BVVS
BASAVESHWAR ENGINEERING COLLEGE, BAGALKOTE

Department of Information Science and Engineering

UG SCHEME OF TEACHING AND EXAMINATION
(Admitted from 2022-2023 onwards)

Presented By
Dr. Shobha R Patil
Professor and Head

Department of Information Science and Engineering

B. E. I semester Scheme of Teaching and Examinations

(Effective from the academic year 2022-23)

I Semester (CSE Stream) **Branches: CS, IS, AIML and BT** **(Chemistry Group)**

Sl. No.	Course			TD	Credits	Teaching Hours/Week			Examination			
	Category	Code	Title			Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
						L	T	P				
1	ASC(IC)	22UMA103C	Mathematics for Computer Sciences - I	Maths	4	3	0	2	3	50	50	100
2	ASC(IC)	22UCH111C	Chemistry for Computer Sciences	Chemistry	4	3	0	2	3	50	50	100
3	ESC	22UCS119C	Principles of Programming using C	Computer Science	3	2	0	2	3	50	50	100
4	ESC-I	22UXXXXXE	Engineering Science Course-I	Respective Engg. Dept	3	3	0	0	3	50	50	100
5	ETC-I	22USXXXXE	Emerging Technology Course-I	Any Engg. Dept	3	2	0	2	3	50	50	100
6	HSSC	22UHS124C	Communicative English	Humanities	1	1	0	0	1	50	50	100
7	HSSC	22UHS126C 22UHS127C	Kannada – SK Kannada - BK	Humanities	1	1	0	0	1	50	50	100
8	AEC	22UHS129C	Innovation and Design Thinking	Any Dept	1	1	0	0	1	50	50	100
				Total	**20**	**16**	**0**	**08**	**18**	**400**	**400**	**800**

SDA-Skill Development Activities, **TD/PSB**- Teaching Department / Paper Setting Board, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **ETC**- Emerging Technology Course, **AEC**- Ability Enhancement Course, **HSMS**-Humanity and Social Science and management Course, **SDC**- Skill Development Course, **CIE**–Continuous Internal Evaluation, **SEE**- Semester End Examination, **IC** – Integrated Course (Theory Course Integrated with Practical Course)

Department of Information Science and Engineering

B. E. II semester Scheme of Teaching and Examinations

(Effective from the academic year 2022-23)

II Semester (CSE Stream) **(Physics Group)**

Sl. No.	Course			TD	Credits	Teaching Hours/Week			Examination			
	Category	Code	Title			Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
						L	T	P				
1	ASC(IC)	22UMA203C	Mathematics for Computer Sciences - II	Maths	4	3	0	2	3	50	50	100
2	ASC(IC)	22UPH207C	Physics for Computer Sciences	Physics	4	3	0	2	3	50	50	100
3	ESC	22UME223C	CAED	Civil / Mechanical	3	2	0	2	3	50	50	100
4	ESC-I	22UXXXXE	Engineering Science Course-I	Respective Engg. Dept	3	3	0	0	3	50	50	100
5	PLC-I	22USXXXXE	Programming Language Course-I	Any Engg. Dept	3	2	0	2	3	50	50	100
6	HSMC	22UHS224C	Professional writing skills in English	Humanities	1	1	0	0	1	50	50	100
7	HSMC	22UHS225C	Indian Constitution	Humanities	1	1	0	0	1	50	50	100
8	AEC	22UHS228C	Scientific Foundations of Health	Any Dept	1	1	0	0	1	50	50	100
				Total	**20**	**16**	**0**	**08**	**18**	**400**	**400**	**800**

SDA-Skill Development Activities, **TD/PSB**- Teaching Department / Paper Setting Board, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **ETC**- Emerging Technology Course, **AEC**- Ability Enhancement Course, **HSMS**-Humanity and Social Science and management Course, **SDC**- Skill Development Course,**CIE**–Continuous Internal Evaluation, **SEE**- Semester End Examination, **IC** – Integrated Course (Theory Course Integrated with Practical Course)

Department of Information Science and Engineering
3rd Semester

Sl. No.	Course			Credits	Examination						
	Category	Code	Title		Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
					L	T	P				
1	BSC	22UMA301C	Numerical Techniques and Integral Transforms	**3**	3	0	0	3	50	50	100
2	AEC	22UIS305C	Advanced Web Programming (Integrated)	**4**	3	0	2	5	50	50	100
3	PCC	22UIS304C	Logic Design(integrated)	**4**	3	0	2	5	50	50	100
4	PCC	22UIS314C	Computer Organization	**4**	4	0	0	4	50	50	100
5	PCC	22UIS303C	Data Structures	**4**	3	2	0	5	50	50	100
6	PCC	22UIS381L	Data Structures Lab	**1**	0	0	2	2	50	50	100
7	BSC	22UMA300M	Bridge Course Mathematics - I	**0**	2	0	2	4	50	50	100
8	MC	UHS002M UHS003M UHS001M	National Service Scheme Physical Education(Sports and Athletics) Yoga	**0**	0	0	2	2	100	0	100
9		AAP	AICTE Activity Points								
Total				**20**	**17**	**2**	**10**	**29**	**400**	**400**	**800**

Department of Information Science and Engineering
4th Semester

Sl. No.	Course			Credits	Examination						
	Category	Code	Title		Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
					L	T	P				
1	BSC	22UMA401C	Engineering Mathematics - IV	3	3	0	0	3	50	50	100
2	HSSM	22UHSXXC	Universal Human Values - II	1	1	0	0	1	50	50	100
3	PCC	22UIS403C	Analysis and Design of Algorithms(Integrated)	4	3	0	2	5	50	50	100
4	PCC	22UIS412C	Object Oriented Modelling and Design (Integrated)	4	3	0	2	5	50	50	100
5	PCC	22UIS413C	Database Management Systems	4	3	2	0	5	50	50	100
6	PCC	22UIS417C	Software Engineering	3	3	0	0	3	50	50	100
7	PCC	22UIS421L	Database Application Laboratory	1	0	0	2	2	50	50	100
8	BSC	22UMA400C	Bridge course Mathematics - II	0	2	0	0	2	50	50	100
9	MC	NSS PE YO	National Service Scheme Physical Education(Sports and Athletics) Yoga	0	0	0	2	2	0	0	0
10		AAP	AICTE Activity Points								
Total				**20**	**18**	**2**	**6**	**26**	**400**	**400**	**800**

Department of Information Science and Engineering
5th Semester

Sl. No.	Course			Credits	Examination						
	Category	Code	Title		Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
					L	T	P				
1	HSSM		Environmental Studies	**1**	1	0	0	1	50	50	100
2	AEC		Soft Skills	**2**	2	0	0	2	50	50	100
3	PCC		Advanced Java Programming (Integrated)	**3**	2	0	2	4	50	50	100
4	PCC		Operating Systems	**3**	3	0	0	3	50	50	100
5	PCC		Microcontroller and Embedded Systems (Integrated)	**3**	2	0	2	4	50	50	100
6	PEC		Professional Elective Course – I	**3**	3	0	0	3	50	50	100
7	OEC		Open Elective Course - I	**3**	3	0	0	3	50	50	100
8	PROJ		Miniproject	**2**	0	0	2	2	50	50	100
9	MC	NSS PE YO	National Service Scheme Physical Education(Sports and Athletics) Yoga	**0**	0	0	2	2	0	0	0
10		AAP	AICTE Activity Points								
			Total	**20**	**16**	**0**	**6**	**22**	**400**	**400**	**800**

Department of Information Science and Engineering

6th Semester

Sl. No.	Course			Credits	Examination						
	Category	Code	Title		Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
					L	T	P				
1	PCC		Computer Networks(Integrated)	**4**	3	0	2	5	50	50	100
2	PCC		Discrete Mathematical Structures	**3**	3	0	0	3	50	50	100
3	PCC		AI & Machine Learning using Python (Integrated)	**4**	3	0	2	5	50	50	100
4	PCC		Theory of Computations	**3**	3	0	0	3	50	50	100
5	PEC		Professional Elective Course - II	**3**	3	0	0	3	50	50	100
6	OEC		Open Elective Course - II	**3**	3	0	0	3	50	50	100
7	PROJ.		Pre-Project Work	**0**	0	0	0	0	0	0	0
8	MC	NSS PE YO	National Service Scheme Physical Education(Sports and Athletics) Yoga	**0**	0	0	2	2	0	0	0
9		AAP	AICTE Activity Points								
			Total	**20**	**18**	**0**	**4**	**22**	**350**	**350**	**700**

Note:

Pre-Project Work – 1) Batch Formulation, 2) Project Allocation and Guide Allotment, 3) Problem Identification and Formulation, and 4) Literature Survey – Minimum 10 papers are to be surveyed.

Department of Information Science and Engineering

7th Semester

Sl. No.	Course			Credits	Examination						
	Category	Code	Title		Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
					L	T	P				
1	HSSM		Management and Entrepreneurship	**3**	3	0	2	5	50	50	100
2	PCC		Cryptography and Network Security	**3**	2	0	2	4	50	50	100
3	PEC		Professional Core Elective – III (Integrated)	**3**	2	0	2	4	50	50	100
4	PEC		Professional Core Elective - IV	**3**	3	0	0	3	50	50	100
5	PROJ		Project Work	**12**	0	0	12	12	50	50	100
			Total	**24**	**10**	**0**	**18**	**28**	**250**	**250**	**500**

Department of Information Science and Engineering

8th Semester

Sl. No.	Course			Credits	Examination						
	Category	Code	Title		Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks
					L	T	P				
1	AEC		MOOCS	3	3	0	0	3	50	50	100
2	OEC		MOOCS	3	3	0	0	3	50	50	100
3	INT		Internship	10	0	0	10	10	50	50	100
Total				**16**	**6**	**0**	**10**	**16**	**150**	**150**	**300**

3rd Semester NEP 2nd Batch

2022-23 Entry Batch

22UMA301C	Numerical Techniques and Integral Transforms	Credits: 03
L:T:P - 3 : 0 : 0		CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT-I	10 Hrs.

