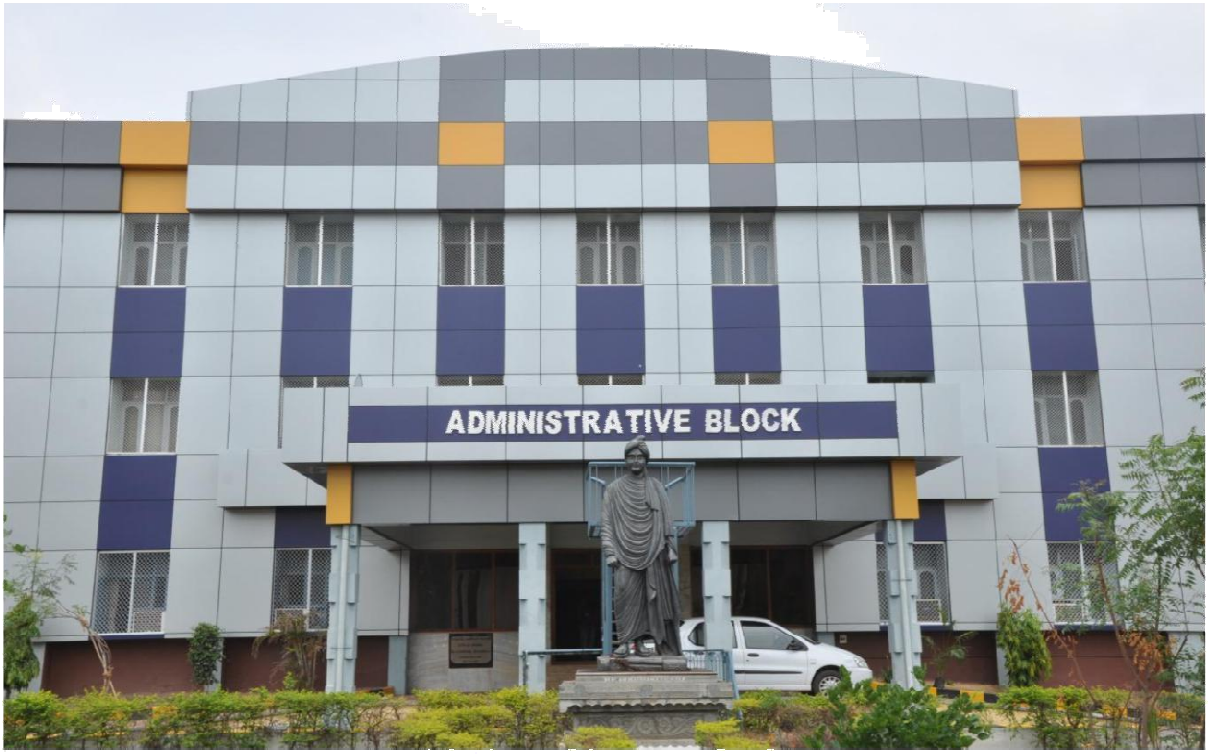

Scheme – 2020

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 Year of FOUR YEAR B.Tech. Degree Course in

COMPUTER SCIENCE & ENGINEERING

(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	***Soft Skills***	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)

<table>
<tr><td colspan="5">III Semester: Common for CSE, CST & ECE</td><td colspan="4">Scheme : 2020</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">HU201</td><td rowspan="2">HSSC</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>TOTAL</td></tr>
<tr><td>3</td><td>-</td><td>-</td><td>3</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="5">Sessional Exam Duration : 1½ Hrs</td><td colspan="4">End Exam Duration: 3 Hrs</td></tr>
<tr><td colspan="9">Course Outcomes : At the end of the course the student will be able to</td></tr>
<tr><td colspan="9">CO1: Understand the nature and scope of managerial economics and the concepts of demand analysis.</td></tr>
<tr><td colspan="9">CO2: Understand the significance of demand elasticity and the concepts of demand forecasting.</td></tr>
<tr><td colspan="9">CO3: Understand the concepts of production and cost analysis and different market structures and their competitive situations.</td></tr>
<tr><td colspan="9">CO4: Understand the concept and significance of capital budgeting.</td></tr>
<tr><td colspan="9">CO5: Understand the principles and significance of accountancy and preparation of final accounts.</td></tr>
<tr><td colspan="9">UNIT – I</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="9">UNIT – II</td></tr>
<tr><td colspan="9">Elasticity of Demand and Demand Forecasting:
Elasticity of Demand-Types, Measurement and Significance;
Demand forecasting –Importance, Factors, Purposes, Methods of Demand Forecasting</td></tr>
<tr><td colspan="9">UNIT – III</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="9">UNIT – IV</td></tr>
<tr><td colspan="9">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</td></tr>
</table>

