VELLALAR COLLEGE FOR WOMEN

(AUTONOMOUS)

ERODE – 12

Department of Computer Science

Course contents, Scheme of Examination, Credits and Syllabus

(for students admitted during 2018-2019 and onwards)

Bloom's Taxonomy based Assessment Pattern

Components of CIA Marks (Theory)

Tests (I & II)	Model Examination	Assignment / Seminar / Subject Viva	Total
10	10	5	25

Components of CIA Marks (Practical)

Tests (I & II) (30 Marks Each)	Model Examination (50 Marks)	Class Performance	Record	Total
10	10	15	5	40

CIA (Theory)

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory	4 x1 = 4	30
K1 & K2	B	Either / or	2 x 5 = 10	
K2, K3 & K4	C	Open Choice (2 out of 3)	2 x 8 = 16	

Model and End Semester Examination (Theory)

Bloom's Category	Section	Choice	Marks	Total
K1	A	Compulsory (MCQ-5, Fill ups-5)	10 x1 = 10	75
K1& K2	B	Either / or	5 x 5 = 25	
K2, K3 & K4	C	Open Choice (5 out of 8)	5 x 8 = 40	

Vellalar College for Women (Autonomous), Erode - 12.									
Bachelor of Computer Science									
2018- 2019 onwards									
Course Content and Scheme of Examinations (CBCS & OBE Pattern)									
Semester I									
Part	**Study Component**	**Subject Code**	**Title of the Paper**	**Inst. Hrs./ Week**	**Exam. Dur. Hrs.**	**Max. Marks**			**Credits**
						CIA	**ESE**	**Total**	
I	Language I	18TAMU101 / 18HINU101	Tamil / Hindi	6	3	25	75	100	3
II	Language II	18ENHU101	English	6	3	25	75	100	3
III	Core	18CSUC101 / 18CAUC101	C Programming	5	3	25	75	100	4
		18CSUCP01/ 18CAUCP01	C Programming Lab	5	3	40	60	100	3
	Allied I	18CSUA101/ 18CAUA101/ 18ITUA101 / 18CTUA101	Mathematics - I (Numerical Methods and Bio Statistics)	6	3	25	75	100	5
	Foundation Course	18FOCU1ES	Environmental Studies	2	3	-	100	100	2
							Total	600	20
Semester II									
I	Language I	18TAMU202/ 18HINU202	Tamil / Hindi	6	3	25	75	100	3
II	Language II	18ENHU202	English	6	3	25	75	100	3
III	Core	18CSUC202 / 18CAUC202	Digital Fundamentals and Architecture	4	3	25	75	100	4
		18CSUC203 / 18CAUC203	Linux and Perl Programming	4	3	25	75	100	4
		18CSUCP02/ 18CAUCP02	Linux and Perl Programming Lab	3	3	40	60	100	1
	Allied II	18CSUA202/ 18ITUA202	Mathematics - II (Discrete Structures)	5	3	25	75	100	5
IV	Value Education	18VEDU2HR	Value Education and Human Rights	2	3	-	100	100	2
							Total	700	22

Semester III									
Part	**Study Component**	**Subject Code**	**Title of the Paper**	**Inst. Hrs./ Week**	**Exam. Dur. Hrs.**	**Max. Marks**			**Credits**
						CIA	**ESE**	**Total**	
III	Core	18CSUC304 / 18CAUC304	Data Structures and Algorithms	6	3	25	75	100	4
		18CSUC305 / 18CAUC305 / 18CTUC305	Object Oriented Programming with Java	5	3	25	75	100	4
		18CSUC306	Internet of Things	5	3	25	75	100	4
		18CSUCP03 / 18CAUCP03 / 18CTUCP03	Java Programming Lab	4	3	40	60	100	3
	Allied III	18CSUA303/ 18CAUA303	Business Accounting	5 (4+1**)	3	25	75	100	5
IV	Skill based Subject I			3	3	40	60	100	3
	Non Major Elective I			2	3	-	100	100	2
							Total	700	25
Semester IV									
III	Core	18CSUC407 / 18CAUC407/ 18CTUC304	Relational Database Management Systems	5 (4+1**)	3	25	75	100	4
		18CSUC408 / 18CAUC408	Web Programming	5	3	25	75	100	4
		18CSUC409 / 18CAUC409	Operating Systems	6	3	25	75	100	4
		18CSUCP04 / 18CAUCP04	Web Programming Lab	4	3	40	60	100	3
	Allied IV	18CSUA404	Operations Research	5	3	25	75	100	5
IV	Skill based Subject II	18CSUS402 / 18CAUS402 / 18ITUS402/ 18CTUS402	Multi Skill Development Paper	3	1*	40	60	100	3
	Non Major Elective II			2	3	-	100	100	2
							Total	700	25

** Accounting Package & RDBMS : one hour lab-internal only, No ESE

* Online Examination (ESE)

SKILL BASED SUBJECTS		
S.No	**Subject Code**	**Title of the paper**
1	18CSUSP01 / 18CAUSP01 / 18ITUSP01 / 18CTUSP01	Data Management for Biological Applications Lab [Cafeteria]
2	18CSUS402 / 18CAUS402 / 18ITUS402 / 18CTUS402	Multi Skill Development Paper
NON MAJOR ELECTIVES		
S.No	**Subject Code**	**Title of the paper**
1	18TMLU301	Basic Tamil *
	18TMLU402	
2	18ADTU301	Advanced Tamil **
	18ADTU402	
3	18CSUNP01 / 18CAUNP01 / 18ITUNP01 / 18CTUNP01	Data Processing through Excel Lab
	18CSUNP02 / 18CAUNP02 / 18ITUNP02 / 18CTUNP02	Web Designing Lab (Dream Weaver)

* For students whose Part I in Secondary Education is not Tamil
** For students whose Part I in Higher Secondary Education is not Tamil

SELF LEARNING PAPERS (Optional)					
S.No	**Subject Code**	**Title of the Paper**	**Exam. Dur. Hrs.**	**Max. Marks**	**Credits**
1	13CSUSL01	Computer Ethics	3	100	5
2	13AUGSL05	General Awareness Online Examination	1*	100	5
3	16CSUSL15	Python	1**	100	5
4	16CSUSL25	PHP and MySQL	1**	100	5

* Online Examination

** Online Examination - Spoken Tutorial, IIT, Bombay

MOOCs Non-ranking Compusory Credit Course will be introduced in Part V for UG from the Academic Year 2019-20 and Onwards.