Numerical Analysis-I

Introduction to root finding problems, Bisection Method, Newton-Raphson method. Finite differences, forward and backward difference operators (no derivations on relations between operators) Newton-Gregory forward and backward interpolation formulae. (Without proof), Lagrange's and Newton's divided difference interpolation formulae (without proof).

UNIT–II	10 Hrs.

Numerical Analysis-II

Numerical differentiation using Newton's forward and backward formulae-problems. Trapezoidal rule, Simpson's one third rule, Simpson's three eighth rule and Weddle's rule (no derivation of any formulae)-problems. Euler's and Modified Euler's method, Runge-Kutta 4^{th} order method.

UNIT–III	10 Hrs.

Fourier series

Periodic functions, Conditions for Fourier series expansions, Fourier series expansion of continuous and functions having finite number of discontinuities, even and odd functions. Half-range series, practical harmonic analysis.

UNIT–IV	10 Hrs.

Fourier transforms and z-transforms

Infinite Fourier transforms and inverse Fourier transforms- simple properties, Fourier sine and Fourier cosine transforms, Inverse Fourier sine and cosine transforms. Z-transforms-definition, standard forms, linearity property, damping rule, shifting rule-problems.

Reference Books *

1. Steven C Chapra & Raymond P Canale, Numerical Methods for Engineers.
2. Dr. B.S. Grewal, Higher Engineering Mathematics Khanna Publishers, New Delhi.
3. H. K. Das, S. Chand & company Ltd Advanced Engineering Mathematics. Ram Nagar, New Delhi.
4. E Kreyszig, Advanced Engineering Mathematics

Course Outcomes**

After completion of the course student will be able to

1. The ability to solve engineering problems using non-linear equations and interpolation techniques.
2. The ability to solve problems using numerical differention and numerical integration.
3. Be capable to perform numerical solutions of ordinary differential equations.
4. Fourier analysis provides a set of mathematical tools which enable the engineer to break down a wave into its various frequency components. It is then possible predict the effect of a particular waveform.
5. It is essential to understand the basic concepts of Fourier transforms and z –transforms, to solve ode, pde and difference equations.

Subject Title	**:**	**Advanced Web Programming(Integrated)**
Subject code	**:**	**22UIS305C**
Semester	**:**	**3**
Credits with LTP Structure	**:**	**04 Credits (3L-0T-2P)**
Lecture Hours per Week	**:**	**3**
Practical Hours per Week		**2**
Tutorial Hours per Week	**:**	**0**
Total Contact Hours/Week	**:**	**03 Teaching Hours + 02 Practical Hours = 05 Hours**

Course Objectives:

1. Understand the principles of World Wide Web and also to create an effective web page.
2. Use CSS to implement a variety of presentation effects in XHTML and XML documents.
3. Develop basic programming skills using JavaScript.
4. Implement interactive and dynamic web page(s) using XHTML, JavaScript,XML,PHP,etc
5. Understand how server-side programming works on the web using PHP technology and design responsive web pages using PHP.

Course Outcomes:

After completing the course the student will be able to:

1. Develop JavaScript scripts for basic problems.
2. Develop JavaScript scripts for event handling.
3. Build dynamic documents using JavaScript and XHTML.
4. Develop web pages using XML technology.
5. Implement web pages using PHP.

CO-PO Mapping:

Course Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Develop JavaScript scripts for basic problems.	3	2	3		1							1	1	2	1
Develop JavaScript scripts for event handling.	3	2	3		1							1	1	2	1
Build dynamic documents using JavaScript and XHTML.	3	2	3		1							1	1	2	1
Develop web pages using XML technology.	3	2	3		1							1	1	2	1
Implement web pages using PHP.	3	2	3		1							1	1	2	1

1**:** Low correlation 2: Moderate correlation 3: High correlation

UNIT - I	09 Hours	Teaching Hours	Tutorial Hours
Basics of JavaScript: General syntactic characteristics; Primitives, Screen output and keyboard input; Control statements; Object creation and modification, Arrays; Functions; Pattern matching using regular expressions.		**09**	**00**
UNIT - II	**09 Hours**	**Teaching Hours**	**Tutorial Hours**
JavaScript & XHTML Documents: The Document Object Model, Element Access in JavaScript, Events & Event Handling, Basic Concepts of Event handling, Events, Attributes & Tags, Handling Events from Body Elements, Handling Events from Button Elements, Handling Events from Textbox & password Elements, The Focus Event, Validating from Input, The DOM 2 Event Model, Event Propagation, Event handler registration, An Example of the DOM 2 Event Model, The Navigator Object.		**09**	**00**
UNIT - III	**11 Hours**	**Teaching Hours**	**Tutorial Hours**
Dynamic Documents with JavaScript: Introduction, Positioning Elements, Absolute Positioning, Relative Positioning, Static Positioning, Moving Elements, Element Visibility, Changing Colors & Fonts, Changing Colors, Changing Fonts, Dynamic Contents, Stacking Elements, Locating the Mouse Cursor, Reacting to the Mouse Click, Slow Movement of Elements. **Introduction to XML:** Introduction, The Syntax of XML, XML Document Structure, Document Type Definitions: Declaring Elements, Declaring Attributes, Declaring Entities, A Sample DTD, Internal & External DTDs.		**11**	**00**
UNIT - IV	**11 Hours**	**Teaching Hours**	**Tutorial Hours**
Introduction to PHP: Origins and Uses of PHP, Overview of PHP, General Syntactic Characteristics, Primitives, Operations and Expressions, Output, Control statements, Arrays, Functions, Pattern Matching, Form Handling, Files, Cookies, Session Tracking, Database access with PHP and MySQL.		**11**	**00**
Reference Books:			
1. Programming the World Wide Web - Robert W. Sebesta, 4th Edition, Pearson Education, 2008			

Laboratory Assignments

1. Develop JavaScript scripts for the following:

   i.to model a simple calculator using 'switch' statement
   ii.to print the number of prime numbers in a given range L to R using functions
   iii.to find whether the given number is an Armstrong number using functions
   iv. to find the number of occurrences of a character in a string using functions.

2. Develop and demonstrate using Javascript an XHTML document to validate the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be displayed when errors are detected.
3. Develop XHTML document with Java Script to handle events as follows:
   i) 'Blur' event to transform the input text to upper case.
   ii) 'focus' event to change the background color of a text box.
   iii) 'Change' event to display the preferred browser in an alert box when the user relocates the browser from a drop-down menu.
   iv) 'click' event to copy the contents of one text in to another.
4. Create and demonstrate an XHTML document using Java Script for event handling as follows:

   XHTML document should contain a set of radio buttons showing names of web programming tools. On clicking a particular button, event handler should be called to display a brief description about the related tool using an alert box.
5. Develop and demonstrate an XHTML document as follows:

   The XHTML document must contain four paragraphs stacked on the top of each other with only enough of each showing so that the mouse cursor when placed over the exposed part of any paragraph, it should rise to the top to become completely visible.
6. Develop an XHTML document to accept user details. Develop a PHP script to retrieve these and display them with appropriate messages.

7. Write XHTML code to create a table as follows and enter the quantity required.

Product Name	Price/item (Rs)	Quantity
A	20	
B	30	
C	40	

Create a set of radio buttons to accept the payment method needed-cheque, cash or card. Develop a PHP script to display the results in a table, which should contain product name, price, quantity and total cost for each product. Below the table, display the total number of ordered items, the total cost and the payment method used.

8. Create an XHTML document to accept student data which contains student name, branch and college name. Write a PHP document to insert data into the MySQL database and retrieve the particular database on student name from the database and display.

22UIS304C	Logic Design	Credits: 04
L:T:P - 3 : 0 : 2		CIE Marks: 50
Total Hours/Week: 05		SEE Marks: 50

UNIT-I	10 Hrs.

Boolean Algebra: Definition of Boolean algebra, Boolean algebra theorems, A two-valued Boolean algebra, Boolean formulas and functions, Canonical Formulas, Manipulations of Boolean formulas
Gates and Combinational networks: Incomplete Boolean functions and Don't care conditions, Additional Boolean operations and Gates

UNIT–II	10 Hrs.

Simplification of Boolean Expressions:
Formulations of simplification problem, Prime implicants and Irredundant disjunctive expressions, Prime implicates and Irredundant conjunctive expressions, Karnaugh maps, Using Karnaugh maps to obtain minimal expressions for complete Boolean functions, Minimal expressions of incomplete Boolean functions
The Quine-McCluskey method of generating Prime implicants and Prime implicates, Decimal method for obtaining prime implicants, Variable-Entered Karnaugh maps.

UNIT–III	10 Hrs.

Logic Design with MSI Components and Programmable Logic Devices:
Binary adders and subtracters, Decimal adders, Comparators, Decoders, Multilpexers. Programmable logic devices (PLDs), Programmable read only memories (PROMs), Programmable logic arrays (PLAs), Programmable array logics (PALs).

UNIT–IV	10 Hrs.

Flip-Flops and Simple Flip-Flop Applications:
The basic Bistable element, Latches, Master-Slave flip-flops (Pulse-Triggered flip-flops), Edge triggered flip-flops, Characteristic equations, Registers, Counters, Design of Synchronous Counters.
Synchronous sequential networks: Structure and operation of clocked synchronous sequential networks, Analysis of clocked synchronous sequential networks.

List of assignments

1. Realization of a given Boolean Expression using MEV method.
2. Design and implementation of BCD to Excess-3 using 4-bit Adder Chip and Logic Gates.
3. Design and implement Full adder using 3:8 Decoder (74138).
4. Design and implement Full subtractor using 8:1 multiplexer (74154).
5. Design JK master/slave flip-flop using NAND gates.
6. Design and implementation of 3 bit Mod-n synchronous counter using JK flip-flops (7476) (where n<=8).
7. Design and implementation of Ring counter and Johnson counter using 4-bit shift register.
8. Design and implementation of an Asynchronous Counter using a Decade Counter IC to count up from 0 to n (n<9). Display the count value on 7-segment LED display using BCD to 7-segment code converter IC.

