



B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19
Autonomous Institute, Affiliated to VTU
DEPARTMENT OF CSE



B. M. S. College of Engineering, Bengaluru-19
Autonomous Institute, affiliated to VTU
Department of Computer Science and Engineering
Curriculum Design for UG

Academic Year of admission 2018-19

UG Syllabus from 3rd to 4th Semester

Definition of Credit: 1Hr. Lecture (L) per week 1 credit ; 2Hrs Tutorial (T) per week 1 credit ; 2Hrs Practical per week 1 credit



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THIRD SEMESTER B.E COURSE (CSE/ISE)

Course Title	Statistics and Discrete Mathematics	Course Code	19MA3BSSDM
Credits	04	L – T – P	3 – 1 – 0
Contact hours	48 hours (36L+12T)		

Prerequisites: Basic Concepts of Probability and Statistics.

Course Objectives: To acquaint the student with various concepts of discrete mathematics, Probability, Statistics and Queuing required in several streams of Computer/Information Science.

UNIT-1

GRAPH THEORY

[11 hours]

Basic concepts: Types of graphs, order and size of a graph, in-degree and out-degree, connected and disconnected graphs, Eulerian graph, Hamiltonian graphs, sub-graphs, isomorphic graphs. Matrix representation of graphs: adjacency matrix, incidence matrix. Trees: spanning tree, minimal spanning tree: Kruskal's algorithm, Prim's algorithm, shortest path-Dijkstra's algorithm.

(8L+3T)

UNIT-2

COMBINATORICS

[9 hours]

Principles of counting: The rules of sum and product, permutations. Combinations- Binomial and multinomial theorems. Catalan numbers, the principle of inclusion and exclusion. Derangements.

(7L+2T)

UNIT-3

PROBABILITY

[8 hours]

Theoretical distributions: Poisson distribution, Exponential and Normal distributions.

Joint probability distributions: Discrete random variable, Mathematical expectations, Covariance and Correlation.

(6L+2T)

UNIT-4

STATISTICAL INFERENCE

[11 hours]

Introduction, procedure for testing of hypothesis, level of significance.

[Large sample] Test of significance for single mean, difference between two means, single proportion, difference between two proportions.

[Small sample] Test of significance for single mean, difference between two means, paired t-test, ratio of variances (F- distribution), Chi-Square distribution-goodness of fit.

(8L+3T)

UNIT-5

MARKOV CHAIN AND QUEUING THEORY

[9 hours]

Markov Chain, Probability vectors, stochastic matrices, fixed point vector, regular stochastic matrices. Higher transition probabilities, stationary distribution of regular Markov chains. Queuing models: Concept of Queue, M/M/1 queuing systems.

(7L+2T)



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On completion of the course student will have the ability to:

Course Code	CO #	COURSE OUTCOMES (CO)	PO
19MA3BSSDM	CO 1	Use graphs as representation tool in network analysis	1
	CO 2	Demonstrate an understanding of the basic concepts of Combinatorics.	
	CO 3	Apply the concepts for probability, Statistics and Queuing theory.	

Text Books:

1. Discrete Mathematics, Seymour Lipchitz. M. Lipson, 2005, Tata McGraw Hill.
2. Graph Theory and Combinatorics, D. S. Chandrasekharaiah, 4th edition, 2011-12, Prism Engineering Education Series.
3. Higher Engineering Mathematics, B. V. Ramana, 2007, Tata McGraw Hill.

Reference Books:

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 2002, McGraw Hill.
2. Discrete Mathematics, Kolman, Busby Ross, 5th edition, 2004, Prentice Hall.
3. Graph Theory with Applications to Engineering and Computer Science, Narsingh Deo, Eastern Economy Edition, PHI Learning Pvt., Ltd.

E books and online course materials:

1. <http://jlmartin.faculty.ku.edu/~jlmartin/courses/math725-S16/>
2. https://www.whitman.edu/mathematics/cgt_online/cgt.pdf

Online Courses and Video Lectures:

1. <https://www.coursera.org/learn/probability-intro>
2. <https://nptel.ac.in/courses/111104026/> (Discrete Mathematics)
3. <https://nptel.ac.in/courses/111106086/> (Combinatorics)
4. <https://nptel.ac.in/courses/111102112/> (Statistical Inference)

Question Paper Pattern:

1. Five full questions to be answered.
2. To set one question in Units 2, 3, 5 and two questions each in unit 1 and unit 4.



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Sem	3rd		
Course Title:	Microprocessors and Microcontrollers		
Course Code:	19CS3ESMMC		
L-T-P:	3-0-1	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction to 8086 Microprocessor, Internal Architecture, Register Organisation, Flag register, Addressing Modes, Assembler directives, Instruction set of 8086 – Data Transfer instructions, Logical instructions, Arithmetic instructions, Example programs, Branch instructions, Loop instructions.	8 Hrs	Text Book-1: 1.1, 1.2, 2.2, 2.4, 2.3
2	Machine control instructions, Flag manipulation instructions, Shift and rotate instructions, Delay Loops, String instructions, Assembly language programming examples Instruction Templates, MOV instruction Coding Format and Examples, Special Architectural Features and related programming: Stacks, Procedures, Macros, Interrupts and the Vector Table	7 Hrs	2.3, 3.2, 4.1-4.7
3	Pin Diagram of 8086, Maximum/ Minimum Mode of 8086, Timing Diagram, Methods of interfacing I/O devices, Programmable Peripheral interface 8255, Interfacing of Logic controller, Interfacing of Seven segment display	8 Hrs	1.8, 1.9, 5.3, 5.4, 5.5
4	Microprocessors versus Microcontrollers, 8051 Architecture: Introduction, 8051 Microcontroller Hardware, Input/ Output Pins, External Memory Interface, Addressing Modes and Instruction set. Example Demonstration using 8051 instruction set, Data transfer instructions, Arithmetic instructions.	9 Hrs	Text Book-2: Page No. 2 to 4, 11-28, 45-54, 71-82,
5	8051 instruction set: Logical instructions, Branching and Subroutines, Example programs. Interfacing with 8051: LCD Interfacing, Keyboard Interfacing, Seven segment display, Stepper Motor, Elevator	7 Hrs	Text Book-2: Page No. 59-68, 86-95. Text Book-3: 12.1 and 12.2, 17.2

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Advanced Microprocessor and peripherals	A K Ray and K M Bhurchandi.	3rd edition	Tata McGraw-Hill Education, 2006	2012
2.	The 8051 Microcontroller Architecture, Programming &	Kenneth J. Ayala	2 nd Edition	Penram International Publishing	2005



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	Applications”.				
3	8051 Microcontroller and Embedded Systems- using Assembly and C	Mohammed Ali mazidi , Janice Gillispie mazidi and rolim d mcKinley	2nd Edition	Pearson Education Limited	2012

Reference Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Advanced Microprocessors and IBM - Pc Assembly Language Programming	Udaya Kumar and B. Uma shankar	1 st Edition	McGraw Hill Education	July 2017
2.	Microprocessor and Microcontroller	Soumitra Kumar Mandal	1 st Edition	McGraw Hill Education	2011

E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Microcomputer System The 8086/8088 Family	Yu-Cheng Liu and Glenn A Gibson	2 nd Edition	PHI	2009	https://drive.google.co/drive/folders/0B1yKJzk_EV46N2pWLXB4bExzSE0

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	Microprocessors and Microcontrollers	NPTEL		(https://nptel.ac.in/courses/Webcourse-contents/IISc-BANG/notused/Microprocessors%20and%20Microcontrollers-Learning%20Material%20-%20Microprocessors%20and%20microcontrollers.pdf)

B Course Outcomes



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At the end of the course the student will be able to

CO1	Ability to apply the knowledge of architecture, instruction set and assembly language programming of microprocessor and microcontroller.
CO2	Ability to analyze the attributes of Microprocessors & Microcontrollers to address the given problem
CO3	Ability to design microprocessor and microcontroller based systems
CO4	Ability to conduct experiments using assembly language programming to demonstrate the features of microprocessor and microcontroller .

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		3													
CO3			2											2	
CO4				3	2										

D Proposed Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	---	20
QUIZ	---	5
Lab Component	---	25
Alternate Assessment Tool	----	---
Total		50

E Tutorial Plan (if applicable):

F Laboratory Plan (if applicable)

Lab Program	Unit #	Program Details
1	1,2	Assembly level Programs using 8086 Design and develop an assembly language program to search a key element "X" in a list of 'n' 16-bit numbers. Adopt Binary search algorithm in your program for searching.
2	1,2	Design and develop an assembly program to sort a given set of 'n' 16-bit numbers in ascending order. Adopt Bubble Sort algorithm to sort given elements.
3	1,2	Read an alphanumeric character and display its equivalent ASCII code at the center of the screen.
4	1,2	Reverse a given string and check whether it is a palindrome or not.
5	1,2	Read two strings, store them in locations STR1 and STR2. Check whether they are equal or not and display appropriate messages. Also display the length of the stored strings.
6	1,2	Develop an assembly language program to compute nCr using recursive procedure. Assume that 'n' and 'r' are non-negative integers



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7	1,2	Read the current time from the system and display it in the standard format on the screen
8	1,2	Write a program to simulate a Decimal Up-counter to display 00-99.
9	1,2	Read a pair of input co-ordinates in BCD and move the cursor to the specified location on the screen.
10	1,2	Write a program to create a file (input file) and to delete an existing file
Interfacing Programs Using 8051		
11	4,5	Read the status of eight input bits from the Logic Controller Interface and display 'FF' if it is the parity of the input read is even; otherwise display 00.
12	4,5	Implement a BCD Up-Down Counter on the Logic Controller Interface.
13	4,5	Scan a 8 x 3 keypad for key closure and to store the code of the key pressed in a memory location or display on screen. Also display row and column numbers of the key pressed.
14	4,5	Drive a Stepper Motor interface to rotate the motor in specified direction (clockwise or counter-clockwise) by N steps. Introduce suitable delay between successive steps.
15	4,5	Display messages FIRE and HELP alternately with flickering effects on a 7-segment display interface for a suitable period of time. Ensure a flashing rate that makes it easy to read both the messages
16	4,5	Convert a 16-bit binary value (assumed to be an unsigned integer) to BCD and display it from left to right and right to left for specified number of times on a 7-segment display interface
17	4,5	Drive an elevator interface in the following way: i. Initially the elevator should be in the ground floor, with all requests in OFF state. ii. When a request is made from a floor, the elevator should move to that floor, wait there for a couple of seconds (approximately), and then come down to ground floor and stop. If some requests occur during going up or coming down they should be ignored.