SEMESTER I

CODE	COURSE TITLE
18CSUC101 / 18CAUC101	C PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	4

Preamble

The objective of the course is to train the students to acquire problem-solving skills through structured programming

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of Algorithms to solve problems	K2
CO2	Define the fundamentals of C Programming	K1
CO3	Distinguish between branching and looping concept	K4
CO4	Develop C programs using Array Data structure, Functions, Structure, Union and Pointers to solve complex problems	K3
CO5	Apply File concepts to data storage and manipulation	K3

Syllabus

UNIT I **15 Hrs.**

Introduction to Computer Problem Solving: Introduction – The Problem Solving Aspect. **Fundamental Algorithms:** Introduction – Exchanging the Values of Two Variables – Summation of a Set of Numbers – Factorial Computation – Generation of the Fibonacci Sequence – Reversing the Digits of an Integer. **Overview of C:** History and Importance of C – Basic Structure of C. Constants, Variables, and Data Types – Operators and Expressions.

UNIT II **15 Hrs.**

Managing Input & Output Operations: Introduction – Reading and Writing a Character – Formatted Input and Output. **Decision Making and Branching:** Introduction – Decision Making with **if** Statement – Simple **if** Statement – **if …else** Statement – Nesting of **if …else** Statements – The **else if** Ladder – The **switch** Statement – The**?:** Operator – The **goto** Statement. **Decision Making and Looping:** Introduction – The **while** Statement – The **do** Statement – The **for** Statement – Jumps in Loops.

UNIT III **15 Hrs.**

Arrays: Introduction – One Dimensional Arrays – Declaration and Initialization of One-Dimensional Arrays – Two-Dimensional Arrays – Initializing Two-Dimensional Arrays – Multidimensional Arrays – **Character Arrays and Strings** : Declaring and Initializing String Variables – Reading and Writing Strings – String-Handling Functions

UNIT IV **15 Hrs.**

User-Defined Functions: Need for User-Defined Functions – Declaration and Definition of Functions – Function Calls and Return Values – Category of Functions – Recursion – Scope , Visibility and Lifetime of Variables

Structures and Unions: Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members - Structure Initialization – Copying and Comparing Structure Variables – Operations on Individual Members – Arrays of Structures – Array within Structures – Structures within Structures – Structures and Functions - Unions.

UNIT V **15 Hrs.**

Pointers: Introduction – Declaration, Initialization and Accessing Pointer variables – Chain of Pointers – Pointers and Arrays – Pointer and Character Strings – Array of Pointers – Pointers as Function Arguments – Functions returning Pointers – Pointers and Structures.

File Management in C: Introduction –Defining, Opening and Closing a File – Input/Output Operations on Files

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1	R. G. Dromey	How to Solve it by Computer	PHI Pvt. Ltd, New Delhi	2007, 2nd Edition
2	E.Balagurusamy	Programming in ANSI C	McGraw Hill Education, New Delhi	2017, 7th Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ashok N. Kamthane	Programming and Data Structures	Pearson Education, Private Ltd, New Delhi	2009, 1st Edition
2.	Ashok N. Kamthane	C Programming: Test Your Skills	Pearson Education, Private Ltd, New Delhi	2010, 1st Edition
3.	Yashavant Kanetkar	Test Your C Skills	BPB Publications	2015, 5th Edition

Web Resources

1. https://swayam.gov.in/course/1388-introduction-to-programming-in-c
2. www.learn-c.org
3. https://fresh2refresh.com/c-programming/
4. https://www.programiz.com/c-programming

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER I

CODE	COURSE TITLE
18CSUCP01/ 18CAUCP01	C PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core Practical	40	60	-	5	70	3

Preamble

The main objective of C Programming Lab is to provide the students a strong foundation on programming concepts and its applications through hands-on training

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate branching and looping constructs	K2
CO2	Distinguish between Iteration and Recursion	K4
CO3	Construct C programs using arrays and functions	K3
CO4	Make use of Pointers in C Programs	K3
CO5	Build C programs for Biological Problems	K3

Prerequisite

- Linux, free and open-source platform for the development of programs and applications using C.
- GCC and GNU C standard library to compile and run C programs on Linux OS.
- Text editors (gedit, vi, eclipse) to write c programming code

Practical List

1. Write a program to find the sum, average, standard deviation for a given set of numbers
2. Write a program to generate n Fibonacci numbers using recursion
3. Write a program to convert a decimal number into binary
4. Write a program to multiply two matrices using functions
5. Calculate the binomial co-efficient nCr using functions
6. Write a program to count the number of vowels and consonants in a given line of text using pointers
7. Implement BINARY SEARCH to find a particular name from a list
8. Write a program to generate permutations of a given string using Pointers
9. Write a program to print the Student Mark sheet assuming Register number, name, and

marks in 5 subjects using Structure

10. Write a program to find palindromic nucleic acid sequences in human genome(ACTG)
11. Write a program to find the
    (i) Complementary sequence of a given DNA sequence
    (ii) Percentage of nucleotides A, C, T, G in a given DNA sequence.
12. Write a program to find the start codon **ATG** and stop codons **TAA, TAG and TGA** in a given DNA sequence (eg: look for all "ATG"s, "TAA"s, "TAG"s and "TGA"s in the sequence "AAAATGCAGAACCCATGCCCGTAA").

Web Resources

1. https://www.w3resource.com/c-programming-exercises
2. https://www.udemy.com/c-programming-laboratory

Pedagogy

Demonstration, Flipped Learning

SEMESTER I

CODE	COURSE TITLE
18CSUA101/ 18CAUA101/ 18ITUA101/ 18CTUA101	MATHEMATICS – I (NUMERICAL METHODS AND BIO STATISTICS) (Derivations not included – Problems only)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	85	5	-	5

Preamble

The objective of the course is to impart mathematical skills in matrix operations, numerical methods and statistics. The students will be trained on the applications of these methods on scientific and biological problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify and Apply the matrix operations for solving any matrix related problems	K1 - K3
CO2	Determine and apply appropriate numerical methods for solving System of Linear Equations	K2 - K4
CO3	Compare and distinguish the use of differentiation / integration methods and plan for solving scientific problems.	K3 - K4
CO4	Analyze and infer the type of data for using measures of location and measures of dispersion.	K2 - K4
CO5	Recognize and apply the correlation/regression methods for finding the association between the dependent and independent variables.	K2 - K3

Syllabus

UNIT I **15 Hrs.**

Matrices: Introduction – Determinant – Inverse of a Matrix – Rank of a Matrix – Eigen Values of a Matrix.