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. Varshiney and Maheswari, Managerial Economics, Sultan Chand & Co, New Delhi

Reference Books:

1) Vanita Agarwal, Managerial Economics, Pearson Education
2) Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Thomson
3) S.P.Jain and K.L.Narang, Financial Accounting

Question Paper Pattern:

Sessional Examination:

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

End Examination:

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.

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.

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)

<table>
<tr><td colspan="5">III Semester : Common for CSE & CST</td><td colspan="4">Scheme : 2020</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">CS203</td><td rowspan="2">PCC</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>TOTAL</td></tr>
<tr><td>3</td><td>-</td><td>-</td><td>3</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="5">Sessional Exam Duration : 1½ Hrs</td><td colspan="4">End Exam Duration: 3 Hrs</td></tr>
<tr><td colspan="9">Course Outcomes : At the end of the course the student will be able to</td></tr>
<tr><td colspan="9">CO1: Understand the concepts of Database Management Systems and Entity Relationship Modeling.</td></tr>
<tr><td colspan="9">CO2: Use SQL commands to create, retrieve, update, and delete data from the Data bases.</td></tr>
<tr><td colspan="9">CO3: Comprehend the concepts of Normalization techniques and Indexing.</td></tr>
<tr><td colspan="9">CO4: Understand the properties of Transactions in a Database System.</td></tr>
<tr><td colspan="9">CO5: Understand Concurrency Control techniques and Recovery System.</td></tr>
<tr><td colspan="9">UNIT – I</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="9">UNIT – II</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="9">UNIT – III</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="9">UNIT – IV</td></tr>
<tr><td colspan="9">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.</td></tr>
</table>

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**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
CS206	**PCL**	**-**	**-**	**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 PROGRAMING THROUGH JAVA LAB (OOPJ(P))

III Semester : Common for CSE & CST						**Scheme : 2020**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS207	**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: Implement Method overloading and Constructor overloading.

CO2: Implement Inheritance, Packages and Interfaces concepts.

CO3: Implement String handling and Exception handling.

CO4: Implement multithreading and collections.

List of Experiments

1. Programs on Method overloading and Constructor overloading.
2. Program to implement Multilevel and Hierarchical Inheritance.
3. Program to implement Packages with access protection.
4. Program to implement Multiple inheritance using interfaces.
5. Programs on String Handling methods.
6. Programs to implement built-in exceptions and customized exceptions.
7. Programs to implement Synchronization and Inter Thread Communication in Multi-threading.
8. Programs to implement ArrayList, LinkedList and HashSet collections.

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)

<table>
<tr><td colspan="5">IV Semester : Common for CSE, CST & CSBS</td><td colspan="4">Scheme : 2020</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">CS208</td><td rowspan="2">PCC</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>TOTAL</td></tr>
<tr><td>3</td><td>-</td><td>-</td><td>3</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="5">Sessional Exam Duration : 1½ Hrs</td><td colspan="4">End Exam Duration: 3 Hrs</td></tr>
<tr><td colspan="9">Course Outcomes : At the end of the course the student will be able to</td></tr>
<tr><td colspan="9">CO1: Acquaint with the basics of the Operating System and their different structures.</td></tr>
<tr><td colspan="9">CO2: Comprehend the process management policies, CPU Scheduling and Process synchronization techniques</td></tr>
<tr><td colspan="9">CO3: Understand Deadlocks and their Handling mechanisms, file management system.</td></tr>
<tr><td colspan="9">CO4: Analyze memory management schemes and allocation policies.</td></tr>
<tr><td colspan="9">CO5: Demonstrate Input / Output related Software/Hardware and Disk scheduling strategies.</td></tr>
<tr><td colspan="9">UNIT – I</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="9">UNIT – II</td></tr>
<tr><td colspan="9">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, Dinning Philosopher Problem, Barber’s shop problem.</td></tr>
<tr><td colspan="9">UNIT – III</td></tr>
<tr><td colspan="9">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.</td></tr>
</table>

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:

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.

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		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS210	PCC	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 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)

IV Semester : Common for CSE & CST						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS211	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: Analyze the performance of algorithms.

CO2:.Comprehend Divide and conquer technique to solve problems.

CO3: Apply Greedy method to solve problems.

CO4: Apply Dynamic programming technique to solve problems.

CO5: Understand Tree traversal, Graph traversal and Backtracking techniques.

CO6: Understand Branch and Bound technique and Lower bound theory.

UNIT– I

Introduction: What is an Algorithm? Performance Analysis: Space &Time Complexities, Asymptotic notations.

Divide and Conquer: General method, Binary search, Finding Maximum and Minimum, Merge sort, Quick sort, Strassen's Matrix Multiplication.

UNIT– II

Greedy Method : The General Method, Knapsack Problem, Tree Vertex splitting, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT– III

Dynamic Programming : The General Method, Multistage Graphs, All Pairs Shortest Paths, Optimal Binary Search Trees, String Editing problem, 0/1-Knapsack, Reliability Design, The Travelling Salesperson Problem.

UNIT– IV

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Bi-connected Components and DFS

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, and Hamiltonian cycles.

UNIT – V

Branch and Bound: The Method, 15 Puzzle problem, Job Sequencing with Deadlines, Travelling Salesperson problem.

Lower Bound Theory: Comparison Trees, Oracles and Adversary Arguments, Techniques for Algebraic problems.

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)

IV Semester : Common for CSE & CST						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS212	BSC	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 mathematical representation of statements using connectives, normal forms, equivalence and implications.

CO2: Calculate number of possible outcomes of elementary combinatorial processes.

CO3: Solve homogenous and Inhomogeneous recurrence relations using substitution method and generating functions

CO4: Understand the concept of Planar graphs, Hamiltonian graphs, Euler graphs, Spanning trees and Binary trees.

CO5: Understand the association between the elements of sets using Digraphs and Warshall's Algorithm.

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.Chandrasekharaiah, Mathematical foundations of computer science, -Prism books Pvt.Ltd.
2. Ralph P.Grimaldi [2006], [5th Edition], Discrete and Combinational Mathematics-An Applied Introduction, Pearson Education.
3. Liu [2004], Elements of discrete mathematics, McGraw-Hill.

Question Paper Pattern:

Sessional Examination :

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

End Examination:

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	100
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))

IV Semester: Common for CSE & CST						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS215	PCL	-	-	3	1.5	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

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

CO1: Apply Divide and Conquer and Greedy methods for problem solving.

CO2: Apply Dynamic Programming Technique to solve problems.

CO3: Apply Backtracking and Branch and Bound Techniques for problem solving.

List of Experiments

1. Implement Binary Search algorithm using Divide and Conquer Technique.
2. Implement Merge Sort algorithm using Divide and Conquer Technique.
3. Implement Knapsack using Greedy Technique.
4. Implement Job Sequencing with Deadlines using Greedy Technique.
5. Implement Kruskal's algorithm for finding minimum cost spanning tree using Greedy Technique.
6. Implement 0/1 Knapsack problem using Dynamic Programming Technique.
7. Implement Travelling Sales Person problem using Dynamic Programming Technique.
8. Implement Depth First Search Algorithm.
9. Implement N Queens's problem using Backtracking technique.
10. Implement Travelling Sales Person problem using Branch and Bound Technique.