Text Books

1. Donald D. Givone, 2002, "Digital Principles and Design", McGraw Hill Edition
2. Leach and Malvino, 2002, "Digital Principles and Applications", TMH, New Delhi.
3. Yarbrough J. M, 2001, "Digital logic- Applications and Design, Thomson Learning, New Delhi.

22UIS314C	Computer Organization	Credits: 04
L:T:P - 4 : 0 : 0		CIE Marks: 50
Total Hours/Week: 04		SEE Marks: 50

UNIT-I	13 Hrs.

Basic Structure of Computer: Computer Types. Functional Units, Basic Operational Concepts, Bus Structures, Performance – processor clock, Basic Performance Equation, Clock rate, Performance Measurement.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Characteristics, Memory Location and Addresses, Memory Operations.

Instructions and Instruction Sequencing: Addressing Modes, Assembly language, Basic Input and Output operations, Stacks and Queues, Subroutines.

UNIT–II	13 Hrs.

Input/Output organization: Accessing I/O Devices, Interrupts-interrupt hardware, Enabling and disabling interrupts, Handling multiple devices, Controlling device requests, Exceptions, Direct memory access, Buses, Interface circuits, Standard I/O interfaces-USB; Device characteristics, Architecture, Addressing.

UNIT–III	13 Hrs.

Basic processing unit: Fundamental concepts, Execution of a complete instruction, Multiple bus organization, Hard-wired control, Micro programmed control.

Memory system: Basic Concepts, Semiconductor RAM Memories, Read Only Memories, Speed, Size and cost, Cache Memories, Mapping Functions.

UNIT–IV	13 Hrs.

Basic Arithmetic concepts for ALU: Addition and subtraction of signed numbers, Design of fast adders; Carry-lookahead addition only, Multiplication of positive numbers, Signed operand multiplication, Fast multiplication, Integer division, Floating point numbers and operations.

Reference Books *

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 2002, Computer Organization, , 5th edition, TMH.
2. William Stallings, 2006, Computer Organization and Architecture, ,7th edition, PHI.

Course Outcomes**

After completion of the course student will be able to

1. Comprehend the fundamentals of a computing system and its functional units.
2. Write an Assembly Language Program using various types of instructions and addressing modes.
3. Comprehend and Compare the approaches to implement I/O i.e. programmed I/O, interrupt driven I/O and DMA.
4. Comprehend and design various memory organizations.
5. Understand the concepts of 2's complement representation, addition and subtraction operations with this representation, multiplication (BOOTH) and division methods.
6. Comprehend the basics of CPU organization and design of control unit.

22UIS303C	Data Structures	Credits: 04
L:T:P - 3 : 1 : 0		CIE Marks: 50
Total Hours/Week: 05		SEE Marks: 50

UNIT-I	16 Hrs.

Introduction to data structures: Structures in C.

The stack: Definition and Examples: Primitive operations, An Example, The stack as an Abstract data type. , Representing Stacks in C: Implementing pop operation, Testing for exceptional conditions, Implementing the push operations. , An Example- Infix, Postfix and Prefix: Basic Definitions and Examples, Evaluating a postfix expression, Program to evaluate a postfix expression, Limitations of the program, Converting an expression from Infix to Postfix, Program to convert an expression from Infix to Postfix.

Recursion: Recursive definition and processes: The factorial function, Properties of recursive definitions or Algorithms. , Recursion in C: Factorial in C., writing recursive programs: The Towers of Hanoi Problem.

UNIT–II	16 Hrs.

Queues: ***The queue and its sequential representation***: The queue as an abstract data type, C implementation of queues, The insert operation, The priority queue, Array implementation of a priority queue**.**

Lists: ***Linked lists***: Inserting and removing nodes from a list, Linked implementation of stacks, The getnode and freenode operations, Linked implementation of queues, The linked list as a data structure, Examples of list operations, List implementation of priority queues, Header Nodes.

UNIT–III	17 Hrs.

Lists in C: Array implementation of lists, Limitations of the array implementation, Allocating and freeing dynamic variables, Linked lists using dynamic variables, Queues as lists in C, Examples of list operations in C, Noninteger and nonhomogeneous lists, Comparing the dynamic and array implementation of lists, Implementing Header Nodes. , An example:simulation using linked lists.

Other list structures: Circular lists, The stack as a circular list, The queue as a circular list, Primitive operations on circular lists, The Josephus problem, Header nodes, Addition of long positive integers using circular lists**.**

UNIT–IV	17 Hrs.

Trees: Binary trees: Basics, Operation on Binary trees, Applications of Binary trees. Binary tree representations: Node representations of Binary trees, Node Representation of binary trees, Internal & external nodes, Implicit array representation of Binary trees, Choosing a Binary tree representation, Binary tree traversal in c, traversal using a father field, heterogeneous binary trees. ***Trees and their applications***: C representation of trees, Tree traversals, General expressions as trees, Evaluating an expression tree, Constructing tree.

Reference Books *

1. Aaron M. Tennenbaum, Yedidyah Langsam and Moshe J. Augenstein, 2006, “Data structure using C”, Pearson Education/PHI.
2. Behrouz A. Forouzan, Richard F. Gilberg, “A Structured Programming Approach Using C”, Second Edition, Thomson Brooks/Cole.
3. Behrouz A. Forouzan and Richard F. Gilberg, Thomson, 2003, “Computer Science A structured Programming Approach using C”, II edition.
4. Richard F. Gilberg and Behrouz, 2005, “Data structures A pseudo code approach with c“, Thomson.
5. Robert Kruse and Breuse Leung, 2007, ”Data structures and program Design in C”, PEARSON Education.

22UIS381L	Data Structure Laboratory	Credits: 1
L:T:P - 0 : 0 : 2		CIE Marks: 50
Total Hours/Week: 02		SEE Marks: 50

List of assignments

1. Process information of the students using array of structures.
2. Implement integer stack ADT using arrays.
3. Convert infix expression into postfix expression.
4. Solve Towers of Hanoi problem using recursion.
5. Implement integer queue ADT using arrays.
6. Construct singly linked list and implement insertion operation on it.
7. Construct singly linked list and implement deletion operation on it.
8. Implement integer queue ADT using singly linked list.
9. Construct circular linked list and perform insertion operation on it.
10. Construct circular linked list and perform deletion operation on it.
11. Construct binary tree and implement tree traversal methods.

22UMA300M	Bridge Course Mathematics-I	Mandatory - Credits (3 : 0 : 0)
Hours / Week : 03		CIE Marks : 50
Total Hours : 40		SEE Marks : 50

Differential Equations-1	10 Hrs.

Introduction to Differential Equations: Ordinary differential equations of first order**:** Variable separable, Homogeneous. Exact form and reducible to exact differential equations-Integrating factors on $1/N\,(\partial M/\partial y - \partial N/)$ and $1/M\,(\partial N/\partial x - \partial M/\partial y)$. Linear and Bernoulli's equation.
(RBT Levels: L1, L2 and L3)

Differential Equations-2	10 Hrs.

Introduction to Higher Order Differential Equations: Second and higher order linear ODE's with constant coefficients-Inverse differential operator, method of variation of parameters (second order); Cauchy's and Legendre homogeneous equations.
(RBT Levels: L1, L2 and L3)

Partial differentiation	10 Hrs.

Introduction to function of several variables: Partial derivatives; Euler's theorem - problems. Total derivatives-differentiation of composite functions. Jacobeans-problems.
(RBT Levels: L1, L2 and L3)

Integral Calculus and Beta, Gamma functions	10 Hrs.

Introduction to Multiple integrals: Evaluation of double and triple integrals. Area bounded by the curve.
Introduction to Beta and Gamma functions: Definitions, Relation between beta and gamma functions-problems.
(RBT Levels: L1, L2 and L3)

References:

1. Maurice D weir, Joel Hass and Frank R. Giordano, "Thomas calculus", Pearson, eleventh edition, 2011
2. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
3. B. V. Ramana: "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Erwin Kreyszing's Advanced Engineering Mathematics volume1 and volume1I,wiley India Pvt.Ltd.,2014

4th Semester NEP 2nd Batch

2022-23 Entry Batch

22UMA401C	Statistics and Probability Distributions	03 - Credits (3 : 0 : 0)
Hours / Week : 03		CIE Marks : 50
Total Hours : 40		SEE Marks : 50

UNIT – I Statistics **10 Hrs.**

Curve fitting by the method of least squares: $y = a + bx$, $y = ab^x$, $y = a + bx + cx^2$. Correlation, expression for the rank correlation coefficient and regression.

(RBT Levels: L1, L2 and L3)

UNIT – II Probability **10 Hrs.**

Addition rule, conditional probability, multiplication rule, Baye's rule. Discrete and continuous random variables-Probability density function, Cumulative distribution function, Problems on expectation and variance.

(RBT Levels: L1, L2 and L3)

UNIT – III Probability distributions **10 Hrs.**

Binomial distributions, Poisson distributions and Normal distributions. Concept of joint probability, Joint probability distributions.

(RBT Levels: L1, L2 and L3)

UNIT – IV Markov chains **10 Hrs.**

Introduction, Probability vectors, Stochastic Matrices, Fixed Points and Regular stochastic Matrices, Markov chains, higher transition probabilities, stationary distribution of regular Markov chains and absorbing states.