UNIT II **20 Hrs.**

System of Simultaneous Linear Algebraic Equations: Gauss Jordan and Gauss Seidal Methods. **The Solution of Numerical- Algebraic & Transcendental Equations:** Newton – Raphson Method and False Position Method.

UNIT III **20 Hrs.**

Numerical Differentiation: Newton's Forward Difference Formula – Backward Difference Formula – Lagrange's Formula for unequal intervals. **Numerical Integration:** Trapezoidal Rule & Simpson's Rule (1/3 only).

UNIT IV **15 Hrs.**

Introduction to Biostatistics: Definition- Types of statistics- Applications and uses of Biostatistics-

Types of variables- Identification of the type of variable. **Measures of Central Tendency:** Measures of location- Mode- Median- Mean. **Measures of Spread:** Range- Interquartile range- Standard deviation. **Case Study:** Data analysis using Measures of Central Tendency.

UNIT V **20 Hrs.**

Correlation: Definition- Types of correlation- Calculation of correlation coefficient by definitional and computational formula. **Regression:** Definition- Meaning of regression and Regression coefficient. **Case Study:** Data analysis using Correlation and Regression.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Vital P. R	Allied Mathematics	Margham Publication	2012
2.	Venkataraman M. K.	Numerical Methods in Science & Engineering	National Publisher	2013 Third Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Balagurusamy. E	Numerical Methods	Tata McGraw Hill	2008, 25th Edition
2.	Manju Pandey	Biostatistics Basic and Advanced	MV Learning	2015

Ebook

- S. B. Bhise, R. J. Dias, K. K. Mali, P.H. Ghanwat, "Textbook of Computer Applications and Biostatistics", Jan 2011 Chapter.

Web Resources

1. https://statistics.laerd.com/statistical-guides/measures-central-tendency-mean-mode-median.php
2. https://www.tutorialspoint.com/statistics/index.htm
3. http://www.ece.mcmaster.ca/~xwu/part6.pdf

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18CSUC202/ 18CAUC202	DIGITAL FUNDAMENTALS AND ARCHITECTURE

Category	CIA	ESE	L	T	P	Credit
Core	25	75	56	4	-	4

Preamble

On successful completion of this subject the student should have knowledge on fundamental concepts, digital circuits, number system, Boolean functions, interfacing of various components and Memory Organization.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge on number systems and Boolean algebra	K2
CO2	Interpret logic functions, circuits, truth tables, and Boolean algebra expressions for logic gates	K3
CO3	Simplify the Boolean expressions and circuits using Karnaugh Maps	K3
CO4	Outline the fundamentals of combinational logic design, Flip-Flop, computer buses, I/O Peripherals and various data transfer techniques	K2
CO5	Outline the concept of Memory Organization and mapping Techniques	K2

Syllabus

UNIT I **12 Hrs.**

Binary Systems : Digital Computers and Digital Systems – Binary Numbers – Number base conversion – Octal and Hexadecimal Numbers – Complements – Binary Codes. **Boolean Algebra and Logic gates:** Basic Definitions- Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Other Logic Operations – Digital Logic Gates.

UNIT II **14 Hrs.**

Simplification of Boolean Functions: The Map method – Two and Three variable Maps – Four Variable Map – Product of Sums simplification – Don't Care Condition. **Combinational Logic:** Introduction – Design procedure – Adders – Subtractors – Code Conversion – Decoders – Multiplexers. **Flip-Flop:** RS Flip-Flop – JK Flip-Flop – D Flip-flop.

UNIT III **12 Hrs.**

Input – Output Organization: Peripheral Devices - Input – output interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – Example of I/O Interface.

UNIT IV **12 Hrs.**

Asynchronous data Transfer: Strobe Control and Handshaking – **Priority Interrupt**: Daisy-Chaining Priority, Parallel Priority Interrupt – Priority Encoder – Interrupt Cycle – Software Routines – Initial & Final Operations. **Direct Memory Access**: DMA Controller, DMA Transfer.

UNIT V **10 Hrs.**

Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory - Associative memory. **Cache Memory**: Associative, Direct, Set-associative Mapping – Writing into Cache Initialization.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Morris Mano M	Digital Logic and Computer Design	Prentice Hall of India	2006, 1st Edition
2.	Morris Mano M	Computer System Architecture	Pearson Publication	2006, 3rd Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Albert Paul Malvino & Donald P Leach	Digital Principles and Applications	McGrawHill	1996, 5th Edition
2.	Carter	Computer Architecture	TMH	2007, 2nd Edition

Web Resources

1. https://www.tutorialspoint.com/computer_logical_organization
2. http://www.ee.ncu.edu.tw/~jfli/computer/lecture/ch05.pdf

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18CSUC203/ 18CAUC203	LINUX AND PERL PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	55	5	-	4

Preamble

This course will prepare students to learn about the Linux Operating System - structure, concepts and commands. Student will be able to write simple shell programming using Linux utilities, pipes and filters. Student will learn fundamentals of Perl programming and write Perl scripts using array, hash data structures, file and regular expressions.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Explain the structure of Linux Operating System	K2
CO2	Develop Linux utilities to perform File processing, Directory handling, User Management and display system configuration	K3
CO3	Develop shell scripts using pipes, redirection, filters and Pipes	K2
CO4	Understand the concepts of process, backup and compression	K3
CO5	Develop Perl scripts using array, hash data structures and Regular expressions	K3

Syllabus

UNIT I **10 Hrs.**

Introduction to LINUX Operating System: Introduction - The LINUX Operating System. **Managing Files and Directories**: Introduction – Directory Commands in LINUX – File Commands in LINUX.

UNIT II **10 Hrs.**

Creating files using the vi editor: Text editors – The vi editor. **Managing Documents**: Locating files in LINUX – Standard files – Redirection – Filters – Pipes. **Securing files in LINUX**: File access permissions – viewing File access permissions – Changing File access permissions.

UNIT III **15 Hrs.**

Automating Tasks using Shell Scripts: Introduction – Variables- Local and Global Shell variables – Command Substitution. **Using Conditional Execution in Shell Scripts**: Conditional Execution – Construct. **Managing repetitive tasks using Shell Scripts**: Using Iteration in Shell Scripts – The while construct – The until construct – The for construct – The break and continue commands – Parameter handling in shell scripts - Simple Programs using Shell Scripts.

UNIT IV **15 Hrs.**

Controlling Process Execution : Requesting for background processing – Checking a background process – the top command – Terminating a background process – Finding the time taken to complete a command **Backing up, Restoring & Compressing Files** : Need for making backups – Selecting a Backup medium – Mounting and Unmounting a file system – Compressing Files.

