India.

4. Hofmann-Wellenhof, Lichtennegger and Wasle, *GNSS: Global Navigation Satellite Systems*, Springer -Verlag Wein, New York.

Reference Books:

1. B.Bhatta, *Remote sensing and Geographic Information System*, Oxford Publications.

2. Siddiqui M.A., Introduction to Geographical Information System, ShardaPustakBhavan, Allahabad.

3. Curran, Paul J, Principles of Remote Sensing, Longman, London.

4. Floyd F Sabins Jr., *Remote Sensing Principles and Interpretation*, Freeman and Co., San Francisco.

Web References:

1. <u>https://nptel.ac.in/courses/105/101/105101206/</u>

2. https://nptel.ac.in/courses/105107155

3. <u>https://nptel.ac.in/courses/105/107/105107194/</u>

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

	IN	TRO	DUC	TION	TO JAVA	(ITJ)				
V Semester : B.Te	ch				Scheme : 2020					
Course Code	Category	Ho	urs/V	Veek	Credits	Maxi	imum Ma	rks		
OEC303	OEC- I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam D	uration 1½ Hrs		L			End	Exam Du	ration: 3 Hrs		
Course Outcomes : At the end of the course the student will be able to										
CO1: Understand f	undamentals of oc	ops co	ncept	s, inpu	t and outpu	t				
CO2: Understand the	he classes and obj	ects.	0							
CO3: Understand the	he Inheritance and	l inter	taces							
CO5: Understand th	he string handling	meth	lods							
	ne exception nane	iiiig		UNIT	T					
Object oriented co	oncents. Fundam	ental		erview	-Ι of Java Γ	lata types varial	nles Oper	ators control		
statements. Reading	console input. w	riting	cons	ole out	but. arravs.	ata types, variat	Jies, Oper			
	UNIT – II									
Introducing Class	ses: Class fundar	nenta	ls, de	claring	g objects, i	ntroducing meth	ods, Cons	structors, this		
keyword, finalize										
			1	<u>UNIT -</u>	- III	<u> </u>	~	<u> </u>		
Inheritance: Inherit	tance basics, using	supe	r, met	thod ov	erriding, ab	stract class, using	g final with	i inheritance,		
Interfaces: Defining	g interface, implei	nenti	ng mu		_ IV					
String Handling: S	String constructor	s. Spe	ecial s	string o	perations.	character extracti	on, string	comparison.		
searching strings, n	nodifying strings.	String	gBuff	er class	s and its me	thods.	ion, sung	eompunison,		
				UNIT	$-\mathbf{V}$					
Exception Handli exceptions, creating	ng: Fundamental g your own except	s, exe tion s	ceptic ubclas	on type sses.	es, try, catc	h, throw, throw	s, finally.	Java built-in		
Text Books :										
1. Herbert Schildt	[2008], [9th Editi	ion], [The C	Comple	te Referenc	e Java2, TATA	McGraw-l	Hill.		
2. E Balaguruswam	y [2007], [3 rd Edi	tion],	Prog	rammin	ng with Java	, A Primer, TAT	A McGraw	7- Hil.		
Reference Books	:									
1. Bruce Eckel [20	08], [2nd Edition	<u>], Thi</u>	inking	<u>g in Jav</u>	va, Pearson	Education.	1			
2. H.M Dietel and	P.J Dietel [2008]	, [6th	Editi	on], Ja	va How to	Program, Pearso	n Ed.			
Question Paper Pa	ittern:									
The question paper sessional and remain with Two Question each section.	for sessional exa ining half for seco is (EITHER/ OR	minat ond se Type	tion sl ession e) in	hall be al exan each se	for 25 mar n. The ques ection. The	ks, covering half tion paper shall student shall and	f of the syl consist of swer one o	labus for first three sections question from		
The question paper	for End examin	ation	shall	be for	60 marks.	The Question p	aper shall	contain Five		

	INTERNET OF THINGS (IoT)											
V - Semest	er: B.Tech					\$ 6	Schen	ne: 2020				
Course	Course	Hou	rs/We	ek	Credits	Maxim	um Marl	KS				
Code	Category											
		_			_	Continuous						
OEC304	OEC-I	L	Т	Р	С	Internal	End	TOTAL				
						Assessment	Exam					
			-	-	3	40	60	100				
Sessional	Course Outcomes : At the end of the course the student will be able to											
Con: Understand the basic knowledge of Internet of things and its design												
CO: Understand the purpose of sensors and Actuators in LoT												
CO2: Under	CO2: Understand the purpose of sensors and Actuators in IoT											
CO4: Design	IoT Projects Usi	ng Ardi	iino									
COE: Under	stand Rasnherry-	Di Proc	essor a	nd R	asphian Or	perating Systems						
CO ₃ . Onder	stand Raspberry-		c5501 a	nu r		perating systems						
				UN	IT – I							
Introducti	on to IoT:			01								
		a										
Definition a	nd Characteristics	s of IoT	, Physic	cal I	Design and 1	Logical Design, IoT H	Enabling					
Technologie	s, IoTLevels and I	Deployı	nent T	emp	lates, IoT V	/s M2M						
				UN	IT – II							
Sensing ar	nd Actuation:											
Definition o	f Sensor Sensor f	eatures	Resol	utio	n Classes 1	Different types of ser	isors Acti	iator				
Differenttyn	es of Actuators n	urnose	of Sen	sors	and Actuat	ors in IoT	15015, 1100	iator,				
Differenttyp	es of fieldators, p	urpose	of ben		$\frac{110}{T} - 111$	015 11 101						
Wireless T	echnologies an	d Data	Tran	smi	ssion for	IoT:						
	connoiogies un	u Duu	. II ull									
Wi-Max, Wi	-Fi (802.11), Blue	tooth/I	Bluetoc	oth s	mart,Zigbe	e/Zigbee smart, Cellı	ılar, NFC,	Serial				
Transmissio	on, RS-232, RS-48	5, I2C I	Inter-I	nteg	rated Circu	it, Ethernet, CAN bu	s, USB, Fi	rewall,				
SerialATA, I	Parallel Transmiss	sion										
				UN	IT - IV		-					
Building I	oT with Arduin	o:Ardu	ino IDI	E, Pr	ogramming	g of Arduino, Interfac	cing					
LED, switch	,potentiometer, S	ensors,	LCD, I	Blue	tooth, W1-F	i, ,GPS, RFID with A	rduino					
				UN	IT –V							
Raspberry	· Pi :											
	T' D'I				.1			•				
Linux basic	s, Linux File sy	stem, 1	Naviga	ting	the File s	system, Text Editor	s, Access	ing Files,				
Permissions	, Processes, Linu	ix Grap	hic us	er Ir	\mathbf{R}	aspberry Pi Processo	or, Raspbe	erry Pi Vs				
Arduino, Op	berating system be	enerits,	Raspbe	erry	Pi Set up, C	configuration,						
Text Book	S:	- 11 -			(1 - t		1					
l. Arshe	eepBahga , Vijay N	Aadiset	tı ,Inte	rnet	of Things:	A Hands-On Approa	ch Paperb	ack,2015				
2. Rajku	ımar Bhuyya ,Inte	ernet of	Thing	s : P	rinciples an	d Paradigms,2016.						
3. Adee	l Javed , Building	Arduin	o Proje	ects f	for the Inte	rnet of Things, Apress	s,20 <u>16</u> .					
L												
4. Wolfram Donat, Learn Raspberry-Pi with Python, Apress, 2016

Web References:

- 1. https://nptel.ac.in/courses/106105166/
- 2. <u>https://onlinecourses.nptel.ac.in/noc17_cs22/course</u>
- 3. https://nptel.ac.in/courses/108108098/4
- 4. https://onlinecourses.nptel.ac.in/noc19_ee28

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

SCIENTIFIC PROGRAMMING WITH PYTHON (SPY)													
V Semester:	B.Tech						Schen	ne: 2020					
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks						
OEC305	OEC - I	L	Т	Р	С	Continuous Internal Assessment	tinuous ternal End Exam TOT essment						
		3	-	-	3	3 40 60 100							
Sessional E	xam Duratio	n: 1½	² Hrs			End E	xam Duration:	3 Hrs					
	1		0.1			11 11							
Course Out	comes: At the	e end	of the of	course	student Will	be able to							
				E									
CO2: Apply the concepts of Loops, lists, Functions and Branching. CO3: Work with Input. Error Handling and Modules.													
CO4: Learn	CO3: Work with Input, Error Handling and Modules.												
CO5: Work	CO4: Learn to visualize mathematical functions and mathematical calculations.												
CO6: Apply the concepts of Object Oriented Programming.													
CO6: Apply the concepts of Object Oriented Programming.													
UNIT– I													
Getting Start Python. Computing w Formatting Tex Loops and Lis Store Sequence Tuples. Functions an Variables, Dex Functions as A Functions to V	ed with Pyte ith Formular at Output, Im sts: Loops for es of Data, I d Branching fault Arguments to erify our Pro-	s: Pro portin r Aut teratir g: Pro ents a Func grams	The I gramm gramm g Moc omatin ng Ove ogramm nd Do tions,	First E ning Si lules, F U g Rep r a Li ming co Stri Solvin	Example: H mple Mathe Pitfalls Whe MIT-II etitive Task st with Task st with a fo with Functi ings, If-Tes g Equations	ello, World!, ematics, Variab n Programming s, Boolean Exp r Loop, Nested ons, Function ts for Branch s with Python	Different Ways oles and Variable g Mathematics. pressions, Using d Lists and List Arguments and ing the Program Functions, Write	to Use e Types, g Lists to Slicing, d Local m Flow, ting Test					
				UN	IT–III								
User Input an exec, Readin Modules.	d Error Ha g Data from	ndlin Files	g: Rea , Writi	ding U ng Da	User Input D ta to Files,	Data, Flexible U Handling Erro	Jser Input with rs in Programs,	eval and Making					
				UN	IT–IV								
 Arrays and Plotting: NumPy and Array Computing, Plotting Curves with Matplotlib, Plotting Discontinuous and Piecewise-Defined Functions, Making a Movie of a Plot, More Useful Array Operations. Dictionaries and Strings: Dictionaries, Example: A Dictionary for Polynomials, Example: Reading File Data to a Dictionary, String Manipulation. 													
	UNIT– V												
Classes: Basic Differentiation Object-Orient Numerical Diff	UNIT-V Classes: Basics of Classes, Protected Class Attributes, Special Methods, Example: Automatic Differentiation of Functions, Test Functions for Classes, Example: A Polynomial Class. Object-Oriented Programming: Class Hierarchies and Inheritance, Example: Classes for Numerical Differentiation, Example: Classes for Numerical Integration.												

Text Books :

1. Joakim Sundnes, Introduction to Scientific Programming with Python, Springer Open, 2020. **Reference Books :**

1. Christian Hill, Learning Scientific Programming with Python, Cambridge University Press, 2 edition, 2020.

Web References:

1. https://www.tutorialspoint.com/scipy/index.htm

- 2. <u>https://realpython.com/</u>
- 3. <u>https://www.w3schools.com/python/scipy/index.php</u>

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

INTRODUTION TO DATABASE SYSTEMS (IDBS)										
V Semester : B.	Tech	-				-		Scheme : 2020		
Course Code	Category	Ηοι	irs/W	eek	Credits	Max	ximum Ma	rks		
OEC306	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam	Duration1½ I	Irs	<u> </u>	1		E	nd Exam D	ouration: 3 Hrs		
Course Outcom	es: At the end	of the	e cou	rse th	e student v	vill be able to				
CO1: Understan	CO1: Understand the concepts of Database Management Systems and Entity Relationship Modelling.									
CO2: Use SQL	commands to c	reate,	retrie	eve, u	pdate, and	delete data from	the Data bas	se.		
CO3: Comprehe	end the concept	s of N	Jorma	alizati	on techniq	ues				
CO4: Understan	d the properties	s of T	ransa	ctions	s in a Data	base System.				
CO5: Understan	d Concurrency	Cont	rol te	chniq	ues and Re	ecovery System.				
				J	JNIT – I					
Introduction: In	ntroduction to		S, Pu	irpose	of Databa	ase Systems, Data	ibase Syster	n Applications,		
View of Data, D Entity-Relation	shin Models, Da	tabas Rasic	e Use	ers, Da	atabase Ar Cardinali	cnitecture. ty of Relationshi	n FR Diao	ram Notations		
Entity-Relations	hip Diagrams, 1	Mode	ling u	using	ER Diagra	ms, Reduction of	an E-R Sch	ema to Tables		
	1 0 /		0			,				
					$\frac{\mathbf{NIT} - \mathbf{II}}{\mathbf{NIT}}$	The second secon	1 D (
Language Comr key, Select Cla Matching, Order Join Operations.	nands and Data use, Where C r By, Group By	a Con lause, y, Set	trol I , Log	Langu gical ration	age Comn Connectiv s – Union	hands, Candidate ity's – AND, O , Intersect and M	Key, Prima R, Range inus, Aggre	ry key, Foreign Search, Pattern gate Functions,		
				U.	NIT - III					
Relational Dat Normalization, H Form, Third Nor	abase Design: Functional Deportmal Form, Boy	Fea enden vce Co	tures icy, T odd N	of (ypes) lorma	Good Rela of Normal l Form (B0	ational Database Forms - First Nor CNF)	Designs, 1 rmal Form,	Decomposition, Second Normal		
				U	NIT – IV					
Transactions: A Concurrent Exec Serializability :	ACID propertion cutions. Conflict Serial	es, Ti izabil	ransao ity, V	ction View S	States, Im Serializabil	plementation of	Atomicity	and Durability,		
				U	NIT – V					
Concurrency C Protocol.	Concurrency Control: Lock-Based Protocols – Locks, Granting of Locks, The Two-Phase Locking Protocol.									
Recovery System: Failure Classification, Log-Based Recovery, Shadow Paging Technique										
1. Database System Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw Hill, 7 th Edition, 2019.										
Reference Books:										
1. Principles of	Database and l	Know	ledge	e - Ba	se System	s, J. D. Ullman, V	ol. 1, 2016.			
2. Fundamental	Is of Database S	syster	$\frac{\text{ns. R}}{\text{R}}$. Elm	asri and S.	Navathe, 7th Edi	tion, 2017.	morry [1]:11 21		
5. Data Base M	lanagement Sys	stems,	, Kagi	nu Ka	makrisnna	and Joinannes G	enrke, MCG	naw miii, sru		

Edition, 2014.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

]	ETHIC	CAL HA	ACKING ((EH)					
V Semester	B.Tech						S	Scheme : 2020			
Course Code	Category	He	ours/W	'eek	Credits	Max	timum Ma	arks			
OEC307	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duration 1	1/2 Hrs				End	Exam Du	iration: 3 Hrs			
Course Out	tcomes : At the e	nd of th	ne cour	se the st	tudent will	be able to					
CO1: Unde	CO1: Understand the basics of security and ethical hacking.										
CO3: Understand about foot printing and types of attacks in social engineering.											
CO3: Understand about sniffers, hijacking and DoS attacks.											
CO5: Unde	CO4: Understand the importance of web server hacking, database hacking and SQL Injection.										
			Cimoro		T I		u115.				
Introductio	n to Ethical He	okina	Introd	luction	$\mathbf{I} = \mathbf{I}$	fundamentals S	ecurity te	sting Hackers			
and Cracker	s description. Eth	nical Ha	ackers.	uction,	Security	fundamentais, S	ceunty te	sting, mackers			
Technical F	Foundations of H	lacking	: The	Hacking	g process.	Information Se	ecurity Sy	stems and the			
Stack.		U			<i>.</i> ,		5 5				
				UNI	Γ – II						
Foot printi	ng: Information	Gather	ing M	ethodol	ogy, OS	Fingerprinting,	Fingerprir	nting Services,			
Enumeration	n, System Hackir	ıg.	-					-			
Social Engi	neering: Social I	Enginee	ering, N	Aalware	threats, V	ulnerability ana	lysis.				
				UNII	$\Gamma - III$						
Sniffers: P	assive sniffing,	Active	sniffi	ng, AR	P,ARP po	isoning and M	AC flood	ling, tools for			
sniffing, wi	re shark, sniffing	and spo	oofing	counter	measures.	1	·				
Session Hi	jacking: Transp	ort lay	er Hija	acking,	Applicatio	on layer Hijacl	ang, Sess	ion Hijacking			
1 0015. Denial of S	ervice: DoS attac	k techr	iques	Distrib	ited DoS	DDoS tools					
Demai or S			iiques,	District							
				UNIT	$\Gamma - IV$						
Web Server	r Hacking: HTT DoS/ DDoS and	TP prot	ocol, s ttacks	canning	, web serv	ers, Banner gra	bbing and	Enumeration,			
Database H	acking: Introduc	ction to	SOL a	and SOL	_ injection	and categories.	Finger pri	nting. UNION			
Exploitation	technique, Boo	lean in	SQL	injection	n attacks,	Out-of band ex	ploitation,	exploring the			
time-delay S	SQL injection tec	chnique	, Store	d proce	dure SQL	injection and m	itigations,	SQL injection			
hacking too	ls.										
				UNI	$\Gamma - V$						
Wireless To	echnologies, Mo	bile Se	curity	: Mobil	e device o	peration and se	curity, Wi	reless LAN's-			
Basics, Wire	ion Detection and	d Preve	na sigi ntion S	alling,	Firewalls	AN security.	,				
Text Books	•			systems.	. Thewalls	and money pois	•				
1. Micheal	Gregg,"Certified	Ethical	Hacke	er (CEH) Cert Gui	de",Pearson edu	cation, 20	20.			
Reference I	Books:				/)	, , ,				
1 EC-Council "Ethical Hacking and Countermeasures(CEH)" CENGAGE Learning 2020											
2 Sai Sati	ish "Hacking Sec	rets Par	10 COL 1-1" In	dian Se	rvers 2018	II, CENUAUE	Learning,	2020.			
3. David I	Litchfield.Chris A	nlev"T	The Dat	abase H	lackers Ha	ndbook:Defend	ing Databa	ase Servers".			
	,						0	,			

Wiley.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	ENTRE	PR	ENE	URS	HIP DEVE	LOPMENT (EDP)			
V Semeste	r: B.Tech						Scheme	: 2020	
Course Code	Category	H	ours Wee	s / k	Credits	Maximum	Marks		
OEC308	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	-	-	3	40	60	100	
Sessional l	Exam Duration :	1 ን	⁄2 Hr	S		End Exam D	uration :	3 Hrs	
Course Ou	tcomes: At the en	nd o	of the	e cou	arse, studer	its will be able to			
CO1:Analys	se the role of entr	repr	eneu	ırshi	p in econor	nic development			
CO2:Under	CO2: Understand rural entrepreneurship and small enterprises								
CO3:Exam	ine the project re	port	s						
CO4:Under	stand the owners	ship	stru	ictur	e of compa	ny and women entrep	reneursh	ip in	
India		-			-	-		-	
CO5:Under	stand the suppor	rt by	y spe	ecifie	d institutio	ns for entrepreneursh	ip develo	pment	
					UNIT – I		-		
Entrepren	eur: Concept of	an	ent	repre	eneur; Defi	nition of an entrepre	eneur; T	ypes of	
entreprenet	urs; Characterist	ics (of an	enti	repreneur.				
Entrepren	eurship: Introdu	ctio	n; El	eme	nts of entre	preneurship; Six imp	ortant se	gments	
of entrepr	eneurship envir	roni	nent	; A	dvantages	of entrepreneurshi	p; Barri	ers to	
entreprene	ursnip; Role of er	itrej	oren	eurs.	nip in econ	omic development.			
Rural Ent	renreneurshin	Mea	ninc	r Ne	ed: Retros	nection of miral indi	ustrializa	tion in	
India; Prob Small Ent economic d	lems of rural entr erprises: Definit evelopment; Prob	repr tion	enet of is fac	urshi SSI; ced t	p; Developr Types, Ch by SSI.	nent plan for rural en aracteristics of SSI;	treprenet Role of	arship. SSI in	
	1 /			τ	JNIT – III				
Project Pla Formulation Financial F	anning: Project I n; Methods of P easibility and Ec	den roje ono	tifica ct A mic I	ation ppra Feas:	; Project So usal – Mar ibility.	election; Project Repo ket Feasibility, Techr	rt – Cont nical Fea	tents & sibility,	
O	Stree strees of	<u>_1_</u>	Dee	U	JNIT – IV	nte analie Campage		anatima	
Selection of Women En	f appropriate own	ners in	hip s Ind	struc ia: I	torship; Pa eture. Introduction	rthership; Company r; Policies and Scher	mes for	Women	
Entreprene	urs; Factors Ini	iue or V	Nom	g th on F	e women	Entrepreneursnip; Ty	pes of	women	
Entreprene	uis, chanenges i	01 1	VOIII		$\mathbf{UNIT} - \mathbf{V}$	l			
Institution	al Finance: Con	mm	ercia	l ba	nks: Other	Financial Institution	ns – IFC	I, IRBI.	
SFC, SIDC	& EXIM Bank.				-,			, ,	
Institution infrastructu (Governmen	al Support: Ne are corporation, nt and private).	eed; ar	Su nd N	ppor Vatio	t to Smal nal institu	l Entrepreneurs – I ite for MSME, Incu	DICs, Inc Ibation (lustrial Centers	
Text Book	S:								
Prof. Satish	ı C. Ailawadi & M	lrs.	Rom	v Ba	nerjee, "Pri	nciples of Entreprene	urship". I	Everest	

Publishing House.

S. S. Khanka, "Entrepreneurial Development", S. Chand, New Delhi.

Robert D. Hisrich, Michael P. Peters, Dean A. Sheperd, "Entrepreneurship", McGraw-Hill,6 ed.

Reference Books:

Poornima M. Charantimath, "Entrepreneurship Development and Small Business Enterprises", 2e, Pearson.

Arya Kumar, "Entrepreneurship", 4 e, Pearson.

Ram Chandran, "Entrepreneurial Development", Tata McGraw Hill, New Delhi

estion Paper Pattern:

ssional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

	INTRO	DUC	TION	TO IN	FORMAT	ION SYSTEMS ((IIS)			
V Semester	: B.Tech							Scheme : 2020		
Course Code	Category	Н	ours/V	Veek	Credits	Max	ximum Mar	•ks		
OEC309	OEC-I	L	Т	Р	С	Continuous Internal AssessmentEnd ExamTOTAL				
		3	-	-	3	40	60	100		
Sessional E	xam Duration 11/2	2 Hrs				E	nd Exam D	uration: 3 Hrs		
Course Out	tcomes : At the end	$\frac{1}{2}$ of the formula $\frac{1}{2}$	ne cour	se the st	tudent will	be able to	System Sof			
CO2: Unde	erstand the page rer	s of C lacer	vomput nent ar	d CPU	Scheduling	Algorithms	System Sor	tware.		
CO3: Unde	CO3: Understand the phases of software development life cycle and process models.									
CO4: Design ER model for real life scenarios										
CO5: Appl	y SQL commands	to cre	ate, up	date, m	odify and re	etrieve data from t	he data base	es.		
CO6: Appl	y normalization tec	chniqu	ues to 1	normaliz	ze the datab	ase				
				III	NIT _ I					
		0	C			T 4 1 4	<u> </u>	C 11		
Fundament	als of Computer	rs & Init I	Com Execut	puter A	Architectul e Instruction	e: Introduction,	Organizatio	on of a small		
Memory. In	put/output devices.	BUS	addre	essing m	iodes	on categories, mea		o performance,		
System Sof	tware: Assemblers	, Loa	ders an	nd linker	rs, Compile	rs and interpreters	.			
				UN	II – TI					
Operating	System: Introducti	on N	lemon	v manac	rement sch	mes Page renlac	ement algor	rithms Process		
managemen Software e software pro	t, CPU scheduling ngineering: Softw oject, software Dev	algor vare e elopn	ithms. enginee nent m	ering: In odels.	ntroduction	to Software eng	gineering, L	ife cycle of a		
				UN	IIT – III					
Relational models, Dat	Database Manag abase Users.	gemer	nt Sys	tem: In	troduction	to DBMS, the	database te	chnology, data		
Merits and I	Demerits of E-R m	odelir	ng.	liouucii		ins, wodening L-i		, Case Studies,		
			~	UN	IT – IV					
Structured Query Language (SQL): Introduction to SQL, Data types, Data Definition language commands, Data Manipulation Language Commands and Data control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectives – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations										
UNIT – V										
Normalization: Introduction, Need for Normalization, Process of Normalization, Types of Normal Forms (1NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization.										
Text Books	Text Books:									
L										

- 1. Campus Connect Foundation Program Computer Hardware and System Software Concepts, Programming Fundamentals- Vol. 1, INFOSYS
- 2. Campus Connect Foundation Program Relational Database Management System, Client Server Concepts, Introduction to Web Technologies Vol. 4, INFOSYS
- 3 Henry F. Korth& Abraham Silberschatz, Data Base System Concepts, 5th Edition, 2005, Mc Graw hill

Reference Books:

- 1. M. Morris Mano [2011], [3 rd Edition], Computer system architecture, Pearson Education, 2011.
- 2. Sommerville [2008], [7th Edition], Software Engineering, Pearson education.
- 3. Raghu Ramakrishna and Johannes Gehrke [2003], [3rd Edition], Data Base Management Systems, TATA McGraw Hill
- 4. Tanenbaum [2000], Modern Operating System, Pearson Education

Web References:

- 1. https://www.w3schools.com/sql/
- 2. https://www.geeksforgeeks.org/dbms/
- 3. https://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	NEURAL	NETV	VORK	SAN	DFUZZY	LOGIC (NN		
V Semester: B	3.Tech						Schen	ne: 2020
Course Code	Course Category	Но	ours/W	eek	Credits	Max	ximum Mark	S
OEC310	OEC-I	L	Т	P	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam	n Duration: 1	¹ / ₂ Hrs	5				l Exam Dura	tion: 3 Hr
Course Outo	the states at the	ena oi	c the co		$\frac{1}{1}$	t will be able t	10	
COI: understar	nd the basic co	ncepts	of Neu	iral ne	etworks			
CO2: analyze S	Supervised Lea	arning	feedbac	ek net	works			
CO3: analyze I	Insupervised	earnir	ng feedl	back r	networks			
					ietworks.			
CO4: understar	nd concepts of	fuzzy	logic ai	nd fuz	zy set theo	ory		
CO5: To apply	the knowledg	e of Ne	eural N	etwor	ks & fuzzy	logic to real ti	me systems.	
				TINIT	TI			
I		1		UNI	$\frac{1-1}{1-1}$			
Dialogical may	o Neural Net	NORKS	and its	Basi itta m	c Concept		of activation	functions
Noural natural	tons and Med		anu r	maral	louers of I	neuron, Types	of activation	unctions,
avammlag East	types and adv	s, LIII	earry so	eparat	otre and mi	earry non-sepe	table systems	s and then
representation	lures and adv	antage	s of he	rootio	n loorning	over statistical	uporvised les	rning and
unsupervised le	earning proc	CSS, CI	101-0011		li leannig,	, concepts of s	upervised, iea	innig, and
unsupervised it	carning			UNI	Г <u>–</u> П			
Supervised Le	arning Neura	l Netw	vorks	UIUI				
Single laver p	erceptron and	l mult	ilaver 1	percer	otron neur	al networks, t	heir architect	ure. Back
propagation a	lgorithm. gen	eralize	d delta	a rule	e. learning	factors, ster	learning. N	Iomentum
learning. Conc	ept of training	. testir	ng and	cross	validation	data sets for o	lesign and va	lidation of
the Networks		,, ,,	ig und	•1000	, and and a			
				UNIT	- III			
Unsupervised	Learning Neu	ıral No	etwork	S				
Competitive Le	earning networ	ks, ko	henen s	elf-or	ganizing n	etworks, K-me	ans and LMS	
algorithms, RB	F neural netwo	ork and	d its str	ucture	, Hybrid tı	raining algorith	m for RBF ne	ural
networks, Com	parison of RB	F and I	MLP no	etworl	ks Learnin	g, Hebbian lear	ning, Hopfiel	d
networks.								
				UNIT	$\Gamma - IV$			
Fuzzy logic								
Basic Fuzzy lo	ogic theory, se	ts and	their p	roper	ties, Opera	tions on fuzzy	set, Fuzzy re	elation and
operations on f	fuzzy relations	and ex	xtensio	n prin	ciple, Fuzz	zy membership	functions and	l linguistic
variables, Fuzz	y rules and fu	izzy re	asoning	g, Fuz	zification	and defuzzifica	ation and their	r methods,
Fuzzy inference	e systems							
				UNI	$\Gamma - V$			
Applications o	of Neural Netv	vorks	& Fuzz	zy sys	tems			
Applications of	t Neural Netw	orks: F	attern	classi	tication, H	andwritten cha	racter recogni	ition, Face

recognition, Image compression and decompression

Applications of Fuzzy Logic & Fuzzy System: Fuzzy pattern recognition, Fuzzy image processing, Simple applications of Fuzzy knowledge-based controllers like washing machines, traffic

regulations, and lift control

Text Books :

- 1. Timothy J. Ross, Fuzzy Logic with Engineering Applications, John Wiley and sons, 3/e, 2010.
- 2. S. Haykin, Neural Networks, A Comprehensive Foundation, Pearson Education Inc.3/e, 2008.
- 3. Jacek. M. Zurada, -Introduction to Artificial Neural Systems, Jaico Publishing House, 2006.
- 4. LaureneFausett, Fundamentals of Neural Networks-Architectures, algorithms and applications, Pearson Education Inc., 2004.
- 5. J.S.R. Jang, C.T. Sun, E. Mizutani,, -Neuro Fuzzy and Soft Computing A computational Approach to Learning and Machine Intelligence, Pearson Education Inc., 2002.

6. Bart Kosko, Neural networks and Fuzzy Systems, Pearson Education

Reference Books :

1. T.Pradeep, Nano: The Essentials Understanding Nano Science and Nano Technology, Tata McGraw Hill, 2013.

2. Richard Booker and earl Boyson, Nanotechnology: The Fun and Easy Way to Explore the Science of Matters Smallest Particle, Wiley Publications, 2011.

Web References:

- 1. S. Rajsekaran and G. A. VijaylakshmiPai, Neural Networks, Fuzzy Logic, and Genetic Algorithms, PHI
- 2. N. Sivanandam, S. Sumathi, and S. N. Deepa, Introduction to Neural Network Using MATLAB11, Tata McGraw-Hill Publications
- S.N.Sivanandam. M.Pau1Raj, Introduction to Artificail Neural Networks, Vikas Publication House Pvt.Ltd, NewDelhi

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

RENEWABLE ENERGY SOURCES (RES)									
VI Semester	B.Tech					S	Scheme	: 2020	
Course Code	Category	F	Iou We	rs/ ek	Credit s	Maxim	um Ma	rks	
OEC311	OEC - II	L	т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Exa	m Duration :	1	1∕2	Hrs]	End Exam D	uratio	ı:3 Hrs	
Course Outcom	mes : At the e	eno	1 of	the	course	students wil	l be abl	le to	
CO1:Understan	nd various sou	irc	es	of er	nergy ar	nd solar geom	netry.		
CO2:Describe t	he process of	ha	arne	essir	ng solar	energy in the	e form	of heat.	
CO3:Explore bas	ic terms of wind	l a	nd t	the e	xtraction	of energy from	n wind.		
CO4:Understan	d the technol	log	gies	inv	olved ir	n extraction	of bior	nass	
energy and geot	thermal Energ	y.							
CO5: Understan	nd Tidal, Wave		nd	Ocea	an energ	gy conversion	n metho	ds and	
		og	<u>168.</u> U	NIT	- I				
Principles of e World energy s Fundamentals radiation- Sola length-Estimat surface and til principle & class	nergy conserv tatus & Energe of Solar ar constant a ion of monthl ted Solar sur- ssification of F	va sy Ei nc y a fac PV	tior Scener, d so ave ce-N cel	n –E enari gy: olar rage Meas l JNII	nergy of io in Inc Extra- radiatio daily to suremen	conservation lia. terrestrial a on geometry- otal radiation nts of radiation	opport nd ter time a on ho on data	unities. rrestrial and day rizontal a. Basic	
water heating- refrigeration sy solar drier-sola	solar passive stem – Solar pond.	sc s th	pac pac ern	ce h nal p	eating ower ge	and cooling	system ar Dist	- Solar is-Solar illation-	
			τ	JNIJ	L – III				
Wind Energy: Origin of wind-nature of winds-Applications of wind power –energy estimation of wind – power extraction from wind-Betz limit-Components of wind turbine- horizontal axis wind turbine & vertical axis wind turbine -Types of blades UNIT – IV Biomass Energy: Photosynthesis process. Biomass conversion									
Biomass Energy: Photosynthesis process- Biomass conversion technologies- Biogas production - Types of digester- Factors affecting the digester performance – Biomass liquefaction – Biomass to ethanol production. Geothermal Energy: Types of geothermal energy resources-Energy									

conversion through geothermal energy resources-Environmental consideration

 $\mathbf{UNIT} - \mathbf{V}$

Ocean Thermal Energy Conversion: Principle of OTEC- Anderson and Claude cycles, Tidal and Wave energy conversion methods

Emerging Technologies: Principle of magneto hydro dynamics, Fuel cell, Hydrogen energy

Text Books:

1. B.H. Khan, Non-conventional Energy Sources, 3rd edition TMH Publishers, New Delhi

2. G.D Rai, Non-conventional Energy Sources, Khanna Publishers, New Delhi

Reference Books:

- 1. Suhas P.Sukhatme., Solar energy: Principles of thermal collection and storage, Tata McGraw Hill publishing Co. Ltd
- 2. S. Rao and Paulekar, Energy Technology, Khanna Publishers, New Delhi
- 3. H. P. Garg, J. Prakash, Solar energy fundamentals and applications, Tata McGraw Hill publishing Co. Ltd

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

			IND	USTRI	AL SAFE	TY (IS)			
VI Semester	B.Tech						Se	cheme : 2020	
Course Code	Category	Hou	rs /We	ek	Credits	Maximun	a Marks		
		т	т	D	C	Continuous Internal	End	Total	
OEC312	OEC - II		1	ſ		Assessment	Exam	Total	
C · IF		3	-	-	3	40	60	100	
Sessional Exam	Duration : 17	2 Hrs				End E	xam Durat	ion: 3 Hrs	
Course Outeer	mage At the and	laftha	0.011#2	o atuda	anto vill h	a ahla			
Course Outcon	mes: At the end	i of the	cours	e, stude		e able	a a fatar a da		
accident invest	rigation	iples c	of safe	ty man	agement	including salety audit,	, safety edi	ication and	
CO2 : To understand the causes and implication of fire and explosion and the preventive measures									
CO3: To understand machine and construction safety assessment and safeguarding methods									
	cost to understand machine and construction safety assessment and safeguarding methods								
CO4: I o unders	stand the effec	t of to:	xic sul	bstance	es and haz	ardous chemicals			
CO5:To under	stand the mode	es of el	lectric	al haza	ords and sa	afety measures in elec	trical and	information	
technology ind	ustries								
Sefeter in Fere	·		G . C . t .	U	$\frac{\mathbf{N}\mathbf{I}\mathbf{I} - \mathbf{I}}{\mathbf{C}}$		<u> </u>	· · · · · · · · · · · · · · · · · · ·	
industry Fou	neering indu	indust	Salety	neea,	General r	hazards and control m	easures in Bhonal	Chernobyl	
Flixborough, F	ana plaza).Sa	ifetv a	udit- p	rocedu	ire	ieu in the world (, Dhopai,	chemobyl,	
Accident Inve	estigation- Lea	arning	from	accide	nt, Layer	ed investigations, Inv	estigation	process and	
summary						-		_	
				U	NIT –II				
Fire Safety: 7	The fire triang	gle, Ex	plosic	ons, Di	stinction	between fire and exp	plosions, F	lammability	
characteristics	of liquids and	vapou	irs, Fi	re prol	tection tec	chniques, Fire extingu	ishers, Fire	e hazard and	
systems, Explo	sion proof equ	inmer	atter of the stand	instrur	nents	e, File detection, File		. mengnung	
	·····			III					
Machine Safe	tv. Machine	ouard	ίησ Ν	Vachine Aachine	e guardin	g assessment Safeg	uarding m	achines and	
equipment, Gu	ards. Safeguar	ding d	levices	s. Othe	r potentia	l safeguards	Jarung m	actimes and	
Construction	Safety: Sco	pe, Sa	afety	in -U	ndergrou	nd works, Above g	ground wo	orks, Under	
waterworks, D	emolition wor	ks.							
				U	NIT –IV				
Chemical Safe	e ty: Hazardou	s chen	nicals,	Defini	ition of a	hazardous chemical, '	Toxic effec	ets, Working	
with toxins, S	toring hazardo	ous che	emical	ls, Proc	cess hazai	ds, Transportation of	f hazardou	s chemicals,	
Chemical was	te managemen	nt, Haz	zardou	is cher	nical eme	ergency procedures,	Worker co	ntamination,	
Chemicals and	worker health	1							
					NIT - V	~			
Electrical Saf	fety: Electrica	ul dang	gers, I	Electric	cal pathw	ays, Static electricity	y, Result	of electrical	
electrical haza	rds Training	Safety	i, Elt	ealth r	ourns,	Handling electrical	nazarus,	Controlling	
IT Industry	Safety: Hazan	rdous	in IT	indust	try, Gene	ral precautions, Emr	olover's re	sponsibility,	
Employees res	ponsibilities, (Office	ergon	omics,	Compute	r workstation – healt	n & safety	tips, Laptop	
safety precauti	ons								
Text Books	:	10.0		1 1 4			·· (I., 1')		
1. L. M. Deshr	and I F Lour	al Safe	ery and	i Mana al Proc	gement. N	ACGRAW HILL Education	n (India) Applicatio	ns) Prentice	
Hall, 2011.	and J. F. LOU	vai, Cl		ui i 100	css barety		rppileatio	115 <i>)</i> , 11011100	

3.Reese, Charles D. Industrial Safety and Health for People-oriented Services. CRC Press, 2008. 4. M. P. Poonia, S. C. Sharma. Industrial Safety and Maintenance Management. Khanna Book Publishing, 2019.

Reference Books:

- 1. Reese, Charles D. Industrial Safety and Health for Infrastructure Services. CRC Press, 2009.
- 2. R. K. Jain, Sunil S. Rao, Industrial Safety and Health and Environment Management Systems, Khanna Book Publishing, 2000.
- **3.** K. U. Mistry. Fundamentals of Industrial safety and Health, Siddharth Prakashan Publisher,2008. **Question Paper Pattern:**

Sessional Exam : The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

WEB TECHNOLOGIES (WT)									
VI Semester : 1	B.Tech						Sch	eme : 2020	
Course Code	Category	Ho	urs/W	eek	Credits	Maxi	i <mark>mum M</mark> ar	ks	
OEC313	OEC - II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Exan	n Duration : 1½	<u>Hrs</u>		.1 .	1 . 11	End E	xam Dura	tion: 3 Hrs	
Course Outcon	nes: At the end	of the	course	the st	udent will	be able to			
CO1: Design a Web Page using Text Formatting Tags, Hyperlinks									
CO2: Develop a	lynamic web na	mage	s, Tab. ng Iau	aScrin	t	<i>Asts</i> , C55.			
CO4: Design a	Form using HT	$MI_{\rm F}$	ng Jav	z Cont	rols				
CO5: Understa	nd the basic cor	ncepts	of PHI	P and d	latabase co	onnection using	XAMPP S	erver.	
				UNIT	– I				
HTML5: Over Fundamentals o and URLs.	rview of HTM f HTML5,Work	IL5 and the state of the state	nd oth ith Tex	ner we kt and	eb techno organizing	logies, HTML g Text in HTMI	5 and its 2, Working	essentials, with Links	
				UNIT	– II				
Images: Workin CSS: Overview Styles, Table La	ng with Images, of CSS, Backg wouts.	Image ground	Maps s and	, Creat Color	ting Tables Gradients	s, Frames in CSS, Fonts	and Text	Styles, List	
	<i>j</i> • <i>m</i> ,		1	U NIT -	- III				
JavaScript: Or Browser Objec Handling in Jav	verview of java ts, Document (aScript.	a scrip Object	ot, Fui , Doci	nctions ument	s, Events, Object M	Java script O Iodel, Validatio	bjects, Wo on, Errors,	orking with Exception	
Forms: What's Controls, Subm Script, Interactiv	a Form? What itting Data from ve Elements.	at Cor 1 forms	itrols s, Cust	are av tomizir	ailable? C	Creating a Form s in CSS, Form	n and add validation	ing HTML using Java	
				UNIT	$-\mathbf{V}$				
Introduction to The Basics of I Expressions, C Combining HTM	PHP: Installin PHP scripts. Th onstants. Creat ML and PHP coo	g and e Buil ing Fo de on a	Config ding b orms, a single	guring locks Acces e Page,	PHP: Buil of PHP: V sing Forn , XAMPP	lding PHP with Variables, Data n Input with Server configur	Apache or Types, Op User defin ation.	Windows, erators and ed Arrays,	
1 HTML 5 Pla	ak Book 2nd E	dition	Droor	ntach I	$\mathbf{D}_{racc} = 2014$	5			
 Deitel and E Hall, 5th Ed 	 HTML5 Black Book, 2nd Edition, Dreamtech Press, 2016. Deitel and Deitel and Nieto, —Internet and World Wide Web - How to Programl, Prentice Hall, 5th Edition, 2011. 								
3. Julie C. Mel	3. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach yourself, Pearson Education (2007).								
Reference Bool1. Web Technol2015	Reference Books: 1. Web Technologies, Uttam K. Roy, Oxford Higher Education., 1st edition, 10th impression, 2015								
2015. 2. Robert Patti Development	nson, Beginners	Guide	for H	TML a	and CSS W	Veb Design and	Web		
3. Jeffrey C an	d Jackson, —W	eb Tec	hnolo	gies A	Computer	Science			

PerspectivePearsonEducation, 2011.

4. Gopalan N.P. and Akilandeswari J., -Web Technology, Prentice Hall of India, 2011.

Web References:

1. https://www.tutorialspoint.com/Html/index.htm

2. https://www.w3.org/Style/CSS/

3. https://www.w3schools.com/php/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		INUD			CIDER SE	CURITY (ICS)							
VI Semester :	B.Tech						Scho	eme : 2020					
Course Code	Category	Η	ours/W	eek	Credits	Maxim	num Marks	8					
OE314	OEC- II	L	Т	Р	С	Continuous InternalEnd ExamTOTALAssessmentExamTOTAL							
Sessional Exar	n Duration1½ Hrs					End E	xam Durat	ion: 3 Hrs					
Course Outcon	mes :At the end of t	he cou	rse the st	udent	will be able t	0							
~ ~ ~ ~ ~ ~ ~													
CO1: Discrimi	nate and analyze the	e proble	ems in c	ybercri	me.								
CO2: Identifying different classes of attacks.													
CO4: Use and apply modern cyber forensics tools.													
CO5: Analyze the computer forensic problems for feasible solutions.													
				UNIT	– I								
Introduction	to Cybercrime:	Introd	luction,	Cybe	rcrime: De	finition and Ori	igins of t	he Word,					
Cybercrime a	nd Information S	ecurity	v, Who	are (Cybercrimin	als? Classificatio	ons of Cy	bercrimes,					
Cybercrime: T	The Legal Perspect	ives, C	Cybercri	mes: A	An Indian Po	erspective, Cybero	crime and	the Indian					
ITA 2000, A C	Blobal Perspective	on Cyb	percrime	s, Cyb	ercrime Era	: Survival Mantra	for the Ne	tizens.					
UNIT – II													
		D1		UNIT -	- II	C · · 1 D1	(1 A ()	1 0 1					
Cyber offense Engineering, C Vector Cloud C	es: How Criminals Cyber stalking, Cy Computing.	Flan ber ca	Them– fé and (UNIT - Introc Cyberc	- II luction, Hov rimes, Botn	w Criminals Plan ets: The Fuel for	the Attac Cybercrin	ks, Social ne, Attack					
Cyber offense Engineering, C Vector Cloud C	es: How Criminals Cyber stalking, Cy Computing.	Plan ber ca	Them– fé and (UNIT - Introc Cyberc JNIT -	- II luction, Hov rimes, Botn - III	w Criminals Plan ets: The Fuel for	the Attac Cybercrir	ks, Social ne, Attack					
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Compu	es: How Criminals Cyber stalking, Cy Computing. Mobile and Winds in Mobility, C sed by Mobile De cks on Mobile/Ce Measures for H uting Era, Laptops.	reless Fredit Vices, Il Photandling	Them– fé and C Device Card Fi Registry nes. Mc g Mobi	UNIT - Introc Cyberc UNIT - s: Intr rauds / Setti bile I le, Or	- II luction, Hov rimes, Botn - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational	w Criminals Plan ets: The Fuel for Proliferation of M and Wireless Com bile Devices, Au curity Implication I Security Policie	the Attac Cybercrin Mobile and puting Era thentications for Organes and Mo	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in					
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Compu	es: How Criminals Cyber stalking, Cy Computing. Mobile and Win ds in Mobility, C sed by Mobile De cks on Mobile/Ce Measures for H uting Era, Laptops.	reless Fredit Vices, Il Phor andling	Them– fé and C Device Card Fr Registry nes. Mc g Mobi	UNIT - Introc Cyberc UNIT - s: Intr auds / Setti bbile I le, Or UNIT -	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV	w Criminals Plan ets: The Fuel for Proliferation of M and Wireless Com bile Devices, Au curity Implication l Security Policie	the Attac Cybercrin Mobile and puting Era thentications for Organes and Mo	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in					
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Por Security, Atta Organizational Mobile Compu Tools and Me Password Cra Steganography Phishing.	es: How Criminals Cyber stalking, Cy Computing. Mobile and Winds in Mobility, C sed by Mobile De cks on Mobile/Ce Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At	reless credit vices, ll Phot andling ybercus and ttacks,	Them– fé and C L Device Card Fr Registry nes. Mc g Mobi g Mobi	UNIT - Introd Cyberc JNIT - s: Intr rauds / Setti bile I le, Or JNIT - ntroduc res, V ection,	- II luction, How rimes, Both - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV etion, Proxy irus and W Buffer Ove	w Criminals Plan ets: The Fuel for Proliferation of M and Wireless Com bile Devices, Au curity Implication l Security Policie Servers and And forms, Trojan Ho erflow, Attacks on	A the Attac Cybercrin Mobile and puting Era othentication is for Orga es and Mo onymizers, proses and Mo onymizers, orses and Mo	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks,					
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Compu Tools and Ma Password Cra Steganography, Phishing.	es: How Criminals Cyber stalking, Cy Computing. Mobile and Wi ds in Mobility, C sed by Mobile De cks on Mobile/Ce Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At	reless reless vices, Il Photandling ybercuss and ttacks,	Them– fé and C Device Card Fi Registry nes. Mc g Mobi I rime: Ir Spywar SQL Inj	UNIT - Introc Cyberc UNIT - s: Intr auds / Setti bbile I le, Or UNIT - ntroduc ces, V ection,	- II luction, How rimes, Botm - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV ction, Proxy irus and W Buffer Ove	w Criminals Plan ets: The Fuel for Proliferation of M and Wireless Com bile Devices, Au curity Implication l Security Policie Servers and And forms, Trojan Ho erflow, Attacks on	A the Attac Cybercrin Mobile and puting Era othenticatic is for Orga es and Mo onymizers, prses and Mo	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks,					
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Compu Tools and Ma Password Cra Steganography, Phishing. Cyber Securi Web threats for Risks and Peri	es: How Criminals Cyber stalking, Cy Computing. Mobile and Winds ds in Mobility, Co sed by Mobile De cks on Mobile/Ce Measures for H ating Era, Laptops. ethods Used in Co cking, Keyloggers , DoS and DDoS At ty: Organizations, So ls for Organization	Feless Predit vices, Il Photandling yberch andling yberch and tacks, I Imp ecurity s, Soci	Them– fé and C Device Card Fr Registry nes. Mc g Mobi rime: Ir Spywar SQL Inj lication y and Pr al Comp	UNIT - Introd Cyberc UNIT - s: Intr auds / Setti bbile I le, Or UNIT - atroduc ces, V ection, UNIT s: Intr ivacy puting	- II luction, How rimes, Botm - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV ction, Proxy irus and W Buffer Ove - V roduction, C Implication and the asso	w Criminals Plan ets: The Fuel for Proliferation of M and Wireless Com bile Devices, Au curity Implication I Security Policie Servers and And forms, Trojan Ho erflow, Attacks on Cost of Cyber cri s. Social media poiated challenges	A the Attac Cybercrin Mobile and aputing Era athenticatic as for Orga es and Mo onymizers, orses and Mo onymizers, orses and Mo onymizers onymizers onymizers onymizers onymizers	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks, PR issues, g: Security izations.					
Cyber offense Engineering, C Vector Cloud C Ovector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Computer Tools and Ma Password Cra Steganography Phishing. Cyber Securi Web threats for Risks and Peri	es: How Criminals Cyber stalking, Cy Computing. Mobile and Wi ds in Mobility, C sed by Mobile De cks on Mobile/Ce Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At ty: Organizations, S ls for Organization	Feless Predit vices, Il Photandling yberch andling yberch and ttacks, I Imp ecurity s, Soci	Them– fé and C Device Card Fr Registry nes. Mc g Mobi I rime: Ir Spywar SQL Inj lication y and Pr al Comj	UNIT - Introd Cyberc UNIT - s: Intr auds / Setti bbile I le, Or UNIT - ntroduc ces, V ection, s: Intr ivacy puting	- II luction, How rimes, Botm - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV ction, Proxy irus and W Buffer Ove - V roduction, C Implication and the asso	w Criminals Plan ets: The Fuel for Proliferation of M and Wireless Com bile Devices, Au curity Implication l Security Policie Servers and And forms, Trojan Ho erflow, Attacks on Cost of Cyber cri s. Social media peciated challenges	A the Attac Cybercrin Mobile and aputing Era athenticatic as for Orga es and Mo onymizers, orses and I mes and I marketing for Organ	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks, PR issues, g: Security izations.					
Cyber offense Engineering, C Vector Cloud C Cyber crime Devices, Tren Challenges Pos Security, Atta Organizational Mobile Compu Tools and Ma Password Cra Steganography, Phishing. Cyber Securi Web threats for Risks and Peri Text Books: 1. Cyber Secu Godbole, S	es: How Criminals Cyber stalking, Cy Computing. Mobile and Winds in Mobility, C sed by Mobile De cks on Mobile/Ce Measures for H ating Era, Laptops. ethods Used in C cking, Keyloggers , DoS and DDoS At ty: Organizations, S ls for Organizations rity: Understanding ounit Belapure, Wil	Feless Predit vices, Il Photandling yberch andling yberch and tacks, I Imp ecurity s, Soci Cyber ey.	Them- fé and C Device Card Fi Registry nes. Mc g Mobi I rime: Ir Spywar SQL Inj Iication y and Pr al Comp Crimes,	UNIT - Introd Cyberc UNIT - s: Intr auds / Setti bbile I le, Or UNIT - atroduc ces, V ection, UNIT s: Int rivacy puting Comp	- II luction, How rimes, Botm - III oduction, P in Mobile a ngs for Mo Devices: Sec ganizational - IV ction, Proxy irus and W Buffer Ove - V roduction, C Implication and the assoce uter Forensid	w Criminals Plan ets: The Fuel for Proliferation of M and Wireless Com bile Devices, Au curity Implication I Security Policie Servers and And forms, Trojan Ho erflow, Attacks on Cost of Cyber cri s. Social media peciated challenges	A the Attac Cybercrin Mobile and puting Era othenticatic is for Orga es and Mo onymizers, orses and I mes and I marketing for Organi ectives, Nin	ks, Social ne, Attack Wireless a, Security on Service anizations, easures in Phishing, Backdoors, Networks, PR issues, g: Security izations.					

Reference Books:

1. Information Security, Mark Rhodes, Ousley, MGH.

2. CyberSecurityEssentials,JamesGraham,RichardHowardandRyanOtson,CRCPress.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

			NAI	ΙΤ Ο	ECHNOLOG	GY (NNT)			
VI - Sem	ester: B.Tecl	h					Schem	le: 2020	
Course	Course	Ho	urs/		Credits	Maxim	um Marl	KS	
Code	Category	We	ek			a			
		-	T	р	C	Continuous	End	тотат	
OEC315	OEC-II	L	1	P	C	Internal	Enu Evam	IUIAL	
		2	_	-	2		<u>60</u>	100	
Sessiona	l Exam Dura	tion	1 ¹ /2	Hrs	5	End Exa	am Durat	ion: 3 Hrs	
Course	Outcomes: A	t the	end	of th	e course t	he student will b	e able to		
CO1: Un	derstand the p	orincij	ples b	ehind	l nanotechr	ology and nanoma	terials		
CO2: Analyze the fabrication, characterization, and manipulation of nanomaterials,									
CO3: Un	derstand abou	ıt met	al nar	io pai	rticle based	sensors			
CO4: An	alyze about na	no wi	re bas	sed se	ensors.				
CO ₅ : Ur	nderstand Sens	sors B	ased	on Na	nostructur	es of Metal Oxides			
					UNIT – I				
Introdu	ction to Nand	otech	inolo	gy:			C		
Definition	1 of nanotechi	nolog	y; ma	in fe	atures of 1	nanomaterials; typ	es of nan	ostructures	
(OD,	1D, al	na (alaata	2 // [D ti.aa	structu	res); nanoco	mposites;	and the definition	
mainchen	nical/physical/	electi	rical/(u propert	les of nanomate	riais. Me	Thous for	
Migrogoo	izing the hand	omate	rians:	Ator Iootn	me Force	microscopy (AFM)), Scannin	g Electron	
WICTOSCO	by (SEM), 11ai	ISIIIIS	SI011 E	Jectro	$\frac{011 \text{ MICLOSC}}{11 \text{ NIT} - 11}$	opy (TEM), and Sp	ectroscopy	•	
Introdu	ction to Sens	ors'	Scier	ice a	nd Techn	ologu:			
Definition	n of sensors: m	ain el	emen	ts of	sensors: the	e parameters used t	for charact	erizing the	
performa	nce of sensors	acci	uracy.	prec	cision, sens	itivity, detection li	mit. dvna	mic range,	
selectivity	, linearity, reso	olutio	n, res	ponse	e time, hyst	eresis, and life cycl	e.	0,	
					UNIT -	-III			
Metal no	ano particle-	base	d Sei	isor	s:				
Definition	n of nano partic	cle; fe	ature	s of n	ano particl	es; and production	of nano pa	rticles by	
physical a	pproach (laser	ablat	tion) a	and cl	nemical app	proaches (Brust me	thod, seed	-mediated	
growth, et	tc.). Quantum I	Dot S	ensor	s. Def	finition of c	luantum dot; fabric	ation tech	niques of	
quantum	dots;				UNIT – IV	7			
Nanowi	re-based Sen	sors	:						
Definition	n of nanowires	; feat	ures c	of nar	nowires; fal	prication of individ	ual nanow	rire by top-	
down app	proaches and b	otton	n-up a	appro	aches; and	fabrication of nar	nowire arra	ays (fluidic	
channel, l	blown bubble f	ilm, c	ontac	t prii	nting, spray	v coating, etc.).Carb	on Nanoti	ubes-based	
Sensors: 1	Definition of ca	arbon	nano	tube;	features of	f carbon nanotubes	; synthesis	s of carbon	
nanotube	s.						-		
					UNIT -	V			
Sensors	Based on Na	inost	ruct	ures	of Metal (Oxide:	_	_	
Synthesis	of metal oxid	de str	uctur	es by	dry and	wet methods; type	es of meta	l oxide gas	
sensors (sensors (OD, 1D, and 2D); defect chemistry of the metal oxide sensors; sensing mechanism								
ot metal-	oxide gas ser	nsors;	and	pore	ous metal-	oxide structures f	or improv	ved sensing	
applicatio	ons.								
1 ext Bo	OKS:	1	1 • •		N. NT ·	1 1 4 7 .	1		
1. Varghe	ese Thomas and	d Bala	akrish	na K	M, Nanot€	echnology: An Intro	duction to) and	
Synthesi	s, Properties	and	Applic	ation	is of Nanon	nateriais, Atlantic F	udiisners	ana	

Distributers(P) Ltd, 2012.

2. G.Mohan Kumar, Nanotechnology: Nanomaterials and Nano devices, Narosa Publications, 2016.

Reference Books :

1. T.Pradeep, Nano: The Essentials Understanding Nano Science and Nano Technology, Tata McGraw

Hill, 2013.

Richard Booker and earl Boyson, Nanotechnology: The Fun and Easy Way to Explore the Science of Matters Smallest Particle, Wiley Publications, 2011.

Web References:

1.https://nptel.ac.in/courses/118102003

2. online courses.nptel.ac.in/noc19_mm21/preview

3. online courses nptel.ac.in/noc22_ch11/preview

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

DISASTER MANAGEMENT (DM)									
VI Semester :B	B.Tech.					· ·	Scheme	: 2020	
Course Code	Category	Hou	rs/V	Veek	Credi	Maxi	mum Mar	ks	
	•••••				ts	Ocations			
						us			
050316	OFC II	L	Т	Р	С	Internal	End Evam	Total	
OEC310	OEC-II					Assessme	DAam		
		2			2	<u>nt</u>	60	100	
Sessional Exar	n Duration:	1.5H	rs	-	3	End Exan	1 Duratio	n: 3 Hrs	
Course Outcomes : At the end of the course the student will be able to									
CO1: Understand the definitions and terminologies used in disaster									
management.									
CO2: Understa	and the type	s and	cate	egorie	s of disa	sters.			
CO3: Understa	ind the impa	$\frac{\text{act of}}{1}$	disa	sters	on socio	-economic at	nd enviror	iment.	
CO4: Plan Ior (usaster risk	t reau	lCtioi	n, mit	igation a	nd managen	inent strate	egies.	
	ind the rela	lionsi	<u>up b</u>			pinent and d	isasters.		
Introduction:	Concepts	and d	efini	tions	disaster	r hazard vi	ılnerahilit	v risks	
severity. freque:	ncv and det	ails. c	capao	city. i	mpact. p	revention. m	itigation.	y, 110100,	
,,,,,			τ	JNIT ·	• II				
Disasters: Dis	asters class	ificati	ion						
Natural Disa	sters: Flo	ods,	drau	ught,	cyclone	es, volcano	es, earth	iquakes,	
tsunami, lands	lides, coasta	al eros	sion,	soil e	rosion, f	orest fires et	c.,		
	asters: Ind	ustria	al po	llutio	n – Artifi	icial flooding	in urban	areas –	
Nuclear radiat	ion – Cher	nical	spil.	ls –	Transpo	rtation acci	dents –	l'errorist	
strikes, etc. – M		u coa	stal a	NIT -	TTT				
Disaster Imn	acts: Di	saste	r in	inact	s –Envi	ronmental	nhysical	social	
ecological econ	omic politi	cal et	to F	Jealth	- nevch	o-social issu	physical,	ographic	
aspects_Hazard	locations	- G	uc., i loha	1 and	1 psych 1 nation	al disaster	trends _	Climate	
change and urb	on disaster	- C	noba		i nation	ai uisastei	uciius –	Cilliate	
	all ulsaster	0.	TI	NIT -	117				
Disaster Risk	Reduction		0	<u> 1111 -</u>	• 1 V				
Disaster Mar	naaement	Cuc	le	- its	s phas	es: Preven	tion. mi	tigation.	
preparedness,	relief and 1	recove	erv –	Risk	analysi	is, vulnerab	ility and	capacity	
assessment – E	arly warnin	g syst	ems	•	5	,	5	1 5	
Post-Disaster	Environme	ental	Res	pons	e (i.e. wa	ater, sanitat	tion, food	safety,	
waste managen	nent, diseas	se cor	ntrol,	secu	rity, and	l communica	ations) : F	Role and	
responsibilities	of governm	ient,	com	munit	y, local	institutions,	NGOs ar	nd other	
stakeholders -	stakeholders - Policies and legislation for disaster risk reduction - Activities of								
National Disast	er Managen	nent A	Autho	ority.					
UNIT - V									
Disasters, Env	vironment d	and D)evel	opme	ent:Facto	ors affecting	vulnerabil	ity such	
as impact of	developme	ntal	proj	ects	and en	vironmental	modifica	tions –	
Sustainable a	nd enviror	nment	al f	friend	ly reco	very – Red	construction	on and	

development methods.

Text Books:

1. PradeepSahni, Disaster Risk Reduction in South Asia, PHI, New Delhi.

2. Ghosh G.K., Disaster Management, APH Publishing Corporation.

3. Singh B.K., *Handbook of Disaster Management Techniques & Guidelines*, Rajat Publication.

4. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi,

Reference Books:

1. A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, *Disaster Management in India*.

2. A. S. Arya, AnupKaranth, and Ankush Agarwal, *Hazards, Disasters and Your Community; A Primer for Parliamentarians*, GOI–UNDP Disaster Risk Management Programme.

3. Inter Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC.

Web References:

http://ndma.gov.in/ (Home page of National Disaster Management Authority) 2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).

3. <u>www.odihpn.org</u>, *Disaster Preparedness Programme in India. A Cost Benefit Analysis*, Commissioned and Published by the Humanitarian Practice Network 'at ODI HPN.