G Alternate Assessment Tool Plan (if applicable):NA

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Internal Choice	Two Questions to be asked for 20 Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	25%
Apply / Analyze	50%
Create / Evaluate	25%



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Sem	3rd		
Course Title:	Data structures		
Course Code:	19CS3PCDST		
L-T-P:	3-0-1	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	<p>Basic concepts: Structures, Pointers and dynamic memory allocation.</p> <p>Stack: Definition and examples, Representation of stacks in C</p> <p>Applications of Stack: Converting an expression from Infix to postfix and Evaluation of Expression.</p> <p>Recursion: Factorial, Fibonacci Sequence, Tower of Hanoi</p>	9	<p>Textbook1</p> <p>Chapter 1:1.4</p> <p>Chapter 2 : 2.3</p> <p>Chapter 1:1.2</p> <p>Textbook2</p> <p>Chapter 2: 2.1, 2.2,2.3</p> <p>Chapter 3 : 3.2,3.3</p>
2	<p>Queues: The queue and its sequential representation, Linear queue, Circular Queues, Double Ended Queue, Priority Queues.</p>	8	<p>Textbook1: 3.3</p> <p>Textbook 2</p> <p>Chapter 4: 4.1</p>
3	<p>Linked Lists: Linked list, Array implementation of Lists, Limitations of the array implementation, Allocating and freeing dynamic variables, Linked list using dynamic variables. Operations on singly linked list: Insert, Delete, Display, Concatenate, Search, Merge, Sort, Reverse.</p> <p>Linked list: Linked Stacks and Queues</p>	7	<p>Textbook 2:</p> <p>Chapter 4: 4.2</p> <p>Textbook 1:</p> <p>Chapter 4: 4.4</p>
4	<p>Circular lists and it's basic operations: Insert, Delete and Display.</p> <p>Doubly linked lists and it's basic operations: Insert, Delete and Display.</p> <p>Applications of linked lists: Addition of long positive integers using circular list, Adding Polynomials.</p> <p>Hashing: Hash tables, Hash function, Overflow handling:</p>	7	<p>Textbook1</p> <p>Chapter 5:5.1,5.2,5.3,5.7</p>



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	Open Addressing, Chaining		
5	Trees: Introduction, Representation of trees, Binary Tree, Properties of Binary Trees, Binary tree representation- Binary tree traversals, Binary Search Tree(BST): Definition, Searching a BST, Inserting into BST, deletion from BST	8	Textbook1 Chapter 10: 10.2,10.4 Chapter 5: 5.5 Chapter 8: 8.2

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1	Fundamentals of Data Structures in C	Horowitz, Sahni, Anderson Freed	Second	Universities Press	2008
2.	Data Structures using C	Aaron M.Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein	Fifth	Pearson education	2007

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Data structures and program design in C	Robert L. Kruse, Clovis L. Tondo, Bruce P. Leung	Second	Prentice Hal	1997
2	Data Structure using C	A.M Padma Reddy	Thirteenth edition	Sri Nandi	2013

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Data Structures using C	Reema Thareja	Second Edition	Oxford University press	2014	https://www.academia.edu/28758384/Data_structures_using_c_2nd_reema_thareja

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Data Structures	Coursera		https://www.coursera.org/learn/data-structures



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2.	Data Structures and algorithms	NPTEL		https://nptel.ac.in/courses/106102064/
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B Course Outcomes

At the end of the course the student will be able to

CO1	Apply the concept of linear and nonlinear data structures to various applications
CO2	Analyse the usage of appropriate data structure for a given application
CO3	Design and implement operations of linear and nonlinear data structure
CO4	Ability to conduct practical experiments for demonstrating the operations of different data structures.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1														
CO2		2													
CO3			3												
CO4			3		3										3

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	---	20
Quiz/AAT	---	5
Lab Component	---	25
Total		50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Lab Program	Unit #	Program Details
1	1	Write a program to simulate the working of stack using an array with the following : a) Push b) Pop c) Display The program should print appropriate messages for stack overflow, stack underflow
2	1	WAP to convert a given valid parenthesized infix arithmetic expression to postfix expression. The expression consists of single character operands



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		and the binary operators + (plus), - (minus), * (multiply) and / (divide)
3	2	<p>WAP to simulate the working of a queue of integers using an array. Provide the following operations</p> <ul style="list-style-type: none">a) Insertb) Deletec) Display <p>The program should print appropriate messages for queue empty and queue overflow conditions</p>
4	2	<p>WAP to simulate the working of a circular queue of integers using an array. Provide the following operations.</p> <ul style="list-style-type: none">a) Insertb) Deletec) Display <p>The program should print appropriate messages for queue empty and queue overflow conditions</p>
5	3	<p>WAP to Implement Singly Linked List with following operations</p> <ul style="list-style-type: none">a) Create a linked list.b) Insertion of a node at first position, at any position and at end of list.c) Display the contents of the linked list.
6	3	<p>WAP to Implement Singly Linked List with following operations</p> <ul style="list-style-type: none">a) Create a linked list.b) Deletion of first element, specified element and last element in the list.c) Display the contents of the linked list.
7	3	<p>WAP Implement Single Link List with following operations</p> <ul style="list-style-type: none">a) Sort the linked list.b) Reverse the linked list.c) Concatenation of two linked lists
8	3	<p>WAP to implement Stack & Queues using Linked Representation</p>
9	4	<p>WAP Implement doubly link list with primitive operations</p> <ul style="list-style-type: none">a) Create a doubly linked list.b) Insert a new node to the left of the node.c) Delete the node based on a specific valued) Display the contents of the list
10	5	<p>Write a program</p> <ul style="list-style-type: none">a) To construct a binary Search tree.b) To traverse the tree using all the methods i.e., in-order, preorder and post order



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		c) To display the elements in the tree.
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G Proposed Alternate Assessment ToolPlan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Internal Choice	One Question to be asked for 20 Marks
Unit-5	Mandatory	Two Questions to be asked for 20 Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Sem	3rd		
Course Title:	Object Oriented Java Programming		
Course Code:	19CS3PCOOJ		
L-T-P:	3-0-1	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No.	Chapters
1	<p>The History and Evolution of Java: Java's Lineage, Java's Magic: The Byte code, The Java Buzzwords</p> <p>An overview of Java: Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements</p> <p>Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, Integers, Floating-Point Types, Characters, The Primitive Types, Booleans, Variables, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays</p>	7	1	1,2,3
2	<p>Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, A Stack Class</p> <p>A Closer Look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Introducing Access Control, Understanding static, Introducing final, Using Command-Line Arguments</p>	8	1	6,7
3	<p>Inheritance: Inheritance Basics, Member Access and Inheritance, A More Practical Example, A Superclass Variable Can Reference a Subclass Object, Using super, Using super to Call Superclass Constructors, A Second Use for super, Creating a Multilevel Hierarchy, When Constructors Are Executed, Method Overriding, Dynamic Method Dispatch, Why Overridden Methods?, Applying Method Overriding, Using Abstract Classes, Using final with Inheritance, Using final to Prevent Overriding, Using final to Prevent Inheritance, Local Variable Type Inference and Inheritance, The Object Class</p>	8	1	8
4	<p>Packages and Interfaces:</p> <p>Packages: Defining a package, Finding packages and class path, Example, Access protection, importing packages</p>	8	1	9,10,14



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	<p>Interfaces: Defining Interface, Implementing Interface, Nested Interfaces, Applying interfaces, Variables in interface, .Interfaces can be extended.</p> <p>Generics: Introduction to Generics. A Simple Generics Example</p> <p>Exception handling: Fundamentals, Exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions. Creating your own exception subclasses.</p>			
5	<p>Multithreaded Programming: The Java thread model, The Main thread, Creating a thread, creating multiple threads, Using isalive() and Join(), thread priorities, Synchronization, Interthread communication</p> <p>Event Handling: Two Event Handling Mechanisms, The Delegation Event Model, Events- Event Sources, Event Listeners, Event Classes- The MouseEvent Class, Event Listener Interfaces-The MouseListener Interface, the MouseMotionListener Interface, Using the Delegation Event Model – Handling Mouse Events.</p> <p>Introduction the AWT: Working with Windows, Graphics and Text</p> <p>AWT Classes, Window Fundamentals, Working with Frame Windows, Introducing Graphics, Working with Color</p>	8	1	11, 24, 25

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Java the Complete Reference	Herbert Schildt	11 th Edition	Tata McGraw-hill Edition	2019

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to JAVA Programming	Y. Daniel Liang	9 th edition	Pearson education	2012
2.	Programming in JAVA 5.0	James P Cohoon, Jack W Davidson	1 st Edition	TATA McGraw hill	2006
3.	Core Java2	Cay S Horstmann, Gary Cornell	11 th Edition	<u>Prentice Hall.</u>	2018



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4.	Programming with Java A Primer	E.BalaGuruSwamy	5 th Edition	McGraw Hill Education	2014
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E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1	Java, Java, Java Object-Oriented Problem Solving	R. Morelli and R. Walde	Third edition	Pearson Education, Inc	2012	https://ia800303.us.archive.org/26/items/JavaJavaJavaObject-orientedProblemSolving/jjj-os.pdf
2	The Art and Science of Java	Eric S. Roberts		Greg Tobin	2007	http://people.reed.edu/~jerry/121/materials/artsciencejava.pdf
3	Java Programming	Wikibooks Contributors	Seventh Edition	wikibooks.org	2016	https://upload.wikimedia.org/wikipedia/commons/e/e7/Java_Programming.pdf
4	Think Java How to Think Like a Computer Scientist	Allen B. Downey and Chris Mayfield	6.1.3	Green Tea Press Needham, Massachusetts	2016	https://www.pdfdrive.com/think-java-how-to-think-like-a-computer-scientist-e17327018.html
5	Introduction to Programming Using Java,	<u>David J. Eck</u>	Seventh Edition	CreateSpace	2014	http://math.hws.edu/javanotes/index.html

MOOC Course

Sl. No.	Course name	Course	Year	URL
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		Offered By		
1.	Object Oriented Programming in Java	Coursera	2019	https://www.classcentral.com/course/coursera-object-oriented-programming-in-java-4212
2	Java Programming Basics	Udacity	2019	https://www.udacity.com/course/java-programming-basics--ud282
3.	Programming in Java	NPTEL	Aug – Oct 2019	https://onlinecourses.nptel.ac.in/noc18_cs41

B Course Outcomes

At the end of the course the student will be able to

CO1	Apply knowledge of java constructs for developing programs/applications.
CO2	Analyse the given java program to identify bugs and to write correct code.
CO3	Design java programs/ applications for a given requirement.
CO4	Conduct practical experiments for demonstrating features of java using eclipse.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3													1	
CO2		3												2	
CO3			3											3	2
CO4					3									3	

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	2 Internals	20
QUIZ	1	5
Lab Component	2 Lab Tests	25
Alternate Assessment Tool	NA	--
Total		50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Lab Program	Unit #	Program Details
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1	I	Develop a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.
2	II	Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.
3	II	Create a class Book which contains four members: name, author, price, num_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.
4	III	Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.
5	III	<p>Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:</p> <ul style="list-style-type: none">a) Accept deposit from customer and update the balance.b) Display the balance.c) Compute and deposit interestd) Permit withdrawal and update the balance <p>Check for the minimum balance, impose penalty if necessary and update the balance.</p>
6	IV	Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.



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7	IV	Write a program to demonstrate generics with multiple object parameters.
8	IV	Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called “Father” and derived class called “Son” which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge() when the input age<0. In Son class, implement a constructor that takes both father and son’s age and throws an exception if son’s age is >=father’s age.
9	V	Write a program which creates two threads, one thread displaying “BMS College of Engineering” once every ten seconds and another displaying “CSE” once every two seconds.
10	V	Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException. Display the exception in a message dialog box.

G Alternate Assessment Tool Plan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20Marks
Unit-2	Mandatory	One Question to be asked for 20Marks
Unit-3	Mandatory	One Question to be asked for 20Marks
Unit-4	Internal Choice	Two Questions to be asked for 20Marks each
Unit-5	Internal Choice	Two Questions to be asked for 20Marks each

Bloom’s Level	Percentage of Questions to be Covered
Remember / Understand	25%
Apply / Analyze	50%
Create / Evaluate	25%



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Sem	3rd		
Course Title:	Computer Organization and Architecture		
Course Code:	19CS3PCCOA		
L-T-P:	3-0-0	Total Credits:	3

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
Unit-1	Basic Structure of Computers and Instruction Set Architecture: Functional Units, Basic Operational Concepts, Number Representation and Arithmetic Operations, Memory Locations and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language,	8 Hrs	Text Book 1: Chapter 1: 1.2, 1.3, 1.4, Chapter 2: 2.1, 2.2, 2.3, 2.4, 2.5
Unit-2	Stacks, Subroutines, Additional Instructions, Basic Input/Output: Accessing I/O Devices, Interrupts, Bus Structure, Bus Operation, Arbitration	7 Hrs	Text Book 1: Chapter 2: 2.6, 2.7, 2.8, Chapter 3: 3.1, 3.2, Chapter 7: 7.1, 7.2, 7.3
Unit-3	Memory System: Basic Concepts, Semiconductor RAM Memories, Read-only Memories, Direct Memory Access, Memory Hierarchy, Cache Memories: Mapping Functions, Virtual Memory	8 Hrs	Text Book 1: Chapter 8: 8.1, 8.2, 8.3, 8.4, 8.5, 8.6: 8.6.1, 8.8
Unit-4	Arithmetic: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Unsigned Numbers, Multiplication of Signed Numbers, Fast Multiplication: Bit-Pair Recoding of Multipliers, Integer Division, Floating-Point Numbers and Operations : Arithmetic Operations on Floating-Point Numbers, Guard Bits and Truncation, Implementing Floating-Point Operations	8 Hrs	Text Book 1: Chapter 9: 9.1, 9.2, 9.3, 9.4, 9.5.1, 9.5.2, 9.5.3, 9.6, 9.7: 9.7.1, 9.7.2, 9.7.3
Unit-5	Basic Processing Unit: Some Fundamental Concepts, Instruction Execution, Hardware Components, Instruction Fetch and Execution Steps, Control Signals, Hardwired Control Parallel Computer Architecture: Processor Architecture and Technology Trends, Flynn's Taxonomy of Parallel Architectures, Memory	8 Hrs	Text Book 1: Chapter 5: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 Text Book 2: Chapter 2: 2.1, 2.2, 2.3: 2.3.1, 2.3.2, 2.4: 2.4.1, 2.4.2



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	Organization of Parallel Computers: Computers with Distributed Memory Organization, Computers with Shared Memory Organization, Thread-Level Parallelism: Simultaneous Multithreading, Multicore Processors		
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Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	COMPUTER ORGANIZATION AND EMBEDDED SYSTEMS	Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian	6th Edition	McGraw-Hil	2012
2.	Parallel Programming for Multicore and Cluster Systems	Thomas Rauber, Gudula Runger	2nd Edition	Springer	2013

Reference Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Computer Organization and Design - The Hardware/Software Interface	David A. Patterson, John L. Hennessy	4th Edition	Elsevier	2008
2.	Computer Organization & Architecture	William Stallings	7th Edition	PHI	2010

E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Computer Organization and Architecture	William Stallings	9 th Edition	Pearson	2013	http://www.allitebooks.in/computer-organization-and-architecture-9th-edition/

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL



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1.	Computer Organization and Architecture A Pedagogical Aspect	NPTEL	2019	https://onlinecourses.nptel.ac.in/noc19_cs04/preview
2.	Computation Structures 3: Computer Organization	Edx	2019	https://www.edx.org/course/computation-structures-3-computer-mitx-6-004-3x-0

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply the concepts of basic functional units to demonstrate the working of computational system
CO2	Ability to analyse the design issues in the development of processor and other components to articulate improvement in computer design
CO3	Ability to design memory modules and Arithmetic Logic unit by analysing performance issues

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2														
CO2		3												1	
CO3			3											2	

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	---	40
QUIZ/AAT	---	10
Lab Component	---	--
Total		50

E Tutorial Plan (if applicable)

Not Applicable

F Laboratory Plan (if applicable)

Not Applicable

G Alternate Assessment ToolPlan (if applicable)

Not Applicable

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20Marks
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Unit-2	Internal Choice	Two Questions to be asked for 20Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20Marks each
Unit-4	Mandatory	One Question to be asked for 20Marks
Unit-5	Mandatory	One Question to be asked for 20Marks

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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DEPARTMENT OF CSE

Sem	3rd		
Course Title:	Logic Design		
Course Code:	19CS3PCLOD		
L-T-P:	2-1-0	Total Credits:	3

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	<p>The Basic Gates: Review of Basic Logic gates, Positive and Negative Logic, Introduction to HDL.</p> <p>Combinational Logic Circuits: Sum-of-Products Method, Truth Table to Karnaugh Map, Pairs Quads, and Octets, Karnaugh Simplifications, Don't-care Conditions, Product-of-sums Method, Product-of-sums simplifications, Simplification by Quine-McClusky Method, Hazards and Hazard covers, HDL Implementation Models.</p>	5	<p>Chapter 2-2.1,2.2,2.3,2.4,2.5</p> <p>Chapter 3-</p> <p>3.1,3.2,3.3,3.4,3.5,3.6,3.7,3.8,3.9,3.10,3.11</p>
2	<p>Data-Processing Circuits: Multiplexers, Demultiplexers, 1-of-16 Decoder, BCD to Decimal Decoders, Seven Segment Decoders, Encoders, Exclusive-OR Gates, Parity Generators and Checkers, Magnitude Comparator, Programmable Array Logic, Programmable Logic Arrays, HDL Implementation of Data Processing Circuits.</p>	5	<p>Chapter 4-</p> <p>4.1,4.2,4.3,4.4,4.5,4.6,4.7,4.8,4.9,4.11,4.12,4.14</p>
3	<p>Flip- Flops: RS Flip-Flops, Gated Flip-Flops, Edge-triggered RS FLIP-FLOP, Edge-triggered D FLIP-FLOPs, Edge-triggered JK FLIPFLOPs.</p> <p>Flip- Flops: FLIP-FLOP Timing, JK Master-slave FLIP-FLOP, Switch Contact Bounce Circuits, Various Representation of FLIP-FLOPs, HDL Implementation of FLIP-FLOP.</p> <p>Registers: Types of Registers, Serial In - Serial Out, Serial In - Parallel out, Parallel In -Serial Out, Parallel In - Parallel Out, Universal Shift Register, Applications of Shift Registers, Register implementation in HDL.</p>	6	<p>Chapter 8-</p> <p>8.1,8.2,8.3,8.4,8.5,8.6,8.7,8.8,8.9,8.10,8.13</p> <p>Chapter 9 –</p> <p>9.1,9.2,9.3,9.4,9.5,9.6,9.7,9.8</p>
4	<p>Counters: Asynchronous Counters, Decoding Gates, Synchronous Counters, Changing the Counter Modulus.</p> <p>Counters: Decade Counters, Presettable Counters, Counter Design as a Synthesis problem, A Digital Clock, Counter Design using HDL.</p>	5	<p>Chapter 10-</p> <p>10.1,10.2,10.3,10.4,10.5,10.6,10.7,10.8,10.9</p>



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5	Design of Sequential Circuit: Model Selection, State Transition Diagram, State Synthesis Table, Design Equations and Circuit Diagram, Implementation using Read Only Memory, Algorithmic State Machine, State Reduction Technique, Analysis of Asynchronous Sequential Circuit, Problems with Asynchronous Sequential Circuits, Design of Asynchronous Sequential Circuit	5	Chapter 11- 11.1,11.2,11.3,11.4,11.5,11.6,11.7,11.8,11.9,11.10

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Digital Principles and Applications,	Donald P Leach, Albert Paul Malvino&GoutamSaha	7th Edition	Tata McGraw Hill	2011

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Illustrative Approach to Logic Design,	R D Sudhaker Samuel		Sanguine-Pearson,	2010.
2.	Digital Logic and Computer Design,	M Morris Mano:	10th Edition,	Pearson	2008
3.	Digital Principles & Design	Donald D Givone	1st edition	Tata McGraw Hill	2009.

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Introduction to Logic Design	Alan B. Marcovitz	Third Edition,	McGraw-Hill	2010.	https://zodml.org/sites/default/files/Introduction_to_Logic_Designs_%28Third_Edition%29.pdf
2.	Foundation of Digital Electronics and Logic Design	Subir Kumar Sarkar Asish Kumar De Souvik	-	Panstanford Publishing	2015	http://www.panstanford.com/pdf/9789814364591_fm.pdf



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MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	Digital Circuits and systems	NPTTEL	2019	https://onlinecourses.nptel.ac.in/noc19_cs72
2.	Digital Circuits and Systems	SWAYAM IIT-Madras	2019	https://swayam.gov.in/ndl_noc19_ee51

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply the minimization techniques to digital circuits.
CO2	Ability to analyse functionality of the digital circuits .
CO3	Ability to design efficient combinational and sequential logic circuit implementations from functional description of digital systems.
CO4	Ability to use CAD tools to simulate and verify logic circuits.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														3
CO2		2													3
CO3			3												3
CO4					3										3

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	---	40
QUIZ/AAT	---	-
Lab Component	---	-
Alternate Assessment Tool		10
Total		50

E Tutorial Plan (if applicable)

Tutorial	Unit #	Topic
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#		
1	1	Introduction to HDL, HDL Implementation Models
2	1	Numericals on Simplification by K maps
3	1	Simplification by Quine-McClusky Method
4	2	Data processing circuits
5	2	HDL implementation of Data processing circuits
6	3	Registers
7	3	HDL Implementation of FLIP-FLOP.
8	3	HDL Implementation of Registers.
9	4	Counters
10	4	Counter Design using HDL

Tutorial Evaluation Rubrics: 10 Marks

Sl.No	Criteria	Excellent	Good	Average	Max Score
Data sheet					
A	Problem statement	9-10	6-8	1-5	10
B	Design & specifications	9-10	6-8	1-5	10
C	Expected output	9-10	6-8	1-5	10
Record					
D	Simulation/ Conduction of the experiment	14-15	11-13	1-10	15
E	Analysis of the result.	14-15	11-13	1-10	15
Viva					40
Total					100
Scale down to 10 marks					

F Laboratory Plan : ----

G Alternate Assessment Tool Plan

The students will be asked to design and simulate digital circuit using HDL.

H SEE Exam Question paper format

Unit-1	Internal Choice	Two Questions to be asked for 20Marks each
Unit-2	Mandatory	One Question to be asked for 20Marks
Unit-3	Internal Choice	Two Questions to be asked for 20Marks each
Unit-4	Mandatory	One Question to be asked for 20Marks
Unit-5	Mandatory	One Question to be asked for 20Marks



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Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	25%
Apply / Analyze	50%
Create / Evaluate	25%



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Course Code	19IC3HSCPH / 19IC4HSCPH	Course Name	Constitution of India, Professional Ethics and Human Rights
Credits	01	L-T-P-S	1-0-0-0

Total Hours: 12

Course Objectives:

1. To educate students about the Supreme Law of the Land.
2. To value human dignity and to save the liberties of the people against discriminations.
3. To raise awareness and consciousness of the issues related to the profession and discuss the issue of liability of risks and safety at work place.

UNIT-1

[03 hours]

Introduction to Indian Constitution

Historical Background of the Indian Constitution. Framing of the Indian constitution: Role of the Constituent Assembly - Preamble and Salient features of the Constitution of India, Fundamental Rights and its limitations. Fundamental Duties and their significance. Directive Principles of State Policy: Importance and its relevance. Case Studies

UNIT -2

[02 hours]

Union Executive and State Executive

The Union Executive – The President and The Vice President, The Prime Minister and

The Council of Ministers. The Union Parliament – Lok Sabha & Rajya Sabha.

The Supreme Court of India.

State Executive – The Governors, The Chief Ministers and The Council of Ministers. The State Legislature – Legislative Assembly and Legislative Council. State High Courts.

UNIT -3

[02 hours]

Election Commission of India, Amendments and Emergency Provisions

Election Commission of India – Powers & Functions – Electoral Process in India.

Methods of Constitutional Amendments and their Limitations.

Important Constitutional Amendments – 42nd, 44th, 61st, 74th, 76th, 77th, 86th and 91st.

Emergency Provisions. Case Studies.



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UNIT-4

[02 hours]

Special Constitutional Provisions/ Human Rights

Special Constitutional Provisions for Schedule Castes, Schedule Tribes & Other Backward Classes. Women & Children. Case Studies.

Human Rights/values – Meaning and Definitions, Legislative Specific Themes in Human

Rights and Functions/ Roles of National Human Rights Commission of India. Human Rights

(Amendment Act) 2006.

UNIT-5

[03 hours]

Professional Ethics

Scope and Aims of Engineering Ethics, Responsibilities of Engineers and impediments to

responsibilities. Honesty, Integrity and Reliability; Risks – Safety and Liability in

Engineering. Case Studies.

Course Outcomes:

Students will:

- 1: Understand and explain the significance of Indian Constitution as the Fundamental Law of the Land.
- 2: Analyse the concepts and ideas of Human Rights.
- 3: Apply the practice of ethical responsibilities and duties to protect the welfare and safety of the public.

At the end of the course, the student will have the ability to

CO1	Understand and explain the significance of Indian Constitution as the Fundamental Law of the Land.	Remember
CO2	Analyse the concepts and ideas of Human Rights.	Analyse
CO3	Apply the practice of ethical responsibilities and duties to protect the welfare and safety of the public.	Application

Text Books:

1. “An Introduction to Constitution of India and Professional Ethics” by Merunandan K.B. and B.R. Venkatesh, Meragu Publications, 3rd edition, 2011.
2. “Constitution of India & Professional Ethics & Human Rights” by Phaneesh K. R., Sudha Publications, 10th edition, 2016.

Reference Books:

1. “V.N. Shukla's Constitution of India” by Prof (Dr.) Mahendra Pal Singh (Revised), Eastern Book Company, Edition: 13th Edition, 2017, Reprint 2019.



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2. "Ethics in Engineering" by Martin, W. Mike., Schinzing, Roland., McGraw-Hill Education; 4th edition (February 6, 2004).

E-Book:

1. https://books.google.co.in/books/about/Constitution_of_India_and_Professional_E.html?id=VcvuVt-d88QC
Constitution of India and Professional Ethics, by G.B. Reddy and MohdSuhaib, I.K. International Publishing House Pvt. Ltd., 2006.
2. <http://www.scribd.com/doc/82372282/Indian-Constitution-M-Raja-Ram-2009#scribd>
Indian Constitution, by M. Raja Ram, New Age International Pvt. Limited, 2009.

Course Outcomes and Programme outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						✓						
CO2						✓						
CO3								✓				

Correlation between programme outcome and course outcome:

Programme Outcome	Course Outcome	Blooms Taxonomy
PO6:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. PO8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	CO1 Understand and explain the significance of Indian Constitution as the Fundamental Law of the Land.	Remember
	CO2 Analyse the concepts and ideas of Human Rights.	Analyse
	CO3 Apply the practice of ethical responsibilities and duties to protect the welfare and safety of the public.	Application



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SEE Exam Question paper format

SEE	Online Examination		
Pattern	50 Multiple Choice Questions	Total Marks	50X2=100

CIE format

Type of Assessment	Marks
AAT-1	5 Marks
AAT-2	5 Marks
Test 1,2,3 (Online Test)	20 Marks
Multiple Choice Questions	20 Marks
	20 Marks



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Sem	3rd		
Course Title:	Project Work-1		
Course Code:	19CS3PWPW1		
L-T-P:	0-0-2	Total Credits:	2

A Introduction:

- Website based Application Development - Only Front End: Under this project work, student should develop front end for the websites of any chosen topic. Students can form a group with minimum of two and maximum of four.
- Teacher allotted for project work to students should teach students front end web technologies such as HTML, CSS, Java Script and basics of PHP (Sessions/Cookies Management) during Class/Lab hours as per the allotment.
- Teacher allotted for project work should guide the students in choosing the topic and towards carrying out project work and complete the evaluation of assigned students.
- The evaluation of project work will be based on the rubrics set by the department under the committee of HOD, UG NBA coordinator, One professor, One Associate professor and One Assistant Professor.

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply practical knowledge and latest tools usage along with project development.
CO2	Ability to design and develop a project using web technologies to solve societal problems.
CO3	Ability to report and present the implemented solutions in a team

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3										
CO2	3	3	3	2	3	2		2				1	1	3	2
CO3								2	3	3					

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	---	---
QUIZ	---	---
Lab Component	---	50
Alternate Assessment Tool	----	--
Total		50



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Criteria	Exemplary	Proficient	Partially Proficient	Points
Layout	(10) The Web site has an exceptional design, attractive and usable layout. It is easy to locate all important elements.	(6) The Web pages have an attractive design and usable layout. It is easy to locate all important elements.	(4) The Web pages have a usable design layout, but may appear busy or boring. It is easy to locate most of the important elements.	___ / 10
Navigation	(5) Links for navigation are clearly labeled, consistently placed, allow the reader to easily move from a page to related pages (forward and back), and take the reader where s/he expects to go. A user does not become lost.	(3) Links for navigation are clearly labeled, allow the reader to easily move from a page to related pages (forward and back), and internal links take the reader where s/he expects to go. A user rarely becomes lost.	(2) Links for navigation take the reader where s/he expects to go, but some needed links seem to be missing. A user sometimes gets lost.	___ / 5
Validation of Form fields	(10) Validations have been carried out for all form fields completely in all the webpages.	(6) Most of the validations have been carried out for all form fields completely in all the webpages.	(4) Few of the validations has been carried out for the form fields in the webpages.	___ / 10
Background	(5) Background is exceptionally attractive, consistent across pages, adds to the theme or purpose of the site, and does not detract from readability.	(3) Background is attractive, consistent across pages, adds to the theme or purpose of the site, and does not detract from readability.	(2) Background is consistent across pages and does not detract from readability.	___ / 5
Content Accuracy	(5) All information provided by the student on the Web site is accurate, Legal and all the requirements of the assignment have been met.	(3) Almost all the information provided by the student on the Web site is accurate, legal and most of the requirements of the assignment have been met.	(2) Almost all of the information provided by the student on the Web site is accurate, legal and few of the requirements of the assignment have been met.	___ / 5
Report	(5) Clear and Effective writing and adherence to appropriate style	(3) Writing that is clear and effective for the	(2) Unclear and ineffective writing and multiple errors	___ / 5



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	guidelines	most part and minor errors in adherence to appropriate style guidelines	in adherence to appropriate style guidelines	
Oral communication (presentation)	(5) Clear and effective communication	(3) Communication is clear	(2) Unclear communication	___/5
Participation in Discussions	(5) Provided many good ideas; inspired others; clearly communicated ideas, needs, and feelings.	(3) Participated in discussions; on some occasions, made suggestions.	(2) Listened mainly; Rarely spoke up, and ideas were off the mark.	___/5
Total				___/ 50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Project Topics for Website Development:

Department Lab Stock Book Maintenance System; Department Faculty Weekly Report Submission System; Department Faculty Self-Assessment Report Submission System; Department Faculty Self –Appraisal form Submission System; Department Student Project Submission System; Department Conference Paper Submission System; College TEQIP student project proposal submission system;

College TEQIP Faculty Workshop/Conference/Seminar Application Submission System; College Exam Application Form Submission System

Note: Apart from the above mentioned project topics if student groups come up with any innovative project ideas which are useful for the Department / College academic purpose will be considered based on the approval and acceptance from class teacher.

Sl. No	Week	Activity	Content deliverables by the assigned teacher
1	1 st	Formation of groups. Note: Student groups of size 2 or 3 or 4	Deploying source code in the web server (XAAMP) and server setup.
2	2 nd	Project topic selection by each group	Program to demonstrate HTML document creation: To display static content(s) To handle form(s) elements such as Text Boxes, Check Boxes, Radio buttons etc.,
3	3 rd	Presentation: Student and Project	Program to demonstrate basics of CSS



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		topic introduction by each group	concepts. -Levels of Style sheets -Selector forms -Box Model
4	4 th 5 th and 6 th	Design Layout of the Web Pages	Program to demonstrate basics of Java Script concepts. - A table of the numbers from 5 to 15 and their squares and cubes. - The first 20 Fibonacci numbers. - The words of the input text, in alphabetical order. - The number of names in the given array that end in either "A" or "Y" - The position in the String of the leftmost vowel. - The numbers of negative elements, zeros, and values greater than Zeros in the given array.
5	7 th	Presentation on Front-end Design by each group	Program to demonstrate basics of PHP concepts.
6	8 th and 9 th	Design and Development of connecting among different web pages	Program to demonstrate basics of PHP concepts.
7	10 th	Presentation by each group	
8	11 th	Complete Project Work Demonstration by each group	
9	12 th	Project Report Preparation	

G SEE Exam (50 Marks)

Evaluation of Projects carried out by students from External examiner along with internal faculty.



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Sem	3rd		
Course Title:	Physical Activity (Sports/ Yoga Etc.)		
Course Code:	19CS3NCNC3		
L-T-P:	0-0-0	Total Credits:	ZERO PASS/FAIL

A Introduction

- Student can participate in any of the physical activities such as Sports, Marathon, Yoga conducted by college or any organization.

- Student should produce participation certificate for clearing this mandatory course.

Note: If student is unable to participate in outside physical activities then department Head should take care of conducting Yoga and Meditation of one or two day event in the college.

- Physically challenged students can produce participation certificate of any technical/cultural events conducted by college/department clubs.

B Course Outcomes

CO1	Promoting comprehensive health, safety, and physical fitness by engaging in competitive activities
CO2	Demonstrates personalities of virtuous sportsmanship and teamwork in both competition and practice.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3									
CO2									3						

D Assessment Plan

CATEGORY	MARKS (RANGE)	SPORTS & GAMES
L1	90 (90-100)	- Winning Certificates/ at International/National / Zonal Level Competitions. - Representing State & Zonal level teams.
L2	80 (80-89)	Winning Certificates/ at State University Level Competitions. Representing VTU team.
L3	70 (70-79)	Winning Certificates Inter-Collegiate competitions. Representing college team.
L4	60 (60-69)	Winning Certificates at college level events.



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L5	50 (50-59)	- Winning Certificates at Departmental events. - Coordinators- Blood donations (Volunteers)
L6	40 (40-49)	Participation in Inter-Collegiate /College level events/ Blood donation /NGO/ Personality development Programs

E SEE Exam Question paper

Student should produce participation certificate for clearing this mandatory course.



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DEPARTMENT OF CSE

THIRD SEMESTER B.E COURSE

(Common to All Branches)

Course Title	Additional Mathematics-I	Course Code	19MA3IMMAT
Credits	00	L – T – P	3 – 1 – 0
Contact hours	48 hours (36L+12T)	III semester Lateral Entry students	

Prerequisites: Basic concepts of Trigonometry, Trigonometric formulas, concept of differentiation, concept of integration.

Course Objectives: To provide students with a solid foundation in mathematical fundamentals such as differentiation, differential equations, vectors and orthogonal curvilinear coordinates for different branches of engineering.

UNIT 1

DIFFERENTIAL AND INTEGRAL CALCULUS

[9 Hours]

List of standard derivatives including hyperbolic functions, rules of differentiation. Taylor's and Maclaurin's series expansion for functions of single variable. List of standard integrals, integration by parts. Definite integrals – problems.

(7L+2T)

UNIT 2

POLAR COORDINATES AND PARTIAL DERIVATIVES

[10 Hours]

Polar curves: Polar coordinates, angle between radius vector and tangent, angle between two polar curves. Partial differentiation. Total differentiation-Composite and Implicit functions. Jacobians and their properties (without proof) – Problems.

(7L+3T)

UNIT 3

VECTOR CALCULUS AND ORTHOGONAL CURVILINEAR COORDINATES [10 Hours]

Recapitulation of scalars, vectors and operation on scalars and vectors. Scalar and vector point functions. Del operator, gradient-directional derivative, divergence, curl and Laplacian operator.

Vector identities (without proof). Cylindrical and Spherical polar coordinate systems. Expressing a vector point function in cylindrical and spherical systems. Expressions for gradient, divergence, curl and Laplacian in orthogonal curvilinear coordinates.

(7L+3T)

UNIT 4

FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS

[9 Hours]

Introduction to first order differential equations. Linear equation and its solution. Bernoulli's equation and its solution. Exact differential equation and its solution. Orthogonal Trajectories.

(7L+2T)

UNIT 5

SECOND AND HIGHER ORDER ORDINARY DIFFERENTIAL EQUATIONS [10 Hours]

Ordinary differential equations with constant coefficients: Homogeneous differential equations, non-homogeneous differential equations – Particular integral for functions of the type $f(x) = e^{ax}$, $\sin(ax)$, $\cos(ax)$, x^n , method of variation of parameters, Cauchy's and Legendre linear differential equations.

(8L+2T)



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On completion of the course, students will have the ability to:

Course Code	CO #	COURSE OUTCOME (CO)	PO
19MA3IMMAT	CO 1	Understand the basic concepts of differentiation and integration.	1
	CO 2	Apply the concepts of polar curves and multivariate calculus.	
	CO 3	Apply analytical techniques to compute solutions of first and higher order ordinary differential equations.	
	CO 4	Apply techniques of vector calculus to engineering problems.	
	CO 5	Comprehend the generalization of vector calculus in curvilinear coordinate system.	

Text Book:

1. Higher Engineering Mathematics, B. S. Grewal, 43rd edition, 2014, Khanna Publishers
2. Advanced Engineering Mathematics, 4th edition, 2011, by Dennis G. Zill and Cullen, Jones and Bartlett India Pvt. Ltd.

Reference Book:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Precise Textbook series, Vol. 1 and Vol. 2, 10th edition, 2014, Wiley- India.
2. Higher Engineering Mathematics, B. V. Ramana, 2007, Tata McGraw Hill.

E books and online course materials:

1. Engineering Mathematics, K. A. Stroud, Dexter J. Booth, Industrial Press, 2001
2. http://books.google.co.in/books/about/Engineering_Mathematics.html?id=FZncL-xB8dEC&redir_esc=y.
3. Advanced Engineering Mathematics, P. V. O'Neil, 5th Indian reprint, 2009, Cengage learning India Pvt. Ltd.
4. <http://ocw.mit.edu/courses/mathematics/> (online course material)

Online Courses:

1. [https:// www.khanacademy.org/Math](https://www.khanacademy.org/Math)
2. [https:// www.class-central.com/subject/math](https://www.class-central.com/subject/math) (MOOCS)



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FOURTH SEMESTER B.E COURSE - (CSE/ISE)

Course Title	Linear Algebra	Course Code	19MA4BSLIA
Credits	04	L – T – P	3 – 1 – 0
Contact hours	48 hours (36L+12T)	CS/IS Cluster	

Prerequisites: Vector Algebra, Matrix computations, Calculus, Geometry, Group Theory.

Course Objectives: To provide the students with a foundation of concepts in linear algebra that is essential to engineers of computer and information science.

UNIT-1

SYSTEM OF LINEAR EQUATIONS AND VECTOR SPACES

[11 hours]

Elementary row operations, echelon forms, rank of matrix.

System of Linear Equations: solution of homogeneous equations, consistency of non-homogeneous system of linear equations. Gauss elimination method, LU decomposition method.

Vector spaces: Subspaces, Linear Combinations, Linear Spans, row space and column space of a Matrix, Linear Dependence and Independence, Basis and Dimension, Coordinates.

(9L+2T)

UNIT-2

LINEAR TRANSFORMATIONS

[9 hours]

Introduction, Linear Mappings, Geometric linear transformation of \mathbb{R}^2 , Kernel and Image of a linear transformations, Matrix representation of linear transformations, Rank-Nullity Theorem(No proof), Singular and Nonsingular linear transformations, Invertible linear transformations.

(7L+2T)

UNIT-3

EIGENVALUES AND EIGENVECTORS

[10 hours]

Introduction, Polynomials of Matrices, Characteristic polynomial, Cayley-Hamilton Theorem, eigenvalues and eigenvectors, eigen spaces of a linear transformation, Diagonalization, Minimal Polynomial, Characteristic and Minimal Polynomials of Block Matrices, Jordan Canonical form, Solving differential equations in Fundamental form.

(7L+3T)

UNIT-4

INNER PRODUCT SPACES

[10 hours]

Inner product, inner product spaces, length and orthogonality, orthogonal sets and Bases, projections, Gram-Schmidt process, QR-factorization, least squares problem and least square error.

(7L+3T)

UNIT-5

SYMMETRIC MATRICES AND QUADRATIC FORMS

[8 hours]

Diagonalization of real symmetric matrices, Orthogonal diagonalization of real symmetric matrices, quadratic forms and its classifications, Singular value decomposition.

(6L+2T)



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On completion of the course, student will have the ability to:

Course Code	CO #	Course Outcome (CO)	PO
19MA4BSLIA	CO 1	Apply the concepts of Matrices to linear systems and Vectors spaces.	1
	CO 2	Relate the concepts of Eigen values, Eigen vectors & functions to linear algebra.	
	CO 3	Apply the concepts of inner products to matrix decomposition.	

Text Books:

1. Linear Algebra and its applications, David C. lay, Steven R. lay, Judi J Mc. Donald, 5th Edition, 2015, Pearson Education.
2. Linear Algebra and its applications, Gilbert Strang, 4th edition, 2005, Brooks Cole.

Reference Books:

1. Schaum's outline series-Theory and problems of linear algebra, Seymour Lipschutz, 5th edition, 2012, McGraw-Hill Education.
2. Linear Algebra an Introduction, Richard Bronson & Gabriel B. Costa, 2nd edition.

E books and online course materials:

1. <https://ocw.mit.edu/courses/mathematics/18-06sc-linear-algebra-fall-2011/index.htm>
2. <https://www.math.ucdavis.edu/~linear/linear.pdf>

Online Courses and Video Lectures:

1. <https://www.coursera.org/learn/linear-algebra-machine-learning>
2. <https://nptel.ac.in/syllabus/111106051/>

Question Paper Pattern:

1. Five full questions to be answered.
2. To set one question each in Units 2, 4, 5 and two questions each in Unit 1 and Unit 3.



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Sem	4 th		
Course Title:	Theoretical Foundations of Computations		
Course Code:	19CS4PCTFC		
L-T-P:	3-1-0-0	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction to Finite Automata Introduction to Finite Automata, Central Concepts of Automata Theory, Deterministic Finite Automata (DFA), Nondeterministic Finite Automata (NFA), Finite Automata with Epsilon Transition, An Application Text Search.	8	1 Chapter 1 – 1.1.1,1.5 Chapter 2- 2.2,2.3,2.4,2.5
2	Regular Expressions and Languages Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Proving Languages Not to Be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata	8	1 Chapter 3 – 3.1,3.2,3.3 Chapter 4- 4.1,4.2,4.4
3	Context Free Grammars and Languages Parse Trees Applications of Context Free Grammars, Applications of Context Free Grammars, Ambiguity in Grammars and Languages, Eliminating Useless Symbols, Computing the Generating and Reachable Symbols, Eliminating Epsilon Productions, Eliminating Unit Productions, Chomsky Normal Form	8	1 Chapter 5 – 5.1,5.2,5.3,5.4 Chapter 7- 7.1.1 – 7.1.5
4	Pushdown Automata Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDA's and CFG's , Deterministic Pushdown Automata, The Pumping Lemma for Context Free Languages, Closure Properties of Context Free Languages	8	1 Chapter 6 – 6.1,6.2,6.3,6.4 Chapter 7- 7.2,7.3
5	Problems That Computers Cannot Solve , The Turing Machine, Programming Techniques for Turing Machines, Extensions to the Basic Turing	7	1 Chapter 8 – 8.1,8.2,8.3,8.4,8.5,8.6



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Machine, Restricted Turing Machines, Turing Machines and Computers, Definition of Post's Correspondence Problem, A Language That Is Not Recursively Enumerable, An Undecidable Problem That is RE		Chapter 9- 9.1,9.2,9.4.1,9.5
Other Undecidable Problems		

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to Automata Theory, Languages and Computation	John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman: education	3rd Edition	Pearson	2007

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to Languages and Automata Theory	John C Martin	3 rd Ed, Tata	Tata McGraw-Hill	2007
2.	An Introduction to formal Languages and Automata	Peter Linz	Narosa publishing house	II edition	1997
3.	Introduction to Computer Theory	Daniel I.A. Cohen	John Willy & Sons	Inc, 2 nd Edition	2000

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Introduction to Theory of Computation	Anil Maheshwari, Michiel smid		Carleton University	2019	https://cglab.ca/~michiel/TheoryOfComputation/TheoryOfComputation.pdf

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL



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1.	www.coursera.org/	Coursera	2019	https://www.coursera.org/courses?query=theory%20of%20computation
2.	www.nptel.ac.in	IIT B	2019	nptel.ac.in/courses/106104028/theory of computation.
3.	https://lagunita.stanford.edu/courses	Stanford University	Self – paced 2019	https://lagunita.stanford.edu/courses/course-v1:ComputerScience+Automata+SelfPaced/about

B Course Outcomes

At the end of the course the student will be able to

CO1	Able to Apply the knowledge of Automata Theory, Grammars & Regular Expressions for solving the Problem.
CO2	Ability to analyse the given Automata, Regular Expression & Grammar to know the Language it represents.
CO3	Design Automata & Grammar for pattern recognition and syntax checking.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3													2	
CO2		2												2	
CO3			2											2	

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	----	40
QUIZ/AAT	---	10
Lab Component	---	---
Total		50

E Tutorial Plan (if applicable)

Tutorial #	Unit #	Topic
1	I	Problems on DFA Book 1, Chapter 2. Exercise 2.2.1, 2.2.6, 2.2.7,
2	I	Problems on NFA Book 1, Chapter 2. Exercise 2.3.1, 2.3.2, 2.3.3, 2.4.1
3	I	Problems on conversion of NFA to DFA



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		Book 1, Chapter 2. Exercise 2.5.1,2.5.2,2.5.3
4	I	Real-life examples for DFA and NFA Book 1, Chapter 2. Exercise 2.2.10 Design a Vending Machines, Video Games, Traffic lights
5	II	Problems on regular expressions Book 1, Chapter 3. Exercise 3.1.1, 3.1.2,3.1.3
6	II	Problems on regular expressions Book 1, Chapter 3. Exercise 3.1.4, 3.1.5,3.1.3,3.2.1,3.2.3
7	III	Problems on Grammar and Minimization Book 1, Chapter 4. Exercise 4.2.1, 4.4.1,4.4.2
8	III	Problems on CFG Book 1, Chapter 5. Exercise 5.1.1,5.1.2,5.4.5,5.4.7
9	IV	Problems on PDA Book 1, Chapter 6. Exercise 6.2.1,6.2.2,6.2.3
10	IV	Problems on conversion of CGF to PDA and vice versa Book 1, Chapter 6. Exercise 6.3.1,6.3.2,6.3.3 Book 1, Chapter 7. Problem 7.4,7.8
11	V	Problems on Turing machine Book 1, Chapter 8. Exercise 8.2.1, 8.2.2 8.2.3
12	V	Book 1, Chapter 8. Exercise 8.4.9, 8.4.10

F Laboratory Plan (if applicable)

G Alternate Assessment Tool Plan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks



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Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Sem	4th		
Course Title:	Database Management Systems		
Course Code:	19CS4PCDBM		
L-T-P:	3-0-1	L-T-P:	3-0-1

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	<p>Introduction to Databases: Introduction, An Example, Characteristics of Database approach, Advantages of using DBMS approach, When not to use a DBMS</p> <p>Database System Concepts and Architecture: Data models, Schemas and instances, Three schema architecture and data independence Database languages and interfaces, The database system environment,</p> <p>SQL: SQL Data Definition and Data Types specifying basic constraints in SQL, Basic retrieval queries in SQL, Insert, Delete and Update statements in SQL, Additional features of SQL ,More complex SQL Queries, Specifying Constraints as Assertions and Triggers, Views (Virtual Tables) in SQL,Schema Change Statement in SQL.</p>	7	1.1, 1.2, 1.3, 1.6, 1.8,2.1, 2.2, 2.3, 2.4, 4.1, 4.2, 4.3, 4.4, 4.5, 5.1, 5.2, 5.3, 5.4
2	<p>Data Modelling using the Entity-Relationship(ER) model: Using High-Level conceptual Data Models for Database Design, A sample 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, Relational Database Design using ER-to-Relational Mapping.</p>	8	7.1, 7.2,7.3,7.4,7.5,7.6,7.7,7.9, 9.1
3	<p>Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and</p> <p>Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations.</p> <p>Relational Algebra: Unary Relational Operations, SELECT and PROJECT, Relational Algebra Operations from Set Theory</p> <p>Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra.</p>	8	3.1,3.2,3.3, 6.1, 6.2,6.3,6.4,6.5
4	<p>Database Design Theory and Normalization: Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys,</p>	8	15.1,15.2,15.3,15.4,15.5,15.6,



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	General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multi-valued Dependencies and a Fourth Normal Form, Join Dependencies, Fifth Normal Form.		15.7
5	Transaction Processing, Concurrency Control, and Recovery: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability, Two-Phase Locking Techniques for Concurrency Control, Recovery Concepts ,NO-UNDO/REDO Recovery Techniques based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm.	8	21.1,21.2,21.3,21.4,21.5, 22.1, 23.1,23.2,23.3,23.4,23.5

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Fundamental of Database Systems	Ramez Elmasri and Shamkant B Navathe	Sixth Edition	Pearson	2017
2.	Database Management Systems	Ramakrishnan and Gehrke	3 rd Edition	McGraw Hill	2014

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	An Introduction to Database Systems	C.J. Date, A.Kannan, S.Swamynathan	8 th Edition	Pearson Education	2006
2.	Database Systems: The Complete Book	Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer Widom	Second Edition	Pearson Education	2001
3.	Database System Concepts	Abraham Silberschatz, HenryF. Korth, S. Sudarshan	Sixth Edition	Tata McGraw-Hill	2010

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
.						



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1.	An Introduction to Relational Database Theory	Hugh Darwen	3 rd Edition	Ventus Publishing ApS	2012	https://zodml.org/sites/default/files/An_Introduction_to_Relational_Database_Theory_0.pdf
2.	Database Systems: Design, Implementation, and Management, Eighth Edition	Peter Rob and Carlos Coronel	8 th Edition		2009	http://m5zn.com/newuploads/2015/04/27/pdf/b38963a5c2824b9.pdf

MOOC Course

Sl. No	Course name	Course Offered By	Year	URL
1.	Data Base Management System	NPTEL	2019	https://onlinecourses.nptel.ac.in/noc19_cs12/preview
2.	Data Base Management System	SWAYAM	2017	https://swayam.gov.in/course/220-database-management-system
3.	SQL tutorial	W3 schools	--	www.w3schools.com/sql/

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply the concepts of database management system for various applications.
CO2	Ability to analyse the given database concepts to its correctness.
CO3	Ability to design and demonstrate conceptual models, query and optimization.
CO4	Ability to conduct experiments to demonstrate the various SQL query processing.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												1		
CO2		3												2	
CO3			3											3	
CO4			3		3									2	

D Assessment Plan (for 50 marks of CIE)



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Tool	Remarks	Marks
Internals	Average of two	20
QUIZ	ONE	5
Lab Component	Lab Test	25
Alternate Assessment Tool	---	
Total		50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Instructions to Students to be followed in each DBMS lab:

1. Each Student should write down the work carried out and the outputs in the observation book and get it evaluated by the respective lab faculty in-charge.
2. Each Student should bring the lab record with the programs and output written for the programs completed in their respective previous week and get it evaluated by the lab faculty in-charge.

Writing SQL Queries using Oracle for the following database systems

Experiment #	Name of Experiment
1	Insurance Database
2	Banking Enterprise Database
3	Supplier Database
4	Student Faculty Database
5	Airline Flight Database
6	Order Processing Database
7	Book dealer Database
8	Student Enrolment Database
9	Movie Database
10	College Database

PROGRAM 1: INSURANCE DATABASE

1. 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, date: date, location: String)

OWNS (driver-id #: String, Regno: String)



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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) Enter at least five tuples for each relation.
- iii) Demonstrate how you
 - a. Update the damage amount for the car with a specific Regno in the accident with report number 12 to 25000.
 - b. Add a new accident to the database.
- iv) Find the total number of people who owned cars that involved in accidents in 2008.
- v) Find the number of accidents in which cars belonging to a specific model were involved.

PROGRAM 2. BANKING ENTERPRISE DATABASE

Consider the following database for a banking enterprise.

BRANCH (branch-name: String, branch-city: String, assets: real)

ACCOUNTS (accno: int, branch-name: String, balance: real)

DEPOSITOR (customer-name: String, customer-street: String,
customer-city: 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) Enter at least five tuples for each relation.
- iii) Find all the customers who have at least two accounts at the Main branch.
- iv) Find all the customers who have an account at all the branches located in a specific city.
- v) Demonstrate how you delete all account tuples at every branch located in a specific city.

PROGRAM 3. SUPPLIER DATABASE

Consider the following schema:

SUPPLIERS (sid: integer, sname: string, address: string)

PARTS (pid: integer, pname: string, color: string)

CATALOG (sid: integer, pid: integer, cost: real)

The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in SQL:

- i) Find the pnames of parts for which there is some supplier.
- ii) Find the snames of suppliers who supply every part.
- iii) Find the snames of suppliers who supply every red part.
- iv) Find the pnames of parts supplied by Acme Widget Suppliers and by no one else.
- v) Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part).
- vi) For each part, find the sname of the supplier who charges the most for that part.



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vii) Find the sides of suppliers who supply only red parts.

PROGRAM 4. STUDENT FACULTY DATABASE

Consider the following database for student enrollment for course :

STUDENT (snum: integer, sname: string, major: string, level: string, age: integer)

CLASS (name: string, meets at: time, room: string, fid: integer)

ENROLLED (snum: integer, cname: string)

FACULTY (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

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
- ii. Find the names of all classes that either meet in room R128 or have five or more Students enrolled.
- iii. Find the names of all students who are enrolled in two classes that meet at the same time.
- iv. Find the names of faculty members who teach in every room in which some class is taught.
- v. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.
- vi. Find the names of students who are not enrolled in any class.
- vii. For each age value that appears in Students, find the level value that appears most often. For example, if there are more FR level students aged 18 than SR, JR, or SO students aged 18, you should print the pair (18, FR).

PROGRAM 5. AIRLINE FLIGHT DATABASE

Consider the following database that keeps track of airline flight information:

FLIGHTS (flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: integer)

AIRCRAFT (aid: integer, aname: string, cruisingrange: integer)

CERTIFIED (eid: integer, aid: integer)

EMPLOYEE (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; Every pilot is certified for some aircraft, and only pilots are certified to fly.

Write each of the following queries in SQL.

- i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.
- ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of the aircraft for which she or he is certified.
- iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.



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- iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
- v. Find the names of pilots certified for some Boeing aircraft.
- vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.
- vii. A customer wants to travel from Madison to New York with no more than two changes of flight. List the choice of departure times from Madison if the customer wants to arrive in New York by 6 p.m.
- viii. Print the name and salary of every non-pilot whose salary is more than the average salary for pilots.

PROGRAM 6. ORDER PROCESSING DATABASE

Consider the following relations for an Order Processing database application in a company.

CUSTOMER (CUST #: int, cname: String, city: String)

ORDER (order #: int, odate: date, cust #: int, ord-Amt: int)

ITEM (item #: int, unit-price: int)

ORDER-ITEM (order #: int, item #: int, qty: int)

WAREHOUSE (warehouse #: int, city: String)

SHIPMENT (order #: int, warehouse #: int, ship-date: date)

- i) Create the above tables by properly specifying the primary keys and the foreign keys and the foreign keys.
- ii) Enter at least five tuples for each relation.
- iii) Produce a listing: CUSTNAME, #oforders, AVG_ORDER_AMT, where the middle column is the total numbers of orders by the customer and the last column is the average order amount for that customer.
- iv) List the order# for orders that were shipped from all warehouses that the company has in a specific city.
- v) Demonstrate how you delete item# 10 from the ITEM table and make that field null in the ORDER_ITEM table.

PROGRAM 7. BOOK DEALER DATABASE

The following tables are maintained by a book dealer:

AUTHOR(author-id: int, name: String, city: String, country: String)

PUBLISHER(publisher-id: int, name: String, city: String, country: String)

CATALOG(book-id: int, title: String, author-id: int, publisher-id: int, category-id: int, year: int, price: int)

CATEGORY(category-id: int, description: String)

ORDER-DETAILS(order-no: int, book-id: int, quantity: int)

- i) Create the above tables by properly specifying the primary keys and the foreign keys.
- ii) Enter at least five tuples for each relation.



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- iii) Give the details of the authors who have 2 or more books in the catalog and the price of the books in the catalog and the year of publication is after 2000.
- iv) Find the author of the book which has maximum sales.
- v) Demonstrate how you increase the price of books published by a specific publisher by 10%.

PROGRAM 8. STUDENT ENROLLMENT DATABASE

Consider the following database of student enrollment in courses and books adopted for each course.

STUDENT (regno: String, name: String, major: String, bdate: date)

COURSE (course #: int, cname: String, dept: String)

ENROLL (regno: String, cname: String, 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) Enter at least five tuples for each relation.
- iii) Demonstrate how you add a new text book to the database and make this book be adopted by some department.
- iv) Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for courses offered by the 'CS' department that use more than two books.
- v) List any department that has all its adopted books published by a specific publisher.

PROGRAM 9: MOVIE DATABASE

Consider the schema for Movie Database: ACTOR(Act_id, Act_Name, Act_Gender) DIRECTOR(Dir_id, Dir_Name, Dir_Phone) MOVIES(Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id) MOVIE_CAST(Act_id, Mov_id, Role) RATING(Mov_id, Rev_Stars)

Write SQL queries to

1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
5. Update rating of all movies directed by 'Steven Spielberg' to 5.

PROGRAM 10: COLLEGE DATABASE

Consider the schema for College Database:

STUDENT(USN, SName, Address, Phone, Gender)

SEMSEC(SSID, Sem, Sec)

CLASS(USN, SSID)

SUBJECT(Subcode, Title, Sem, Credits)

IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)

Write SQL queries to

1. List all the student details studying in fourth semester 'C' section.
2. Compute the total number of male and female students in each semester and in each section.



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3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
5. Categorize students based on the following criterion:
 If FinalIA = 17 to 20 then CAT = 'Outstanding'
 If FinalIA = 12 to 16 then CAT = 'Average'
 If FinalIA < 12 then CAT = 'Weak'
 Give these details only for 8th semester A, B, and C section students.

G Alternate Assessment Tool Plan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Sem	4th		
Course Title:	Analysis and Design of Algorithms		
Course Code:	19CS4PCADA		
L-T-P:	3-0-1	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction: What is an Algorithm? Fundamentals of Algorithmic Problem Solving, Fundamentals of the Analysis of Algorithm Efficiency : The Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Nonrecursive Algorithm, Mathematical Analysis of Recursive Algorithms.	7	Text Book 1 Chapter 1:1.1, 1.2, Chapter 2-2.1,2.2,2.3,2.4
2	Brute Force and Exhaustive Search: Selection Sort and Bubble Sort, Sequential Search and Brute-Force String Matching, Exhaustive Search, Depth-First Search and Breadth-First Search Decrease-and-Conquer: Insertion Sort , Topological Sorting, Algorithms for Generating Combinatorial Objects, Decrease-by-a-Constant-Factor Algorithms: Binary Search, Variable-Size-Decrease Algorithms: Computing Median and the Selection Problem	8	Text Book 1 Chapter 3-3.1,3.2, 3.4,3.5, Chapter 4-4.1,4.2,4.3,4.4, 4.5
3	Divide-and-Conquer: Mergesort, Quicksort, Multiplication of Large Integers and Strassen's Matrix Multiplication Transform-and-Conquer: Presorting, Heaps and Heapsort, Horner's Rule	8	Text Book 1 Chapter 5-5.1,5.2,5.4, Chapter 6- 6.1,6.4,6.5
4	Dynamic Programming: Three Basic Examples, The Knapsack Problem[Without Memory Functions], Warshall's and Floyd's Algorithms Greedy Technique: Prim's Algorithm, Kruskal's Algorithm[Without disjoint subsets and Union Find algorithms], Dijkstra's Algorithm	8	Text Book 1 Caper 8-8.1,8.2,8.4, Chapter 9-9.1,9.2,9.3
5	Coping with the Limitations of Algorithm Power: Backtracking: n -Queens Problem, Subset-Sum Problem, Branch-and-Bound : Knapsack Problem, Traveling Salesman Problem NP-Completeness: Polynomial time, Polynomial-time	8	Text Book 1 Chapter 12:12.1,12.2



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verification, NP-completeness and reducibility, NP-Complete Problems: The clique problem, The vertex cover problem, Approximation Algorithms: The vertex-cover problem		Text Book 2 Chapter 34: 34.1,34.2,34.3, 34.5- 34.5.1, 34.5.2, 35:35.1
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Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to the Design and Analysis of Algorithms	Anany Levitin	Third Edition	Pearson	2011
2.	Introduction to Algorithms	Thomas H Cormen , Charles E Leiserson, Ronald L Rivest, Clifford Stein	Third Edition	The MIT Press	2009

Reference Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Fundamentals of Computer Algorithms	Ellis Horowitz, Satraj Sahni and Rajasekharam	2nd Edition	University Press Pvt. Ltd,	2009
2.	Analysis and design of Algorithms	Padma Reddy,		Sri Nandi Publications	2009

E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Introduction to Design & Analysis of	K. RaghavaRao		Smashwords	2013	https://www.smashwords.com/



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	Algorithms					books/view/365630
2.	Data structures and Algorithm Analysis in C++	Allen Weiss	Fourth edition	Pearson education	2014	http://iips.icci.edu.iq/images/exam/DataStructuresAndAlgorithmAnalysisInCpp_2014.pdf

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	Algorithms-design-and-analysis-part-1-coursera	<u>Coursera</u>	2016	https://www.mooc-list.com/course/algorithms-design-and-analysis-part-1-coursera
2.	Design and Analysis of Algorithms	NPTEL	2015	https://onlinecourses.nptel.ac.in/noc15_cs02/preview

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to analyze time complexity of Recursive and Non-recursive algorithms using asymptotic notations.
CO2	Ability to design efficient algorithms using various design techniques.
CO3	Ability to apply the knowledge of complexity classes P, NP, and NP-Complete and prove certain problems are NP-Complete
CO4	Ability to conduct practical experiments to solve problems using an appropriate designing method and find time efficiency.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3													
CO2			3												3
CO3	1														
CO4				3											

D Assessment Plan (for 50 marks of CIE)



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Tool	Remarks	Marks
Internals	TWO	20
QUIZ/AAT	ONE	5
Lab Component	Two Lab Tests	25
Total		50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Instructions- a) Lab faculty should discuss the topics from Text Book 1(Introduction to the Design and

Analysis of Algorithms- Anany Levitin- Third Edition) -2.6-Empirical Analysis of Algorithm and
2.7- Algorithm Visualization

b) Design, develop and implement the specified algorithms for the following problems using C

Language in LINUX / Windows environment. But preferably on LINUX environment.

c) For sorting and searching problems the program should allow both manual entry of the array
elements and also reading of array elements using random number generator.

Plot a graph of the time taken versus N using MS Excel and paste the same in the record.

d)Lab Record - Handwrite the Algorithm, Program and the output

Lab Program	Unit #	Program Details
1	1	Write a recursive program to a. Solve Towers-of-Hanoi problem b. To find GCD
2	2	Implement Recursive Binary search and Linear search and determine the time required to search an element. Repeat the experiment for different values of N and plot a graph of the time taken versus N.
3	2	Sort a given set of N integer elements using Selection Sort technique and compute its time taken. Run the program for different values of N and record the time taken to sort.
4	2	Write program to do the following: a. Print all the nodes reachable from a given starting node in a digraph using BFS method. b. Check whether a given graph is connected or not using DFS method.
5	2	Sort a given set of N integer elements using Insertion Sort technique and compute its time taken.
6	2	Write program to obtain the Topological ordering of vertices in a given digraph.
7	2	Implement Johnson Trotter algorithm to generate permutations
8	3	Sort a given set of N integer elements using Merge Sort technique and compute its time taken. Run the program for different values of N and record the time taken to sort.
9	3	Sort a given set of N integer elements using Quick Sort technique and compute its time taken
10	3	Sort a given set of N integer elements using Heap Sort technique and compute its time taken.
11	4	Implement Warshall's algorithm using dynamic programming.



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12	4	Implement 0/1 Knapsack problem using dynamic programming.
13	4	Implement All Pair Shortest paths problem using Floyd's algorithm .
14	4	Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm .
15	4	Find Minimum Cost Spanning Tree of a given undirected graph using Kruskals algorithm .
16	4	From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm .
17	5	Implement "Sum of Subsets" using Backtracking. "Sum of Subsets" problem: Find a subset of a given $\{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d . For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and suitable message is to be displayed if the given problem instance doesn't have a solution.
18	5	Implement "N-Queens Problem" using Backtracking.

G Alternate Assessment Tool Plan (if applicable)

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20Marks
Unit-2	Internal Choice	Two Questions to be asked for 20Marks each
Unit-3	Mandatory	One Question to be asked for 20Marks
Unit-4	Internal Choice	One Question to be asked for 20Marks
Unit-5	Mandatory	Two Questions to be asked for 20Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Sem	4 th		
Course Title:	Operating Systems		
Course Code:	19CS4PCOPS		
L-T-P:	3-1-0	Total Credits:	4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction: What Operating Systems Do?, Computer System Architecture, Operating System Structure, Operating System Operations System Structures: User Operating system interface, system Calls, Types of System calls, System programs, Operating System Structure, System boot. Process Concept: Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication.	7	Book 1 : 1.1,1.3-1.5 Book 1 : 2.2-2.5,2.7,2.10 Book 1 : 3.1-3.4
2	Multithreaded Programming: Overview, Multi-core Programming, Multithreading Models, Implicit Threading, Threading Issues. Process Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms. Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling.	8	1: 4.1-4.3,4.5-4.6 1: 5.1-5.6
3	Synchronization: Background, Critical Section Problem, Mutex locks, Semaphores, Classic Problems of Synchronization Deadlocks: System Model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock Detection and Recovery from deadlock.	8	1:6.1,6.2,6.5-6.7 1:7.1-7.7
4	Memory management strategies : Background, Swapping, Contiguous Memory Allocation, Segmentation , Paging, Structure of Page Table Virtual Memory Management: Background, Demand paging, Copy on write, Page replacement algorithms, Allocation of frames, Thrashing.	8	1:8.1-8.6 1:9.1-9.6
5	Implementing File-system: File-System Structure, File-System Implementation, Directory Implementation, Allocation methods, Free-space management. Mass-storage structure: Disk Structure, Disk Attachment, Disk Scheduling. System Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix.	8	1:11.1-11.5 1:12.1-12.4 1:14.1-14.5

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Operating System Concepts	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne	9th Edition	John Wiley & Sons, Inc.	2012.

Reference Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Modern Operating System3	Andrew S. Tanenbaum	3rd Edition	Prentice Hall	2007
2.	Operating System:	William	8th Edition	Prentice Hall	2014



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	Internals and Design Principles	Stallings			
3.	Schaum's Outline of Operating Systems (Schaum's Outline Series)	J. Archer Harris	Kindle Edition	McGraw-Hill	2001

E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Operating Systems Guide	Tim Bower	-	Kansas State Polytechnic	2009	http://faculty.salina.k-state.edu/tim/oss/
2.	Operating Systems Course Notes	Dr. John T. Bell	-	University of Illinois Chicago	2006 & 2013	https://www.cs.uiuc.edu/~jbell/Courses/OperatingSystems/index.html
3.	Schaum's Outline of Operating Systems (Schaum's Outline Series)	J. Archer Harris.	[Kindle Edition]		2002	http://www.naturli.org/grow.com/schaum-s-outline-of-operating-systems.pdf

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	Introduction to operating system	Course era		www.coursera.org/lecture/technical-support-fundamentals/module-introduction-I3n9l
2.	Introduction to operating system	IIT, Madras	2017	https://onlinecourses.nptel.ac.in/noc17_cs29/preview
3.	Introduction to operating system	Udacity Georgia Tech		in.udacity.com/course/introduction-to-operating-systems--ud923

B Course Outcomes



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At the end of the course the student will be able to

CO1	Ability to Apply Various Process Scheduling Algorithms, Disk Scheduling algorithms, Page replacement algorithms and Deadlock detection and avoidance techniques for providing Operating System functionalities
CO2	Ability to Analyse various process management concepts (including scheduling, synchronization and deadlocks), Memory Management strategies and Design considerations of file system.
CO3	Ability to Demonstrate the Basic Concepts of Operating System.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		3													
CO3			2						1	1					

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	2	40
QUIZ	1	5
Lab Component	--	--
Alternate Assessment Tool	1	5
Total		50

E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

G Alternate Assessment Tool Plan (if applicable)

Demonstrate the basic concepts of Operating system like Scheduling, Synchronization, Deadlock, Page replacement and Disk Scheduling algorithms using any Programming Language and present the same along with the report.

H SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20Marks
Unit-2	Mandatory	One Question to be asked for 20Marks
Unit-3	Mandatory	One Question to be asked for 20Marks
Unit-4	Internal Choice	Two Questions to be asked for 20Marks each
Unit-5	Internal Choice	Two Questions to be asked for 20Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%



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Course	Environmental studies	Course Code	19HS4PCEVS	SEE Duration	3 hours
Credits	02	L:T:P	2: 0 : 0	SEE+ CIE marks	50+50

COURSE OBJECTIVE:

1. To acquire the knowledge of environmental studies, it's need & importance
2. To understand the concept, structure and function of different ecosystems
3. To know about pollution problems and green technology
4. To develop a sense of responsibility about the role of students in fostering the idea of learning to live in harmony with nature.
5. To aware the studies about current conditions of environment
6. To give an opportunity to the student to experience the interdisciplinary nature of the environmental studies
7. To create interest in students about the environment through a project work
8. To encourage student to prevent the environmental degradation

COURSE OUTCOME:

CO1:	Understand the components and impacts of human activities on environment.
CO2:	Apply the environmental concepts for conservation and protection of natural resources.
CO3:	Identify and establish relationship between social, economical and ethical values from environmental perspectives.

Unit – I : Introduction to Environment:

Definition about Earth, atmosphere, hydrosphere, lithosphere and biosphere.

Structure of Atmosphere : Troposphere, Stratosphere, Mesosphere, Ionosphere, Exosphere.

Internal structure of the Earth: Crust, Mantle, Core.

Ecosystem, types of Ecosystem: Land, Forest, Water, Desert, Marine.

Effects of Human activities on Environment: Agriculture, Housing, Industries, Mining and Transportation.

06 Hrs

Unit-II: Natural Resources:

Water resources: availability, use and consequences of over utilisation, water conflicts.

Case studies

Mineral resources: Definition, types, environmental impact of mining

Forest resources: Uses, effects of deforestation, remedial measures



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Energy resources: renewable and non-renewable, growing needs, types of energy resources: hydroelectric, wind power, fossil, solar, nuclear and bio gas.

Hydrogen as an alternate future source of energy

06 Hrs

Unit-III: Environmental pollution

Introduction, causes, effects and control measures.

Water pollution, land pollution, noise pollution, air pollution and marine pollution-case studies.

Environmental management: Solid waste, hazardous waste, e-waste, bio medical waste

06 Hrs

Unit-IV: Social issues and Environment

Population growth.

Climatic changes: Global warming, acid rain, ozone layer depletion.

Water conservation: rain water harvesting and ground water recharging.

Disaster management: floods, earthquakes, landslides-case studies

Environmental Protection Acts: Air, Water, land and Noise (Prevention and Control of pollution), Forest conservation, Wildlife protection.

04 Hrs

TEXT BOOKS:

1. Environmental studies by - Dr. Geethabalakrishanan (Revised Edition)
2. Ecology by - Subramanyam (Tata McGraw Hill Publication)
3. Environmental studies by - Dr. J.P.Sharma (Third edition)
4. Environmental studies by - SmritiSrivastav

REFERENCES:

1. Environmental studies by - Benny Joseph
2. Environmental studies by - Dr. D.L.Manunath

LEARNING RESOURCES:

1. NPTEL (Open Sources / power point and visuals)
2. Ecological studies / IITR / Open Sources
3. Ministry of Environment and forest & wildlife.

MOOC's: MOOCS – <https://www.coursera.org/course/sustain>

SEE PAPER PATTERN:

Sub: Environmental Studies (19HS4PCEVS)

SEE Question paper consist of two parts, Part –A consists of 40 MCQ'S, one mark each. Whereas Part –B consist of 5 main questions of 20 marks each.

Student should answer Part – A compulsory and any three full questions from Part-B, covering all units.

MAPPING SCALE 1 TO 3

COURSE : EVSCODE: 19 HS4PCEVS															
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO1	PSO2	PSO3



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	1	2	3	4	5	6	7	8	9	0	1	2			
CO1	1			-											
CO2				-	1										-
CO3		1	-		-	-	-	-			-				

	COURSE : EVS			CODE : 19 HS4ICEVS	
Taxonomy Levels and COs	Remember/ understand	Apply	Analyze	Design	Create or any other
CO1	✓	-	-		
CO2		✓			
CO3		✓			

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Sem	4th		
Course Title:	Project Work-2		
Course Code:	19CS4PWPW2		
L-T-P:	0-0-2	Total Credits:	2

A Introduction

- Database Application Development - Under this project work, student should develop back end data base table for any chosen data base applications. It can be extension of 3rd sem project with back end connection.
- Front end can be either Visual basic or C# or Java framework. Tables developed should be more than six database table. Students can form a group with minimum of two and maximum of four.
- Teacher allotted for project work to students should teach students back end technologies like Oracle and front end technologies like Visual during Lab hours as per the allotment.
- Teacher allotted for project work should guide the students in choosing the topic and towards carrying out project work and complete the evaluation of assigned students.
- The evaluation of project work will be based on the rubrics set by the department under the committee of HOD, UG NBA coordinator, One professor, One Associate professor and One Assistant Professor.

B Course Outcomes

At the end of the course the student will be able to

CO1	Ability to apply practical knowledge and latest tools usage along with project development.
CO2	Ability to design and develop a project using Database technologies to solve societal problems.
CO3	Ability to report and present the implemented solutions in a team

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3										
CO2	3	3	3	2	3	2		2				1	1	3	2
CO3								2	3	3					

D Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	---	--
QUIZ	---	--
Lab Component	---	50
Alternate Assessment Tool	---	--
Total		50



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Criteria	Exemplary	Proficient	Partially Proficient	Points
Form Layout	(10) The Management System has an exceptional design, attractive and usable layout. It is easy to locate all important elements.	(6) The Management System have an attractive design and usable layout. It is easy to locate all important elements.	(4) The Management System have a usable design layout, but may appear busy or boring. It is easy to locate most of the important elements.	___ / 10
ER Diagram	(10) Complete ER diagram with details of Constraints, Cardinality ratio, different type's entities, participation, Keyes, relationship and attributes.	(6) Partial ER diagram with details of only Cardinality ratio, different type's entities, participation, Keys, relationship and attributes.	(4) Incomplete ER diagram with only entities, relationship, keys and attributes.	___ / 10
Schema diagram	(5) Complete Schema diagram with clear identification of all relationships	(3) Partial Schema diagram with identification of only few relationships	(2) Incomplete Schema diagram with improper identification of relationships	___ / 5
Normalized tables	(5) Complete normalization of all the tables	(3) Normalization of only few tables	(2) Tables has not been normalized.	___ / 5
Validation of Form fields	(5) Validations have been carried out for all form fields completely in all the forms.	(3) Most of the validations have been carried out for all form fields completely in all the forms.	(2) Few of the validations has been carried out for the form fields in the forms.	___/5
Report	(5) Clear and Effective writing and adherence to appropriate style guidelines	(3) Writing that is clear and effective for the most part and minor errors in adherence to appropriate style guidelines	(2) Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines	___/5
Oral commu. (presentation)	(5) Clear and effective communication	(3) Communication is clear	(2) Unclear communication	___/5
Participation in Discussions	(5) Provided many good ideas; inspired others; clearly communicated ideas, needs, and feelings.	(3) Participated in discussions; on some occasions, made suggestions.	(2) Listened mainly; Rarely spoke up, and ideas were off the mark.	___/5
Total				___/50



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E Tutorial Plan (if applicable)

F Laboratory Plan (if applicable)

Project Topics for Database Application Development:

Online shopping system, College ERP (Small Scale), Library Management System, Banking Application, Hostel Management System, Event Management, Online Food Delivery, Timed Quiz, Gym management, matrimonial website, Pharmacy Management System, Railway reservation, Department level Course End Survey Tool, Alumni Survey Submission System, Class Room Discussion Between Teacher and Student, Notification Dashboard, Students SEE exam results, CIE Marks and attendance, Department Faculty Self-Assessment Report Submission System; Department Faculty Self-Appraisal form Submission System; College TEQIP student project proposal submission system; College TEQIP Faculty Workshop/Conference/Seminar Application Submission System; College Exam Application Form Submission System; Placement management System (Company details, Company schedules on presentation, exams, placed students details);

Note: Apart from the above mentioned project topics if student groups come up with any innovative project ideas which are useful for the college academic purpose will be considered based on the approval and acceptance from class teacher.

For Front-end tool (for Form Design): Visual basic or C# or Java framework or any relevant drag-drop from design tool for front end design.

Back –end tool (for database table creation): Oracle or any relevant tool

Note: At least for three users Login form, at least four main forms which has functionality for insert, delete, search, update and view the data base tables

Sl. No	Week	Activity	Content deliverables by the assigned teacher
1	1 st	Formation of groups. Note: Student groups of size 2 or 3 or 4	Introduction of front end frameworks such as Visual basic or C# or Java framework
2	2 nd	Project topic selection by each group	Front-end development using Visual C# Focus of Visual C# is only on learning to develop front-end i.e., form design using the toolbox. Students will learn the basic coding to handle events. Demonstration of Visual C# lab programs. Adding two numbers, Finding Largest of three numbers
3	3 rd	Presentation: Student and Project topic introduction by each group with ER diagram	Student USN validation Collect Student Information (USN, Name, Department Name(Combo Box) and Semester (Radio Button) Using Form And Display it on Message Box Reading data from already existing database table and displaying it using form grid. Note: Database table should contain Student name, USN,



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			Department name and Semester.
4	4 th 5 th and 6 th	Front-end Design Layout of the Forms	Insert the new record into the existing database table by accepting the new record information through form and Update any of the existing database record. Note: Database table should contain Student name, USN, Department name and Semester.
5	7 th	Presentation on Front-end Design by each group	Delete the existing record from the database table against USN by accepting it through the form text box and Search the student database records.
6	8 th and 9 th	Back end design of the project tables with schema diagram Design and Development of connecting among different web pages	Demonstration of for connecting front end with back end database system
7	10 th	Presentation of Normalized tables with front-end back-end connectivity.	
8	11 th	Complete Project Work Demonstration by each group	
9	12 th	Project Report Preparation	

G SEE Exam (50 Marks)

Evaluation of Projects carried out by students from External examiner along with internal faculty.



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Sem	4th		
Course Title:	Cultural Activity (Music/Dance etc.)		
Course Code:	19CS4NCNC4		
L-T-P:	0-0-0	Total Credits:	ZERO PASS/FAIL

A Introduction

- Student can participate in any of the cultural activities such as Music, dance conducted by college or any other institute.

- Student should produce participation certificate for clearing this mandatory course.

Note: If student is unable to participate in outside cultural activities then department Head should take care of conducting any small cultural event (like Essay, Debate etc.) of one or two day event in the college.

- Physically challenged students can produce participation certificate of any technical/cultural events conducted by college/department clubs.

B Course Outcomes

At the end of the course the student will be able to

CO1	Able to reflect creatively on artistic and cultural processes of the society.
CO2	Demonstrate characters of individuality and teamwork in both competition and practice.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3									
CO2									3						

D Assessment Plan (for 50 marks of CIE)

CATEGORY	MARKS (RANGE)	CULTURAL ACTIVITIES
L1	90 (90-100)	Winning Certificates at International/National/Zonal Level Competitions.
L2	80 (80-89)	Winning Certificates at State and University Level Competitions
L3	70 (70-79)	- Winning Certificates/ at Inter-Collegiate competitions. - Representing college team Organizing - National/ State/University level events.



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		<ul style="list-style-type: none">- Core Committee of techno cultural activity.- Debating society (Adjudicator, Secretary, and President).- NGO activity with registered NGO recognized by the Institution.
L4	60 (60-69)	Organizing Inter –Collegiate/ College level Events(Organizer and volunteers)
L5	50 (50-59)	<ul style="list-style-type: none">- Participation in International/National/ Zonal/State//University Level Events.- NGO activity With registered NGO recognized by the institution(Participation only)
L6	40 (40-49)	Participation in Inter-Collegiate /College level events/ Blood donation /NGO/ Personality development Programs

E SEE Exam Question paper

Student should produce participation certificate for clearing this mandatory course.



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FOURTH SEMESTER B.E COURSE

(Common to All Branches)

Course Title	Additional Mathematics-II	Course Code	19MA4IMMAT
Credits	00	L – T – P	3 – 1 – 0
Contact hours	48 hours (36L+12T)	IV semester Lateral Entry students	

Prerequisites: Basic concepts of Trigonometry, Trigonometric formulas, concept of differentiation, concept of integration.

Course Objectives: To provide students with a solid foundation in mathematical fundamentals such as Laplace Transforms, Solution of ordinary differential equations using Laplace Transforms, vector integration, computation of area and volume using double and triple integrals respectively.

UNIT 1

LAPLACE TRANSFORMS

[9 Hours]

Laplace transforms of standard functions. Properties and problems. Laplace Transform of Periodic functions with plotting, unit step function and dirac-delta function.

(7L+2T)

UNIT 2

INVERSE LAPLACE TRANSFORMS

[10 Hours]

Inverse Laplace transforms of standard functions. Properties and problems. Solution of ODE- Initial and Boundary value Problems.

(7L+3T)

UNIT 3

DOUBLE INTEGRALS

[11 Hours]

Evaluation of double integral. Change of order of integration. Change of variables to polar coordinates. Application: Area.

(8L+3T)

UNIT 4

TRIPLE INTEGRALS AND IMPROPER INTEGRALS

[9 Hours]

Evaluation of triple integral. Application: Volume. Beta and Gamma functions-definition, relation between Beta and Gamma functions, properties and problems.

(7L+2T)

UNIT 5

VECTOR INTEGRATION

[9 Hours]

Line integral, Green's theorem, Stokes' theorem and Gauss divergence theorem.

(7L+2T)



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On completion of the course, students will have the ability to:

Course Code	CO #	COURSE OUTCOME (CO)	PO
19MA4IMMAT	CO 1	Use Laplace transforms to solve differential equations.	1
	CO 2	Apply multiple integrals of plane figures to compute areas and volume.	
	CO 3	Use Gamma and Beta functions to evaluate integrals.	
	CO 4	Ability to understand the use of integral calculus in scalar and vector fields.	

Text Book:

1. Higher Engineering Mathematics, B. S. Grewal, 43rd edition, 2014, Khanna Publishers.
2. Higher Engineering Mathematics, B. V. Ramana, 2007, Tata McGraw Hill.

Reference Book:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Precise Textbook series, Vol. 1 and Vol. 2, 10th edition, 2014, Wiley- India.
2. Advanced Engineering Mathematics, 4th edition, 2011, by Dennis G. Zill and Cullen, Jones and Bartlett India Pvt. Ltd

E books and online course materials

1. Engineering Mathematics, K. A. Stroud, Dexter J. Booth, Industrial Press, 2001
http://books.google.co.in/books/about/Engineering_Mathematics.html?id=FZnCL-xB8dEC&redir_esc=y.
2. Advanced Engineering Mathematics, P. V. O'Neil, 5th Indian reprint, 2009, Cengage learning India Pvt. Ltd.
3. <http://ocw.mit.edu/courses/mathematics/> (online course material)

Online Courses:

1. [https:// www.khanacademy.org/Math](https://www.khanacademy.org/Math)
2. [https:// www.class-central.com/subject/math](https://www.class-central.com/subject/math) (MOOCS)
3. E-learning: www.vtu.ac.in