(RBT Levels: L1, L2 and L3)

References:

1. Numerical Methods for Engineers by Steven C Chapra & Raymond P Canale.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers, New Delhi.
3. Advanced Engineering Mathematics By H. K. Das, S. Chand & company Ltd. Ram Nagar, New Delhi
4. Advanced Engineering Mathematics by E Kreyszig ,John Wiley & Sons**.**
5. Probability and stochastic processes by Roy D. Yates and David J. Goodman, wiley India pvt.ltd 2nd edition 2012.
6. Theory and problems of probability by Seymour Lipschutz (Schaum's Series).

22UISXXXM	Universal Human Values-II	Credits: 1
L:T:P - 2 : 1 : 0		CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT-I	04 Hrs.

Introduction to Value Education: Right Understanding;Relationship and Physical Facility;UnderstandingValue Education;Self-exploration as the Process for Value Education,Continuous Happiness and Prosperity -the Basic Human Aspiration-Current Scenario and Method to Fulfill the Basic Human Aspirations.

UNIT–II	04Hrs.

Harmony in the Human Being: Understanding Human being as the Co-existence of the Self and the Body, distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self,Understanding Harmony in the Self, Harmony of the Self with the Body,Programme to ensure self-regulation and Health.

UNIT–III	04Hrs.

Harmony in the Family and Society and Nature: Harmony in the Family – the Basic Unit of Human Interaction; 'Trust' – the Foundational Value in Relationship; 'Respect' – as the RightEvaluation: Other Feelings, Justice in Human-to-Human Relationship; Understanding Harmony in the Society;Vision for the Universal Human Order; Understanding Harmony in the Nature; Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature..

UNIT–IV	03Hrs.

Implications of the Holistic Understanding – a Look at Professional Ethics

Definitiveness of (Ethical) Human Conduct; A Basis for Humanistic Education, HumanisticConstitution and Universal Human Order;Competence in Professional Ethics;HolisticTechnologies, Production Systems and Management Models; Strategies for Transition towards Value-based Life and Profession

Reference Books *

1. *A Foundation Course in Human Values and Professional Ethics*, R R Gaur, R Asthana, G P Bagaria,2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. Teachers'Manualfor*AFoundationCourseinHumanValuesandProfessionalEthics*,RRGaur, R Asthana,G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93- 87034- 53-2
3. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak,1999.
4. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi,2004.
5. The Story of Stuff(Book).
6. The Story of My Experiments with Truth - by Mohandas KaramchandGandhi
7. Small is Beautiful - E. F Schumacher.
8. Slow is Beautiful - CecileAndrews
9. Economy of Permanence - J CKumarappa
10. Bharat Mein Angreji Raj – PanditSunderlal
11. Rediscovering India - byDharampal
12. Hind Swaraj or Indian Home Rule - by Mohandas K.Gandhi
13. India Wins Freedom - Maulana Abdul KalamAzad
14. Vivekananda - Romain Rolland(English)
15. Gandhi - Romain Rolland(English)

22IS403C	ANALYSIS AND DESIGN OF ALGORITHMS (Integrated)	Credits: 04
L:T:P - 3 : 0 : 2		CIE Marks: 50
Total Hours/Week: 05		SEE Marks: 50

UNIT-I	10 Hrs.

Introduction: What is an Algorithm?, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Fundamental Data Structures.

Fundamentals of the Analysis of Algorithm Efficiency: Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Nonrecursive Algorithms, Mathematical Analysis of Recursive Algorithms, Example: Fibonacci Numbers.

UNIT–II	10 Hrs.

Brute Force: Selection Sort and Bubble Sort, Sequential Search and Brute-Force String Matching, Exhaustive Search.

Divide-and-Conquer: Mergesort, Quicksort, Binary Search, Multiplication of Large Integers and Strassen's Matrix Multiplication.

Decrease-and-Conquer: Insertion Sort, Depth-First Search and Breadth-First Search, Topological Sorting, Decrease-by-a-Constant-Factor Algorithms, Variable-Size-Decrease Algorithms.

UNIT–III	10 Hrs.

Transform-and-Conquer: Presorting, Balanced Search Trees, Heaps and Heapsort, Problem Reduction.

Space and Time Tradeoffs: Sorting by Counting, Input Enhancement in String Matching, Hashing, B-trees.

Dynamic Programming: Computing a Binomial Coefficient, Warshall's and Floyd's Algorithms, The Knapsack Problem and Memory Functions.

UNIT–IV	10 Hrs.

Greedy Technique: Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Huffman Trees.

Limitation of Algorithm Power: Lower-Bound Arguments, Decision Trees.

Coping with the Limitations of Algorithm Power: Backtracking, Branch-and-Bound.

Laboratory Assignments

All the assignments are implemented using Java

1. a.Perform linear search. Hence find the time required to search an element.
   b.Perform binary search. Hence find the time required to search an element.
2. Sort a given set of ***n*** integer elements using **Bubble Sort** method and compute its time complexity. Run the program for varied values of *n* and record the time taken to sort. Plot a graph of the time taken versus ***n*** on graph sheet. Demonstrate using Java how the Brute Force method works along with its time complexity analysis: worst case, average case and best case.
3. Write a Java program to implement **Brute Force** string matching algorithm.
4. Sort a given set of ***n*** integer elements using **Quick Sort** method and compute its time complexity. Run the program for varied values of *n* and record the time taken to sort. Plot a graph of the time taken versus ***n*** on graph sheet. Demonstrate using Java how the divide-and-conquer method works along with its time complexity analysis: worst case, average case and best case.
5. Sort a given set of ***n*** integer elements using **Merge Sort** method and compute its time complexity. Run the program for varied values of *n* and record the time taken to sort. Plot a graph of the time taken versus ***n*** on graph sheet. Demonstrate using Java how the divide-and-conquer method works along with its time complexity analysis: worst case, average case and best case.
6. Implement **BottomUp Heap** construction algorithm using Java.
7. Implement in Java, the **0/1 Knapsack** problem using (a) Dynamic Programming method (b)

Greedy method.

8. From a given vertex in a weighted connected graph, find shortest paths to other vertices using **Dijkstra's algorithm**. Write the program in Java.
9. Find Minimum Cost Spanning Tree of a given connected undirected graph using **Kruskal'salgorithm.**
10. Write Java programs to Implement All-Pairs Shortest Paths problem using **Floyd's algorithm**.

Reference Books *

5. Anany Levitin, "Introduction to the Design & Analysis of Algorithms", 2nd Edition, [Chapters or Topics: 1, 2.1–2.5, 3.1, 3.2, 3.4, 4.1–4.3,4.5 5.1–5.4, 6.1, 6.3, 6.4, 6.6, 7, 8.1, 8.2, 8.4, 9, 11.1–11.3, 12.1–12.2], Pearson Education, 2007.
6. Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, "Introduction to Algorithms", 2nd Edition, PHI, 2006.
7. Horowitz E., Sahni S., Rajasekaran S. "Computer Algorithms", Galgotia Publications, 2001.

22IS412C	Object Oriented Modeling and Design (Integrated)	Credits: 04
L:T:P - 3 : 1 : 0		CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT - I	10 Hours	Teaching Hours	Tutorial Hours
INTRODUCTION, MODELING CONCEPTS, CLASS MODELING: Object Orientation, OO development, OO themes; Evidence for usefulness of OO development; OO modeling history. *Modeling as Design Technique:* Modeling; abstraction; the three models. Class Modeling: Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models; Practical tips. **Advanced Class Modeling:** Advanced object and class concepts; Association ends; N-Ary associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived data; Packages; Practical tips.		**10**	**00**

UNIT - II	10 Hours	Teaching Hours	Tutorial Hours
STATE MODELING, ADVANCED STATE MODELING, INTERACTION MODELING, PROCESS OVERVIEW: **State Modeling:** Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Practical tips. **Advanced State Modeling:** Nested state diagrams; Nested states; Signal generalization; Concurrency; A sample state model; Relation of class and state models; Practical tips. **Interaction Modeling:** Use case models; Sequence models; Activity models. Use case relationships; Procedural sequence models; Special constructs for activity models.		**10**	**00**

UNIT - III	10 Hours	Teaching Hours	Tutorial Hours
SYSTEM CONCEPTION, DOMAIN ANALYSIS, APPLICATION ANALYSIS, AND SYSTEM DESIGN-1: **System Conception:** Devising a system concept; Elaborating a concept; Preparing a problem statement.**Domain Analysis:** Overview of analysis; Domain class model; Domain state model; Domain interaction model; Iterating the analysis. **Application Analysis:** Application interaction model; Application class model; Application state model; Adding operations. **System Design -1:** Overview of system design; Estimating performance; Making a reuse plan; Breaking a system in to sub-systems; Identifying concurrency; Allocation of sub-systems; Management of data storage; Handling global resources; Choosing a software control strategy.		**10**	**00**

UNIT - IV	10 Hours	Teaching Hours	Tutorial Hours
SYSTEM DESIGN-2, CLASS DESIGN, IMPLEMENTATION MODELING, AND DESIGN PATTERNS: **System Design -2:** Handling boundary conditions; Setting the trade-off priorities; Common architectural styles; Architecture of the ATM system as the example. **Class Design:** Overview of class design; Bridging the gap; Realizing use cases; Designing algorithms; Recursing downwards, Refactoring; Design optimization; Reification of behavior; Adjustment of inheritance; Organizing a class design; ATM example. **Implementation Modeling:** Overview of implementation; Fine-tuning classes; Fine-tuning generalizations; Realizing associations; Testing.		**10**	**00**

Text Books:

Michael. Blaha, James. Rumbaugh **"Object-Oriented Modeling and Design with UML"**, 2nd Edition, Pearson Education, 2005.

Reference Books:

1. **Ali. Bahrami, "Object Oriented Systems Development",** McGraw-Hill, 2008.
2. Grady. Booch **"Object-Oriented Analysis and Design with Applications",** 3rd Edition, Pearson, 2007.
3. Mark. Priestley, **"Practical Object-Oriented Design with UML"**, 2nd Edition, Tata McGraw-Hill, 2003.