4. www.empowerpoor.org, Drought in India: Challenges and Initiatives; Poorest Areas in Civil Society (PACS) Programme. [2001–2008]

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

	PROJECT MANAGEMENT (PM)									
VI Semester :B.Tech. Scheme : 2020										
Course Code	Category	Hours/Week			Credits	Maximum Marks				
OEC317	OEC - II	L	Т	Р	С	Continuous Internal Assessment	Continuous Internal Assessment			
		3	0	-	3	40	60	100		
Sessional Exam	Duration:1.5 H	lrs				End E	xam Durati	on: 3 Hrs		
Course Outcom		f 410 a a 4		<u>41. a. a. 41. a</u>	1 + 11 1-	a altila ta				
Course Outcome	the methods of	f the co	ing s	the stu	ling and pr	inciples of con	struction			
management.	i the methods of	i piaim	mg, s	ciicuu	ing and pr	incipies of cons	Struction			
CO2: Formulate	e, solve CPM an	nd PER	T net	works						
CO3: Understar	nd the structure	of orga	nizat	ion and	d resource	allocation.				
CO4: Understar	nd the procedure	e for do	ocume	entatio	n of tender	s, contracts & 1	time-cost and	alysis.		
CO5: Understar	nd basics of eng	ineerin	ig eco	nomic	$\frac{s \text{ and solvi}}{1 + c}$	ng of cash flow	v problems.			
CO6: Understar	id the concepts	of qua	lity co	ontrol a	and safety i	management.				
Introduction to	Construction	Mana	19 <i>em</i>	ent: S	<u> </u>	e – Obiective	es and fun	ctions of		
construction man	agement – Type	es - Re	sourc	es - St	tages – Tea	um of construct	ion unit.			
<i>Construction Pla</i> Methods of plann Milestone charts.	inning and Schunder and Schunder and schedu	<i>edulin</i> ş ıling –	g: Ob Adva	jective antages	es and impo s and class	ortance of plant ification of sch	ning and Sch nedules – Ba	eduling – r charts –		
			1	UNIT	- II					
Network Techniq Breakdown struc Network. Critical Path M	tures in Constru tures – Repres	sentation Introd	nanag on ar	gemen nd spe n – T	<i>t:</i> Element cifying of	s of network – activities and between CPM	Network tec l events – 1	hniques – Rules for		
estimates – Float	– Critical path -	– Netw	ork a	nalysis	and comp	utation probler	ns.	Time		
			U	J NIT -	- III					
Program Evalua path – Network a	<i>tion and Reviev</i> nalysis and com	w Tech	nique on pro	e (PEF oblems	?<i>T</i>): Introd	uction, time es	timates, slac	k, critical		
<i>Cost–Time Analy</i> planning – Updat	v sis in Net Worl ing – Resources	k <i>Plan</i> s alloca	<i>ning:</i> ition.	Impor	tance of tin	me – Project co	ost analysis in	n network		
			U	J NIT -	- IV					
<i>Tenders and Co</i> Contracts definiti	<i>ntracts:</i> Type on – Essentials	of tend – Type	lers – es – D	- Princ Ocume	ciples of te ents – Cono	endering – No litions of contr	tice inviting acts.	tender –		
<i>Arbitration:</i> Definition – Arbitrator – Arbitration agreement – Qualification of arbitrator – Advantages of arbitration.										
<i>Organisation:</i> Principles of organization – Types of organization – Measurement book.										
			1	UNIT	- V					
<i>Engineering Eco</i> present worth fac	nomics: Basic for the state of	Princip eries p	oles – resent	Equiv t worth	alence – C 1 factor.	ash Flow diag	ram – Single	Payment		
<i>Safety, Inspectio</i> Protection Equip	on and Quality ment – Need fo	or insp	r <i>ol:</i> I ection	mporta n at w	ance of sa ork – Prin	fety – Safety ciples ofinspec	Measures – etion – Impo	Personal ortance of		

quality - Elements of quality - Organisation for quality control.

Text Books:

1. B.C. Punmia& K.K. Kandelwal, *Project Planning & Control with PERT & CPM*, Laxmi Publications (P) Ltd, New Delhi.

2. J.L. Sharma, Construction Management and Accounts, SatyaPrakasan (P), NewDelhi.

3.

Reference Books:

1. U.K. Shrivastava, Construction planning and Management, Galgotia (P), New Delhi.

2. S. Seetha Raman, Construction Engineering and Management, Umesh (P), New Delhi.

3. Chitkara, *Construction project management – Planning, Scheduling and Control*, Tata McGraw Hill.

4. Halpin, D.W, *Financial and Cost Concepts for Construction Management*, JohnWiley and Sons, New York.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weight age of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

ADVANCED INFORMATION SYSTEMS (AIS)								
VI Semeste	er: B.Tech					Sch	neme : 2020	
Course Code	Category	Hours/Week			Credits	Maximum Marks		(S
OEC318	OEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional E	xam Duration 1 ¹ /2	$\frac{2}{2}$ Hrs		(1 (1 4 111	End	Exam Dura	ation: 3 Hrs
Course Out	comes : At the end	1 OI U	ted co	se the st	udent Will	be able to		
CO2: Inter	bret different types	of In	heritar	nce and I	Polvmorphi	sm.		
CO3: Class	sify layer functiona	lities	ofOS	I referen	ce model a	nd TCP Protocol s	suite.	
CO4: Sum	marize the concepts	s of it	nternet	working	, security a	nd IP addressing.		
CO5: Dem	onstrate different ty	ypes o	of prote	ocols and	d web conte	ents used in web d	lesign	
				UN	IT – I			
Introduction to Object Oriented Concepts : Introduction, Programming Techniques, Introduction to Object Oriented Concepts, Concept of Structured Procedural Programming, Class, Object Characteristics of Objects : Data Abstraction, Classification, Encapsulation and Message Passing.								
	<u> </u>			UNI	T – II			
Advanced Concepts in Object Oriented Technology: Relationships, Inheritance- Protected Access Specifier, Multiple and Multilevel Inheritance, Generalization and Specialization, Abstract classes, Polymorphism, Implementation of OOC through C++.								
	UNIT – III							
Introductio Protocol Sui	n to computer N oite, Routing Device	e twor es, Ty	• ks: In pes of	troductio Network	on, Networ ks.	k Topology, OSI	Reference 1	Model, TCP
UNIT – IV								
Internetwo Switched Ne	Internetworking: Protocols for Internetworking, Internet Address and Domains, Packets, Packet Switched Networks, Virtual Private Networks, and Working of Internet.							
				UNI	T - V			
Introduction to Web Technology: Introduction, Hyper Text Transfer Protocol (HTTP), File Transfer Protocol (FTP), Domain Name Server (DNS), Web Applications, Types of Web Content, Multi-Tier Web Applications, Performance of Web Applications.								
Text Books	:							
1. Campus	Connect Foundation	on Pre	ogrami	ne – Ob	ject Oriente	ed Concepts – Sys	tem	
2. Campus INFOSY	Connect Foundati	on Pi	ogram	me – Co	omputer Ha	ardware and Syste	em Software	e - Vol. – 3,
3. Campus Server	Connect Foundat	tion	Progra	mme –	Relational	Database Manag	gement Sys	tem, Client
4. E.Balagu	uruswamy, Object	Orien	ted pro	ogrammi	ng with C+	+, 2017		
5. Data Co	mmunications & N	etwo	rking,	Forouza	n, Tata Mc	GrawHill, Fifth ed	lition, 2017	
Web Refere	ences:	• .	/ 4	1 /				
I. https	s://www.tutorialspo	oint.co	om/cpl	usplus/	atrena - 4	aniala/		
2. http	2. https://www.geeksforgeeks.org/computer-network-tutorials/							

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		PROD	UCT LI	FE C	YCLE MAN	AGEMENT (PLM)				
VI Semest	er: B.Tech	1			Scheme : 2020						
Course Code	Category	Hours	/Week		Credits	Max	kimum Marks				
OEC319	OEC - II	L	Т	P	С	Continuous Internal Assessment	End Exam	TOTAL			
Seccional I	Exam Durat	$\frac{3}{11/2}$	- U#0	-	3	40	60 Syam Duration	100			
Course Out	tcomes: At 1	the end a	of the c	ourse	the studen	t will be able to		. 5 1115			
CO1: Unde:	rstand Prod	uct life c	vcle ma	inage	ment proce	ss.					
CO2: Unde	rstand differ	ent step	s in Pro	oduct	developme	nt process.					
CO3: Get k	nowledge or	Produc	t data r	nana	gement	-					
CO4: Under	rstand the ir	nplemen	itation (of PLI	M and its in	npact on the orga	anization				
CO5: Unde:	rstand core	function	s of PLI	M and	d supply ch	ain and ERP sys	tems				
					UNIT – I						
Organizatio	n Business	Models	(MTS, N	ITO,	CIO, EIO E	Etc), Basics of Er	iterprise Syste	ms			
(PLM, ERP,	MES), Bac	kground	l, Over	view,	Need, Ben	efits, and Conce	ept of Product	Life Cycle,			
Component	s / Elemen	ts of PL	M, Eme	ergen	ce of PLM,	Significance of l	PLM, Differenc	es between			
PLM and PI	DM										
					UNIT – II						
Integrated I	Product deve	elopment	t proces	s-Co	nceive-Spec	cification, Concep	ot design, Desi	gn-			
Detailed de	sign, Valida	tion and	l analys	sis (S	imulation),	Tool design, Rea	alize-Plan man	ufacturing,			
Manufactur	re, Build/As	semble,	Test(qu	ality	check).						
					UNIT – III						
Workflow H	Processes, I	Design C	Collabor	ration	i, Processes	s Management,	Document Ma	anagement,			
Visualizatio	on, Bill of Ma	aterials (BOM) N	Ianag	gement – La	b exercises.					
					UNIT – IV						
Engineering	g Change C	ontrol, C	Configui	ation	n Manageme	ent, Manufactur	ing Process Ma	anagement,			
Variant Ma	anagement,	Classifi	cation	PLM	Architectu	re, Various PLI	M tools, Data	Modeling,			
Security ma	anagement.										
CAD Intern	ationa Info	masticus	011th 04	ing t	$\frac{\mathbf{UNIT} - \mathbf{V}}{\mathbf{v}^{1} \mathbf{v}^{1} \mathbf{v}^{2} \mathbf{v}^{2} \mathbf{v}^{2}}$	ICAD ECAD To	abrical mublic	hing) Com			
CAD Integr				ing u		ICAD, ECAD, Ie					
functions (e.g., data v	aults),	Data F	low 1	to Other sy	ystems such as	Supply chair	i and ERP			
Text Bool	hours for la	b exerci	sesi								
1. Grieves,	Michael, Pro	oduct Lif	ecycle I	Mana	gement, Mc	Graw-Hill publis	hers.				
2. Antti Saa	lksvuori, An	selmi Im	imonen	, Proc	luct Life Cy	cle Management	– Springer pul	blications			
Reference	Books										
1.Kari Ulric	h and Steve	n D. En	oinger	Produ	act Design 8	& Development	McGraw Hill In	ternational			
2.Burden, I	Rodger PDM	: Produc	t Data 1	Mana	gement, Re	source Publicatio	ons.				
Question P	aper Patter	n:			0 ,						
Sessional I	Exam:										
The questi	on paper f	or sessio	onal ex	amir	nation shall	be for 25 mar	ks, covering	half of the			
syllabus fo	r first sessio	onal and	remai	ning	half for sec	cond sessional e	xam. The ques	stion paper			
shall consi	st of three	section	s with	Two	Questions	(Either or Tvi	be) in each se	ection. The			
student sha	all answer o	ne quest	tion fro	m ea	ch section.	х - ЭТ		_`			

End Exam:

	INDUSTRY 4.0 (I40)							
VI Semester : B.Tech Scheme : 2020								
Course Code	Category	Ho	urs/We	eek	Credits	Maxi	mum Mar	ks
		L	Т	Р	С	Continuous Internal	End	Total
OE320	OEC-II	_				Assessment	Exam	
		3	-	-	3	40	60	100
Sessional Exam	n Duration : 1	1/2 Hrs				End	Exam Dur	ation: 3 Hrs
Course Outcon	nes : At the end	d of the	course	e the st	udent will b	e able to		
CO1: Understa	nd the Characte	eristics,	Sensor	rs, Act	tuators and C	Communication m	odels for in	dustry 4.0.
CO2: Understa	nd Fourth revol	ution a	nd Indi	ustry c	perations.			
CO3: Understa	nd the Cyber-P	hysical	System	ns, Se	nsors, platfor	rms of Industrial I	oT.	
CO4: Understa	nd the Cyber se	ecurity,	Indust	rial In	ternet Systen	ns.		
CO5: Understa	nd Business Mo	odels a	nd Arcl	hitectu	ire, Key enał	olers in Industrial	IoT.	
				UN	IT – I			
Introduction to	o IoT, Sensing	and A	ctuator	rs, Co	mmunicatio	n 	·	•
Introduction, T	ransducer- Defi	inition,	Senso	r - Sta	atic and Dyn	amic characterist	ics, Types,	Actuator –
Features, Type	es, Communic	ation	protoc	ol, S	tandards, F	eatures, Variant	s, IoI N	etworking -
introduction, Pr	oprietary non-1	P based	1 Soluti	on, IP	based soluti	ons.		
				UN	11 - 11			
Industry 4.0: 7	The Fourth Rev	volutio	n					
Introduction, St	ustainability As	sessme	nt of N	lanuta	icturing Indu	istry, Lean Produc	etion System	n, Smart and
Connected Business Perspective, Smart Factories								
				UN	1 – 111			
Cyber-Physica	l Systems, Sen	sors, P	latforr	ns	~ 11		1	T 10 1
Cyber-Physical	Systems and	Next-G	enerati	on Se	nsors, Colla	boration Platform	and Produ	act Lifecycle
Management, A	Augmented Rea	ility an	d Virtu	ial Re	ality, Artific	ial Intelligence, I	Big Data ar	nd Advanced
Analysis.				UN				
				UN	11 - 1 V			
Cyber security	, Industrial In	ternet	System	15:				
Cyber security	– Introduction,	challen	ges, In	dustria	al Internet Sy	ystems, Industrial	Sensing &	Actuation,
Industrial Proce	esses and system	ns.						
UNIT - V								
Business Mode	Business Models and Architecture, Key Enablers:							
Industrial Business Models, Reference Architecture for Industrial Business Models of IIoT, Key								
Enablers of Ind	ustrial IoT in S	Sensing	, Key l	Enable	ers of Industr	rial IoT in Conne	ctivity, Key	/ Enablers of
Industrial IoT in	n Connectivity.							
Text Books								
1. Vijay Madis	etti, Arshdeep H	Bahga, '	"Intern	et of 7	Things: A Ha	nds-On Approach	n", VPT; 1 e	edition.
2. Industrial Io	T Challenges,	Desig	n Princ	iples,	Application	s, and Security,	Ismail But	un, Springer
Nature Switz	zerland AG, 202	20.						

3. Industrial Internet of Things Technologies and Research Directions, Anand Sharma, Sunil Kumar Jangir, Manish Kumar, Dilip Kumar Choubey, Tarun Shrivastava, S. Balamurugan, CRC, Taylor & Francis Group, LLC, 2020.

Reference Books

1. Industrial IoT Application Architectures and Use Cases, A. Suresh, Malarvizhi Nandagopal, Pethuru Raj, E. A. Neeba, Jenn-Wei Lin, CRC Press, Taylor & Francis Group, 2020.

2. "Introduction to Industry 4.0 and Industrial Internet of Things", Prof. Sudip Misra, IIT kharagpur

Web References:

- 1. https://www.electricaltechnology.org/2016/07/internet-of-things-iot-and-its-applications-inelectrical- power-industry.html
- 2. http://www.nptelvideos.in/2012/11/internet-technologies.html
- **Question Paper Pattern:**

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

Open Elective Courses (OEC-III)							
S. No	Course Title						
1.	Multimodal Transportation Engineering						
2.	Air pollution and control						
3.	Industrial Robotics						
4.	Quality & Reliability Engineering						
5.	Smart Grid Technologies						
6.	Artificial Intelligence and Machine Learning						
7.	Distributed Embedded Systems						
8.	Natural Language processing						
9.	Design Thinking						
10.	Cloud, Micro services & Application						
11.	Block Chain Technologies						
12.	Agile Methodologies						
13.	Augmented Reality & Virtual Reality						

List of Open Electives - OEC-III & OEC-IV

Open Elective Courses (OEC-IV)							
S. No	Course Title						
1.	Composite Materials						
2.	Image Processing						
3.	Mobile Computing						
4.	Enterprise systems						
5.	Modern Web Applications						
6.	Cognitive Radio						
7.	Automation & Control						
8.	Human Resource Management						
9.	Design Patterns						
10.	Pre stressing Systems						
11.	Additive Manufacturing Technology						
12.	Drone Technology						
13.	Infrastructure for Smart City Development						

MULTIMODAL TRANSPORTATION ENGINEERING (MTE)								
VII Semester : B.		Scheme : 2020						
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC401	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100
Sessional Exam Duration : 1 ½ Hrs End Exam Duration: 3 Hrs								
Correct Orate and	A 4 41 1 -	- £ 41		41 4		1 1. 1		
Course Outcomes	At the end of urban a	of the o	course	the st	estimates 1	the capacity and	t level of ser	TVICO
CO2: the compone	ents and function	$\frac{110}{000}$ ons of	railw	av trac	k	the capacity and		VICE
CO3: the control f	actors, gradien	ts and	geom	etric d	lesign of ra	uilway track		
CO4: the various a	aircraft charact	eristic	s and	design	of runway	/s		
CO5: the various f	eatures in Har	bours	and Po	orts, th	eir constru	ction and coast	al protection	1
works							1	
			U	NIT –	Ι			
Highway Engineer	ring: Critical c	cross s	ection	of urb	an and rur	al roads- Road	ecology-	
Classification of ro	ads-Concept o	of Capa	acity a	and Le	vel of Serv	vice-Factors affe	ecting-	
Computation of Ca	apacity and Lev	vel of a	Servic	e as po	er Indo-HC	CM2017- Measu	ure of	
effectiveness-High	way capacity a	and pe	riorm			ICS.		
Railway Track · Re	equirements of	an ide	eal ner	maner	nt way _ G	auges in India -	- Selection o	f
gauge- Functions a	and requirements	ts of r	ails-	Sleeper	rs and Ball	ast- Functions	and requiren	nents.
types of sleepers -	Sleeper densit	y – Ba	llast –	- Funct	ions and re	equirements, ty	pes – Sub gr	ade –
Functions of sub g	rade or format	ion – S	Sub gr	ade ma	aterials and	l its improveme	ent.	
			UN	I T I	Ш			
Track Alignment:	Basic requirem	nents -	- Fact	ors cor	ntrolling al	ignment – Grac	dients – Typ	es of
gradient – Grade co	ompensation o	n curv	es.		G1	D. 1		. f
Geometric Design	of the Track:	speed	on inc ant de	e train	- Speed of	i curves – Kadi	us or degree	01 f
transition curve – I	ength of trans	sition c	urve -	-Wide	ning of gai	uge on curves –	- Shift of the	curve.
			U	- TIV	IV	- <u>B</u>		
<i>Airport Engineerin</i> of Runway- Comp Runway – Wind R	Airport Engineering: Selection of site for Airport – Aircraft Characteristics- Geometric Design of Runway- Computation of Runway length – Correction for runway length – Orientation of Runway – Wind Rose Diagram – Runway Lighting system							
	8		U	<u>8 8</u> NIT -	V			
Harbour Engineering: Definition of Basic Terms: Harbour, Port, Satellite Port, Docks, Waves and Tides – Planning and Design of Harbours: Harbour Layout and Terminal Facilities – Coastal Structures: Piers, Break waters, Wharves, Jetties, Quays, Spring Fenders, Dolphins and Floating Landing Stage – Inland Water Transport – Wave action on Coastal Structures and Coastal Protection Works.								
1. Indian Highway	Capacity Man	ual- D	ecem	ber201	7, CSIR P	ublications, Ne	w Delhi.	
2. C. Saxena and S	.P. Arora [201	5], <i>Ra</i>	ilway	Engin	eering, Dh	anpat Raj Publi	ications	
3. Khanna, S. K., A Chand and Bros, R	Arora, M. G., a loorkee, India,	nd Jain 2012.	n, S. S	S. Airpo	ort plannir	ng and Design,	Sixth Edition	n, Nem
4. C.Venkatramaia	h., Transportat	tion Er	nginee	ering-V	ol.2 Railw	vays, Airports, I	Docks and	
Harbours, Bridges	and Tunnels.,U	Univer	sities	Press ((India) Priv	vate Limited, H	yderabad, 20	015.

Reference Books

1. Satish Chandra and M. Agrawal, *Railway Engineering*, Second Edition, Oxford University Press, 2013.

2. Rangwala, S.C. Railway Engineering, Charotar Publishing House, Anand, India, 2008.

3. Horonjeff, R., McKelvey, F. X., Sproule, W. J., and Young, S. B. *Planning and Design of Airports*, Fifth Edition, McGraw-Hill, New York, USA, 2010.

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.
AIR POLLUTION AND CONTROL (APC)										
VII Semester :B. 7	Tech						Scheme	: 2020		
Course Code	Category	Ho	urs/W	eek	Credits	Maxin	num Marks			
OEC402	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional Exam D	ouration: 1 ¹ / ₂	Hrs				End Exa	m Duration	: 3 Hrs		
Course Outcomes At the and of the course the student will be able to										
CO1: To take up t	the basic conc	ents of	air no	ule stu ollution	n					
CO2: To introduc	CO1: To take up the basic concepts of air pollution.									
CO3: The contents involved the knowledge of causes of air pollution.										
CO4: The contents involved the knowledge of health related to air pollution.										
CO5: To develop skills relevant to control of air pollution.										
UNIT – I										
<i>Introduction:</i> History of Air pollution and episodes –Sources of air pollution and types – Introduction to meteorology and transport of air pollution: Global winds, Headley cells, wind rose terrestrial wind profile –Effects of terrain and topography on winds, lapse rate, maximum mixing depths, plume rise.										
UNIT - II										
<i>Transport of Pollution in Atmosphere:</i> Plume behavior under different atmospheric conditions – Mathematical models of dispersion of air pollutants –Plume behavior in valley and terrains – Plume behavior under different meteorological conditions –Concept of isoplates.										
UNIT – III										
<i>Effects of Air Pol</i> Properties –Globa Automobile pollut	<i>llution:</i> Effect 1 Effects –Greation sources an	ts of A eenhou d conti	Air Po ise eff rol –P	ollutior fect –(hotoch	n on huma Ozone dep nemical sm	n beings, plant letion, heat isl og –Future eng	ts and anim and, dust st ines and fue	als and orms – ls.		
			U	- TIV	IV					
<i>Air Pollution control:</i> Air Pollution control-at source – Equipment for control of air pollution – For particulate matter –Settling chambers–Fabric filters –Scrubbers –Cyclones Electrostatic precipitators, For Gaseous pollutants-control by absorption-adsorption scrubbers-secondary combustion after burners –Working principles advantages and disadvantages – Design criteria and examples.										
			U	NIT –	V					
<i>Air Quality Sampling and Monitoring:</i> Stack sampling – Instrumentation and methods of analysis of SO2, CO etc, – Legislation for control of air pollution and automobile pollution.										
Text Books:										
1. C.S. Rao, <i>Environmental Pollution Control Engineering</i> , New Age International publishers.										
2. H.S. Peavy, D.K. Kow & G. Ichobanoglous, <i>Environmental Engineering</i> , McGraw Hill International Edition										
3. Martin Crawford, <i>Air Pollution Control Theory</i> , TMH Publication.										
Reference Books:										
 H.C Parkins, <i>Air Pollution and Control</i>, McGraw Hill Publication. Wark, K., Warner, C.F., and Davis, W.T., <i>Air Pollution: Its Origin and Control</i>, Addison- 										

Wesley Longman. 1998.

3. Gurjar, B.R., Molina, L., Ojha, C.S.P. (Eds.), *Air Pollution: Health and Environmental Impacts*, CRC Press.

4. Boubel, R.W., Fox, D.L., Turner, D.B., Stern, A.C., Fundamentals of Air Pollution, Academic Press.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

	INDUSTRIAL ROBOTICS (IRT)									
VII Semeste	er: B. Tech						Sche	me: 2020		
Course Code	Category	Ho	ours/W	eek	Credits	Maxin	num Mark	5		
OEC403	OEC - III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional E	xam Duration	: 1 1/2	Hrs			End Exam l	Duration :	3 Hrs		
Course Outcomes : At the end of the course the student will be able to										
CO1: Understand the basic components of industrial robots.										
CO2: Under	CO2: Understand the types of End Effectors and Sensors in robots.									
CO3: Under	stand the Robot	t mani	pulator	, forwa	ard and inver	se kinematics.				
CO4: Under	stand the progra	ammir	ng meth	nods fo	r robots and	design considerat	ions of Rob	ot		
work	cell									
CO5: Understand the manufacturing and processing applications of robot.										
UNIT – I										
Fobot anatom feed-back cc and perman encoders), ve End Effecte other type o other miscel Machine Vis	robot anatomy, robot configurations, work volume, precession of movement, robot actuation and feed-back component, actuators, hydraulic actuators, electrical actuators (variable reluctance type and permanent magnet type stepper motor). Position sensors (potentiometer, resolvers, and encoders), velocity sensors (tachometer), power transmission devices. UNIT – II End Effectors and Sensors: Robot end effectors, types of end effectors, mechanical grippers, other type of grippers- Vacuum cups, magnetic grippers, adhesive grippers, Hooks, Scoops and other miscellaneous devices. Sensors in robotics- tactile sensors, proximity and range sensors,									
		~		UN	IT – III					
Robot Motio representatio three degree dimension, h	on Analysis and on, forward tran e of freedom nomogeneous tra	Contr sforma arm in ansforma	ol: Intration and two mation	nd reve dimen and ho	on to manipu erse transforr usions, four omogeneous IT – IV	lator kinematics, nation of two deg degree freedom transformation ma	position gree freedor manipulate atrix.	n robot arm ors in thre		
 Robot Programming: Methods of robot programming- Lead through- WAIT, SIGNAL and delay commands; The textual robot programming languages, robot language structures, constants, variables and other data objects, motion commands, end effectors, sensors commands and monitor mode commands. Robot cell design and control: Robot cell layout, work cell control, interlocks, error detection and recovery, graphical simulation of robot work cell. 										
UNIT – V										
Robot Applications in Manufacturing: Material transfer and machine loading and unloading general considerations in material handling.										
processing operations. Spot weiding, continuous are weiding, spruy counting, and other										
Text Books										

1. Mickel. P. Groover et. al, Industrial Robotics- Technology, Programming and Applications, McGraw Hill Publishers, New Delhi.

2. Deb S.R., Robotics Technology and Flexible Automation, TMH Publishers, New Delhi.

3. Richard D. Klafter, Robotic Engineering: An Integrated Approach, Pearson Publications.

Reference Books

K. S. Fu, Ralph C. Gonzalez and C.S.G. Lee, Robotics, control, sensing, vision, Mc Graw Hill.
 Rama chandran, Nagarajan, Introduction to Industrial Robotics, Pearson.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

QUALITY & RELIABILITY ENGINEERING (QRE)										
VII Semester:	B. Tech	1					Sche	me : 2020		
Course Code	Category	H	lours Weel	/ K	Credits	Max	ximum Mar	ks		
OEC 404	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exan	n Duration : 1.5	Hrs			End Exa	m Duration : 3 H	Irs			
Course Outcomes : At the end of the course students will be able to										
CO1: Understand the overview of the Total Quality Management system										
CO2: Understand concepts of customer satisfaction and employee involvement										
CO3: Apply the appropriate tools and techniques of continuous process improvement for controlling and improving quality										
CO4: Apply Quality Function Deployment and Bench Marking process for improving a product or process										
CO5: Understand concept of Reliability Engineering										
UNIT – I										
IntroductiontoT.Q.M.: IntroductiontoQuality; Evolutionof and basic approach to Total Qualit										
y Managemen	t;Leadershipcor	ncept	s;The	Sev	enhabitsc	ofhighlyeffective	people;Rol	eofTQM		
Leaders; Imple	ementation of T	QM;	Qual	lity o	council, q	uality statement	S			
				UNI	T – II					
CustomerSat	isfaction:Types	ofCu	stom	ers-						
InternalandEx	ternal;Customer	perc	eptio	nofq	uality; Fo	eedback & brief	discussion	on		
Information C	ollecting Tools									
Employee Inv	olvement: Maslo	ow's	hiera	rchy	of needs;	Types of Teams,	, Stages of t	eam		
development, Involvement	Common barrie	rs to	team	pro	gress, Tra	aining; Benefits	of Employe	e		
				UNI	T – III					
ContinuousP	rocessImprove	ment	:Intro	oduc	ction,Juro	ntrilogy,Improvo	ementstrate	gies;P-		
D-S-A cycle &	& Problem solvi	ng m	etho	1; Ba	asic conc	epts of Kaizen a	nd Six sigm	na quality		
control, Taguc	hi method, Qua	ality	circle	S						
Supplier Part	tnership: Introd	ducti	on, P	artn	ering, So	urcing, Supplier	· Selection,	Supplier		
Rating, Relationship Development										
Tools & Techniques of TQM : Pareto diagram, Cause & Effect diagram										
Benchmarking: Introduction, Benchmarking process										
Quality Funct	ion Deployment	t: Be	nefits	of Q	QFD, Hou	se of Quality				

UNIT – V

Reliability Engineering: Introduction, Failures & failure modes, Causes of failures

Design for Reliability: Designing for higher Reliability, Reliability & Cost

Component Reliability: MTTF, Time dependent hazard models – Exponential Distribution **System Reliability:** Systems with components- in Series, and in Parallel; Non-Series-Parallel systems

Redundancy Techniques: Introduction, Component & Unit Redundancy, Weakest link technique

Text Books:

1. Dale H. Bester field, Total Quality Management, Pearson Education, New Delhi

2. E. Balagurusamy, Reliability Engineering, TMH Publishers, New Delhi

3. M. Mahajan, Statistical Quality Control, DhanapatRai and Sons Publishers, New Delhi

Reference Books:

1. Douglas C. Montgomery, Introduction to Quality Control, John Wiley and Sons Publishers, New

York

2. N. Logothetis, Managing for Total Quality, From Deming to Taguchi, PHI Publishers, New Delhi

3. L.S. Srinath, Reliability Engineering, East West Press, New Delhi

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

		SM	ART C	GRID	TECHNOLO	GIES (SGT)			
VII Semester :	B.Tech							Scheme : 2020	
Course Code	Category	Hou	ars/We	eek	Credits	Ma	ximum Marl	KS	
OEC405	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	0	0	3	40	60	100	
Sessional Exan	n Duration : 1	¹ / ₂ Hrs					End Exam D	uration: 3 Hrs	
Course Outco	omes : At the e	nd of th	ne cour	se the	student will	be able to			
CO1: Understan	nd the basic con	ncepts,	compo	nents	and architect	ure of smart grid.			
CO2: Understan	nd the various r	neasure	ement t	echno	logies in sma	art grid.			
CO3: Understan	nd about battery	y techno	ology a	and en	ergy storage	in smart grid.			
CO4: Understand the Interoperability and control of power grid.									
CO5: Understan	CO5: Understand the cyber security issues in smart grid.								
					UNIT – I				
Introduction: Today's Gird versus Smart Grid, Rationale for smart Grid, Computational Intelligence, Power System Enhancement, Communication and Standards, Environment and Economics, Shareholders Roles and Function, Architecture, Functions of Components.									
				l	UNIT - II				
Sensors and Measurement: Sensors for Smart Grid, Monitoring and Measurement Technologies, PMU, Smart meters, Smart Appliances, Multi Agent Systems (MAS) Technology, Micro grid and Smart grid comparison, Wide Area Monitoring Protection and Control and SCADA.									
UNIT – III									
Energy Storage Batteries, Flow storage systems	e: Batteries, Fuel , super capacito	Cell a ors, Sim	nd hyd ulatior	lrogen 1 and 0	electrolytes, case studies	, Flywheel, Super	conduction m	nagnetic energy	
				J	J NIT - IV				
Interoperabilit Introduction - Interoperability Control of the P	y: State-of-the-Ar in the Smart C ower Grid, Sta	t-Interc Frid En ndards	operabi vironm - Appr	lity - nent - oach t	Benefits an Smart Grid I o Smart Grid	d Challenges of Network Interoper I Interoperability S	Interoperabil ability - Inter tandards	ity- Model for roperability and	
				1	UNIT - V				
Smart Grid Cyber Security: Cyber Security State of the Art- Cyber Security Risks - Cyber Security Concerns Associated with AMI- Mitigation Approach to Cyber Security Risks - Cyber Security and Possible Operation for Improving - Methodology for Other Users									
Text Books									
1. James Momo 2012.	oh, "Smart Grid	1: Fund	ament	als of	design and a	analysis", John W	iley & sons I	nc, IEEE press	
2. Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", John Wiley & Sons Inc, 2012.									
3. Lars.T.Berger, K.Iniewski, "Smart Grid: Applications, Communications & Security" Wiley India Pvt. Ltd, Reprint 2015.									
Reference Bool	ks								
1. Fereidoon P Academic P	. Sioshansi, "Sı ress, 2012.	nart Gr	rid: Int	egrati	ng Renewab	le, Distributed &	Efficient Ene	ergy",	

- 2. Clark W.Gellings, "The smart grid: Enabling energy efficiency and demand response", Fairmont Press Inc,2009.
- 3. Qi Huang, Shi Jing "Innovative Testing and Measurement Solutions for Smart Grid", John Wiley & Sons Inc, 2015.

