



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 CSE & CST

Scheme-2020

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P/D	End Exam Marks	CIA Marks	Total Marks
I		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
II		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	<i>Soft Skills</i>	2	-		4	60	40	100
		Total	21.5						

IV SEM CSE & CST

Scheme-2020

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P/D	End Exam Marks	CIA Marks	Total Marks
I		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
II		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)

UNIT - I

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.

UNIT - II

Elasticity of Demand and Demand Forecasting:

Elasticity of Demand-Types, Measurement and Significance:

Demand forecasting –Importance, Factors, Purposes, Methods of Demand Forecasting

UNIT - III

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.

UNIT - 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:

1. A.R. Aryasri A.R. Aryasri, Managerial Economics and Financial Analysis, McGrawHill Education
2. Varshney 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

SWITCHING THEORY & LOGIC DESIGN (STLD)

III Semester : Common for CSE & CST				Scheme : 2020										
Course Code	Category	Hours/Week		Credits	Maximum Marks									
CS201	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL						
		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 number conversions, Error detection and correction mechanisms.														
CO2: Apply axioms and theorems of Boolean Algebra for minimization of Boolean functions.														
CO3: Apply Karnaugh map and Tabulation method to obtain minimal SOP and POS.														
CO4: Implement combinational circuits: Encoders, Decoders, Multiplexers, ROM, PLA.														
CO5: Design Sequential circuits using Flip-flops and sequential logic.														
CO6: Design registers and counters.														

UNIT – I

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 Implicants.

UNIT – III

Combinational Logic: Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND Circuits, Multilevel NOR Circuits, Exclusive-or and Equivalence Functions. Combinational Logic with MSI & LSI: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers, Read Only Memory (ROM), Programmable Logic Array (PLA).

UNIT – IV

Sequential Logic: Introduction, Flip Flops, Triggering of Flip Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip Flop Excitation Tables, Design Procedure, Design of Counters, Design with State Equations.

UNIT – V

Registers: Introduction, Registers - Registers with parallel load, Sequential Logic Implementation, 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.

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End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

ADVANCED DATA STRUCTURES (ADS)

III Semester : Common for CSE & CST					Scheme : 2020								
Course Code	Category	Hours/Week			Credits	Maximum Marks							
CS202	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL					
		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: Illustrate the applications of Linked Lists, Stacks and Queues.													
CO2: Comprehend the operations performed on Binary Search Tree and AVL Tree.													
CO3: Understand Heap Operations and Applications.													
CO4: Organize the data using Hashing Techniques for efficient Searching.													
CO5: Understand Operations on Special Trees and String searching algorithms.													

UNIT – I

Linear Data Structures-Applications:

Applications of Linked lists- Polynomial manipulation.

Applications of Stacks- Recursion, Quick sort, Polish notations, Conversion of infix notation to postfix notation, Postfix expression evaluation.

Applications of Queues- Breadth First Search.

UNIT – II

Non Linear Data Structures:

Operations on Binary Search Trees- Insertion, Deletion and Traversals.

AVL Trees and their operations, Threaded Binary Trees.

UNIT – III

Priority Queues (Heaps):

Simple Priority Queues - Using arrays and linked lists , Binary Heaps- Max heap, Min heap,

Applications of Binary heap- Heap Sort.

d-heaps, Leftist Heaps, Skew Heaps and Binomial Queues.

UNIT – IV

Hashing Techniques:

Hashing Definition, Hash functions, Open Hashing (Separate Chaining), Closed Hashing (Open Addressing) - Linear Probing, Quadratic Probing, Double Hashing.

Rehashing and Extendible Hashing.

UNIT – 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)

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, 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.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (OOPJ)

III Semester : Common for CSE & CST				Scheme : 2020				
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS204	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 Object Oriented Programming concepts.

CO2: Demonstrate the concepts of Inheritance, Packages and Interfaces.

CO3: Understand String handling methods and Exception handling mechanism.

CO4: Comprehend Multithreading and Java Data Base Connectivity.

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 output, this keyword, Garbage collection, finalize and Wrapper classes.

UNIT - II

Inheritance:

Inheritance basics, super key word, Method overloading, Dynamic method dispatch, Abstract classes and final key word.

Packages:

Defining a package, Access protection, Importing packages.

Interfaces:

Defining an interface and Implementing interfaces.

UNIT - III

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.

UNIT - IV

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:

1. Java The Complete Reference, Herbert Schildt, TATA McGraw-Hill, Eleventh Edition, 2019.

2. 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

CONSTITUTION OF INDIA (CI)

III Semester : Common for all Branches					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MC201	MC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	-	-	-	100	-	100

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

CO1: Understand the formation and principles of Indian Constitution.

CO2: Understand structure and functions of Union government and State executive. Duties of President, Vice president, Prime Minister, Governor, Chief Minister cabinet and State Legislature.

CO3: Understand constitutional amendments of 42, 44, 74, 76, 86 and 91. Central-State relations, President rule.

CO4: Understand Indian social structure and languages in India. Rights of women, SC, ST and then weaker section.

CO5: Understand the structure of Judiciary, Role and functions of Supreme Court, High court and Subordinate courts, Judicial review.

UNIT - I

Historical back ground, Significance of Constitution, Making of the constitution, Role of the constituent Assembly, Salient features, the Preamble, Citizenship, procedure for amendment of Constitution Fundamental rights-Derivative principles of state policy-Elections in India.

UNIT - II

Union Executive: Structures of Union Government & Functions, President, Vice President, Prime Minister, Cabinet, Parliament- State Executive:Structures and Functions, Governor, Chief Minister, Cabinet, State Legislature

UNIT - III

Central, State Relations, President's Rule, Constitutional Amendments [42, 44, 74, 76, 86 & 91]- Constitutional functionaries, Working of Parliamentary system in India

UNIT - IV

Indian Social Structure, Languages in India-Political Parties & Pressure groups, Rights of Women-S.C"s, S.T"s & other weaker sections.

UNIT - V

Judiciary: Structure, Organisation of Judiciary, independence of the Judiciary, role and functions of Supreme Court, High Courts & Sub ordinate courts, Judicial Review.

Text Books :

1. Durga Das Basu, "*Introduction to the Constitution of India*", Wedwe& Company
2. Macivel, Page, "*An Introduction Analysis*", Society
3. M.V. Pylee, "*Indian Constitution*", S. Chand Publications
4. Subhash C Kashyao : "*Our Constitution*", NationalBank, Trust, India.
5. Constitutional Law of india by Dr.S.M.Rajan

Reference Books :

1. The Constitution of India.By the Ministry of Law and Justice, The Govt. of India.
2. Constitutional Law of India by kashyapsubhasah
3. Indian constitution Law by M.P.Jain
4. Constitutional Law of India by H.M Seervai

Web References:

1. <https://www.india.gov.in/my-government/constitution-india>

ADVANCED DATA STRUCTURES LAB (ADS(P))

III Semester : Common for CSE & CST				Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks			
CS205	PCL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	100
Sessional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			

CO1: Implement the applications of Linked lists, Stacks and Queues.

CO2: Implement Binary Search Tree and AVL Tree operations.

CO3: Implement Hashing Techniques.

CO4: Implement String searching algorithms.

List of Experiments

1. Application of Linked List : Addition of two polynomial equations.
 2. Conversion of Infix expression to Postfix expression
 3. Evaluation of Postfix Expression
 4. Quick Sort (Recursion).
 5. Application of Queue: Breadth First Search Graph traversal technique.
 6. Insertion, Deletion and Traversal operations on a Binary Search Tree.
 7. Insertion and Traversal operations on an AVL Tree.
 8. Application of Binary Heap: Heap Sort.
 9. Implementation of Hashing Techniques - Linear Probing, Quadratic Probing and Separate Chaining method.
 10. Implementation of Brute force String searching technique.

DATABASE SYSTEMS LAB (DBS (P))

III Semester : Common for CSE & CST				Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks			
CS206	PCL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	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: Design Entity Relationship diagrams and Schema diagrams for real life systems.

CO2: Implement SQL queries on the real-life systems.

CO3: Write PL/SQL programs for given problems.

CO4: Implement Procedures, Functions, Triggers and Cursors in PL/SQL.

List of Experiments

1. Perform DDL, DML and DCL commands.
 2. Design and create a University Library Database using ER diagram and Schema diagram.
 3. Design and create a University database consisting of the following tables Department, Course, Instructor and Student using ER Modeling and Schema Diagram.
 4. Create various tables like Branch, Account, Depositor, Customer, Loan and Borrower for a Banking system with constraints using a Schema diagram.
 5. Perform various SQL queries on Select clause, Where clause, Pattern matching, Order by, and Group by.
 6. SQL Queries on Set operations, Aggregate functions and Join operations.
 7. PL/SQL program using Control Structures.
 8. Program to implement Procedures and Functions.
 9. Program to implement Cursors.
 10. Program to implement Triggers.

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

SOFT SKILLS LAB (SS(P))

III/IV Semester : Common for all Branches					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
SCCM01	SC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	4	2	40	60	100

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

CO1: Communicate effectively and enhance their interpersonal relationship building skills with renewed self confidence

CO2: Work together in teams and accomplish objectives in a cordial atmosphere

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 breaking Activities, Principles of Time and Stress Management
2. Art of speaking
3. Art of writing - Essay / Picture / Story
4. Business etiquette - Telephone and email
5. Presentation Skills - Power point making
6. Group Discussion – Objectives and Skills tested in a GD, types of GD, Dos and don'ts & practice
7. Team work - Drama / Skit / Role play
8. Paper / Poster Presentation
9. Problem Solving by lateral thinking puzzles
10. Know your General Awareness / Knowledge – Quiz
11. Principles of Personal excellence
12. Interview Skills

Reference Books :

1. Stephen R. Covey, "The Seven Habits of Highly Effective People", Pocket Books Publishers, London
2. Priyadarshani Patnaik, "Group Discussion and Interview Skills with VCD", Foundation Books.
3. Sangeeta Sharma & Binod Mishra, "Communication Skills for Engineers and Scientists", PHI Learning Private Limited.
4. Shiv Khera, "You Can Win", MacMillan India Publishers, New Delhi
5. Campus Connect Portals - TCS - <https://campuscommune.tcs.com>;
Infosys <http://campusconnect.infosys.com/>

OPERATING SYSTEMS (OS)

IV Semester : Common for CSE, CST & CSBS					Scheme : 2020								
Course Code	Category	Hours/Week			Credits	Maximum Marks							
CS208	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL					
		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: Acquaint with the basics of the Operating System and their different structures.													
CO2: Comprehend the process management policies, CPU Scheduling and Process synchronization techniques													
CO3: Understand Deadlocks and their Handling mechanisms, file management system.													
CO4: Analyze memory management schemes and allocation policies.													
CO5: Demonstrate Input / Output related Software/Hardware and Disk scheduling strategies.													

UNIT – I

Introduction: Concept of Operating Systems (OS), Generations of OS, Types of OS, OS Services, Interrupt handling and System Calls, Basic architectural concepts of an OS, Concept of Virtual Machine, Resource Manager view, process view and hierarchical view of an OS.

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching.

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads.

UNIT – II

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.

Scheduling algorithms: Pre-emptive and non-pre-emptive, FCFS, SJF, RR; Multi processor scheduling: Real Time scheduling: RM and EDF.

Inter-process Communication: Concurrent processes, precedence graphs, Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Semaphores, Strict Alternation, Peterson's Solution, The Producer / Consumer Problem, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem, Barber's shop problem.

UNIT – III

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Concurrent Programming: Critical region, conditional critical region, monitors, concurrent languages, communicating sequential process (CSP); Deadlocks - prevention, avoidance, detection and recovery.

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation(linear list, hash table), efficiency and performance.

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).

UNIT – 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:

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End Examination:

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SOFTWARE ENGINEERING & APPLICATIONS (SEA)

IV Semester : Common for CSE & CST					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS209	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	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: Identify the key activities in managing a software project and Process Models.

CO2: Understand the components of Software Requirements Specification document.

CO3: Apply systematic procedure for software design and deployment.

CO4: Understand the testing strategies to build the test cases.

CO5: Estimate project risks and project metrics.

UNIT - I

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.

UNIT - II

Requirements Analysis & Specification: Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management.

UNIT - III

Software Design: Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design - Architectural styles, Architectural Patterns, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.

UNIT - IV

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

UNIT – V

Risk Management & Software Metrics: Risk Management – Identification, Projection - Risk Management - Risk Identification-RMMM Plan-CASE TOOLS. Metrics for Process & Products. Software Measurement, Metrics for software quality, Types of Metrics-Function Point, Size

Oriented Metrics.

Text Books:

1. Roger S. Pressman, -Software Engineering – A Practitioner's Approach, 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.
2. James F.Peters,Witoldpedecz,JohnWiely [2008], *Software Engineering-an Engineering approach*
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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

COMPUTER ORGANIZATION (CO)

IV Semester : Common for CSE & CST					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS210	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	
		3	-	-	3	40	60	

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 design of a basic computer.

CO2: Acquire the concepts of basic programming, design of Micro Programmed control unit

CO3: Understand the Internal working of CPU, Pipelining and Vector Processing

CO4: Illustrate the basic Computer Arithmetic operations, Input Output Organization

CO5: Understand the concepts of Memory system and Secondary Storage devices

UNIT – I

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.

UNIT – II

Programming The Basic Computer

Introduction, Machine Language, Assembly Language, The Assembler, Programming Arithmetic and Logic Operations.

Micro Programmed Control

Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT – III

Central Processing Unit

Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, RISC and CISC.

Pipeline and Vector Processing

Parallel Processing, Pipelining, Arithmetic and Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT – IV

Computer Arithmetic

Introduction, Addition and Subtraction, Multiplication, Division algorithms.

Input/output Organization

Peripheral Devices, Input/output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA.

UNIT – V

The Memory System

Basic Concepts, Semiconductor RAM memories, Read-Only memories, Speed, Size and Cost, Cache Memories -Mapping Functions, Virtual Memories, Secondary Storage.

Text Books:

1. M. Morris Mano [2011], [3rd Edition], Computer system architecture, Pearson Education, 2011

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

DESIGN AND ANALYSIS OF ALGORITHMS (DAA)

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

DISCRETE STRUCTURES (DSS)

UNIT - I

Mathematical Logic:

Statements & Notation, Connectives, Well Formed Formulas, Equivalence & implications, Duality law, other connectives.

Normal forms:

Normal forms-Principle Disjunctive Normal form, Principle conjunctive Normal form, Theory of inference for statement calculus

UNIT - II

Elementary Combinatorics:

Permutations & Combinations, Enumeration of Combinations and Permutations without repetition, Combinations with repetition, Principle of Inclusion-Exclusion.

UNIT - III

Recurrence Relations:

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT - IV

Graphs:

Basic Concepts, Isomorphism and Sub graphs, Trees and Their Properties, Spanning Tress-Depth First search and Breadth First search, Minimal Spanning Trees, Binary Trees, Planar and Non planar Graphs, Euler's Formula, Hamiltonian Graphs, Chromatic Numbers.

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.Chandrasekharaiyah, 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

PYTHON PROGRAMMING (PYP)

IV Semester : Common for CSE & CST				Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks			
SCCS01	SC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		1	-	2	2	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 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 Object Oriented Programming concepts to solve real life problems.

UNIT – I

Introduction to Python Programming: Overview of Programming Languages, History of Python, Installing Python, Executing Python Programs, Commenting in Python, Internal Working of Python.

Basics of Python Programming: Python Character Set, Token, Python Core Data Type, I/O functions, Assigning Value to a Variable, Multiple Assignments, Writing Simple Programs in Python, Formatting Number and Strings, Python Inbuilt Functions.

Operators and Expressions: Operators and Expressions, Arithmetic Operators, Operator Precedence and Associativity, Changing Precedence and Associativity of Arithmetic Operators, Translating Mathematical Formulae into Equivalent Python Expressions, Bitwise Operator, The Compound Assignment Operator.

UNIT – II

Decision Statements: Boolean Type, Boolean Operators, Using Numbers with Boolean Operators, Using String with Boolean Operators, Boolean Expressions and Relational Operators, Decision Making Statements, Conditional Expressions.

Loop Control Statements: The while Loop, The range() Function, The for Loop, Nested Loops, The break Statement, The continue Statement.

Functions: Syntax and Basics of a Function, Use of a Function, Parameters and Arguments in a Function, The Local and Global Scope of a Variable, The return Statement, Recursive Functions, The Lambda Function.

UNIT – III

Strings: The str class, Basic Inbuilt Python Functions for String, The index[] Operator, Traversing String with for and while Loop, Immutable Strings, The String Operators, String Operations.