22UIS413C	Database Management Systems	Credits: 04
L:T:P - 3 : 1 : 0		CIE Marks: 50
Total Hours/Week: 05		SEE Marks: 50

UNIT-I	16 Hrs.

INTRODUCTION: Introduction; An example; Characteristics of database approach; Advantages of using DBMS approach; when not to use a DBMS. Data models, schemas and instances; Three-schema architecture and data independence; Database languages and interfaces; The database system environment; Centralized and client-server architectures; Classification of Database Management systems.

ENTITY-RELATIONSHIP MODEL: Using High-Level Conceptual Data Models for Database Design; An example database application; Entity types, Entity sets, Attributes and Keys; Relationship types, Relationship sets, Roles and Structural constraints; Weak entity types; Refining the ER Design; ER Diagrams, Naming conventions and design issues; Relationship types of degree higher than two.

UNIT–II	16 Hrs.

RELATIONAL MODEL AND RELATIONAL DATABASE CONSTRAINTS: Relational model concepts; Relational model constraints and Relational database schemas; Update operations, Transaction and dealing with constraint violations.

SQL: data definition and data types; Specifying basic constraints in SQL; Schema change statements in SQL; Basic queries in SQL; More complex SQL queries. Insert, Delete and Update statements in SQL; Specifying constraints as Assertion and Trigger; Views (Virtual Tables) in SQL.

PL/SQL: PL/SQL Concepts, PL/SQL Language Fundamentals, SQL in PL/SQL, DML Statements in PL/SQL

UNIT–III	17 Hrs.

DATABASE DESIGN: Informal design guidelines for relation schemas; Functional dependencies; Normal forms based on primary keys; General definitions of second and third normal forms; Boyce-Codd Normal Form Properties of relational decompositions; Algorithms for relational database Schema design; Multivalued dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form; Inclusion Dependencies; Other Dependencies and Normal forms.

UNIT–IV	17 Hrs.

TRANSACTION MANAGEMENT: Introduction to transaction processing; Transaction & system concepts; Desirable properties of transactions; Characterizing schedules based on recoverability; Characterizing schedules based on serializability; Transaction support in SQL; CONCURRENCY

CONTROL: Two-phase locking techniques for concurrency control;

CRASH RECOVERY: Recovery concepts; Recovery techniques based on deferred update; recovery techniques based on immediate update; shadow paging; The ARIES recovery algorithm;

Reference Books *

1. Remez Elmasri & amp; Shamkant B. Navathe, Fundamentals of Database Systems 5th Edition, Pearson Education.
2. Ramakrishanan Gehrke, " Database Management Systems", 3 rd edition, McGraw-Hill Higher Education.
3. C. J. Date, "An Introduction to Data base systems", Addision Wesley, 4 th edition.

22UIS417C	Software Engineering	Credits: 03
L:T:P - 3 : 0 : 0		CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT-I	10 Hrs.

INTRODUCTION: Evolution- from an art form to an engineering discipline, software development projects, exploratory style of software development, emergence of software engineering, notable changes in software development practices, computer systems engineering.

SOFTWARE LIFE CYCLE MODELS: A few basic concepts, waterfall model and its extensions, rapid application development, agile development models, spiral model, a comparison of different life cycle models.

UNIT–II	10 Hrs.

REQUIREMENTS ANALYSIS AND SPECIFICATION: Requirements gathering and analysis, software requirements specification (SRS).

SOFTWARE DESIGN: Overview of the design process, how to characterize a good software design, cohesion and coupling, layered arrangement of Modules, approaches to software design.

UNIT–III	10 Hrs.

FUNCTION-ORIENTED SOFTWARE DESIGN: Overview of SA/SD methodology, structured analysis, developing the DFD model of the system, structured design, detailed design, design review.

CODING AND TESTING: Introduction to program testing,Coding, code review, software documentation, testing, unit testing, black – box testing,

White – box testing, debugging, program analysis tools, integration testing, testing object-oriented programs, systems testing

UNIT–IV	10 Hrs.

SOFTWARE RELIABILITY AND QUALITY MANAGEMENT: Software reliability, statistical testing, software quality, software quality management system, ISO 9000, SEI capability maturity model.

SOFTWARE PROJECT MANAGEMENT: software project management complexities, responsibilities of a software project manager, project planning, metrics for project size estimation, project estimation techniques, COCOMO – a heuristic estimation technique, Staffing level estimation, scheduling, organization and team structures, staffing, risk management, software configuration management.

Reference Books *

1. Rajib Mall, Fundamentals of software engineering, 4th edition, pHI.
2. Ian Somerville, Software Engineering, 7th edition, Pearson Education.
3. Pressman R.S, “Software Engineering- A Practitioners Approach”, MGH New Delhi.
4. Jalote P, Narosa, “An integral approach to software Engineering”, New Delhi.

22UIS421L	Database Application Laboratory	Credits: 1
L:T:P - 0 : 0 : 2		CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

List of assignments

PART-A

1. Consider the following relations:

Student (snum:Integer, sname: char, subject: char,slevel: char, age:integer)

Class(cname:char, roomno: integer, fid:integer)

Enrolled(snum:integer, cname:char)

Faculty(fid: integer, fname:char, deptid: integer

Enrolled has one record per student-class pair such that the student is enrolled in the class. Write the following queries in SQL. No duplicates should be printed in any of the answers.

(i) Find the names of all juniors (level=JR) who are enrolled in a class taught by faculty name.

(ii) For each level, print the level and the average age of students for that level.

(iii) For all levels except JR, print the level and the average age of students for that level.

(iv) Foe each faculty member that has taught classes only in room_number-20, print the faculty member's name and the total number of classes she or he has taught.

(v) Find the names of students not enrolled in any class.

2. Consider the Insurance database given below. The primary keys are underlined and the data types are specified:

PERSON (Driver – id #: string, Name: string, Address: string)

CAR (Regno: string, Model: string, Year: int)

ACCIDENT (Report-number: int, Accd-Date: date, Location: string)

OWNS (Driver-id #: string, Regno:string)

PARTICIPATED (Driver-id: string, Regno:string, Report-Number: int, Damage Amount: int)

(i) Create the above tables by properly specifying the primary keys and the foreign keys.

(ii) Demonstrate how you

a. Update the damage amount to 25000 for the car with a specific Regno in the ACCIDENT table with report number 12.

b. Add a new accident to the database.

(iii) Find the total number of people who owned cars that were involved in accidents in 2008.

(iv) Find the number of accidents in which cars belonging to a specific model were involved.

3. Consider the following database of student enrollment in courses & books adopted for each course:

STUDENT (Regno: string, Name: string, Major: string, Bdate:date)

COURSE (Course #:int, Cname:string, Dept:string)

ENROLL (Regno:string, Course#:int, Sem:int, Marks:int)

BOOK _ ADOPTION (Course# :int, Sem:int, Book-ISBN:int)

TEXT (Book-ISBN:int, Book-Title:string, Publisher:string, Author:string)

(i) Create the above tables by properly specifying the primary keys and the foreign keys.
(ii) Demonstrate how you add a new textbook to the database and make this book be adopted by some department.
(iii) Produce a list of textbooks (include Course #, Book-ISBN, Book-Title) in the alphabetical order for courses offered by the 'CS' department that use more than two books.
(iv) List any department that has *all* its adopted books published by a specific publisher.

4. A database management system is to be created for a study centre to keep track of the students and the assignments records of the students. The database records the date of submission of assignments, the date of evolution, the date of viva, the date of declaration of results, who evaluated the assignment, and the mark list description in which the assignment marks were sent to regional office. The database also maintains the details of the evaluators. Perform the following activities for the description as given above.

a) Design the database with suitable integrity constraints and create the database
b) Write the following queries using SQL:
- (i) Find the list of the students who have not submitted even a single assignment
- (ii) Find the details of the evaluators by whom average marks awarded are more than 70%
- (iii) Find the students who have passed more than 5 assignments
- (iv) Find the list of students who have not appeared in VIVA. Make and state suitable assumptions, if any.

5. Design a database for maintaining the details of shows and ticketing for the shows of multiples. New perform the following activities for the system:
a) Create the database
b) Write the following queries using SQL
- (i) Find the details of the movies whose shows are not yet full
- (ii) Find the details of the movies that had been screened at least one year earlier to
- (iii) Find the names of those that have an overall state of 60% of capacity on all days of screening

6. Consider the following database for a banking enterprise:

BRANCH(Branch-name:string, Branch-City:string, Assets:real)
ACCOUNT(Accno:int, Branch-Name:string, Balance:real)

DEPOSITOR(Customer-Name:string, Accno:int)
CUSTOMER(Customer-Name:string, Customer-Street:string, Customercity: string)
LOAN(Loan-Number:int, Branch-Name:string, Amount:real)
BORROWER(Customer-Name:string, Loan-Number:int)

(i) Create the above tables by properly specifying the primary keys and the foreign keys
(ii) Find all the customers who have at least two accounts at the Main branch.
(iii) Find all the customers who have an account at all the branches located in a specific city.
(iv) Demonstrate how you delete tuples in ACCOUNT relation at every branch located in a specific city.
(v) Find all loan numbers for loans made at the specific branch with loan amounts greater than Rs1200.
(vi) Find all loan numbers for loans with loan amounts between Rs 90,000 and Rs100000.

7. Demonstrate views using SQL

Part-B

1. Write a PL/SQL code to demonstrate nested block.
2. Write a PL/SQL code to retrieve a employee name form employee database.
3. Write a PL/SQL code to calculate tax for employee and display taxable amount.
4. Write a PL/SQL code to calculate total & percentage of marks of the students in four subjects.
5. Write a PL/SQL code to reverse a sting.
6. Write a PL/SQL code to find the factorial of a given number.
7. Demonstrate transactions in PL/SQL.