Web References:

- 1. https://onlinecourses.nptel.ac.in/noc18_ee42/preview
- 2. https://www.smartgrid.gov/the_smart_grid/smart_grid.html
- 3. https://www.coursera.org/lecture/electric-power-systems/smart-grid-the-environment-aH8g0

Question Paper Pattern:

Sessional Examination: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

AR	TIFICIAL INT	ELLI	GENC	E & N	MACHINE	LEARNING (AI & ML)	
VII - Semester:	B. Tech						Sch	eme:2020
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks	
OEC 406	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exan	n Duration: 1 ½	Hrs				End E	xam Duration	:3 Hrs
Comme Orate or	A 4 41 1 - 4	241		<u> 1</u>		1 - 4 -		
Course Outcom	re how foundation	s laid	$\frac{\text{for Ar}}{\text{for Ar}}$	tificial	S will be ab.			
CO2: Analyze t	he search strategie	$\frac{15}{2}$ to fi	nd solu	tions t	o the proble	e ms by systematic	ally generating	new states
CO3: Understa	nd the machine le	earning	g conce	epts ar	d the main	steps in a typica	l machine learn	ning
CO4: Design a c	ligit image classifi	ier on 1	MNIST	datas	et	1 71		0
CO5: Analyze	various ML traini	ng mo	odels					
				UNI	T–I			
Introduction: W	hat Is AI? The F	ounda	ations of	of Art	ificial Intel	ligence		
Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of								
Environments, A	nd the Structure	of Ag	ents.					
				UNI	Γ–ΙΙ			
Uninformed Searc	ch Strategies: BF	S, DF	S, Dep	oth –lir	nited search	, IDA, Bidirect	ional search	
Informed (Heuristic	c) Search Strategi	es- Gi	reedy b	est-fir	st search, A	* search, Memo	ory-bounded he	uristic
search, Learning to	search better. He	euristic	e Funct	tions.				
Machine Learning	3			UNII	-111			
Introduction, Types	s of Machine Lea	rning	System	ns, Cha	allenges, Te	sting and Valida	ating.	
				UNI	ſ–IV			
Classification, Tra	ining a Binary C	lassifi	er, Perl	formar	nce measure	s, Multiclass cla	assification, Err	ror analysis,
End-to-End Mac	hine Learning P	put cia roject	assinca	ation				
Working with Rea	al data, Launch, N	Monito	or and l	Mainta	ain your sys	tem		
				TINIT	F X 7			
Tusining Madala I		Crack	li ant D	UNI	I – V	1 Decreasion I		
Regularized Linea	r Models, Logisti	i, Grac	ressior	escent 1	, Polynomia	al Regression, L	earning Curves	,
TextBooks:	, 8	0						
1.Stuart Russel Edition,201	ll and Peter Norv 0.Pearson Educa	vig, "A ation.	Artifici	al Inte	elligence:A	Modern Appro	oach",Third	
2. Aurelian Ge Flow:Concepts,	ron,"Hands-On M ,Tools,and Techn	Iachin iques	e Lear to build	ning v d Intel	vith Scikit-I ligent Syste	earn and Tenso ms",OReilly Pu	r blications,First	Edition,

2017

ReferenceBooks:

1.Elaine Richie Kevin Knight[2008],[3rdEdition],Artificial Intelligence,TMH

2. Oliver Theobald,"Machine Learning for Absolute Beginners", Second Edition, 2017

3. Miroslav Kubat, "An Introduction to Machine Learning", Springer, 2017

WebReferences:

1.<u>https://onlinecourses.nptel.ac.in/noc18_cs51</u>

2.https://www.geeksforgeeks.org/F-intelligence-an-introduction/

3. https://www.coursera.org/learn/python-machine-learning offered by University of Michigan

4. https://github.com/ageron/handson-ml.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam

DISTRIBUTED EMBEDDED SYSTEMS (DES)												
VII - Seme	ster : B. Tecl	h					Sc	heme: 2020				
Course Code	Category	Hours/	Week		Credits	Max	imum Marks					
OEC 407	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40 60 100						
Sessional l	Exam Durati	on: 1 ½	Hrs			End	Exam Duratio	n: 3 Hrs				
Course O	utcomes: At	the end	of the c	ourse	the studen	t will be able to						
CO1: Unde	erstand the rea	al time er	nvironm	ent ai	nd applicat	ions.						
CO2: Unde	CO2: Understand System architecture and design of Distributed Embedded Systems											
CO3: Unde	CO3: Understand inter task management and scheduling.											
CO4: Analyze the network connection of distributed systems												
CO5: Analy	COS: Analyze the working of multiple embedded devices in a distributed network											
	UNIT-I Real Time Environment: Real-time computer system requirements classification of real time systems											
Real Time	functional requirements temporal requirements global time, examples of real time systems,											
functional r	Tunctional requirements, temporal requirements, global time, examples of real time systems.											
					UNIT-II							
Distributed System Design: Need of distributed systems, System Architecture, compatibility, scalability and dependability.												
					UNIT-III							
System Sch task interact time-trigger	eduling: Inter tions, Schedu red architectu	r compon ling prob ire.	ient con olem - st	nmun tatic &	ication, tas & dynamic	k management, and scheduling – syster	l dual role of tin m design – valio	ne; inter lation –				
D: 11 1	<u>), 1 m</u>				UNIT-IV							
Distributed concepts, E	Networks: Ty thernet	ypes of n	etworks	s, con	nparisons, I	SO-OSI model, TC	CP/IP connection	ns. CAN				
					UNIT-V							
Case Studie trigger base	es: Bluetooth o d embedded a	controlle	d embeo ons.	dded	operations,	GSM based embed	lded operations	, and event				
Text Books	S:	1										
1. Hermann 2nd Edition	, Springer 20	l—Time s 11.	ystems	– Des	sign Princip	bles for distributed	Embedded App	lications,				
2. GlafP.Feiffer, Andrew Ayre and Christian Keyold, Embedded Networking with CAN and CAN open, Copperhill Media Corporation, 2008.												
Reference Books:												
1. Bernd Kl	einjohann, Ar	rchitectu	re and I	Design	n of Distrib	uted Embedded Sv	stems, Springer	· US,2013				
1. Wayne V	Volf, "Compu	iters as C	Compon	ents",	Second ed	ition, Morgan Kau	fmann, 2008.					
Web Refer	Web References:											
L												

- 1.https://www.coursera.org/specializations/real-time-embedded-systems
- 2. <u>https://onlinecourses.nptel.ac.in/noc20_ee98/preview</u>

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

		NATU	RAL L	ANGUA	GE PROC	ESSING (NLP)					
VI Semeste	r:B.Tech						S	cheme : 2020			
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks			
OEC 408	OEC-III	L	Т	Р	С	Continuous Internal Assessment	Continuous Internal Assessment				
		3	0	0	3	40	60	100			
Sessional E	xam Duration: 1	1½ Hrs				En	d Exam Du	ration: 3 Hrs			
Course Outcomes: At the end of the course the student will be able to											
CO1: Understand the importance of Text Wrangling, Cleansing and POS tagging.											
CO2: Develop a NLP application using the NLTK library.											
CO3: Implement Text classification algorithms using scikit-learn and NLTK.											
CO4: Under	rstand the basics	of loke	enizing	g text us	sing WordN	et.					
COS: Under	rstand the import	ance of	1 ext 1	eature e	xtraction pr	ocess.					
	UNIT – I										
Introduction to Natural Language Processing : Why learn NLP, Diving into NLTK, Text Wrangling and Cleansing, Sentence splitter, Tokenization, Stemming, Lemmatization, Stop word removal, Rare word removal, Spell correction, POS tagging, Named Entity Recognition (NER).											
UNIT – II											
NLP Applications: Building your first NLP application, Other NLP applications – Machine translation,											
Information retrieval, Speech recognition, Text classification, Information extraction.											
inclusion for the second for the sec											
UNIT – III Tout Classification: Machine Learning, Tout classification, Canadian, Netter, Device, Device											
Text Class		he Lear	ning,		issification,	Sampling – Nalv	ve Bayes, L	Jecision trees,			
algorithm, T	gradient descent ext clustering – 1	t, Logi K-Meai	stic re	egressio	n, Support	Vector Machin	es, The R	andom forest			
			10.	UN							
Tokenizing	Text and Wo	rdNet	Rasico	UN e: Intro	$\frac{11 - 1}{1}$	kenizing text int	o sentence	s Tokenizing			
sentences in Filtering sto lemmas and collocations	Tokenizing Text and WordNet Basics : Introduction, Tokenizing text into sentences, Tokenizing sentences into words, Tokenizing sentences using regular expressions, Training a sentence tokenizer, Filtering stop words in a tokenized sentence, Looking up Synsets for a word in WordNet, Looking up lemmas and synonyms in the WordNet, Calculating WordNet Synset similarity, Discovering word collocations.										
				UN	IT – V						
Feature Extraction : Bag of words feature extraction, Training a Naïve Bayes classifier, Training a Decision tree classifier, Training a maximum entropy classifier, Training scikit-learn classifiers, Measuring precision and recall of a classifier, Training a classifier with NLTK-Trainer.											
Text Books	:										
1. Natural Hardeniy	Language Proc ya by Packt 2016	essing:	Pytho	on and	NLTK, D	eepti Chopra, Ja	acob Perkir	ns, and Nitin			
2. Practical Systems O'Reily	l Natural Langu , Bodhisattwa Media, Inc, 2020	age Pr Majumo).	ocessii ler, Ai	ng: Ā (nuj Guj	Comprehens ota, Sowm	sive Guide to Bu ya Vajjala, Harsl	uilding Rea hit Surana	l-World NLP published by			

- 1. Daniel Jurafsky & James H. Martin, Speech and Language Processing, An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition, 2nd Edition, Pearson Education, 2009.
- 2. Tanvier Siddiqui, U.S. Tiwary, Natural Language Processing and Information Retrieval, Oxford Higher Education, 2008.
- 3. Daniel M. Bikel & Imed Zitouni, Multilingual Natural Language Processing Applications: From Theory to Practice, Pearson Publication, 2012.
- 4. Christopher D. Manning, and Hinrich Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

Web References:

- 1. <u>https://www.coursera.org/specializations/natural-language-processing</u>
- 2. https://www.udemy.com/course/speech-recognition-a-z-with-hands-onlearnkarts/
- 3. https://nptel.ac.in/courses/106105158

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	DESIGN THINKING (DTH)									
VII Semest	er: B. Tech						S	cheme : 2020		
Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	ks		
OEC 409	OEC-III	L	Т	P	С	Continuous Internal Assessment	End Exam	TOTAL		
Sessional F	vam Duration 1	5	0	0	3	40 Fn	60 d Exam Du	100		
Course Outcomes : At the end of the course the student will be able to										
CO1: Recognize the importance of Design Thinking										
CO2: Ident	ify the steps in De	esign T	hinkin	g proces	s					
CO3: Ident	ify the difference	betwee	en crea	tivity an	d innovatio	n				
CO4 : Eval	uate the value of	creativ	ity							
CO5: Forn	nulate specific pro	oblem s	stateme	ents of re	al time issu	ies				
UNIT – I										
Introduction to Design Thinking: Introduction to elements and principles of Design, basics of design-										
dot, line, shape, form as fundamental design components. Principles of design. Introduction to design										
thinking, history of Design Thinking, New materials in Industry										
UNIT – II										
Design Thinking Process: Design thinking process (empathize, analyze, idea & prototype),										
1mplementing	ng the process in	drivin	g inve	ntions, c	lesign think	ang in social inno	ovations. 10	ools of design		
uninking - p	erson, costumer,	journey	/ map,		T – III					
Innovation	• Art of innovat	ion D	ifforon	ce betw	$\frac{11 - 111}{200}$	tion and creativit	y role of	creativity and		
innovation	in organizations	Creativ	vity to	Innovat	ion Teams	for innovation N	Aeasuring th	he impact and		
value of cre	ativity.	Cieuti	vity to	mnovut			icusuing u	ie impuet und		
	5			UN	IT – IV					
Product De	esign: Problem for	ormatic	on, intr	oductior	to produc	t design, Product	strategies, I	Product value,		
Product plan	nning, product sp	ecificat	tions. I	nnovatic	n towards	product design Ca	se studies.	,		
				UN	IT – V					
Design Thi	nking in Busine	ss Pro	cesses:	Design	Thinking a	pplied in Busines	s & Strateg	ic Innovation,		
Design Thir	nking principles t	hat red	efine b	usiness -	- Business	challenges: Growt	h, Predictab	oility, Change,		
Maintaining	g Relevance, Extr	eme co	mpetit	ion, Star	ndardization	n. Design thinking	to meet co	rporate needs.		
Design thin	king for Startups	. Defin	ing an	d testing	Business 1	Models and Busin	ess Cases.]	Developing &		
testing prototypes.										
Text Books:										
1.Change by design, Tim Brown, Harper Bollins (2009)										
2 Design Thinking for Strategic Innovation, Idris Mootee, 2013, John Wiley & Sons										
Reference Books:										
1. Design	Thinking in the C	Classro	om by	David L	ee, Ulysses	press				

- 2. Rod Judkins, The Art of Creative Thinking, Rod Judkins, Hodder & Stoughton
- 3. Universal principles of design- William lidwell, kritinaholden, Jill butter.
- 4. The era of open innovation chesbrough. H

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/OR Type) in each section. The student shall answer one question from each section.

End Examination:

CLOUD, MICRO SERVICES & APPLICATION (CMSA)									
VII Semester:	B. Tech	TT					Sch	eme:2020	
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks		
OEC 410	OEC-III	L	Т	Р	С	Internal Assessment	EndExam	TOTAL	
		3	0	-	3	40	60	100	
Sessional E	Exam Duration:	1½ H	[rs			EndEx	xamDuration:3	8 Hrs	
	A / /1	1 0 1	1		1 4 111	11 /			
Course Out	comes: At the en	d of t	he cou	rse stu	dents will b	e able to	ges key techno	logies and	
its various delivery and deployment models.									
CO2: Devel	CO2: Develop and design an application using various tools in cloud environment.								
CO3:Acqui techni	re the basic and i	mpor	tant de	sign co	oncepts an d	isuse of web ap	oplication devel	opment	
CO4: Struct	ture simple pythc	on pro	oram f	or dev	eloping an a	nplication in c	loud		
CO5:Analy	ze the issue of cl	oud si	uch as	securit	ty, energy ef	ficiency and in	teroperability, a	and provide	
an insi	ght into future pr	rospec	ets of c	omput	ing in the cl	oud monitoring	g.	1	
UNIT– I									
Cloud Fund	Cloud Fundamentals-Cloud Service Components-Cloud Service, Deployment Models-Cloud								
components-G	uiding principle	with	respe	ect to	utilization,	Security, Price	ing- Applicatio	on of Cloud	
Computing. Ca	ase Study: Desig	n and	Imple	mentat	ion of Publi	c and Private C	Cloud Environm	ents – Open	
Stack and AW	S.								
				UN	IT–II				
ApplicationA	rchitectures -Mo	nolith	nic&Di	stribut	ed,Microser	viceFundamen	talandDesignAj	pproach-	
CloudNativeA	pplications-12Fa	ctors	App-A	pplicat	tionIntegrati	onProcessandA	PIficationProc	ess-	
APIFundamen	tal-Microservice	and	API N	/lanage	ement- Spr	ing Boot Fur	ndamental and	Design of	
Microservice -	API Tools - Dev	velope	er Porta	al-App	lications of	Micro service a	and API fication	1	
				UN	IT–III				
Devops funda	mentals - Devo	ps R	ole an	d Res	ponsibility-7	Fools and App	olications- Con	tainerization	
Process and Ap	plication-Evolut	ion of	f APP	Deplo	yment- Doc	ker Fundamen	tals - Docker A	Architecture-	
Docker Comma	nds. Case study	Orche	estratio	n, Kuł	ernetes, Do	cker Container			
				UN	IT–IV				
Cloud Securit	y-Cloud Securit	y Sha	ared R	espon	sibility Arc	hitecture-Secur	rity By Design	Principles-	
Identity And Access Management-Cloud Security Layers Illustration-Cloud Network, Host And Data									
Security Concepts-Security Operations and Major Cloud Service Provider Tools-Security Compliance									
and Regulations	s-Cloud Monitori	ing-Bo	enefits	of Clo	oud Monitor	ing-Overview of	of Cloud Monite	oring Tools.	
				UN	IT–V				

Developing and Deploying an Application in the Cloud- Building a python project based on Design-Development-Testing-Deployment of an application in the cloud using a development framework and deployment platform.

Case Study: Python Use case and Python Framework.

TextBooks :

- 1. Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, "Cloud ComputingConcepts, Technology & Architecture", PrenticeHall, 2013.
- GuoNingLiu, Qiang GuoTong, Harm Sluiman, AlexAmies, "Developing and Hosting Applications on the Cloud", IBMPress, 2012.
- 3. KaiHwang,GeofferyC.FoxandJackJ.Dongarra,"Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher,anImprintofElsevier,2012.
- 4. Rajkumar Buyya ,James Broberg Andrzej M.Goscinski , "Cloud Computing: Principles and Paradigms",Wiley,2011

Reference Books

- 1. Michael J. Kavis "Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS)", 1stEdition, Wiley, 2014.
- 2. AzureVirtual Machineshttps://docs.microsoft.com/enus/azure/virtualmachines/
- 3. GoogleApp Enginehttps://cloud.google.com/appengine#allfeatures
- 4. GoogleKubernetesEnginehttps://cloud.google.com/kubernetesengine#allfeatures
- 5. DockerTutorial:https://dockercurriculum.com

Question Paper Pattern

Sessional Exam

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

BLOCK CHAIN TECHNOLOGIES (BCT)										
VII Semest	er: B.Tech						S	cheme : 2020		
Course Code	Category	Но	ours/W	'eek	Credits	Max	imum Mar	ks		
OEC411	OEC-III	L	Т	Р	End Exam	TOTAL				
		3	0	0	3	40	60	100		
Sessional E	xam Duration 1	1½ Hrs				En	d Exam Du	ration: 3 Hrs		
Course Outcomes : At the end of the course the student will be able to										
CO1: Unde	erstand the basic	concept	ts of Bl	ockchai	n technolog	gy.				
CO2: Inter	pret the security a	and risk	s invo	lved in I	Blockchain	applications.				
CO3: Inter	pret the types of	Blockcl	hain ap	plication	ns and Bloc	kchain solutions.				
CO4: Under	rstand the proces	s of Eth	nereum	Blockel	hain Implei	nentation				
CO5: Under	rstand the proces	s of Hy	per led	ger Blo	ckchain Im	plementation				
	1	5	1	0						
				UN	IT – I					
Introduction	. Scenarios. Cha	llenges	Artici	ılated. I	Blockchain.	Blockchain Chai	racteristics.	Opportunities		
Using Blockchain, History of Blockchain, Evolution of Blockchain : Evolution of Computer										
Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain.										
Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks,										
Public Block	Public Blockchain Environments Type of Players in Blockchain Ecosystem Players in Market									

UNIT – II

Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.

UNIT – III

Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications

UNIT – IV

Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet

UNIT – V

Hyperledger Blockchain Implementation, Introduction, Use Case – Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application.

Text Books:

- 3. Ambadas, Arshad Sarfarz Ariff, Sham "Blockchain for Enterprise Application Developers", Wiley
- 2. Andreas M. Antonpoulos, "Mastering Bitcoin: Programming the Open Blockchain", O'Reilly

- 1. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill
- Mastering Bitcoin: Programming the Open Blockchain, 2nd ed., Antonopoulos, O'Reilly, 2017. ISBN: 978
- 3. Blockchain: Blueprint for a New Economy, Melanie Swan, O'Reilly
 - Web Resources
 - 1. NPTEL online course : https://nptel.ac.in/courses/106/104/106104220/#
 - 2.Udemy: https://www.udemy.com/course/build-your-blockchain-az/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	AGILE METHODOLOGIES (AM)									
VII Semest	er : B. Tech						S	cheme : 2020		
Course Code	Category	Но	ours/W	/eek	Credits	Max	imum Mar	ks		
OEC 412	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional E	xam Duration1 ¹	∕₂ Hrs				En	d Exam Du	ration: 3 Hrs		
Course Out	tcomes :At the er	nd of th	e cours	se the stu	<u>ident will b</u>	e able to		1		
COI: Unde	rstand the import	ance of	1ntera	cting wi	th business	stakeholders in de	etermining t	he		
CO2. Analy	<u>s for a software s</u>	ystem vare de	velonn	pent prod	resses how	to plan them how	v to execute	them		
CO3: Identi	ify the impact of	social a	spects	on softy	vare develo	pment success.				
CO4: Unde	rstand Software r	process	impro ^v	vement a	as an ongoi	ng task for develo	pment team	s.		
CO5: Analyze the Agile Metrics and Quality Assurance Activities										
	UNIT – I									
AGILE METHODOLOGY: Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values										
	-			UN	IT – II					
AGILE PROCESSES: Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.										
				UN	III – III					
AGILITY Making - Acquisition Managing S Sharing – R	AND KNOWL Earl_S Schools , Refinement, D oftware Knowle ole of Story-Carc	EDGE of K istribut dge – C ls – Sto	MAN M – ion, D Challen ory-Car	AGEM Institutio Deploymo Iges of M rd Matur	ENT: Agi onal Know ent , Leve Migrating to ity Model (le Information Syledge Evolution raging – KM in Agile Methodole SMM).	ystems – A Cycle – Software I ogies – Agi	gile Decision Development, Engineering – le Knowledge		
				UN	IT – IV					
AGILITY Agile Pract Requirement Agile Envir Concurrence	AGILITY AND REQUIREMENTS ENGINEERING: Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.									
				UN	$\mathbf{IT} - \mathbf{V}$					
AGILITY AND QUALITY ASSURANCE: Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development – Agile Approach in Global Software Development.										
Text Books:										
1. David J. Anderson and Eli Schragenheim, —Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.										
2. Hazza a Science	 Hazza and Dubinsky, —Agile Software Engineering, Series: Undergraduate Topics in Computer Sciencel, Springer, 2009. 									

1. Craig Larman, —Agile and Iterative Development: A Manager_s Guidel, Addison-Wesley, 2004.

2. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Managementl, Butterworth-Heinemann, 2007.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	AUGMENTED REALITY & VIRTUAL REALITY (ARVR)									
VII Semest	er : B. Tech						S	cheme : 2020		
Course Code	Category	Но	ours/W	/eek	Credits	Max	imum Mar	ks		
OEC 413	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional E	xam Duration1	² Hrs				En	d Exam Du	ration: 3 Hrs		
Course Out	tcomes :At the er	nd of th	e cours	se the st	udent will b	e able to				
COI: Explo	ore the history of	spatial	compu	iting and	design inte	eractions				
function .										
CO3: Learn	CO3: Learn Virtual reality animation and 3D Art optimization.									
CO4: Demo	onstrate Virtual re	eality		_	1					
CO5: Introd	luce to the design	n of vis	ualizati	ion tools	5					
				UN	I – TI					
Designing a	nd Art Across Dig	ital Rea	alities:	Introduc	tion, Modal	ities, Types of con	nmon HCI m	odalities, New		
Modalities,	The current state	of mod	alities	for spat	ial computir	ng Devices, current	t controllers	for immersive		
computing sy	stems, Voice, Har	nds and	Hardwa	are input	s over the n	ext generation.				
Designing for our senses, not our devices: Envisioning a future sensory technology. The Role of women in Al										
Sensory Design Five sensory Principles Adobes' AR										
Sensory Design, rive sensory randiples, Adobes Art.										
				UN	IT – II					
Virtual Reali	ty of Art: A more n	natural v	vay of r	making 3	D art, VR for	animation				
3D Art Optir	nization: Introduc	ction, D	raw Cal	ls, Using	VR Tools fo	r creating 3D Art, A	Acquiring 3D	Models Versus		
Making them	n from scratch.									
				UN	IT – III					
Computer vi	sion that makes a	augmen	ted rea	ality Pos	sible works:	History of AR, Ho	w and why t	o select an AR		
Platform, Ma	apping, platforms,	other D	evelopr	ment con	siderations,	The AR Cloud				
Virtual Reali	tv and Augmented	d Reality	v – cros	ss- platfo	orm theory:	Why cross platform	. The role of	game engines.		
understandir	ng 3D Graphics, Po	rtability	lesson	s from vi	deo game de	esign, simplifying th	e controller i	nput.		
					-					
				UN	$\Gamma - IV$		6 · · · - · · ·	<u></u>		
Virtual Reali	ty Toolkit: What is	VRTK, H	listory,	Steam V	R Unity Tool	kit, VRTK v4, future	e of VRTK, suc	cess of VRTK		
Three Virtua	l Reality and Augr	nented	Reality	Develop	oment Best I	Practices: Handling	Locomotion,	Locomotion in		
VR, Locomo	tion in AR, Effect	ive use	of Au	dio, Aud	io in VR, A	udio in AR, Comm	non interacti	on paradigms,		
Inventory of VR, Augmented Reality Raycasts										
UNIT – V										
VIII = V										
	nachine learning	visuall		Design	anu Develo	pinent in spatial	computing:	development		
	ig uata visudiizatio	n, princ	ipies ic I mach	ing loom		rearring visualization	ni uesigli alli	uting 2D data		
in spatial CC	mputing, why do	ala dilu	i mach		ing visualiz			unig, ZD Uald		

visualization vs 3D data visualization in spatial computing, interactivity in data visualizations and in spatial computing, animation, failures in data visualization, good data visualization design optimize 3D spaces, data representations, info graphics, and interactions, defining distinctions in data visualization and big data for machine, how to create data visualization: data visualization creation pipeline, webXR, data visualization industry use case examples of data visualization, 3D reconstruction and direct manipulation of real world data, data visualization is for everyone, hands on tutorials, how to create data visualization is for everyone, hands on tutorials, how to create data visualization, resources.

Character AI and Behaviors: Introduction, behaviors, current practice: Reactive AI, more intelligence in the system, Deliberative AI, machine learning.

Text Books:

1. Erin Pangilinan, Steve lukas, and Vasanth Mohan, "Creating Augmented & Virtual Realities", 1st edition, O'REILLY, 2019.

Reference Books:

1. Steve Aukstakalnis, "Practical Augmented Reality", Pearson Education, 2017

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

COMPOSITE MATERIALS (CM)									
VII Semeste	er: B. Tech					1	Sche	eme: 2020	
Course Code	Category	Ho	Iours/Week		Credits	Maximum Marks			
OEC 414	OEC – IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	0	0	3	40	60	100	
Sessional E	Exam Duration	: 1 ½	Hrs			End Exam	Duration :	3 Hrs	
Course Outcomes : At the end of the course the student will be able to									
CO1: Identi	fy the properties	s of fil	per and	matrix	materials us	sed in commercia	l composite	s,	
and its	s manufacturing	techn	iques.				1	,	
CO2: Under	rstand manufact	uring	nethod	ls and t	heir elastic p	properties of lamin	na.		
CO3: Analy	ze the Hooke's	law fo	or diffe	rent ty	be of materia	ls.			
CO4: Under	rstand the elastic	e beha	vior of	the un	idirectional c	composite			
CO5: Analy lamin	ze a laminated _j a.	plate in	n bendi	ing, inc	luding findi	ng laminate prope	erties from		
				UN	I – TIV				
Keinforcements: Fibers- Glass, Slifca, Kevlar, carbon, boron, slifcon carbide, and boron carbide fibers. Particulate composites, Polymer composites, Thermoplastics, Thermosets, Metal matrix and ceramic composites UNIT – II Manufacturing methods: Autoclave, tape production, moulding methods, filament winding, hand layup, pultrusion, RTM . Micromechanics: Unidirectional composites, constituent materials and properties, elastic properties of a lamina, properties of typical composite materials, laminate characteristics and configurations. Characterization of composite properties UNIT – III Coordinate transformations: Hooke's law for different types of materials, Hooke's law for two dimensional unidirectional lamina, Transformation of stress and strain, Numerical examples of									
				UN	IT – IV				
Elastic behaviour of Unidirectional Composites: Elastic constants of lamina, relationship between engineering constants and reduced stiffness and compliances, analysis of laminated composites, constitutive relations. UNIT – V Analysis of laminated composite plates: Introduction, thin plate theory, specially orthotropic plate cross and angle ply laminated plates problems using thin plate theory									
, cross (and angle ply la	·····	- piuc	, prot	i i i i i i i i i i i i i i i i i i i				
Text Books 1. R.M.Jone 2. Isaac and 3. Madhujit N Reference F	s, Mechanics of M.Daniel, Engi Mukhopadadhya Books	[°] Comp neerin ly, Me	oosite N g Meel chanics	Materia hanics s of con	ls Mc Graw of Composite mposite mate	Hill Company, N e Materials, Oxfo erials and structur	ew York. rd Universi es, Universi	ty Press. ities Press	
ACTUICUTURU I	JOUNS								

1. L. R. Calcote, Analysis of Laminated Composite Structures , Van Nostrand Rainfold

2. B. D. Agarwal and L. J. Broutman, Analysis and performance of fibre Composites, Wiley Interscience, New York

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

IMAGE PROCESSING (IP)									
VII Semester :	B. Tech						Sc	heme : 2020	
Course Code	Category	gory Hours/Week Credits Maximum Marks				ks			
OEC 415	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	0	0	3	40	60	100	
Sessional Exar	n Duration : 1	¹ / ₂ Hrs		.1	. 1	End	Exam Dur	ation: 3 Hrs	
Course Outc	omes : At the e	$\frac{1}{10000000000000000000000000000000000$	he cour	se the	student will	be able to	.1 .	6	
digital images.									
CO2: Understa	nd the image er	nhancer	nent in	spatia	al and freque	ncy domain.			
CO3: Understa	nd various imag	ge resto	oration	techni	ques.				
CO4: Understa	nd various imag	ge com	pressio	n and	segmentation	n techniques.			
CO5: Understa	nd the various 1	mathen	natical	transfo	orms , color i	mage concepts an	nd processir	ng.	
				UN	$\mathbf{IT} - \mathbf{I}$				
Basic Concept	s Definition, Ap	pplicati	ons of	Digita	l Image Proc	essing, Fundame	ntal Steps, (Components	
of Image Proce	ssing System, F	luman	Visual	Syster	m, Simple In	hage Formation N	lodel, Imag	e Sampling	
And Quantizati	on, Spatial and	Gray L	evel R	esolut	ion, Image Ii	nterpolation, Som	e Basic Rel	ationships	
Between Pixels	, Linear And N	on Line	ear Ope		IS.				
Imaga Enhana				UN	11 - 11				
Spatial Doma Logical And A Smoothing And Frequency Do Fundamental S Sharpening Fre	 Spatial Domain: Basic Gray Level Transformations, Histogram Processing, Enhancement Using Logical And Arithmetic Operations, Image Subtraction, Image Averaging, Basic of Spatial Filtering, Smoothing And Sharpening Spatial Filters, Combining Spatial Enhancement Methods. Frequency Domain: Introduction to Fourier Transforms, Basics of Filtering in Frequency Domain, Fundamental Steps in Filtering in Frequency Domain, Smoothing Frequency Domain Filters, Combining Spatial Filters, Combining Spatial Filters, Combining Spatial Enhancement Methods. 								
	queney Domain		<i>s</i> , 110111		T - III	•			
Image Restora Presence of No Domain Filterin Filtering, Least	tion Model of l ise Only-Spatia ng, Linear Posit Mean Square F	Image 1 1 Filter ion Inv Filters, 9	Degrad ing, Ac ariant I Constra	ation/l laptive Deriva	Restoration M Filters, Peri tions, Algeb Least Square	Model, Noise Mod odic Noise Reduc raic Approach to s Restoration.	dels, Restor ction by Fre Restoration	ation In quency , Inverse	
				UN	IT - IV				
Image Compre Compression M Coding, Lossler coding	Image Compression File format (bmp, tiff, pcx, gif, jpeg.), Compression fundamentals, Image Compression Models, Error Free Compression: VLC, Arithmetic Coding, LZW coding, Bit plane Coding, Lossless Predictive Coding, Lossy Compression: Lossy Predictive Coding, Block Transform coding								
Image Segmen	tation Fundam	entals,	Detect	ion of	Discontinuit	ies: Point, Line, I	Edge detecti	on, Edge	
Linking and Bo	oundary Detection	on: Loo	cal Proc	cessing UN	g, Global Pro IT - V	ocessing via Houg	gh Transform	n.	
Image Transfo	orms Introduction	on One	and Ty	wo Di	mensional D	iscrete Fourier Tr	ansform (D	FT),	
Properties of DFT, Properties of Discrete cosine and sine transforms, Properties of Slant, KL transforms									
Color Image P	rocessing Cold	or fund	amenta	ls. Co	lor models. I	RGB. CMY and C	MYK HS	. Converting	
colors, RGB to	HIS, HIS to R	GB ma	nipulat	ing H	IS componen	it images, Pseudo	color Imag	e	
Processing, Ful	l Color Image I	Process	ing.						
Text Books									
1. Rafael Go publications	onzalez & Rio s, 2012	chard	Woods	s, —l	Digital Imag	ge Processing ^{II} ,	3rd Editio	on. Pearson	

2. Anil K. Jain, —Fundamental of Digital Image Processing, PHI publication, 2013.

3. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, —Digital Image Processing^{II}, Mc. Graw Hill, 2011.