Lists: Creating Lists, Accessing the Elements of a List, Negative List Indices, List Slicing [Start: end], List Slicing with Step Size, Python Inbuilt Functions for Lists, The List Operator, List Comprehensions, List Methods, List and Strings, Splitting a String in List, Passing List to a Function, Returning List from a Function.

Tuples, Sets and Dictionaries: Introduction to Tuples, Sets, Dictionaries.

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 Self-parameter 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. <https://docs.python.org/>
3. <https://realpython.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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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: Common for CSE,CST & CSBS					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS213	PCL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	100
Seesional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			

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

CO1: Understand the Unix commands and vi editor.

CO2: Implement threads and scheduling concepts.

CO3: Implement inter-process communication, deadlock avoidance and deadlock detection.

CO4: Implement the shared memory concepts.

CO5: Implement the memory management techniques.

List of Experiments (Using C)

1. Basic UNIX commands.
2. Shell programming using vi editor.
3. Program for implementation of thread and multi threads.
4. Program for implementation of Scheduling Algorithms.
5. Program for implementation of Inter Process Communication
6. Program for implementation of Deadlock Avoidance and Deadlock Detection.
7. Program for implementation of Shared memory.
8. Program for implementation of Semaphores.
9. Program for implementation of Memory Management.
10. Program for implementation of Indexing and Hashing.

SOFTWARE ENGINEERING & APPLICATIONS LAB (SEA(P))

IV Semester : Common for CSE & CST				Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks			
CS214	PCL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	
Sessional Exam Duration: 2Hrs				End Exam Duration: 3 Hrs				

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

CO1: Identify suitable software development process model for a given scenario

CO2: Create a UML diagrams for a specified problem

CO3: Apply testing methodologies for validating design models

List of Experiments

1. **Role of Software & Software Development Model:** Identify the role of the software in today's world & suitable software development model for the given scenario.
2. **Requirement Development:** Identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenario, develop an SRS document.
3. **Introduction to UML:** To create a UML diagram of ATM APPLICATION
4. To create a UML diagram of LIBRARY MANAGEMENT SYSTEM
5. To create a UML diagram of BANKING SYSTEM
6. To create a UML diagram of RAILWAY RESERVATION SYSTEM
7. **Software Testing:** Design the Test cases for triangle problem with Software Testing Technique: Boundary Value Analysis using C
8. Win Runner is a program that is responsible for the automated testing of software. Win Runner is a Mercury Interactive enterprise functional testing tool for Microsoft windows applications.(Calculator App)
9. Study of any web testing tool (e.g. Selenium) with a given scenario
10. To create GIT account for Testing to Version Control

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

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

V Semester CST

(Scheme-2020)

S.No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P	End Exam Marks	Internal Assessment Marks	Total Marks
I 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
II 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

(Scheme-2020)

S.No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P	End Exam Marks	Internal Assessment Marks	Total Marks
I 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						

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

COMPUTER NETWORKS (CN)

V Semester: Common for CST, CSE(AIML) & CSE(DS)					Scheme: 2020			
Course Code	Category	Hours/Week		Credits	Maximum Marks			
CT302	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 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: Understand connection establishment and services provided by TCP and 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.

UNIT – III

Network layer: Design Issues: store-and-forward, services to transport layer, connection less and Connection oriented services.

Routing Algorithms: The optimality principle, shortest path routing, Flooding, Distance vector and Link state, Multicast Routings.

UNIT – IV

Congestion Control: Principles, congestion prevention policies, congestion control in virtual circuits and datagram subnets, load shedding, jitter control.

Internetworking: Tunnelling, Internet work routing, Fragmentation. The IP protocol, IP address, Gateway routing protocols: OSPF, BGP.

UNIT – 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.

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.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

ARTIFICIAL INTELLIGENCE (AI)

Scheme : 2020

V Semester : Common for CSE & CST					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS303	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 the fundamental concepts of Artificial Intelligence.

CO2: Solve problems by applying suitable search method.

CO3: Solve problems by applying heuristic search method.

CO4: Understand constraint satisfaction problems.

CO5: Understand the Knowledge Representation techniques.

UNIT – I

Introduction: What Is AI? Risk and benefits of AI. **Intelligent Agents:** Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments and the Structure of Agents.

UNIT – II

Solving Problems by Searching: Problem-Solving Agents, Example Problems, Searching for Solutions.

Uninformed Search Strategies: BFS, DFS, Depth –limited search, IDA, Bidirectional search.

UNIT – III

Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Memory-bounded heuristic search, learning to search better. Heuristic Functions.

UNIT – IV

Constraint satisfaction problem: Defining Constraint Satisfaction Problems, Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs, Backtracking Search for CSPs, The Structure of Problems.

UNIT – V

Knowledge Representation: Ontological Engineering, Categories and Objects, Events, Mental Objects and Modal Logic, Reasoning Systems for Categories, Reasoning with Default Information.

Text Books:

- RussellStuart, and Peter Norvig. "Artificial intelligence: a modern approach." (2002).

Reference Books:

- Artificial Intelligence, Ritch & Knight, TMH
- Artificial Intelligence, Saroj Kaushik.
- Introduction to Artificial Intelligence, Philip C Jackson
- Artificial Intelligence: The Basics, Kevin Warwick

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

PROFESSIONAL ETHICS (PE)								
V Semester: Common to all Branches					Scheme: 2020			
Course Code	Category	Hours/Week		Credits	Maximum Marks			
MC104	MC	L	T	P	C	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: Know the moral autonomy and uses of Ethical theories.

CO 3: Know the responsibilities of the Engineer towards the society.

CO 4: Assess environmental issues to take Protective measures to evade risks.

CO 5: Determine various roles of Engineer and help them make the world a better place.

UNIT-I

Human Values

Morals – Values - Ethics – Morals vs Laws - Integrity - Work Ethics - Respect for Others - Peaceful Life - Honesty - Courage - Valuing Time- Empathy - Character - Spirituality

UNIT-II

Engineering Ethics: Definition of Engineering Ethics - Varieties of Morals - Types of Inquiry – Kohlberg’s Theory – Gilligan’s Theory - Consensus & Controversy - Models of Professional Roles - Customs and Religion - Uses of Ethical Theories

UNIT-III

Engineering As Social Experimentation: Engineering as Social Experimentation
- Engineers as responsible experimenters - Codes of Ethics - A balanced Outlook on Law -The Challenger case study

UNIT-IV

Safety, Responsibilities & Rights: Safety and Risk - Risk Benefit Analysis and Reducing Risk - Collegiality and Loyalty - Respect for Authority - Confidentiality - Occupational Crime - Professional Rights - Employee Rights - Intellectual Property Rights (IPR)

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, IITE etc.,

Text Books:

1. Jayashree Suresh, B.S.Raghavan, "Human Values and Professional Ethics", S. Chand Publications

Reference Books:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York., 1996
 2. Charles D.Fleddermann , "Engineering Ethics", prentice Hall, New Mexico., 1999.
 3. S. Dinesh Babu, “Professional Ethics & Human Values”, Laxmi publications.

MULTIMEDIA AND APPLICATIONS LAB (MAA (P))

Scheme : 2020

V Semester : Common for CSE, CST, CSE(AIML), CSE(DS) & CSBS

Course Code	Category	Hours/Week			Credits	Maximum Marks		
SCCS02	SC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		0	0	4	2	40	60	100

Sessional Exam Duration: 2Hrs

End Exam Duration: 3 Hrs

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

CO1: Design the web based multimedia components

CO2: Create time-based and interactive multimedia components.

CO3: Create Animation Projects from its Conceptual Stage to the final Product.

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 navigate to Home page.
4. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
5. Design a web page which includes text, graphics, sound, video, and animation create your Institute website, Department Website and Tutorial website for specific subject.
6. Procedure to create an animation to change a Circle into a Square using flash.
7. Procedure to create an animation for a Boy playing with a Football.
8. Procedure to create an animation to show the ripple effect.
9. Procedure to create a scene to show the sunrise and sunset (using multiple layers and motion tweening)
10. Procedure to Create an animation for bus, car race in which both starts from the same origin point and the car winning the race.
11. Procedure for creating a Banner using Photoshop.
12. Procedure for creating a Audio file using free open source tools.
13. Procedure for creating a video: Editing, Mixing, Adding Sound to a video.
14. Procedure for Editing an Image using Photoshop/free open source tool.
15. Procedure for working with text using Microsoft power 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					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CT304	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 the phases of compiler and lexical analyzer.

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 intermediate code generation and code optimization techniques.

CO5: Understand target code generation using flow graph and DAG representation Three address code.

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 parser, Context free grammars, Derivations, Syntax tree, Writing a Grammar, Left most and rightmost Derivations, Elimination of left recursion, Left factor a grammar.

Top Down Parsing: Top Down Parsing, Recursive decent parser, Predictive parser, Non Recursive predictive parser, First and Follow Functions, Construction of LL parsing Table.

Bottom up parsing: Shift reduce parsing using stack, Handles, Operator precedence parsing, Construction Precedence Table, SLR parser, LR(0) items, Constructing SLR parsing Table.

UNIT – III

Semantic Analysis: Role of Semantic Analyzer, Type Checking, Type conversions, Type system, Type expressions, Basic Types and Constructor Types, a simple type checker, equivalence of type expressions.

Runtime environments: Activation Trees, Control Stacks, Storage Organization, Rum time memory, Activation Records, Storage Allocation Strategies - Static Allocation, Stack Allocation, Heap Allocation.

UNIT – IV

Intermediate Code Generation: Intermediate languages, Threes address code - Postfix notations, Syntax trees, Directed Acyclic graphs, Translation into Three Address Code, Implementation of three address code-Quadruples, Triples, Indirect Triples.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

Text Books:

1. Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and Tensor Flow: Concepts, Tools, and Techniques to build Intelligent Systems", O'Reilly Publications, First Edition, 2017
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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

MICROPROCESSORS AND MICROCONTROLLERS (MMC)

Scheme : 2020

VI Semester : Common for CSE & CST

Course Code	Course Category	Hours/Week			Credits	Maximum Marks		
EC320	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 the pin structure, architecture of 8086 microprocessor.

CO2: Understand the operations and internal block description l of 8086 microprocessor.

CO3: Apply the programming model of 8086 microprocessor for Assembly language programs.

CO4: Understand the pin structure, architecture and operations of 8051 microcontroller.

CO5: Apply the programming model of 8051 microcontroller for Assembly language programs.

UNIT - I

Basics of Microprocessors: Block Diagram and Features of 8085 microprocessor, 8086 CPU architecture, Pin Diagram of 8086 microprocessor, comparison of 8085 and 8086 microprocessors.

UNIT - II

8086 Operations: Segmented memory, Physical Memory Organization, Operating modes, Addressing modes, 8086 instruction set

UNIT - 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 8051 Microcontroller: Pin Diagram, Architecture, Input / Output ports and circuits, External memory, counters and Timers, Serial data input/output, interrupts.

UNIT - V

8051 Programming: Addressing Modes, Instruction set. Basic Programming with 8051 Micro controller. Interfacing LEDs, Switches.

Text Books :

1. A K Ray, K M Bhurchandi, *Advanced Microprocessors and Peripherals*, 2nd Edition, Tata McGraw Hill Education Private Ltd, 2010.
2. Mazidi Muhammad Ali, Mazidi Janice Gillespie & McKinlay Rolin D, *The 8051 Microcontroller and Embedded Systems*, 2nd Edition, Pearson Education, 2008.

Reference Books :

1. John Uffenbeck, *The 8086/8088 Family: Design, Programming, and Interfacing*, 3rd Edition, Pearson Ed, 2006.
2. Barry B. Brey, *The Intel Microprocessors-Architecture, Programming and Interfacing*, 8th Edition, Princeton Hall India, 2009.
3. Kenneth J. Ayala, *The 8051 Microcontroller*, Penram International Publication Ltd, 2006.
4. Gaonkar Ramesh, *Microprocessors Architecture, Programming & Applications with 8085/8080A*, 5th Edition, Penram International publication Ltd, 2010.
5. N. Senthil Kumar, M. Saravanan, S. Jeevananthan, *Microprocessors and Interfacing*, OUP India, 2012.

Web References:

1. www.nptel.onlineteachers.ac.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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (EITK)							
VI Semester: Common to all Branches					Scheme:2020		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
MC105	MC	L	T	P	C	Continuous Internal Assessment	End Exam
		2	-	-	-	100	-
						100	

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

CO1: Understand the concept of Traditional knowledge and its importance.

CO2: Explain the need and importance of protecting traditional knowledge.

CO 3: Illustrate the various enactments related to the protection of traditional knowledge.

CO 4: Interpret the concepts of Intellectual property to protect the traditional knowledge.

CO 5: Understand the traditional knowledge in different sectors.

UNIT-I

Introduction To Traditional Knowledge

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

Protection Of Traditional Knowledge

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-III

Legal Frame Work And Tk

- A. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, The Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPVFR Act).
 - B. The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT-IV

Traditional Knowledge And Intellectual Property

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V

Traditional Knowledge In Different Sectors

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK. 139.

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>

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)

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

VIII Semester CST

(Scheme-2020)

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

UNIVERSAL HUMAN VALUES-2 (UHV-2)

VII Semester : Common to all branches

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
HSSEC701	HSSEC	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	40	60	100

Sessional 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: Develop a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.

CO2: Understand the harmony in the human being, family, society and nature/existence

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

UNIT - 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, hostels

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. F Schumacher. "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.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

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

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

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

Reference Books:

1. Hamdy A.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 sub-questions. The student shall answer one question from each unit.

REMOTE SENSING & GIS (RSGIS)

V Semester: B.Tech.

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	Total
OEC302	OEC-I	3	-	-	3	40	60	100

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 problems using appropriate tools and techniques.

CO2: Understand the concepts of remote sensing and interpretation methods.

CO3: Understand the importance of maps, concept of map projections.

CO4: Understand the concept of GIS and its applications, different data models, spatial analysis.

CO5: Understand the principles used in GNSS and Drone surveying, data collection methods, error in observations and corrections.

UNIT – I

Aerial Photogrammetry: Stereoscopy– 3-D Model – Height determination using Parallax Bar– Digital Elevation Model (DEM) – Slope.

Land Surveying: Various Levels – Levelling methods–Total Station– EDM– Working principle – Parts of Total Station – Capabilities and applications of Total Station– Traversing – Triangulation and Trilateration.

UNIT - II

Remote Sensing: Basic concept– Electromagnetic spectrum– Spectral signature – Resolutions –Spectral, Spatial, Temporal and Radiometric – Platforms and Sensors – Remote Sensing Data Products – PAN – Multispectral, Microwave, Thermal, Hyper spectral– Visual and digital interpretation methods.

UNIT – III

Maps: Importance of maps to engineering projects – Types of maps– Scales and uses– Plotting accuracy – Map sheet numbering – Coordinate systems – Cartesian and geographical, map projections, mapdatum–MSL, Geoid, Spheroid, WGS-84.

UNIT – IV

GIS: Introduction– Data Sources – Data Models and Data Structures– Algorithms, DBMS – Creation of Databases (spatial and non-spatial) – Spatial analysis – Interpolation –Buffer, Overlay – Terrain Modelling and Network analysis.

Remote Sensing and GIS Applications: 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

GNSS: 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, Lichtenegger 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. <https://nptel.ac.in/courses/105/101/105101206/>
2. <https://nptel.ac.in/courses/105107155>
3. <https://nptel.ac.in/courses/105/107/105107194/>

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.

INTRODUCTION TO JAVA (ITJ)

V Semester : B.Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	TOTAL
OEC303	OEC- I				C			
		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 fundamentals of oops concepts, input and output

CO2: Understand the classes and objects.

CO3: Understand the Inheritance and interfaces

CO4: Understand the string handling methods

CO5: Understand the exception handling

UNIT – I

Object oriented concepts: Fundamentals, Overview of Java, Data types, variables, Operators, control statements, Reading console input, writing console output, arrays.

UNIT – II

Introducing Classes: Class fundamentals, declaring objects, introducing methods, Constructors, this keyword, finalize

UNIT – III

Inheritance: Inheritance basics, using super, method overriding, abstract class, using final with inheritance, Interfaces: Defining interface, implementing interface

UNIT – IV

String Handling: String constructors, Special string operations, character extraction, string comparison, searching strings, modifying strings. StringBuffer class and its methods.

UNIT – V

Exception Handling: Fundamentals, exception types, try, catch, throw, throws, finally. Java built-in exceptions, creating your own exception subclasses.

Text Books :

1. Herbert Schildt [2008], [9th Edition], The Complete Reference Java2, TATA McGraw-Hill.
2. E Balaguruswamy [2007], [3 rd Edition], Programming with Java, A Primer, TATA McGraw- Hil.

Reference Books :

1. Bruce Eckel [2008], [2nd Edition], Thinking in Java, Pearson Education.
2. H.M Dietel and P.J Dietel [2008], [6th Edition], Java How to Program, Pearson Ed.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

4. Wolfram Donat, Learn Raspberry-Pi with Python, Apress,2016

Web References:

1. <https://nptel.ac.in/courses/106105166/>
2. https://onlinecourses.nptel.ac.in/noc17_cs22/course
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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks

SCIENTIFIC PROGRAMMING WITH PYTHON (SPY)

V Semester: B.Tech					Scheme: 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
OEC305	OEC - I	L	T	P	C	Continuous Internal Assessment	End Exam
		3	-	-	3	40	60

Sessional Exam Duration: 1½ Hrs

End Exam Duration:3 Hrs

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

CO1: Understand programming with mathematical formulas.

CO2: Apply the concepts of Loops, lists, Functions and Branching.

CO3: Work with Input, Error Handling and Modules.

CO4: Learn to visualize mathematical functions and mathematical calculations.

CO5: Work on Dictionaries and Strings.

CO6: Apply the concepts of Object Oriented Programming.

UNIT – I

Getting Started with Python: The First Example: Hello, World!, Different Ways to Use Python.

Computing with Formulas: Programming Simple Mathematics, Variables and Variable Types, Formatting Text Output, Importing Modules, Pitfalls When Programming Mathematics.

UNIT – II

Loops and Lists: Loops for Automating Repetitive Tasks, Boolean Expressions, Using Lists to Store Sequences of Data, Iterating Over a List with a for Loop, Nested Lists and List Slicing, Tuples.

Functions and Branching: Programming with Functions, Function Arguments and Local Variables, Default Arguments and Doc Strings, If-Tests for Branching the Program Flow, Functions as Arguments to Functions, Solving Equations with Python Functions, Writing Test Functions to Verify our Programs.

UNIT – III

User Input and Error Handling: Reading User Input Data, Flexible User Input with eval and exec, Reading Data from Files, Writing Data to Files, Handling Errors in Programs, Making Modules.

UNIT – 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: 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. <https://realpython.com/>
3. <https://www.w3schools.com/python/scipy/index.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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

ETHICAL HACKING (EH)

Scheme : 2020

V Semester : B.Tech								
Course Code	Category	Hours/Week		Credits	Maximum Marks			
OEC307	OEC - I	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 basics of security and ethical hacking.

CO2: Understand about foot printing and types of attacks in social engineering.

CO3: Understand about sniffers, hijacking and DoS attacks.

CO4: Understand the importance of web server hacking, database hacking and SQL Injection.

CO5: Understand about Wireless technologies, intrusion detection and firewalls.

UNIT – I

Introduction to Ethical Hacking: Introduction, Security fundamentals, Security testing, Hackers and Crackers description, Ethical Hackers.

Technical Foundations of Hacking: The Hacking process, Information Security Systems and the Stack.

UNIT – II

Foot printing: Information Gathering Methodology , OS Fingerprinting, Fingerprinting Services, Enumeration, System Hacking.

Social Engineering: Social Engineering, Malware threats, Vulnerability analysis.

UNIT – III

Sniffers: Passive sniffing, Active sniffing, ARP,ARP poisoning and MAC flooding, tools for sniffing, wire shark, sniffing and spoofing countermeasures.

Session Hijacking: Transport layer Hijacking, Application layer Hijacking, Session Hijacking Tools.

Denial of Service: DoS attack techniques, Distributed DoS, DDoS tools.

UNIT – IV

Web Server Hacking: HTTP protocol, scanning web servers, Banner grabbing and Enumeration, Web server, Dos/ DDoS and DNS attacks.

Database Hacking: Introduction to SQL and SQL injection and categories, Finger printing, UNION Exploitation technique, Boolean in SQL injection attacks, Out-of band exploitation, exploring the time-delay SQL injection technique, Stored procedure SQL injection and mitigations,SQL injection hacking tools.

UNIT – V

Wireless Technologies, Mobile Security: Mobile device operation and security, Wireless LAN's-Basics, Wireless LAN frequencies and signalling, Wireless LAN security.

IDS - Intrusion Detection and Prevention Systems. Firewalls and Honey pots.

Text Books:

1. Micheal Gregg, "Certified Ethical Hacker (CEH) Cert Guide", Pearson education, 2020.

Reference Books:

1. EC-Council, "Ethical Hacking and Countermeasures(CEH)", CENGAGE Learning, 2020.
2. Sai Satish, "Hacking Secrets Part-1", Indian Servers, 2018.
3. David Litchfield, Chris Anley "The Database Hackers Handbook:Defending Database Servers",

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

ENTREPRENEURSHIP DEVELOPMENT (EDP)

V Semester: B.Tech					Scheme : 2020			
Course Code	Category	Hours / Week			Credits	Maximum Marks		
OEC308	OEC - I	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100

Sessional Exam Duration : 1 ½ Hrs

End Exam Duration : 3 Hrs

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

CO1: Analyse the role of entrepreneurship in economic development

CO2: Understand rural entrepreneurship and small enterprises

CO3: Examine the project reports

CO4: Understand the ownership structure of company and women entrepreneurship in India

CO5: Understand the support by specified institutions for entrepreneurship development

UNIT – I

Entrepreneur: Concept of an entrepreneur; Definition of an entrepreneur; Types of entrepreneurs; Characteristics of an entrepreneur.

Entrepreneurship: Introduction; Elements of entrepreneurship; Six important segments of entrepreneurship environment; Advantages of entrepreneurship; Barriers to entrepreneurship; Role of entrepreneurship in economic development.

UNIT – II

Rural Entrepreneurship: Meaning; Need; Retrospection of rural industrialization in India; Problems of rural entrepreneurship; Development plan for rural entrepreneurship.

Small Enterprises: Definition of SSI; Types, Characteristics of SSI; Role of SSI in economic development; Problems faced by SSI.

UNIT – III

Project Planning: Project Identification; Project Selection; Project Report – Contents & Formulation; Methods of Project Appraisal – Market Feasibility, Technical Feasibility, Financial Feasibility and Economic Feasibility.

UNIT – IV

Ownership Structures: Sole Proprietorship; Partnership; Company; Co-operative; Selection of appropriate ownership structure.

Women Entrepreneurship in India: Introduction; Policies and Schemes for Women Entrepreneurs; Factors Influencing the Women Entrepreneurship; Types of Women Entrepreneurs; Challenges for Women Entrepreneur.

UNIT – V

Institutional Finance: Commercial banks; Other Financial Institutions – IFCI, IRBI, SFC, SIDC & EXIM Bank.

Institutional Support: Need; Support to Small Entrepreneurs – DICs, Industrial infrastructure corporation, and National institute for MSME, Incubation Centers (Government and private).

Text Books:

Prof. Satish C. Ailawadi & Mrs. Romy Banerjee, "Principles of Entrepreneurship", 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

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

INTRODUCTION TO INFORMATION SYSTEMS (IIS)

V Semester : B.Tech				Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks			
OEC309	OEC-I	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 Computer architecture and functionalities of System Software.

CO2: Understand the page replacement and CPU Scheduling Algorithms

CO3: Understand the phases of software development life cycle and process models.

CO4: Design ER model for real life scenarios

CO5: Apply SQL commands to create, update, modify and retrieve data from the data bases.

CO6: Apply normalization techniques to normalize the database

UNIT – I

Fundamentals of Computers & Computer Architecture: Introduction, Organization of a small computer, Central Processing Unit, Execution cycle, Instruction categories, measure of CPU performance, Memory, Input/output devices, BUS, addressing modes

System Software: Assemblers, Loaders and linkers, Compilers and interpreters.

UNIT – II

Operating System: Introduction, Memory management schemes, Page replacement algorithms, Process management, CPU scheduling algorithms.

Software engineering: Software engineering: Introduction to Software engineering, Life cycle of a software project, software Development models.

UNIT – III

Relational Database Management System: Introduction to DBMS, the database technology, data models, Database Users.

Entity Relationship (E-R) Modeling: Introduction, Notations, Modeling E-R Diagrams, Case Studies, Merits and Demerits of E-R modeling.

UNIT – 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:

- | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

NEURAL NETWORKS AND FUZZY LOGIC (NNFL)

V Semester: B.Tech

Scheme: 2020

Course Code	Course Category	Hours/Week			Credits	Maximum Marks		
OEC310	OEC- I	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100

Sessional 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: understand the basic concepts of Neural networks

CO2: analyze Supervised Learning feedback networks

CO3: analyze Unsupervised Learning feedback networks.

CO4: understand concepts of fuzzy logic and fuzzy set theory

CO5: To apply the knowledge of Neural Networks & fuzzy logic to real time systems.

UNIT – I

Introduction to Neural Networks and its Basic Concepts

Biological neurons and McCulloch and Pitts models of neuron, Types of activation functions, Neural networks architectures, Linearly separable and linearly non-separable systems and their examples, Features and advantages of neural networks over statistical techniques, Knowledge representation, learning process, error-correction learning, concepts of supervised, learning, and unsupervised learning..

UNIT – II

Supervised Learning Neural Networks

Single layer perceptron and multilayer perceptron neural networks, their architecture, Back propagation algorithm, generalized delta rule, learning factors, step learning, Momentum learning, Concept of training, testing and cross-validation data sets for design and validation of the Networks

UNIT – III

Unsupervised Learning Neural Networks

Competitive Learning networks, kohonen self-organizing networks, K-means and LMS algorithms, RBF neural network and its structure, Hybrid training algorithm for RBF neural networks, Comparison of RBF and MLP networks Learning, Hebbian learning, Hopfield networks.

UNIT – IV

Fuzzy logic

Basic Fuzzy logic theory, sets and their properties, Operations on fuzzy set, Fuzzy relation and operations on fuzzy relations and extension principle, Fuzzy membership functions and linguistic variables, Fuzzy rules and fuzzy reasoning, Fuzzification and defuzzification and their methods, Fuzzy inference systems

UNIT – V

Applications of Neural Networks & Fuzzy systems

Applications of Neural Networks: Pattern classification, Handwritten character recognition, 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
3. S.N.Sivanandam. M.PaulRaj, - 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions and the student should answer any one question from each unit. Each Question carries 12 marks.

RENEWABLE ENERGY SOURCES (RES)

VI Semester B.Tech					Scheme : 2020			
Course Code	Category	Hours/ Week		Credit s	Maximum Marks			
OEC311	OEC - II	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam Duration : 1 ½ Hrs					End Exam Duration : 3 Hrs			

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

CO1:Understand various sources of energy and solar geometry.

CO2:Describe the process of harnessing solar energy in the form of heat.

CO3:Explore basic terms of wind and the extraction of energy from wind.

CO4:Understand the technologies involved in extraction o f biomass energy and geothermal Energy.

CO5:Understand Tidal, Wave and Ocean energy conversion methods and concepts of emerging technologies.

UNIT – I

Introduction and Energy Conservation: Classification of energy sources-Importance of renewable energy sources and energy chain-Principles of energy conservation -Energy conservation opportunities. World energy status & Energy Scenario in India.

Fundamentals of Solar Energy: Extra-terrestrial and terrestrial radiation- Solar constant and solar radiation geometry- time and day length-Estimation of monthly average daily total radiation on horizontal surface and tilted Solar surface-Measurements of radiation data. Basic principle & classification of PV cell

UNIT – II

Solar Thermal Systems: Solar collectors & its classification - Solar water heating-solar passive space heating and cooling systems-Solar refrigeration system – Solar thermal power generation-Solar Distillation-solar drier-solar pond.

UNIT – 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 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

UNIT – 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.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

INDUSTRIAL SAFETY (IS)

Scheme : 2020

VI Semester	B.Tech							
Course Code	Category	Hours /Week		Credits	Maximum Marks			
OEC312	OEC - II	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100

Sessional Exam Duration : 1½ Hrs

End Exam Duration : 3 Hrs

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

CO1: To understand the principles of safety management including safety audit, safety education and accident investigation

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

CO4: To understand the effect of toxic substances and hazardous chemicals

CO5: To understand the modes of electrical hazards and safety measures in electrical and information technology industries

UNIT –I

Safety in Engineering Industry- Safety need, General hazards and control measures in engineering industry, Four significant industrial disasters happened in the world (Bhopal, Chernobyl, Flixborough, Rana plaza),Safety audit- procedure

Accident Investigation- Learning from accident, Layered investigations, Investigation process and summary

UNIT –II

Fire Safety: The fire triangle, Explosions, Distinction between fire and explosions, Flammability characteristics of liquids and vapours, Fire protection techniques, Fire extinguishers, Fire hazard and analysis, Prevention of fire, Steps after occurrence of fire, Fire detection, Fire alarmand firefighting systems, Explosion proof equipment and instruments

UNIT –III

Machine Safety: Machine guarding, Machine guarding assessment, Safeguarding machines and equipment, Guards, Safeguarding devices, Other potential safeguards

Construction Safety: Scope, Safety in -Underground works, Above ground works, Under waterworks, Demolition works.

UNIT –IV

Chemical Safety: Hazardous chemicals, Definition of a hazardous chemical, Toxic effects, Working with toxins, Storing hazardous chemicals, Process hazards, Transportation of hazardous chemicals, Chemical waste management, Hazardous chemical emergency procedures, Worker contamination, Chemicals and worker health

UNIT –V

Electrical Safety: Electrical dangers, Electrical pathways, Static electricity, Result of electrical contact, Shockversus electrocution, Electrical burns, Handling electrical hazards, Controlling electrical hazards, Training, Safety and Health program

IT Industry Safety: Hazardous in IT industry, General precautions, Employer's responsibility, Employees responsibilities, Office ergonomics, Computer workstation – health & safety tips, Laptop safety precautions

Text Books:

1. L. M. Deshmukh. Industrial Safety and Management. McGraw Hill Education (India)

2. D. A. Crowl and J. F. Louvar, Chemical Process Safety (Fundamentals with Applications), Prentice Hall, 2011.

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.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

WEB TECHNOLOGIES (WT)

VI Semester : B.Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		C	Continuous Internal Assessment	End Exam
OEC313	OEC - II	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: Design a Web Page using Text Formatting Tags, Hyperlinks

CO2: Develop a webpage with Images, Tables Hyperlinks, Lists, CSS.

CO3: Design dynamic web pages using JavaScript

CO4: Design a Form using HTML Forms & Controls

CO5: Understand the basic concepts of PHP and database connection using XAMPP Server.

UNIT – I

HTML5: Overview of HTML5 and other web technologies, HTML5 and its essentials, Fundamentals of HTML5, Working with Text and organizing Text in HTML, Working with Links and URLs.

UNIT – II

Images: Working with Images, Image Maps, Creating Tables, Frames

CSS: Overview of CSS, Backgrounds and Color Gradients in CSS, Fonts and Text Styles, List Styles, Table Layouts,

UNIT – III

JavaScript: Overview of java script, Functions, Events, Java script Objects, Working with Browser Objects, Document Object, Document Object Model, Validation, Errors, Exception Handling in JavaScript.

UNIT – IV

Forms: What's a Form? What Controls are available? Creating a Form and adding HTML Controls, Submitting Data from forms, Customizing Controls in CSS, Form validation using Java Script, Interactive Elements.

UNIT – V

Introduction to PHP: Installing and Configuring PHP: Building PHP with Apache on Windows, The Basics of PHP scripts. The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, XAMPP Server configuration.

Text Books:

1. HTML5 Black Book, 2nd Edition, Dreamtech Press, 2016.
2. Deitel and Deitel and Nieto, —Internet and World Wide Web - How to Program®, Prentice Hall, 5th Edition, 2011.
3. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach yourself, Pearson Education (2007).

Reference Books:

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. <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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

INTRODUCTION TO CYBER SECURITY (ICS)

VI Semester : B.Tech					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE314	OEC- II	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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: Discriminate and analyze the problems in cybercrime.

CO2: Identifying different classes of attacks.

CO3: Synthesize cybercrime issues on wireless and mobile devices.

CO4: Use and apply modern cyber forensics tools.

CO5: Analyze the computer forensic problems for feasible solutions.

UNIT – I

Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

UNIT – II

Cyber offenses: How Criminals Plan Them– Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber café and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

UNIT – III

Cyber crime Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones. Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT – IV

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing.

UNIT – V

Cyber Security: Organizational Implications: Introduction, Cost of Cyber crimes and IPR issues, Web threats for Organizations, Security and Privacy Implications. **Social media marketing:** Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, Sunit Belapure, Wiley.
2. Principles of Information Security, Micheal E.Whitman and HerbertJ. Mattord, Cengage Learning.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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](https://online.courses.nptel.ac.in/noc19_mm21/preview)

3. [online courses nptel.ac.in/noc22_ch11/preview](https://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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions and the student should answer any one question from each unit. Each Question carries 12 marks.

development methods.

Text Books:

1. Pradeep Sahni, *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, Anup Karanth, 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:

1. <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. www.odihpn.org, *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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

PROJECT MANAGEMENT (PM)

VI Semester :B.Tech.					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC317	OEC - II	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	-	3	40	60	100

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 methods of planning, scheduling and principles of construction management.

CO2: Formulate, solve CPM and PERT networks.

CO3: Understand the structure of organization and resource allocation.

CO4: Understand the procedure for documentation of tenders, contracts & time-cost analysis.

CO5: Understand basics of engineering economics and solving of cash flow problems.

CO6: Understand the concepts of quality control and safety management.

UNIT – I

Introduction to Construction Management: Significance – Objectives and functions of construction management – Types – Resources – Stages – Team of construction unit.

Construction Planning and Scheduling: Objectives and importance of planning and Scheduling – Methods of planning and scheduling – Advantages and classification of schedules – Bar charts – Milestone charts.

UNIT - II

Network Techniques in Construction management: Elements of network – Network techniques – Breakdown structures – Representation and specifying of activities and events – Rules for Network.

Critical Path Method (CPM): Introduction – Difference between CPM and PERT – Time estimates – Float – Critical path – Network analysis and computation problems.

UNIT – III

Program Evaluation and Review Technique (PERT): Introduction, time estimates, slack, critical path – Network analysis and computation problems.

Cost–Time Analysis in Net Work Planning: Importance of time – Project cost analysis in network planning – Updating – Resources allocation.

UNIT – IV

Tenders and Contracts: Type of tenders – Principles of tendering – Notice inviting tender – Contracts definition – Essentials – Types – Documents – Conditions of contracts.

Arbitration: Definition – Arbitrator – Arbitration agreement – Qualification of arbitrator – Advantages of arbitration.

Organisation: Principles of organization – Types of organization – Measurement book.

UNIT - V

Engineering Economics: Basic Principles – Equivalence – Cash Flow diagram – Single Payment present worth factor – Uniform series present worth factor.

Safety, Inspection and Quality Control: Importance of safety – Safety Measures – Personal Protection Equipment – Need for inspection at work – Principles of inspection – Importance 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), New Delhi.
- 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*, John Wiley 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 weightage 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 Semester : B.Tech					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC318	OEC-II	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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: Demonstrate the Object oriented concepts.

CO2: Interpret different types of Inheritance and Polymorphism.

CO3: Classify layer functionalities of OSI reference model and TCP Protocol suite.

CO4: Summarize the concepts of internetworking, security and IP addressing.

CO5: Demonstrate different types of protocols and web contents used in web design

UNIT – 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. Access Specifiers in Class, UML Class Diagrams.

UNIT – 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

Introduction to computer Networks: Introduction, Network Topology, OSI Reference Model, TCP Protocol Suite, Routing Devices, Types of Networks.

UNIT – IV

Internetworking: Protocols for Internetworking, Internet Address and Domains, Packets, Packet Switched Networks, Virtual Private Networks, and Working of Internet.

UNIT – 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 Programme – Object Oriented Concepts – System
2. Campus Connect Foundation Programme – Computer Hardware and System Software - Vol. – 3, INFOSYS Concepts
3. Campus Connect Foundation Programme – Relational Database Management System, Client Server
4. E.Balaguruswamy, Object Oriented programming with C++, 2017
5. Data Communications & Networking, Forouzan, Tata McGrawHill, Fifth edition, 2017

Web References:

1. <https://www.tutorialspoint.com/cplusplus/>

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

End Exam:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

INDUSTRY 4.0 (I40)

Scheme : 2020

VI Semester : B.Tech

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE320	OEC-II	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100
Sessional 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:** Understand the Characteristics, Sensors, Actuators and Communication models for industry 4.0.
- CO2:** Understand Fourth revolution and Industry operations.
- CO3:** Understand the Cyber-Physical Systems, Sensors, platforms of Industrial IoT.
- CO4:** Understand the Cyber security, Industrial Internet Systems.
- CO5:** Understand Business Models and Architecture, Key enablers in Industrial IoT.

UNIT – I

Introduction to IoT, Sensing and Actuators, Communication

Introduction, Transducer- Definition, Sensor – Static and Dynamic characteristics, Types, Actuator – Features, Types, Communication protocol, Standards, Features, Variants, IoT Networking - introduction, Proprietary non-IP based solution, IP based solutions.

UNIT - II

Industry 4.0: The Fourth Revolution

Introduction, Sustainability Assessment of Manufacturing Industry, Lean Production System, Smart and Connected Business Perspective, Smart Factories

UNIT – III

Cyber-Physical Systems, Sensors, Platforms

Cyber-Physical Systems and Next-Generation Sensors, Collaboration Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis.

UNIT - IV

Cyber security, Industrial Internet Systems:

Cyber security – Introduction, challenges, Industrial Internet Systems, Industrial Sensing & Actuation, Industrial Processes and systems.

UNIT - V

Business Models and Architecture, Key Enablers:

Industrial Business Models, Reference Architecture for Industrial Business Models of IIoT, Key Enablers of Industrial IoT in Sensing, Key Enablers of Industrial IoT in Connectivity, Key Enablers of Industrial IoT in Connectivity.

Text Books

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach", VPT; 1 edition.

2. Industrial IoT Challenges, Design Principles, Applications, and Security, Ismail Butun, Springer Nature Switzerland AG, 2020.

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-in-electrical-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.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

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

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

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. Tech					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC401	OEC-III	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100

Sessional Exam Duration : 1 ½ Hrs

End Exam Duration: 3 Hrs

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

CO1: the components of urban and rural roads and estimates the capacity and level of service

CO2: the components and functions of railway track

CO3: the control factors, gradients and geometric design of railway track

CO4: the various aircraft characteristics and design of runways

CO5: the various features in Harbours and Ports, their construction and coastal protection works

UNIT - I

Highway Engineering: Critical cross section of urban and rural roads- Road ecology- Classification of roads-Concept of Capacity and Level of Service-Factors affecting- Computation of Capacity and Level of Service as per Indo-HCM2017- Measure of effectiveness-Highway capacity and performance characteristics.

UNIT - II

Railway Track: Requirements of an ideal permanent way – Gauges in India – Selection of gauge- Functions and requirements of rails- Sleepers and Ballast- Functions and requirements, types of sleepers - Sleeper density – Ballast – Functions and requirements, types – Sub grade – Functions of sub grade or formation – Sub grade materials and its improvement.

UNIT - III

Track Alignment: Basic requirements – Factors controlling alignment – Gradients – Types of gradient – Grade compensation on curves.

Geometric Design of the Track: Speed of the train – Speed on curves – Radius or degree of curvature – Super elevation or cant – Cant deficiency- negative super elevation - Types of transition curve – Length of transition curve – Widening of gauge on curves – Shift of the curve.

UNIT - IV

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.

UNIT - 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.

Text Books

1. Indian Highway Capacity Manual- December2017, CSIR Publications, New Delhi.
2. C. Saxena and S.P. Arora [2015], *Railway Engineering*, Dhanpat Raj Publications
3. Khanna, S. K., Arora, M. G., and Jain, S. S. *Airport planning and Design*, Sixth Edition, Nem Chand and Bros, Roorkee, India, 2012.
4. C.Venkatramaiah., *Transportation Engineering*- Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels..Universities Press (India) Private Limited, Hyderabad, 2015.

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. Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC402	OEC-III	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	-	-		40	60	100

Sessional 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: To take up the basic concepts of air pollution.

CO2: To introduce students to basic concepts of 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

Introduction: 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

Transport of Pollution in Atmosphere: 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 isolates.

UNIT – III

Effects of Air Pollution: Effects of Air Pollution on human beings, plants and animals and Properties –Global Effects –Greenhouse effect –Ozone depletion, heat island, dust storms – Automobile pollution sources and control –Photochemical smog –Future engines and fuels.

UNIT – IV

Air Pollution control: 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.

UNIT – V

Air Quality Sampling and Monitoring: 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, *Environmental Pollution Control Engineering*, New Age International publishers.
2. H.S. Peavy, D.R. Row & G. Tchobanoglou, *Environmental Engineering*, McGraw Hill International Edition.
3. Martin Crawford, *Air Pollution Control Theory*, TMH Publication.

Reference Books:

1. H.C Parkins, *Air Pollution and Control*, McGraw Hill Publication.
2. Wark K, Warner C F, and Davis W T, *Air Pollution: Its Origin and Control*, 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 Semester: B. Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	TOTAL
OEC403	OEC - III	3	-	-	3	40	60	100

Sessional 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: Understand the basic components of industrial robots.

CO2: Understand the types of End Effectors and Sensors in robots.

CO3: Understand the Robot manipulator, forward and inverse kinematics.

CO4: Understand the programming methods for robots and design considerations of Robot work cell

CO5: Understand the manufacturing and processing applications of robot.

UNIT – I

Fundamentals of Robotics and Robot technology: Automation and robotics, robot definition, 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, Machine Vision, use of sensors in robotics.

UNIT – III

Robot Motion Analysis and Control: Introduction to manipulator kinematics, position representation, forward transformation and reverse transformation of two degree freedom robot arm three degree of freedom arm in two dimensions, four degree freedom manipulators in three dimension, homogeneous transformation and homogeneous transformation matrix.

UNIT – IV

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 welding, continuous arc welding, spray coating, and other processing operations.

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

- | |
|--------------------------------------------------------------------------------------------------|
| 1. K. S. Fu, Ralph C. Gonzalez and C.S.G. Lee, Robotics, control, sensing, vision, Mc Graw Hill. |
| 2. 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

QUALITY & RELIABILITY ENGINEERING (QRE)

VII Semester: B. Tech

Scheme : 2020

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	TOTAL
OEC 404	OEC-III	3	-	-	3	40	60	100

Sessional Exam Duration : 1.5 Hrs

End Exam Duration : 3 Hrs

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

Introduction to T.Q.M.: Introduction to Quality; Evolution of and basic approach to Total Quality Management; Leadership concepts; The Seven habits of highly effective people; Role of TQM Leaders; Implementation of TQM; Quality council, quality statements

UNIT – II

Customer Satisfaction: Types of Customers-

Internal and External; Customer perception of quality; Feedback & brief discussion on Information Collecting Tools

Employee Involvement: Maslow's hierarchy of needs; Types of Teams, Stages of team development, Common barriers to team progress, Training; Benefits of Employee Involvement

UNIT – III

Continuous Process Improvement: Introduction, Juran trilogy, Improvement strategies; P-D-S-A cycle & Problem solving method; Basic concepts of Kaizen and Six sigma quality control, Taguchi method, Quality circles

Supplier Partnership: Introduction, Partnering, Sourcing, Supplier Selection, Supplier Rating, Relationship Development

Tools & Techniques of TQM : Pareto diagram, Cause & Effect diagram

UNIT – IV

Benchmarking: Introduction, Benchmarking process

Quality Function Deployment: Benefits of QFD, House 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

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| 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:

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

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.https://onlinecourses.nptel.ac.in/noc18_cs51

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

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions, and the student should answer any one question from each unit. Each Question carries 12 marks.

DISTRIBUTED EMBEDDED SYSTEMS (DES)

VII - Semester : B. Tech

Scheme: 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 407	OEC-III	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional 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: Understand the real time environment and applications.

CO2: Understand System architecture and design of Distributed Embedded Systems

CO3: Understand inter task management and scheduling.

CO4: Analyze the network connection of distributed systems

CO5: 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, functional 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 Scheduling: Inter component communication, task management, and dual role of time; inter task interactions, Scheduling problem - static & dynamic scheduling – system design – validation – time-triggered architecture.

UNIT-IV

Distributed Networks: Types of networks, comparisons, ISO-OSI model, TCP/IP connections. CAN concepts, Ethernet

UNIT-V

Case Studies: Bluetooth controlled embedded operations, GSM based embedded operations, and event trigger based embedded applications.

Text Books:

1. Hermann Kopetz, Real-Time systems – Design Principles for distributed Embedded Applications, 2nd Edition, Springer 2011.

2. GlaF.P.Feiffer, Andrew Ayre and Christian Keyold, Embedded Networking with CAN and CAN open, Copperhill Media Corporation, 2008.

Reference Books:

1. Bernd Kleinjohann, Architecture and Design of Distributed Embedded Systems, Springer US,2013

1. Wayne Wolf, “Computers as Components”, Second edition, Morgan Kaufmann, 2008.

Web References:

1. <https://www.coursera.org/specializations/real-time-embedded-systems>

2. https://onlinecourses.nptel.ac.in/noc20_ee98/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 Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

NATURAL LANGUAGE PROCESSING (NLP)

VI Semester : B. Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 408	OEC-III	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0		3	40	
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 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: Understand the basics of Tokenizing text using WordNet.

CO5: Understand the importance of Text feature extraction process.

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.

UNIT – III

Text Classification: Machine Learning, Text classification, Sampling – Naïve Bayes, Decision trees, Stochastic gradient descent, Logistic regression, Support Vector Machines, The Random forest algorithm, Text clustering – K-Means.

UNIT – IV

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.

UNIT – 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 Language Processing: Python and NLTK, Deepti Chopra, Jacob Perkins, and Nitin Hardeniya by Packt 2016.
2. Practical Natural Language Processing: A Comprehensive Guide to Building Real-World NLP Systems, Bodhisattwa Majumder, Anuj Gupta, Sowmya Vajjala, Harshit Surana published by O'Reilly Media, Inc. 2020.

Reference Books:

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 Schütze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

Web References:

1. <https://www.coursera.org/specializations/natural-language-processing>
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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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|---------------------------------------------------------------------------------|
| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

CLOUD, MICRO SERVICES & APPLICATION (CMSA)

VII Semester: B. Tech

Scheme:2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 410	OEC-III	L	T	P	C	Continuous Internal Assessment	EndExam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 1½ Hrs				EndExamDuration: 3 Hrs				

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

CO1: Demonstrate the main concepts of cloud, its characteristics, advantages, key technologies and its various delivery and deployment models.

CO2: Develop and design an application using various tools in cloud environment.

CO3: Acquire the basic and important design concepts and use of web application development techniques in cloud

CO4: Structure simple python program for developing an application in cloud.

CO5: Analyze the issue of cloud such as security, energy efficiency and interoperability, and provide an insight into future prospects of computing in the cloud monitoring.

UNIT - I

Cloud Fundamentals-Cloud Service Components-Cloud Service, Deployment Models-Cloud components-Guiding principle with respect to utilization, Security, Pricing- Application of Cloud Computing. Case Study: Design and Implementation of Public and Private Cloud Environments – Open Stack and AWS.

UNIT - II

Application Architectures-Monolithic&Distributed,MicroserviceFundamental and Design Approach-CloudNative Applications-12FactorsApp-Application Integration Process and API fication Process-API Fundamental-Microservice and API Management- Spring Boot Fundamental and Design of Microservice - API Tools - Developer Portal-Applications of Micro service and API fication

UNIT - III

Devops fundamentals - Devops Role and Responsibility-Tools and Applications- Containerization Process and Application-Evolution of APP Deployment- Docker Fundamentals - Docker Architecture-Docker Commands. Case study Orchestration, Kubernetes, Docker Container.

UNIT - IV

Cloud Security-Cloud Security Shared Responsibility Architecture-Security 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-Cloud Monitoring-Benefits of Cloud Monitoring-Overview of Cloud Monitoring Tools.

UNIT - 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 Computing Concepts, Technology & Architecture”, Prentice Hall, 2013.
2. GuoNingLiu, Qiang GuoTong, Harm Sluiman, Alex Amies, "Developing and Hosting Applications on the Cloud", IBM Press, 2012.
3. KaiHwang, Geoffery C. Fox and Jack J. Dongarra, “Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet”, First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 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)”, 1st Edition, Wiley, 2014.
2. Azure Virtual Machines <https://docs.microsoft.com/en-us/azure/virtualmachines/>
3. Google App Engine <https://cloud.google.com/appengine#allfeatures>
4. Google Kubernetes Engine <https://cloud.google.com/kubernetesengine#allfeatures>
5. Docker Tutorial: <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.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

BLOCK CHAIN TECHNOLOGIES (BCT)

VII Semester : B.Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	TOTAL
OEC411	OEC-III	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 the basic concepts of Blockchain technology.

CO2: Interpret the security and risks involved in Blockchain applications.

CO3: Interpret the types of Blockchain applications and Blockchain solutions.

CO4: Understand the process of Ethereum Blockchain Implementation

CO5: Understand the process of Hyper ledger Blockchain Implementation

UNIT – I

Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, 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 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:

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

Reference Books:

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|-------------------------------------------------------------------------------------------------------------------------------------|
| 1. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill |
| 2. 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

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| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

AGILE METHODOLOGIES (AM)

VII Semester : B. Tech					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 412	OEC-III	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0		3	40	60
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 importance of interacting with business stakeholders in determining the requirements for a software system

CO2: Analyze iterative software development processes: how to plan them, how to execute them.

CO3: Identify the impact of social aspects on software development success.

CO4: Understand Software process improvement as an ongoing task for development teams.

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

UNIT – II

AGILE PROCESSES: Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

UNIT – III

AGILITY AND KNOWLEDGE MANAGEMENT: Agile Information Systems – Agile Decision Making - Earl_S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

UNIT – IV

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.

UNIT – 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 and Dubinsky, —Agile Software Engineering, Series: Undergraduate Topics in Computer Science, Springer, 2009.

Reference Books:

1. Craig Larman, —Agile and Iterative Development: A Manager_s Guide, Addison-Wesley, 2004.
2. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Management, 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

AUGMENTED REALITY & VIRTUAL REALITY (ARVR)

VII Semester : B. Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 413	OEC-III	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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: Explore the history of spatial computing and design interactions

CO2: Understand the foundational principles describing how hardware, computer vision algorithms function .

CO3: Learn Virtual reality animation and 3D Art optimization.

CO4: Demonstrate Virtual reality

CO5: Introduce to the design of visualization tools

UNIT – I

Designing and Art Across Digital Realities: Introduction, Modalities, Types of common HCI modalities, New Modalities, The current state of modalities for spatial computing Devices, current controllers for immersive computing systems, Voice, Hands and Hardware inputs over the next generation.

Designing for our senses, not our devices: Envisioning a future, sensory technology, The Role of women in AI, Sensory Design, Five sensory Principles, Adobes' AR .

UNIT – II

Virtual Reality of Art: A more natural way of making 3D art, VR for animation

3D Art Optimization: Introduction, Draw Calls, Using VR Tools for creating 3D Art, Acquiring 3D Models Versus Making them from scratch.

UNIT – III

Computer vision that makes augmented reality Possible works: History of AR, How and why to select an AR Platform, Mapping, platforms, other Development considerations, The AR Cloud

Virtual Reality and Augmented Reality – cross- platform theory: Why cross platform, The role of game engines, understanding 3D Graphics, Portability lessons from video game design, simplifying the controller input.

UNIT – IV

Virtual Reality Toolkit: What is VRTK, History, Steam VR Unity Toolkit, VRTK v4, future of VRTK, success of VRTK

Three Virtual Reality and Augmented Reality Development Best Practices: Handling Locomotion, Locomotion in VR, Locomotion in AR, Effective use of Audio, Audio in VR, Audio in AR, Common interaction paradigms, Inventory of VR, Augmented Reality Raycasts

UNIT – V

Data and Machine learning visualization Design and Development in spatial computing: Introduction, understanding data visualization, principles for data and machine learning visualization design and development in spatial computing, why data and machine learning visualization works in spatial computing, 2D data

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 challenges in XR, 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, 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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|-----------------------------------------------------------------------------------------------------------------|
| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

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|---------------------------------------------------------------------------------------------------|
| 2. Anil K. Jain, —Fundamental of Digital Image Processing, PHI publication, 2013. |
| 3. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, —Digital Image Processing, Mc. Graw Hill, 2011. |

Reference Books

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| 1. Pratt, —Digital Image Processing, 2nd Edition, Wiley Publication, 1991. |
| 2. S. Sridhar, —Digital Image Processing, Oxford University Press, 2011. |

Web References:

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| 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.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

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 Computing", 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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|------------------------------------------------------------------------------------------------------------------------|
| 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, |

Reference Books:

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|-------------------------------------------------------------------|
| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

MODERN WEB APPLICATIONS (MWA)

Scheme : 2020

VI Semester : B. Tech

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 418	OEC-IV	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0		40	60	
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 various steps to design static websites.

CO2: Develop a Web Page using the HTML5.

CO3: Apply CSS effectively to create interactive websites.

CO4: Implement client-side scripting using JavaScript to design dynamic websites.

CO5: Develop end to end application - web frontend and backend development.

UNIT – I

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, REST services, Introduction to HTML, XML, JSON

UNIT – II

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 sheet, Internal style sheet, Inline style sheet, CSS Syntax, color, background, Font, images

UNIT – IV

Java Script: Features of JavaScript, extension of JavaScript, Syntax of JavaScript: data types, operators, variables, tag, Document Object Model (DOM) with JavaScript, Selection Statement using if and Switch, Iterative statement: for, for/in, while, do while, break and continue

UNIT – V

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 and Deitel and Nieto, —Internet and World Wide Web - How to Program®, Prentice Hall, 5th Edition, 2011.

2. HTML5 Black Book, 2nd Edition, Dreamtech Press, 2016.

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

Reference Books:

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

Web References:

- | |
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| 1. https://www.tutorialspoint.com/Html/index.htm |
| 2. https://www.w3.org/Style/CSS/ |
| 3. Bootstrap - CSS Framework: https://getbootstrap.com |
| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

- 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)in each section. The students shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the students should answer any one question from each unit. Each Question carries 12marks.

AUTOMATION & CONTROL (AMC)

Scheme : 2020

VII Semester : B. Tech

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 420	OEC- IV	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100

Sessional 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: Understand the elements of automation principles

CO2: Understand the construction and working of pneumatic systems

CO3: Understand the working of hydraulic systems

CO4: Understand various control techniques in automation

CO5: Understand the automated testing and inspection methods in industry

UNIT - I

Automation in Manufacturing Industries: Introduction- Automation in production system, Principles and strategies of automation, Basic elements of an automated system, Advanced automation functions, Levels of automations, Automated flow lines and transfer mechanisms, Analysis of transfer lines without storage, Automated flow lines with storage buffers.

UNIT - II

Pneumatic Systems: Introduction to pneumatic systems: advantages and limitations, applications, structure and signal flow of pneumatic systems; pneumatic power pack: air generation and distribution, air reservoir, constructional details and working of filter, lubricator, pressure regulator, actuators, direction control valves, check valves, flow control valves, pneumatic counter.

Symbols of pneumatic valves, traverse time diagram, design of manually operated circuits: direct and indirect control of actuators, control of single and multiple actuators.

UNIT - III

Introduction to Hydraulic systems: Advantages and limitations, physical principles of oil hydraulics, hydraulic power pack, hydraulic fluids, filters, types of hydraulic pumps, pump performance calculations, hose size calculations, hydraulic actuators and accessories, accumulator, hydraulic valves, pressure control valves, flow control valves, open-center and closed-center hydraulic systems.

UNIT - IV

Control Technologies in Automation: Industrial Control Systems, Process Industries Verses Discrete-Manufacturing Industries, Continuous Verses Discrete Control, Computer Process Control and its Forms. Computer Based Industrial Control: Introduction & Automatic Process Control, Building Blocks of Automation System: LAN, Analog & Digital I/O Modules, SCADA System & RTU.

UNIT - V

Automated Inspection and Testing: Inspection and testing, Statistical Quality Control, Automated Inspection Principles and Methods, Sensor Technologies for Automated Inspection, Coordinate Measuring machines, Other Contact Inspection Methods, Machine Vision, Other optical Inspection Methods.

Text Books :

1. Mikell P.-Groover "Automation-Production-Systems-and-Computer-Integrated-Manufacturing"-Ed-4-2015, Pearson publishers
2. Majumdar S.R., "Pneumatic Systems Principles and Maintenance", Tata McGraw Hill, New Delhi.
3. Peter Croser and Frank Ebel, "Pneumatics Basic Level TP 101" Festo Didactic GMBH & 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 Thomas 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 Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

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:

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

Web References:

1. https://sourcemaking.com/design_patterns
2. <https://www.odesign.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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

PRESTRESSING SYSTEMS (PS)

VII Semester :B. Tech

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 423	OEC-IV	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	-	-		3	40	60

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 principles and systems of pre-stressing.

CO2: Understand the various methods of pretensioning

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 - I

Introduction: Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressing – Need for high strength steel and high grade concrete for prestressed elements – Prestressing types.

UNIT - II

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 their advantages and disadvantages, applications and manufacturing techniques

UNIT - III

Methods and Systems of Posttensioning: Tensioning device for post tensioning –Methods of post tensioning - MagnelBlatonsystem, Freyssinet system, Gifford Udall system, Lee McCall System, Prescon System, Baur – Leonhardt System – Comparison of Pretensioning and Posttensioning systems

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.

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.

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|------------------------------------------------------------------------------------------------------------------------------------------------|
| 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

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| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

DRONE TECHNOLOGY (DT)

Scheme: 2020

VII Semester: B. Tech					Maximum Marks			
Course Code	Category	Hours / Week			Credits	Continuous Internal Assessment	End Exam	TOTAL
OEC 425	OEC - IV	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100

Sessional Exam Duration: 1½ Hrs **End Exam Duration:** 3 Hrs

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

- CO1:** Understand the historical development of unmanned aerial vehicles
- CO2:** Understand different drone parts and their contribution for successful flight operation
- CO3:** Identify the battery to be used for UAV application.
- CO4:** Understand working of motor that can be used in UAV.
- CO5:** Classify different microcontrollers and flight controllers

UNIT – I

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.

UNIT – II

Components of drones: -classifications of drone structures and their suitability, applications and uses of drone frame materials, classifications and applicability of propeller motors, drone materials, design parameters for propellers, composition and structuring of Electronic speed controller, flight control board, characteristics of FCB and their structure.

UNIT – III

Battery and its management: Introduction of Battery, Description of Li-Po Battery, Charging / Discharging of Battery. Back up, Ratings, Shelf Life, Maintenance and safety of Battery. Selection criteria of Battery for Drone application.

UNIT – 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 application. Working and application of BLDC motor.

UNIT – V

Connections and Interfaces of Devices in Drone: Brief introduction of RS232, RS422, RS485, UART ports. Different types of connectors and their specifications. Microcontroller interfacing techniques.

Introduction to Drone Programming Introduction to programming language used in drone : C and Python. Installation of cards. Auto Pilot software i.e. ArduPilot, OpenPilot

Text Books:

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

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

INFRASTRUCTURE FOR SMART CITY DEVELOPMENT (ISCD)

VII Semester :B. Tech					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OEC 426	OEC-IV	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100

Sessional Exam Duration: 1.5Hrs

End Exam Duration: 3 Hrs

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

CO1: Understand the fundamental concepts of smart and sustainable cities.

CO2: Understand the GIS applications in Smart City Planning.

CO3: Understand the component of smart cities and dwell into their technological advancement.

CO4: Understand the involvement of stake holders in the design and implementation of responsive smart cities.

CO5: Explain the importance of different linkages and their defined roles including government, urban planners, universities, city developers and communities.

UNIT – I

Smart City Planning – An Overview: Understanding – Dimensions – Global experience, Global standards and performance bench marks, Practice codes. India 100 smart cities policy and mission, Smart city planning and development, Financing smart cities development, Governance of smart cities.

UNIT - II

Green Building Concepts & Sustainable Development: Green projects in smart cities, sustainability – Green building – Rating system – Energy efficient building – Energy saving systems.

GIS Applications in Smart City Planning: 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.

UNIT – III

Smart Urban Transportation Systems: Elements of Infrastructure (Physical, Social, Utilities and services) - Basic definitions – Concepts - Significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, Provision of infrastructure; Role of transport, types of transport systems, evolution of transport modes, transport problems and mobility issues; Urban form and Transport patterns, land use – Transport cycle, concept of accessibility. Hierarchy, capacity and geometric design elements of roads and intersections. Basic principles of Transport infrastructure design. Urban transport planning process –Transport, environment and safety issues. Principles and approaches of Traffic Management, Transport System Management.

UNIT – IV

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 &e-business - e-Government Principles – From 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 Tripathi, *Smart cities transforming India*, Pentagon Press.
2. Marta Peris-Ortiz, 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. <https://smartcitiescouncil.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

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 Asia, 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

OBJECT ORIENTED ANALYSIS AND DESIGN (OOAD)

V Semester : Common for CSE & CST

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	TOTAL
CS313	PEC - I	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 the importance of model, UML and Class diagrams.

CO2: Describe the structural and behavioral modeling of a software system.

CO3: Design an event driven system with dynamic dimensions.

CO4: Design logical elements of a system.

CO5: 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.

UNIT – II

Advanced Structural Modeling

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Instances, Object diagrams, Components.

Basic Behavioral Modeling

Interactions, Use cases, Use case diagrams, Interaction diagrams, Activity diagrams.

UNIT – III

Advanced Behavioral Modeling

Events and signals, state machines, processes and Threads, Time and Space, State diagrams.

UNIT – IV

Architectural Modeling

Artifacts, Deployment, Collaborations, Common modeling techniques.

UNIT – V

Architectural Modeling

Patterns and Frameworks, Artifact diagrams, Deployment diagrams, Systems and Models.

Applying the UML

Case Study- Library management system, Online shopping system.

Text Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, **[2nd Edition]**, The Unified Modeling Language User Guide, Pearson Education, 2015.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

INFORMATION RETRIEVAL SYSTEM (IRS)

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
		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: 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.

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

Text Books:
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: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

EMBEDDED SYSTEMS (EBS)

VI Semester : Common for CSE & CST					Scheme : 2020								
Course Code	Category	Hours/Week			Credits	Maximum Marks							
CS316	PEC-II	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL					
		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: Provides general overview of Embedded Systems													
CO2: Show current statistics of embedded systems.													
CO3: Design, Code, Compile, and test real time software.													
CO4: Understand the RTOS Environment													
CO5: Integrate a fully functional system including hardware 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 system protocols.

UNIT – 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

UNIT – IV

Inter Process communication and synchronization of processes, Threads and tasks: Multiple process application, multiple threads in an application, Tasks, Task states, Task and Data, Clear-cut distinction between functions. ISRS and tasks by their characteristics, concept and semaphores, shared data, Inter-process communication, Signal function, Semaphore functions, Message Queue functions, Mailbox functions, Pipe functions, Socket functions, RPC functions.

UNIT – V

Real – time Operating Systems: OS Services, process management, Timer functions, Event functions, Memory management, Device, file and IO subsystems management, Interrupt routines in RTOS

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 – Architecture, 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:

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.

DISTRIBUTED SYSTEMS (DS)

VI Semester : Common for CSE & CST					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS317	PEC-II	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 the models and design requirements of distributed systems.

CO2: Describe Client Server Model, Communication Methods of Distributed System

CO3: Classify Clock Synchronization, Mutual Exclusion, Deadlocks in Distributed System

CO4: Summarize the concepts of Threads, Processor Allocation Algorithms

CO5: Understand Distributed File System Design with Implementation.

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 Model, Failure Model, Security Model.

UNIT – II

Communication in Distributed Systems

Client-Server Model: Clients & Servers, addressing, blocking Vs non-blocking primitives, buffered Vs unbuffered primitives, reliable Vs unreliable primitives, Implementing client-server model.

Remote Procedure Call: Basic RPC operation, parameter passing, dynamic binding, RPC semantics in Presence of failures, implementation issues.

UNIT – III

Synchronization in Distributed Systems

Clock Synchronization: Logical clocks, physical clocks, clock synchronization algorithms, use of synchronized clocks.

Mutual Exclusion: Centralized algorithm, distributed algorithm, token ring algorithm.

Dead Locks: Distributed deadlock detection and prevention.

UNIT – IV

Processes and Processors in Distributed Systems

Threads-Introduction, threads usage, design issues, implementing a threads package, threads and RPC.

Processor Allocation-Allocation models, design issues for processor allocation algorithms, implementation issues for processor allocation algorithms, example processor allocation algorithms.

UNIT – V

Distributed File System Design: File service interface, directory service interface, semantics of file Sharing.

Implementation: File usage, system structure, caching, and replication. Trends in Distributed File System.

Text Books:

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/rs001_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:

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.

Text Books:

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, Academic 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:**

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:

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.

SOFTWARE PROJECT MANAGEMENT (SPM)

VI Semester : Common for CSE & CST					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS319	PEC-II	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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: 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 projects, 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 Management, Strategic Programme Management, Creating a Programme, Aids to programme 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 Prototyping, Incremental Delivery, Rapid Application Development, Agile Methods, Extreme Programming, Scrum, Managing Iterative Processes, Selecting the Most Appropriate Process Model.

UNIT – III

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 Compression, Caper Jones Estimating Rules of Thumb.

UNIT – IV

Risk Management: Risk, Categories of Risk, A Framework for dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Applying the PERT Technique.

Monitoring and Control: Creating the Framework, Collecting the Data, Review, Project Termination Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting

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, O'Reilly, 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:

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.

ADHOC AND SENSOR NETWORKS (ASN)

VII Semester : Common for CSE & CST

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	TOTAL
CS401	PEC-III	3	0	0	C	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: Explain the concepts, network architectures and applications of ad hoc and wireless Sensor networks.

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 Reservation Mechanisms, Contention based protocols with Scheduling Mechanisms, Multi channel MAC-IEEE 802.11.

UNIT – III

Routing Protocols and Transport Layer in Ad Hoc Wireless Networks: Issues in designing a routing and Transport Layer protocol for Ad hoc networks, proactive routing, reactive routing (on-demand), hybrid routing, Classification of Transport Layer solutions, TCP over Ad hoc Wireless Networks.

UNIT – IV

Wireless Sensor Networks (WSNs) and MAC Protocols: 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.

UNIT – V

WSN Routing, Localization & QoS: Issues in WSN routing, OLSR, Localization: Indoor and Sensor Network Localization, absolute and relative localization, triangulation, QOS in WSN, Energy Efficient Design, Synchronization, Transport Layer issues.

Text Books:

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

SERVICE ORIENTED ARCHITECTURE (SOA)

VII Semester : Common for CSE & CST

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		Continuous Internal Assessment	End Exam	TOTAL
CS402	PEC-III	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 software oriented architectures.

CO2: Design medium scale software project development using SOA principles.

CO3: Develop SOA messages from business use cases.

CO4: Design and implementation of modern SOA and SOA-specific methodologies, technologies and standards.

CO5: Create composite services by applying composition style.

UNIT – 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 (comparing SOA to Past architectures).

UNIT – II

Web Services and Primitive SOA: The Web services framework• Services (as Web services); Service descriptions (with WSDL); Messaging (with SOAP).

Web Services and Contemporary SOA – I Message exchange patterns; Service activity; Coordination; Atomic Transactions; Business activities; Orchestration; Choreography.

Web Services and Contemporary SOA-2: Addressing; Reliable messaging; Correlation; Policies; Metadata exchange; Security; Notification and eventing

UNIT – III

Principles of Service - Orientation: Services orientation and the enterprise; Anatomy of a service oriented architecture; Common Principles of Service orientation; How service orientation principles interrelate; Service orientation and object orientation; Native Web service support for service orientation principles.

UNIT – IV

Service Layers: Service orientation and contemporary SOA; Service layer abstraction; Application service layer, Business service layer, Orchestration service layer; Agnostic services; Service layer configuration scenarios.

UNIT – V

Business Process Design: WS-BPEL language basics; WS Coordination overview; Service oriented business process design; WS addressing language basics; WS Reliable Messaging language basics.

SOA Platforms: SOA platform basics; SOA support in J2EE; SOA support in. ET; Integration considerations.

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:

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.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

NETWORK SECURITY AND CRYPTOGRAPHY (NSC)

VII Semester : Common to CSE & CST

Scheme : 2020

Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS404	PEC-III	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		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 the concepts and principles of Network Security.

CO2: Analyze various classical encryption techniques and block cipher structure.

CO3: Analyze advanced encryption standard.

CO4: Understand block cipher modes of operation.

CO5: Explain various asymmetric ciphers

CO6: Understand cryptographic hash functions and digital signatures

UNIT – I

Introduction to Security concepts: Computer Security concepts, OSI Security Architecture, Security 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 Ciphers: Classical Encryption Techniques: Symmetric Cipher model, Substitution techniques, Transposition techniques, Steganography.

Block Ciphers and DES: Traditional block cipher structure, Data Encryption Standard, DES Example, Strength of DES, Block cipher design principles.

UNIT – III

Advanced Encryption Standard: AES Structure, AES transformation functions, AES Key Expansion, AES Example, AES Implementation.

Block Cipher Operation Modes: Multiple Encryption and Triple DES, Electronic codebook, Cipher Block Chaining Mode, Cipher feedback mode, output feedback mode.

UNIT – IV

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

Cryptographic Hash Functions: Applications of cryptographic hash functions, Hash functions based on cipher block chaining, SHA.

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 Mukhopadhyay, [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:

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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:

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

DEEP LEARNING (DLE)

VII Semester : Common for CSE , CST , CSBS, CSE(AIML) & CSE(DS)					Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks				
CS407	PEC-IV	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL	
		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 concept of deep learning and Artificial Neural Network. CO2: Summarize the Deep Neural Nets. CO3: Understand the Convolutional Neural Networks Operations. CO4: Understand the different types of Convolutional Neural Networks Architectures. CO5: Understand the Recurrent Neural Networks and deep RNN training.									

UNIT – I

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

UNIT – III

Convolutional Neural Network-1: The Convolutional operation, Motivation, Pooling, structured Outputs, Applications of CNN

UNIT – IV

Convolutional Neural Network-2: CNN Architectures: LeNet5, AlexNet, GoogLeNet, ResNet, advantages of CNN

Case Study: Handwritten Digit Recognition

UNIT – V

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:

1. “Hands-On Machine Learning with Scikit-Learn and TensorFlow” March 2017: First Edition
2. “Deep Learning” Ian Good fellow Yoshua Bengio Aaron Courville, MIT Press book

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

TextBooks :

1. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Introduction to Parallel Computing, Second Edition, Pearson Education, 2007.
2. Benedict R Gaster, Lee Howes, David R Kaeli, Perhaad 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. https://www.tutorialspoint.com/parallel_algorithm/parallel_algorithm_introduction.html
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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

CLOUD COMPUTING(CC)							
VII Semester: Common for CSE , CST , CSE(AIML) & CSE(DS)				Scheme:2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks	
CS410	PEC-V	L	T	P	C	Continuous Internal Assessment	End Exam
		3	0	0	3	40	60
Sessional ExamDuration:1½ Hrs					EndExamDuration:3 Hrs		

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

CO1: Understand the 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 Web on 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" by Rajkumar Buyya, 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. Rajkumar Buyya, Chee Shin Yeo, Srikumar Venugopal, James Broberg, and Ivona Brandic, "Cloud Computing and Emerging IT Platforms: Vision, Hype, and Reality for Delivering Computing as the 5th Utility", Future Generation Computer Systems, Volume 25, Number 6, ISSN: 0167-739X, Elsevier Science, Amsterdam, The Netherlands, June 2009.
2. Suraj Pandey, William Voorsluys, Sheng Niu, Ahsan Khandoker, and Rajkumar Buyya, "An Autonomic Cloud Environment for Hosting ECG Data Analysis Services", Technical Report, CLOUDS-TR-2010-4, Cloud Computing and Distributed Systems Laboratory, The University of Melbourne, 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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks

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

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

DIGITAL FORENSICS (DF)							
VII Semester : Common for CSE , CST, CSE(AIML) & CSE(DS)				Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks	
CS412	PEC-V	L	T	P	C	Continuous Internal Assessment	End Exam
		3	-	-	3	40	60
Sessional Exam Duration 1½ Hrs					End Exam Duration: 3 Hrs		

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

C01: Understand the fundamental concepts of digital forensic, digital evidence, and its applications.

CO1: Understand the fundamental concepts of digital forensic, digital evidence and the incident response process.

C02: Apply various data acquisition techniques and tools on the evidences.

C03: Learn the methods applicable for different forensic investigations.

CO4: Usage of various forensic tools to analyse different forensics data.

CO5: Gains knowledge on cloud forensic procedures and challenges.

CO6: Understand the concept of file system and their use in forensic analysis

UNIT - I

Digital forensics: Introduction, History, Rules of Computer/ Digital forensic, Digital forensic as a discipline, Definition of digital forensic, digital forensic investigations, Goal of digital forensic investigation.

Digital evidences: Introduction, what is digital evidence, rules of digital evidence, characteristics of digital evidence, types of evidence, challenges in evidence handling, volatile evidence, evidence handling procedures.

Incidence Response: Introduction, Goals of incident response, people involved in incident response, incident respond Methodology, Activities in initial response, Phases after detection of an incident.

UNIT - 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 Qualified Forensic duplicate of a hard Drive.

UNIT - III

Network Forensics: Introduction to IDS (Intrusion Detection System), Types of IDS, Advantages and disadvantages, Understanding Network intrusions and Attacks, recognizing pre-intrusion/ Attack activities, Port Scans, Address Spoofing, Attacking with Trojans, Viruses and Worms, Understanding Password cracking, Understanding Technical Exploits, Collecting Network based evidence, Investigating routers, Network Protocols.

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.

UNIT – 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.

UNIT – 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/>

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

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

Scheme of Instruction and Examination

I SEM CSE & CST

Scheme-2020

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P/D	End Exam Marks	CIA Marks	Total Marks
I		Theory							
1.	BSC	Engineering Mathematics- I	3	2	1		60	40	100
2.	BSC	Applied Physics	3	3			60	40	100
3.	ESC	Elements of Electrical Engineering	3	3			60	40	100
4.	ESC	Electronic Devices and Circuits	3	3			60	40	100
5.	ESC	Programming for Problem Solving	3	3			60	40	100
6	Audit	English Proficiency Course				3	-	-	-
II		Practical							
7	BSL	Applied Physics Lab	1.5			3	60	40	100
8.	ESL	Electronic Devices and Circuits Lab	1.5			3	60	40	100
9	ESL	Programming for Problem Solving Lab	1.5			3	60	40	100
		Total	19.5						

II SEM CSE & CST

Scheme-2020

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P/D	End Exam Marks	Internal Assessment Marks	Total Marks
I		Theory							
1.	BSC	Engineering Mathematics- II	3	2	1		60	40	100
2.	BSC	Probability & Statistical Methods	3	2	1		60	40	100
3.	HSSC	English	3	3			60	40	100
4.	ESC	Engineering Drawing	3	1	-	4	60	40	100
5.	ESC	Data Structures	3	3			60	40	100
6	MC	Environmental Studies		2				100	100
II		Practical							
7	BSL	Statistical Methods Lab	1.5			3	60	40	100
8	HSSL	Phonetics & Communication Skills Lab	1.5			3	60	40	100
9	ESL	Data structures lab	1.5			3	60	40	100
		Total	19.5						

ENGINEERING MATHEMATICS – I (EM1)

I Semester : Common for CSE, CST, CE & ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS101	BSC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessional 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: Find the solution for simultaneous system of linear equations and eigen values and eigen vectors.

CO2: Solve first order differential equations and its applications.

CO3: Solve higher order differential equations and its applications.

CO4: Understand Rolle's and Lagrange's mean value theorems. Evaluate maxima & minima and areas and volumes by multiple integrals.

CO5: Learn Laplace transform of a function and solve the differential equations using Laplace Transforms

UNIT – I

Matrices

Rank of a matrix, Consistency of systems of linear equations, Rouche's Theorem (Statement only). Eigen values and Eigen vectors, diagonalization of a matrix. Cayley-Hamilton Theorem, finding inverse of a matrix. Quadratic form, reduction of a quadratic form to canonical form by orthogonal transformation

UNIT - II

Differential Equations

First order and first degree differential equations - Exact, Non-exact equations, Linear and Non-linear equations. Applications: Newton's law of cooling, law of natural growth and decay, L-R and C-R circuits.

UNIT – III

Higher Order Differential Equations

Homogeneous linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $f(x) = e^{ax}$, $\sin ax$, $\cos ax$, x^n , $e^{ax}v(x)$, $x v(x)$ and General case. Applications to L-C-R circuits.

UNIT – IV

Differential Calculus

Rolle's theorem, Lagrange's mean value theorem. Maxima and minima of functions of two variables.

Multiple Integrals

Double integrals, change of order of integration, Change to polar coordinates. Area and volume by double integration. Triple integrals, volume by triple integrals.

UNIT - V

Laplace Transforms

Laplace transform of standard functions, first & second shifting theorems, Laplace transforms of derivatives, integrals, multiplication by t, division by t and periodic functions. Inverse Laplace transforms, Convolution Theorem. Applications of Laplace transforms to ordinary differential equations.

Text Books

1. B.S. Grewal- Higher Engineering Mathematics. Khanna Publishers, 42nd Edition, 2012
2. T.K.V.Iyengar and others -A Text Book of Engineering Mathematics, Vol I & II - S.Chand & Company, 13th Edition 2014

Reference Books

1. B.V. Ramana -Higher Engineering Mathematics, TMH Publishers, 2nd Edition, 2006.
2. N.P.Bali and others -A Text Book of Engineering Mathematics, Lakshmi publishers, 7th Edition, 2009.
3. Erwyn Kreyszig -Advanced Engineering Mathematics, John wiley, 8th Edition 2006.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

APPLIED PHYSICS (AP)

I /II Semester : Common for CSE,CST,ECE / CE,ME,EEE					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS110	BSC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam Duration : 1 ½ Hrs.					End Exam Duration: 3 Hrs.			

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

- CO1:** Understand the origin of magnetism, hysteresis, soft and hard magnetic materials; Dielectrics and their characteristics; superconductivity, types, characteristics, Meissner, Josephson effects.
- CO2:** Understand the phenomenon of interference, diffraction of light and their applications.
- CO3:** Understand the Production, detection, properties and applications of ultrasonic waves, determination of velocity of ultrasonic waves in liquids. Principles of quantum mechanics, Schrodinger's equation and its applications.
- CO4:** Understand the theory and different production methods of lasers and their applications, different types of optical fibers, losses in fibers and applications of optical fibers.
- CO5:** Understand the Properties, synthesis, applications of Nanomaterials and Carbon Nanotubes.

UNIT – I

Magnetic Materials:

Introduction – Basic definitions in Magnetism, their relations – Origin of permanent magnetic moment, Bohr magneton – Classification and properties of magnetic materials (Dia, Para, Ferro, Antiferro and Ferri)– Hysteresis, Soft and Hard magnetic materials, Applications

Dielectrics:

Introduction - Dielectric polarization, Dielectric Polarizability, Susceptibility and Dielectric constant – Types of Polarizations: Electronic, Ionic, Orientation polarizations – Derivation of Expression for Electronic polarizability – Dielectric Loss – Applications of dielectrics.

Superconductivity:

Introduction – Critical Temperature, Critical magnetic field, Critical Current , Meissner effect, Flux quantization – Type – I & Type – II Superconductors, Josephson's effect – Applications of Superconductors – SQUID.

UNIT – II

Interference:

Introduction - Conditions for interference - Interference due to thin uniform film (Reflected light), wedge shaped film, Newton's rings. Applications of interference: Testing of flatness, determination of wavelength, radius of curvature, refractive index of liquid - Non-reflective coatings.

Diffraction:

Introduction - Differences between Interference and Diffraction - Types of Diffraction - Fraunhofer diffraction due to single slit, double slit, circular aperture, N-Slits (grating) (qualitative analysis only) - Determination of wavelength using grating - Resolving power, Rayleigh's criterion for resolution, Resolving power of grating and telescope.

UNIT – III

Ultrasonics:

Introduction - Properties of ultrasonics - Production of ultrasonics by Magnetostriction method, Piezoelectric method - Detection of ultrasonics - Determination velocity of ultrasonics in liquids. Applications: SONAR, NDT, general applications.

Quantum Mechanics:

Wave – Particle duality; de Broglie Concept of Matter Waves – Properties of Matter Waves – Heisenberg's Uncertainty Principle. Schrödinger's Time Independent and Time Dependent Wave equation, Significance of Wave Function - Application of Schrodinger's equation for : particle in a box (one dimensional problem)

UNIT – IV

Lasers:

Spontaneous and Stimulated emission of radiation – Einstein coefficients and their relation - Characteristics of Lasers – Pumping mechanisms – Components of Laser – Ruby, He-Ne and Semiconductor lasers - Applications of Lasers.

Fibre Optics:

Principle and propagation of light in Optical fibers – Structure of optical fibres – Acceptance angle – Numerical aperture – Classification of optical fibres – Applications of Optical fibres: Fibre optic communication system, Fibre optic sensors(Temperature, Pressure, Displacement and Water level indicator)– Losses in optical fibres.

UNIT – V

Nanomaterials:

Introduction - Significance and Properties of Nano particles - Synthesis Methods: Ball Milling method, Sol-Gel method, CVD method, its applications - PVD method, its applications - Pulsed Laser Deposition method - Wire explosion method - Applications of Nano materials.

Carbon Nano tubes:

Properties of Graphene - Classification of CNTs – properties - Synthesis methods: Ball Milling method, CVD method, Arc method, Sputtering - Applications of carbon Nano tubes - Effect of nanotechnology on Environment.

Text Books :

1. M.N.Avadhanulu and P.G.Kshirsagar, A text Book of Engineering Physics, S. Chand & Company
2. V.Rajendran, Engineering Physics, McGraw Hill Education (India) Pvt. Limited.
3. Dr. K.Vijaya Kumar, Engineering Physics, S. Chand & Company
4. S.L.Gupta & S.G.Gupta, Unified Physics (vol. 3) – Electricity, Magnetism and Electronics. Jai Prakash nath Publications, Meerut.

Reference Books :

1. Hitendra K. Malik & A.K. Singh, Engineering Physics, Tata McGraw Hill Education Pvt. Ltd.
2. P.K Palaniswamy, Engineering Physics, SCITECH Publications (India) Pvt. Ltd.
3. R. Murugashan and Er.K.Siva Prasanth, Modern Physics, S. Chand & Company

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

ELEMENTS OF ELECTRICAL ENGINEERING (EEE)

I/II Semester : Common for ECE, CSE, CST / ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
EE101	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100

Sessional Exam Duration : 1 ½ Hrs **End Exam Duration: 3 Hrs**

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

CO1: Understand the basic essentials of DC circuits.

CO2: Understand the basic essentials of AC circuits.

CO3: Understand the construction and working of DC machines.

CO4: Understand the construction and working of transformers, induction motors and AC generators.

CO5: Understand the basics of illumination and earthing.

UNIT – I

DC Circuits: Definition of current, potential, resistance, power and energy, symbol and units, Ohm's law, Kirchhoff's laws, solution of series, parallel and series parallel circuits, analysis of circuits using loop current method and node voltage method, source transformation. (Elementary treatment only) (Simple problems only).

UNIT – II

AC Circuits: Instantaneous, average, r.m.s and maximum values of sinusoidal wave, concept of phase and phase difference, Phasor representation of sinusoidal wave, A.C through pure resistance, pure inductance and pure capacitance, Series R-L-C Circuits (Simple Problems), power factor, concept of 3-Φ system - voltage and current relations in star and delta connections (No derivation -Problems with R load only - Elementary treatment only)

UNIT – III

DC Machines: Electromagnetic Induction, Faraday's law, Lenz's law and Flemings rules, Construction and working principle of a DC machine, emf equation of a D.C Generator, DC motor principle, voltage equation of generator and motor (Elementary treatment only-Simple Problems).

UNIT – IV

Transformers: Working principle and construction of 1-Φ Transformer, transformer ratio, emf equation (Elementary treatment only) (Simple problems).

Induction Motors: Construction and principle of operation of induction motor, slip (Elementary treatment only) (Theoretical aspects only).

AC Generators Construction, EMF equation (Elementary treatment only) (Theoretical aspects only).

UNIT – V

Illumination: Units and laws of Illumination, Types of lamps, Incandescent lamps, Fluorescent lamps and Sodium-vapour lamps. (elementary treatment only).

Earthing: Difference between neutral wire and earth wire, Concept of earthing, applications of fuse and MCB's, electrical shock, precautions against shock, treatment of electrical shock. (elementary treatment only).

Text Books :

1. V.K.Mehta and Rohith Mehta, "Basic electrical engineering", S.Chand publishers, 14th edition.

2. M.S. Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", Tata McGraw Hill Publishers, 1st edition, 2004.

3. B.L. Thereja, "Electrical technology-Vol-I & II ", S. Chand Publishers, 23rd edition, 2004.

4. Dr.S.L.Uppal, "Electrical Wiring, Estimating and Costing", Khanna publishers, 1st edition, 2008.

Reference Books :

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|---------------------------------------------------------------------------------------------------------------------|
| 1. H. Cotton, "Electrical Technology", CBS Publishers, 7th edition, 2005. |
| 2. Joseph Edminister, "Electric Circuits" Tata McGraw Hill Publishers, 5th edition, 2010. |
| 3. K.B.Raina and S.K.Battacharya, "Electrical Design Estimating and Costing" New age publishers, 1st edition, 1991. |
| 4. V.N.Mittle, "Basic electrical engineering", Tata McGraw Hill Publishers, 2nd edition, 2005. |

Web References:

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|--------------------------------------------------------------------------------------------------|
| 1. http://nptel.ac.in/downloads/108105053/ |
| 2. https://www.electrical4u.com/ |
| 3. http://www.smpe.us/references.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 Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

ELECTRONIC DEVICES AND CIRCUITS (EDC)

I/II Semester : ECE,CSE,CST/EEE					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
EC101	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100

Sessional Exam Duration : 1 ½ Hrs **End Exam Duration: 3 Hrs**

Course Outcomes : At the end of the course the students are able to

CO1: Understand the concepts of energy band diagrams and semiconductors.

CO2: Apply the concept of diode in rectifiers, filter circuits and wave shaping.

CO3: Analyze the operation and configurations of BJT.

CO4: Analyze the operation and characteristics of JFET.

CO5: Analyze the operation and characteristics of MOSFET and special devices.

UNIT – I

Review of Semiconductor materials

Classification of materials based on Energy Band Diagrams, mobility & conductivity of Charge carriers in Semiconductors, Continuity equation, Intrinsic and Extrinsic semiconductors, Mass-action law, Charge densities in semiconductors, Drift current & diffusion current, Hall-effect.

UNIT - II

Semiconductor Diodes And Applications

p-n junction Diode - Construction and V-I Characteristics ,Current components in p-n diode, Diode resistance, Diode as a Rectifier-HWR,FWR and Bridge Rectifier With and Without Filters, Clipping and Clamping circuits without biasing, Break down mechanisms, Zener diode characteristics and its Applications.

UNIT – III

Bipolar Junction Transistor (BJT)

Construction and operation of n-p-n and p-n-p transistors, Transistor current components, CB, CE and CC configurations, characteristics and their comparisons, Transistor Biasing, Transistor as an amplifier.

UNIT – IV

Field Effect Transistors (FET)

Construction, Types and operation of JFETs, Drain and Transfer characteristics, Parameters of JFET, JFET Biasing, Comparison of JFET and BJT, Applications of JFET.

UNIT - V

MOSFETs and Special Purpose Devices

MOSFETs: Introduction of MOSFETs, Types of MOSFETs. Characteristics of Depletion MOSFET and Enhancement MOSFET.

Special Purpose Devices: LED, Photo diode, UJT, SCR and working Principle of solar cell.

Text Books

1. Jacob Millman, Christos C Halkias, Satyabrata Jit, "Integrated Electronic", 2nd Edition, TMH, 2012.
2. Ben G Streetman and Sanjay Banerjee, "Solid State Electronic Devices", 5th Edition, Pearson Education Asia, 2002.
3. Robert L Boylestad, Louis Nashelsky, "Electronic devices and Circuit theory", 8th Edition, PHI Pvt. Ltd., 2004.
4. Donald A Neamen and Dhrubes Biswas, "Semiconductor Physics and Devices", 4th Edition TMH, 2012.

5. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th edition, 2008

Reference Books

1. N.N Bhargava, D.C. Kulshrestha, S.C Gupta, NITTTR – Chandigarh, Basic Electronics and Linear Circuits, McGraw Hill Education (India), Pvt. Ltd., 2nd Edition, 2017.
2. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits, Oxford University Press, 7th Edition, 2018.
3. Jacob Millman and Arvin Gabriel, Microelectronics- 2nd Edition, McGraw Hill, 2013.
4. A S Sedra and K C Smith, Microelectronics, 7th Edition, Oxford University Press, 2018.
5. Albert Paul Malvino, Electronic Principles, McGraw Hill International edition.

Web References

1. <http://www.electronics-tutorials.ws/>
2. <http://nptel.ac.in/courses/117103063/>
3. www.electronicshub.org/tutorials/
4. engineering.nyu.edu/gk12/amps-cbri/pdf/Basic%20Electronics.pdf

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

PROGRAMMING FOR PROBLEM SOLVING (PPS)

I Semester : Common for CE,CSE,CST,ECE,EEE & ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS101	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration : 1 1/2 Hrs					End Exam Duration: 3 Hrs			

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

CO1: Understand fundamentals of problem solving concepts with various data types and operators

CO2: Apply conditional and iterative statements for solving a given problem

CO3: Illustrate the applications of functions and storage classes.

CO4 : Apply the concepts of pointers and dynamic memory management in problem solving.

CO5: Understand the purpose of structures, unions and files.

UNIT – I

General Problem Solving Concepts

Algorithm, Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops.

Imperative Languages

Introduction to imperative language; syntax and constructs of a specific language (ANSI C) – Types Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, Formatted input/output.

UNIT – II

Control Flow with discussion on structured and unstructured programming

Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, goto labels, structured and un- structured programming.

UNIT - III

Functions and Program Structure with discussion on standard library

Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Pre-processor, Standard Library Functions and return types.

UNIT - IV

Pointers and Arrays:

Pointers and address, dynamic memory management, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialization of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

UNIT - V

Structures and Unions:

Basic Structure, Structures and Functions, Array of structures, Pointer of structures, Self-referral

structures, Table look up, typedef, Unions, Bit-fields.

Files:

Introduction to Files, Opening and Closing files, Reading and Writing files, File I/O functions, Error Handling in files.

Text Books :

1. The C Programming Language, B. W. Kernighan and D. M. Ritchie, Second Edition, PHI.
2. Programming in C, B. Gottfried, Second Edition, Schaum Outline Series.

Reference Books :

1. C: The Complete Reference, Herbert Schildt, Fourth Edition, McGraw Hill.
2. Let Us C, Yashavant Kanetkar, BPB Publications.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

APPLIED PHYSICS LAB (AP(P))

I/II Semester : Common for ECE,CSE, CST/ ME, CE,EEE					Scheme : 2020		
Course Code	Category	Hours / Week			Credits	Maximum Marks	
BS114	BSL	L	T	P	C	Continuous Internal Assessment	End Exam
		-	-	3	1.5	40	60

End Exam Duration: 2 Hrs

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

CO1: Apply the knowledge of physics laboratory in measuring the standard values.

CO2: Apply theoretical knowledge to experimental values.

List of Experiments

Note : At least 12 of the following experiments shall be conducted

1. Determination of size of small particles using a laser.
2. B-H curve to study the magnetic behavior of ferromagnetic materials.
3. Determination of Numerical Aperture of an Optical Fiber.
4. Verification of Faraday's Laws.
5. Determination of wavelength using a single slit.
6. Study of magnetic field along the axis of a circular coil (Steward Gees Apparatus).
7. LCR Series and Parallel Resonance.
8. Determination of wavelengths using a grating.
9. Hall Effect-determination of Hall coefficient and charge density.
10. Determination of radius of curvature of a plano-convex lens using Newton's rings.
11. Double refraction - determination of refractive indices of e-ray and o-ray.
12. Determination of small thickness by forming parallel fringes.
13. Determination of rigidity modulus by using torsion pendulum.
14. Determination of energy gap of a semiconductor by four probe method.

ELECTRONIC DEVICES AND CIRCUITS LAB (EDC (P))

I/II Semester : CSE,CST/ EEE				Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks			
EC103	ESL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	100

End Exam Duration: 3 Hrs

Course Outcomes : At the end of the course, students are able to

CO1: Understand the operation of electronic equipments - CRO, CDS and FG.

CO2: Analyze the characteristics and applications of PN-diode and Zener diode.

CO3: Understand the characteristics of BJT.

CO4: Understand the characteristics of JFET.

List of Experiments

Note : At least 12 of the following experiments shall be conducted

1. Study of Electronic equipment - CRO, CDS and FG.

2. P-N Junction Diode V-I Characteristics.

3. Zener Diode V-I Characteristics.

4. Zener diode as a voltage regulator.

5. Performance characteristics of half wave rectifier.

6. Performance characteristics of full wave rectifier.

7. Performance characteristics of bridge rectifier.

8. Clipping circuits using diodes.

9. Clamping circuits using diodes.

10. Common emitter input-output characteristics.

11. Common base input-output characteristics.

12. JFET drain and transfer characteristics.

13. SCR characteristics.

14. UJT characteristics.

15. UJT as relaxation oscillator

PROGRAMMING FOR PROBLEM SOLVING LAB [PPS(P)]

I Semester : Common for CE, CSE, CST, ECE, EEE & ME					Scheme : 2020			
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS107	ESL	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		-	-	3	1.5	40	60	100
End Exam Duration : 3 Hrs								

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

- CO1:** Implement programs using conditional and loop statements in C.
- CO2:** Develop programs using 1-Dimensional and 2-Dimensional arrays.
- CO3:** Perform Call by value, Call by reference and Recursion through functions.
- CO4:** Implement programs using pointers.
- CO5:** Develop programs using structures and file concepts.

List of Experiments

1. Conditional Statements: Quadratic equations, usage of switch statement.
2. Loop Statements : Adam Number, Cosine series
3. Arrays: Max Min problem, standard deviation and variance.
4. Character Arrays: Palindrome, implementation of string handling functions.
5. Functions and Recursion : Matrix operations, Towers of Hanoi, GCD
6. Pointers: Interchanging problem, implementation of dynamic memory allocation.
7. Structures: Usage of structures in various applications.
8. Files: Reading contents from files and writing contents to files.

Reference Books :

1. Yashavant P.Kanetkar , Let US C , BPB Publications, 7th Edition,2007.
2. B.W. Kernigan and Dennis M.Ritchie, The C Programming Language , (PHI), 2nd Edition 2003.

ENGINEERING MATHEMATICS – II (EM2)

II Semester : Common for CSE, CST, CE & ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS104	BSC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	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: Utilize Numerical Methods and principles of least square methods in engineering problems.

CO2: Determine the Fourier series of a function and its expansion.

CO3: Understand the Fourier and Z-transforms.

CO4: Use Partial differential equations and method of separation of variables in solving the one dimensional wave and Heat equations.

CO5: Understand vector differentiation & integration and its applications.

UNIT - I

Numerical Methods

Solution of Algebraic and Transcendental Equations – Method of False Position, Iteration method, Newton Raphson method. Solution of Simultaneous Equations – Gauss Seidel iteration method. Curve Fitting – Least squares method. Fitting a straight line $y = a + bx$ and parabola $y = a + bx + cx^2$.

UNIT - II

Fourier Series

Determination of Fourier coefficients, Dirichlet's conditions. Fourier series of Even and Odd functions. Functions having points of discontinuity. Change of interval. Half-Range Fourier Sine and Cosine series.

UNIT - III

Fourier Transforms

Infinite Fourier Transforms, Fourier Sine and Cosine transforms. Finite Fourier Sine and Cosine Transforms, Inverse Fourier Transforms.

Z-Transforms

Z-Transforms, Inverse Z-Transformation, Properties, Damping rule, Shifting rule. Application of Z- Transforms to Difference equations.

UNIT - IV

Partial Differential Equations

Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions. Linear equations of first order – Lagrange's Linear equation. Applications - Method of separation of variables. One dimensional Wave equation, One dimensional Heat equation.

UNIT - V

Vector Calculus

Scalar and Vector point functions. Divergence, curl, gradient, solenoidal and irrotational vectors. Repeated operations by del. Green's theorem, Stoke's theorem and Gauss - Divergence theorem (Statement only). Applications to theorems.

Text Books

1. B.S. Grewal- Higher Engineering Mathematics. Khanna Publishers, 42nd Edition, 2012.
2. T.K.V. Iyengar and others - A Text Book of Engineering Mathematics, Vol. I & II - S.Chand & Company, 13th Edition 2014.

Reference Books

1. B.V. Ramana -Higher Engineering Mathematics, TMH Publishers, 2nd Edition, 2006.
2. N.P. Bali and others - A Text Book of Engineering Mathematics, Lakshmi publishers, 7th Edition, 2009.
3. Erwyn Kreyszig - Advanced Engineering Mathematics, John Wiley, 8th Edition 2006.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

PROBABILITY & STATISTICAL METHODS (PSM)

II Semester : Common for CSE & CST				Scheme : 2020				
Course Code	Category	Hours/Week		Credits	Maximum Marks			
BS106	BSC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional 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: Gain the knowledge on Mathematical Statistics and probability theory.

CO2: Classify discrete and continuous distributions.

CO3: Understand the test of hypothesis for large samples.

CO4: Analyze the Test of significance for small samples.

CO5: Find correlation coefficient and classification of ANOVA.

UNIT – I

Statistical Methods: Introduction to statistics, Frequency distribution, Measures of Central Tendency, Measures of dispersion, Moments.

Probability: Basic concepts of probability, Addition and Multiplication law of probability, Mathematical Expectation -Variance and Co-variance.

UNIT - II

Probability Distributions: Random variable – Discrete and continuous probability distributions and Functions; Binomial, Poisson and Normal distributions.

UNIT – III

Test of Hypothesis: Population and sample, Confidence interval of mean, Statistical hypothesis –Null and Alternative hypothesis, Level of Significance and Critical region, Z-test for means and Proportions.

UNIT - IV

Test of Significance: Student t-test - sample mean, difference between sample means and paired Student t-test, F – test, Chi-square test –Goodness of fit and independence of attributes.

UNIT - V

Correlation: Co-efficient of Correlation, Lines of regression and Rank Correlation.

Analysis of Variance: ANOVA for One-way classification, ANOVA for Two-way classification.

Text Books

1. Gupta and Kapur Fundamentals of Mathematical Statistics; S. Chand & Company, New Delhi.
2. T.K.V.Iyengar and others -Probability And Statistics, S.Chand & Company, 5th Edition, 2015.
3. B.S.Grewal [2012], Higher Engineering Mathematics, Khanna Publishers, New Delhi.

Reference Books

1. K.Murugesan & P.Gurusamy , Probability And Statistics , Anuradha Publications.
2. Probability And Statistics, Murray R Spiegel and others, Schaum's series, Tata Mcgraw Hill Education.
3. Leonard Kazmier , Business Statistics , Schaum's series, Tata Mcgraw Hill Education.

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

ENGLISH (ENG)

I/II Semester : Common for CE, EEE, ME/ ECE, CSE & CST					Scheme : 2020			
Course Code	Category	Hours/Week		Credits	Maximum Marks			
HU101	HSSC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100

Sessional Exam Duration : 1 ½ Hrs **End Exam Duration: 3 Hrs**

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

CO 1: Use Grammatically acceptable English in Oral and Written communication.

CO 2: Use appropriate Vocabulary in Technical and General Contexts.

CO 3: Comprehend General and Technical Content using various Reading Skills like Skimming and Scanning.

CO 4: Write Letters, Summaries and Essays of topical, Narrative, Descriptive, Analytical and Persuasive nature.

CO 5: Write Job Applications, Resumes, Memos and E-mails.

UNIT – I

I Have a Dream: An Independent, Development and Strong India – Dr. A.P.J. Abdul Kalam

Vocabulary: Synonyms and Antonyms

Grammar: Parts of Speech, Types of Nouns, Pronouns and Adjectives

Reading: Reading with a Purpose: Reading for Understanding, Note - Making

Writing: Punctuation, Writing notes and Paragraphs, Note – Taking

UNIT – II

The Doctor's Word – R.K. Narayan

Vocabulary: One-word Substitutes, Idioms and Idiomatic Phrases

Grammar: Adverbs, Verbs –Verb forms, Types of Verbs, Prepositions, Conjunctions and Articles, Word Order

Reading: Skimming and Scanning, Reading Comprehension

Writing: Business Letters & E-mail Writing

UNIT – III

Stay Hungry, Stay Foolish - Steve Jobs

Vocabulary: Prefixes and Suffixes, Homophones and Homonyms Grammar:

Tenses, Concord, Voices and Reported Speech

Reading: Use of Dictionary, Thesaurus, Library and Internet for Information

Writing: Writing Cover Letters for Job Applications and Resume Preparation

UNIT – IV

Once there was a King – Rabindranath Tagore

Vocabulary: Words often Confused and Collocations

Grammar: Question Tags, Degrees of Comparison, Transformation of Sentences and Correction of Sentences

Reading: Précis Writing

Writing: Memo Writing

Detailed Study Text:

1. The Enriched Reading by D. Sudha Rani, Pearson India Education Services Pvt. Ltd, Second Impression, 2017.

Reference Books:

1. Michael Swan, Practical English Usage, Third Edition, OUP, 2006.
2. David Green, Contemporary English Grammar, Structure and Composition,, Second Edition, Lakshmi Publications, 2015.
3. Oxford Advanced Learner's Dictionary of Current English, OUP, 2015.
4. Meenakshi Raman and Sangeetha Sarma, Technical Communication Principles and Practice, 3rd Edition, OUP, 2015.
5. Raj N Bakshi, English Grammar Practice, Orient BlackSwan, 2005.
6. Sangeeta Sharma & Binod Mishra, Communication Skills for Engineers and Scientists, PHI Learning Private Limited.
7. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Publishing Company Ltd., 2005.
8. Dr A. Ramakrishna Rao, Dr G. Natanam & Prof S.A. Sankaranarayanan, "English Language Communication: A Reader cum Lab Manual", Anuradha Publications, Chennai, 2006.

Question Paper Pattern:**Sessional Exam****I Sessional Examination : 25 Marks**

1. Short Answer Questions – 4 Marks
2. Vocabulary – 4 Marks
3. Grammar – 4 Marks
4. Reading Comprehension – 5 Marks
5. Business Letter – 4 Marks
6. E-mail Writing – 4 Marks

II Sessional Examination : 25 Marks

1. Short Answer Questions – 4 Marks
2. Vocabulary – 4 Marks
3. Grammar – 4 Marks
4. Précis Writing – 4 Marks
5. Memo Writing – 4 Marks
6. Job Application Letter – 5 Marks

End Exam :

1. Short Answer Questions – 8 Marks
2. Vocabulary – 8 Marks
3. Grammar – 12 Marks
4. Reading Comprehension – 5 Marks
5. Précis Writing – 5 Marks
6. Job Application Letter – 10 Marks
7. E-mail Writing – 6 Marks
8. Memo Writing – 6 Marks

ENGINEERING DRAWING (ED)

I / II Semester : Common to CE, ECE, ME/ CSE, CST, EEE					Scheme : 2020			
Course Code	Category	Hours/Week		Credits	Maximum Marks			
ME101	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		1	-	4	3	40	60	100

Sessional Exam Duration : 1 1/2 Hrs **End Exam Duration: 3 Hrs**

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

CO1: Understand the concept of projections of an object and draw the projection of points, straight lines and planes

CO2: Draw projection of regular solids

CO3: Draw the sectional views of regular solids and their surface developments

CO4: Draw the orthographic views from given isometric view

CO5: Draw the isometric views from the orthographic views

UNIT – I

Introduction to Engineering Drawing:

Drawing instruments and their uses, Lettering and Dimensioning. Introduction to polygons and conics.

Introduction to scales (**not for End examinations**)

Orthographic projections:

Introduction, planes of projections, projections of points. First angle projection- Projections of straight lines- parallel to one and inclined to other plane- Inclined to both the planes, traces of lines (treatment is limited to simple problems only)

Projection of planes:

Regular planes- perpendicular, parallel to one reference plane and inclined to other reference planes - Inclined to both the reference planes

UNIT – II

Projections of solids:

Projections of right regular solids- prism, pyramid, cylinder and cone with axis inclined to one plane and inclined to both planes.

UNIT – III

Sections of Solids:

Sectional views of right regular solids - prism, pyramid, cylinder and cone. True shapes of Sections (Treatment is limited to simple problems only)

Development of Surfaces:

Development of surfaces of right regular solids and their sections - prism, pyramid, cylinder and cone.

UNIT – IV

Orthographic projections:

Conversion of pictorial views into orthographic views (Treatment limited to simple problems only)

UNIT – V

Isometric Projections:

Principle of Isometric projection, Isometric scale. Isometric projections of simple planes, regular solids and compound solids.

Text Books

1. K.L.Narayana and P.Kannaiah“ Text book on Engineering Drawing,” Second Edition Scitech Publications, Chennai.,2006
2. N.D.Bhatt and V.M.Panchal,“ Elementary Engineering Drawing “, 45th Edition , Charotar Publishing house , Anand, India., 2002

Reference Books

1. K.Venugopal, “ Engineering Drawing and Graphics with Auto CAD” , Fourth Edition,2001, New Age International(P) Limited, Publishers, New Delhi, 2001
2. Dhananjay A Jolhe, “ Engineering Drawing with an introduction to Auto CAD”, Tata Mc Graw-Hill Publishing Company Ltd. , New Delhi , 2008
3. M.B.Shaw & B.C.Rana “ Engineering Drawing “Second Edition Pearson Education , New Delhi, 2009

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

DATA STRUCTURES (DS)

II Semester : Common for CSE,CST,ECE & EEE					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS104	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional 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: Understand the purpose of array data structure and its applications

CO2: Understand the linked list data structure and its operations.

CO3: Illustrate the operations performed on stack data structure.

CO4: Illustrate the operations performed on queue data structure

CO5: Understand the concepts of trees and operations on binary search trees.

UNIT – I

Introduction to Data Structures

Definition,Classification of Datastructures- Linear and Non Linear

Sequential Storage Representation

Arrays, Operations on Arrays- Insertion, Deletion, Traversing; Applications of arrays–Linear Search, Binary Search, Bubble Sort, Selection Sort, Insertion Sort, Merging of arrays.

UNIT – II

Linked Storage Representation –Linked Lists

Linked storage representation using pointers, Types of Linked Lists–Single linked list, Double linked list, Operations on linked lists-Traversing, Searching, Insertion and Deletion.

UNIT – III

Linear DataStructures – Stacks

Representation of Stack using sequential storage and linked allocation methods, Operations on Stacks- Push, Pop, and Display.

UNIT - IV

Linear DataStructures - Queues

Representation of Queue using sequential and linked allocation, Operations on Queues- Insertion, Deletion and Traversing, Circular queue.

UNIT - V

Non Linear Data Structures-Trees

Basic terminology, Binary trees, Representation of Binary tree in memory using arrays and linked lists, Binary Search Trees, Operations on binary search trees- Insertion, Deletion and Recursive Traversals- Preorder, Inorder and Postorder.

Text Books :

1. Jean Paul Tremblay and Paul G.Sorenson[2007], An Introduction to DataStructures With Applications, TMH.
2. Debasis Samantha, Classic Data Structures Second Edition (2009), PHI.

Reference Books :

1. Pradip Dey, Manas Ghosh and Reema Tereja, Computer Programming and DataStructures, Oxford University Press.
2. S.K.Srivatsava and Deepali Srivatsava, Data Structures through ‘C’ in depth, BPB Publications.

Web References :

1. https://www.tutorialspoint.com/data_structures_algorithms
2. <http://www.geeksforgeeks.org/data-structures>

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:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

ENVIRONMENTAL STUDIES (ES)

II Semester: ECE,CSE,CST,CE,EEE,ME						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MC101	MC	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	-	-	-	100	-	100

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

- CO1:** Apply the knowledge of environmental issues in his area of work. Understands the need for the conservation of Natural resources for sustainable development.
- CO2:** Understands the importance of Ecosystem and conservation of biodiversity
- CO3:** Understands the problems due to environmental pollution with remedial measures and issues related to environment.
- CO4:** Understands the disaster management in prevention of loss of life and property
- CO5:** Understands the use of IT & related technology to conserve environment & human health.

UNIT – I

Introduction to Environmental studies and Natural resources:

Definition, scope, importance and multidisciplinary nature of Environmental studies. Need for public awareness.

Energy resources-Growing energy needs, nonrenewable and renewable energy resources: Hydroelectric, solar, wind and nuclear energy resources. Water resources- Use and over exploitation of surface and ground water. Dams and its effects on forest and tribal people. Forest resources- uses of forest, deforestation causes and its effects. Food resources- changes caused by agriculture and over grazing. Modern agriculture and its effects.

UNIT – II

Concepts of ecosystem:

Structure and function of an ecosystem. Energy flow in an ecosystem (single channel energy flow model). Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics and functions of grass lands, desert, pond and ocean ecosystems.

UNIT – III

Biodiversity and its conservation

Definition and levels of biodiversity. Values of biodiversity- consumptive, productive, social, ethical, aesthetic and ecological services. Hot spots of biodiversity. Bio geographical classification of India. Endangered and endemic species of India. Threats to biodiversity-Habitat loss, poaching of wild life and man-wild life conflict. Conservation strategies- In situ and ex situ conservation.

UNIT – IV

Environmental pollution

Air Pollution - sources, types, causes and Effects of air pollutants on humans, plants and animals. Global effects-global warming, acid rains and ozone layer depletion. Air Pollution control measures for suspended particulate matter (SPM) and gaseous pollutants. Water Pollution – sources, causes and effects of water pollution. sewage water treatment. Disaster management- Floods, Earth quake and cyclone .Municipal solid waste management. Role of an individual in prevention of pollution.

UNIT – V

Social issues and the environment

From unsustainable development to sustainable development. Consumerism and waste products. Salient features of Air Act, water Act and Forest conservation Act .Process involved in the enforcement of environmental legislation. Role of Information Technology in environment and human health.

Text books

- 1.C.P.KaushikandAnubhaKaushik,—EnvironmentalStudies||NewAgeInternational(p)Ltd.,NewDelhi
2. R.Rajagopalan— Environmental Studies, Oxford University press, Chennai
3. Y.Anjaneyulu— Introduction to Environmental sciences, BS Publications, Hyderabad

Reference books

- 1.BennyJoseph-EnvironmentalStudies,TataMcGrawHill,NewDelhi.
- 2.BaruchaErach-Environmentalstudies,Universitiespress.

STATISTICAL METHODS LAB (SM(P))

PHONETICS & COMMUNICATION SKILLS LAB (PCSP)

I/II Semester : Common for CE, EEE, ME/ ECE, CSE & CST					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
HU103	HSSL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		0	0	3	1.5	40	60	100

End Exam Duration: 2 Hrs

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

CO1: Speak Internationally Intelligible English without mother tongue accent.

CO2: Adopt appropriate intonation patterns for effective Oral Communication.

CO3: Identify International Phonetic Symbols to find the pronunciation of new words.

CO4: Integrate Listening Skills & Speak in English confidently, fluently and effectively.

CO5: Exhibit team playing & Leadership skills.

List of Experiments

Phonetics Laboratory

Focus in the lab is on accent neutralization for International Intelligibility

1. Introduction to English Phonetic Symbols and associated sounds.

2. Practice in Consonant sounds

3. Practice in Vowel sounds

4. Practice in Accent, Rhythm and Intonation

5. Practice sessions on Listening for General Information, Specific Information & Comprehension,

Communication Skills Laboratory

Focus in the lab is more on fluency than on accuracy

1. Inter-Personal Communication

a) Self Introduction

b) Introducing Others

c) Non-Verbal Communication

d) Posture, Gait and Body language

2. Communication in Formal Situations

a) Public Speaking – Extempore, Prepared Speech

b) Role-play

c) Situational Dialogues

d) Giving Directions

e) Sell-out

f) JAM

g) Telephone Etiquette

Reference Books :

1. Exercises in Spoken English Part – I, Part – II & Part – III Published by EFLU, Hyderabad.

2. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice Hall of India, Pvt Ltd.

3. T. Balasubramanyam , A.Text Book of English Phonetics for Indian Students, Macmillan India Ltd.

4. Krishna Mohan and Meera Benerjee , Developing Communication Skills , Macmillan India Ltd.

5. D.Souza Eunice and Shahani. G, “Communication Skills in English”, Noble Publishing House.

DATA STRUCTURES LAB (DS(P))

II Semester : Common for CSE, CST, ECE & EEE					Scheme : 2020			
Course Code	Category	Hours/Week		Credits	Maximum Marks			
CS109	ESL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	100

End Exam Duration: 3 Hrs

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

CO1: Implement the operations on array data structure.

CO2: Implementation of searching and sorting techniques.

CO3: Implement Stacks using static and dynamic allocation.

CO4: Implement Queues using static and dynamic allocation.

List of Experiments

1. Array Data Structures:
 - a) Array Operations
 - b) Merging of two sorted arrays.
2. Applications of Array Data Structures:
 - a) Linear Search
 - b) Binary Search
 - c) Bubble Sort
 - d) Insertion Sort
 - e) Selection Sort
3. Implementation of single linked list and its operations
4. Implementation of double linked lists and its operations
5. Implementation of stack operations using static allocation
6. Implementation of stack operations using dynamic allocation
7. Implementation of queue operations using dynamic allocation
8. Implementation of circular queue operations using static allocation

Reference Books :

1. Yashavant P.Kanetkar , Let US C , BPB Publications, 7th Edition,2007.
2. B.W. Kernigan and Dennis M.Ritchie, The C Programming Language , (PHI), 2nd Edition 2003.