22UMA400M	Bridge Course Mathematics-II	Credits - Mandatory L-T-P:(3 : 0 : 0)
Hours / Week : 03		CIE Marks : 50
Total Hours : 40		SEE Marks : 50

Differential Calculus **10 Hrs.**

Review of elementary calculus, Polar curves - angle between the radius vector and tangent, angle between two curves, pedal equation. Taylor's and Maclaurin's series expansions for one variable (without proof) problems

(RBT Levels: L1, L2 and L3)

Vector Differentiation **10 Hrs.**

Introduction, Scalar and vector fields**.** Gradient, directional derivative; curl and divergence-physical interpretation; solenoidal and irrotational vector fields- problems.

(RBT Levels: L1, L2 and L3)

Laplace Transform **10 Hrs.**

Introduction, Definition of Laplace Transform, Laplace Transform of standard functions, Properties: Shifting, differentiation, Integral and division by t. Periodic function, Heaviside's Unit step function.

(RBT Levels: L1, L2 and L3)

Inverse Laplace transforms **10 Hrs.**

Properties, Convolution theorem-problems, Solutions of linear differential equations.

(RBT Levels: L1, L2 and L3)

References:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
2. Erwin Kreyszing's Advanced Engineering Mathematics volume I and volume II, wiley India Pvt.Ltd., 2014.
3. Elementary Differential Equations by Earl D. Rainville and Phillip E, Bedient, Sixth Edition
4. Erwin Kreyszing's Advanced Engineering Mathematics, wiley India Pvt.Ltd.,2014.

5th Semester NEP 2nd Batch

2022-23 Entry Batch

Subject Title	**:**	**Advanced Java Programming(Integrated)**
Subject code	**:**	**22UISXXXC**
Semester	**:**	**5**
Credits with LTP Structure	**:**	**03 Credits (2L-0T-2P)**
Lecture Hours per Week	**:**	**2**
Practical Hours per Week		**2**
Tutorial Hours per Week	**:**	**0**
Total Contact Hours/Week	**:**	**02 Teaching Hours + 02 Practical Hours = 04 Hours**

UNIT - I	**08 Hours**	**Teaching Hours**	**Tutorial Hours**
Applets and Event Handling **The Applet Class:** Two types of Applets, Applet basics, Applet Architecture, An Applet skeleton, Simple Applet display methods, Requesting repainting, The HTML'APPLET' tag, Passing parameters to Applets. **Event Handling:** Two Event Handling Mechanisms, The Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model		**08**	**00**
UNIT - II	**06 Hours**	**Teaching Hours**	**Tutorial Hours**
. **Servlets**: Java Servlets and Common Gateway Interface Programming, A Simple Java Servlet. Anatomy of a Java Servlet, Reading data from a client, Reading HTTP request headers, Sending data to a client and Writing the HTTP response header, Working with Cookies, Tracking Sessions.		**06**	**00**
UNIT - III	**06 Hours**	**Teaching Hours**	**Tutorial Hours**
JDBC Objects: The concepts of JDBC, JDBC Drivers Types, JDBC Packages, A brief overview of the JDBC Process, Database connection, Statement Objects, ResultSet		**06**	
UNIT - IV	**08 Hours**	**Teaching Hours**	**Tutorial Hours**
Java Server Pages (JSP) **JSP Syntax and semantics**: JSP Overview**,** The JSP Development model, Components of JSP Page, A complete example, Expressions, Scriptlets and Declarations: Expressions, Scriptlets, and Declarations.		**08**	**00**

Text Books:

1. The Complete Reference -Java, Herbert Schildt, 7th edition, McGraw Hill Publication.(Chapters 21,22)
2. The Complete Reference –J2EE, Jim Keogh, McGraw Hill Publication.(Chapters 1, 2, 6, 7, 10)
3. The Complete Reference –JSP 2.0, Phil Hanna, McGraw Hill Publication.(Chapters 4, 5, 6, 7)

Reference Books:

1. Java 6 Programming Black Book, Dreamtech Press. 2007.
2. Core servlets and Java Server Pages, Marty Hall, Larry Brown, Volume 1: Core Technologies, Second Edition.

Laboratory Assignments

1. Develop a Java applet to accept three integers from the user and display the largest one with appropriate messages.

2. Develop a Java servlet to accept user details entered through a web form and display the same with appropriate messages.

3. Develop a java applet which performs arithmetic operations on two numbers entered by the user and present the results to the user.(by handling actions events on buttons)

4. Develop a Java applet which handles mouse events by displaying the respective event names and co-ordinates.

5. Develop a Java servlet to read and write cookies.

6. Write a Java program to create a database table, insert records in it, and display them.

7. Write a Java program to update an existing database table.

8. Write a JSP program to print the multiplication table of a number entered by user.

9. Write a JSP program to print Fibonacci series for a given number.

10. Write a JSP program to:
    a) Demonstrate error page in JSP
    b) Display HTTP request headers in table form on a web page.

Subject Title	**:**	**Operating Systems**
Subject code	**:**	
Semester	**:**	**05**
Credits with LTP Structure	**:**	**3 Credits (3L-0T-0P)**
Lecture Hours per Week	**:**	**3 Hours**
Tutorial Hours per Week	**:**	**0 Hours**
Total Contact Hours	**:**	**40 (40 Teaching Hours + 00 Tutorial Hours)**

UNIT – I	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
OVERVIEW **Introduction:** What Operating Systems Do: User View, System View, Operating-System Structure, Operating-System Operations, Process Management, Memory Management, Storage Management, Protection and Security. **System Structures:** Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating-		10	00
UNIT – II	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
PROCESS MANAGEMENT **Process Concept:** Operations on Processes. **Process Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling. **Multi-Threaded Programming:** Overview, Multithreading Models, Thread Libraries, Threading Issues. **Process Scheduling:** Thread Scheduling.		10	00
UNIT - III	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
PROCESS COORDINATION **Synchronization:** The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Monitors **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Detection, Recovery from Deadlock. **MEMORY MANAGEMENT** **Memory Management Strategies:** Background, Swapping, Contiguous		10	00
UNIT – IV	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
MEMORY MANAGEMENT **Virtual Memory Management:** Background, Demand Paging, Page		10	00

Replacement **STORAGE MANAGEMENT** **File system:** File concept, Access Methods, Directory Structure **Implementing File Systems:** File-System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management. **Secondary Storage Structure:** Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap-Space Management.		

Text Book:

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, **"OPERATING SYSTEM PRINCIPLES"**, 7th Edition

Reference Books:

1) D. M. Dhamdhere, "Operating systems - A concept based Approach", 2nd Edition, Tata McGraw-Hill, 2002.
2) P. C. P. Bhatt, "Operating Systems", 2nd Edition, PHI, 2006.
3) Harvey M. Deital, "Operating systems", 3rd Edition, Addison Wesley, 1990.

Subject Title	**:**	**Microcontroller and Embedded Systems**
Subject code	**:**	**22UISXXXC**
Semester	**:**	**5th**
Credits with LTP Structure	**:**	**3 Credits**
Lecture Hours per Week	**:**	**2**
Practical Hours per Week	**:**	**2**
Tutorial Hours per Week	**:**	**0**
Total Contact Hours/Week	**:**	**02 Teaching Hours + 02 Practical Hours**

UNIT - I	**07 Hours**	**Teaching Hours**	**Tutorial Hours**
The 8051 Microcontrollers, Assembly Language Programming: Microcontrollers and Embedded systems, Overview of the 8051 family, Inside the 8051, Introduction to 8051 Assembly programming, Assembling and running an 8051 program, the program counter and ROM space in the 8051, 8051 data types and directives, 8051 flag bits and PSW register, 8051 register banks and stack, pin description of the 8051. **Jump, Loop and Call Instructions, I/O Port Programming**: Loop and Jump instructions, Call instructions, Time delay for various 8051 chips, 8051 I/O programming, I/O bit manipulation programming.		**07**	**00**
UNIT - II	**07 Hours**	**Teaching Hours**	**Tutorial Hours**
8051 Addressing Modes, Arithmetic, Logic Instructions and Programs: Immediate and register addressing modes, Accessing memory using various addressing modes, Bit addresses for I/O and RAM, Extra 128-byte-on-chip RAM in 8052. Arithmetic instructions, Signed number concepts and arithmetic operations, Logic and compare instructions, Rotate instruction and data serialization, BCD, ASCII, and other application programs.		**07**	**00**
UNIT - III	**06 Hours**	**Teaching Hours**	**Tutorial Hours**
8051 Programming in C, Pin description of 8051: Data types and time delay in 8051 C, I/O programming in 8051 C, Logic operations in 8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Data serialization using 8051 C. **8051 Timer Programming in Assembly and C**: Programming 8051 timers, counter programming, Programming timer 0 and 1 in 8051 C.		**06**	
UNIT - IV	**06 Hours**	**Teaching Hours**	**Tutorial Hours**
8051 Serial Port Programming in Assembly and C: Basics of serial communication, 8051 conversion to RS232, 8051 serial port programming in Assembly, Programming the second serial port, Serial port programming in C. **Interrupts Programming in Assembly and C**: 8051 interrupts, Programming timer interrupts, Programming external hardware interrupts, Programming the serial communication interrupt, Interrupt priority in the 8051/52, Interrupt programming in C.**MOTOR Control:** DC and Stepper Motors.		**06**	**00**
Text Books:			
1. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, " The 8051			

Microcontroller and Embedded Systems" using Assembly and C. Pearson 2nd Edition, 2011.Chapter 1: 1.1-1.2, Chapter 2: 2.1-2.7, Chapter 3: 3.1-3.3, Chapter 4: 4.1-4.2, Chapter 5: 5.1-5.4, Chapter 6: 6.1-6.5, Chapter 7: 7.1-7.6, Chapter 8: 8.1, Chapter 9: 9.1-9.3, Chapter 10: 10.1-10.5, Chapter 11: 11.1-11.6, Chapter 17: 17.2-17.3

Reference Books:

1. Kenneth J. Ayala, "The 8051 Microcontroller Architecture, Programming and Applications", 2nd Edition, Penram International, 1996.
2. Dr. Uma Rao and Dr. Andhe Pallavi, "The 8051 Microcontroller Architecture, Programming and Applications", Pearson Education Sanguine.
3. V Udayshankar, M S Mallikarjunaswamy, " 8051 Microcontroller: Hardware, Software and Applications", McGrawHill, New Delhi.

6th Semester NEP 2nd Batch

2022-23 Entry Batch

Subject Title	**:**	**Computer Networks**
Subject code	**:**	**22UIS623C**
Semester	**:**	**6**
Credits with LTP Structure	**:**	**4 (3L-0T-1P)**
Lecture Hours per Week	**:**	**3 Hours**
Tutorial Hours per Week	**:**	**--**
Total Contact Hours	**:**	**40 (40 Teaching Hours + 00 Tutorial Hours)**

UNIT - I	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Introduction: Data Communications: Components, Data representations, Data flow, Networks: Distributed Processing, Network Criteria, And Physical structures, Categories of Networks [LAN, WAN, MAN]. **Network Models:** The OSI Model: layered architecture, peer to peer processes, and encapsulation, Layers in the OSI model : [Brief description of all seven layers], TCP / IP Protocol Suite: physical, data link, network, transport and application layer, Addressing: physical, logical and port addresses. **Physical Layer: Transmission Media**: Guided Media: Twisted pair cable, Coaxial cable, Fiber Optic cable, Unguided Media: Radio waves, Microwaves, Infrared.		**10 Hours**	--
UNIT - II	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Switching: Definition, Circuit switched networks, Data gram Networks, Virtual circuit networks. **Data Link Layer: Error detection and correction**: Cyclic codes: Checksum. **Data link control**: Protocols: Noiseless channels: Noisy channels.		**10 Hours**	--
UNIT - III	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Network Layer: Logical Addressing: IPv4 Addresses: Address Space, Notation, Classful Addressing, Classless Addressing, IPv6 Addresses: Structure, Address Space. **Network Layer :Internet Protocol:** IPv4, IPv6, Transition from IPv4 to IPv6 **Network Layer: Address mapping, Error Reporting, and Multicasting:** ARP, RARP, and ICMP. **Network Layer: Delivery, Forwarding & Routing:** Delivery, Forwarding: Routing Table, Unicast routing protocols: Distance vector routing [RIP Description], Link state routing [OSPF Description], Path vector routing [BGP Description].		**10 Hours**	--
UNIT - IV	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Transport Layer: Process to Process Delivery: UDP: TCP: TCP services, TCP features, segment, A TCP connection. SCTP: SCTP services, SCTP features, packet format, An SCTP association. **Congestion Control and Quality of Service:** Congestion control: Open loop congestion control and closed loop congestion control.		**10 Hours**	--

Application Layer: Remote Logging, Electronic Mail and File Transfer: Remote logging: Telnet, Electronic mail: Architecture ,File Transfer: FTP		

Text Books:

Data Communications and Networking Behrouz A. Forouzan, 4th Edition, Tata McGrawHill, 2006.

[**Unit-I:**Chapters 1, 2 ,7
Unit-II: Chapters 8, 10, 11
Unit-III: Chapters 19,20, 21,22
Unit-IV: Chapters 23, 24, 25 and 26]

Reference Books:

1) Communication Networks –Fundamental Concepts and Key Architectures Alberto LeonGarcia and IndraWidjaja, 2 nd Edition, Tata McGrawHill,2004.
2) Computer and Communication Networks Nader F. Mir, Pearson Education,2007.
3) Data and Computer Communication William Stallings, 8 th Edition, Pearson Education,2007.
4) Computer Networks – A Systems Approach Larry L. Peterson and Bruce S. David, 4th Edition, Elsevier,2007.
5) Introduction to Data Communications and Networking – Wayne Tomasi, Pearson Education,2005.

Laboratory Assignments

Part A

Simulate the following experiments using NS2 simulators

1. Three node point to point network with duplex link between them.
2. Four node point to point network using TCP/UDP.
3. Different types on internet traffic such as FTP, TELNET and analyze throughput.
4. Ethernet LAN using N nodes (6-10), change error rate and data rate and compare throughput.

Part B

Write C program for:

1. Error detection using CRC-CCITT (16-bits).
2. Bit stuffing and de-stuffing of binary data.
3. Client sending the file name and the server to send back the contents of the requested file if present, using TCP/IP Socket.
4. congestion control using leaky bucket algorithm

Subject Title	:	**DISCRETE MATHEMATICAL STRUCTURES**
Subject code	:	**22UIS618C**
Semester	:	**3**
Credits with LTP Structure	:	**3 Credits (3L-0T-0P)**
Lecture Hours per Week	:	**3 Hours**
Practical Hours per Week	:	**00**
Tutorial Hours per Week	:	**00**
Total Contact Hours per Week	:	**03 (3 Teaching Hours + 00 Tutorial Hours)**

UNIT - I	**10 Hours**	**Teaching Hours**
Fundamentals Principles of Counting: The Rules of sum and product, permutations, combinations: the binomial theorem, combinations with repetition, mathematical induction. **Recurrence relation**: first order linear recurrence relation, the second order linear homogeneous recurrence relation with constant coefficient		**10**
UNIT - II	**10 Hours**	
Fundamentals of Logic: Basic connectives and truth tables, Logical equivalence: the laws of logic, logical implication: rules of inference, the use of quantifiers, definitions and the proofs of theorems. **Set Theory:** Sets and subsets, set operations and the laws of set theory.		**10**
UNIT - III	**10 Hours**	
Relations and Functions: Cartesian products and relations, functions: plain and one to one, on to functions: sterling numbers of the second kind, special functions, the pigeonhole principle, function composition and inverse functions, properties of relations, computer recognition: zero one matrices and directed graphs, partial order: Hasse diagram, equivalence relations and partitions, lattices. **Semigroups and Groups**: Definition, example and elementary properties, Homomorphism, Isomorphism.		**10**
UNIT - IV	**10 Hours**	
An introduction to graph theory: Definitions and examples, subgraphs, complement and graph isomorphism, vertex degree: Euler trails and circuits**.** **Trees:** definitions, properties and examples, rooted trees, trees and sorting weighted trees and prefix codes.		**10**

Text Books:

"Discrete and Combinatorial Mathematics-An Applied Introduction", Ralph P Grimaldi, Pearson Education, 4th and 5th Edition

Reference Books:

1. C.L.Lin, "Elements of Discrete Mathematics" 2nd Editions
2. Thomas Khoshy "Discrete Mathematics with applications"
3. Richard Johasonbangh "Discrete Mathematics" 6th Edition
4. Kenneth H rossey "Discrete Mathematics & etc applications" 6th edition

Subject Title	**:**	**Artificial Intelligence and Machine Learning using Python**
Subject code	**:**	**22UIS621C**
Semester	**:**	**VII**
Credits with LTP Structure	**:**	**Credits (3L-0T-0P)**
Lecture Hours per Week	**:**	**3Hours**
Tutorial Hours per Week	**:**	**Hours**
Total Contact Hours	**:**	**40 (40 Teaching Hours + 00 Tutorial Hours)**

UNIT - I	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Foundation and History of AI, Overview of AI problems, Evolution of AI, Applications of AI, Classification/Types of AI. Artificial Intelligence vs Machine learning. Problem-Solving Agent: Problems of AI, AI technique, Tic – Tac – Toe problem. Intelligent Agents, Agents & environment, nature of environment, structure of agents, goal-based agents, utility-based agents, learning agents. Defining the problem as state space search, production system, problem characteristics, and issues in the design of search programs.		**10 Hours**	

UNIT - II	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Search Techniques: Problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies. Heuristic search strategies Greedy best -first search, A* search, AO* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search.		**10 Hours**	

UNIT - III	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Introduction: Introduction to Machine Learning, Examples of Machine Learning, Applications. Well posed learning problems, Designing Learning System, Perspectives and issues in Machine Learning. Supervised Learning Algorithms: Artificial Neural Networks – Introduction, Evolution of Neural Networks, Basics of Neural Networks, and Activation functions.		**10 Hours**	

UNIT - IV	10 Hours	**Teaching Hours**	**Tutorial Hours**
Support Vector Machines – Introduction, Linear Support Vector Machines, Optimal Hyperlane, Basics of Vectors. Bayesian Classification – Introduction, Naive bayes classifier, KNN, Measuring Classifier Accuracy. Unsupervised Algorithms – Introduction, Types of clustering. Usage of python programming for AI and ML algorithms – Introduction, Getting started with Python coding, Data handling and Pandas Deep Dive, Data Exploration, Basic operators, python decision making,.		**10 Hours**	

Text Books:

1) Russell, S. and Norvig, P. 2015. Artificial Intelligence - A Modern Approach, 3rd edition, Prentice Hall
2) Elaine Rich, Kevin Knight, & Shivashankar B Nair, “Artificial Intelligence”, McGraw Hill, 3rd ed.,2017.
3) S. Russell and P. Norvig, “Artificial Intelligence: A Modern Approach”, Prentice Hall, Third Edition,

2015. 2. Nils J. Nilsson, “Artificial Intelligence: A New Synthesis”, 1st Edition, Morgan-Kaufmann, 1998.
4) Anuradha Srinicasaraghavan, Vincy Joseph, Machine Learning, Willey, 1st Edition, 2019
5) Tom Mitchell, “Machine Learning”, McGraw Hill, 1997
6) Venkata Reddy Konasani, Shailendra Kadre, Machine Learning and Deep Learning using Python and Tensorflow, MC Graw Hill, 2021.

Reference Books:

7) Ethem Alpaydin, Introduction to Machine Learning, MIT press, Cambridge, Massachusetts, London, 2nd Edition, 2010.
8) Trevor Hastie. Robert Tipeshirani, Jerome Fredman, Elements of Statistical Learning, Springer, 2nd Edition, 2010.
9) Luis Pedro Coelho and Willi Richart, Building Machine Learning Systems with Python, PACKT Publication, 2nd Edition, 2013.