Reference Books

1. Pratt, —Digital Image Processing, 2nd Edition, Wiley Publication, 1991.

2. S. Sridhar, —Digital Image Processing, Oxford University Press, 2011.

Web References:

1. https://nptel.ac.in/courses/117105079/

2. https://nptel.ac.in/courses/117104069/

3. https://nptel.ac.in/courses/106105032/

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

MOBILE COMPUTING (MC)									
VII Semest	er : B. Tech						S	cheme : 2020	
Course Code	Category	He	ours/W	/eek	Credits	Maximum Marks			
OEC 416	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	xam Duration1	<u>2 Hrs</u>				En	d Exam Du	ration: 3 Hrs	
Course Out	Course Outcomes : At the end of the course the student will be able to								
1G to $5G$	arn about the mo	one infi	rastruc	ture, rad	110 resource	management, ove	rview of ge	neration	
CO2: To ill	ustrate the location	on man	ageme	nt invol	ved in GSM	I. Mobile IP.			
CO3: To ill	ustrate the transn	nission,	, transa	ction te	chnology in	volved in mobile.			
CO4: To ex	plore the wireles	s netwo	ork in r	nobile.					
CO5: To dis	scover the cognit	ive rad	io netw	vorks in	mobile				
				UN	I – TIN				
Introductio	n Overview of	f wirel	ess an	d mobil	le infrastru	cture, Preliminary	concepts	on cellular	
architecture.	, Design objectiv	ves and	l perfo	rmance	issues, Rac	lio resource mana	agement and	d interface,	
Propagation	and path loss m	iodels,	Chann	el interf	erence and	frequency reuse,	Cell splittin	ig, Channel	
assignment	strategies, Overv	iew of	genera	tions:- 1	G to 5G				
T (* A		π						1 1/1 D)	
Mobility ma Activity base based group update, Rep Movement, Location ma performance vertical).	Mobility models characterizing individual node movement (Random walk, Fluid flow, Markovian, Activity based), Mobility models characterizing the movement of groups of nodes (Reference point based group mobility model, Community based group mobility model), Static (Always vs. Never update, Reporting Cells, Location Areas) and Dynamic location management schemes (Time, Movement, Distance, Profile Based), Terminal Paging (Simultaneous paging, Sequential paging), Location management and Mobile IP, Overview of handoff process, Factors affecting handoffs and performance evaluation metrics, Handoff strategies, Different types of handoffs (soft, hard, horizontal, warticel)								
				UN	IT – III				
Wireless T spectrum, F Introduction SDMA), Wi	Wireless Transmission Fundamentals Introduction to narrow and wideband systems, Spread spectrum, Frequency hopping, Introduction to MIMO, MIMO Channel Capacity and diversity gain, Introduction to OFDM, MIMO-OFDM system, Multiple access control (FDMA, TDMA, CDMA, SDMA), Wireless local area network, Wireless personal area network (Bluetooth and zigbee).								
XX/0 1		A 1 1				• .• • •			
Wireless Network Mobile Ad-hoc networks - Characteristics and applications; Coverage and connectivity problems, Routing in MANETs, Wireless sensor networks - Concepts, basic architecture, design objectives and applications; Sensing and communication range, Coverage and connectivity, Sensor placement, Data relaying and aggregation, Energy consumption, Clustering of sensors, Energy efficient Routing (LEACH).									
				UN	IT – V				
Cognitive I sensing, Spo networks, I Introduction	Radio Networks ectrum sharing, introduction to to the radio	s Fixe Interop D2D resourc	ed and erabili commu e mar	dynam ty and o unication nagemen	ic spectrum coexistence ns-High lev nt, power o	n access, Direct issues, Applicati vel requirements control and mod	and indirec ons of cogr for 5G a e selection	t spectrum nitive radio rchitecture, problems,	

Millimeter wave communication in 5G.

Text Books:

- 4. Jochen Schiller, "Mobile Communications", Second Edition, Pearson, 2004.
- 5. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2005

Reference Books:

1. Theodore Rappaport, "Wireless Communications: Principles and Practice", Pearson Education, 2014.

2. Ezio Biglieri, MIMO, "Wireless Communications", Cambridge University Press, 2009.

3. Ivan Stojmenovic, "Handbook of Wireless Networking and Mobile Computin", Wiley, 2002.

4. James Cowling, "Dynamic Location Management in Heterogeneous Cellular Networks", 2004.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	ENTERPRISE SYSTEMS (ES)										
VII Semest	er : B. Tech						S	cheme : 2020			
Course Code	Category	Но	ours/W	eek	Credits	Maximum Marks					
OEC 417	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration1 ¹ /	² Hrs				En	d Exam Du	ration: 3 Hrs			
Course Outcomes :At the end of the course the student will be able to											
CO1:Under	stand basic eleme	ents of	Enterp	rise Sys	tems						
CO2:Devel	op skills in under	tion na	ig arch	llecture							
CO4:Under	stand the integrat	tion and	1 natter	ms							
CO5: Analy	ze the deployme	nt	a patter	115							
				UN	I – TIV						
Introduction to Modern Enterprise Systems : Introduction to enterprise systems. Elements of enterprise systems – Business Information system, Decision support systems, Knowledge management systems, Financial and human resource systems. Kinds of Enterprise systems- B2C and B2B models. Components of Enterprise systems: Channels (Mobile, web, desktop, partner integration), Data management workflow Controlling and Auditing Accounting etc.											
			_	UN	II – II	-					
Key charac Collaboratio Enterprise oriented, mi	cteristics Enterpon, Data transform System archite cro service, and c	nation. ctures	y stems : Batcl rchitec	: Distrib h proces tures.	outivity, M ssing, Mon	anaged redundand	vy, Exceptio ver, ecomn	n processing, nerce, service			
				UN	IT – III						
Introduction Service orien Application Presentation	Introduction to Enterprise Application architectures: Layer Architecture, Event driven Architecture, Service oriented Architecture, Micro service architecture, Plug-in architecture. Application architecture Patterns: Layering, Organizing domain logic, Mapping to database, Web Presentation, Concurrency.										
				UN	IT – IV						
Enterprise Application Integration: Introduction to Enterprise Integration, different integration styles. Elements of messaging-based Integration. Enterprise Integration patterns: Modern service integration techniques. Introduction to WSDL, SOAP Introduction RESTENT webservices integration. Differences between SOAP and REST											
UNIT – V											
Deploymen Security, av Introductio architecture	Deployment of Enterprise applications: Key requirements in deployment - Stability, capacity, Security, availability, Network, Availability, and Transparency (Basic Introduction only). Introduction to Enterprise Architecture: Importance of Enterprise Architecture. Enterprise architecture models. Zachman Framework, TOGAF Framework.										
Text Books	:										

- 1. Ralph Stair, George Reynold, "Principle of Information Systems", 10 ed.
- 2. Martin Fowler et al, "Pattern of Enterprise Application Architecture", Addison-Wesley, 2012
- 3. Gregor Hohpe, Bobby Woolf, Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions,

- 1. Mark Richards, Software Architecture patterns, 2015, O'Reilly.
- 2. Sam Newman, "Building Microservices", 2015, O'Reilly.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		MOI	DERN	WEB A	PPLICATIO	ONS (MWA)				
VI Semeste	r: B. Tech						S	cheme : 2020		
Course Code	Category	Но	ours/W	eek	Credits	Maximum Marks				
OEC 418	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
								100		
Sessional E	xam Duration:	1½ Hrs	5		1	En	d Exam Du	ration: 3 Hrs		
Course Out	tcomes: At the en	nd of th	e cours	se the st	udent will b	be able to				
CO2: Develop a Web Deservoir a the UTML 5										
CO2: Dev	v CSS effectively	v to cre	ate inte	eractive	websites					
CO4: Impl	ement client-side	scripti	ng usir	ng JavaS	cript to des	ign dynamic webs	sites.			
CO5: Deve	elop end to end a	oplicati	on - we	eb fronte	end and bac	kend developmen	t.			
		. 1		UN	I – TIV	*				
Introduction websites: St and Web P Tier Model,	Introduction to Internet & World Wide Web: Concept of website, its need and purpose, Types of websites: Static and dynamic website, Web Browsers, – Web Servers, Uniform Resource Locator, Tools and Web Programming Languages. Web Standards, Tiered Architecture: Client Server Model, Three Tier Model Service Oriented Architectures PEST services Introduction to HTML_XML_ISON									
				UN	II – II					
Hyper Tex formatting t and Externa Cascading sheet, Intern	Hyper Text Mark Up Language: - Languages used for website development, HTML5: basic tags, formatting tags, Adding images, Lists, Embedding multimedia in Web pages, Inserting tables, Internal and External Linking, Frames, Forms UNIT – III Cascading Style Sheets (CSS3): Basics of Cascading Style sheets, Advantages of CSS, External Style									
,						, , ,	, 0			
Java Scrint	+ Features of Jav	aScript	evten	UN sion of	II – IV IavaScript	Syntax of JavaSci	rint: data tur	hes operators		
variables, ta Iterative sta	g, Document Ob tement: for, for/in	ject Mo n, while	odel (D e, do w	OM) wi hile, bre	th JavaScri ak and cont	pt, Selection State	ement using	if and Switch,		
				UN	IT – V					
Front End Introduction Scopes, Dire	Front End Framework : Introduction to jQuery - Syntax, Selectors, Events, Traversing, AJAX ; Introduction to Bootstrap – Basics, Grids, Themes ; Angular JS – Expressions, Modules, Data Binding, Scopes, Directives & Events, Controllers, Filters, Services, Validation									
Back End Technologies: Introduction to RESTful services, Resources, Messages (Request, Response), Addressing, Methods – (GET, POST, PUT, DELETE)										
Text Books	:									
1. Deitel an Edition,	nd Deitel and Nie 2011.	eto, —I	nternet	and Wo	orld Wide V	Veb - How to Prog	gram ^I , Prent	ice Hall, 5th		
2. HTML5	Black Book,2nd	Editio	n, Drea	umtech F	Press,2016.					

- 3. HTML & CSS: Design and Build Websites, Jon Duckett, John Wiley & Sons
- 4. RESTful Web Services: Leonard Richardson, Sam Ruby, May 2007

- 1 Web Technologies, Uttam K. Roy, Oxford Higher Education., 1st edition, 10th impression, 2015.
- 2. Robert Pattinson, Beginners Guide for HTML and CSS Web Design and Web Development, 2018
- **3** Jeffrey C and Jackson, —Web Technologies A Computer Science PerspectivePearsonEducation, 2011.

4. Gopalan N.P. and Akilandeswari J., —Web Technology, Prentice Hall of India, 2011.

Web References:

1. https://www.tutorialspoint.com/Html/index.htm

2. https://www.w3.org/Style/CSS/

- 3.Bootstrap CSS Framework: <u>https://getbootstrap.com</u>
- 4. https://docs.angularjs.org/api/ng/function/angular.element

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		CC	GNIT	IVE R	ADIO (CR	R)					
VII - Semester: B.	Гесh						Sche	me:2020			
Course Code	Category	Hours/Week		Credits	Maximum Marks						
OEC 419	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOT AL			
		3	-	-	3	40	60	100			
SessionalExamDura	essionalExamDuration:1 ½ Hrs. End Exam Duration: 3 Hrs.										
Course Out comes: A	At the end of the architecture	he cour	rse the s	studen	t will be abl	e to	n				
C02: Analyze the A	ware and Adar	of SDI	onitive	radio		icensed spectrul	11.				
CO3: Analyze the st	pectrum aware	ness a	nd inter	ferenc	e avoidance	2					
CO4: Understand te	chnical challer	nges in	CR and	d vario	ous spectrun	n sensing metho	ds.				
CO5: Analyze the C	FDM based C	Cognitiv	ve radio	and N	/IMO-OFD	M channel estin	nation				
				UNI	Г-І						
Software defined R Management – Mana development– Cognit	adio: Basic s iging unlicen ive wave form	SDR - sed sp develo	- Softw ectrum- opment	are ar -Noise	nd Hardwar Aggregatio	re Architecture on-Component	of an SDR – development–W	Spectrum ave form			
				UNIT	-II						
Spectrum Awarenes Introduction, TheInter Creating Spectrum analysis, Distributed s	s: ferenceavoida Awareness-Sp sensing and op	ncepro pectrum peratior	blem,C n usage n, Chann	UNIT ognitiv e repo nel aw	-III veRadioRol orting, Spe- areness and	e,Spectralfootpr ctrum sensing, multiple signals	intminimization Potential Inte s in space	l, rference			
Cognitive Radio tech Design Challenges a	nnical challen	ges an	d spect Hardwar	rum s	ensing: irements-H	idden primary u	ser problem-				
Detecting spread spe	ectrum primary	v users	-Sensin	g dura	tion and fre	quency-Security					
	1 5	,		<u>UNIT</u>	'-V	1 5 5					
Spectrum sensing Spectrum sensing ov stationary based sensi sensing methods.	verview – Cla ing –Energy d	ussifica letector	tion -	Match sensin	ed filter – g –Radio Io	waveform base dentifier– Coope	ed sensing – c erative sensing-	yclo- other			
I CAU DOUKS:				. c+							
1.BruceA.Fetti,-0 2.H.Arslan-Cogn	Cognitive Radi itiveRadio,SD	iotechn RandA	ology", daptive	, 1 st Edi Wirele	ition,Elsevie ss <i>Systems</i> ,S	er. Springer,2007.					
References:											
1.K.C.Chen, R.Prasad 2.J. H. Reed, —Softw 3. Paul Burns, —Soft	l , —Cognitive vare Radiol, Pe ware defined r	e Radio earson, eadio fo	o Netwo 2004. or 3Gll, 4	orks∥,` Artech	Wiley, 2009 House, 200).)3.					
WebReferences:											

1.https://nptel.ac.in/courses/108107107/3

2.https://www.youtube.com/watch?v=hzxgDyXbpt4

3.https://www.youtube.com/watch?v=z-E5jIoUFbA

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ORType)ineachsection. The studentshallans wero nequestion from each section.

End Examination:
	A	AUTC	MAT	ION &	& CONTR	OL (AMC)					
VII Semester :	B. Tech						Sche	me : 2020			
Course Code	Category	Hours/Week Credits Maximum Marks									
						Continuous					
OFC 420	OFC- IV	L	Т	Р	С	Internal	End Exam	TOTAL			
OEC 420	OEC-IV					Assessment					
	3 0 0 3 40 60 100										
Sessional Ex	am Duration : 1	1 ½ H	rs			End E	Exam Duration	: 3 Hrs			
		1 0									
Course Outc	omes : At the en	$\frac{d \text{ of } t}{d}$	he cou	rse the	$\frac{1}{2}$ student wi	Il be able to					
COI: Unders	stand the element	$\frac{\text{ts of } a}{\sqrt{2}}$	utoma	<u>tion p</u>	orinciples	· · ·					
CO2: Under	stand the constru	lction	and w	orking	; of pneuma	atic systems					
CO3: Under	stand the workin	g of h	ydraul	$\frac{10 \text{ syst}}{10 \text{ syst}}$	tems						
CO4: Under	stand various con	<u>itrol t</u>	echniq	$\frac{\text{ues in}}{1}$	automation	$\frac{1}{1}$					
CUS: Under	stand the automa	ited te	sting a	nd ins	pection met	thods in industi	У				
A utomotion in	Manufaduuina	- T d-		UI Lutur	duction Ax		- du sti su sustau	Duinsinlag			
Automation in	f outomation Da	g Inal	istries	: Intro	auction- Al	itomation in pro	oduction system	functions			
I and strategies of	automation, Ba	tod flo	ements	s or an	transfor mo	system, Advan	veis of transfor	lines			
without storage	Automated flox	v line	s with	s anu storag	e buffers	chamsins, Ana	lysis of transfer	lines			
without storage	, Automated nov		5 WILLI								
Pneumatic Sys	tems: Introducti	on to	nneum	atic s	vstems: adv	antages and lin	nitations, applic	ations			
structure and si	gnal flow of pne	umati	c syste	ms: pi	neumatic po	wer pack: air 9	reneration and d	istribution.			
air reservoir. co	Instructional deta	ails an	d work	cing of	f filter. lubr	icator, pressure	regulator. actu	ators.			
direction control	ol valves, check v	alves	, flow	contro	ol valves, pr	eumatic counte	er.	,			
Symbols of pne	eumatic valves, t	traver	se time	e diag	ram, design	of manually o	perated circuits	s: direct and			
indirect control	of actuators, cor	ntrol c	of singl	e and	multiple ac	tuators.	-				
				UN	IT - III						
Introduction to	o Hydraulic syst	tems:	Advar	ntages	and limitati	ions, physical p	principles of oil	hydraulics,			
hydraulic powe	r pack, hydraulic	e fluid	s, filte	rs, typ	es of hydra	ulic pumps, pu	mp performance	e			
calculations, ho	se size calculation	ons, h	ydrauli	ic actu	ators and ad	ccessories, accu	umulator, hydra	ulic valves,			
pressure contro	l valves, flow co	ntrol	valves,	open	-center and	closed-center h	ydraulic system	ıs.			
				UN	IT - IV						
Control Techn	ologies in Autor	matio	n: Ind	ustrial	Control Sy	stems, Process	Industries Vers	es Discrete-			
Manufacturing	Industries, Conti	nuou	s Verse	es Dise	crete Contro	ol, Computer Pi	rocess Control a	and its			
Forms. Comput	ter Based Industr	ial Co	ontrol:	Introd	uction & A	utomatic Proce	ss Control, Bui	lding			
BIOCKS OF AULO	mation System:	LAN,	Analo	g & D		lodules, SCAD	A System & K	10.			
Automated Inc	mation and Ta	sting	Incno	otion	nd tosting	Statistical Qual	ity Control Au	tomated			
Inspection Prin	ciples and Metho	ode S	ensor]	Cechno Cechno	logies for /	Statistical Qual Automated Insr	ection Coordin	ate			
Measuring mac	hines Other Cor	ntact I	nspect	ion M	ethods Mac	chine Vision O	other ontical Ins	nection			
Methods	lines, other cor	itaet i	nspeer		culous, wia	chine vision, o	ther optical ms	peetion			
ivietheus.											
Text Books :											
1. Mikell-	PGroover "Auto	omati	on-Pro	ductio	n-Systems-	and-Computer-	-Integrated-				
Manufa	cturing"-Ed-4-20)1 <u>5, P</u>	earson	publi	shers						
2. Majumo Delhi.	lar S.R., "Pneun	natic	Systen	ns Pri	nciples and	Maintenance"	, Tata McGrav	v Hill, New			
3. Peter C	roser and Frank	Ebel,	"Pneu	matics	s Basic Lev	el TP 101" Fe	sto Didactic GN	MBH & Co,			

Germany.
4. Hasebrink J.P. and Kobler R., "Fundamentals of Pneumatic Control Engineering", Festo
Didactic GMBH & Co, Germany.
5. Krishna Kant "Computer Based Industrial Control" -PHI
6. Groover M. P., "Industrial Robotics, Technology, Programming and Application", McGraw Hill
Book and Co., 2012.
Reference Books :
1. Merkle D., Schrader B. and Thomes M., "Hydraulics Basic Level TP 501" Festo Didactic
GMBH & Co, Germany.
2. Peter Rohner, "Industrial Hydraulic Control" John Wiley and Sons, Brisbane
3. Tiess Chiu Chang & Richard A. Wysk "An Introduction to Automated Process Planning
Systems"
4. Amber G.H & P.S. Amber "Anatomy of Automation" PrenticeHall
5. Srinivas Medida, "Pocket Guide on Industrial Automation", First Edition, IDC Technologies,
2008
Web References:
1. https://www.electrical4u.com/industrial-automation/
2. https://conceptsystemsinc.com/what-is-industrial-automation-types-of-industrial-automation
3. https://www.thomasnet.com/articles/automation-electronics/general-automation-systems
Question Paper Pattern:
Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of
the syllabus for first sessional and remaining half for second sessional exam. The question paper shall
consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall
answer one question from each section.
End Exame The question paper for End examination shall be for 60 mortes. The Question paper shall

	H	UMAN	RESC	DURCE	MANAGI	EMENT (HRM)		
VII Semes	ter : B. Tech						S	cheme : 2020
Course Code	Category	Hours/Week			Credits	Max	imum Mar	ks
OEC 421	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional E	Exam Duration1 ¹ /2	∕₂ Hrs				En	d Exam Du	ration: 3 Hrs
Course Ou	tcomes :At the er	nd of th	e cours	se the stu	udent will b	e able to		
CO1: Unde	rstand human reso	ource n	nanage	ment con	ncept and c	hallenges		
CO2:Under	stand human reso	urce sy	vstem d	esign				
CO3: Unde	rstand Functional	Areas	of HRI	M				
CO4: Unde	rstand human reso	ource p	lannıng	<u> </u>	<u>a ' a</u>			
COS: Unde	rstand human reso	ource n	nanage	ment in	Service Sec	ctor		
				UN	I – TI			
HUMAN F Meaning, I Recent Tre Systems: H	RESOURCE MA Definitions, Char nds -Human Res R Philosophy: HF	NAGE acterist ources	CMEN tics, C Mana es, pra	F : Conce bjective ger – D ctices ar	ept And Ch s, Importa outies and ind processes	allenges: Human nce, Functions a Responsibilities. 7	Resources M and Process The Compo	Aanagement – , Challenges, ments Of HR
		<u>- p - 11 - 1</u>	, pro		IT – II			
TITINGAN		ICTEN				· II D		
Qualities a Functions a and Huma Evaluation Definition Measureme Conducting	Qualities and Skills ;HR Department-Meaning, Definitions, Characteristics, Objectives, Importance, Functions and Process of Human Resources Development-Differences between personnel Management and Human Resources Development; Line Management Responsibility in HRM; Performance Evaluation and Management: Selected Evaluation Techniques; Human Resource Accounting And Audit: Definition Of Human Resource Accounting (HRA), Need, Significance, Objectives For Hr, Measurements In HRA, Meaning of Human Resource Audit ,Need Of Human Resource Audit Conducting Human Resource Audit Human Resource Audit Process: Information Management In HRA							
				UN	IT – III			
Functional Areas of HRM: Recruitment and Staffing: Strategic recruitment decisions, Types of recruitment-Internal recruitment, External recruitment, Selection process, Staffing global assignments; Compensation and Reward System: Compensation - Meaning, Definitions, Objectives and Importance-Wages and Salary Perquisites, Fringe Benefits, Bonus and Incentives – Meanings only, incentives in sun rise sector and sun set sector. Employee Relations - Define employee relations, four methods for managing employee relations; HR compliance: Meaning and Importance; Human Resource Information Systems: Importance of HR Information Systems Features of HR Information Systems, Designing And Implementing an HRIS; Payroll Management: What is Payroll Management , Importance of Payroll Management, Payroll Management Process, Payroll Processing Stages, Methods of Payroll Management.								
				UN	IT – IV			
Human Ro Training A needs asse analysis, Su	esource Plannin nd Development: ssment, Training accession planning	g: Stra Introd g eval g.	tegic a luction uation,	and Hui : Trainii Devel	nan Resou ng-Objectiv opment-De	rce Planning, Th res, Training Proc velopment proce	e HR Plan cess of train ess, Develo	ning Process; iing, Training pment needs

UNIT – V

Strategic Management of Human Resources: SHRM, relationship between HR strategy and overall corporate strategy, HR as a Factor of Competitive Advantage, Managing Diversity in the Workplace. **Human Resource Management in Service Sector:** Managing Human Element in Service Sector: Human Element in Service Sector – Introduction, Role and Significance; The Services Triangle ; Front Line Employees /Boundary Spanners – Meaning, Issues Faced by Front Line Employees: Person/Role Conflicts, Organization/Client Conflict, Inter client Conflict; Emotional Labour – Meaning, Strategies for Managing Emotional Labor; Flexible Working Practices – Implications for HR.

Text Books:

- 1. Prof. Gary Dessler, Human Resources Management, Pearson, 16th Edition, 2020.
- 2. Prof.JohnM.Ivancevich, "Human Resource Management", Tata McGraw Hill Publication, 12th Edition, 2003.
- 3. Prof.Aswathappa, "Human Resource Management and Personnel Management", 3 rd Edition, Tata McGraw Hill, 2002.

Reference Books:

- 6. Dr.C.B.Gupta, "Human Resource Management", Sultan Chand & Sons, New Delhi, 1st Edition, 2018.
- 7. Prof.S.S.Khanka, "Human Resource Management", Chand & Company, New Delhi, 2019
- 8. Dr.S.Seetharaman et al., "Human Resource Management", SciTech Publications Pvt Ltd. Chennai,2012.

Question Paper Pattern:

Sessional Examination:

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End Examination:

			DE	SIGN P.	ATTERNS	(DP)				
VII Semest	er: B. Tech				Scheme: 2020					
Course Code	Category	Hour	s/Wee	k	Credits	Maximum Marks				
OEC 422	OEC-IV	L	T	P	C	Continuous Internal AssessmentEnd ExamTOTAL4060100				
Sessional E	xam Duration: 1	1½ Hrs		U	End Exa	m Duration: 3 H	rs	100		
Course Out	tcomes: At the er	nd of th	e cours	se the stu	udent will b	be able to				
CO1: Unde	rstand the usage	of desig	gn patte	erns for	solving obj	ect-oriented desig	n problems			
CO2: Desci	ribe the creationa	l patter	ns abst	ract fact	ory, factory	y method, builder,	prototype, a	and singleton.		
CO4: Expla	nin behavioral pat	terns cl	s: adap hain of	respons	ibility con	mand interpreter	iterator m	ediator		
mem	ento, observer, st	ate, stra	ategy, 1	template	method, a	nd visitor.	, normor, m	culator,		
CO5: Expla	in the patterns us	sed in s	olving	design p	oroblems of	f Lexi Document H	Editor			
				UN	I – TI					
Design Pat	tern Introductio	on: Wł	nat Is a	a Design	n Pattern, I	Describing Design	n Patterns, ti	he Catalog of		
Design Patt	erns, Organizing	the Ca	talog, l Droble	How to S	Select a De	esign Pattern, How	v to Use a D	esign Pattern,		
How Design	I Fatterils Solve I	Jesigii	FIODIC		ти					
Creational	Patterns. Abst	ract Fa	ctory	Pattern	Builder P	attern Factory M	lethod Patte	ern Prototyne		
Pattern, Sin	gleton Pattern.		ctory .	i atterii,	Dunder 1	atterni, i actory ivi		in, mototype		
	<u> </u>			UN	IT – III					
Structural Pattern, Fly	Patterns: Adaptweight Pattern, P	ter Patt roxy Pa	tern, B attern.	ridge P	attern, Con	nposite Pattern, I	Decorator Pa	attern, Facade		
		•		UN	IT – IV					
Behavioral Pattern, Me method Patt	patterns: Chain diator Pattern, M tern, Visitor Patte	n of re lemento rn.	sponsil Patter	bility Pa rn, Obse	ttern, Com rver Patter	nmand Pattern, In n, State Pattern, S	terpreter Pa Strategy Patt	ttern, Iterator ern, Template		
				UN	IT – V					
A Case Stu Embellishin Window Sy	dy: Designing a g the User Inter stems, User Oper	Docur face, S rations	nent E Support Spellin	ditor, D ting Mu g Check	esign Probl ltiple Look ting and Hy	lems, and Documo k-and-Feel Standa phenation.	ent Structure ards, Suppor	e, Formatting, rting Multiple		
Text Books	:									
1. Erich G Education.	amma [2008], I	Design	Patter	ns elem	ents of re	eusable object or	iented softw	ware, Pearson		
2. Frank Bu Software An	uschmann, Regin rchitecture: A Sys	eMeun stem of	ier, Ha Patter	ins Roh n, John '	nert, Peter Wiley & Sc	Sommerlad, Miclons; 1996.	hael Stal, Pa	atternOriented		
Reference l	Books:									
1. Mark Gra	and, Pattern's in J	AVA	Vol-I, V	Viley D	reamTech					
2. Mark Gra	and, Pattern's in J	AVA	Vol-II,	Wiley D	PreamTech	III Wiley Dream	Taab			
4. Eric Free	man-Oreilly-spd	A Enter Head I	First D	esign Pa	tterns	-m, whey Dream	rech			
5. Alan Sha	lloway,Design Pa	atterns]	Explain	ned, Pea	rson Educa	tion.				

Web References:

1. https://sourcemaking.com/design_patterns

2. https://www.oodesign.com/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

VII Semester : B. Tech Scheme : 2020 Course Code Category Hours/Week Credits Maximum Marks OEC 423 OEC-IV L T P C Internal Assessment End Exam Total Sessional Exam Duration: 1½ Hrs 3 - 3 40 60 100 Sessional Exam Duration: 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to COI: Understand the various methods of prestressing. CO2: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. Introduction: Historical development - General principles of prestressing – Prectonsioning and post tensioning - Advantages and limitations of prestressing types. UNIT - 11 Methods and Systems of Pretensioning: Pre cost mation: generating: Tensioning methods – Tensioning devices - Long line system) - Individual Mould System - Strut system (ShorerChalos System) - Comparison of the variou systems - Precast elements – Poles, Masts, Pylons and railway sleepers their advantages and d		PR	ESTR	RESSI	NG S	YSTEMS	(PS)					
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OEC 423 OEC-IV L T P C Continuous Internal Assessment End Exam Total Sessional Exam Duration: 1/2 Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course the student will be able to End Exam Duration: 3 Hrs CO2: Understand the various methods of pretensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO3: Understand the various methods of post tensioning CO4: Determine the losses in pre-tensioned and post-tensioned members. CO5: Analyse the prestressed members with straight, concentric and eccentric tendons. UNIT - 1 Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning and post tensioning types. UNIT - 1I Methods and Systems of Pretensioning: Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) – Individual Mould System – Strut system (ShorerChalos System) – Comparison of the various systems - Precast elements – Poles, Masts, Pylons and railway sleepers theria advantages and disadvantages, applications and manufacturing techniques UNIT - II Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning and Posttensioning - Lonhardt System – Strut system (Sifford Udall system, Lee McCall System, Precose System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems	Course Code	Category	Ho	urs/W	/eek	Credits	Maximum Marks					
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UNIT - IV Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress. UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	Posttensioning syst	tems		TIN								
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UNIT - V Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: 1. N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. 2. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. 3. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	instantaneous losse shrinkage, creep ar	es – elastic del nd relaxation o	format format	ion, fi s.	riction	and ancho	rage slip; time-	dependent l	losses –			
 Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile. Text Books: N. Krishna Raju, Prestressed Concrete, Sixth Edition, Tata McGraw–Hill publishing Company Limited. Praveen Nagarajan, Prestressed Concrete, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 				U	NIT -	V						
 N. Krishna Raju, <i>Prestressed Concrete</i>, Sixth Edition, Tata McGraw–Hill publishing Company Limited. Praveen Nagarajan, <i>Prestressed Concrete</i>, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: E. G. Nawy, <i>Prestressed Concrete: A fundamental approach</i>, Prentice Hall. Reference Codes: IS 1343-2012, <i>Code of Practice for Prestressed Concrete</i>, BIS, New Delhi. IS 456-2000, <i>Code of Practice for plain and reinforced concrete</i>, BIS, New Delhi. 	Analysis of Sector straight, concentric.	<i>ions for Flex</i> , eccentric, ber	<i>xure:</i> nt and	Elasti parab	ic ana olic tei	lysis of a ndons – Ke	concrete beams ern lines – Cable	s prestresse e profile.	d with			
 Praveen Nagarajan, <i>Prestressed Concrete</i>, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. Reference Books: E. G. Nawy, <i>Prestressed Concrete: A fundamental approach</i>, Prentice Hall. Reference Codes: IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	1. N. Krishna Raju Company Limited.	a, Prestressed	Concr	ete, Si	ixth Eo	lition, Tata	n McGraw–Hill	publishing				
Reference Books: 1. E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: 1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. 2. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi.	 Praveen Nagarajan, <i>Prestressed Concrete</i>, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., Vijayawada. 											
 E. G. Nawy, Prestressed Concrete: A fundamental approach, Prentice Hall. Reference Codes: IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	Reference Books:	10	4	1.0	1	(1		1				
 IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	I. E. G. Nawy, Pr	estressed Cond	crete: .	A func	ament	tal approa	cn, Prentice Ha	11.				
 IS 1545-2012, Code of Fractice for Frestressed Concrete, BIS, New Defin. IS 456-2000, Code of Practice for plain and reinforced concrete, BIS, New Delhi. 	Keierence Codes 1 IS 1242 2012	Code of Duran	tion for	Duan	tuacaa	1 Concrete	DIC Now Dal	hi				
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Code of Practic	ce for	<u>i res</u> nlain	and ro	i Concrete. inforced co	ncrete BIS N	m. ew Delhi				
Question Paper Pattern:	Question Paper P	attern:						en Donn.				

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

	ADDITIV	E MA	NUFA	CTU	RING TECH	INOLOGY (AD	MT)			
VII Semeste	er: B. Tech						Sche	me: 2020		
Course Code	Category	Ho	ours/W	eek	Credits	Maximum Marks		8		
OEC 424	OEC – IV	L	Т	Р	С	ContinuousEndInternalExamAssessmentTC				
		3	-	-	3	40	60	100		
Sessional E	Sessional Exam Duration : 1 ½ HrsEnd Exam Duration : 3 Hrs									
Course Out	Course Outcomes : At the end of the course the student will be able to									
CO1: Under	stand prototypi	ng, and	d the pl	hases o	f Rapid prote	otyping.				
CO2: Under	stand the rapid	protot	vping r	process	chain.					
CO3: Under	stand the functi	oning	of Liqu	uid bas	ed rapid prot	otyping systems.				
CO4: Under	stand the functi	oning	of Pow	/der ba	sed rapid pro	ototyping systems				
CO5: Under	stand the Direc	t meth	ods of	Toolin	g and Indirec	t methods of Too	ling.			
				UN	<u>s - 1</u>		8:			
Introduction prototypes, ' prototyping,	n: Historical D Three phases o Applications an	Develog f deve nd adv	pment, lopmer antages	Defin nt lead s of rap	ition of pro- ing to Rapic id prototypin	totype, types of 1 prototyping, Fu 1g.	prototypes, ndamentals	Role of of rapid		
				UN	IT – II					
Rapid proto	otyping process	s chair	1: 3D r	nodelli	ng, data con	version and transi	nission, che	ecking and		
preparing, I	Building and	post p	process	ing. L	liquid based	l rapid prototyp	ing system	is- Stereo		
STI file for	Apparatus (SL	A), ap	plicali	ons, ac	ivantages and	d disadvantages (of Stereo III	.nograpny.		
Fusion Den	osition Modell	ing: P	rincinl	e nroc	ess applicat	ions advantages	and disady	antages of		
FDM, Multi	Jet Modelling S	System	is.	e , pro e	ess, apprica	ions, uu vunuuges	und undur			
	<u> </u>	2		UN	IT – III					
Solid based LOM, Appli	rapid prototy cations of LOM	ping s [, adva	ystems ntages	s: Lam and di	inated Objec sadvantages	t Manufacturing of LOM.	(LOM), thr	ee phases o		
Solid Grou	nd Curing(SG	C): S	teps ir	1 solid	ground cur	ing, Applications	s of solid	ground		
curing, adva	ntages and disa	dvanta	ges of	Solid <u>g</u>	round curing	g, build time calcu	ilation.			
				UN	$\frac{\mathbf{IT} - \mathbf{IV}}{\mathbf{I} + \mathbf{I} + \mathbf{I}}$	0.1.				
Powder-bas	sed Rapid prot	iona	ig syst	ems: S	d disadvanta	ser Sintering (SLS	S), Material	s for SLS,		
Three Din	vensional Priv	ntinσ	(3DP)• Pri	nciple Pro	cess Applicatio	ns advant	ages and		
disadvantage	es of 3DP	11115	(UDI	<i>)</i> • 111	neipie, 110	cess, ripplicatio	ins, uavain	uges and		
Laser Engi	neered Net Sha	ping	(LENS	5) : Prin	nciple, Proce	ss steps, Applicat	tions, Adva	ntages and		
disadvantage	es of LENS	1 0			-			-		
				UN	IT – V					
Direct meth	nods of rapid	tooling	g:AI	M tool	ing, SLS rap	oid steel, Direct l	Laser Metal	Sintering		
(DMLS), La	minate tooling	J Ta	l'a a				·····	Desetion		
injection Mc	ulding(RIM) W	u 10 /ax Ini	ection	KIV S mould	ng Sprav m	etal tooling 3D k	um casting, elt tool	, Reaction		
		un IIIJ		moulu	ing, opray in	cui tooning, 5D K	011 1001			
Text Books										

- 1. Chua C.K., Leong.K.F, and Lim C, C.S., Rapid Prototyping Principles and Applications, World Scientific Publishing Co. Pte. Ltd
- 2. D.T.Pham and S.S.Dimov, Rapid manufacturing The technologies and applications of rapid Prototyping and rapid tooling. Springer Publications

Reference Books

- 1. Terry Wholers, Wholers report, Wholers Associates
- 2. I. Gibson D. W. Rosen and B. Stucker., Additive manufacturing technologies, Springer Publication

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

		DF	ONE	E TE	CHNOLC	OGY (DT)			
VII Semester: B	B. Tech						Sch	eme: 2020	
Course Code	Category	Hou	rs / V	Veek	Credits	Maximum Marks			
OEC 425	OEC - IV	L	Т	Р	С	ContinuousEndInternalExamAssessmentExam			
	3 3 40 60 100							100	
Sessional Exam I	Duration: 1	½ Hr	5			End Exa	am Durati	on: 3 Hrs	
Course Outcom	es: At the e	nd of	the c	ourse	e students	will be able to			
CO1: Understa	and the histo	orical o	levelo	opme	nt of unma	anned aerial vehicles			
CO2: Understa	nd different	t dron	e part	s and	their cont	ribution for successfu	l flight op	eration	
CO3: Identify	the battery t	o be u	sed fo	or UA	AV applica	tion.			
CO4: Understa	nd working	of mo	otor th	nat ca	in be used	in UAV.			
CO5: Classify	different mi	croco	ntroll	ers a	nd flight c	ontrollers			
				l	JNIT – I				
Introduction to Structural classifi aircraft and applic	Introduction to drones and their applications : - Definition of drones, history of drones, Structural classification of drones: - fixed wing structure, lighter than air systems, rotary wings aircraft and applications of drones.								
				U	NIT – II				
Components of a uses of drone fr materials, design controller, flight c Battery and its p	drones:-clas rame mater parameters ontrol board managemen	sifica ials, for d, char nt: Int	tions classi prope racter roduc	of di ficati ellers, istics U	one struct ons and , composi of FCB as NIT – III of Battery	ures and their suitabi applicability of prop tion and structuring nd their structure.	lity, applid beller mot of Electro Po Battery,	cations and cors, drone onic speed Charging /	
Discharging of Ba criteria of Battery	attery. Back for Drone a	up, R pplica	ating ation.	s, Sh	elf Life, N	laintenance and safet	y of Batter	y. Selection	
				U	NIT – IV				
 Sensors : Wi fi devices, RADAR and range finder, GPS receiver, Gyro sensor, Speed and Distance sensor, Image sensor, TOF sensor, Chemical sensor. Cameras in drones and selection criteria of camera for different range. Barometers, Accelerometer, Magnetometer, remote control for drone. Motors : Difference between AC and DC motors and stepper motor, Brushed and Brushless motors, brief idea of motor capabilities for a drone build. Selection criterion of motor for drone 									
	C 11								
	T		•		$\frac{1 \mathbf{N} \mathbf{I} \mathbf{I} - \mathbf{V}}{\mathbf{D} \mathbf{V}}$	affinter 1 di CDC	1000 D.C.4	22 DO405	
Connections and UART ports. Dif techniques. Introduction to l and Python. Instal	ferent types Drone Prog lation of car	of D of co gramm rds.Au	evice onnec ning ito Pi	s in tors Intro lot sc	and their duction to	er introduction of RS specifications. Micro programming langua Ardupilot, Openpilot	o232, RS4 controller age used in	22, KS485, interfacing n drone : C	

1. Terry Kilby and Belinda Kilby, "Make:Getting Started with Drones ",Maker Media, Inc, 2016

2. VasilisTzivaras, "Building a Quadcopter with Arduino", Packt Publishing, 2016

3. Donald Norris, "Build Your Own Quadcopter -Power Up Your Designs with the Parallax Elev-8", McGraw-Hill Education, 2014

Reference Books:

1. Baichtal, "Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs", Que Publishing,2016.

2. Austin, Unmanned Aircraft Systems: UAVS Design, Development and Deployment. Wiley, 2010.

3. Sebbane, Smart Autonomous Aircraft: Flight Control and Planning for UAV. CRC Press, 2015

4. Zavrsnik, Drones and Unmanned Aerial Systems: Legal and Social Implications for Security and Surveillance. Springer, 2015.

Web References :

1. https://www.dronezon.com/learn-about-drones-quadcopters/

2.http://ardupilot.org/copter/docs/advanced-multicopter-design.html

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Exam:

INFRA	STRUCTUR	E FOI	R SM	ART (CITY DEV	ELOPMENT	(ISCD)		
VII Semester :B.		Scheme : 2020							
Course Code	Category	Hours/Week			Credits Maximum Marks				
OEC 426	OEC-IV	L	Т	Р	C C Continuous C Internal Assessment End Exam				
		3	-	-	3	40	60	100	
Sessional Exam Duration:1.5HrsEnd Exam Duration: 3 Hrs									
Course Outcomes	At the end of	f the co	ourse	the stu	dent will b	e able to			
CO1: Understand	the fundament	tal con	cepts	of sma	art and sust	tainable cities.			
CO2: Understand	the GIS applie	cations	s in Sr	nart Ci	ity Plannin	g.			
CO3: Understand	the component	t of sm	art cit	ties and	d dwell int	o their technolo	ogical		
advancement.	41		4 - 1 1.	. 1 .1	:				
CO4: Understand	the involveme	nt of s	take n	olders	in the desi	gn and impleme	entation of		
CO5: Explain the	importance of	differe	nt lin	kages	and their d	efined roles inc	luding		
government urban	niportance of	versitie	es city	v devel	oners and	communities	luuling		
	i plainieis, ani	ver sitte	<u>, on</u>	$\frac{\mathbf{NIT}}{\mathbf{NIT}}$		communities.			
mission, Smart city Governance of sma Green Building Co	y planning and art cities.	develo tainab	opmer U	nt, Fina NIT - velopn	ancing sma II nent: Gree	n projects in sm	pment,		
sustainability – Gr systems.	een building –	Kating	g syste	em – E	nergy enno	ent building –	Energy sav	ing	
<i>GIS Applications in Smart City Planning:</i> Coordinate system and geo-coding, vector data structure and algorithms, raster data structure and algorithms, data bases for GIS – Concepts, error modeling and data uncertainty, decision making through GIS, constructing spatial data infrastructure and spatial information system. National Urban Information system. Why remote sensing, aerial & satellite remote sensing – Principles of aerial remote sensing – Aerial photo-interpretation – Photogrammetry – Stereovision – Measurement of heights/depths by relief displacement and parallax displacement. Principles of satellite remote sensing, spatial, spectral and temporal resolutions.									
			UN	IT – 1	III				
<i>Smart Urban Tra</i> and services) - Ba provision and pla infrastructure; Rol transport problem Transport cycle, co roads and intersec	ansportation S asic definitions anning of urb le of transpor s and mobili- poncept of acce ctions. Basic p	ystems – Co an ne t, type ty issu- ssibilit princip	s: Ele ncepts twork es of ues; U ty. Hie les of	ments s - Sig s and transp Urban erarchy f Trans	of Infrastr nificance a services; ort system form and y, capacity sport infra	ructure (Physic and importance Resource anal as, evolution o Transport par and geometric structure desig	al, Social, U ; Data requination ysis, Provin f transport tterns, land design elen n. Urban tr	Utilities ired for sion of modes, use – nents of ransport	

UNIT – IV

planning process -Transport, environment and safety issues. Principles and approaches of

Traffic Management, Transport System Management.

*Water Supply and Drainage:*Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues. Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Municipal and other wastes –generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand assessment, norms and standards, planning provisions and management issues.

UNIT - V

Project Management for Smart Cities:Philosophy and concepts of Project management phases – Stages of project & their approval status – Planning – Scheduling – PERT model - Project cost analysis – Resource allocation & Levelling – Project monitoring and control – Risk management – Case studies.

E-Governance and IOT: The concept of management – Concept of e-management &ebusiness - e-Government Principles – Form e-Government to e-governance - e-governance and developing countries – Designing and Implementing e-Government Strategy; E-governance: Issues in implementation. IOT- fundamentals, protocols, design and development, data analytics and supporting services, case studies.

Text Books:

1. Gupta Tripati, Smart cities transforming India, Pentagon Press.

2. Marta Peris-Ortize, Dag r Bennett, Diana Perez, Bustamante Yabav, Sustainable Smart Cities, Springer

3. Mani. N, Smart Cities and Urban Development in India, New Century Publications.

Web References:

1. https://smartnet.niua.org

2. <u>https://smartcities</u>council.com

3. https:// mygov.in/group/smart- cities.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

CST	Professional Elective Course (PE-I)
S.No	Course Title
1.	Advanced Computer Architecture
2.	Object Oriented Analysis and Design
3.	Information Retrieval Systems
4.	Soft Computing

CST	Professional Elective Course (PE-II)
S.No	Course Title
1.	Embedded Systems
2.	Distributed Systems
3.	Pattern Recognition
4.	Software Project Management

CST	Professional Elective Course (PE-III)
S.No	Course Title
1.	Adhoc & Sensor Networks
2.	Service Oriented Architecture
3.	Mobile Communications
4.	Network Security & Cryptography

CST	Professional Elective Course (PE-IV)
S.No	Course Title
1.	Software Quality and Testing
2.	Quantum Computing
3.	Deep Learning
4.	Parallel and Distributed Algorithms

CST	Professional Elective Course (PE-V)
S.No	Course Title
1.	High Performance Computing
2.	Cloud Computing
3.	Image and Video Processing
4.	Digital Forensics

ADVANCED COMPUTER ARCHITECTURE (ACA)										
V Semester	: Common for	CSE &	& CST	I	Scheme : 2020					
Course Code	Category	I	Hours/	Week	Credits	Maximum Marks				
CS312	PEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
~		3	0	0	3	40	60	100		
Sessional E	xam Duration	1½ Hr	rs	.1 . 1		End	Exam Du	ration: 3 Hrs		
Course Outcomes :At the end of the course the student will be able to										
CO1: Understand the concept of parallel processing, classification schemes and memory addressing										
schemes in	parallel processi	ng syst	tems.	for ation are	- 1		.1.1.			
CO2: Appl	y the concept of	Pipelin	11ng in Eminalia	function ev	aluation us	ling reservation ta	ible.			
CO4: Unde	rstand the SIME	pies of	structu	ung in desi	gning pipe	av processors and	ISIMD Inte	propriation		
networks		allay	Siluciu	ires, aigoriu		ay processors and				
CO5: Unde	erstand the chara	cteristi	cs of m	ultiprocess	or systems	interconnection	networks a	nd control		
flow compu	iters	eteristi	05 01 11	lampiocess	or systems					
UNIT – I										
Systems, parallel computer structures, architecture classification schemes, memory hierarchy in parallel processing systems. UNIT – II Pipelining: Pipeline concept, Linear pipelining and space time diagram, Classification of pipe line processor, Nonlinear pipeline and Reservation table, Instruction and Arithmetic pipelines.										
Principles of and Busing sequencing	of designing pip structures, Inter and Collision pr	eline p nal forv reventio	process warding on.	sors: Instruc g and regist	ction prefet er tagging,	ch and Branch ha Hazard detectior	andling, Da 1 and resolu	ta buffering tion, Job		
				UNIT	- IV					
SIMD Arra and routing multiplicati SIMD inter shuffle exch	SIMD Array Processors: SIMD structures and algorithms for array processors, organization, masking and routing mechanisms, inter processor communication, parallel algorithms for array processors (matrix multiplication and parallel sorting). SIMD interconnection network: Single stage and Multistage network, Cube network, Barrel shifter, shuffle exchange and Omega networks									
				UNIT	$\Gamma - \mathbf{V}$					
Multiproce characterist memories, 1 Data flow c and languag	essor architectu ics, interconnect nultistage netwo computers: Con ges, Data flow ar	re: Loc ion net ork. trol flo nd desig	osely co twork, t ow Vs I gn alter	oupled and timeshared Data flow, D matives-De	tightly cou or commor Data flow co pendency c	pled multiprocess a busses, crossbar omputer architect lriven approach a	sor systems switch and tures, Data t nd Multi le	, processor l multi-port flow graphs vel driven		

approaches.

Text Books:

1. Kai Hwang, Faye Briggs [2017], "Computer architecture and parallel processing", ISBN 10: 125902914X ISBN 13: 9781259029141 Publisher: Mc Graw Hill India, 2017.

2. Kai Hwang (2017), Advanced Computer Architecture-Parallelism, Scalability, Programmability, McGraw Hill.

Reference Books:

- 1. David E. Culler, J. P. Singh, Anoop Gupta, Harcourt Asiam, Morgan Kaufmann (1999), Parallel Computer Architecture, Elsevier, India.
- 2. V. Rajararnan, C. Siva Ram Murthy (2000), Parallel Computers Architecture and
- 3. Programming, Prentice Hall of India, New Delhi.

Web References:

1. https://nptel.ac.in/courses/108105118/25

2. https://nptel.ac.in/courses/117106111/23

3. https://nptel.ac.in/courses/117104128/5

4.https://www.tutorialspoint.com/parallel_computer_architecture/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	OBJEC	OBJECT ORIENTED ANALYSIS AND DESIGN (OOAD)										
V Semester	: Common for	CSE &	CST			Scheme : 2020						
Course Code	Category	Ho	Iours/Week		Credits	Max	ximum Mar	ks				
CS313	PEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	0	0	3	40	60	100				
Sessional E	xam Duration 1	¹ / ₂ Hrs				E	nd Exam Du	uration: 3 Hrs				
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will b	be able to						
CO1: Understand the importance of model, UML and Class diagrams.												
CO2: Describe the structural and behavioral modeling of a software system.												
CO3: D	esign an event dr	iven sy	stem w	ath dyna	imic dimen	sions.						
CO4: D	onstruct an archit	ectural	templa	te for ar	nlications	and deployment d	iagrams					
COS: Construct an architectural template for applications and deployment diagrams.												
UNIT – I												
Introduction to UML												
Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the												
UML, Architecture, Software Development Life Cycle, Mechanisms, Artifacts, Hello World.												
Basic Structural Modeling												
Classes, Relationships, Common mechanisms, Diagrams, Class diagrams.												
				UN	$\Pi - \Pi$							
Advanced S	tructural Modeli	ng 1	1	Interfor		ad Dalaa Daalaa	. Turtou or	Ohiset				
Advanced c	lasses, advanced	relation	isnips,	Interfac	es, Types a	nd Roles, Package	es, instances	, Object				
Rasic Reha	vioral Modeling											
Interactions	. Use cases. Use of	case dia	igrams.	Interac	tion diagrai	ns. Activity diagr	ams.					
	, , , ,		0	,		,						
				UN	II – III							
Advanced B	Sehavioral Model	ing	a #0.0000	log and T	Threads Th	ma and Space Sta	to diagrama					
	signals, state mac	miles, j	process		TT IV	ne and Space, Sta	lle diagrams	•				
A I • / /	1 7 1 1			UI	11 - 11							
Architectur	al Modeling	1	na Ca			1						
Artifacts, D	eployment, Collo	boratio	ns, Co	mmon n	lodeling tec	chniques.						
				UN	$\mathbf{V} - \mathbf{V}$							
Architectur	al Modeling											
Patterns and	l Frameworks, Ar	tifact d	iagram	is, Deplo	oyment diag	grams, Systems ar	nd Models.					
Applying th	e UML											
Case Study-	 Library manager 	ment sy	/stem,	Online s	hopping sy	stem.						
Text Books	:											
1. Grady Bo Guide, Pear	ooch, James Rum son Education. 20	baugh,)15.	Ivar Ja	acobson	, [2nd Edit	ion], The Unified	Modeling I	Language User				

Reference Books:

1. Craig Larman, Applying UML and Patterns: An Introduction to Object Oriented Analysis and Design and Iterative Development, Pearson Education, 2015.

2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, UML 2 Toolkit, WILEY Dreamtech India Pvt. Ltd,2004.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

V Semester : Common for CSE & CST Scheme : 2020 Course Code Category Hours/Week Credits Maximum Marks CS314 PEC - I L T P C Continuous Internal Assessment End Exam TOTAL Sessional Exam Duration : 1½ Hrs Image: Course Outcomes : At the end of the course the student will be able to End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Ability to apply IR principles to locate relevant information large collections of data. CO2: Ability to design different document clustering algorithms. CO3: Implement retrieval systems for web search tasks. CO4: Design an Information Retrieval System for web search tasks. CO5: To understand the concepts of multimedia information retrieval.									
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$\begin{array}{c c c c c c c c } CS314 & PEC-I & L & T & P & C & Continuous \\ Internal \\ Assessment & Assessment & End \\ Exam & TOTAL \\ \hline \\ Sessional Exam Duration : 1½ Hrs & End Exam Duration : 3 Hrs \\ \hline \\ Course Outcomes : At the end of the course the student will be able to \\ \hline \\ CO1: Ability to apply IR principles to locate relevant information large collections of data. \\ \hline \\ CO2: Ability to design different document clustering algorithms. \\ \hline \\ CO3: Implement retrieval systems for web search tasks. \\ \hline \\ CO4: Design an Information Retrieval System for web search tasks. \\ \hline \\ CO5: To understand the concepts of multimedia information retrieval. \\ \hline \\ \hline \\ UNIT I \\ \hline \\$									
3 0 0 3 40 60 100 Sessional Exam Duration : 1½ Hrs End Exam Duration : 3 Hrs Course Outcomes :At the end of the course the student will be able to Course Outcomes :At the end of the course the student will be able to CO1: Ability to apply IR principles to locate relevant information large collections of data. CO2: Ability to design different document clustering algorithms. CO3: Implement retrieval systems for web search tasks. CO4: Design an Information Retrieval System for web search tasks. CO5: To understand the concepts of multimedia information retrieval.									
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CO3: Implement retrieval systems for web search tasks. CO4: Design an Information Retrieval System for web search tasks. CO5: To understand the concepts of multimedia information retrieval.									
CO4: Design an Information Retrieval System for web search tasks. CO5: To understand the concepts of multimedia information retrieval.									
CO5: To understand the concepts of multimedia information retrieval.									
UNIT I									
UNIT – I									
Introduction to Information Retrieval Systems: Definition of Information Retrieval System,									
Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database									
Management Systems, Digital Libraries and Data Warehouses									
Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous									
Capabilities									
UNIT – II									
Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing,									
Information Extraction									
Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram									
Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures,									
Hidden Markov Models									
UNIT – III									
Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept									
Indexing, Hypertext Linkages									
Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering,									
Hierarchy of Clusters									
UNIT – IV									
User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance									
Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems,									
Searching the INTERNET and Hypertext									
Information Visualization: Introduction to Information Visualization, Cognition and Perception,									
Information Visualization Technologies									
UNIT – V									
Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms.									
Hardware Text Search Systems									
Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval.									
Graph Retrieval, Imagery Retrieval, Video Retrieval									

1. Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T. Maybury, Springer

Reference Books:

- 1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
- 2. Information Storage & Retrieval By Robert Korfhage John Wiley & Sons.

3. Modern Information Retrieval By Yates and Neto Pearson Education.

Web References:

- 1. https://en.wikipedia.org/wiki/Information_retrieval
- 2. https://www.geeksforgeeks.org/what-is-information-retrieval/
- 3. https://www.upgrad.com/blog/information-retrieval-system-explained/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

			SOF	T CO	MPUTING	G (SC)		
V Semester : C	ommon for CSE	& CS	T				Sc	heme: 2020
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks	
CS315	PEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam	Duration: 1½ H	lrs				End	Exam Duration	n: 3 Hrs
Course Outcou CO1: Analyze CO2: Design a CO3: Define th CO4: Study of	nes: At the end of various neural ne ssociative memor le fuzzy logic and membership fund	of the o etwork ry netw l sets. etions	course archit vorks a and fuz	studen eecture ind uns zzy ari	its will be al s and learni supervised l ithmetic ope	ble to ng models. earning networl erations.	ζδ.	
CO5: Understa	nd genetic algorit	thm co	oncepts	s and t	heir applica	tions.		
Artificial Neura Supervised Lea Network. Associative Men Bidirectional Ass Unsupervised L Net, Hamming N Propagation Netw Introduction to Fuzzy Sets, Clas Tolerance and ea	I Networks: Intro- arning Networks: mory Networks: sociative Memory learning Networ Network, Kohone vorks, Adaptive I Fuzzy Logic, C sical Relations -a uivalence relation	oducti s: Pe : Train y (BA) rk: In en Sel: Resona Classic and Fu	on, Bas rceptro ning A M), and troduct f-Organ ance T eal Set uzzy Re	UN sic mo on Ne UN Ilgorith d Hopt tion, F nizing heory UN s and elation	NIT-I odels of ANI tworks, Ad IIT-II hms for pat field Networ Fixed Weigh Feature Ma Networks IT-III Fuzzy Set as- Cardinal	N, important ten laptive Linear ttern association rks. nt Competitive aps, Learning V s: Introduction ity, Operations	rminologies of A Neuron, Back n Auto associa Nets, Maxnet, Vector Quantiza , Classical Sets , Properties and	ANNs. propagation tive Memory, Mexican Hat ation, Counter (Crisp Sets), composition.
	urvarence relation	115.		UN	IT-IV			
Membership fu Fuzzy Arithmet	nctions- Features ic and Fuzzy Me	, Fuzz easure	ificatio s: Fuz	on, me zy arit	mbership va hmetic, Ext	alue assignment ension principle	ts, Defuzzificati e, Fuzzy measur	on res.
UNIT-V Genetic Algorithm: Introduction, Basic Terminologies in Genetic Algorithm, Operators in Genetic Algorithm –Encoding, selection, Crossover and Mutation, Applications. Application of Soft computing: Optimization of Traveling Salesman Problem using Genetic Algorithm Approach, Genetic Algorithm –Based Internet search Technique.								
Text Books :								
1. S.N.Sivan	andam, S.N.Deep	pa "Pr	iciples	of So	ft Computin	ng" WILEY Sec	cond Edition 20	13.
Reference Bool 1. S.R. Jang	<mark><s :<="" mark=""> , C.T.Sun and E.M</s></mark>	Mizuta	ani, "N	euro-F	Fuzzy and S	oft Computing"	' PHI/Pearson E	ducation,
New De	lni 2004.							

- 2. S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI, New Delhi 2003
- 3. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.

Web References:

1.https://nptel.ac.in/courses/106105173

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

EMBEDDED SYSTEMS (EBS)										
VI Semeste	r : Common for	CSE &	& CST				S	cheme : 2020		
Course Code	Category	Ho	ours/W	'eek	Credits	Ma	Maximum Marks			
CS316	PEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional E	xam Duration :	1½ Hrs	5			E	nd Exam Du	ration: 3 Hrs		
Course Out	comes : At the e	nd of th	e cour	se the st	udent will b	be able to				
COI: Provi	ides general over	view of	Embe	dded Sy	stems					
CO2: Show current statistics of embedded systems.										
CO3: Desig	gn, Code, Compilered the PTOS	Le, and	test rea	I time s	offware.					
CO4: Unde	rate a fully funct	ional su	stom i	neludina	hordware	and software				
CO3. Integ		ional sy	stem n	liciuuiii	<u>z naruwarc</u>	and software.				
UNIT – I										
Introduction to embedded Systems: Embedded systems, processor embedded into a system, Embedded hardware units and device in a system, Embedded software in a system, Examples of embedded systems, Design process in embedded system, formalization of system design, Design process and design examples, Classification of embedded systems, skills required for an embedded system designer. UNIT – II Devices and communication buses for devices network: IO types and example, Serial communication devices, Parallel device ports, Sophisticated interfacing features in device ports, wireless devices, timer and counting devices, Watch dog timer, Real time clock, networked embedded systems, Serial bus Communication protocols, parallel bus device protocols – parallel communication internet using ISA, PCI,PCI-X and advanced buses, internet enabled systems – network protocols, wireless and mobile automation protocols.										
				UN	IT – III					
Device drivers and interrupts and service mechanisms: Programming – I/O busy-wait approach without interrupt Service mechanism, ISR concept, interrupt sources, interrupt servicing (handling) Mechanism, multiple interrupts, context and periods for context switching , interrupt latency and deadline, classification of processors interrupt service mechanisms from context-saving angle, Direct memory access, device driver programming										
Inter Proces	ss communicatio	n and s	synchro	onizatio	n of proces	ses, Threads and	<i>l tasks:</i> Mult	iple process		
application, between fun process com functions, P	multiple threads ctions. ISRS and munication, Sigr ipe functions, So	in an aj tasks b nal func cket fur	oplication by their tion, S actions	ion, Tas charact emapho , RPC fi UN	ks, Task sta eristics, cor re functions unctions. IT – V	ttes, Task and Da ncept and semapl s, Message Queu	tta, Clear-cut nores, shared e functions, l	distinction data, Inter- Mailbox		
Real – time	Operating System	ms: OS	Servic	es, proc	ess manage	ment, Timer fun	ctions, Event	t functions.		
Memory ma	nagement, Devic	e, file a	ind IO	subsyste	ems manage	ement, Interrupt	routines in R	TOS		

Environment and handling of interrupt source calls. Real-time Operating systems, Basic Design using RTOS, RTOS task scheduling models, interrupt latency and response of the tasks as performance metrics, OS Security issues, Introduction to embedded software development process and tools, Host and target machines, linking and location software

Text Books:

1. Raj Kamal [2017], [3rd Edition], Embedded Systems – Architecutre, Programming and Design, McGraw-Hill.

Reference Books:

1. Arnold S Burger, Embedded System Design An Introduction to Processes, Tools and Techniques, 1st Edition, CMP Books, 2007.

2. David.E. Simon, An Embedded Software Primer, 2nd Edition, Pearson Edition, 2009.

3. Jonathan W Valvano, Embedded Micro Computer Systems, Real Time Interfacing, 1st Edition, Books / Cole, Thomson learning 2006.

Web References:

1. https://nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The Question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The Question paper shall consists of 3 sections with Two Questions (EITHER/OR type) in each section. The student shall answer one question from each section.

End Exam:

	DISTRIBUTED SYSTEMS (DS)										
VI Semeste	r : Common for	CSE &	& CST				S	cheme : 2020			
Course Code	Category	Ho	ours/W	eek	Credits	Max	Maximum Marks				
CS317	PEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration :	1½ Hr	8			En	d Exam Du	ration: 3 Hrs			
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will l	be able to					
CO1: Unde	erstand the model	s and d	esign r	requirem	ents of dist	ributed systems.					
CO2: Describe Client Server Model, Communication Methods of Distributed System											
CO3: Class	sify Clock Synch	ronizati	on, Mı	utual Ex	clusion, De	adlocks in Distrib	uted System	1			
CO4: Sum	marize the concept	ots of T	hreads	, Proces	sor Allocat	ion Algorithms					
CO5: Unde	erstand Distribute	d File S	System	Design	with Imple	mentation.					
UNIT – I											
Introduction to Distributed Systems: Introduction, Examples of Distributed Systems,											
Resource Sharing and the Web, Challenges.											
System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations,											
Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models-											
Interaction N	Model, Failure M	odel, S	ecurity	Model.			,				
	· · · · ·		·	UN	IT – II						
Communica	tion in Distribut	ted Syst	tems								
Client-Serve	er Model: Clients	&Serv	ers, ad	dressing	, blocking	Vs non-blocking j	primitives, b	ouffered Vs			
unbuffered p	primitives, reliabl	le Vs ui	nreliab	le primit	tives, Imple	menting client-se	rver model.				
Remote Pro	cedure Call: Bas	ic RPC	operat	tion, par	ameter pass	sing, dynamic bin	ding, RPC se	emantics in			
Presence of	failures, impleme	entatior	issues	5.							
				UN	IT – III						
Synchroniza	ation in Distribut	ted Syst	tems								
Clock Synch	hronization: Log	ical clo	cks, pł	nysical c	locks, clocl	k synchronization	algorithms,	use of			
synchronize	d clocks.	1 1	•.1	11	. 1 1 .1	. 1 • 1	•.1				
Mutual Exc	clusion: Centraliz	ted algo	prithm,	distribu	ted algorith	im, token ring alg	orithm.				
Deaa Locks	: Distributed dea	dlock d	etectio	n and pi	revention.						
				UN.	11 – 1V						
Processes a	nd Processors in	Distril	outed S	Systems							
Threads-Int	roduction, thread	s usage	e, desig	n issues	, implemen	ting a threads pac	kage, thread	s and RPC.			
Processor	Allocation-Alloc	cation	mode	ls, des	ign issues	for processor	allocation	algorithms,			
implementat	tion issues for pro	ocessor	alloca	tion algo	orithms, exa	ample processor a	llocation alg	orithms.			
				UN	$\mathbf{IT} - \mathbf{V}$						
Distributed	File System Dest	i gn: Fil	e servi	ce interf	face, directo	ory service interfa	ce, semantic	es of file			
Sharing.											
Implementa	tion: File usage	e, syste	m stru	icture, o	caching, an	d replication. Tr	rends in Di	stributed File			
System.											

1. Andrew S. Tanenbaum, Distributed Operating System, Pearson Education.

2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication.

Reference Books:

1. Mukesh Singhal, Niranjan G. Shivaratri, Advanced Concepts in Operating Systems.

2. Sinha, Distributed Operating System: Concepts and Design, PHI

Web References:

1. https://www.e-reading.club/book.php?book=143358

2 http://www.ia.pw.edu.pl/~tkruk/edu/rso.b/lecture/pre/rso01_pre.pdf

Question Paper Pattern:

Sessional Exam:

The Question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The Question paper shall consists of 3 sections with Two Questions (EITHER/OR type) in each section. The student shall answer one question from each section.

End Exam:

	PATTERN RECOGNITION (PR)									
VI Semester CSE(DS)	r : Common for	CSE,	CST &	k.			S	cheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		ks		
CS318	PEC-II	L	Т	Р	C Continuous Internal Assessment C TO					
		3	0	-	3	40	60	100		
Sessional E	xam Duration :	1½ Hr	S			En	d Exam Du	ration: 3 Hrs		
Course Out	comes : At the e	nd of tl	ne cour	se the st	tudent will b	be able to				
CO1: Unde	erstand supervised	d and u	nsuper	vised cla	assification	methods for patte	ern recognit	ion.		
CO2: Unde	erstand the differe	ent clus	tering	techniqu	ies.					
CO3: Unde	erstand the structu	ıral pat	tern ree	cognitio	n models.					
CO4: Inter	pret feature extra	ction ai	nd subs	set selec	tion method	ls				
CO5: Imple	ement the neural	networ	ks for j	pattern r	ecognition	problems.				
UNIT – I										
Pattern Classifier Overview of pattern recognition – Discriminant functions – Supervised and Unsupervised learning – Parametric estimation – Maximum likelihood estimation – Bayesian parameter estimation – Perceptron algorithm – LMSE algorithm – Problems with Bayes approach – Pattern classification by distance functions – Minimum distance pattern classifier.										
UNIT – II										
Unsupervised Classification Clustering for unsupervised learning and classification – Clustering concept – C-means algorithm – Hierarchical clustering procedures – Graph theoretic approach to pattern clustering – Validity of clustering solutions										
				UN	IT – III					
<i>Structural I</i> Elements of description -	Pattern Recogniti formal grammar - Parsing – Stoch	i on s – Stri astic g	ng gen ramma	eration a	as pattern de	escription – Recog – Graph based str	gnition of sy uctural repre	esentation		
				UN	IT – IV					
<i>Feature Ext</i> Entropy min approximati	traction and Sele himization – Karh on – Binary featu	<i>ction</i> iunen – ire sele	Loeve	transfo	rmation – F	eature selection th	nrough func	tional		
				UN	$\mathbf{IT} - \mathbf{V}$					
Recent Adve Neural netw Unsupervise pattern class	ances ork structures for d learning in neu ifiers – Pattern c	r Patter Iral Pat	n Reco tern Re ation u	gnition cognitic sing Ge	– Neural ne on – Self-or netic Algori	twork based Patte ganizing networks ithms.	ern associato s – Fuzzy lo	ors – gic – Fuzzy		

- 1. Robert J.Schalkoff, "Pattern Recognition Statistical, Structural and Neural Approaches", Wiley, India, 2009.
- 2. M. Narasimha Murthy and V. Susheela Devi, "Pattern Recognition", Springer 2011

3. Sergios Theodoridis, Konstantinos Koutroumbas, "Pattern Recognition & Matlab Introduction", Fourth edition, Acadamic press, 2010

Reference Books:

1. Andrew R. Webb, Keith D. Copsey, "Statistical Pattern Recognition", Third Edition, Wiley, 2011.

2. Duda R.O., Har P.E., and David G Stork, "Pattern Classification", Second edition, John Wiley & Sons, NewYork, 2012.

3. S.N. Deepa , S.N. Sivanandam, "Principles of Soft Computing", Second Edition, Wiley, 2012.
4. Tou and Gonzales, "Pattern Recognition Principles", Wesley Publication Company, London, 1974.

Web References:

1. https://www.mathworks.com/discovery/pattern-recognition.html

2 https://www.igi-global.com/book/pattern-recognition-classification-time-series/147125

3. https://www.mathworks.com/discovery/pattern-recognition.html

Question Paper Pattern:

Sessional Exam:

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End Exam:

VI Semester : Common for CSE & CST Scheme : 2 Course Code Category Hours/Week Credits Maximum Marks CS319 PEC-II L T P C Continuous Internal Assessment End Exam TOTA Sessional Exam Duration : 1½ L T P C Continuous Internal Assessment End Exam TOTA Course Outcomes : At the end of the course the student will be able to End Exam Duration: 3 Course outcomes : At the end of the course the student will be able to CO2: Discuss project planning and process models. CO3: Estimate effort of software project using effort estimation techniques. CO4: Describe risk categories and steps to monitor, control the project. CO5: Understand the importance of team work and software quality. UNIT – 1 Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Managem and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Protfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	SOFTWARE PROJECT MANAGEMENT (SPM)										
Course CodeCategoryHours/WeekCreditsMaximum MarksCS319PEC-IILTPCInternal AssessmentEnd ExamTOTA ExamSessional Exam Duration : 1½30034060100Sessional Exam Duration : 1½HrsEnd Exam Duration : 3Course Outcomes : At the end of the course the student will be able toCO1:Define the purpose of project management and programme management.CO2:Discuss project planning and process models.CO3:Estimate effort of software project using effort estimation techniques.CO4:Describe risk categories and steps to monitor, control the project.CO5:Understand the importance of team work and software quality.UNIT - 1Introduction to Software Project Management:What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software projed Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices.Project Evaluation and Programme Management:A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	SE & CST	or CSE &	r : Common for	ester : Common for CSE & CST							
CS319PEC-IILTPCContinuous Internal AssessmentEnd ExamTOTA30034060100Sessional Exam Duration : 1½ HrsEnd Exam Duration : 3Course Outcomes : At the end of the course the student will be able toCO1: Define the purpose of project management and programme management.CO2: Discuss project planning and process models.CO3: Estimate effort of software project using effort estimation techniques.CO4: Describe risk categories and steps to monitor, control the project.CO5: Understand the importance of team work and software quality.UNIT – IIntroduction to Software Project Management: What is a project, Activities covered by Software project Management control, Traditional and Modern Project Management Practices.Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	Hours/Week (Hou	Category	Category Hours/Week Cred							
30034060100Sessional Exam Duration : 1½ HrsEnd Exam Duration : 3Course Outcomes : At the end of the course the student will be able toCO1: Define the purpose of project management and programme management.CO2: Discuss project planning and process models.CO3: Estimate effort of software project using effort estimation techniques.CO4: Describe risk categories and steps to monitor, control the project.CO5: Understand the importance of team work and software quality.UNIT - 1Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	L T P	L	PEC-II	PEC-II L T P C							
Sessional Exam Duration : 1½ Hrs End Exam Duration : 3 Course Outcomes : At the end of the course the student will be able to CO1: Define the purpose of project management and programme management. CO2: Discuss project planning and process models. CO3: Estimate effort of software project using effort estimation techniques. CO4: Describe risk categories and steps to monitor, control the project. CO5: Understand the importance of team work and software quality. UNIT - I Introduction to Software Project Management: What is a project, Activities covered by Software project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	3 0 0	3		3 0 0 3							
Course Outcomes : At the end of the course the student will be able to CO1: Define the purpose of project management and programme management. CO2: Discuss project planning and process models. CO3: Estimate effort of software project using effort estimation techniques. CO4: Describe risk categories and steps to monitor, control the project. CO5: Understand the importance of team work and software quality. UNIT – I Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	Hrs	$1 : 1\frac{1}{2}$ Hrs	xam Duration :	l Exam Duration : 1½ Hrs							
 CO1: Define the purpose of project management and programme management. CO2: Discuss project planning and process models. CO3: Estimate effort of software project using effort estimation techniques. CO4: Describe risk categories and steps to monitor, control the project. CO5: Understand the importance of team work and software quality. UNIT – I Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme 	of the course the stud	$\frac{1}{2}$ end of the	tcomes : At the e	Outcomes : At the end of the course the student v							
 CO2: Discuss project planning and process models. CO3: Estimate effort of software project using effort estimation techniques. CO4: Describe risk categories and steps to monitor, control the project. CO5: Understand the importance of team work and software quality. UNIT – I Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme 	CO1: Define the purpose of project management and programme management.										
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 CO4: Describe fisk categories and steps to monitor, control the project. CO5: Understand the importance of team work and software quality. UNIT – I Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme 	re project using effort	offware pro	nate effort of sof	stimate effort of software project using effort esti							
UNIT – I Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	CO4: Describe risk categories and steps to monitor, control the project.										
Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	CO5: Understand the importance of team work and software quality.										
Introduction to Software Project Management: What is a project, Activities covered by Softw Project Management, Plans Methods and Methodologies, Ways of categorizing software project Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices. Project Evaluation and Programme Management: A Business Case, Project Portfolio Management Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme	UNIT – I										
Management, Strategic Programme Management, Creating a Programme, Aids to program management, Benefits Management. UNIT – II An overview of Project Planning: Introduction to Step Wise Project Planning Selection of an Appropriate Project Approach: Choosing Methodologies and Technologies, Software Processes and Process Models, The Waterfall Model, The Spiral Model, Software Prototyp Incremental Delivery, Rapid Application Development, Agile Methods, Extreme Programming, Scr Managing Iterative Processes, Selecting the Most Appropriate Process Model.											
UNIT – III	UNIT			UNIT – II							
Software Effort Estimation: Introduction, Where are Estimates done, Problems with Over and Under estimates, The basis for Software Estimating, Software Effort Estimation Techniques, Estimation by Analogy, Albrecht Function Point Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Staffing Pattern, Effect of Schedule Compress Caper Jones Estimating Rules of Thumb.											
Disk Managements Disk Catagories of Disk A Engenerate for tasting with Disk Disk Disk (if a		Catarra	mann an ta Diala	Programmente Diele Cetegories of Diele A.D.							
Risk Management: Risk, Categories of Risk, A Framework for dealing with Risk, Risk Identificat Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Applying PERT Technique. Monitoring and Control: Creating the Framework, Collecting the Data, Review, Project Termination Review, Vigualizing Programs, Cost Manitoring, Formed Value Analysis, Dejectivity of Cost	gories of Risk, A Fra ig, Risk Managemen ting the Framework, (Categories lanning, Ri	gement: Risk, C sment, Risk Plar nique. g and Control: C	sessment: Risk, Categories of Risk, A Framew sessment, Risk Planning, Risk Management, Ev echnique. ing and Control: Creating the Framework, Colle							

the Project Back to Target, Change Control, Software Configuration Management. Rehashing and Extendible Hashing.

UNIT – V

Working in Teams: Introduction, Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership.

Software Quality: The place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to help enhance Software Quality.

Text Books:

1. Software Project Management, Bob Hughes, Mike Cotterell & Rajib Mall, Fifth edition, Tata McGraw Hill Education (India) Private Limited, 2011.

2. Software Project Management, Walker Royce, Pearson Education, 2012.

Reference Books:

1. Software Project Management, S.A.Kelkar, Second Edition, PHI, 2011.

2. Applied Software Project Management, Andrew Stellman & Jennifer Greene, OReilly, 2006..

3. The art of Project Management, Scott Berkun, O'Reilly, 2005.

4. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002.

Web References:

1. https://www.tutorialspoint.com/software engineering/software project management.htm 2. https://en.wikipedia.org/wiki/Software project management

Question Paper Pattern:

Sessional Exam:

The Question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The Question paper shall consists of 3 sections with Two Questions (EITHER/OR type) in each section. The student shall answer one question from each section.

End Exam:

	ADHOC AND SENSOR NETWORKS (ASN)										
VII Semest	er : Common fo	r CSE	& CS7	Γ				Scheme : 2020			
Course Code	Category	Ho	ours/W	eek	Credits	Ma	ximum Ma	rks			
CS401	PEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional E	xam Duration 1	1/2 Hrs		.1 .	1 / 111	11 4	End Exam	Duration: 3 Hrs			
Course Out CO1: Expla	tromes : At the e ain the concepts, a or networks.	nd of th network	te cour c archit	se the st tectures	and applica	tions of ad hoc an	d wireless				
CO2: Describe MAC protocols of ad hoc wireless networks.											
CO3: Explain characteristics, design issues and classification of routing and transport layer protocols in ad hoc wireless networks.											
CO4: Summarize the architecture of WSN along with MAC protocols for WSNs.											
CO5: Understand routing issues, localization and QoS in WSN.											
UNIT – I											
Introduction: Fundamentals of Wireless Communication Technology, The Electromagnetic Spectrum, Radio propagation Mechanisms, Characteristics of the Wireless Channel. Mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures. Applications of Ad Hoc and Sensor networks, Design Challenges in Ad hoc and Sensor Networks. UNIT – II MAC Protocols for Ad Hoc Wireless Networks: Issues in designing a MAC Protocol, Classification of MAC Protocols, Contention based protocols, Contention based protocols with Scheduling Mechanisms, Multi abannel MAC IEEE 802.11											
				U	NIT – III						
Routing Parouting and (on-demand Wireless Network)	rotocols and T d Transport La), hybrid routi etworks.	yer pro ng, C	rt Lay otocol lassific	er in for Ac ation o	<i>Ad Hoc</i> d hoc net of Transpo	<i>Wireless Networ</i> works, proactive ort Layer solution	<i>ks</i> : Issues routing, ons, TCP	in designing a reactive routing over Ad hoc			
				UI	NIT – IV						
<i>Wireless Sensor Networks (WSNs) and MAC Protocols:</i> Single node architecture: hardware and software components of a sensor node, WSN Network architecture: typical network architectures, data relaying and aggregation strategies, MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.											
μαν	4		0-0	U.			Lass1' d'	T 1 1			
Sensor Ne Energy Efficiency	twork Localization twork Localization cient Design, Syr	tion, a chroniz	Los: bsolute zation,	issues e and Transpo	in wSN relative lo ort Layer iss	routing, OLSR, ocalization, triar sues.	igulation, (QOS in WSN,			

1. C. Siva Ram Murthy and B. S. Manoj, *Ad Hoc Wireless Networks: Architectures and Protocols*, Prentice Hall Professional Technical Reference, 2008.

Reference Books:

- 1. Carlos De Morais Cordeiro and Dharma Prakash Agrawal, *Ad Hoc & Sensor Networks: Theory and Applications*, World Scientific Publishing Company, 2006.
- 2. Jagnnathan Sarangapani, Wireless Ad Hoc and Sensor Networks-Protocols, Performance and Control, CRC press, Taylor & Francis group, 2007.

Web References:

- 1. http://cse.iitkgp.ac.in/~smisra/course/wasn.html
- 2. https://www.youtube.com/playlist?list=PLJ5C_6qdAvBHroAfekCO7K4xphEF74UPc

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

SERVICE ORIENTED ARCHITECTURE (SOA)										
VII Semest	er : Common fo	r CSE	& CST	Γ			S	Scheme : 2020		
Course Code	Category	Но	ours/W	eek	Credits	Max	imum Mar	ks		
CS402	PEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional Exam Duration: 1/2 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to										
Course Out	erstand software of	nu or u	le cour l archit	se the st		be able to				
CO2: Desig	CO2: Design medium scale software project development using SOA principles.									
CO3: Deve	lop SOA messag	es fron	1 busin	ess use o	cases.					
CO4: Desig	gn and implemen	tation of	of mod	ern SOA	and SOA-	specific methodol	ogies, techn	ologies and		
stand	ards.							_		
CO5: Creat	te composite serv	rices by	apply apply	ing com	position sty	le.				
				UN	IIT - I	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~				
Introduction To SOA, Evolution Of SOA: Fundamental SOA; Common Characteristics of contemporary										
SOA; Common tangible benefits of SOA; An SOA timeline (from XML to Web services to SOA); The continuing evolution of SOA (Standards organizations and Contributing vendors). The roots of SOA										
continuing evolution of SOA (Standards organizations and Contributing vendors); The roots of SOA (comparing SOA to Past architectures)										
UNIT – II										
UNIT - II Web Services and Primitive SOA: The Web services framework Services (as Web services): Service										
descriptions (with WSDI): Messaging (with SOAP)										
Web Service	es and Contempo	rary SC	DA - I	Message	e exchange	patterns; Service a	activity; Co	ordination;		
Atomic Tran	nsactions; Busine	ss activ	vities; (Orchestra	ation; Chor	eography.	,	,		
Web Service	es and Contempo	rary SC	DA-2: /	Addressi	ng; Reliabl	e messaging; Corr	relation; Pol	lices;		
Metadata ex	change; Security	; Notifi	cation	and ever	nting					
				UN	III – III					
Principles oriented arc interrelate; S principles.	of Service - Ori chitecture; Comm Service orientation	entatio non Pri on and o	n: Ser inciple object o	vices or s of Ser orientation	ientation a vice orient on; Native	nd the enterprise tation; How serve Web service supp	e; Anatomy ice orientat ort for servi	of a service ion principles ice orientation		
				UN	IT – IV					
Service Lay service layer configuration	<i>ers:</i> Service orien r, Business servic n scenarios.	ntation e layer	and co , Orche	ntempor estration	ary SOA; S service lay	Service layer abstr ver; Agnostic servi	action; App ices; Service	lication e layer		
				UN	$\mathbf{T} \mathbf{T} - \mathbf{V}$					
Business Problems business pro SOA Platfo consideratio	rocess Design: V peess design; WS prms: SOA plat: ns.	WS-BP addres form b	EL lar sing la basics;	nguage l nguage l SOA s	pasics; WS pasics; WS upport in	Coordination ov Reliable Messagin J2EE; SOA sup	verview; Se ng language port in. E	rvice oriented basics. Γ; Integration		
Text Books	:									

- 1. Thomas Erl, Service-Oriented Architecture: Concepts, Technology and Design, Prentice Hall Publication, 2005.
- 2. Michael Rosen, Boris Lublinsky, Applied SOA Service Oriented Architecture and Design Strategies, Wiely India Edition, 2008.

Reference Books:

- 1. James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, —Java Web Services Architecture, Elsevier, 2003.
- 2. Ron Schmelzer et al. XML and Web Services, Pearson Education, 2002.
- 3. Frank P.Coyle, -XML, Web Services and the Data Revolution, Pearson Education, 2002.

Web References:

- 1. https://www.service-architecture.com
- 2 http://www.opengroup.org/soa/source-book/soa/p1.htm
- 3. https://www.javatpoint.com/service-oriented-architecture

Question Paper Pattern:

Sessional Exam:

The Question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The Question paper shall consists of 3 sections with Two Questions (EITHER/OR type) in each section. The student shall answer one question from each section.

End Exam:

	MOBILE COMMUNICATIONS (MC)											
VII Semest	er : Common fo	r CSE	& CST	-				Scheme : 2020				
Course Code	Category	Ho	ours/W	'eek	Credits	Ma	Maximum Marks					
CS403	PEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	0	0	3	40	60	100				
Sessional E	xam Duration	$\frac{1}{2}$ Hrs			- 1 4 : 11 1	1. 1	End Exam	Duration: 3 Hrs				
Course Out	comes : At the e	nd of th	le cour	se the st	udent will t	be able to	antin ~					
CO1: Unde	rstand the basic c	concepts	5 01 W1	reless co	mmunicati	on & mobile com	puting.					
CO3: Understand the WI AN System Architecture Protocol Architecture And Physical Laver												
	iring knowledge	on the s	structur	re & con	$\frac{11000001}{1000001}$	obile IP	I Hysical Ea	yeı.				
CO5: Understand the Traditional TCP and Classical Improvements of TCP.												
UNIT – I												
Wireless transmission : Frequencies for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation (ASK, FSK, PSK) Spread spectrum, Cellular systems.												
1		,	,	U	NIT – II	, ,						
Medium access control: Motivation for a Specialized MAC, SDMA, FDMA, TDMA (Fixed TDM, Classical Aloha, Slotted Aloha, CSMA), CDMA, Comparison of S/T/F/CDMA. GSM: Mobile services, System Architecture, Radio interface, Protocols, Localization and calling, Handover. UNIT – III Wireless LAN: Infrared Vs Radio Transmission, Infra Red and ad-hoc network. IFEE 802 11: System architecture												
layer, MAC	management.		,				,					
				U	NIT – IV							
Mobile II discovery, Dynamic ho	Coals & Registration, T est Configuration	require Funnelin protoco	ments, ng & ol.	Entitie Encar	es and to sulation,	erminology, IP Optimizations,	Packet of Reverse to	lelivery, Agent unneling, IPv6,				
				U.	NII – V							
Traditional mobility, Cl	assical TCP imp	stion c rovement	ontrol, nts.	Slow	start, Fas	t retransmit/fast	recovery,	implications of				
Text Books	:											
1. Jochen S	Schiller [2008], [S	Second	Edition	n], Mobi	ile Commu	nications, Low pri	ice edition, I	Pearson				
Keterence I	500KS:											
1. Talukde	r [2008], Mobile	Compu	ting: T	echnolo	gy, Applica	ations & service c	reation, TM	Η.				
Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	NETW	VORK	SECU	RITY A	ND CRYI	PTOGRAPHY (N	ISC)			
VII Semest	er : Common to	CSE &	& CST					Scheme : 2020		
Course Code	Category	Но	ours/W	eek	Credits	Max	Maximum Marks			
CS404	PEC-III	L	Т	Р	С	ContinuousEndInternalExamAssessmentTOTAL				
Section of F	nom Dunation 1	3	0	0	3	40	<u>60</u>			
Course Out	tcomes · At the e	$\frac{172}{172}$ Hrs	ne cour	se the st	 udent will l	ne able to	nd Exam D	uration: 5 Hrs		
CO1: Und	erstand the conce	epts and	l princi	ples of l	Network Se	curity.				
CO2: Ana	lyze various class	sical en	cryptic	n techni	iques and b	lock cipher structu	ure.			
CO3: Ana	lyze advanced en	cryptio	n stanc	lard.						
CO4: Und	erstand block cip	her mo	$\frac{\text{des of}}{1}$	operatio	n.					
COS: Exp	lain various asym	imetric	cipher	s 	1 1 1 1					
CO6: Und	erstand cryptogra	aphic ha	ash fun	ctions a	nd digital si	Ignatures				
				UI	11-1					
Network Se Number Th primality Symmetric	attacks, Security services, Security mechanisms, Fundamental security design principles, A model for Network Security. Number Theory: Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorem, Testing for primality UNIT – II Symmetric Cinhers: Classical Encryption Techniques: Symmetric Cinher model. Substitution techniques.									
Transposition Block Ciph Strength of	on techniques, Ste ers and DES: T DES, Block ciphe	eganogi raditior er desig	raphy. nal blo gn prino	ck ciphe ciples.	er structure	, Data Encryption	Standard,	DES Example,		
				UN	IT – III					
<i>Advanced I</i> AES Examp <i>Block Ciph</i> Block Chair	<i>Advanced Encryption Standard:</i> AES Structure, AES transformation functions, AES Key Expansion, AES Example, AES Implementation. <i>Block Cipher Operation Modes:</i> Multiple Encryption and Triple DES, Electronic codebook, Cipher Block Chaining Mode, Cipher feedback mode, output feedback mode.									
				UN	IT – IV					
Asymmetric Public-key systems.	Asymmetric Ciphers and Public key cryptosystems: Public-Key Cryptography and RSA: Principles of Public-key cryptosystems, RSA Algorithm. Daffier Hellman Key Exchange, Elgamal Cryptographic systems.									
	UNIT – V									
Cryptograph cipher block	<i>hic Hash Functi</i> c chaining, SHA.	ons: A	pplicat	ions of	cryptograpl	nic hash functions	s, Hash func	tions based on		

Message Authentication codes: Requirements, Message authentication functions, security of MACs. *Digital Signatures:* Digital Signature requirements, Elgamal Digital Signature, Schnorr Digital Signature scheme.

Text Books:

- 1. William Stallings, [7th Edition], Cryptography and Network Security, Pearson, 2017
- 2. Behrouz A. Forouzan, D Mukhopadhayay, [2nd Edition], Cryptography and Network Security, MC Graw Hill, 2010

Reference Books:

- 1. Eric Cole, Dr. Ronald Kurtz and James W. Conley, Network Security Bible, Wiley Publishers, 2009
- 2. Bruce C. Berndt, Number Theory in the Spirit of Ramanujan, University Press, American Mathematical Society, 2006
- 3. V.K. Jain, Cryptography and Network Security, Khanna Publishing House, 2017

4. Atul Kahate, Cryptography and Network Security, TMH, 4th Edition, 2019

Question Paper Pattern:

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End Examination:

SOFTWARE QUALITY AND TESTING (SQT)										
VII Semest	er : Common fo	r CSE	& CS7	[Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Ma	Maximum Marks			
CS405	PEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0	0	3	40	60	100		
Sessional Exam Duration 1/2 Hrs End Exam Duration: 3 Hrs										
CO1: Unde	erstand the basic	concent	ts of so	ftware to	esting					
CO2: Class	sify the types of s	oftware	e testin	g to poir	nt out the ir	nportance of testin	ng in achievi	ing		
high	n-quality software	e.		0 1		1	0	8		
CO3: Unde	erstand the variou	ıs testin	ig techi	niques of	f a software	e system.				
CO4: Com	pare the tradition	al softv	vare tes	sting and	l web based	l testing.				
CO5: Exter	nd the Quality co	ncepts	and Me	etrics for	the Softward	are Quality.				
				U	NIT – I					
Introduction to Software Testing: Introduction, Evolution of Software Testing, Software Testing—Myths and Facts, Goals of Software Testing, Psychology for Software Testing, Software Testing Definitions, Model for Software Testing, Effective Software Testing vs. Exhaustive Software Testing, Effective Testing is Hard, Software Testing as a Process, Software Failure Case Studies. UNIT – II Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle (STLC), Software Testing Methodology. Verification and Validation: Verification and Validation (V&V) Activities, Verification, Verification of Requirements, Verification of High-level Design, Verification of Low-level Design, How to Verify Code? Verification										
				UN	III – TII					
Testing Techniques: Dynamic Testing: Black-Box Testing Techniques Boundary Value Analysis (BVA), Equivalence Class Testing, State Table-Based Testing, Decision Table-Based Testing, Cause-Effect Graphing Based Testing, Error Guessing. White-Box Testing Techniques Need of White-Box Testing, Logic Coverage Criteria, Basis Path Testing, Graph Matrices Loop Testing										
				UN	NIT – IV					
<i>Testing Web-based Systems:</i> Web-based System, Web Technology Evolution, Traditional Software and Web-based Software, Challenges in Testing for Web-based Software, Quality Aspects, Web Engineering (Webe), Testing of Web-based Systems										
				U	VIT - V					
Software Que Softw	<i>uality Manageme</i> uality, Broadenir	ent: ng the	Concep	ot of Qu	ality, Qual	ity Cost, Benefits	s of Investm	ent on Quality,		

Quality Control and Quality Assurance, Quality Management (QM), QM and Project Management, Quality Factors, Methods of Quality Management, Software Quality Metrics, SQA Models.

Text Books:

- 1. Software Testing Principles and Practices, Chauhan, Oxford University Press
- 2. Software Testing, Yogesh Singh, University Press

Reference Books:

1. Software Testing and Quality Assurance, Theory and Practice A JOHNWILEY & SONS, INC., PUBLICATION by KSHIRASAGAR NAIK.

2. Fundamentals of Software Testing, AB Mathur, Pearson.

Question Paper Pattern:

Sessional Examination:

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End Examination:

		(QUAN'	ГИМ С	OMPUTIN	G (QC)		
VII Semeste CSE(AIML	er : Common for) & CSE(DS)	r CSE,	CST,				S	cheme : 2020
Course Code	Category	Hours/Week			Credits	Max	imum Mar	ks
CS406	PEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional E	xam Duration 1	1/2 Hrs				En	d Exam Du	ration: 3 Hrs
Course Out	comes : At the e	nd of th	ne cour	se the st	tudent will b	be able to		
CO1: Under	rstand the Quant	um Co	mputat	ion				
CO2: Under	rstand the Frame	work of	f Quan	tum Me	chanics			
CO3: Under	rstand Deutsch A	lgorith	m					
CO4: Under	rstand Amplitude	e Ampli	ificatio	n				
CO5: Imple	ment Error Corre	ection (Codes					
UNIT – I								
INTRODU	CTION AND B	ACKO	GROU	ND: Co	mputers an	d the Strong Ch	urch–Turing	g Thesis, The
Circuit Mo	del of Computa	tion, A	A Line	ear Alg	ebra Formu	ulation of the C	Circuit Mod	el Reversible
Computation	n, A Preview of C	Quantui	m Phys	sics, Qua	antum Physi	es and Computation	ion.	
				UN	II – II			
QUBITS A	ND THE FRAM	[EWO]	RK OI	FQUAN	NTUM ME	CHANICS: The	State of a Qu	uantum
System, Tin	ne-Evolution of a	Closed	l Syste	m, Com	posite Syste	ems, Measuremen	t.	
				UN	IT – III			
INTRODU	CTORY QUAN	TUM	ALGC	RITH	MS: Probab	ilistic Versus Qu	antum Algo	orithms, Phase
Kick-Back,	The Deutsch Alg	orithm	, The I	Deutsch-	-Jozsa Algor	rithm.		
				UN	IT – IV			
ALGORIT	HMS BASED O	N AM	PLITU	JDE AN	IPLIFICA	FION : Grover's	Quantum Se	earch
Algorithm, A	Amplitude Ampli	ification	n, Qua	ntum Aı	nplitude Est	timation and Quar	ntum Counti	ing,
Searching W	/ithout Knowing	the Su	ccess P	robabili	ty.			
				UN	IT – V			
QUANTUN	1 ERROR CO	RREC	FION:	Classic	cal Error C	orrection, The C	Classical Th	ree-Bit Code,
Fault Tolera	nce, Quantum Er	ror Co	rrection	n, Error	Models for	Quantum Compu	ting, Encodi	ing.
Text Books	:							
1. An Intro	duction to Quant	um Co	mputin	ig by Ph	illip Kaye, I	Raymond Laflam	me, Michele	e Mosca.
Reference H	Books:							

- 1. Presskil Lecture notes: Available online: http://www.theory.caltech.edu/~preskill/ph229/
- 2. An Introduction to Quantum Computing. P. Kaye.
- 3. Quantum Computer Science. N. David Mermin.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

DEEP LEARNING (DLE)

VII Semest CSBS, CSE	VII Semester : Common for CSE , CST , CSBS, CSE(AIML) & CSE(DS)						S	cheme : 2020			
Course Code	Category	He	ours/W	eek	Credits	Maximum Marks					
CS407	PEC-IV	L 3	T	P	C	Continuous Internal AssessmentEnd ExamTOTAL					
Sessional E	xam Duration 1	J 1/2 Hrs	U	U	5	<u> </u>	d Exam Du	ration: 3 Hrs			
Course Out	Course Outcomes : At the end of the course the student will be able to										
CO1: Understand concept of deep learning and Artificial Neural Network.											
CO2: Sumn	narize the Deep N	Jeural 1	Nets.								
CO3: Under	rstand the Convo	lutiona	l Neura	al Netwo	orks Operation	ions.					
CO4: Under	rstand the differe	nt type	s of Co	onvolutio	onal Neural	Networks Archite	ectures.				
CO5: Under	rstand the Recurr	ent Ne	ural Ne	etworks a	and deep R	NN training.					
				UN	IT – I						
Deep Learn of Deep Lea Artificial N Neurons, Di Fine-Tuning Case Study Deep Neura Avoiding O	Deep Learning: Introduction, Difference between Machine Learning and Deep Learning, Applications of Deep Learning Artificial Neural Network: Introduction, Artificial Neural Networks from Biological to Artificial Neurons, Difference between ANN and BNN, Single Layer Perceptron, Training Multi-layer perceptron, Fine-Tuning Neural Network Hyper parameters. Case Study: Heart Disease Prediction using ANN UNIT – II Deep Neural Network: Training a DNN, Vanishing/Exploding Gradients Problems, Faster Optimizers, Avoiding Overfitting through Regularization										
Convolutio Outputs, Ap	nal Neural Net	work-	1: The	e Convo	olutional o	peration, Motiva	tion, Poolin	ng, structured			
				UN	IT – IV						
Convolution advantages of Case Study	Convolutional Neural Network-2 : CNN Architectures: LeNet5, AlexNet, GoogLeNet, ResNet, advantages of CNN Case Study: Handwritten Digit Recognition										
	UNIT – V										
Recurrent TensorFlow Case Study	Recurrent Neural Network : Recurrent Neurons, Types of Recurrent Neural Network, Basic RNNs in TensorFlow, Training RNNs, Deep RNNs, LSTM, Case Study: Time series prediction with LSTM recurrent neural networks,										
Text Books	Text Books:										
1. "Hands	-On Machine Lea	rning v	with Sc	ikit-Lea	rn and Tens	sorFlow" March 2	2017: First E	Edition			
2. Deep L	Lanning Tan GOC		W I US	nua Der	igio Aaron		1055 UUUK				

Reference Books:

1. "Neural Networks and Deep Learning", Michael Nielsen.

2. "Neural Networks and Deep Learning" Aggarwal, Charu C.Springer International Publishing.

Web References:

1. https://www.geeksforgeeks.org

2. https://www.coursera.org/specializations/deep-learning

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

VII Semester : Common for CSE & CST Scheme : 2020 Course Code Category Hours/Week Credits Maximum Marks CS408 PEC-IV L T P C Continuous Internal Assessment End Exam TOTAL CS408 PEC-IV L T P C Continuous Internal Assessment Find Exam TOTAL CS408 PEC-IV L T P C Continuous Internal Assessment Find Exam TOTAL CS408 PEC-IV L T P C Continuous Internal Assessment Find Exam TOTAL CS408 PEC-IV L T P C Continuous Internal Assessment Find Exam TOTAL CO1: Understand Parallel Algorithms TO the course the student will be able to CO1: CO1: CO1: CO1: Course Course and Asset And Parallel Algorithms CO3: CO4: CO4: CO4: Course and Classical algorithms CO3: CO4: CO4: CO4: Course and Classical Algorithms CO3: CO4: CO4: Algorithms: Courseand Array, Algorithms CO4:	PARALLEL AND DISTRIBUTED ALGORITHMS												
Course Code Category Hours/Week Credits Maximum Marks CS408 PEC-IV L T P C Continuous Internal Assessment End Exam TOTAL Sessional Exam Duration 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs CO1: Understand Parallel Algorithms CO2: Understand Parallel Algorithms CO2: Understand Parallel Algorithms CO2: Understand Parallel Algorithms CO2: Study the complexity correctness models for parallel algorithms. CO3: Understand Parallel Algorithms CO4: Understand Distributed Algorithms CO4: Understand Distributed Algorithms UNIT – 1 Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms: Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Dimeting Paradigms, Solving Recurses , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms, Solving Recurses . Notelizable Programming Paradigms, Solving Recurses . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures , Global versus Distributed Memory , The PRAM Shared-Memory Model , Distributed-Memory or Graph Models. UNIT – II PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Profix Computation , Ra	VII Semeste	er : Common fo	or CSE	& CS	Γ			S	cheme : 2020				
CS408 PEC-IV L T P C Internal Assessment End Exam TOTAL Sessional Exam Duration 1/2 Hrs 0 0 3 40 60 100 Sessional Exam Duration 1/2 Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes : A the end of the course the student will be able to CO1: Understand PRAM and Shared Memory Algorithms. CO2: Understand PRAM and Shared Memory Algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO4: Understand PRAM and Shared Memory Algorithms. CO4: Understand PRAM and Shared Memory Algorithms. UNIT - 1 Introduction to Parallelism Parallel Processing Ups and Downs. Types of Parallelism: A Taxonomy. Parallel Algorithm Scippe Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Linear Array . Algorithms for a Binary Tree , Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms, Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures , Global versus Distributed Memory , The PRAM Shared-Memory Model , Distributed-Memory or Graph Models , SiMD versus MIMD Architectures , Global versus Distributed Algorithms: Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithms is equential Rank	Course Code	Category	Ho	ours/W	eek	Credits	Maximum Marks						
3 0 0 3 40 60 100 Sessional Exam Duration 1½ Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand Parallel Algorithms CO2: Study the complexity correctness models for parallel algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO4: Understand Distributed Algorithms CO4: Understand Distributed Algorithms. CO5: Understand PRAM and Shared Memory Algorithms. UNIT – I Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms: Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithm for a 2D Mesh ,Algorithms with Shared Variables . UNIT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD Versus MIMD Architectures , Global versus Distributed Memory , The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication .	CS408	PEC-IV	L	Т	Р	С	Continuous Internal Assessment	ContinuousEndInternalExamAssessmentTOTAL					
Sessional Exam Duration 19, Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course the student will be able to CO1: Understand Praallel Algorithms CO2: Study the complexity correctness models for parallel algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO4: Understand PRAM and Shared Memory Algorithms. CO4: Understand PRAM and Shared Memory Algorithms. CO4: Understand Praallel Algorithms CO5: Understand Classical algorithms. CO5: Understand Distributed Algorithms CO5: Understand Classical algorithms. Parallel Algorithms:Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Linear Array , Algorithms for a lineary Tree , Algorithms for a 2D Mesh ,Algorithms with Shared Variables . UNIT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures , Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms: Easic concepts. Models of computation: shared memory and message passing systems, synchro			3	0	0	3	40	60	100				
Course Uniteomes : At the end of the course the student will be able to CO1: Understand Parallel Algorithms CO2: Study the complexity correctness models for parallel algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO4: Understand Distributed Algorithms CO5: Understand Distributed Algorithms CO5: Understand classical algorithms . UNIT – I Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms:Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh ,Algorithms With Shared Variables . UNIT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures (Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – II PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms: Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm. UNIT – IV Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.	Sessional Exam Duration 1/2 Hrs End Exam Duration: 3 Hrs												
CO2: Study the complexity correctness models for parallel algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO3: Understand Distributed Algorithms CO5: Understand Distributed Algorithms . CO5: Understand classical algorithms . Parallel Algorithms: Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh , Algorithms with Shared Variables . UNT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures (Global versus Distributed Memory , The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms : Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm . Support - IV Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its app	Course Out	Course Outcomes : At the end of the course the student will be able to											
CO3: Understand PRAM and Shared Memory Algorithms. CO3: Understand PRAM and Shared Memory Algorithms. CO5: Understand Plastributed Algorithms . CO5: Understand Plastributed Algorithms . UNIT – I Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms:Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh , Algorithms with Shared Variables . UNIT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures ,Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms : Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm . UNIT – IV Distributed Algorithms: Basic concepts. Models of computation : shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.	CO1: Under	rstand Parallel A	ligorith	ms mass m	odola fa	r porollal ala	arithms						
CO4 :Understand Distributed Algorithms CO5: Understand Distributed Algorithms . UNIT – 1 Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms:Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh , Algorithms with Shared Variables . UNIT – 11 Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIND Architectures ,Global versus Distributed Memory , The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – 111 PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms : Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm . UNIT – IV Distributed Algorithms: Basic concepts. Models of computation : shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.	CO2: Study	rstand PR AM an	d Shar	ed Mer	$\frac{1}{10000000000000000000000000000000000$	orithms	,011011115.						
CO5: Understand classical algorithms . UNIT – I Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms:Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh ,Algorithms with Shared Variables . UNIT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms ,Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures ,Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms: Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm . UNIT – IV Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.	CO4 ·Under	stand Distribute	d Algo	rithms		goritinis.							
UNIT – I Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms:Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a DMesh , Algorithms with Shared Variables . UNIT – II Parallel Algorithm Complexity Algorithm Complexity Algorithm Complexity Algorithm Complexity Algorithm Complexity Asska and the NC Class , Parallel Programming Paradigms, Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms : Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm . UNIT – IV Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapabhot algorithms, clock synchronization. Distributed	CO5: Under	rstand classical a	ulgorith	ms .									
UNIT – 1 Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms: Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh ,Algorithms with Shared Variables . UNIT – 11 Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures , Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – 111 PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms : Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm . UNIT – IV Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Le			-0										
Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms:Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh ,Algorithms with Shared Variables . UNIT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms : Sequential Rank-Based Selection , A Parallel Selection Algorithm, A Selection-Based Sorting Algorithm . UNIT – IV Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.					τ	JNIT – I							
UNIT – IV Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.	UNIT – I Introduction to Parallelism Parallel Processing Ups and Downs, Types of Parallelism: A Taxonomy. Parallel Algorithms: Simple Computations and Architectures , Algorithms for a Linear Array , Algorithms for a Binary Tree , Algorithms for a 2D Mesh , Algorithms with Shared Variables . UNIT – II Parallel Algorithm Complexity Asymptotic Complexity, Algorithm Optimality and Efficiency , Complexity Classes , Parallelizable Tasks and the NC Class , Parallel Programming Paradigms , Solving Recurrences . Models of Parallel Processing: Development of Early Models , SIMD versus MIMD Architectures , Global versus Distributed Memory ,The PRAM Shared-Memory Model , Distributed-Memory or Graph Models . UNIT – III PRAM and Basic Algorithms: PRAM Sub-models and Assumptions , Data Broadcasting , Semigroup or Fan-In Computation , Parallel Prefix Computation , Ranking the Elements of a Linked List , Matrix Multiplication . Shared-Memory Algorithms : Sequential Rank-Based Selection , A Parallel Selection Algorithm,												
Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.					U	NIT – IV							
tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check pointing and recovery, reliable communication.	Distributed Algorithms: Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection. UNIT – V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault												
	tolerance an protocols, vo	d recovery: bas oting protocols, o	ic cond check p	cepts, f pointing	ault mo	odels, agreen covery, relial	nent problems and ole communication.	its applica	tions, commit				

Text Books:

- 1. Behrooz Parhami, Introduction to Parallel Processing Algorithms and Architectures, Platinum series of computer science,2002.
- 2. Mukesh Singhal and Niranjan Shivaratri, Advanced Concepts in Operating Systems, McGraw-Hill

Reference Books:

- 1. Michael J Quinn, Parallel Programming in C with MPI and OpenMP, first edition, McGraw Hill, 2004/2003.
- 2. Nancy Lynch, Distributed Algorithms, Morgan Kaufmann.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/OR Type) in each section. The student shall answer one question from each section.

End Examination:

	HIG	H PE	RFOR	MAN	CE COMP	UTING (HPC)				
VII Semester:	Common for C	SE &	CST			•	Sc	heme: 2020		
CourseCode	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks			
CS409	PEC-V	L	Т	Р	С	Continuous Internal Assessment	EndExam	TOTAL		
		3	0	0	3	40	60	100		
Sessional Exam	Duration: 1 ¹ / ₂ H	[rs				End E	xam Duration:	3 Hrs		
Course Outc	omes: At the end	of th	e cours	se stud	lents will be	e able to				
CO1: Unders systen	stand the limitations.	ons, c	ontrol	struct	ure and com	munication mo	odels of parallel	computer		
CO2: Summ	arize the decomp	ositio	n techr	iques	and mappin	g techniques fo	r parallelalgorit	hms.		
CO3: Unders	stand One-to-all,	all-to-	one an	d all-t	o-all comm	unication opera	tions for paralle	el computers.		
CO4: Interpre	et the programmin	g tech	niques	using	message pass	sing paradigm.	1	1		
CO5: Unders	stand the thread p	rogra	mming	for sh	nared addres	s space platform	ns using Open I	MP.		
	*									
				UI	I –TIV					
Parallel algorit Decomposition reducing interact the work pool n	<i>hm design</i> techniques, task ction overheads, hodel, the master	s and parall	intera el algo model	ctions , the p	, mapping t models- the	techniques for e data parallel 1 lel, hybrid mod	load balancing, nodel, the task	, methods for graph model,		
				UN	IT–III					
Basic commun	ication operation	s								
One-to-All Bro Improving the s communication	adcast and All-to speed of some co	o-One ommu	Redu nicatio	ction, n oper	All-to-all E rations: spli	Broadcast and r tting and routir	eduction, scatte ng messages in	er and gather, parts, all port		
				UN	IT–IV					
Programming using message passing paradigm Principles of message passing programming, The building blocks, MPI: The message passing interface, topologies and embedding, overlapping communication with computation: non blocking communication operations.										
				UN	NIT– V					
Programming	shared address s	pace t	olatfor	ms						
Threads, POSE programming n multiple for dire	X threads, synch nodel, specifying ectives, merging	roniz conc directi	ation p urrent ives, ne	orimiti tasks: esting	ves, attribu assigning i parallel dire	tes of threads terations to thr ectives.	and mutex, Op reads, synchron	enMP – The ization across		

TextBooks :

- 1. AnanthGrama, Anshul Gupta, George Karypis, Vipin Kumar, Introduction to Parallel Computing, Second Edition, Pearson Education, 2007.
- 2. Benedict R Gaster, Lee Howes, David R KaeliPerhaad Mistry Dana Schaa, Heterogeneous Computing with OpenCL, McGraw-Hill,Inc. Newyork, 2011.

ReferenceBooks :

- 1. Michael J. Quinn, Parallel Programming in C with MPI and OpenMP, McGraw-Hill International Editions, Computer Science Series, 2004.
- 2. Jason Sanders, Edward Kandrot, CUDA by Example An Introduction to General-Purpose*GPU* Programming, Addison Wesley, 2011.

WebReferences:

1.<u>https://www.tutorialspoint.com/parallel_algorithm/parallel_algorithm_introduction.html</u>

2. https://computing.llnl.gov/tutorials/openMP

3. https://nptel.ac.in/courses/106108055

QuestionPaperPattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

			CLOU	JD CC	MPUTIN	G(CC)			
VII Semester	: Common for	CSE,	CST,	1			Sc	heme:2020	
CSE(AIML)	& CSE(DS)								
Course Code	Category	Hou	irs/We	ek	Credits	Ma	Maximum Marks		
CS410	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	0	0	3	40	60	100	
Sessional ExamDuration:1½ Hrs					EndExamDuration:3 Hrs				

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

CO1: Understandthe features, layers and types of clouds.

CO2: Understand the Virtual Machine Provisioning and Migration Services in cloud

CO3: Understand the Aneka Cloud Architecture and Hybrid Cloud Architecture.

CO4: Understand the cloud features implemented in Google, Microsoft, Amazon and SalesForce.com

CO5: Understand the Cloud Applications, Best Practices and Future of Cloud.

UNIT-I

Introduction to Cloud Computing: Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks.

UNIT-II

Virtual Machine Provisioning and Migration Services: Introduction and Inspiration, Virtual Machines (VM), VM Provisioning and Manageability, VM Migration Services, Provisioning in the Cloud Context-Amazon Elastic Compute Cloud, Infrastructure Enabling Technology, Eucalyptus, VM Dynamic Management Using Open Nebula, and Future Research Directions.

UNIT-III

Aneka-Integration of Private and Public Clouds: Introduction, Aneka Cloud Architecture, Aneka Resource Provisioning Service, Hybrid Cloud Implementation-Design and Implementation Guidelines, Aneka Hybrid Cloud Architecture, Use Case—The Amazon EC2 Resource Pool, Implementation Steps for Aneka Resource Provisioning Service

UNIT-IV

Cloud computing with Titans: Google: Google App Engine, Google Web ToolKit,Microsoft: Azure services platform, windows live, Exchange online, Share Point services, Microsoft Dynamic Customer Relationship Management (CRM),Amazon: Amazon EC2, Amazon SimpleDB, Amazon S3, Amazon Cloud Front, Amazon Simple Queue Service, Salesforce.com: Force.com, Salesforce.com CRM, AppExchange.

UNIT-V

Cloud Applications: Grep The Webon Amazon cloud - Architecture, Workflow, ECG (Electro-Cardio Gram) analysis in Health Care, Multiplayer online Games.

Best Practices- Finding the Right Vendor, Phased-in vs. Flash-cut Approaches, Be Creative in Your Approach, How Cloud Computing Might Evolve - Researcher Predictions, Responding to Change.

TextBooks :

- 1. "Cloud Computing: Principles and Paradigms" byRajkumarBuyya, James Broberg, and Andrzej Goscinski, Wiley Press, New York, USA, Edition 2011.
- 2. "Cloud Computing: A Practical Approach" by Anthony T.Velte, Toby J Velte, , Robert Elsenpeter. McGraw-Hill, Inc. New York, NY, USA, Edition 2010

Reference Books :

- 1. RajkumarBuyya, Chee Shin Yeo, SrikumarVenugopal, James Broberg, and IvonaBrandic, "CloudComputing and Emerging IT Platforms: Vision, Hype, and Reality for Delivering Computing as the5th Utility", Future Generation Computer Systems, Volume 25, Number 6, ISSN: 0167-739X,Elsevier Science, Amsterdam, The Netherlands, June2009.
- 2. Suraj Pandey, William Voorsluys, Sheng Niu, Ahsan Khandoker, and RajkumarBuyya, "AnAutonomic Cloud Environment for Hosting ECG Data Analysis Services", Technical Report,CLOUDS-TR-2010-4, Cloud Computing and Distributed Systems Laboratory, The University ofMelbourne, Australia, August 3,2010.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

IMAGE & VIDEO PROCESSING (IVP)									
VII Semest	er : Common fo	r CSE	& CS7	Г			S	cheme : 2020	
Course Code	Category	Hours/Week			Credits	Maximum Marks			
CS411	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	0	0	3	40	60	100	
Sessional E	xam Duration 1	1 ¹ / ₂ Hrs				Enc	d Exam Du	ration: 3 Hrs	
Course Out	tcomes : At the e	nd of th	ne cour	se the st	udent will b	be able to			
CO1: To pr	ovide the basic u	ndersta	nding	of the di	gital image	formation and vis	ualization.		
CO2: Apply	y various image e	nhance	ment t	echnique	es both in s	patial and frequen	cy domain.		
CO3: Under	rstand image con	npressio	on mod	lels and	different ty	pes of compressio	n technique	S	
CO4: Perfor	rm Image segmer	ntation	on real	time in	nages.				
CO5: Under	CO5: Understand the principles of Video imaging and Video display								
	UNIT – I								
Digital Image Fundamentals: Definition and Applications of Digital Image Processing - Components									
of Image Pr	ocessing System	- Huma	an Visı	ual Syste	em - Image	Sensing Acquisiti	on - Image	Sampling and	
Quantization	n - Some Basic R	Relation	ships t	between	Pixels, Co	lor Image Process	ing: Color I	Fundamentals,	
Color Mode	ls								
				UN	IT – II				
Image Enh	ancement, Filte	ring an	nd Res	toratio	n Techniqu	ies: Histogram M	odification	Techniques, ,	
Fundamenta	ils of Spatial F	iltering	, Smo	othing S	Spatial filte	ers, Sharpening S	Spatial filte	rs Frequency	
Domain met	thods: Basics of	filtering	g in fre	quency	domain, im	age smoothing, in	nage sharpe	ning, – Image	
Restoration	- Degradation M	lodel –	Noise		ит пп				
Internet Com		£	(1				<u> </u>	4-1- T	
Compressio plane Codi Transform c	Image Compression : File format (bmp, tiff, pcx, gif, jpeg.) - Compression fundamentals – Image Compression Models: Error Free Compression: Huffman Coding, Arithmetic Coding, LZW coding, Bit plane Coding, Lossless Predictive Coding; Lossy Compression: Lossy Predictive Coding, Block Transform coding - Digital Watermarking.								
				UN	IT – IV				
Image Segmentation : Point, Line and Edge Detection - Thresholding – Region Based Segmentation, Morphological Operations and Application-Boundary , Skelton, Convex-Hull, Thinning, Pruning, Segmentation Using Morphological Watersheds - The Use of Motion in Segmentation									
				UN	IT – V				
Introductio	on to Video Pro	cessing	: Vide	eo Capti	are and Dis	splay- Principles	of Color Vi	ideo Imaging,	
Video Came	eras, Video Disp	lay, Co	mposit	te versus	s Compone	nt Video; Analog	Video Rast	terProgressive	

and Interlaced Scan, Characterization of a Video Raster; Analog Color Television Systems; Digital Video.

Text Books:

1.Rafael Gonzalez & Richard Woods, Digital Image Processing, 3rd Edition. Pearson publications, 2012

2. Video Processing and Communications- Yao Wang, Jorn Ostermann, Ya-Qin Zhang

3. Anil K. Jain, Fundamental of Digital Image Processing, PHI publication, 2013.

Reference Books:

1. Pratt, Digital Image Processing, 4th Edition, Wiley Publication, 2007.

- 2. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, Digital Image Processing, Mc. Graw Hill, 2011..
- 3. S. Sridhar, Digital Image Processing, Oxford University Press, 2011.
- 4. Digital Logic Design 4th Edition, by Brian Holdsworth, Clive Woods.

Web -References:

1. https://en.wikipedia.org/wiki/Digital_image_processing

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End Examination:

			DIGI	TAL FO	DRENSICS	S (DF)		
VII Semest	er : Common fo	r CSE	, CST,				S	cheme : 2020
CSE(AIML	L) & CSE(DS)							
Course Code	Category	Но	ours/W	'eek	Credits	Max	imum Mar	ks
CS412	PEC-V	L T P C Continuous Internal Assessment End Exam						TOTAL
		3	-	-	3	40	60	100
Sessional E	xam Duration1 ¹ /	2 Hrs				En	d Exam Du	ration: 3 Hrs
Course Out	tcomes :At the er	nd of th	e cours	se the stu	ident will b	e able to		
CO1: Under	rstand the fundan	nental c	concept	ts of dig	ital forensic	, digital evidence	and the inci	ident
response pro	ocess.							
CO2: Apply	y various data acc	uisitio	n techn	iques ar	nd tools on t	the evidences.		
CO3: Learn	the methods app	licable	for dif	ferent fo	prensic inve	stigations.		
CO4: Usage	e of various foren	sic too	ls to an	alyse di	fferent fore	nsics data.		
CO5: Gains	knowledge on c	loud for	rensic j	procedui	res and chal	lenges.		
CO6: Under	rstand the concep	ot of file	e syster	n and th	eir use in fo	orensic analysis.		
				UN	IT – I			
Digital fore discipline, 1 investigation Digital evid	ensics: Introducti Definition of dig n. lences: Introduct	on, His gital fo ion, wł	story, l prensic, nat is d	Rules of , digital ligital ev	Computer forensic i vidence, rul	/ Digital forensic nvestigations, Go es of digital evide	, Digital fo bal of digit ence, charao	rensic as a al forensic cteristics of
digital evide handling pro	ence, types of e ocedures.	videnc	e, chal	lenges	in evidence	e handling, volati	ile evidence	e, evidence
Incidence F incident resp	Response: Introd pond Methodolog	uction, 39, Acti	Goals vities i	of incid n initial	ent respons response, F	e, people involve Phases after detect	d in incider ion of an in	nt response, cident.
				UN	IT – II			
 Data Collection: Introduction, the facts in a criminal case, people involved in data collection techniques, Live data collection, Live data collection examples-Windows, Unix. Forensic Duplication: Introduction, Rules of forensic duplication(Thumb Rule), Necessity of forensic duplication, Forensic duplicates as admissible evidence, Important terms in forensic duplicate, Forensic duplication Tool requirements, Creating a Forensic duplicate of a Hard Drive, Creating a Oualified Forensic duplicate of a hard Drive. 								
	UNIT – III							
Network For disadvantag activities, Po Password Investigating	orensics: Introdu es, Understandir ort Scans, Addrea cracking, Under g routers, Networ	ction to ng Net ss Spoo standin k Proto	DIDS (1 work i ofing, A og Tec ocols.	Intrusion ntrusion Attacking chnical	n Detection as and Atta g with Troj Exploits,	System), Types or acks, recognizing ans, Viruses and Collecting Netw	f IDS, Adva pre-intrusi Worms, Und ork based	antages and on/ Attack derstanding evidence,

E-Mail Forensics: Importance of E-Mail as evidence, Working of E-Mail, Steps in E- mail communication, E-mail service protocols, E-Mail forensic analysis steps, E- Mail Forensic Tools.

 $\mathbf{UNIT} - \mathbf{IV}$

Mobile Forensics: Mobile hacking- SMS and Call Forging, mobile phone forensics, Forensic procedures CIA Traid, Software and hardware mobile phone tricks, Android forensics, Mobile forensic Tools.

Computer Forensic Tools: Introduction, evaluating computer forensic tool needs, types of computer forensic tools, tasks performed by computer forensic tools, Tool comparisons, software tools, hardware tools, Various computer/ Digital forensic tools.

 $\mathbf{UNIT} - \mathbf{V}$

Cloud Forensics: Introduction, Three dimensions of cloud forensics, usage of cloud forensic, challenges to cloud forensic. Impact of cloud computing on digital forensic, Cloud forensic Tools. **File systems:** Various types of file systems, Introduction to storage layers, Hard disk drive, Forensic Analysis of file systems.

Text Books:

1. Dr.Neelakshijain and Dr.Dhanajay R. Kalbande, Digital Forensic: The Fascinating World of Digital Evidences, Wiley Publications, 2017.

Reference Books:

1. Kevin Mandia, Chris Prosise, Incident Response and computer forensics, Tata McGraw Hill, 2006.

2. Nelson, Phillips Enfinger, Steuart, Computer Forensics and Investigations, CENGAGE Learning.

3. John R. Vacca, Computer Forensics, Computer Crime Investigation, Firewall Media, New Delhi.

4. https://www.oreilly.com/library/view/digital-forensics-with/9781597495868/

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End Examination: