DEPARTMENT OF COMPUTER APPLICATIONS

VISION

To be a Centre of Excellence in the discipline of Computer Applications and make students the world leaders both in educational and research through effective reaching and learning.

MISSION

- To develop human resource with sound knowledge-theory and practical in the discipline of Computer Applications and the ability to apply the knowledge to the benefit of the society at large.
- To inspire the sense of Sincerity in Teaching & Learning, Nobility in Profession and Service to the society for Academic & research excellence through a continuous process of improvement.
- To generate new knowledge by engaging in cutting-edge research and to promote academic growth by offering state-of-the-art undergraduate, postgraduate.
- To undertake collaborative projects which offer opportunities for long-term interaction with academia and industry.
- To make the students ready to meet the industry requirements.

MASTER OF COMPUTER APPLICATIONS

PROGRAMME EDUCATIONAL OBJECTIVES

- To empower women graduates to meet global challenges through innovative Teaching-Learning methodologies
- Apply ethical and social aspects of contemporary computing technology to design and develop computing artifacts
- To practice effectively as individuals and as team members in multidisciplinary projects involving technical, managerial, economical and social constraints
- To encourage students capability to set up their own enterprise in various sectors of Computer Applications
- To prepare the students to pursue higher studies in computing and related fields and to work in the fields of teaching and research

2018-19 ONWARDS

PROGRAMME OUTCOMES

The programme aids the graduates to

- Able to apply knowledge of Computer fundamentals, computing specializations and domain knowledge for the perception and conceptualization of computing models from defined problems and requirements.

- Skill to understand and analyze a given problem and intend practicable computing solutions.

- Able to use the techniques, skills and recent hardware and software tools necessary for innovative software solutions.

- Able to recognize the social, professional, cultural and ethical issues involved in the use of computer technology and give them due consideration in developing software systems.

- Able to master fundamental project management skills, concepts and techniques, set attainable objectives and ensure positive results, meeting scope, time and budget constraints.

			Vellalar College for Women (Autonomous), Erode - 12.							
			Master of Computer Applications							
			2018 - 2019 onwards							
			Course Content and Scheme of Examinations (CBCS Pattern)&OBE							
			Semester I							
Part	**Study Component**	**Subject Code**	**Title of the Paper**	**Inst. Hrs./ Week**	**Exam. Dur. Hrs.**	**Max. Marks**			**Credits**
						CIA	**ESE**	**Total**	
III	Core	18CAPC101	Digital Computer Fundamentals	4	3	25	75	100	4
		18CAPC102	Programming in C	4	3	25	75	100	3
		18CAPC103	Computer Organization and Architecture	4	3	25	75	100	4
		18CAPC104	Mathematical Foundations of Computer Science	4	3	25	75	100	4
		18CAPCP01	C Programming Lab	5	3	40	60	100	3
		18CAPCP02	Linux Lab (Script)	5	3	40	60	100	3
	Supportive I	18CAPA101	Accounting and Financial Management	4	3	25	75	100	4
							Total	700	25
			Semester II							
III	Core	18CAPC205	Object Oriented Programming with C++	4	3	25	75	100	3
		18CAPC206	Data Structures and Algorithms	4	3	25	75	100	4
		18CAPC207	Operations Research	5	3	25	75	100	4
		18CAPCP03	OOPS and C++ Lab	5	3	40	60	100	3
		18CAPCP04	Data structures Lab	5	3	40	60	100	3
	Supportive II	18CAPA202	Management Concepts and Communications	4	3	25	75	100	4
IV	Skill Based Subject I	18CAPSP01	Web Programming Lab	3	3	40	60	100	3
							Total	700	24

Part	Study Componenet	Sub. Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	CIA	ESE	Total	Credits
Semester III									
III	Core	18CAPC308	Java Programming	4	3	25	75	100	4
		18CSPC104/ 18CAPC309	Advanced Operating System	5	3	25	75	100	4
		18CSPC105/ 18CAPC310	Advanced Relational Database Management System	4	3	25	75	100	4
		18CAPC311	Software Engineering	4	3	25	75	100	4
		18CAPCP05	Java Programming Lab	5	3	40	60	100	3
		18CAPCP06	RDBMS Lab	5	3	40	60	100	3
IV	Skill Based Subject II	18CAPSP02	SOA and Web Services Lab	3	3	40	60	100	3
							Total	700	25
Semester IV									
III	Core	18CAPC412	Computer Networks	4	3	25	75	100	4
		18CAPC413	Data Mining Techniques	4	3	25	75	100	4
		18CAPCP07	Data Mining Lab	4	3	40	60	100	3
		18CAPCP08	Software Testing Lab	5	3	40	60	100	3
	Elective I	18CAPE411	Network Security	5	3	25	75	100	5
		18CAPE421	Enterprise Networking						
		18CSPE342/ 18CAPE431	TCP/IP						
		18CAPE441	Distributed Computing						
	Elective II	18CSPE231/ 18CAPE412	Soft Computing	5	3	25	75	100	5
		18CAPE412	Knowledge Based Systems						
		18CAPE432	Embedded Systems						
		18CAPE442	Natural Language Processing						
IV	Skill Based Subject III	18CSPS202/ 18CAPS403	Advanced Multiskill Paper	3	1*	40	60	100	3
							Total	700	27

2018-19 ONWARDS

Semester V

Part	Study Componenet	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
III	Core	18CSPC309/ 18CAPC514	ASP.NET Programming	4	3	25	75	100	4
		18CAPC515	Design of Information Systems	4	3	25	75	100	4
		18CSPCP04/ 18CAPCP09	ASP.NET Programming Lab	5	3	40	60	100	3
		18CAPCMPV	Mini Project **	4	_			100	3
	Elective III	18CSPE312/ 18CAPE513	Information Security /	5	3	25	75	100	5
		18CAPE523	Software Project Management /						
		18CAPE533	Multimedia and its Applications /						
		18CAPE543	Machine Learning						
	Elective IV	18CAPE514	Digital Image Processing/	5	3	25	75	100	5
		18CAPE524	Big Data Analytics/						
		18CAPE534	Cloud Computing/						
		18CSPE211 / 18CAPE544	Mobile Computing/						
IV	Skill Based Subject IV	18CAPS504	Python Programming	3	3	25	75	100	3
							Total	700	27

Semester VI

Part	Study Componenet	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.			Max. Marks	Credits
III	Core	18CAPC6PV	Major Project **	30	_			200	12
					Total (I - VI Semesters)			3700	140

** Project Report Evaluation- 80%   Viva-Voce- 20%   (Both Internal and External)

		SKILL BASED SUBJECTS			
S.No	Subject Code	Title of the Paper	Exam.Dur.Hours	Max. Marks	Credits
1	18CAPSP01	Web Programming Lab	3	100	**3**
2	18CAPSP02	SOA and Web Services Lab	3	100	3
3	18CSPS202/ 18CAPS403	Advanced Multiskill Paper	3	100	3
4	18CAPS504	Python Programming	3	100	3
		SELF LEARNING PAPERS(Optional)			
1	18CAPSL04	Internet of Things	3	100	5
2	18CSPSL15	PERL*	3	100	5
3	18CSPSL25	SCI LAB*	3	100	5

* Online Examination by Spoken Tutorial by IIT Bombay

* MOOCs Non-ranking Compulsory Credit Course for PG will be introduced in the Academic Year 2019-20 and Onwards.

Bloom's Taxonomy Based Assessment Pattern

Components of CIA Marks (Theory)

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

Bloom's Category	Section	Choice	Marks	Total
K1,K2	A	Compulsory	4 x 1 = 4	
K2,K3,K4	B	Either / Or	2 x 5 = 10	30
K2,K3,K4	C	Either/ Or	2 x 8 = 16	

Model and End Semester Examination

Bloom's Category	Section	Choice	Marks	Total
K1,K2	A	Compulsory (5 Multiple Choice & 5 Fill up)	10 x 1 = 10	
K2,K3,K4	B	Either / Or	5 x 5 = 25	75
K2,K3,K4	C	Either/ Or	5 x 8 = 40	

SKILL BASED SUBJECTS

Five **Questions out of** Eight   (5 ×15 = 75 marks)

SELF LEARNING PAPERS

Five **Questions out of** Eight   (5 ×20 = 100 marks)

2018-19 ONWARDS

CODE	COURSE TITLE
18CAPC101	DIGITAL COMPUTER FUNDAMENTALS

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

Preamble

The course covers the building blocks of digital system and application of knowledge to understand the digital electronics circuits.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understanding the basic concept of the number systems, logic gates	K1
CO2	Simplify the Boolean Functions with different methods	K2
CO3	Get awareness of combinational circuit	K2
CO4	Apply the Sequential circuits	K3
CO5	Understand the fundamental concepts of Registers, Counters and Memory unit	K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	M	S	S	M	S
CO3	S	M	S	M	M
CO4	M	M	S	S	S
CO5	S	M	S	S	M

S- Strong; M-Medium; L-Low

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 12 Hrs.

Simplification of Boolean Functions:The Map Methods – Two and Three Variable Maps – Product of Sums Simplification – NAND and NOR Implementations – Don't Care Conditions – The Tabulation Method – Determination of Prime-Implicants- Selection of Prime-Implicants.

UNIT III 12 Hrs.

Combinational Logic:Introduction – Design Procedure – Adders – Subtractors – Code Conversion – Analysis Procedure – Universal Gates – Exclusive-OR and Equivalence Functions. Combinational Logic with MSI and LSI: Introduction – Binary Parallel Adder – Decimal Adder – Magnitude Comparator – Decoders - De-multiplexers - Encoders– Multiplexers.

UNIT IV   **12 Hrs.**

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

UNIT V   **12 Hrs.**

Registers, Counters and the Memory Unit:Introduction – Registers – Shift Registers – Ripple Counters – Synchronous Counters – Timing Sequences – The Memory Unit – Examples of Random Access Memories.

Text Books

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1	M. Morris Mano	Digital Logic and Computer Design (Unit I, II)	PHI New Delhi	2004

Reference Books

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Albert Paul Malvino, Donald P Leach	Digital principles and Applications	Tata McGraw Hill	2008, 6th Edition
2	Puri .V.K.,	Digital Electronics – Circuits and Systems	Tata McGraw Hill	2013
3	Roger L. Tokheim	Schaum's Outlines of Theory and Problems of Digital Principles	Tata McGraw Hill	2004, 3rd Edition
4	Thomas C. Bartee	Digital Computer Fundamentals	Tata McGraw Hill	2005, Sixth Edition

Web Resources

1. www.UOP.edu.jo
2. www.csd.nutn.edu.tw
3. www.indiastudychannel.com

Pedagogy

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

CODE	COURSE TITLE
18CAPC102	PROGRAMMING IN C

Category	CIA	ESE	L	T	P	Credit
Core Paper II	25	75	55	5	-	3

Preamble

This course is designed to provide a comprehensive study of the C programming language, which provides students with the means of writing efficient, maintainable and portable code. The nature of C language is emphasized in the wide variety of examples and applications.

Course Outcomes

On the successful completion of the course, Students should able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the problem solving techniques using computer and basic concepts of C programming	K1
CO2	Apply conditional and iterative statements to write C programs	K3
CO3	Apply user defined functions to solve real time problems	K3
CO4	Make use of user defined data types including structures and unions to solve problems	K3
CO5	Experiment with files concept to show input and output of files and Error handling in C	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	L
CO2	S	M	M	M	M
CO3	S	M	S	M	M
CO4	M	S	S	M	M
CO5	M	S	S	M	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12 Hrs.

Tutorial Introduction – Types, Operators and Expressions: Variable Names – Data Types and Sizes – Constants – Declarations – Arithmetic Operators – Relational and Logical Operators – Type Conversions – Increment and Decrement Operators – Bitwise Operators – Assignment Operators and Expressions – Conditional Expressions – Precedence and Order of Evaluation.

UNIT II 12 Hrs.

Input and Output: Standard Input and Output – Formatted Output – printf – Variable–Length Argument Lists – Formatted Input – Scanf. Control Flow: Statements and Blocks – if … else – else if – switch – Loops: while, for and do while – break and continue – go to Labels.

UNIT III 12 Hrs.

Functions And Program Structure: Basics Of Functions – Functions Returning Non–Integers – External Variables – Scope Rules – Header Files – Static Variables – Register Variables – Block Structure – Initialization – Recursion – The C Preprocessor.

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UNIT IV **12 Hrs.**

Pointers and Arrays: Pointers and Arrays – Pointers and Function Arguments - Pointers and Arrays – Address Arithmetic – Character Pointers and Functions – Pointers Arrays; Pointers to Pointers – Multi Dimensional Arrays – Command Line Arguments – Pointers to Functions – Complicated Declarations.

UNIT V **12 Hrs.**

Structures: Basics of Structures – Structures And Functions – Arrays of Structures – Pointers to Structures – Self–Referential Structures – Table Lookup – Typedef - Unions – Bit Fields. Files: File Access – Error Handling – Stderr and Exit – Line Input and Output – Miscellaneous Functions.

Text Book

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Brain W. Kernighan and Dennis M. Ritchie	The C Programming Language	Prentice Hall of India Ltd	2010, 2nd Edition.

Reference Books

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Ashok N. Kamathane	C Programming with ANSI and Turbo c	Pearson Education	2006, 1st Edition
2.	Balagurusamy E.	Programming in ANSI C	Tata McGraw Hill	2012, 6th Edition
3.	Deitel & Deitel	C How to Program	PHI/Pearson Education Asia	2007, 5th Edition
4.	Yeswanth Kanetkar	Let us C	BPB	2009, 9th Edition
5.	Yeswanth Kanetkar	Understanding Pointers in C	BPB	2009,4th Edition
6.	Yeswanth Kanetkar	TSR through C	BPB	Illustrated 2002

Web Resources

1. www.spoken-tutorial.org
2. www.nptel.ac.in
3. https://www.tutorialspoint.com/cprogramming/index.htm
4. https://www.slideshare.net/gauravjuneja11/c-language-ppt
5. https://www.w3schools.in/c-tutorial/

Pedagogy

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

CODE	COURSE TITLE
18CAPC103	COMPUTER ORGANIZATION AND ARCHITECTURE

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

Preamble

This course will introduce students to the fundamental concepts underlying modern computer organization and architecture. Main objective of the course is to enable the students to learn about pipeline and vector processing and gain knowledge about computer arithmetic and input output organization.

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 computer architecture	K2
CO2	Ability to evaluate performance of different computer structures	K3
CO3	Analyzing the Parallel Processing, Pipelining techniques, Vector Processing and Array Processors and their impacts on performance	K4
CO4	Assess the communication and the computing possibilities of parallel system	K3
CO5	Analyze the difference between Memory Hierarchy	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	L
CO2	S	S	M	M	M
CO3	S	M	M	M	M
CO4	S	S	M	S	L
CO5	M	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **12 Hrs.**

Register Transfer and Microoperations: Register Transfer Language-Register Transfer- Bus and Memory Transfer-Arithmetic Microoperations – Logic Microoperations – Logic Microoperations – Shift Microoperations – Arithmetic Logic Shift Unit. Basic Computer Organization and Design: Instruction Codes- Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle.

UNIT II   **12 Hrs.**

Central Processing Unit: Introduction- General Register Organizations – Stack Organization – Instruction Formats – Addressing Modes- Data Transfer and Manipulation – Program Control.

UNIT III   **12 Hrs.**

Pipeline and Vector Processing: Parallel Processing – Pipelining- Arithmetic Pipeline – Instruction Pipeline – RISC pipeline – Vector Processing – Array Processors.Computer Arithmetic: Introduction – Addition and Subtraction.

UNIT IV   **12 Hrs.**

Input – output Organization: Peripheral Devices – Input- output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – Direct Memory Access (DMA) – Input – Output Processor (IOP).

UNIT V   **12 Hrs.**

Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Cache Memory – Virtual Memory.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Morris M. Mano	Computer System Architecture	Pearson Education	2000, 3rd Edition.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Hayes J.P.,	Computer Architecture and Organization	Tata McGraw Hill.	1998, 3rd Edition.
2.	Nicholas Carter	Computer Architecture Schaum's outlines	Tata McGraw Hill.	2007, 1st Edition.
3.	William Stallings	Computer Organization and Architecture – Designing for Performance	Pearson Education	2002, 6th Edition.

Web Resources

1. www.ece.uic.edu
2. www.edunotes.in
3. www.vidyathiplus.com

Pedagogy

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

CODE	COURSE TITLE
18CAPC104	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Category	CIA	ESE	L	T	P	Credit
Core	25	75	57	3		4

Preamble

This course provides the logical thinking and applications to computer science in basics of mathematical logic, graph theory and automata theory. The course also endeavors the students to improve their reasoning and problem solving capabilities.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Classify the basic logical operations using truth table and properties of logic.	K2
CO2	Compare and construct the basic principles of graph theory, matrix representation and tress.	K3
CO3	Solve the problems related to distribution, measures of central tendency, correlation and regression.	K3
CO4	Apply the concepts and able to solve the numerical methods and linear equations.	K3
CO5	Analyze the topics of automata theory and its applications.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	L
CO2	S	S	M	M	M
CO3	S	M	M	M	M
CO4	S	S	M	S	L
CO5	M	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   **12 Hrs.**

Mathematical Logic: Connectives – NAND and NOR Connectives, FunctionallyComplete Set of Connectives, Logical Networks, Principle Conjunctive and DisjunctiveNormal Forms, Equivalence of Statements, Formulae Derivations – Conditional Proof,Indirect Method of Proof, Automatic Theorem Proving.

UNIT II   **12 Hrs.**

Graph Theory: Basic Concepts of Graph Theory –Path, Reachability and Connectedness– Matrix Representation of Graphs – Trees – Storage Representation and Manipulation ofGraphs.

UNIT III **12 Hrs.**

Univarite Distribution – Frequency Distribution – Grouped and Ungrouped Distributions– Measures of Central Tendency – Measure of Dispersion – Coefficient of Variation.Bivariate Distribution: Correlation - Types of Correlation – Karl Pearson's Coefficientof Correlation – Rank Correlation – Regression – Regression Equations – Methods ofSolving Regression Equations.

UNIT IV **12 Hrs.**

Numerical Methods: Finding Roots, Bisection, Regula-Falsi, Newton Raphson Methods,Solutions of Simultaneous Linear Equations, Gaussian Elimination, Gauss-SiedalMethods.

UNIT V **12 Hrs.**

Introduction to Automata Theory: Finite State Automata – Deterministic and Non-Deterministic, Regular Expressions.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Gupta S.P	Statistical Methods	Sultan & Chand	2009,37th Edition
2.	Gupta S.C and Kapoor V.K	Fundamental of Mathematics Statistics.	Sultan Chand & Sons	2005,11th Edition
3.	Hopcroft and Ullman	Introduction to Automata Theory, Languages and Computation	Pearson Education	2001,2nd Edition.
4.	Kandaswamy P, Thialkavathy K and Ganavathi K	Numerical Methods	S. C.Chand & amp; Company Limited, New Delhi	2002,2nd Edition.
5.	Prof. Sunderasen. V, Ganapathy Subramanian K.S, Ganesan K	Discrete Mathematics	A.R. Publications	2001,New Revised Edition
6.	Trembley and Monohar	Discrete Mathematical Structures with Application to Computer Science	McGraw-Hill	2006,International Edition
7.	Venkataraman M.K	Numerical Methods in Science and Engineering	National Publishing Company	1999,5th Edition.

Pedagogy

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

CODE	COURSE TITLE
18CAPCP01	C PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Practical –I	40	60	-	-	75	3

Preamble

To make the students to write C program for various problems and learn advanced concepts of C programming.

Course Outcomes

On the successful completion of the course, Students should able to

CO Number	CO Statement	Knowledge Level
CO1	Distinguish different conditional and iterative statements in C	K3
CO2	Skills to describe arrays, strings and functions	K3
CO3	Demonstrate the concept of pointers and structures	K4
CO4	Illustrate the concept of files	K3
CO5	Apply numerical methods and statistics for various applications	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L
CO2	S	M	M	S	M
CO3	M	S	S	M	L
CO4	M	S	M	M	S
CO5	M	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

1. Program using Control structures.
2. Program using Arrays.
3. Program using Structure.
4. Program using Functions.
5. Program using Pointers.
6. Program using Files.
7. Program based on Numerical Algorithms and Statistics.

CODE	COURSE TITLE
18CAPCP02	LINUX LAB (Script)

Category	CIA	ESE	L	T	P	Credit
Practical	40	60	-	-	75	3

Preamble

This course provides the knowledge for students to know about Linux operating system, exercise various shell commands and it helps the students to write the simple shell scripts.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Identify and use linux utilities to create and manage simple file processing operations	K2
CO2	Design shell script using filters and pipes	K3
CO3	Design shell script to exhibit programming logic	K4
CO4	Implement conditional execution and repetitive task	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	S	M	M	M
CO3	M	S	S	M	S
CO4	M	S	S	M	L

S- Strong; M-Medium; L-Low

Syllabus

1. To implement the following commands in Linux.
   Banner, cal, cat, cmp, diff, grep, head, tail, echo, who.
2. To implement the following commands in Linux.
   a) List Linux files.
   b) Display Linux files.
   c) Copying and Renaming files.
   d) Change the file permissions.
3. Write a Shell Script to implement the following: pipes, Redirection, tee and filter commands.
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5. Write a Shell Script to print the given string in a reverse order.
6. Write a Shell Script to sort the given 5 numbers.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.
9. Write a shell script to print the multiplication table of the given argument using for loop.
10. Write a shell script for palindrome checking.

CODE	COURSE TITLE
18CAPA101	ACCOUNTING AND FINANCIAL MANAGEMENT

Category	CIA	ESE	L	T	P	Credit
Supportive I	25	75	55	5		4

Preamble

Recognize and understand ethical issues related to the accounting profession. Employ critical thinking skills to analyze financial data as well as the effects of differing financial accounting methods on the financial statements. Effectively define the needs of the various users of accounting data and demonstrate the ability to communicate such data effectively, as well as the ability to provide knowledgeable recommendations. Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Grasp the fundamental concepts of accounting and finance.	K2
CO2	Appraise the risk profile of firms; specifically, estimate the costs of capital, including debt and equity capital, using financial data.	K2
CO3	Demonstrate the ability to organize, analyze and draw appropriate conclusions from financial information.	K3
CO4	Analyze a business problem by incorporating diverse perspectives.	K3
CO5	Relate foundation business knowledge and skills to develop competent decisions in the areas of accounting, finance and information systems.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	M	S	M	S	S
CO3	M	S	S	M	S
CO4	S	S	M	M	M
CO5	M	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12 hrs.

Accounting: Definition, Objectives, Advantages, Accounting Concepts, Accounting Conventions, Methods of Accounting – Single Entry and Double Entry System. Basic Books of Accounts – Journal and Ledger – Preparation of Trial Balance. Final Accounts: Trading and Profit and Loss Account and Balance Sheet of Sole Proprietary Concern.

UNIT II 12 hrs.

Ratio Analysis: Meaning − Advantages − Limitations − Classification of Ratio: Profitability, Turnover and Solvency Ratios.

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UNIT III   **12 hrs.**

Funds Flow Statement: Concept of Funds − Funds Flow Statement − Uses and Limitations − Preparation of Fund Flow Statement.

UNIT IV   **12 hrs.**

Budget and Budgetary Control: Meaning and Definition, Objectives of Budgetary Control, Advantages and Limitations Preparation of Different Types of Budgets.

UNIT V   **12 hrs.**

Costing: Definition, Nature and Importance Advantages and Limitations of Cost Accounting Classifications of Cost − Preparation of Cost Sheet.Marginal Costing: Meaning, Advantage − Cost − Volume Profit Analysis − Break Even Analysis − Uses and Assumptions − Applications of Marginal Costing.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Reddy T.S and Hari Prasad Reddy	Management Accounting	Margham Publications.	2005, Special Edition
2.	Reddy T.S and Murthy	Financial Accounting	Margham Publications.	2003, 4th revised Edition
3.	Vinayakam N, Mani Nagarajan	Principle of Accountancy	Eurasia Publishing house, New Delhi,	2002, Revised Edition

Pedagogy

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

CODE	COURSE TITLE
18CAPC205	OBJECT ORIENTED PROGRAMMING WITH C++

Category	CIA	ESE	L	T	P	Credit
CORE	25	75	55	5	-	3

Preamble

To gain knowledge about the basic concepts of object oriented programming and to learn the programming constructs of C++. To develop effective computer programming skills in solving complex problems. To study the features, fundamentals, principles of Object Oriented Programming. To learn the concepts of Classes and Objects, Inheritance, File handling and String Handling. To analyze, write, debug, and test basic C++ codes using the approaches introduced in the course.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Get the knowledge of OOPs concept	K3
CO2	Understand the concepts such as functions, member functions, arrays and array of objects	K5
CO3	Apply the concepts of constructors, destructors and type conversions and illustrate different levels of inheritance	K5
CO4	Implement pointers with functions and accessing class members through pointers	K4
CO5	Apply managing console I/O and file operations on any small application	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	M	M	S	M
CO3	M	S	S	M	L
CO4	S	S	M	S	M
CO5	M	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12 Hrs.

Need For Object Oriented Programming – Characteristics of Object Oriented Languages– C++ Programming Basics – Loops And Decisions – Structures: A Simple Structure– Defining the Structure – Defining A Structure Variable – Accessing Structure Members– Other Structure Features – Structures Within Structures – Functions: Simple Function– Overloaded Functions – Inline Functions – Default Arguments.

UNIT II 12 Hrs.

Objects And Classes: A Simple Class – C++ Objects as Data Types – Constructors – Destructors – Objects as Function Arguments – The Default Copy Constructors –Returning

Objects From Functions – Structures And Classes – Classes Objects and Memory – Static Class Data – Arrays: Array Fundamentals – Array as Class Member Data – Arrays Of Objects – Strings as Class Members – A User Defined String Type.

UNIT III **12 Hrs.**

Operator Overloading: Overloading Unary Operators – Overloading Binary Operators –Data Conversion – Pitfalls of Operator Overloading and Conversion – Inheritance: Derived Class and Base Class – Derived Class Constructors – Overriding Member Functions – Class Hierarchies – Public and Private Inheritance – Levels of Inheritance –Multiple Inheritance – Ambiguity in Multiple Inheritance – Containership.

UNIT IV **12 Hrs.**

Pointers: Addresses and Pointers – Memory Management – Pointers to Objects –Pointers to Pointers – Virtual Functions – Friend Functions – Static Functions –Overloading the Assignment Operator – The Copy Constructor- Accessing Member Data with This Pointer – Using This for Returning Values.

UNIT V **12 Hrs.**

Files: Streams – String I/O – Character I/O – Object I/O – I/O With Multiple Objects –File Pointers – Disk I/O with Member Functions – Error Handling – Templates: Function Templates – Class Templates.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Robert Lafore	Object Oriented Programming in C++	Techmedia Publications Pvt. Ltd.	2002, 4th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ashok N. Kamthane	Object Oriented Programming with ANSI & Turbo C++	Pearson Education	2005, 1st Edition
2.	Balagurusamy E.	Object Oriented Programming with C++	TMCH	2011, 5th Edition
3.	Bjarne Stroustrup	The C++ Programming Language	Pearson Education	2002, 3rd Edition
4.	Ravichandran D.	Programming with C++	TMCH Publication	1999, 1st Edition
5.	Venugopal K.R., Rajkumar Puyya & Ravishankar T.	Mastering C++	TMCH Publications	1999, 1st Edition

Web Resources

1. www.spoken-tutorial.org
2. www.nptel.ac.in
3. https://www.tutorialspoint.com/cplusplus/index.htm

4. https://www.slideshare.net/nikbharat/basics-of-c-38638616
5. https://www.w3schools.in/cplusplus-tutorial/intro/

Pedagogy

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

CODE	COURSE TITLE
18CAPC206	DATA STRUCTURES AND ALGORITHMS

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

Preamble

Computer science student must possess knowledge about basic concepts of data structures, purpose of the data structures. The main objective of the course is to introduce the various data structures and its type .This course introduces fundamental concepts in data structures and algorithms. The course objective provides understanding about different way of representing data structures in memory, various operations done by data structures and its applications.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the different types of data structures and its operations and algorithms	K1
CO2	Understand the concept of linked list with its types	K1
CO3	Analyze the complex data structures such as trees and graphs	K3
CO4	Compare various sorting and searching algorithms	K2
CO5	Understand Hashing techniques and File organization methods	K1

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	L
CO2	S	M	S	M	M
CO3	M	M	S	S	S
CO4	M	S	M	S	M
CO5	S	M	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12 Hrs.

Introduction to Algorithms, Creation and Analysis of Algorithms. Array – Representation of Arrays – Stacks – Queues. Evaluation of Expression - Infix to Postfix Conversion- Multiple Stacks and Queues – Application – Towers of Hanoi.

UNIT II 12 Hrs.

Linked List: Singly Linked List – Linked Stacks and Queues – Polynomial Addition – More on Linked Lists – Sparse Matrices – Doubly Linked List – Dynamic Storage Management – Garbage Collection and Compaction.

UNIT III 12 Hrs.

Trees : Basic Terminology – Binary Trees – Binary Tree Representation – Traversals – More on Binary Trees – Threaded Binary Trees – Binary Tree Representation of Trees – Counting Binary Trees-Application – Game Trees. Graphs: Terminology and Representation-

Traversals – Connected Components – Spanning Trees – Shortest Path and Transitive Closure.

UNIT IV   **12 Hrs.**

Internal Sorting: Insertion Sort – Quick Sort – 2way Merge Sort – Heap Sort – Shell Sort – Sorting on Several Keys. External Sorting: Storage Devices – Sorting With Disks: K- Way Merging – Sorting with Tapes.

UNIT V   **12 Hrs.**

Symbol Tables: Static Tree Tables – Dynamic Tree Tables. Hash Tables: Hashing Functions – Overflow Handling. Files: Files, Queries and Sequential Organizations – Index Techniques - File Organizations.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ellis Horowitz, SartajShani	Fundamentals of Data Structures	G Galgotia Publication	1983, 1st Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Robort L. Kruse, Clovis L. Tondo, Bruce P. Leung	Data Structures and Program Design in C	PHI	2005, 2nd Edition
2.	Jean-paul Tremblay& Paul G. Sorenson	Data Structures with Applications	Tata McGraw Hill Company	2012, 2nd Edition
3.	Yashavant P. Kanetkar	Data Structures through C	BPB Publications	2007, 1st Edition

Web Resources

1. www.spoken-tutorial.org
2. www.nptel.ac.in
3. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
4. https://www.slideshare.net/DhavalKaneria/introduction-to-data-structures-and-algorithm-35441665
5. https://www.w3schools.in/data-structures-tutorial/intro/

Pedagogy

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

SEMESTER II

CODE	COURSE TITLE
18CAPCP04	DATA STRUCTURES LAB

Category	CIA	ESE	L	T	P	Credit
Practical	40	60	-	-	75	3

Preamble

This course provides the knowledge for student to code program in the field of C language and it helps to enhance their analyzing and problem solving skills. This also enables the students to understand and implement the concept of data structure.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Implement linear and nonlinear data structures	K3
CO2	Implement Conversion of infix expressions to postfix and evaluation of postfix expressions	K3
CO3	Apply the concept of polynomial addition	K3
CO4	Implement the operations of strings	K3
CO5	Implement sorting and searching techniques	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	M
CO2	S	S	M	M	M
CO3	M	S	S	S	L
CO4	M	S	S	M	M
CO5	S	M	M	S	L

S- Strong; M-Medium; L-Low

Syllabus

1. Creation and manipulations of array, stack, queue and circular queue.

2. Conversion of infix to postfix.

3. Addition of 2 polynomials.

4. Operations on strings.

5. Create and manipulate singly linked list, doubly linked list.

6. Sequential search, Binary search.

7. Tree traversal.

8. Quick sort, heap sort, radix sort, shell sort.

9. Binary tree construction.

10. Shortest path in graph.

CODE	COURSE NAME
18CAPC207	OPERATIONS RESEARCH

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

Preamble

To provide the students to understand the mathematical tools that are needed to solve optimization problems. It is an analytical method of problem-solving and decision-making that is useful in the management of organizations.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Get the knowledge about the linear programming model and apply to business problems	K3
CO2	Analyze the various methods in transportation and assignment models and apply it for testing the closeness of their results to optimal results	K4
CO3	Analyze the different approaches in inventory and apply them to stock and reorder level with different price breaks	K3
CO4	Analyze the various replacement techniques and apply them for arriving at optimal decisions. Apply the concepts of PERT and CPM for decision making and optimally managing projects.	K4
CO5	Analyze the characteristics of queuing system and apply them to the problem of finite/infinite population models	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	M	M	S	M
CO3	M	M	S	M	S
CO4	M	S	S	S	M
CO5	S	S	M	M	L

Syllabus

UNIT I **15 Hrs**.

Linear Programming: Formulation of LPP – Graphical solutions to LPP – Simplex Method – Big-M method – Two – Phase Simplex Method – Duality in Linear Programming: Primal & Dual Problems – Dual Simplex Method.

UNIT II **15 Hrs.**

The Transportation Problem: Introduction – Mathematical Formulation – Finding Initial Basic Feasible Solutions – Moving towards Optimality – Unbalanced Transportation Problems – Degeneracy. The Assignment Problem: Introduction – Mathematical formulation – Hungarian Assignment Method – Maximization in Assignment Problem – Unbalanced Assignment Problem – Impossible Assignment.

UNIT III   **15 Hrs.**

Inventory Control: Introduction – Costs involved in Inventory – Deterministic Models: EOQ Models without and with Shortage – Buffer Stock and Reorder Level – Price Break Models – ABC Analysis.

UNIT IV   **15 Hrs.**

Replacement Model: Introduction – Replacement of Items that Deteriorates Gradually: Value of Money Does Not Change with Time – Value of Money Changes with Time – Replacement of Items that Fails Suddenly: Individual Replacement – Group Replacement. PERT / CPM: Introduction – Construction of Network – CPM Calculations – PERT Calculations.

UNIT V   **15 Hrs.**

Queuing Theory: Introduction – Characteristics of Queuing System – Problems of Single Server with Finite / Infinite Population Model – Problems of Multi Server with Finite / Infinite Population Model.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Prem Kumar Gupta, Hira D.S	Problems in Operations Research	S.Chand& Co.,	Reprint 2007, 1st Edition
2.	Kant Swarup, Gupta P.K, Man Mohan	Operations Research	Sultan Chand & Sons	2014, 17th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Hamdy A. Taha	Operations Research–An Introduction	PHI/Pearson Edition Sultan Chand & Sons Tata McGraw Hill Pub Company Ltd	2012, 9th Edition
2.	FrederickHillier S, Gerald J. Lieberman	Introduction to Operations Research	Tata McGraw Hill Pub Company Ltd	2006,8th Edition
3.	Sharma S.D	Operations Research	Macmillan India Ltd	2010,15h Edition

Web Resources

1. http://personal.maths.surrey.ac.uk/st/J.F/chapter7.pdf
2. http://web.tecnico.ulisboa.pt/mcasquilho/compute/_linpro/TaylorB_module_b.pdf
3. http://www.pondiuni.edu.in/storage/dde/downloads/mbaii_qt.pdf
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5579525

Pedagogy

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

CODE	COURSE TITLE
10CAPCP03	OOPS AND C++ LAB

Category	CIA	ESE	L	T	P	Credit
CORE	40	60	-	-	75	3

Preamble

To get hands on experience in programming with object oriented concepts using C++ language. This Laboratory course will enable students to identify, formulate all techniques of software development in the C++ Programming Language and demonstrate these techniques by the solution of a variety of problems spanning the breadth of the language.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Justify the concepts of classes and objects	K2
CO2	Analyze the concepts of friend function , function overloading and operator overloading	K3
CO3	Create the concepts of type conversion, string manipulation and inheritance	K4
CO4	Handle the concepts of files and pointers using classes	K4
CO5	Implement the concepts of virtual function and templates	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	M
CO2	S	M	M	L	M
CO3	M	M	S	S	M
CO4	S	S	M	S	L
CO5	M	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

1. Program using Classes &Objects.
2. Program using Function Overloading.
3. Program using Friend function.
4. Program using Operator overloading functions.
5. Program using Type Conversion.
6. Program using String Manipulation functions.
7. Program using Inheritance.
8. Program using Files.
9. Program using Pointers.
10. Program using Virtual Function.
11. Program using Templates.

CODE	COURSE TITLE
09CAPA202	MANAGEMENT CONCEPTS AND COMMUNICATIONS

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

Preamble

To gain technical knowledge about the management concepts and business communications. The course is aimed at providing better insights into the basic principles, theories of various forms of organizations, functions and processes of management. To impart the basic function and roles of the management and its applications in business operations.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Gain knowledge about the functions of management, outline the steps of the decision-making process and produce improved business decisions	K2
CO2	Know the function of organization and the roles of managers, and evaluate the need for management in an organization	K3
CO3	Compare and contrast how various theories in management, leadership, and motivation can assist a person with improving and making a change in their work and/or personal life and Assess different leadership theories.	K3
CO4	Realize the role of effective communication in business and its barriers, discuss the concept of listening, dynamics of listening and develop skills to use latest technology used for communication.	K4
CO5	Illustrate how the concepts of management structure, management process, decision-making, communication and delegation of authority play a role in forming an effective team and gather ideas and information, to organize ideas relevantly and skillfully participate in debates, group discussions, interviews	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	M	M
CO2	S	M	S	S	M
CO3	M	S	M	S	S
CO4	M	M	S	M	M
CO5	S	S	M	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12 Hrs.

Nature and Functions of Management – Planning – Decision-Making.

UNIT II 12 Hrs.

Organization – Authority Delegation and Decentralization – Coordination.

UNIT III 12 Hrs.

Staffing – Training and Development – Leadership.

UNIT IV   **12 Hrs.**

Communication – Principles and Barriers to Communication – Listening.

UNIT V   **12 Hrs.**

Presentation Skills – Body Sport – Group Discussions and Interviews.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Asha Kaul	Business Communication	PHI, New Delhi	2002, 1st Edition
2.	Tripathi P. C, Reddy P. N	Principles of Management	TMH, New Delhi	2007, 3rd Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Harold Koontz, Heinz Weihrich	Essentials of Management	TMH, New Delhi	1998, 5th Edition
2.	Prasad L.M	Principles and practice of Management	Sultan Chand and Sons, Chennai	2007, 7th Edition
3.	Rajendra Pal and Korlahalli	Essentials of Business Communication	Sultan Chand and Sons, Chennai	2008, 11th Edition

Web Resources

1. www.spoken-tutorial.org
2. www.nptel.ac.in
3. https://www.tutorialspoint.com/management_principles/index.htm
4. https://www.slideshare.net/janettie/business-communication-52718943
5. https://www.slideshare.net/Sanzux/principles-of-management-sem-1-slides

Pedagogy

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

SEMESTER II

CODE	COURSE TITLE
18CAPSP01	WEB PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
SUPPORTIVE II	40	60	-	-	45	3

Preamble

This laboratory course encourages the student's to explore the designing of web application by implementing HTML& Java Script. This course challenges the students to exercise their creativity in bothprogramming and designing.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Design a webpage by the use of HTML	K2
CO2	Create HTML document using tables and forms	K3
CO3	Design Web Page using Frames	K4
CO4	Construct Dynamic Web Page,	K3
CO5	Create animation and validation through Java Script.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	M	M
CO2	S	M	S	M	M
CO3	M	S	M	S	M
CO4	S	S	M	M	L
CO5	S	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

1. Create a Web Page using HTML (headers, lists, links and image).
2. Create a HTML document with Tables.
3. Create a HTML document using Forms.
4. Create a Web Page using Frames
5. Write a Java Script to sort N numbers in ascending order
6. Validation through JavaScript.
7. Write a Java Script to perform Animation.
8. Prepare a sales bill for a departmental store using JavaScript.

CODE	COURSE TITLE
18CAPC308	JAVA PROGRAMMING

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

Preamble

This course introduces computer programming using the JAVA programming language with object-oriented programming principles. It will cover the advanced concepts of java like packages, interfaces, threads, applet and Graphics. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, AWT and SWING.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Illustrate concepts of object-oriented programming with inheritance.	K2
CO2	Describe the concept of multithreading, packages and interfaces.	K2
CO3	Create applet and enable Multithreaded applications.	K3
CO4	Demonstrate the use of AWT with event handling.	K3
CO5	Illustrate the concepts of Layout Managers and SWING with event handling.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	M	M	S	M
CO3	M	S	M	S	L
CO4	S	M	S	M	S
CO5	S	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   **12Hrs.**

Introducing classes – A closer look at methods and classes – Inheritance.

UNIT II   **12Hrs.**

Packages and interfaces – Multithreading – I/O Applets and other Topics

UNIT III   **12Hrs.**

Applet class – Event handling : Two event handling mechanisms – The delegation event model – Event classes – Sources of Events – Event Listener Interfaces- Using the Delegation Event Model – Adapter classes – Inner classes.

UNIT IV   **12Hrs.**

Introducing the AWT: working with windows, graphics and text. Using AWT controls: control fundamentals – Labels – Using Buttons – Applying Check boxes – CheckboxGroup-Choice Controls – Using Lists – Managing Scroll Bars – Using a TextField – Using a Text Area.

UNIT V   **12Hrs.**

Understanding Layout managers – Menu Bars and Menus – Dialog Boxes - FileDialog – Handling Events by Extending AWT components. Introducing Swing – Exploring Swing.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Herbert Schildt	The complete Reference Java	TMH Publishing Company Ltd., New Delhi.	2017, 10th Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bhave M.P., &Patekar S.A	Programming with Java	Pearson Education	2009, 1st Edition
2.	Herbert Schildt	Swing A Beginner's guide	TMH	2007, 1st Edition
3.	Sagayaraj, Denis, Karthik, Gajalakshmi	Java Programming for Core and Advanced Learners	University Press	2017, 1st Edition

Web Resources

1. www.javatpoint.com
2. www.roseindia.net
3. www.javalearner.com
4. www.w3resource.com
5. www.tutorialpoint.com/java
6. www.spoken-tutorial.org

Pedagogy

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

CODE	COURSE TITLE
18CSPC104/ 18CAPC309	ADVANCED OPERATING SYSTEM

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

Preamble

The purpose of this course is to study, learn and understand the advanced concepts of Advanced Operating System. To learn the mechanism of operating system to handle processes and threads and their communication.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall various OS architectures	K2
CO2	Ability to utilize various type of architecture for Resource management.	K4
CO3	Classify the implementation process management and file system	K4
CO4	Outline the principles of various OS	K1
CO5	Construct the process according to the complexity of a problem	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	S	S	L
CO3	S	S	M	L	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15Hrs

Fundamentals: What is a Distributed Computing System? Distributed Commuting System Models – What is Distributed Operating system – Issues in Designing a Distribued Operating System – Introduction to Distributed Computing Environment. Remote Procedure Calls: Introduction – The RPC Model – Transparency of RPC – Implementing RPC Mechanism – Stub Generation – RPC Messages – Server Management – Parameter Passing Semantics – Call Semantics – Communication Protocols for RPCs.

UNIT II 15Hrs

Distributed Shared Memory: Introduction – General Architecture of DSM Systems – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – Replacement Strategy – Thrashing – Advantages of DSM.

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock.

UNIT III   15Hrs.
Resource Management: Introduction – Desirable Features of a Good Global Scheduling Algorithm – Task Assignment Approach – Load Balancing Approach – Load Sharing Approach. **Process Management:** Introduction – Process Migration – Threads – **Distributed File System :** Introduction – Desirable Features of a Good Distributed File System – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication.

UNIT IV   15Hrs.
Introduction to the Kernel : Architecture of the Unix operating system – introduction to system concepts – kernel data structures. **Internal Representation of Files :** Inodes – structure of a regular file – directories – conversion of a path name to an inode – superblock – inode assignment to an new file – allocation of disk blocks. **The structure of processes:** process states and transitions – layout of system memory – the context of a process.

UNIT V   15Hrs.
Process Control: Process creation – process termination – awaiting process termination – invoking other programs – system boot and the init process. **Process scheduling and time:** Process scheduling – system calls for time.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Maurice J.Bach	The Design of the Unix Operating System	PHI Private Limited	2006.
2	Pradeep K, Sinha	Disstributed Operating System – Concepts and Design	Prentice Hall of India Private Limited	2006

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Andrew S.Tanenbaum, Maarten Van Steen	Distributed Systems: Principles and Paradigms	Prentice Hall of India,	2003
2.	Colulouris, G.DollimoreTimkindberg	Distributed System: Concepts and Design	Addition Wesley,	2000
3.	Sumitabha Das	Unix Concepts and Design		3rd edition

Pedagogy

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

CODE	COURSE TITLE
18CSPC105 / 18CAPC310	ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEM

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

Preamble

This course aims at facilitating the student to understand the various functionalities of DBMS software and perform many operations related to creating, manipulating and maintaining databases for Real-world applications and to understand the various designing concepts, storage methods, querying and managing databases. Able to develop, design and construct a typical enterprise database.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Summarize the basics and fundamentals of RDBMS and concept of Entity Relationship Model in Database Applications.	K2
CO2	Make use of SQL for Database Definition and Manipulation	K3
CO3	Demonstration of various normalization techniques and data modeling	K2
CO4	Create a RDBMS package using PL/SQL	K4
CO5	Ability to classify different types of databases.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	S	L	S
CO3	S	S	L	M	S
CO4	S	M	S	S	M
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12 Hrs.

Databases and Database Users: Introduction **Database System Concepts:** Data Models, Schemas and instances – Three schema Architecture and Data Independence – Database Languages and Interfaces – Database System Environment .**Data Modeling Using ER Model:** Entity Types, Entity Sets, Attributes and Keys –Relationships, Relationship Types, Roles and Structural Constraints – Weak Entity Types – ER Diagrams, Naming Conventions and Design issues - Enhanced Entity-Relationship (EER) Modeling.

UNIT II 12 Hrs.

 SQL: Data Definition Language(DDL) – Data Management and Retrieval - Working with Tables Functions and Grouping - Join and Set Operators **Advanced Features: Objects, Transactions and Data Control:** Views.

UNIT III 12 Hrs.

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines – Functional Dependencies - Normal Forms Based on Primary Keys – Definitions for Second and Third Normal Forms – Boyce – Codd Normal Form. **Relational Database Design Algorithms and Further Dependencies :**Multivalued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form. **Introduction to Transaction Processing Concepts and Theory:** Introduction to Transaction Processing – Transaction and System Concepts – Desirable Properties of Transaction – Transaction Support in SQL.

UNIT IV 12 Hrs.

PL/SQL Cursors and Exceptions: Cursors – Implicit Cursors – Explicit Cursors – Explicit Cursors Attributes - Implicit Cursors Attributes – Cursor FOR Loops – SELECT …FOR UPDATE Cursor – WHERE CURRENT OF Clause – Cursor with Parameters – Cursor Variables: An Introduction – Exceptions – Types of Exceptions. **PL/SQL Named Blocks**: Procedures- Functions – Packages – Triggers.

UNIT V 12 Hrs.

Enhanced Data Models for Advanced Applications : Multimedia Databases-**Introduction to Deductive Databases:** Overview of deductive Databases – Prolog/Datalog Notation-Clausal form and Horn Clauses –Interpretation of Rules –Datalog Programs and their Safety. **Distributed Databases:** Distributed Database Concepts – Types of distributed Database Systems

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	RamezElmasri, Shamkant B. Navathe	Fundamentals of Database Systems	Pearson Education	2005,4th Edition.
2.	Nilesh Shah	Database Systems Using Oracle	Pearson Education	2009,2nd Edition.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Abraham Silberschatz, Henry F. Korth, Sudarshan .S	Database System Concepts	MCGraw – Hill International	2014,6th Edition.
2.	Kandare S.S	Database Management and Oracle Programming	S.Chand & Company Ltd	2004,1st Edition.
3.	Rajesh Narang	Database Management Systems	Prentice Hall of India	2004,3rd Edition.
4.	C.J.Date	An Introduction to Database System	Addition Wesley Publications	2002,7th Edition.

Web Resources

1. WWW.tutorialspoint.com/sql/sql-rdbms-concepts
2. WWW.W3Schools.com/sql
3. www.intellipaat.com/tutorial/sql-tutorial/rdbms

Pedagogy

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

CODE	COURSE TITLE
18CAPC311	SOFTWARE ENGINEERING

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

Preamble

The main objective of the course is to provide the concepts of software engineering, Analyzing, designing, testing and assuring the quality of the developed software. To enable the students to overcome the various risk factors while developing the software in an efficient manner

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Able to build and use a model of the application to guide choices of the many trade-offs	K2
CO2	Developing model which is used to explain the behavior of the system and its performance	K3
CO3	Ability to schedule work both of his own and that of others	K3
CO4	Develop techniques for building software that can cope with heterogeneous platforms and execution environments	K4
CO5	Distinguish the strategic Approach of Software Testing and debugging. Analyze the quality of system using various metrics	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	M	S	S	M	M
CO3	S	S	M	S	M
CO4	M	S	M	M	S
CO5	M	M	S	S	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   **12 Hrs.**

Software and Software Engineering: The nature of the software- Software Engineering-The software process- Software Engineering Practice Process Models: A Generic process model-Perspective process models-Specialized process models- Personal and Team process models-Process Technology- Product and Process.

UNIT II   **12 Hrs.**

Principles that guide Practice : Software Engineering Knowledge- Core PrinciplesUnderstanding Requirements: Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-developing Use Cases- Building the requirements model- Negotiating requirements- Validating requirements. Requirements Modeling : Scenarios, Information and Analysis Classes : Requirements Analysis–Data Modeling Concepts.

UNIT III 12 Hrs.

Design Concepts : Design within the Context of Software Engineering – The Design Process-Design Concepts – The Design Model. Architectural Design : Software Architecture-Architectural Styles- Architectural Design- Architectural Mapping using Data Flow. Component-Level Design : What is a Component ? Designing Class-based Components – Conducting Component Level Deign – Component Based development.

UNIT IV 12 Hrs.

User Interface Design : The Golden Rules- User Interface Analysis and Design- Interface Analysis- Interface Design Steps- Design Evaluation. Software Quality Assurance : Background Issues-Elements of Software Quality Assurance-SQA Tasks, Goals and Metrics- Formal Approaches to SQA - Software Reliability - The ISO 9000 Quality Standards- The SQA Plan.

UNIT V 12 Hrs.

Software Testing Strategies : A Strategic Approach of Software Testing- Strategic Issues - The System testing - The Art of debugging.Testing Conventional Applications : Software Testing Fundamentals-Internal and External Views of Testing-White-Box Testing-Basis Path Testing- Control Structure Testing- Black Box Testing

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Roger S. Pressman	Software Engineering A Practitioner's Approach.	McGrw – Hill	2010, 7th International Edition.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli.	Fundamentals of Software Engineering	Prentice Hall of India,	2003, 2nd Edition
2.	Roger S. Pressman	Software Engineering: APractitioners Approach	Prentice Hall	2005, 6th Edition.
3.	Pankaj Jalote	An Integrated Approach to Software Engineering	Narosa Publishing Hous	2008,3rd Edition.

Web Resources

1. www.ceit.aut.ir
2. www.se.rit.edu
3. www.engppt.com

Pedagogy

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

CODE	COURSE TITLE
18CAPCP05	JAVA PROGRAMMING LAB

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

Preamble

This course provides the knowledge for students to develop programming in Java. This course helps to enhance students analyzing and problem solving skills. This also enables the students to understand and implement the GUI application using AWT and SWING.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Apply class and object concepts to solve real world problems.	K4
CO2	Design and develop programs using interfaces and packages.	K4
CO3	Demonstrate the concept of multithreading and applet.	K4
CO4	Implement the concept of Event Handling and AWT.	K4
CO5	Develop applications using Layout Managers and SWING.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	M	S	S	M	M
CO3	S	M	M	S	L
CO4	M	S	S	M	M
CO5	S	S	M	M	S

S- Strong; M-Medium; L-Low

Syllabus

1. Classes and objects
2. Inheritance
3. Packages
4. Interfaces
5. Multithreading
6. Applets
7. AWT controls
8. Event handling
9. Menus
10. Layout Managers
11. Swing controls
12. Trees in Swing

CODE	COURSE TITLE
18CAPCP06	RDBMS LAB

Category	CIA	ESE	L	T	P	Credit
Practical - VI	40	60	-	-	45	3

Preamble

This course aims at giving adequate exposure to students on the Database design and E-modelling. The course also facilitates students with hands on training on SQL and programming language extension to SQL within the RDBMS environment.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Design multiple tables and handle queries to populate a database	K2
CO2	Recognize the application of aggregate function, set operation and View.	K3
CO3	Analyze PL/SQL for Application development.	K4
CO4	Able to manage various error handling mechanisms	K5
CO5	Develop a DBMS package	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	M	S	L
CO3	S	L	S	M	S
CO4	S	M	S	S	M
CO5	S	M	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

i. SQL
1. Table Management.
2. Aggregate Functions.
3. Join Operations
4. Set Operations.
5. Triggers.
6. Views.
7. Grouping

ii. PL / SQL
1. Functions.
2. Procedure.
3. Cursor.
4. Packages.
5. Exception Handling

Pedagogy

● Lecture, PPT, Assignment, Group Discussion

CODE	COURSE TITLE
18CAPSP02	SOA and WEB SERVICES LAB

Category	CIA	ESE	L	T	P	Credit
Skill Based Subject II	40	60	-	-	45	3

Preamble

The exercises help the students to get the knowledge on SOA and Web services using XML.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Relate and Build an XML document for Address book create a DTD files.	K3
CO2	Relate and model a clear idea on creation of schema and CSS files.	K3
CO3	Construct an XSLT program XML document and use formatting.	k3
CO4	Make use of Microsoft DOM to navigate and extract information.	K3
CO5	Build Microsoft DSO to connect HTML form to the book's to the XML document and displays the information.	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	M	S	M	S	M
CO3	S	M	M	M	S
CO4	M	S	S	M	M
CO5	S	S	M	S	L

S- Strong; M-Medium; L-Low

Syllabus

1. Create an XML document to store an address book.
2. Create an XML document to store information about books and create a DTD files.
3. Create an XML schema for any XML document.
4. Create an XML document to store resumes for a job web site.
5. Present the book's XML document using cascading style sheet (CSS).
6. Write an XSLT program to extract book titles, authors, publications, book rating from the book's XML document and use formatting.
7. Use Microsoft DOM to navigate and extract information from the book's XML document.
8. Use Microsoft DSO to connect HTML form to the book's to the XML document and displays the information.

CODE	COURSE TITLE
18CAPC412	COMPUTER NETWORKS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	60			4

Preamble

The course provides insight about networks, topologies, and the key concepts. To gain comprehensive knowledge about the layered communication architectures (OSI and TCP/IP) and its functionalities. To understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP. To know the basic concepts of network security and its various security issues related with each layer

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Outline of basic network theory and layered communication architectures.	K2
CO2	Understand the issues of Data link layer and the elementary data link protocols with its types.	K2
CO3	Classify the various Routing algorithms.	K2
CO4	Make use of TCP and UDP protocols in various applications.	K3
CO5	Categorize the Network security algorithms and its uses.	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	L
CO2	M	S	S	M	M
CO3	S	S	M	S	M
CO4	M	S	S	M	M
CO5	S	S	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12Hrs.

Introduction: Use of Computer Networks – Network Hardware – Network Software-Reference Models .The Physical Layer: Guided Transmission Media – The PublicSwitched Telephone Network: Switching.

UNIT II 12Hrs.

Data Link Layer: Data Link Layer Design Issues – Error Detection and Correction – Elementary Data Link Protocols – Sliding Window Protocols – Protocol Verification.

UNIT III 12Hrs.

Network Layer: Network Layer Design Issues – Routing Algorithms: The optimalityprinciple- Shortest path routing – Flooding – Distance vector routing – Link state routing– Hierarchical routing – Broadcast routing – Multicast Routing. Congestion, ControlAlgorithms.

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UNIT IV   **12Hrs.**

Transport Layer: The Transport Service – Elements of Transport Protocol – TheInternet transport Protocols: UDP

UNIT V   **12Hrs.**

Application Layer: DNS. Network Security: Cryptography - Symmetric KeyAlgorithms: DES – AES. Public Key Algorithms: RSA. Digital Signature: Symmetric –Key Signatures – Public-Key Signatures.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year of Edition
1	Andrew S. Tanenbaum , David J.Wetherall	Computer Networks	Pearson Education	5th Edition, 2012.

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year of Edition
1	Behrouz A. Forouzan	Data Communications and Networking	TMH, New Delhi	2006, 2nd Edition
2	Ed Tittel	Computer Networking	TMH, New Delhi	2007, 1st Edition

Web References

1. www.computernetworkingnotes.com
2. www.tutorialpoints.com
3. www.smartzworld.com
4. www.tutorialride.com

Pedagogy

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

CODE	COURSE TITLE
18CAPC413	DATA MINING TECHNIQUES

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

Preamble

The objective is to introduce the concept of data mining tasks, statistical concepts and the techniques for machine learning that are used in data mining. It explains a variety of machine learning methods for both supervised and unsupervised data. It describes the different methods for association rule mining and web mining.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of data mining tasks , issues, metrics and its related concepts	K2
CO2	Describe the some of the statistical concepts and terminology associated with database systems and machine learning.	K2
CO3	Apply different methods for data classification and prediction algorithm.	K3
CO4	Apply different data clustering methods.	K3
CO5	Illustrate methods for mining frequent patterns, associations, and techniques for mining text documents	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	M	S	S	M
CO3	S	S	M	S	M
CO4	M	M	S	S	M
CO5	S	S	M	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 12Hrs.

Basic Data Mining Tasks – Data Mining Vs Knowledge Discovery in Databases – Data Mining Issues – Data Mining Metrics – Social Implications of Data Mining – Data Mining from a Database Perspective – Information Retrieval – Decision Support System- Dimensional modeling – Data Warehousing – OLAP.

UNIT II 12Hrs.

Data Mining Techniques: Introduction – A Statistical Perspective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNIT III 12Hrs.

Classification: Introduction – Statistical based Algorithms – Distance based Algorithms – Decision Tree based Algorithms – Neural Network based Algorithms – Rule based Algorithms – Combination Techniques.

2018-19 ONWARDS

UNIT IV   **12Hrs.**

Clustering: Introduction – Similarity and Distance Measures– Outliers – Hierarchical Algorithms – Partitional Algorithms- Clustering Large Databases.

UNIT V   **12Hrs.**

Association Rules: Introduction – Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules.Web Mining: Introduction – Web Content mining: Crawlers – Harvest System – Virtual Web View – Personalization – Web Structure Mining: PageRank – Clever – Web Usage Mining: Preprocessing – Data Structures – Pattern Discovery – Pattern analysis.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Margaret H. Dunham	Data Mining: Introductory and Advanced Topics	Pearson Education	2008, 1st Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Jiawei Han &Micheline Kamber & Jian Pei	Data Mining: Concepts and Techniques	Elsevier India Private Limited	2012, 3rd Edition
2.	Ian H.Witten, Eibe Frank, Mark A.Hall, Christopher J.Pal	Data Mining Practical Machine Learning Tools & Techniques	Elsevier India Private Limited	2017, 4th Edition

Web Resoruces

- www.tutorialspoint.com
- www.guru99.com
- www.tutorialride.com
- www.wideskills.com
- www.slideshare.net

Pedagogy

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

CODE	COURSE TITLE
18CAPCP07	DATA MINING LAB

Category	CIA	ESE	L	T	P	Credit
Practical – VII	40	60	-	-	60	3

Preamble

This course provides the skills for students to different preprocessing and visualization techniques. It demonstrates a variety of machine learning methods for both supervised and unsupervised data. It illustrates the different methods for association rule mining and web mining. This also enables the students to understand and implement the different data mining techniques.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Analyze the different preprocessing methods.	K4
CO2	Compare the different visualization techniques.	K4
CO3	Evaluate the different classification algorithms for bench mark dataset.	K5
CO4	Evaluate the different clustering algorithms for bench mark dataset.	K5
CO5	Implement the association rule mining and frequent item set approaches for bench mark dataset.	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	S	M	S	M	L
CO3	S	M	S	S	M
CO4	M	S	M	S	M
CO5	M	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

1. Data Preprocessing and Visualization
2. Attribute Selection
3. Association
4. Clustering
5. Classification

CODE	COURSE TITLE
18CAPCP08	SOFTWARE TESTING LAB

Category	CIA	ESE	L	T	P	Credit
CORE	40	60	-	-	60	3

Preamble

This course provides the knowledge for students to work in automated testing tools Win Runner, Silk Test, SQL Robot, Load Runner, JMeter& QTP. Understanding the software test automation problems and solutions. Learning how to plan a test project, design test cases and data, conduct testing operations, manage software problems and defects and generate a testing report. This also enables the students to understand and implement the testing tools.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Apply the concept of Design Phase Testing and Program Phase Testing using win runner tool	K3
CO2	Implement the concept of Debugging and Acceptance Testing using win runner tool	K4
CO3	Apply programming skills to evaluate the test results using silk test	K3
CO4	Implement the concept of Unit Testing, System Testing using silk test tool	K4
CO5	Apply stress testing using test director	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	S	M	M	S	M
CO3	M	M	S	S	M
CO4	S	S	M	M	S
CO5	S	M	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

1. Design Phase Testing.
2. Program Phase Testing.
3. Debugging.
4. Acceptance Testing.
5. Evaluation of test results.
6. Unit Testing.
7. System Testing.
8. Integration Testing.

Reference Books

Sl. No.	Authors	Title of the Book	Publisher	Year and Edition
1	Prasad, K.V.K.K	Software Testing Tools: Covering winrunner, Silk test, Loadrunner, J Meter, Test Director and QTP with case studies	Dream Tech press	2005, 1st Edition
2	Renu Rajani, Pradeep oak	Software Testing: Effective Methods, Tools and Techniques	TMH	2007, 1st Edition

CODE	COURSE TITLE
18CAPE411	NETWORK SECURITY

Category	CIA	ESE	L	T	P	Credit
Elective – I	25	75	70	5	-	5

Preamble

To learn the fundamentals of cryptography and acquire the knowledge on standard algorithms used to provide confidentiality, integrity and authenticity. To know how to deploy encryption techniques to secure data in transit across data networks. Network security can be applied in the field of electronic voting, electronic payment, job entry etc.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks	K2
CO2	To understand the standard algorithms used to provide confidentiality, integrity and authenticity.Encrypt and decrypt messages using block ciphers	K1
CO3	Implement various cryptographic techniques that provide information and network security	K2
CO4	What is the need for Kerberos authentication and the techniques?	K1
CO5	Implement the System Security, Password Management, viruses, Firewalls, Trusted systems in real life problems	K6

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	L
CO2	M	S	M	M	S
CO3	M	S	S	M	M
CO4	S	S	M	M	S
CO5	S	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15Hrs.

Introduction, attacks, service and mechanisms – security attacks- security attacks services – A model for internet security – Internet standards and RFCS Classical Encryption Techniques – Transportation Techniques – Rotor Mechanisms – Steganography.

UNIT II 15 Hrs.

Block ciphers and the data encryption standard simplified DES – Block Ciphers Principles – The data encryption standard – The strength of DES – Different and liner Cryptanalysis - Block cipher modes of operations. Public Key Cryptography and RSA: Principles of Public-Key Cryptosystems – The RSA Algorithm.

UNIT III 15 Hrs.

Key management : Other Public-Key Cryptosystems: Key management – Diffie– Hellman key exchange - Elliptic curve Arithmetic – Elliptic curve Cryptography – Message Authentication function – Message Authentication codes – Hash function - Security of Hash

functions & MACS. Digital Signatures – Authentication Protocols – Digital Signature standard.

UNIT IV   **15 Hrs.**
Authentication applications: Kerberos –X509 Authentication service. Electronic Mail security: Pretty good Privacy – S/ MIME 455.IP security: IP security overview – IP security Architecture - Authentication Header – Encapsulation security Payload.

UNIT V   **15 Hrs.**
Web security: Web security Considerations – Secure Sockets Layer and Transport Layer security – Secure Electronic Transaction. System Security: Intruders – Intrusion detection – Password Management. Firewalls: Firewall Design Principles –Trusted Systems.
Note: Self-study topics are denoted in Italics

Text Books

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1	William Stallings	Cryptography and Network Security Principles and practices	Pearson Education, New Delhi	2003, 3rd Edition
2	William Stallings	Network Security Essential Applications and Standards	Pearson Education, New Delhi	2003, 1st Edition

Reference Books

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Atul Kahate	Cryptography and Network security	TMCH, New Delhi	2008, 2nd Edition
2	Charlie Kaufman, Radia Perlman, Mike Speciner	Network Security Private Communication in a public World	PHI Learning	2002, 2nd Edition

Web Resources
1. www.onlinecourses.nptel.ac.in
2. www.mitel.com
3. www.vssut.ac.in

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

CODE	COURSE TITLE
18CAPE421	ENTERPRISE NETWORKING

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

Preamble

This course is designed to provide an in-depth view of the advanced technologies used in enterprise-wide computer networks. It gives the theoretical foundation and practical skills of advanced computer networks for many other relevant topics, such as distributed computing. This introduces theoretical, practical, and technical issues in enterprise-wide computer networks. It is also used to develop students interpersonal and teamwork skills

Course Outcomes

On the successful completion of the course, Students should able to

CO Number	CO Statement	Knowledge Level
CO1	Define organizational and functional requirements	K1
CO2	Define concept of network security and network types	K3
CO3	Classify communication and transmission mediums such as LAN, broadband and baseband, physical medium and peripherals	K2
CO4	Demonstrate distributed processing in LAN, MAN and also protocols conversions	K2
CO5	Compare asynchronous and synchronous file transfer and enterprise wide organizational problems	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	M	S	S	M	M
CO3	S	M	M	S	L
CO4	M	S	S	M	M
CO5	S	M	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 Hrs.**

Needs – Organizational Problems and Opportunities – System Dependent Issues – Features, Facilities – Mainframe Requirements – Micro Requirements – Functional Requirements – Single Vendor/Multi Vendor Environments - Services.

UNIT II **15 Hrs.**

Determine the Micro-to-Mainframe Link – Connective Versus Dedicated Networks – Micros, Mainframes and Networks. Network Security – OSI Security Architecture – Network Security Systems – The Impact of Security Measures.

UNIT III **15Hrs.**

LAN – Services and Servers – LAN Access Methods – Collision Avoidance and Detection - Bandwidth – Broadband, Base band – Telephony-the Physical Medium – Reliability – IBM's Impact on Microcomputer LANs – Micros Vs Mainframe Peripherals – Mainframes Vs Micro Peripherals.

UNIT IV   **15 Hrs.**

Distributed Processing and LANs – Distributed Computing – LANs and Mans – LANs and The Internet – IBM and EWC – LANs in a Digital DNA Environment – Protocol Conversion – Protocol Conversion on the Micro – Protocol Conversion Between the Micro and Mainframe – Protocol Conversion at the Mainframe – LANs Protocol Converters – Backward Emulation.

UNIT V   **15 Hrs.**

Issues – Asynchronous Modes of Transfer – Synchronous File Transfers – Other Important Data-link and File Transfer Protocols – Higher Layer File-Transfer Mechanisms – Reflections on the File Transfer Process. Accessing Common Databases – Client-Host Data Format Issues – Application-Specific Micro-To-Mainframe Systems – Multimedia Systems - Successful Networks for EWC. Networks and EWC – Open Issues – Finding the "Right" Solution for the Enterprise – Facing the Organizational Problem.

Text Book

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Thomas W.Madron	Enterprise-Wide Computing-How to Implement and Manage LAN	John Wiley & Sons	1991, New Delhi

Reference Books

Sl. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Gary A.Donahue	Network warrior	O'Reilly	2011, 2nd Edition
2.	Tamara	Network + Guide Networks	Thomas Learning	2002, 2nd Edition

Web Resources
1. www.spoken-tutorial.org
2. www.nptel.ac.in
3. https://www.slideshare.net/visualbeeNetwork/fundamentals-ofenterprise-networks
4. https://www.infinera.com/applications/enterprise-networks/
5. https://www.ece.uvic.ca/~itraore/elec567-13/notes/dist-03-4.pdf

Pedagogy

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

CODE	COURSE TITLE
18CSPE342/ 18CAPE431	TCP/IP

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

Preamble

To understand the principles, key protocols, data fragmentation, File transfer protocols and network management during data transmission.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Gain the knowledge about the concept of Arpanet, protocols and standards and connecting devices	K2
CO2	Demonstrate about IP package, datagram and debugging tools	K2
CO3	Make use of multicast routing protocol, Host Configuration and DNS operations in network management	K3
CO4	Outline various protocols.	K2
CO5	Analyze the application of network technologies in designated scenarios	K3

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	M
CO2	M	S	M	M	M
CO3	S	M	S	M	L
CO4	S	S	M	S	L
CO5	S	S	M	S	M

Mapping with Programme Outcomes

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15 Hrs.

A Brief history : Arpanet-Milnet-Csnet-Nsfnet-Ansnet-Protocols and Standards-Standards and Organizations-TCP/IP Protocol Suite-Addressing-Connecting Devices-Classful Addressing-Classless Addressing.

UNIT II 15 Hrs.

ARP : Proxy ARP - ATMARP- ARP Package - Internet control protocol version 4 : Datagram-Fragmentation-Optios-Checksum-IP Package-Internet Control Message Protocol Version 4(ICMPV4) : Messages-Debugging Tools- ICMP Package.

UNIT III 15 Hrs.

Multicasting and Multicast Routing Protocols :- Group management-IGMP messages-Multicast Routing:-Optimal Routing Shortest Path Trees-Routing Protocols :- MOSPF-Multicast Distance Vector-DVMRP-CBT-PIM-Host configuration :-DHCP operation-Domain name system :-Namespace-DNS in the internet-Resolution-DNS messages-Types of Records.

UNIT IV 15 Hrs.

File Transfer Protocol: FTP-TFTP-Electronic mail: User agent- -Message Transfer Agent (SMTP) - Message Access Agent –MIME- Web Based Mail.

UNIT V 15 Hrs.

Network Management SNMP : Concept-management components-SMI-MIB-SNMP-UDP ports-Security-IPV6 Addressing :- Introduction-Address Space Allocation-Global Unicast Address-AutoConfiguration-Renumbering- IPV6 protocol: Introduction-Packet format.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Behrouz A. Forouzan	TCP/IP Protocol Suite	Tata McGraw – Hill Publishing Company, New Delhi	2010, 4th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	RichardStevens W	TCP/IP Illustrated Volume 1: The Protocols	Pearson Education, New Delhi	2008, 1st Edition
2.	Comer	Internet working with TCP/IP Volume 1: Principles, Protocols & Architecture	Pearson Education, New Delhi	2007,5th edition

Web References

1. www.computernetworkingnotes.com
2. www.tutorialpoints.com
3. www.smartzworld.com
4. www.tutorialride.com

Pedagogy

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

CODE	COURSE TITLE
18CAPE441	DISTRIBUTED COMPUTING

Category	CIA	ESE	L	T	P	Credit
Core	75	25	56	4	-	5

Preamble

This course aims at helps the student to understand the basic concepts about distributed systems and various design considerations.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the distributed databases and distributed resources	K2
CO2	Explain distributed design considerations and network databases	K3
CO3	Describe network server concepts	K2
CO4	Describe the distributed database design and its administration	K4
CO5	Implement R process and various management	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	L
CO2	S	S	M	M	M
CO3	M	S	S	S	M
CO4	S	S	M	S	M
CO5	M	S	S	M	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15Hrs.

Distributed Systems: Pros and Cons of Distributed Processing – Distributed Databases – The Challenges of Distributed Data – Loading Factors – Managing the Distributed Resources – Division of Responsibilities.

UNIT II 15Hrs.

Design Considerations: Communication Line Loading – Line Loading Calculations – Partitioning and Allocation – Data Flow Systems – Dimension Analysis – Network Database Design Considerations – Ration Analysis – Database Decision Trees – Synchronization of Network Databases.

UNIT III 15Hrs.

Client/Server Network Model: Concept – File Server – Printer Server – an E-mail Server.

UNIT IV 15Hrs.

Distributed Databases: An overview – Distributed Databases – Principles of Distributed Databases – Levels of Distribution Transparency – Distributed Database Design – Distributed Database Administration.

UNIT V   **15Hrs.**

Distributed Database Systems: The R* Project – Architecture of R* - Compilation Execution and Recompilation of Queries – View Management – Transaction Management – Terminal Management – Heterogeneous Distributed Database Systems.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Joel M. Crichllow	Introduction to Distributed and Parallel Computing	PHI, New Delhi	2rd Edition, 2005. (Unit – III)
2.	Pradeep K, Sinha	Distributed Databases Principles and Systems	McGraw Hill Book Co., New York	1985 (Unit IV & V).
3.	Uyless D. Black	Data Communications and Distributed Networks	PHI, New Delhi	3rd Edition, 2004. (Unit I & II)

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	George Coulouris, Jean Dollimore and Tim Kindberg	Distributed Systems Concepts and Design	Pearson Education	3rd Edition, 2002
2.	StefansCeri, GinseppePelagatti	Distributed Systems	Addition Wesley	2nd Edition, 1993

Web Resources

1. https://www.tutorialspoint.com/artificial_intelligence/pdf/artificial_intelligence_expert_systems.pdf
2. https://en.wikipedia.org/wiki/Knowledge-based_systems

Pedagogy

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

SEMESTER IV

CODE	COURSE TITLE
18CSPE231/18CAPE412	SOFT COMPUTING

Category	CIA	ESE	L	T	P	Credit
Elective	25	75	71	4	-	5

Preamble

To understand the basic concepts of soft computing and gain knowledge on Neural Networks, Fuzzy systems and Evolutionary computing algorithms. To Create applications using fuzzy system.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Illustrate the basic concepts of AI Systems and Neural Networks	K2
CO2	Demonstrate Back propagation Networks with different parameters and applications	K3
CO3	Outline Fizzy set and crisp sets with example.	K2
CO4	Familiarize with Bio inspired algorithm.	K5
CO5	Analyze the behavior of evolutionary computing algorithms	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	L
CO2	S	S	L	M	S
CO3	S	M	S	S	M
CO4	S	M	S	S	L
CO5	S	S	M	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   **15 Hrs.**

Introduction to Artificial Intelligence Systems – Fundamentals of Neural Networks: Basic Concepts of Neural Networks – Human Bran – Modal of an Artificial Neuron – Neural Network Architectures – Characteristics of Neural Network – Learning Methods – Taxonomy of Neural Network Architectures – History of Neural Network Research – Early Neural Network Architectures – Some Application Domains.

UNIT II   **15 Hrs.**

Back propagation Networks: Architecture of a Back Propagation Network – Back Propagation Learning – Illustration – Applications – Effect of Tuning Parameter of the Back Propagation Neural Network – Selection of Various Parameters in BPN – Variations of Standard Back Propagation Algorithm – Research Directions.

UNIT III   **15 Hrs.**

Fuzzy Set Theory: Fuzzy Versus Crisp – Crisp Sets – Fuzzy Sets – Crisp Relations – Fuzzy Relations.

UNIT IV   **15 Hrs.**

Fuzzy System: Crisp Logic – Predicate Logic – Fuzzy Logic – Fuzzy Rule Based System – Defuzzification Methods – Applications.

2018-19 ONWARDS

UNIT V   **15 Hrs.**

Fundamentals of Genetic Algorithms: History of Genetic Algorithms – Basic Concepts – Creation of Off Springs – Working Principle – Encoding – Fitness Function – Reproduction. **Evolutionary computing algorithms:** Introduction-ACO-BCO-SA-PSO.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Rajasekaran S &VijalakshmiPai G.A	Neural Networks, Fuzzy Logic, and Genetic Algorithms, Synthesis and Applications	Prentice-Hall of India Private Limited, New Delhi	2005, Edition

Reference Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Samir Roy	Introduction to Soft Computing: Neuro - Fuzzy and Genetic Algorithms	Pearson Education,	2013, 1st Edition

Pedagogy

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

CODE	COURSE TITLE
18CAPE422	KNOWLEDGE BASED SYSTEMS

Category	CIA	ESE	L	T	P	Credit
Core	75	25	56	4	-	5

Preamble

This course aims at helps the student to understand the basic concepts about knowledge based systems and various database systems. To equip about various knowledge representation methods and different expert system structures.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the knowledge based systems and various formal logics	K2
CO2	Explain knowledge based logics	K3
CO3	Describe strategies and rule based expert systems	K2
CO4	Describe various functional approach and languages	K4
CO5	Implement knowledge processing	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	L
CO2	S	S	S	M	M
CO3	S	S	M	L	M
CO4	M	S	S	S	M
CO5	S	S	M	M	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15Hrs.

Introduction – Knowledge Base – Knowledge Base Systems – Current Developments – Definitions – Knowledge Representation, Formalisms Database – Conventional Database – Management Systems – Limitations of Existing DBMS – Fifth Generation DBMS Formal Logic – Pro-positional Logic – First Order Predicate Logic and Automated Theorem Proving. Logic and Database Systems.

UNIT II 15Hrs.

Use of Non-classical Logics – Many – Sorted Logics – Situational Logic – Non-monotonic Logic – Many – Valued Logics – Fussy Logic – Modal Logic Temporal Logic – Epistemic Logic – Type Theoretic Language and Intersectional Logic – Theories for dealing with Uncertainty.

UNIT III 15Hrs.

Production – Rule Based Systems – Introduction – Approaches to Problem – Solving – Search Strategies – Rule Based Expert Systems – Slot and Filler Knowledge Representations – Semantic Nets – Frame Base Systems – Scripts Conceptual Dependency.

UNIT IV   **15Hrs.**
Functional Approach to Knowledge Processing – Lambda Calculus –   Mc-Carthys's
approach – Database Query Language - Data Definition and Manipulation Language.
UNIT V   **15Hrs.**
Programming Languages and Knowledge Processing – Syntax – Recognizer – Contextual
Constraints – Semantics – Translation – Interpreters – PS – ALGOL – Special Purpose
Hardware for Knowledge Processing.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Richard Frost	Introduction of Knowledge Base Systems	Macmillan Publishing Company, New Delhi	1st Edition 1986.

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	RajendraAkerkar&PritiSajja	Knowledge Based Systems	Jones and Bartlett	1st Edition, 2009
2.	Joseph C. Giarratano& Gary D. Riley	Expert Systems : Principles and Programming	Course Technology	4th Edition, 2004.

Web Resources
1. https://www.tutorialspoint.com/artificial_intelligence/index.htm
2. https://www.geeksforgeeks.org/genetic-algorithms/
3. https://www.doc.ic.ac.uk/~nd/surprise_96/journal/vol4/cs11/report.html
4. http://www.umsl.edu/~joshik/msis480/chapt11.htm

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

CODE	COURSE TITLE
18CAPE432	EMBEDDED SYSTEMS

Category	CIA	ESE	L	T	P	Credit
Core	75	25	56	4	-	5

Preamble

This course aims at helps the student to understand the basic concepts embedded systems. To equip about various knowledge on modeling concepts and I/O devices. To understand the basic concepts of embedded Systems and Program modeling concepts.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the software, software in to a system and other hardware units	K2
CO2	Explain devices and buses for device network	K3
CO3	Describe modeling concepts and implementation	K2
CO4	Describe real time operating system	K4
CO5	Implement hardware and software co-designs	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L
CO2	S	S	M	S	S
CO3	S	M	S	S	S
CO4	M	M	L	M	S
CO5	S	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15Hrs.

Introduction to Embedded system: An embedded system – processor in the system – other hardware units – software embedded into a system-exemplary embedded systems – on chip and in VLSI circuit, processor and memory selection for an embedded systems.

UNIT II 15Hrs.

Devices and Buses for device network: I/O devices – timer and counting devices. Device drivers and interrupts servicing mechanism: device drivers – parallel port device drivers in a system – serial port device in a system – device drivers for internal programmable timing devices – interrupt servicing mechanism – context and the periods for context – switching, dead ling and interrupt latency.

UNIT III 15Hrs.

Program modeling concepts in single and multiprocessor systems s/w – development process-modeling processes for s/w analysis before s/w implementation-programming models for event controlled or response time constrained real time programs-modeling for microprocessor systems. S/w engineering practices in the embedded s/w development process: s/w algorithm complexity – s/w development process life cycle and its models – s/w analysis – s/w design – s/w implementation – s/w testing, validation and debugging – Real time programming issues during the s/w development process – s/w project management – s/w maintenance – UML.

UNIT IV 15Hrs.

Inter process communication and synchronization of process, Tasks and threads: Multiple processes in an application – problem of sharing data by multiple tasks and routines – IPC. Real Time Operating System: Real time and embedded systems operating systems – interrupt routines in RTOS environment – RTOS task scheduling models, Interrupt latency and Response times of the Tasks as performance metrices- performance metric in scheduling models for periodic, sporadic and a periodic tasks-IEEE standard POSIX 1003.1b functions for standardization of RTOS and inter-task communication functions – List of basic actions in a preemptive scheduler and expected times taken at a processor – filters- point strategy for synchronization between the processes, ISRs, OS functions and tasks and for Resource management.

UNIT V 15Hrs.

H/W –S/W co-design in an embedded system: Embedded system project management- embedded system design and co-design issues in system development processes – design cycle in the development phase for an embedded system – user of target system, or its emulator and in-circuit emulator – use of software tools for development of an embedded system – use of scopes and logic analysis for system hardware tests – issues in embedded system design.

Case Study: An embedded system for adaptive cruise control system in a car and for a smart card.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Raj Kamal	Embedded Systems – Architecture, Programming and Design	Tata McGraw Hill, New Delhi	1st Edition, 2003.

Reference Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	David E. Simon&PritiSajja	An Embedded Software Primer	Pearson Education, Asia	1st Reprint, 2003.

Web Resources

1. http://www.radio-electronics.com/info/processing-embedded/embedded-systems/basics-tutorial.php
2. *https://www.tutorialspoint.com/embedded_systems*

Pedagogy

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

CODE	COURSE TITLE
18CAPE412	NATURAL LANGUAGE PROCESSING

Category	CIA	ESE	L	T	P	Credit
Elective II	25	75	70	5		5

Preamble

Natural Language Processing addresses fundamental questions at the intersection of human languages and computer science. The students can acquire, comprehend and produce English. Can attain computational methods gives insight into observed human language phenomena. In this course, students will learn how computers can do useful things with human languages, such as translate from French into English, filter junk email, extract social networks from the web, and find the main topics in the day's news.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recognize the models, methods, and algorithms of statistical Natural Language Processing (NLP) for common NLP tasks, such as speech recognition, machine translation, spam filtering, text classification, and spell checking.	K2
CO2	Relate core computer science concepts and algorithms, such as dynamic programming.	K2
CO3	Gain understanding of linguistic phenomena and will explore the linguistic features relevant to each NLP task.	K2
CO4	Relate the methods to new NLP problems and will be able to apply the methods to problems outside NLP.	K3
CO5	Understand the programs to carry out natural language processing.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	M	S
CO2	S	S	M	M	M
CO3	M	S	S	S	M
CO4	M	M	S	M	M
CO5	S	S	M	M	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 15 hrs.

Introduction to Natural Language understanding – Linguistic background – Grammars and Parsing – Features and Augmented Grammars.

UNIT II 15 hrs.

Grammars for Natural Languages – Towards Efficient Parsing – Ambiguity Resolution Statistical Methods – Semantics and Logical forms.

UNIT III   **15 hrs.**

Linking Syntax and Semantics – Resolution – Strategies for Semantic Interpretation – Scoping and interpretation of noun phrases.

UNIT IV   **15 hrs.**

Knowledge Representation and Reasoning – Local Discourse Context and Reference – World Knowledge – Discourse Structure.

UNIT V   **15 hrs.**

Conversational Agent – Logic and Natural Language – Model – Theoretic Semantics – Semantics of Set Theoretic Models.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	James Allen	Natural Language Understanding	Pearson Education, New Delhi.	2011, 2nd Edition.

Reference Books

Sl.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Akshar Bharati, Vineet Chaitanya, Rajeev Sangal	Natural Language Understanding	Pearson	2006, 1st Edition
2.	Christopher D.Manning and HinrichSchutze	Foundations of Statistical Natural Language Processing	MIT Press	1999, 1st Edition.

Web Resources

1. www.dtic.mil/dtic/tr/fulltext/u2/a219096.pdf
2. https://www.scm.tees.ac.uk/isg/aia/nlp/NLP-overview.pdf
3. https://www.researchgate.net/publication/234796788_A_tutorial_on_natural-language_processing

Pedagogy

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

CODE	COURSE TITLE
18CSPS202/ 18CAPS403	**ADVANCED MULTISKILL PAPER**

Category	CIA	ESE	L	T	P	Credit
Skill Based Subject III	40	60	40	5	-	3

Objective : To equip knowledge on all topics as desirable for success in various competitive examinations.

UNIT I   **9Hrs.**

Communication: Question tags - Gerund and Infinitives - Spotting the errors – Synonyms – Antonyms - One word substitution – Sentence completion –Prepositions – Articles.

General Awareness and Scientific Aptitude: Socio - Economic - Banking – Basic Sciences

People and Environment - Politics and Current Affairs -Higher

Education - Information and Communication Technology - Teaching

Aptitude - Research Aptitude.

UNIT II   **9Hrs.**

Logical Reasoning : Syllogism – Statement Conclusions – Statement Arguments – Statement Assumptions – Statement Courses of Action – Inference – Cause and Effect – Visual Reasoning – Direction Sense Test – Blood Relation – Coding and Decoding – Deductive Reasoning.

UNIT III **9Hrs.**

Numerical Reasoning and Quantitative Aptitude: Age – speed – Heights and Distance – Time and Distance - Ratio and Proportion – Percentage – Fraction – Profit and Loss – Interest – Average – Calendar – Clocks– Probability – Series – Venn Diagram - Data Interpretation.

UNIT IV **9Hrs.**

Overview of Research Methodology :- Introduction – Mathematical tools for analysis-Research problems in management – types of research – research process.

Algorithmic Research: - Algorithmic Research problems – **Types of Algorithmic Research problems**: polynomial Algorithm for polynomial problem – **Steps of Algorithmic Research. Algorithmic Research:** Meta Heuristics for Combinatorial problems

UNIT V **9Hrs.**

Report writing and Presentation : Introduction – Types of Report – Guidelines for Reviewing draft – Report format – Typing instructions – Oral Presentation. **Hands on Tools** : SPSS / NS2 / LATEX.

Reference Books				
Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	**Agarwal.R.S**	Quantitative Aptitude	S. Chand and Company	Reprint 2012
	Datason. R.P, Manish Arora and Gulati.SW.L	Clerical Cadre Recruitment in State Bank of India	Newlight Publishers	2013
	Chopra.J.K	Bank Probationary Officers' Examination	Unique Publishers	2010
	Davinder Kaur Bright	Railway Recruitment Board	Bright Publications	2010
	Lal, Jain and Vashishtha, K.C	UGC NET/JRF/SET Teaching and Research Aptitude,	Upkar Prakashan Publishers	2012
	Pratyogita Darpan	UGC NET/JRF/SET Teaching and Research Aptitude	Upkar Prakashan Publishers	2012.

	Sharma.J.K	IBPS Recruitment of Bank Clerical Cadre Examination	Unique Publishers	2013
	Tara Chand	General Studies for Civil Services Preliminary Examinations, Paper – I	Tata Mc Graw Hill Education Private Ltd	2013
	Hari Mohan Prasad and Uma Rani Sinha	Objective English for Competitive Examinations New Delhi	Tata McGraw Hill Education Private Ltd	2011
	Jain T.S.	Upkar's SBI Clerical Cadre Recruitment Examination. Agra	Upkar Prakashan	-
	Panneerselvam .R	Research methodology	PHI Learning Private Ltd, New Delhi	2010

CODE	COURSE TITLE
18CSPC309/ 18CAPC514	**ASP.NET PROGRAMMING**

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

Preamble

Students will be able to understand the development and deployment of web applications.

Course Outcomes

On the successful of the course the students able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the framework of web programming and .NET	K1-K2
CO2	Gain knowledge of web forms and controls to create a user interface	K1-K2
CO3	Explore the knowledge on C#.NET with its applications	K1-K3
CO4	Access and manipulate data in a Microsoft SQL Server database by using Microsoft ADO.NET	K1-K3
CO5	Apply advanced controls in web applications	K2-K4

1.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	S	M	M	S	M
CO3	S	M	S	S	M
CO4	S	S	M	M	S
CO5	S	M	M	S	M

S- Strong; M-Medium; L-Low

UNIT I   **12 Hrs.**
ASP.NET 4.0 Essentials: Exploring the .NET Framework - Exploring the Visual Studio 2010
IDE - Exploring the ASP.NET 4.0.

UNIT II   **12 Hrs.**
Application Structure and State - Web Forms: Standard Controls

UNIT III   **12 Hrs.**
Introducing C# 2010 – Flow Control

UNIT IV   **12Hrs.**
.NET and SQL Server – Data Access with ADO.NET

UNIT V   **12Hrs.**
Validation Controls – Working with Database Controls : The SqlDataSource Control – The
AccessDataSource Control – The XmlDataSource Control – The GridView Control – The
DataList Control – The FormView Control - The Chart Control.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	**Kogent Learning Solutions Inc**	ASP.NET 4.0 Projects Black Book	DreamTech Press	Edition 2010.
2.	**Kogent Learning Solutions Inc**	.NET 4.0 Programming (6-in-1) Black Book	DreamTech Press	Edition 2011.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	**Mattnew MacDonald**	Beginning ASP.NET 2.0 in VB 2005	APress	First Indian Reprint 2006
2.	**Adam Freeman**	Applied ASP.NET 4 in Context	APress	First Indian Reprint 2012.

Web Resources
1. https://www.tutorialspoint.com/csharp/
2. https://www.guru99.com/asp-net-tutorial.html

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

CODE	COURSE TITLE
18CAPC515	**DESIGN OF INFORMATION SYSTEMS**

Category	CIA	ESE	L	T	P	Credit
Core	25	75	57	3		4

Preamble

This course provides the basic concepts of analysis and design of information systems and unified modeling language.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the principles and tools of Information systems	K2
CO2	Understand and apply the concept of DFD and Decision Tables	K3
CO3	Create use case to capture requirements for a software system and class diagrams that model both the domain model and design model of a software system	K3
CO4	Understand and apply packages diagrams that model the dynamic aspects of a software system	K3
CO5	Understand and apply state and activity diagram for software system	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	L
CO2	M	S	S	M	M
CO3	S	M	M	M	M
CO4	S	S	M	S	L
CO5	M	S	S	M	M

S- Strong; M-Medium; L-Low

UNIT I   **12 Hrs.**

Information and Management – Information systems Analysis overview – *Information gathering.*

UNIT II   **12 Hrs.**

Data Flow Diagram – Process Specification – *Decision Tables.*

UNIT III   **12 Hrs.**

Introduction - *Use Cases* – Class Diagrams: The Essentials – Interaction Diagrams.

UNIT IV   **12 Hrs.**

Class Diagrams: Advanced Concepts - Packages and *collaborations.*

UNIT V   **12Hrs.**

State Diagrams – Activity Diagrams – *Physical Diagrams.*

Note: Self study topics are denoted in *Italics*

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	**Rajaraman V**	Analysis and Design of Information System	Prentice – Hall of India	2nd Edition , 2004
2.	**Martin Fowler, Kendall Scott**	UML Distilled	Pearson Education	2nd Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	**Eriksson**	UML TOOL Kit	Addison Wesley, New Delhi.	
2.	**Ivar Jacobson**	Object Oriented Software Engineering; A Use Case Driven Approach	Addison Wesley	1994
3.	**. James A Senn**	Analysis & Design of Information Systems	MCH International Edition	2nd Edition, 1989
4.	**James Rumbough, Ivar Jacobson, Grady Booch**	The Unified Modeling Language Reference Manual	Addison Wesley, New Delhi	1999

Web Resources

1. https://www.geeksforgeeks.org/unified-modeling-language-uml-introduction/
2. https://www.tutorialspoint.com/uml/
3. https://nptel.ac.in/courses/106105087/14

Pedagogy

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

CODE	COURSE TITLE
18CSPCP04/ 18CAPCP09	**ASP.NET PROGRAMMING LAB**

Category	CIA	ESE	L	T	P	Credit
Practical IX	40	60	-	-	75	3

Preamble

To make the students to develop web applications using C#.NET in .NET environment.

Course Outcomes

On the successful completion of the course, Students should able to

CO Number	CO Statement	Knowledge Level
CO1	Implement web application using basic controls.	K3
CO2	Skills to develop application using advanced controls.	K3
CO3	Demonstrate the concept of flow control in C#.NET.	K4
CO4	Illustrate the concept of Data grid and Grid View Controls.	K3
CO5	Develop applications using XML Data Source Control.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L
CO2	S	M	M	S	M
CO3	M	S	S	M	L
CO4	M	S	M	M	S
CO5	M	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

Practical List

1. Develop a web application using controls.

2. Develop a web application using CSS and Hyper link control.

3. Develop a web application using Bulleted List Control and Drop down list.

4. Develop an ASP.NET web page to demonstrate the use of image control and File upload control.

5. Develop an ASP.NET web application using Custom Control (User Control).

6. Develop a web application to demonstrate Flow Control using C#.NET.

7. Develop a web application using Data List, DataGridView Controls.

8. Develop a web application using Chart Control.

9. Develop a web application using validation controls.

10. Develop a web application using XmlDataSource Control.

CODE	COURSE TITLE
18CSPE312/18CAPE514	INFORMATION SECURITY

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

Preamble

To enable the students to know about various security concepts and issues. To make awareness about Cyber Crimes and various types for security concepts

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	recall the basic of network security	K1
CO2	identify the various Network attacks	K3
CO3	define the metrics for security issues	K2
CO4	analyze the protocols for secured of electronic communication	K4
CO5	analyze the various security trends	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	S	S	L
CO3	S	S	L	M	S
CO4	S	S	M	S	M
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit I

Introduction – Computer and Computer Network – Internet – Computer and Network Security – Need and Basic goals of Computer Security – Security attacks, Threats and Vulnerabilities – Computer and Network Security Techniques.

Unit II

Telecommunication and Network Security: Introduction – Network Security Goals – Network Security Analysis – Problems in Network Security – Kinds of Network attacks – Model for Network Security – PKI – Electronic Mail Security – IP Security – Web Security – Tools for Network Security.

Unit III

Security Issues: Introduction – Security management Practices – Access control system – Operation security – Application and System Development – Business Community and Disaster Recovery planning – Physical Security.

Security Architecture and Models: Protection mechanisms – Assurance.

Unit IV

Law, Investigations and Ethics: Computer Crime – Laws – Investigation – Ethics.

Cyber Forensics: Cyber Crimes – Types of Cyber crimes – Cyber forensics – Reason for Forensics analysis – Classification of Forensics.

Unit V

Secure E-Commerce: Security Issues and Identifying Payment Related fraud – Electronic payment systems – protocols for secure transactions – Mobile commerce.

Emerging trends: Elliptic Curve Cryptography – Quantum Cryptography – Secure trends.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	S.M. Bhaskar, S.I. Ahson, NewDelhi,	Information Security-A Practical Approach	Narosa Publishing House Pvt. Ltd.	2008.

Reference Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition

1.		Michael E.Whitman, Herbert J. Mattord, Course Technology,	Principles of Information Security,	Cengage Learning India Pvt. Ltd.	2005, 2nd Edition

Web Resources
1. www.narosa.com
2. www.cengage.co.in
3. https://www.tutorialspoint.com/information_security_cyber_law/network_security.htm

Pedagogy

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

CODE	COURSE TITLE
18CAPE523	**SOFTWARE PROJECT MANAGEMENT**

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

Preamble

The objective of this course is to provide students with a sound understanding of the software project management concepts. This course focuses on approaches for managing and optimizing the software development process. This course will also focuses on each phase of the system development lifecycle.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Identify suitable software process model for software projects.	K1
CO2	Develop software metrics for measuring and managing software processes	K2
CO3	Understand software requirement phases	K2
CO4	Evaluate design and development phase	K4
CO5	Develop software metrics for measuring and managing software processes	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	S	S	L
CO3	S	S	M	L	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

Objective : To make the students understand the concept of software project management.

UNIT I 15Hrs.

Product Life Cycle: Introduction – Idea Generation – Prototype Development Phase – Alpha phase – Beta phase – Protection phase – Maintenance and obsolescence phase. Project Life Cycle Models: What is project life cycle model- A frame work for studying different life cycle models – The waterfall model – The prototype model – *The Rapid Application*

Development Model – The spiral model and its variants. Metrices: Introduction – The metrices roadmap – A typical metrices strategy – What should you measure – Set Targets and Track them – Understanding and Trying to minimize variability – Act on data – People and Organizational Issues in metrices programmes – Common Pitfalls to watch out for in metrices programmes – Metrices implementation checklists and tools.

UNIT II   15Hrs.

Software configuration management: Introduction – Basic definitions and terminology – The Process and Activities of software Configuration Audit – software configuration management in geographically distributed teams – Metrices in software configuration management – software configuration management tools and automation. Software quality assurance: How do you define quality – why is quality important in software – Quality Control and Quality assurance – *cost and benefits of quality* – software quality analyst's functions – some popular misconceptions about the SQA's role – software quality assurance tools – organizational structures – Profile of a successful SQA – measures of SQA success – pitfalls to watch out for in the SQA's role. Risk management: Introduction – what is Risk management and why is it important – Risk management cycle – Risk identification: common tools and techniques – Risk quantification – Risk monitoring – Risk mitigation – Risks and mitigation in the context of global project – Teams – some practical techniques in risk management – metrices in risk management.

UNIT III   15Hrs.

Software Requirements gathering: Inputs and start criteria for requirements gathering – Dimensions of requirements gathering – steps to be followed during requirements gathering – outputs and quality records from the requirements phase – skills sets required during the requirements phase – Differences for a Shrink wrapped software – challenges during the requirements management phase metrices for the requirement phase. Estimation: What is estimation – When & Why is estimation done – *The Three phases of estimation* – estimation methodology – Formal models for size estimation – Translation effort estimated into schedule estimates – common challenges during estimation – metrices for the estimation processes.

UNIT IV   15Hrs.

Design and development phases: some difference in our chosen approach – Salient features of design – Evolving an architecture / Blueprint – design for reusability – Technology choices / constraints – Design to standards – design for portability – User interface issues – design for testability – design for diagnosability – design for maintainability – design for Installability – Inter – Operability design – *challenges during design and development phases* – skill sets for design and development metrices for design and development phases. Project management in the testing phase: Introduction – what is testing – what are the activities that make up testing – test scheduling and types of tests – people issues in testing – management structures for testing in global teams – metrices for testing phase.

UNIT V   15Hrs.

Project management in the maintenance phase: Introduction – activities during the maintenance phase – management issues during the maintenance phase - configuration management during the maintenance phase – skill sets for people in the maintenance phase – estimating size, effort and people resources for the maintenance phase – advantages of using

geographically distributed teams for the maintenance phase – metrices for the maintenance phase. Globalization issues in project management: *Evolution of globalization* – challenges in building global teams – models for the execution of some effective management techniques for managing global teams. Impact

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Gopalswamy Ramesh	Managing Global Software Projects	Tata McGraw Hill	2003

Reference Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	**Bob Hughes S.A, Mike Cotterel**	Software Project Management	TMH, New Delhi	4th Edition, 2006.
2.	**Derrel Ince, Sharp H and Woodman M**	Introduction to Software Project Management and Quality Assurance	Tata McGraw Hill	1995
3.	**Kelkar**	Software Project Management –A concise study	PHI, New Delhi	2003
4.	**Stephen H. Kan,**	Metrices and Models in Software Quality Engineering	Pearson Education Asia, New Delhi	2nd Edition

Web Resources

3. https://www.slideshare.net//spm-technology-12567255

Pedagogy

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

CODE	COURSE TITLE
	MULTIMEDIA AND ITS APPLICATIONS
18CAPE533	

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

Preamble

The objective of this course is to provide students with a basic understanding of multimedia systems. This course focuses on topics in multimedia information representation and multimedia standards especially on the audio, image and video. This course will also arouse students' interest in the course and further motivate them towards developing their career in the area of multimedia applications.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand how to make Multimedia presentation and analog and digital conversion and hardware requirement of multimedia system.	K1
CO2	Describe how to use text, images, color models and file formats in multimedia design	K2
CO3	Define audio digitization, audio file format and audio software.	K2
CO4	Summarizethe digital video standards, formats and technology and also the basic principles behind animation and techniques.	K2
CO5	Define the Processes of Making Multimedia and also create a storyboard for the animation project.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	**S**
CO2	S	M	S	S	L
CO3	S	S	M	L	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Objective : To make the students understand the various representation of multimedia and its types.

UNIT I   **15Hrs.**

Multimedia: Multimedia Presentation and Production-Characteristics of a Multimedia Presentation-Multiple Media-Utilities of Multisensory Perception-*Hardware and Software Requirements* – Uses of Multimedia-Promotion of Multimedia Based Content-Steps for Creating a Multimedia Presentation. **Digital Representation** –Analog Representation-Waves-Digital Representation-Need for Digital Representation-Analog to Digital Conversion-Digital to Analog Conversions-Importance and drawbacks of Digital Representation.

UNIT II   **15Hrs.**

Text: Types of Text-Font-*Insertion of Text*-Text Compression-File Formats-**Image:**Image Types-Seeing Color-Color Models-Basic Steps for Image Processing-Scanner-Digital Camera-Specifications of Digital Images-Color Management System-Device Independent Color Models-Image Processing Software-File Formats-Image Output on Monitor and Printer.

UNIT III   **15Hrs.**

Audio: Acoustics-Nature of Sound Waves-Fundemental Characteristics of Sound-Elements of Audio Systems-Microphone-Amplifier-Loudspeaker-Audio Mixer-Digital Audio-Synthesizers-MIDI-*Basics of Staff Notation*-Sound Card-Audio Transmission-Audio File Formats and CODECs -Audio Processing Software.

UNIT IV   **15Hrs.**

Video: Analog Video Camera-Digital Video-Video File Formats and CODECs-Video Editing Software-**Animation:** Types of Animation-Computer Assisted Animation-*Creating Movement*-Principles of Animation-Some Techniques of Animation-Animation on the web-3D Animation-Rendering Algorithms.

UNIT V   **15Hrs.**

Multimedia Documents: Document and Document Architecture – Designing a Multimedia Interchange Format-Markup-SGML - **Multimedia Application Development:**Software Life Cycle-Conceptualization-*Content Collection and Processing*-Story-Flowline-Script-Storyboard-Implementaion-Authoring Metaphors-Testing and Feedback-Final Delivery-Report Writing/Documentation

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ranjan Parekh	Principles of Multimedia	Tata McGraw Hill, New Delhi	2011

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Gokul S	Multimedia Magic	BPB Publications, New Delhi.	2002
2.	John F. Koegel Bufford	Multimedia systems	Pearson Education, New Delhi.	2001
3.	Tay Vaughan	Multimedia making it work	Tata McGraw Hill, New Delhi	6th Edition, 2005.

Web Resources
1. https://www.slideshare.net/VishnuRam7/multimedia-technology-12567255
2. https://littlevision.files.wordpress.com/2013/12/multimedia-technology.pdf

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

CODE	COURSE TITLE
18CAPE543	**MACHINE LEARNING**

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

Preamble

The objective of this course isintroduces several fundamental concepts, algorithms and methods for machine learning. Several software libraries and data sets publicly available will be used to illustrate the application of these algorithms. The emphasis will be thus on machine learning algorithms and applications, with some broad explanation of the underlying principles.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts and applications of machine learning techniques and associated computing techniques and technologies. understand how to apply a variety of learning algorithms to data and how to perform evaluation of learning algorithms and model selection.	K1
CO2	Improve and develop methods and algorithms as applicable to machine learning and data mining. identify algorithmic aspects in machine learning and data mining tasks, evaluate correctness and efficiency of the used methods, and their applicability in each current situation.	K1,K2
CO3	Autonomously extend the knowledge acquired during the study course by reading and understanding scientific and technical documentation.	K2
CO4	Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.	K3
CO5	Design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	**S**
CO2	S	M	S	S	L
CO3	S	S	M	L	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   **15Hrs.**

Introduction: What Is Machine Learning? - Examples of Machine Learning Applications. **Supervised Learning:** Learning a Class from Examples – Vapnik - Chervonenkis (VC) Dimension - Probably Approximately Correct (PAC) Learning – Noise - Learning Multiple Classes – Regression - Model Selection and Generalization - Dimensions of a Supervised Machine Learning Algorithm.

UNIT II   **15Hrs.**

Bayesian Decision Theory: Introduction – Classification - Losses and Risks - Discriminant Functions - Utility Theory - Association Rules. **Parametric Methods:** Introduction - Maximum Likelihood Estimation - **Evaluating an Estimator:** Bias and Variance 65 - The Bayes' Estimator - Parametric Classification – Regression - **Tuning Model Complexity:** Bias/Variance Dilemma - Model Selection Procedures.

UNIT III   **15Hrs.**

Multivariate Methods: Multivariate Data - Parameter Estimation - Estimation of Missing Values - Multivariate Normal Distribution - Multivariate Classification - Tuning Complexity - Discrete Features - Multivariate Regression . **Dimensionality Reduction:** Introduction - Subset Selection - Principal Components Analysis - Factor Analysis - Multidimensional Scaling - Linear Discriminant Analysis – Isomap - Locally Linear Embedding.

UNIT IV   **15Hrs.**

Clustering: Introduction - Mixture Densities- k-Means Clustering -Expectation-Maximization Algorithm - Mixtures of Latent Variable Models - Supervised Learning after Clustering - Hierarchical Clustering - Choosing the Number of Clusters. **Decision Trees:** Introduction - Univariate Trees - Classification Trees - Regression Trees - Pruning - Rule Extraction from Trees - Learning Rules from Data - Multivariate Trees.

UNIT V   **15Hrs.**

Hidden Markov Models: Introduction - Discrete Markov Processes - Hidden Markov Models - Three Basic Problems of HMMs - Evaluation Problem - Finding the State Sequence - Learning Model Parameters - Continuous Observations - The HMM with Input - Model

Selection in HMM. **Design and Analysis of Machine Learning Experiments:** Introduction - Factors, Response, and Strategy of Experimentation - Response Surface Design - Randomization, Replication, and Blocking - Guidelines for Machine Learning Experiments - Cross-Validation and Resampling Methods - Measuring Classifier Performance - Interval Estimation - Hypothesis Testing.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Alpaydin Ethem	Introduction to Machine Learning	Massachusetts Institute of Technology.	Second Edition,2010

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Mitchell	Machine Learning	McCraw Hill Education private Limited	First edition 2011.
2.	Christopher Bishop	Pattern Recognition and Machine Learning (Information Science and Statistics) Hardcover – Import		**Second Edition, Springer 2011.**
3.	S.S. Vinod Chandra and S. Anand Hareendran	Artificial Intelligence and Machine Learning Paperback		First edition , PHI Learning 2014.

Web Resources

1. https://kkpatel7.files.wordpress.com/2015/04/alppaydin_machinelearning_2010.pdf
2. https://littlevision.files.wordpress.com/2013/12/multimedia-technology.pdf

Pedagogy

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

SEMESTER V

CODE	COURSE TITLE
18CAPE514	**DIGITAL IMAGE PROCESSING**

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

Preamble

This course aims at exploring the knowledge to the student to provides a mathematical basis for further study and research in image and video processing, computer vision, and image understanding. The main focus is learning and understanding the fundamentals of digital image processing, and various image Transforms, Image Enhancement Techniques, Image restoration Techniques and methods, image compression and Segmentation used in digital image processing. Student will also have sufficient expertise in the theory of two-dimensional signal processing and its wide range of applications, for example, image restoration, image compression, and image analysis.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of digital image processing system and image formation	K1, K2
CO2	Explain different image enhancement and restoration techniques and evaluate the images in spatial domain using various image transforms	K3
CO3	Analyze the basic image preprocessing techniques based on filtering techniques	K4
CO4	Categorize and interpret the various image compression techniques	K3
CO5	Evaluate the methodologies for image segmentation and representation techniques and apply image processing algorithms in practical applications.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	M	S	S
CO3	S	S	M	M	S
CO4	S	M	M	M	M
CO5	S	M	M	S	M

S - Strong; M - Medium; L - Low

Syllabus

UNIT 1   15 Hrs.

Introduction: What is Digital Image Processing– Examples of fields that use DIP – Fundamentals Steps in DIP – Components of an Image Processing System. **Digital Image Fundamentals:** Elements of Visual Perception – Light and the Electromagnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationship Between Pixels – Linear& Nonlinear Operations.

UNIT 2   15 Hrs.

Intensity Transformations and Spatial Filtering: Background – Some Basic Intensity Transformations Functions – Histogram Processing – Fundamentals of Spatial Filtering – Smoothing Spatial Filters – Sharpening Spatial Filters – Combining Spatial Enhancement Methods.

UNIT 3   15 Hrs.

Image Restoration: A Model of the Image Degradation / Restoration Process – Noise Models – Restoration is the Process of Noise only – Spatial Filtering – Periodic Noise Reduction by Frequency Domain Filtering – Linear, Portion – Invariant Degradations – Estimating the Degradation Function – Inverse Filtering– Geometric Mean Filter.

UNIT 4   15 Hrs.

Image Compression: Fundamentals. **Some Basic Compression Methods**: Huffman Coding – Arithmetic Coding – LZW Coding – Run-Length Coding – Bit-Plane Coding – Wavelet Coding.

UNIT 5   15 Hrs.

Image Segmentation: Fundamentals – Point, Line, Edge Detection – Thresholding – Region – Based Segmentation – Segmentation by Morphological Watersheds.

Text Book

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Rafael C. Gonzalez, Richard E. Woods	Digital Image Processing	PHI / Pearson Education, New Delhi	3rd Edition, 2012

Reference Books

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Chanda B, Dutta Majumder D	Digital Image Processing and Analysis	PHI, New Delhi	2003
2	Nick Efford	Digital Image Processing a practical introducing using Java	Pearson Education, New Delhi	2004

Web Resources

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

Pedagogy

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

CODE	COURSE TITLE
18CAPE524	**BIG DATA ANALYTICS**

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

Preamble

The objectives of this subject are tointroduce the concept and challenge of big data and learn different tools to manage and analyze the big data to optimize business decisions.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the types of digital data, the characteristics of big data, the challenges and techniques of big data	K1-K2
CO2	AnalyzetheHADOOP associatedwithbigdataanalytics	K2-K3
CO3	Understand and Design applications using MongoDB and Cassandra	K1-K3
CO4	Analyze the MapReduce technologies and Hive architecture associated with bigdata analytics	K2-K3
CO5	ExploreonBigDataapplicationsUsingPig	K1-K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	S	M	M	S	M
CO3	M	M	S	S	M
CO4	S	S	M	M	L
CO5	S	M	M	S	M

S- Strong; M-Medium; L-Low

UNIT I   **15Hrs.**

Types of Digital Data: Classification of Digital data – Introducing Big Data: Characteristics of Data – Evolution - Definition– Challenges–Other Characteristics of Big Data– Why Big Data? – Traditional Business Intelligence (BI) versus Big Data – A Typical Data Warehouse Environment – A Typical Hadoop Environment –challenging in the Realms of Big Data – Big Data Analytics: Introduction – Classification of Analytics – Greater Challenges that Prevent Business from Capitalizing on Big Data – Top Challenges facing Big Data – Importanceof Big Data analytics –kind of Technologies– Data Science – Data Scientist – Terminologies used in Big Data Environments – Basically Available Soft state Eventual Consistency – Few top Analytics Tools.

UNIT II   **15Hrs.**

The Big Data Technology Landscape: NoSQL – HADOOP - Introduction to Hadoop : RDBMS versus Hadoop – Distributed computing challenges – History of Hadoop – Hadoop overview – use case of Hadoop – Hadoop Distributors – HDFS – Processing data with Hadoop

UNIT III   **15Hrs.**

Introduction to MongoDB: Introduction – terms used in RDBMS and MongoDB – Datatypes ion MongoDB – MongoDB Query Language. Introduction to Cassandra: Features – CQL Data types – CQLSH – Key spaces – CRUD – Collections – using a counter – TTL – Alter commands – import and export – Querying system tables.

UNIT IV   **15Hrs.**

Introduction to MAPREDUCE Programming: Introduction – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression. Introduction to Hive: What is Hive? – Hive Architecture – Hive Data types – Hive File format – Hive Query Language – RCFile Implementation – SerDe – User Defined Funcation.

UNIT V   **15Hrs.**

Introduction to Pig: What is Pig? – The Anatomy of Pig – Pig on Hadoop – Pig Philosophy – use case for Pig – Pig Latin overview – Data types in Pig – Running Pig- Execution Modes of Pig – HDFS Commands – Relational Operators – Eval function – complex data types – Piggy

bank – User defined function – Parameter substitution – Diagnostic operator – Example using Pig – Pig versus Hive.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Seema Acharya, SubhashiniChellappan,	*Big Data and Analytics*	Wiley India Private Limited	2018 (Reprint)

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bhuvaneswari V, Devi T	Big Data Analytics (A Practioner's approach)	Department of Computer Application BharathiarUniversity	2016, 1st Edition
2.	Anil Maheswari	Big Data	Mc Graw hill Education	2017, 1st Edition

Ebook
1. VigneshPrajapati , "Big Data Analytics with R and Hadoop", Packt Publishing, 2013.

Web Resources
1. https://onlinecourses.nptel.ac.in/noc19_cs33/preview
2. https://www.tutorialspoint.com/hadoop/hadoop_big_data_overview.htm
3. https://www.edureka.co/blog/hadoop-tutorial/

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

CODE	COURSE TITLE
18CAPE534	**CLOUD COMPUTING**

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

Preamble

The objectives of this subject are tointroduce the overview and challengesin cloud computingand learn about the cloud environment and how to use cloud services.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the broad perceptive of cloud architecture and model	K1-K2
CO2	Analyze Virtualizationand security challengesin cloud	K2-K3
CO3	Understand security management and attacks in cloud computing	K1-K3
CO4	Exploresome important cloud computing driven commercial systems such as GoogleApps, Microsoft Azure and Amazon Web Services and other businesses cloudapplications	K2-K3
CO5	Analyze cloud computing in various applications	K2-K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	L
CO2	S	M	M	S	M
CO3	M	M	S	S	M
CO4	S	S	M	M	L
CO5	S	M	M	S	M

S- Strong; M-Medium; L-Low

UNIT I   **15Hrs.**

Cloud Computing – Overview: Introduction – History of Cloud Computing – Characteristics of Cloud – Cloud Computing Model – Issues and Challenges for cloud Computing – Advantages and Disadvantages of Cloud Computing – Security, Privacy and Trust – Virtualization – Threats to cloud Computing – Next Generation of Cloud Computing. **Cloud Computing Architecture:** Introduction – Cloud Architecture – Cloud Computing Models – Comparisons of Service Models – Deployment Models –Identity as a service (IDaaS).

UNIT II   **15Hrs.**

Virtualization in Cloud: Introduction – Virtualization – Implementation of Virtualization, Virtualization support at the OD Level – Middle Support for Virtualization – Advantages of Virtualization – Applications of virtualization – Virtualization Implementations techniques – Hardware Virtualization – types of Virtualization – Load Balancing in Cloud Computing – Logical Cloud Computing Model – Virtualization for Data- Centre. **Security Issues and Challenges in Cloud Computing:** Introduction – Security Challenges in Cloud Computing – Information security in Cloud Computing – Security, privacy and Trust.

UNIT III   **15Hrs.**

Security Management: Introduction – Security Reference Architecture – Security Issues in Cloud Computing – Classification of Security Issues – types of Attackers – Security Risks in Cloud Computing – Security Threats against Cloud Computing – Novel Security approaches – Emerging Trends in Security and Privacy. **Virtualization System Specific Attacks:** Introduction – Attacks in Cloud Computing Environment – Attacks on Hypervisor – Security Challenges – Virtualization Security Solutions – Desktop Virtualization Security – Planning and Deployment for Secure Virtualization.

UNIT IV   **15Hrs.**

Web Services: Introduction – Amazon web services – Microsoft Azure. Data Security and Privacy: Introduction – Data security – Privacy. **Service Oriented Architecture:** Introduction – SOA Components – Design Principles of SOA – SOA Requirements – Benefits of SOA – Significance of SOA to cloud Computing – Challenges Associated with SOA – Enterprise Service Bus (ESB) - Web Services – Recurring Architectural Capabilities.

UNIT V   **15Hrs.**

Migrating Applications to the Cloud Computing: Introduction Motivations for Migration –
Issues in migrating the applications to the Cloud – Challenges in migrating the applications to
the cloud – Solutions for the challenges in migration of application to cloud –Types of
Migration – Planning for Migrating the application to cloud – Migration Roadmap – Cloud
Bursting. **Cloud Computing Applications:** Introduction - Business Applications – Finance
and Banking Application – Cloud Computing in Education.

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Pachghare V.K	Cloud Computing	PHI learning PVT LTD	2016

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Rao M.N	Cloud Computing	PHI learning PVT LTD	2015
2.	Arshdeep Bahga, Vijay Madisetti	Cloud Computing A hands-on Approach	Universities Press	2014
3.	Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde, Dr. Deven Shah	Cloud Computing Black Book	Dream tech Press	2014

Ebook

1. **Michael, Andreas Wittig, "Exploring Cloud Computing",Manning, 2017**

Web Resources
1. https://onlinecourses.nptel.ac.in/noc18_cs16/preview
2. https://aws.amazon.com/what-is-cloud-computing/

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

CODE	COURSE TITLE
18CSPE211/18CAPE544	MOBILE COMPUTING

Category	CIA	ESE	L	T	P	Credit
Elective IV	25	75	71	4		5

Preamble

To enable the students to gain knowledge on Mobile communication Techniques, Wireless LAN and devices involved in Mobile Computing.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the concepts of Mobile Computing Architecture & intelligent network	K1
CO2	Explain the working of Mobile communications	K2
CO3	Gain knowledge about WAP	K4
CO4	Recall the basic concepts of intelligent network	K1
CO5	Analyze the security issues in mobile computing	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	S	M	S	L	S
CO3	S	S	L	M	S
CO4	S	S	M	S	M
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I **15 Hrs**.

Introduction: Wireless the beginning – Mobile Computing – Middleware and gateways – Security in mobile computing – Standard bodies. Mobile computing architecture: Architecture – Three-tier architecture – Mobile computing through Internet. Emerging Technologies: Bluetooth-

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RFID- WiMAX- Mobile IP.

UNIT II   **15 Hrs.**

Global System for Mobile Communications: Global System for Mobile Communications – GSM Architecture- GSM Entities - Call Routing in GSM - Short Message Service(SMS): Mobile computing over SMS – Short Message Services (SMS). General Packet Radio Service(GPRS): GPRS and Packet Data Network – GPRS Network Architecture – Limitations.

UNIT III   **15 Hrs**.

Wireless Application Protocol: Introduction – WAP – MMS. CDMA & 3G: IS-95 – CDMA versus GSM – Third Generation networks – Application on 3G. Wireless LAN: Introduction – IEEE 802.11 standards – Wireless LAN Architecture – Mobility and Deploying Wireless LAN – Mobile Adhoc network and sensor network.

UNIT IV   **15 Hrs.**

Internet Networks and Interworking: SS#7 Signaling – IN Conceptual Model - Client Programming. J2ME: J2ME Technology.

UNIT V   **15 Hrs.**

Wireless Devices with Windows CE: Architecture – Development Environment. Voice Over Internet Protocol and Convergence: Convergence Technologies – Call routing – Voice over IP Applications – IP Multimedia Subsystems – Mobile VoIP. Security Issues in Mobile Computing: Introduction – Security Frameworks for Mobile environment.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	AsokeKTalukder, Roopa R Yavagal,	Mobile Computing Technology Applications and Services	TMH Publishing Company Ltd	2012,2^{nd} Edition

Reference Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Jochen Schiller	Mobile Communication	Pearson Education	2003, 2nd Edition

Web Resources

1. https://www.tutorialspoint.com/mobile_computing/index.htm
2. https://onlinecourses.nptel.ac.in/noc16_cs13/preview

Pedagogy

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

CODE	COURSE TITLE
18CAPS504	**PYTHON PROGRAMMING**

Category	CIA	ESE	L	T	P	Credit
Skill Based Subject – IV	25	75	40	5	-	3

Preamble

This course is designed to provide a comprehensive study of the python programming basics such as string, list, dictionary, files. It aims to provide students with the means of writing efficient code.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Learn various data structures provided by python library including string, list, dictionary and its operations.	K2
CO2	Express different Decision Making statements and Functions	K2
CO3	Interpret Object oriented programming in Python	K3
CO4	Understand and summarize different File handling operations	K3
CO5	Develop real-world applications using oops, files and exception handling provided by python	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	S	S	L
CO3	S	S	M	L	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I 5 Hrs.

Introduction – Putting Numbers to Work in Python – Logic in Programming.

UNIT II 5 Hrs.

Storing Texts in Strings – Processing Input and Output – Grouping Items in Lists

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UNIT – III   **5 Hrs.**

Using Loops to Repeat Code – Using Functions to Create Reusable Codes – Using Dictionaries to Pair Keys with Values

UNIT – IV   **5 Hrs.**

Making Objects – Making Classes – Expanding Classes to Add Functionality

UNIT – V   **5 Hrs.**

Working with Program Files – Storing Information in Databases – Sample Programs

Text Book

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Katie Cunningham	SAMS Teach Yourself PYTHON in 24 Hours	SAMS Teach Yourself PYTHON in 24 Hours, Pearson Education, NewDelhi.	2014

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Lutz	Learning Python	O'Reilly	4th Edition, 2011
2.	Mark Summerfield	Programming in python 3: complete introduction to the python language	Pearson, Chennai.	2nd Edition 2018
3.	Balagurusamy. E	Introduction to computing and problem solving using python	Mc Graw – Hill Education private ltd, new Delhi.	1st Edition REP 2016

Web Resources

1. http://www.tutorialspoint.com/python

2. https://www.learnpython.org

3. https://www.guru99.com/python-tutorials.html

Pedagogy

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

SELF LEARNING PAPER

CODE	COURSE TITLE
18CAPSL04	INTERNET OF THINGS

Category	CIA	ESE	L	T	P	Credit
Self Learning Paper I	-	100	-	-	-	5

Preamble

The purpose of this course is to impart knowledge on IoT Architecture and various protocols, study their implementations. The course aims to introduce students to the concepts underlying the Internet of Things (IoT) that are important to understand the state-of-the-art as well as the trends for IoT. The students will be introduced to the history and evolution of IoT, as well as case studies from various industry domains.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the Architectural Overview of IoT	K2
CO2	Understand the IoT design principles for connected devices	K2
CO3	Learn about the Internet connectivity principles	K3
CO4	Explore the knowledge in Data Acquiring, Organising, Processing and Analytics	K3
CO5	Realize the revolution of Internet in Sensor Networks.	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	M	S	M	S	M
CO3	S	S	S	M	S
CO4	S	S	S	M	S
CO5	M	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   **12 Hrs.**

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

UNIT II   **12 Hrs.**

Design Principles for Connected Devices: Introduction – Iot/M2M systems Layers and Design Standardization – Communication Technologies.

Design Principles of Web Connectivity: Introduction – Web communication Protocols for connected devices – Message communication protocols – SOAP, REST, HTTP RESTful and WebSockets

UNIT III   12 Hrs.
Internet Connectivity Principles: Introduction – Internet Connectivity – Internet-based Communication – IP addressing in the IOT – Media Access Control – Application Layer Protocols.

UNIT IV   12 Hrs.
Data Acquiring , Organising, Processing and Analytics : Introduction- Data Acquiring and Storage – Organizing the Data – Transactions , Business Processes , Integration and Enterprise Systems – Analytics – Knowledge Acquiring, Managing and Storing Processes. Data Collection, Storage and Computing using a cloud platform: Introduction – Cloud Computing Paradigm for Data Collection, Storage and Computing – Everything as a Service and Cloud Service Models.

UNIT V   12 Hrs.
Sensors, Participatory Sensing, RFIDs and Wireless Sensor Networks: Introduction – Sensor Technology – Industrial IOT and Automotive IOT – Actuator – Sensor Communication Protocols – Radio Frequency Identification Technology – Wireless Sensor network technology

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Rajkamal	Internet of Things: Architecture and Design Principles	McGraw Hill Education (India) Private Limited, Chennai.	2017, 1st Edition.

Reference Books

Sl.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Srinivasa KG, Siddesh GM, Hanumantha Raju R	Internet of Things	Cengage Learning India Pvt. Limited	2017, 1st Edition.
2	Arshdeep Bahga, Vijay Madisetti	Internet of Things	Universities Press	Reprinted 2017, 1st Edition.

Web Resources
1. www.howstuffworks.com
2. www.coursera.com
3. www.tutorialpoint.com
4. www.javatpoint.com/iot-tutorial

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

SELF LEARNING PAPER

CODE	COURSE TITLE
18CSPSL15	**PERL**

Category	CIA	ESE	L	T	P	Credit
Self learning paper II	-	100	-	-	-	5

Objective: To learn and develop programs in PERL through free online resources.

UNIT I

Overview and Installation of PERL - Variables in Perl - Comments in Perl.

UNIT II

for for each loops - while do while loops - Conditional statements - More Conditional statements.

UNIT III

Data Structures - Arrays - Array functions - Hash in Perl - Functions in Perl.

UNIT IV

Blocks in Perl - Access Modifiers in PERL - Referencing and Dereferencing - Special Variables in PERL**.**

UNIT V

File Handling - Exception and error handling in PERL - Including files or modules - Sample PERL program - Perl Module Library (CPAN) - Downloading CPAN module - Perl and HTML

Material: Video Tutorials of Spoken Tutorial, IIT Bombay.

CODE	COURSE TITLE
18CSPSL25	SCILAB

Category	CIA	ESE	L	T	P	Credit
Self learning paper III	-	100	-	-	-	5

Objective : To learn and develop programs in Scilab through free online resources.

UNIT I

Why Scilab – Installing - Getting Started - Vector Operations

UNIT II

Matrix Operations - Scripts and Functions - Conditional Branching – Iteration - Plotting 2D graphs - Xcos Introduction - File handling - User Defined Input and Output

UNIT III

Integration - Solving Non linear Equations - Linear equations Gaussian Methods - Linear equations Iterative Methods

UNIT IV

Interpolation - ODE Euler methods - ODE Applications - Optimization Using Karmarkar Function

UNIT V

Digital Signal Processing - Control systems - Discrete systems - Calling User Defined Functions in XCOS

Material: Video Tutorial of Spoken Tutorial, IIT Bombay.

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