Subject Title	**:**	**Theory of Computations**
Subject code	:	**22UIS622C**
Semester	**:**	**06**
Credits with LTP Structure	**:**	**3 Credits (03L-0T-0P)**
Lecture Hours per Week	**:**	**3 Hours**
Tutorial Hours per Week	**:**	**00**
Total Contact Hours	**:**	**40 (40 Teaching Hours + 00 Tutorial Hours)**

Course Outcomes:

After completing the course the student will be able to:

1. Demonstrate a fundamental knowledge of the core concepts in automata theory and formal languages.
2. Prove the properties of languages, grammars and automata with formal mathematical methods;
3. Analyse the closure properties of regular and context-free languages.
4. Design finite automata, pushdown automata, Turing machines for solving language pattern recognition patterns.
5. Apply mathematical and formal techniques for solving problems.

UNIT - I	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Automata: Introduction to Finite Automata, The central concepts of Automata theory. Finite Automata: Deterministic Finite automata, Non-Deterministic Finite Automata. An application of Finite Automata, and Finite Automata with Epsilon-transitions, ***Regular Expressions:*** Regular expressions, Finite Automata and Regular Expressions, and Applications of Regular Expressions		**10**	**00**
UNIT - II	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Properties of Regular Languages: Proving languages not to be regular languages, Closure properties of regular languages, Decision properties of regular languages, and Equivalence and Minimization of Automata. **Context Free Grammars and Languages:** Context Free Grammars, Parse trees, Applications of Context Free Grammars, Ambiguity in Grammars and Languages. .		**10**	**00**
UNIT - III	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Pushdown Automata: Definition of the Pushdown Automaton, The languages of a PDA, Deterministic Pushdown Automata. ***Properties of Context-Free Languages***: Normal forms for Context Free Grammars.		**10**	**00**

UNIT - IV	10 Hours	Teaching Hours	Tutorial Hours
Introduction To Turing Machine: The Turing Machine, Programming Techniques for Turing Machines, Extensions to the basic Turning Machines, Turing Machine and Computers.		**10**	**00**

Text Books:

1. John. E., Hopcroft, Rajeev. Motwani, Jeffrey. D., Ullman, "Introduction to Automata Theory, Languages and Computation", 3rd Edition, Pearson Education, 2007. (Chapters: 1.1, 1.5, 2.2 to 2.5, 3.1 to 3.3, 4, 5, 6.1, 6.2, 6.4, 7.1, 8.1 to 8.4, 8.6)

Reference Books:

1. Peter. Linz, "An Introduction to Formal Languages and Automata", Third Edition, Fifth printing.
2. John, E., Hopcroft, Jeffrey. D. Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publication.
3. A. M., PadmaReddy, "Finite Automata and Formal Languages, Pearson Education,2012

7th Semester NEP 2nd Batch

2022-23 Entry Batch

College Name	:	**Basaveshwar Engineering College (Autonomous), Bagalkot**
Department Name	:	**Information Science and Engineering**
Semester	:	**VII**
Subject	:	**MANAGEMENT AND ENTREPRENEURSHIP**
Subject code	:	**22UIS706H**
Credits	:	**03 (3L-0P-0T)**
Teaching Hours		**40**

1. Know and explain the functional areas of management.
2. Know and explain the social, ethical, global environment of the business.
3. Demonstrate the ability to communicate and work effectively in teams and/or groups.
4. Understand and apply knowledge of key leadership concepts in an integrated manner.
5. Illustrate the ability to identify and evaluate business opportunities and trends that fits the individual.
6. Demonstrate the understanding of how to launch the individuals entrepreneurial career.

UNIT - I

INTRODUCTION:
Management: Science, Theory and Practice, Managing: Science or Art, The Functions of Managers, The Systems Model of Management, Management and Society, Social Responsibility and Ethics
PLANNING: The Nature and Purpose of Planning, Types of Plans, Steps in Planning, The Planning Process, Objectives: Management by Objectives, Strategies, Policies and Planning Premises, The strategic Planning Process, Effective Implementation of Strategies, Premising and Forecasting, Decision Making, Importance of Rational Decision making, Limitations of Rational Decision making, Types of Decision Making, Case Studies
ORGANIZING: The Nature and Purpose of Organizing, Formal and Informal Organization, Organizational Division, The Department, Organization Levels and span of management, The structure and process of Organizing, Effective Organizing, The Departmentation, Matrix Organization, Strategic Business Units, Line Staff Authority and Decentralization, Authority and Power, Line and Staff Concepts, Functional Authority, Decentralization of Authority, Delegation of Authority, Promoting an appropriate Organization Culture, Case Studies 10 Hrs

UNIT - II

STAFFING: The Systems Approach to HRM, An Overview of the staffing Function, Situational Factors affecting Staffing, Selection Process, Techniques and Instruments, Orienting and Socializing New Employees, Performance Appraisal and Career Strategy, Formulating the Career Strategy, Manager and Organization Development, Manager Development Process and Training, Case Studies
LEADING: Human Factors in Managing, Motivation and Motivators, Motivation Content and Process, Theories, Motivational Techniques, A systems and Contingency Approach to Motivation, Leadership, Ingredients of Leadership, Trait Approaches to Leadership, Leadership Behavior 10 Hrs

UNIT - III

COMMUNICATION: Communication: importance of communication, Purposes of Communication, Principles of effective communication, Communication networks in a working group, Checks on in-plant communication, Communication in Indian industries.
CONTROLLING: The System and Process of Controlling, Control as a feedback system, Feed Forward Control, Requirements for Effective Controls, Control Techniques, The Budget, Traditional Non-budgetary Control, Information Technology, Direct Control Vs Preventive Control, Case Studies10 Hrs

UNIT - IV

ENTREPRENEUR: Meaning of an Entrepreneur, Evolution of the Concept, Functions of an Entrepreneur, Types of Entrepreneurs, Intrapreneur – an emerging class, Concept of Entrepreneurship, Steps in Entrepreneurial process, Role of Entrepreneurs in Economic Development, Entrepreneurship in India, Entrepreneurship: Barriers

PREPARATION OF PROJECT: Meaning of Project and, Project Identification / Project Selection, Project Report: Contents and Formulation, Identification of Business Opportunities, Project Appraisal, Market Feasibility Studies, Technical Feasibility Studies, Financial Feasibility Studies, Social Feasibility Studies. **INSTITUTIONAL SUPPORT:** Different Schemes: TECSOK, KIADB, KSSIDC, KSIMC, DIC, Single window Agency:, MSME, NSIC, SIDBI, KSFC. **MICRO, SMALL & MEDIUM ENTERPRISES (MSME):** Definition and Characteristics, Need and Rationale, Objectives and Scope, Role of MSME in Economic Development, Advantage of MSME, Steps to start an MSME Government Policy towards MSME, Impact of Liberalisation, Privatisation & Globalization on MSME, Effect of WTO, GATT 10 hrs		
Text Books	:	1. Essentials of Management, Harold Koontz and Heinz Weihrich, TMH, 7th Edition. 2. Principles of Management, P C Tripathi and P N Reddy, The McGraw-Hill, 4th Edition.
Reference Books	:	1. Entrepreneurship Development – Small Business Enterprises Poornima M Charantimath, 2. Management & Entrepreneurship – Ramesh Burbure

Subject Title	**:**	**CRYPTOGRAPHY AND NETWORK SECURITY**
Subject code	**:**	**22UIS704C**
Semester	**:**	**7**
Credits with LTP Structure	**:**	**Credits (3L-0T-0P)**
Lecture Hours per Week	**:**	**3 Hours**
Tutorial Hours per Week	**:**	**--**
Total Contact Hours	**:**	**40 (40 Teaching Hours + 00 Tutorial Hours)**

UNIT - I	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
INTRODUCTION TO NETWORK SECURITY: OSI security architecture, security attacks, security services, Security Mechanisms, a model of Network Security. **SYMMETRIC CIPHERS** Classical Encryption Techniques, Block Ciphers and the Data Encryption Standard, Introduction to Finite Fields, Confidentiality using Symmetric Encryption.		**10 Hours**	--
UNIT - II	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
PUBLIC - KEY ENCRYPTION AND HASH FUNCTIONS Introduction to Number Theory, Public-Key Cryptography and RSA, Key Management : Diffie-Hellman Key Exchange, Message Authentication and Hash Functions, secure Hash Algorithm, Digital Signatures and Authentication Protocols.		**10 Hours**	--
UNIT - III	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
NETWORK SECURITY PRACTICE Authentication Applications: Kerberos, X.509 Authentication Service, Electronic mail Security: Pretty Good Privacy, S/MIME, IP Security: Overview, Architecture, Authentication header, ESP, Key management.		**10 Hours**	--
UNIT - IV	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
SYSTEM SECURITY Malicious Software: Viruses and Related Threats, Viruses Countermeasures. Distributed Denial of Service Attacks, Firewalls: Firewall Design Principles, Trusted Systems.		**10 Hours**	--

Text Books:

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Pearson Education, Fourth Edition, 2006.
   (Chapters: 1.2, 1.3, 1.4, 1.5, 1.6, 2, 3.1, 3.2, 3.3, 4, 7, 8, 9, 10.1, 10.2, 11, 12.1, 13, 14.1, 14.2, 15, 16.1,16.2, 16.3, 16.4, 16.6, 19, 20)

Reference Books:

1. Atul Kahate, "Cryptography and Network Security", Tata McGraw Hill, 2003.
2. Behrouz A. Forouzan, Introduction to Cryptography and Network Security, 2008, McGraw-Hill
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007

8th Semester NEP 2nd Batch

2022-23 Entry Batch

Sl. No.	Subject	Credit
1	MOOCS	3
2	MOOCS	3
3	Internship	10