UNIT V **10 Hrs.**

Introduction to PERL: Introduction – Program Structure – Perl variables – Loops and Conditionals – Iteration – Files in Perl – Perl Subroutines – die-exit on error-Pattern matching and extraction.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	NIIT	Operating System LINUX	Prentice-Hall of India Private Limited	2009, Eastern Economy Edition
2.	N.B. Venkateswarlu	Introduction to Linux: Installation and Programming	BS Publications	2008,1st Edition

Reference Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Richard Petersen	Linux: The Complete Reference	Tata McGraw-Hill Publishing Company Limited, New Delhi	2008, 6th Edition

Web Resources

1. http://spoken-tutorial.org/
2. https://www.tutorialspoint.com/perl/index.htm

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18CSUCP02/18CAUCP02	LINUX AND PERL PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core Practical	40	60	-	-	45	1

Preamble

The student will be able to create programs in the Linux environment using Linux utilities and commands. Student is given an introduction of Perl Programming and they will be able to write Perl scripts.

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Develop Linux utilities to perform File processing, Directory handling and User Management	K3
CO2	Develop shell scripts using pipes, redirection, filters and Pipes	K3
CO3	Develop shell scripts to display system configuration	K3
CO4	Develop simple Perl scripts	K3
CO5	Develop simple Perl scripts applicable to Bioinformatics	K3

Syllabus

1. Write a shell script to stimulate the file commands : rm, cp, cat, mv, cmp, wc, split, diff.
2. Write a shell script to show the following system configuration :
    a) currently logged user and his log name
    b) current shell , home directory , Operating System type , current Path setting , current working directory
    c) show currently logged number of users, show all available shells
    d) show CPU information like processor type , speed
    e) show memory information
3. Write a shell script to display calendar for a specified month or a range.
4. Write a Shell Script to implement the following: pipes, Redirection and tee commands.
5. Write a shell script to implement the filter commands.

6. Write a shell script to find the frequency of nucleotides in a given sequence.
7. Write a shell script to find the greatest among the given set of numbers using command line arguments.
8. Write a Perl script to find for a motif in protein sequences stored in a file.
9. Write a Perl script to use Array and Hash data structure.
10. Write a Perl script to read a file and count the number of lines containing or not containing certain words.

Pedagogy

Lecture, PPT, Quiz

SEMESER II

CODE	COURSE TITLE
18CSUA202/18ITUA202	MATHEMATICS – II (DISCRETE STRUCTURES)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	70	5	-	5

Preamble

This course comprises the essentials for the students to think logically, mathematically and apply the techniques in solving problems. This is achieved by learning logic and proof, sets, functions, as well as algorithms and mathematical reasoning, relations, graphs and formal languages.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the logical proof and Connectives	K2
CO2	Understand the concepts of equivalence and implication to formulas of the predicate calculus	K2
CO3	Demonstrate Relations and Functions and determine the properties of Relations	K2
CO4	Construct language from a grammar	K3
CO5	Identify shortest path between two nodes. Classify different types of sets and express the logical relationships between various sets	K3

Syllabus

UNIT I **15 Hrs.**

Mathematical Logic: Connectives (Negation, Conjunction, Disjunction) – Statement Formulas and Truth Tables - Conditional and Bi-Conditional – Well-formed Formulas - Equivalence of Formulas – Duality Law. **Normal Forms**: DNF, CNF, PDNF & PCNF.

UNIT II **15 Hrs.**

The Predicate Calculus: Predicates – Variables and Quantifiers - Free and Bound Variables. **The Theory of Inference for the Statement Calculus:** Validity Using Truth Tables - Rule of Inference. **Set Theory:** Basic concepts of Set Theory: Notation - Inclusion and Equality of Sets -The Power Set - Some Operations on Sets - Venn Diagrams.

UNIT III **15 Hrs.**

Relations: Definition - Properties – Relation Matrix and the Graph of a Relation – Equivalence Relations – Composition of Binary Relations. **Functions:** Definition and Introduction – Composition of Functions – Inverse Functions.

UNIT IV **15 Hrs.**

Algebraic Structures: Algebraic Systems- Semigroups and Monoids. **Grammars and Languages:** Discussion of Grammars – Formal Definition of a Language. **Groups**: Definitions - Subgroups and Homomorphisms.

UNIT V **15 Hrs.**

Lattices: Definition and Properties of Lattices. **Graph Theory**: Basic Concepts: Definitions – Paths, Reachability, and Connectedness - Matrix Representation of Graphs.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	J.P. Tremblay and R. Manohar	Discrete Mathematical Structures with applications to Computer Science	McGraw Hill	2015, Forty Seventh Reprint

Reference Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Seymour Lipschutz	Schaums Outline Series: Discrete Mathematics	McGraw Hill	2008, 2nd Edition

Web resources

1. https://www.tutorialspoint.com//discrete_mathematics/index.htm
2. http://nptel.ac.in/courses/106106094/

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSUC304/ 18CAUC304	DATA STRUCTURES AND ALGORITHMS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	85	5	-	4

Preamble

The objective of the course is to introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the basic concepts of data structures and algorithms	K1-K2
CO2.	Construct and analyze of stack and queue operations with illustrations	K2-K4
CO3.	Enhance the knowledge of Linked List and dynamic storage management.	K2-K3
CO4.	Demonstrate the concept of trees and its applications.	K2-K3
CO5.	Design and implement various sorting and searching algorithms for applications and understand the concept of file organizations.	K1-K4

Syllabus

UNIT I (15 Hrs)

Introduction: Overview – SPARKS- Phases in Creating Programs - Analyzing Programs. **Arrays:** Axiomatization – Ordered Lists – Sparse Matrices - Representation of Arrays.

UNIT II (16 Hrs)

Stacks and Queues: Fundamentals – Mazing Problem - Evaluation of Expressions - Multiple Stacks and Queues. **Applications of Stacks and Queue**s: Towers of Hanoi, Simulation.

UNIT III (18 Hrs)

Linked lists: Singly Linked Lists – Linked Stacks and Queues – The Storage Pool – Polynomial Addition - Sparse Matrices - Doubly Linked Lists and Dynamic Storage Management.

UNIT IV (24 Hrs)

Trees: Basic Terminology – Binary Trees – Binary Tree Representation – Binary Tree

Traversal – Binary Tree Representation of Trees – Applications of Trees: Decision Trees. **Internal Sorting:** Searching – Linear Search, Binary Search, Fibonacci Search – Insertion Sort – Quick Sort – Two way Merge Sort – Heap Sort – Radix Sort.

UNIT V (17 Hrs)

Symbol Tables: Static Tree Tables-Hash Tables: Hashing Functions -Overflow Handling. **Files:** File Organizations: Sequential, Random, Linked Organizations, Inverted Files, Cellular Partitions.

Text Book

S.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ellis Horowitz and Sartaj Sahni	Fundamentals of Data Structures	Galgotia Book Source	2003

Reference Books

S.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Jean-Paul Tremblay & Paul G.Sorenson	An Introduction to Data structures with Applications (for Applications of Stacks and Queues only)	Tata McGraw Hill Company	2008, 2nd Edition.
2.	Samanta.D	Classic Data Structure	Prentice Hall of India Pvt Ltd	2007, 9 th Edition
3.	Seymour Lipschutz	Data Structures	McGrawHill Publications	2014, 1st Edition
4.	S.Lovelyn Rose R.Venkatesan	Data Structures	Wiley India Private Limited	2015, 1st Edition

Web Resources

- www.spoken-tutorial.org
- www.nptel.ac.in
- https://www.slideshare.net/

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSUC305 / 18CAUC305 / 18CTUC305	OBJECT ORIENTED PROGRAMMING WITH JAVA

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	4

Preamble

The objective of the course is to train the students to acquire problem-solving skills through object oriented programming

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Demonstrate the concept of object oriented programming through Java	K1, K2
CO2.	Illustrate the syntax and semantics of Java	K2
CO3.	Apply the concept of Inheritance, Modularity, Concurrency, Exceptions handling and data persistence for developing java program	K3
CO4.	Develop java programs for applets and graphics programming	K3
CO5.	Understand the fundamental concepts of AWT controls, layouts and events	K1,K2

Syllabus

UNIT I **15 Hrs.**

Fundamentals of Object-Oriented programming: Introduction-Object –Oriented Paradigm-Basic concepts of Object-Oriented Programming-Benefits of OOP-Applications of OOP. **JAVA Evolution:** History – Features – How Java Differs from C and C++ - Java and Internet – Java and WWW – Web Browsers. **Overview of Java Language:** Introduction – Simple Java Program – Structure – Java Tokens – Statements – Implementing Java Program – Java Virtual Machine. Constants – Variables – Data Types - Operators and Expressions.

UNIT II **15 Hrs.**

Decision Making and Branching: If – If else, Else if ladder, Switch, ?: Operator. **Decision Making and Looping:** While, do, for – Jumps in Loops – Labeled Loops. Classes, Objects and Methods. Arrays, Strings and Vectors.

UNIT III **15 Hrs.**

Interfaces: Multiple Inheritance – **Packages:** Putting Classes together – Multi Threaded Programming. **Managing Errors and Exceptions**: Introduction – Types of Errors –

Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for Debugging.

UNIT IV **15Hrs.**

Applet Programming – Graphics Programming. **Files:** Introduction – Concept of Streams – Stream Classes – Using Streams - I/O Classes – File Class – I/O Exceptions – Creation of Files – Reading/ Writing Characters/ Bytes.

UNIT V **15 Hrs.**

Introducing the AWT: AWT Classes - Window fundamentals. **Using AWT Controls, Layout Managers and Menus:** AWT Control Fundamentals – Labels - Using Buttons - Applying Check Boxes-Checkbox group - Choice controls - Using Lists- Using a TextField- Using a TextArea - Understanding Layout Managers: Flow layout-Border layout. **Event Handling:** Introduction-The MouseEvent Class.

Text Books:

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Balagurusamy E.	Programming with Java - A primer	TMH pub	5th Edition, 2017
2.	Herbert Schildt	Java: The Complete Reference	McGrawHill Education, Oracle press	10th Edition, 2018

Reference Books:

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	John R. Hubbard	Programming with Java	TMH Pub	2nd Edition, 2012
2	Patrick Naughton and Herbert Schildt	The Complete Reference Java 2	TMH Pub	3rd Edition, 1999

Web Resources

- www.spoken-tutorial.org
- www.nptel.ac.in
- https://www.slideshare.net/
- https://www.w3schools.in/java-tutorial/

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSUC306	INTERNET OF THINGS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	5

Preamble

To enable the students to learn about the fundamentals, building blocks, applications of IoT, security and vulnerabilities of internet of things

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1.	To understand the physical, logical design of IoT and to identify various IoT levels	K1
CO2.	To describe conceptual framework, architectural views and technology behind IoT	K2
CO3.	To understand the Physical Servers and different types of applications in various domains	K1
CO4.	To demonstrate the design methodology and building blocks of IoT devices	K2
CO5.	To understand IoT privacy, security, vulnerabilities solutions and business models	K1

On the successful completion of the course, students will be able

Syllabus

UNIT I **15 Hrs.**

Introduction to Internet of Things: Introduction – Physical Design of IoT - Logical Design of IoT - IoT Enabling Technologies – IoT levels & Deployment Templates

UNIT II **15 Hrs.**

IOT: Conceptual framework – Architectural view – Technology behind IOT – Sources of IOT – M2M Communication – Examples of IOT

UNIT III **15 Hrs.**

Domain Specific IoTs: Introduction – Home Automation – Cities – Environments – Retail – Logistics - Agriculture –Industry – Health & Lifestyle - **IoT Physical Servers and Cloud Offerings:** Introduction to cloud storage models & communication APIs **–** WAMP – AutoBahn for IoT – Xively Cloud for IoT

UNIT IV **15 Hrs.**

IoT Platforms Design Methodology: Introduction – IoT Design Methodoloy – Case Study on IoT System for Weather Monitoring - **IoT Physical Devices & Endpoints**: Building blocks of an IoT Device – Exemplary Device: Raspberry Pi – About the Board – Raspberry Pi Interfaces - Other IoT Devices

UNIT V **15 Hrs.**

IoT Privacy, Security and Vulnerabilities Solutions: Introduction – Vulnerabilities, Security Requirements and Threat Analysis – Use Cases and Misuse Cases - IoT Security Tomography and Layered Attacker Model – **Business Models and Processes Using IoT**: Introduction – Business Models and Business Model Innovation

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Arshdeep Bahga, Vijay Madisetti	Internet of Things: A Hands-On Approach **(Unit I, III, IV)**	Universities Press (India) Private Limited	2018, Reprint
2.	Raj Kamal	Internet of Things: Architecture and Design Principles **(Unit II & V)**	McGraw - Hill Education (India) Private Limited Chennai	2017**,** 1st Edition

Reference Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Srinivasa K.G, Siddesh G.M, Hanumantha Raju R	Internet of Things	Cengage Learning India Pvt. Limited	2017**,** 1st Edition

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSUCP03/ 18CAUCP03 / 18CTUCP03	JAVA PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core	40	60	-	5	55	3

Preamble

The main objective of JAVA Programming Lab is to provide the students a strong foundation on programming concepts and its applications through hands-on training

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the creation of objects, classes and methods and the concepts of constructor, methods overloading, Arrays, branching and looping	K2
CO2	Develop Java programs using Strings, Interfaces and Packages	K3
CO3	Construct Java programs using Multithreaded Programming and Exception Handling	K3
CO4	Build Java programs for Applets and Graphics programming	K3
CO5	Create data files and Design a page using AWT controls & MouseEvents in Java programming	K3

Practical List

1. Write a program to display multiplication table using default and argument constructors.
2. Write a program to find the area of the square, rectangle and triangle using the method of overloading.
3. Create a class Employee which includes employee number, Name, Year of experience. To accept N number of employee details, and sort it by employee name wise.
4. Write a program to extract a portion of a character string and print the extracted string.
5. Define an interface having one method that takes an integer parameter. For this method, provide two implementations: In the first one, just print the value and in the second one, print the square of the number. Try to call both the versions.

6. Create a package to calculate arithmetic operations of two numbers and another package to calculate logical operations of two numbers. Write a Java program to use these packages.
7. Write a program using threads to increment a shared variable.
8. Design an applet program to draw several shapes.
9. Write a program to read and write the contents from one file to another file and handles exceptions.
10. Write a program to design a Form using any three AWT controls and MouseEvents.

Web Resources

1. https://www.w3resource.com/java-exercises/
2. https://www.udemy.com/introduction-to-java-programming/

Pedagogy

Demonstration, Flipped Learning

SEMESTER III

CODE	COURSE TITLE
18CSUA303/ 18CAUA303	BUSINESS ACCOUNTING (40% Theory & 60% Problems only)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	55	5	15	5

Preamble

The objective of the course is to impart accounting skills in Final Accounting and Cost Accounting. The students will be trained on the preparation of final accounts and cost sheet using an accounting package.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify and Apply the appropriate accounting rules for the preparation of Journal and method of posting the same into Ledger	K1 - K3
CO2	Select, Classify, Choose and Categorize the given entries to enter in appropriate subsidiary books	K1 - K4
CO3	Classify, Apply and Build various financial statements like Trial Balance, Trading, P&L account and Balance Sheet	K2 - K4
CO4	Define, Explain and Apply appropriate depreciation method to prepare Machinery Account	K1 - K3
CO5	Classify the elements of cost and Construct the Cost Sheet accordingly	K2 - K3
CO6	Apply the knowledge and skill of preparation of various accounting concepts using an accounting package	K2 - K3

Syllabus

UNIT I **15 Hrs.**

Accounting: Definition – Objectives – Branches of Accounting – Accounting Concepts – Conventions – Systems of Accounting – Rules for Double-Entry System of Book Keeping – Preparation of Journal and Ledger Accounting. Hands on training.

UNIT II **15 Hrs.**

Subsidiary Books: Purchase Book – Sales Book – Purchase Return Book – Sales Return Book – Cash Book (Two Columnar only) - Petty Cash Book.Hands on training.

UNIT III **15 Hrs.**

Preparation of Trial Balance – **Final Accounts**: Trading, Profit and Loss Account and Balance Sheet with Simple Adjustments.Hands on training.

UNIT IV **15 Hrs.**

Accounting Package: Features – Home Screen – Accounts Info Menu – Display Menu. Company Creation – Alteration & Deletion of Company – Selection of Company – Ledger Creation – Preparation of Trial Balance & Final accounts.

UNIT V **15 Hrs.**

Depreciation: Definition - Causes of depreciation – Basic factors - Methods of Depreciation – Straight Line Method and Diminishing Balance Method (Simple Problems). **Cost Accounting**: Elements of Costing – Types of Costing – Preparation of Simple Cost Sheets.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Murthy.A, & Reddy .T.S.	Advanced Accountancy	Margham Publications	Second edition, 2012
2.	Jain S. P &. Narang, K.L,	Cost Accounting Principles and Practice	Kalyani Publishers	Twenty Third edition, 2012

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Grewal, T.S.	Double Entry Book Keeping	Sultan Chand & Sons Publisher	2004
2.	VinayakamM.N., Mani P.L., Nagarajan K.L,	Principles of Accountancy	Sultan Chand & Sons Publisher	3rd Edition, 2008

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18CSUC407/ 18CAUC407/ 18CTUC304	RELATIONAL DATABASE MANAGEMENT SYSTEMS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	55	5	15	4

Preamble

The objective of the course is to present an introduction to Relational Database Management Systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a RDBMS using Oracle9i and PL/SQL

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Relational Data Model, Entity-Relationship Model and process of Normalization	K1 – K2
CO2	Understand and construct database using Structured Query Language (SQL) in Oracle9i environment	K1 – K3
CO3	Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	K2 - K4
CO4	Understand and use built-in functions and enhance the knowledge of handling multiple tables	K1 – K3
CO5	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions	K1 – K4

Syllabus

UNIT I **15 Hrs.**

Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams – De-normalization.

UNIT II **15 Hrs.**

Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - iSQL *Plus.

Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

Implementing the SQL*Plus Commands using Create, Update, Alter, Drop, Rename, Truncate and Spooling

UNIT III **15 Hrs.**

Working with Table: Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure.

Writing queries to Add, Update, Delete records, Retrieving data from a table using Where and ORDERBY Clause.

UNIT IV **15 Hrs.**

Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations. ***Designing queries using Built in functions.***

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators.

UNIT V **15 Hrs.**

Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements.

Implementing the basic control structures in PL/SQL – sequential structure, selection structure and looping structure. **PL/SQL Named Blocks :** Procedure – Function, Package and Trigger ***Declaring Functions and Triggers.***

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Nilesh Shah	Database Systems Using Oracle	PHI	2008, 2nd Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Arun Majumdar, Pritimoy Bhattacharya	Database Management Systems	Tata McGraw Hill	2007
2.	Gerald V. Post	Database Management Systems	Tata McGraw Hill	2008, 3rd Edition

Ebook

1. Diana Lorentz, “Oracle® Database SQL Reference”, ORACLE, Dec, 2005.
2. Bill Pribyl, Steven Feuerstein, “Oracle PL/SQL Programming”, O'Reilly Media, Inc., 6th Edition, February 2014.

Web Resources

1. http://www.digimat.in/nptel/courses/video/106105175/L01.html
2. https://www.tutorialspoint.com/oracle_sql/index.htm

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18CSUC408/ 18CAUC408	WEB PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Core -VIII	25	75	70	5	-	4

Preamble

This course aims at exploring the knowledge to the student to understand the web-development techniques that use HTML, CSS and JavaScript as a web development essentials and advanced technique of web programming.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	understand the concept of XHTML document and create a basic web page using forms and Tables.	K2
CO2	create document with different styles and Identify the positioning of web page elements using Cascading Style Sheets.	K2
CO3	understand the basic concepts of JAVA SCRIPT.	K3
CO4	describe the concept of Arrays and Functions.	K3
CO5	develop applications using Objects and Events.	K3

Syllabus

UNIT I **15 Hrs.**

Introduction: History of the Internet and World Wide Web – Key Software Trend- Object Technology – JavaScript : Object-Based Scripting for the Web.

Introduction to HTML : Introduction - Editing HTML – Headers – Linking – Images – Special Characters, Horizontal Rules – Unordered Lists – Nested and Ordered List- Basic HTML Tables –Basic HTML Forms – Internal Linking - Frameset Tag- Nested Frameset Tags.

UNIT II **15 Hrs.**

Cascading Style Sheets (CSS): Introduction – Inline Styles - Conflicting Styles – Linking External Style Sheets – Positioning Elements – Backgrounds – Element Dimensions – Text Flow and Box Model – User Style Sheets.

UNIT III **15 Hrs.**

Introduction to Scripting: JavaScript – Introduction to Scripting – Simple Programs - Memory Concepts – Arithmetic – Decision Making : Equality and Relational Operators – Control Structures – if Selection statement- if..else Selection Statement – while Repetition Statement – Assignment operators- Increment and Decrement Operators - Essentials of counter-controlled repetition – for repetitionStatement – switch Multiple Selection Statement – Do..While Repetition Statement – The break and continue Statements – Labeled break and Continue Statements - Logical operators.

UNIT IV **15 Hrs.**

Functions: Program Modules in Java Script - Programmer-Defined Functions - Function Definitions – Scope Rules – Recursion – Recursion vs. Iteration - JavaScript Global Functions.

Arrays: Arrays - Declaring and allocating Arrays – Examples using Arrays - References and Reference Parameters – Passing Arrays to Functions - Sorting arrays – Searching Arrays : Linear and Binary Search – Multple-Subscripted Arrays.

UNIT V **15 Hrs.**

Objects: Introduction to Object Technology -Math Object - String Object - Date Object - Boolean & Number Objects.

Events : Introduction –Event ONCLICK – Event ONLOAD – Tracking the mouse with Event ONMOUSEMOVE – Rollovers with ONMOUSEOVER and ONMOUSEOUT – Form Processing with ONFOCUS and ONBLUR – More Form Processing with ONSUBMIT and ONRESET – More DHTML Events.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	H.M.Deital, P.J.Deital & T.R.Nieto	Internet and World Wide Web – How to Program	Pearson Prentice Hall of India	2012, Fourth Impression

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Shelley Powers, et al.,	Dynamic Web Publishing Unleashed	Techmedia, New Delhi	1998, 2nd Edition
2.	Thomas A.Powell,	HTML: The Complete Reference	Tata McGraw Hill	2000, 2nd Edition,
3.	Xavier C	World Wide Web design with HTML	Tata McGraw-Hill	2007 1nd Edition

Web Resources

1. http://www.webbasedprogramming.com
2. https://www.w3schools.com

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18CSUC409/ 18CAUC409	OPERATING SYSTEMS

Category	CIA	ESE	L	T	P	Credit
Core Paper	25	75	55	5	-	4

Preamble

The course provides a high-level understanding of the basic concepts and some knowledge of the services provided by the operating system.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of a process and its states	K1
CO2	Acquire the knowledge of real storage and virtual storage	K2
CO3	Procure the facts of processor scheduling by means of various scheduling algorithms	K2
CO4	Understand the basic operations on primary and secondary storage disks	K3
CO5	Get awareness about the functions of a file system. Able to relate UNIX and LINUX operating system	K2

Syllabus

UNIT I **14 Hrs.**

Introduction: Operating System. **Process Concepts:** Definition of Process – Process States – Process States Transitions – The Process Control Block – Operations of Processes – Suspend and Resume - Interrupt Processing - Semaphores. **Deadlock and Indefinite Postponement**.

Hands-on Exercise: Process- Create, Delete, Suspend and Resume a thread, Deadlock in Multithreading.

UNIT II **14 Hrs.**

STORAGE MANAGEMENT

Real Storage: Real Storage Management Strategies – Contiguous Versus Non-Contiguous Storage Allocation – Single User Contiguous Storage Allocation – Fixed Partition Multiprogramming – Variable Partition Multiprogramming. Virtual Storage: Virtual Storage Management Strategies – Page Replacement Strategies – Demand Paging – Page Size.

Hands-on Exercise: Best Fit algorithm in Memory Management.

UNIT III **15Hrs**.

PROCESSOR MANAGEMENT

Job and Processor Scheduling: Introduction – Scheduling Levels, Objectives, Criteria - Preemptive Vs Non-Preemptive Scheduling – Priorities – Deadline Scheduling – FIFO – RR – SJF – SRT – HRN.

Hands-on Exercise: Programming FIFO method.

UNIT IV **16 Hrs.**

AUXILIARY STORAGE MANAGEMENT

Disk Performance Optimization: Introduction - Operation of Moving-Head Disk Storage – Need for Disk Scheduling – Characteristics of Disk Scheduling Policies - Seek Optimization – RAM Disks - Optical Disks.

Hands-on Exercise: SSTF disk scheduling algorithm.

UNIT V **16 Hrs.**

File and Database Systems: Introduction – The File System – File System Functions – File Organization – Allocating and Freeing Space – File Descriptor – Access Control Matrix.- Access Control by User Classes.

Case Study: UNIX and Linux Comparison – Process Management – File Management – Device Drivers – Security.

Text Book

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Deitel H.M.	Operating Systems	Pearson Education Publication	2nd Edition

Reference Books

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Achyut S Godbole	Operating Systems	TMH Publications	2002
2	Harvey M. Deitel, Paul J. Deitel, David R. Choffnes	Operating Systems	Pearson Education	2003

Web Resources

1. https://computer.howstuffworks.com/operating-system.htm
2. https://www.techopedia.com/definition/9654/scheduling
3. https://www.tutorialspoint.com/operating_system/os_memory_management.htm
4. https://operatingsystemsam.wordpress.com/processor-management/
5. https://www.ibm.com/support/knowledgecenter/en/SSLTBW_2.3.0/com.ibm.zos.v2r3.ieae100/auxover.htm
6. https://www.includehelp.com/operating-systems/file-management-in-operating-system.aspx

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar.

SEMESTER IV

CODE	COURSE TITLE
18CSUCP04/ 18CAUCP04	WEB PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Practical - IV	40	60	-	5	55	3

Preamble

This course provides the knowledge for students to design web pages using simple HTML, CSS and JavaScript. This also enables the students to understand and implement the WEB applications.

Course Outcomes

On the successful of this course, student will be able to

CO Number	CO Statement	Knowledge Level
CO1	Design and develop their own web page	K2
CO2	Design and develop programs using CSS	K2
CO3	Implement the concept of functions in javascript	K3
CO4	Implement the concept of arrays and strings..	K3
CO5	Develop applications using Events and Objects.	K4

Practical List

1. Create a web page with
    1. Correct Structure (header and body)
    2. A title
    3. At least two different headings, with separate content following each heading
    4. An unnumbered list with at least 3 items
    5. A numbered list with at least 3 items
    6. At least 4 links to other web pages
    7. At least 1 picture
2. Create a XHTML Document using nested list with indentation
3. Use HTML and CSS to create a 3 column layout with a top banner section, 3 columns, and a bottom footer section. First column contains Buttons, second column shows the main content and third column contains advertisements.
4. Write CSS to make the following style changes:
    a) All elements in the body should have a white background with a text color of #330033 and the font Verdana or any serif available.
    b) The first-level headers are 40px bold serif font. The second-level headers are 24px underlined sans serif.
    c) Paragraph text and lists should have a width of 550px and a top and bottom padding of 10px.
    d) Ordered lists should have a background color of #FFCC99 and unordered lists should have a background color of #CCFFCC. All list elements should be in italics.
    e) Links should never show the default underlining and upon hovering they should become neon green(#33ff33)
5. Write a recursive function GCD that returns the greatest common division of x and y. The GCD of x and y is defined recursively as follows: if y is equal to 0 then GCD(x,y) is x;otherwise GCD(x,y) is GCD(y,x%y) where % is the modulus operator. Write a XHTML document to implement this function.
6. Write a function PERFECT that determines whether the given parameter is a perfect number. Use this function in a script that determines and displays all the perfect numbers between 1 and 1000.
7. Write a program to read numeric data and sort them using bubble sort.
8. Create a XHTML document using functions to calculate the volume of a sphere, cylinder and a cube. Use radio buttons for selecting a particular shape.
9. Write a program to read a string and use indexOf, lastIndexOf and split methods of String object.
10. Write a simple drawing program using onmousemove that allows the user to draw inside a box in red or blue by holding down the Shift or Ctrl keys.

Web Resources

1. https://www.w3resource.com/javascript-exercises
2. https://www.udemy.com/complete-web-development-course

Pedagogy

Demonstration, Flipped Learning

SEMESTER IV

CODE	COURSE TITLE
18CSUA404	ALLIED PAPER IV : OPERATIONS RESEARCH

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	70	5	-	5

Preamble

The objective of the course is to understand the mathematical tools to solve optimization problems. It also provides a quantitative technique or a scientific approach to the executives in making better decisions for operations under their control with the satisfactory customer service and optimum resource utilization.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Formulate a real-world problem into a mathematical programming model that involves an objective function to maximize the benefits with linear inequalities subject to constraints and Solve LPP problems by Simplex and Big-M methods	K3, K4
CO2	Apply appropriate method to find the initial basic feasible solution and solve the transportation and assignment problems towards optimality	K_3
CO3	Demonstrate the various inventory costs and Identify the inventory models to find the stock and reorder levels	K_2,K_3, K_4
CO4	Exercise and experiment the network construction by employing PERT for project planning and CPM for scheduling	K_2, K_3
CO5	Apply the replacement models to find the optimum replacement period for equipments.	K_3
CO6	Understand the characteristics of queuing system and apply them to solve problems of Single Server Infinite and Finite Population Model	K_2, K_3

Syllabus

UNIT I **14 Hrs.**

Linear Programming: Introduction – Mathematical Formulation of the Problem – Graphical Solution – General Form of LPP – Canonical & Standard form of LPP – Simplex Method – Big-M Method.

UNIT II **15 Hrs.**

The Transportation Problem: Mathematical Formulation of the Problem – Initial Basic Feasible Solution (North-West Corner Rule, Minimum Cost Method, Vogel's Approximation Method) – Moving towards Optimality – Unbalanced Transportation Problems.

UNIT III **16 Hrs.**

Assignment Problem: Mathematical Formulation of an Assignment Problem – Hungarian Assignment Method – Unbalanced Assignment Problems.

Inventory Control: Introduction – Various Costs involved in Inventory – EOQ models without Shortage - EOQ models with Shortage - Buffer Stock & Reorder Level.

UNIT IV **15 Hrs.**

PERT – CPM: Introduction - Rules of Network Construction – Critical Path Method – PERT Calculations.

UNIT V **15 Hrs.**

Replacement Problems: Introduction – Replacement of Equipments that deteriorates gradually - Replacement of Equipment that fails suddenly. **Queueing Theory:** Introduction – Characteristics of Queuing System –Problems from Single Server Infinite and Finite Population Model.

Text Book

S. No.	Author Name	Title of the Book	Publisher	Year and Edition
1	Kanti Swarup, Gupta P K & Man Mohan	Operations Research	S.Chand & Company Pvt. Ltd, New Delhi	2014, 17th Edition

Reference Book

S. No.	Author Name	Title of the Book	Publisher	Year and Edition
1	Gupta P K , Hira D S	Introduction to Operations Research	S.Chand& Company Pvt. Ltd, New Delhi	2007, 1st Edition

Web Resources

1. https://nptel.ac.in/courses/112106134/ - Fundamental of Operation Research
2. https://nptel.ac.in/courses/110106062/
3. http://www.nptelvideos.in/2012/12/fundamentals-of-operations-research.html
4. https://swayam.gov.in/operations-research/c/4/management

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar