

Dr. Mahalingam College of Engineering & Technology, Pollachi-03

(An Autonomous Institution)

Affiliated by Anna University, Chennai

Curriculum & Syllabus For

Master of Computer Applications

SEMESTER I to VI

WITH EFFECT FROM THE ACADEMIC YEAR 2018-2019

REGULATION 2014R



BoS Chairman

Vision and Mission of Department of Computer Applications

Vision:

To Make MCA Department, a well known center of excellence in Research & Development and achieve a State of Honor.

Mission:

To provide an environment that promotes the innovation and dissemination of knowledge.

To develop individuals who are leaders, innovators, entrepreneurs and independent learners, well prepared to contribute to their local, regional and global community.

Programme Educational Objectives (PEOs)

The graduates will:

PEO1 - Possess technical expertise, excel in communication skills and leadership to manage diverse audience in their career.

PEO2 - Employ technical skills to solve societal and environmental issues in an ethical manner.

PEO3 - Involve in up-to-date and research to meet the demands of global technology.

Program Outcomes (POs)

At the end of the Computer Application Programme, graduating students/graduates will be able to:

- PO1 - Apply the knowledge of mathematical fundamentals in the field of Computer Applications.
- PO2 - Ability to identify, formulate, and solve the computational problems.
- PO3 - Design and develop algorithms, implement programs and evaluate the performance.
- PO4 - Investigate complex problems by employing research methods to arrive at valid conclusions.
- PO5 - Evaluate and use appropriate tools and techniques in developing application activities.
- PO6 - Follow professional engineering practice by applying contextual knowledge to assess societal and legal issues.
- PO7 - Understand and provide scientific solutions by taking the consideration of environmental and economic sustainability.
- PO8 - Follow ethical principles and norm in developing applications.
- PO9 - Function effectively as an individual, team member or leader in diversified environments.
- PO10 - Communicate effectively through various modes for all application development activities.
- PO11 - Apply application development knowledge and management principles for effective project management in multi-disciplinary environments.
- PO12 - Recognize the need for, and have the ability to engage in independent and lifelong learning in the context of technological change.

Program Specific Outcomes (PSOs)

- PSO1: Application Development: Apply software engineering principles in the design and development of web and mobile applications.
- PSO2: Data management: Able to manage, store and retrieve huge volume of data in real world problems.

DEPARTMENT OF COMPUTER APPLICATIONS

2014 REGULATION (From AY 2018 -19 onwards)

Curriculum for Master of Computer Applications from Semester I to VI

SEMESTER I

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
THEORY COURSES						
141CA0101	Mathematical Foundations of Computer Science	3	0	0	3	100
141CA0102	Problem Solving Techniques	3	0	0	3	100
141CA0103	Computer Organization	3	0	0	3	100
141CA0104	Programming in C	3	0	0	3	100
141CA0105	IT Essentials	3	0	0	3	100
PRACTICAL COURSES						
141CA0107	Problem Solving and Programming Laboratory using C	0	0	4	2	100
141CA0108	Hardware and Trouble Shooting Laboratory	0	0	4	2	100
141CA0109	Communication Skills Laboratory	0	0	4	2	100
	TOTAL	15	0	12	21	800

SEMESTER II

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
THEORY COURSES						
141CA0201	Resource Management Techniques	3	0	0	3	100
141CA0202	System Software	3	0	0	3	100
141CA0203	Object Oriented Programming	3	0	0	3	100
141CA0204	Human Values and Professional Ethics	3	0	0	3	100
141CA0205	Web Programming	3	0	0	3	100
PRACTICAL COURSES						
141CA0207	Object Oriented Programming Laboratory	0	0	4	2	100
141CA0208	System Software Laboratory	0	0	4	2	100
141CA0209	Web Programming Laboratory	0	0	4	2	100
	TOTAL	15	0	12	21	800

BoS Chairman

SEMESTER III

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
THEORY COURSES						
141CA0306	Advanced Operating Systems	3	0	0	3	100
141CA0302R	Software Engineering	3	2	0	4	100
141CA0310	Object Oriented Programming with Java	3	0	0	3	100
141CA0304	Data Structures and Algorithms	3	0	0	3	100
141CA0305	Database Management Systems	3	0	0	3	100
PRACTICAL COURSES						
141CA0311	Object Oriented Programming with Java Laboratory	0	0	4	2	100
141CA0308	Data Structures and Algorithms Laboratory	0	0	4	2	100
141CA0309R	DBMS Laboratory	0	0	4	2	100
141CA0312	Employability Skills- I	0	0	2	1	100
141CA0313	Promotion of Students Wellness	0	0	2	1	100
XXXX	One credit Course	0	0	2	1	100
	TOTAL	15	2	18	25	1100

SEMESTER IV

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
THEORY COURSES						
141CA0404	Computer Networking	3	0	0	3	100
141CA0402R	Mobile Programming	3	0	0	3	100
141CA0403R	Web Application Development	3	0	0	3	100
	Elective – I	3	0	0	3	100
	Elective – II	3	0	0	3	100
PRACTICAL COURSES						
141CA0407R	Mobile Programming Laboratory	0	0	4	2	100
141CA0408R	Web Application Development Laboratory	0	0	4	2	100
141CA0409	Mini Project	0	0	6	3	100
141CA0410	Employability Skills- II	0	0	2	1	100
141CA0411	Campus to Corporate	0	0	2	1	100
XXXX	One credit Course	0	0	2	1	100
	TOTAL	15	0	20	25	1100

SEMESTER V

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
THEORY COURSES						
141CA0504	Machine Learning	3	2	0	4	100
141CA0502R	Cloud Computing	3	0	0	3	100
141CA0503R	Big Data Analytics	3	0	0	3	100
	Elective III	3	0	0	3	100
	Elective IV	3	0	0	3	100
PRACTICAL COURSES						
141CA0507R	Software Testing Lab	0	0	4	2	100
141CA0508R	Cloud and Big Data Analytics Laboratory	0	0	4	2	100
	TOTAL	15	2	8	20	700

SEMESTER VI

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
PRACTICAL COURSES						
141CA0607	Project Work	-	-	28	14	100

Total Credits : 126

SEMESTER – IV –LIST OF ELECTIVES

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
ELECTIVE I						
141CA9112	Human Computer Interface	3	0	0	3	100
141CA9113	Cyber Security	3	0	0	3	100
141CA9114	Data Mining and Data Warehousing	3	0	0	3	100
141CA9116	Unix and Networking Programming	3	0	0	3	100
141CA9133	Artificial Intelligence	3	0	0	3	100
ELECTIVE II						
141CA9111	Design pattern	3	0	0	3	100
141CA9115	Agile Software Development	3	0	0	3	100
141CA9117	Service Oriented Architecture	3	0	0	3	100
141CA9118	Principles of Management	3	0	0	3	100
141CA9129	Information Retrieval Techniques	3	0	0	3	100

SEMESTER – V –LIST OF ELECTIVES

Course code	Course title	Hours / week			Credits	Max marks 100
		L	T	P		
ELECTIVE III						
141CA9122	Software Project Management	3	0	0	3	100
141CA9124	Database Architecture and Administration	3	0	0	3	100
141CA9130	Cryptography and Network Security	3	0	0	3	100
141CA9131	Open Source Technologies	3	0	0	3	100
ELECTIVE IV						
141CA9121	Adhoc Sensor Networks	3	0	0	3	100
141CA9125	Business Intelligence	3	0	0	3	100
141CA9126	Visualization Techniques	3	0	0	3	100
141CA9132	Internet of Things Applications	3	0	0	3	100

Course Code: 141CA0101	Course Title: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites :

- Basics of Mathematics

Course Objectives:

1. Understand the mathematical foundation for computer application that include data structures, database, compiler, computer architecture and operating systems.
2. Derive the concepts of equivalence relations and orders.
3. Evaluate the basic logic statements including compound statements, implications, inverses, converses, and contrapositives using truth tables and the properties of logic.
4. Derive the distribution of functions of a random variable.
5. Understand basic properties of deterministic and nondeterministic finite automata.

Course Content

Hours

UNIT I MATRIX ALGEBRA

9

Matrices, Rank of Matrix, Solving System of Equations - Eigen values and Eigen Vectors - Inverse of a Matrix - Cayley Hamilton Theorem.

UNIT II BASIC SET THEORY

9

Basic Definitions- Venn Diagrams and set operations – Laws of set theory- Principles of inclusion and exclusion-Partitions-Permutation and Combination- Relations – Properties of relations –Matrices of relations –Closure operations on relations- Functions – injective, surjective and bijective functions.

UNIT III MATHEMATICAL LOGIC

9

Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws - Functionally complete set of connectives - Normal forms - Proofs in Propositional calculus - Predicate calculus.

UNIT IV DISCRETE PROBABILITY

9

Finite probability - Conditional probability - Independence – Bayes theorem- Mathematical expectation-Probability Distribution (Binomial, Poisson, Geometric and their Properties).

UNIT V FINITE AUTOMATA

9

Introduction to formal proof- Additional forms of proof- Inductive proofs- Finite Automata (FA)-Deterministic Finite Automata(DFA)-Non-deterministic Finite Automata(NFA)- Finite Automata with Epsilon transitions.

Course Outcomes

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

1. Determine the solution of linear equations and calculate the dominant eigen values
2. Analyze the basic concepts of relations and maps.
3. Analyze the meaning of an expression in logic by using truth table
4. Determine mean and variance of a Probability distribution
5. Calculate regular expression grammars and automata for different levels of formal languages

Text Books:

1. Kenneth H. Rosen, "Discrete Mathematics and its applications", Tata McGraw Hill, Fourth Edition, 2002.
2. Tremblay J P and Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, 2002.

Reference Books:

1. J E Hopcroft, R Motwani and J D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Educations, 2003 .
2. Ross S, "A First course in Probability", Sixth edition, Tata McGraw Hill, Delhi, 2002.

Web References:

1. <http://nptel.ac.in/courses/106106094/>
2. <http://www.math.northwestern.edu/~mlerma/courses/cs310-05s/>

Course Code: 141CA0102	Course Title: PROBLEM SOLVING TECHNIQUES
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- C Programming

Course Objectives:

1. Identify a problem and give solutions.
2. Apply factoring methods concepts
3. Implement array concepts
4. Perform efficient sorting, searching
5. Apply the text processing algorithms

Course Content

Hours

UNIT I INTRODUCTION TO COMPUTER PROBLEM-SOLVING

9

Introduction – The Problem-solving Aspect - Top-down Design -implementation of Algorithms-Program Verification - The Efficiency of Algorithms. Fundamental Algorithms - Exchanging the values of Two Variables – Counting - Summation of a set of Numbers - Factorial Computation-Sine function computation - Generation of the Fibonacci sequence - Reversing the Digits of an Integer - Base Conversion- Character to Number Conversion.

UNIT II FACTORING METHODS

9

Finding the square Root of a number - The Smallest Divisor of an Integer – The Greatest Common Divisor of Two Integers - Generating Prime Numbers – Computing the Prime Factors of an Integer - Generation of Pseudo - random Numbers – Raising a Number to a Large Power - Computing the nth Fibonacci number.

UNIT III ARRAY TECHNIQUES

9

Array Order Reversal-Array Counting or Histogramming - Finding the Maximum Number in a Set - Removal of Duplicates from an Ordered Array - Partitioning an Array - Finding the kth Smallest Element - Longest Monotone Subsequence.

UNIT IV SORTING AND SEARCHING

9

Sorting – Internal Sorting – Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Radix Sort – External Sorting – Merge Sort, Multi - way Merge Sort, Polyphase Sorting. Searching Techniques: Binary Search – Hash Searching.

UNIT V TEXT PROCESSING AND PATTERN SEARCHING

9

Text Line Length Adjustment - Left and Right Justification of Text – Keyword Searching in Text - Text Line editing - Linear Pattern Search - Sub linear Pattern Search.

Course Outcomes

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

1. Identify a problem and design appropriate solutions with pseudo code .
2. Apply factoring methods in solving real time problems.
3. Implement array concepts with numbers and strings problems.
4. Perform efficient sorting, searching and analyze its complexities.
5. Apply the text processing algorithms in text editing & pattern matching.

Text Book:

1. R.G.Dromey, "How to Solve it by Computer", Second Edition, Pearson Education, India, 2008.

Reference Books:

1. Stephen G. Kochen, "Programming in C", Third Edition, Pearson Education, 2014.
2. Rajaram R, Chitra P, "Problem Solving using C", Scitech Publication, 2001.

Web References:

1. <http://nptel.ac.in/courses/106104074/>
2. <http://nptel.ac.in/courses/106103069/>
3. <http://www.nptelvideos.in/2012/11/introduction-to-problem-solving.html>
4. <http://www.nptelvideos.in/2012/11/principles-of-programming-languages.html>

Course Code: 141CA0103	Course Title: COMPUTER ORGANIZATION
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Basics of Computer
- Foundations of Mathematics

Course Objectives:

1. Explain the various functional units of digital computer.
2. Explain the detailed operation of combinational and sequential circuits.
3. Explore various parts of a memory hierarchy and input/output organization.
4. Analyze the detailed operation of CPU.
5. Describe the principle of parallel processing.

Course Content

Hours

UNIT I NUMBER SYSTEMS AND BOOLEAN ALGEBRA

9

Number Systems and conversions — Complements - Binary Codes – Binary Logic – Basic theorems and properties of Boolean algebra – Boolean Functions – Canonical and Standard Forms – Gate level minimization.

UNIT II COMBINATIONAL AND SEQUENTIAL LOGIC

9

Combinational Circuits: Design procedure – Binary Adder & Subtractor – Decoders – Encoders - Multiplexers – Sequential Circuits – Latches - Flip Flops - Registers – Shift Registers – Ripple Counters.

UNIT III MEMORY AND INPUT/OUTPUT ORGANIZATION

9

Random Access Memory – Memory Decoding – error Detection and correction – Read only memory – Programmable Logic Array – Programmable Array Logic.
External Devices – Input/Output modules – Programmed I/O – Interrupt driven I/O - Direct Memory Access - Input/ Output Channels and Processors.

UNIT IV CPU ORGANIZATION

9

Instruction Sets: Characteristics and Functions – Machine Instruction Characteristics – Types of Operands – Intel x86 and ARM Data types – Types of Operations – Addressing Modes and Formats: Addressing – x86and ARM Addressing Modes – Instruction Formats - x86and ARM Instruction Formats - Processor organization – Register Organization – Instruction cycle.

UNIT V PARALLEL ORGANIZATION

9

Parallel Processing: Use of multiple processors – Symmetric multiprocessors – Cache Coherence and MESI protocol – Multithreading and Chip Multiprocessors – clusters. Multicore Computers: Hardware Performance Issues – software Performance issues – Multicore organization – Intel x86 multicore organization.

Course Outcomes

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

1. Illustrate the design principle of the various functional units of digital systems.
2. Demonstrate combinational and sequential circuits.
3. Understand the principle of Input–Output and memory organization.
4. Analyze various instruction sets, addressing modes and instruction formats in a digital computer.
5. Explore the principle of parallel processing and multicore computers.

Text Books:

1. M. Morris Mano, Michael D. Ciletti, "Digital Design", Fifth Edition, Pearson Education, 2014. (Unit I to III)
2. William Stallings, "Computer Organization and Architecture", Eighth Edition, PHI, 2012. (Unit IV & V).

Reference Books:

1. David A Patterson; John L Hennessy, "Computer Organization And Design The Hardware Software Interface", Fourth Edition, Morgan Kaufmann Publishers, 2012.
2. Nicholas Carter, "Computer Architecture", Tata Mcgraw Hill Publishing Company Limited, 2012.

Web References:

1. <http://nptel.ac.in/courses/117105078/>
2. http://www.tutorialspoint.com/computer_logical_organization/
3. <http://www.learnerstv.com/Free-Computer-Science-Video-lectures-Itv086-Page1.htm>

Course Code: 141CA0104	Course Title: PROGRAMMING IN C
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours : 45

Prerequisites :

- Mathematical Foundations of Computer Science
- Problem Solving Techniques

Course Objectives

1. Choose appropriate programming constructs.
2. Construct programs using arrays and functions.
3. Develop program using structures and unions.
4. Apply the concepts of pointers.
5. Develop program using file management.

Course Content

Hours

UNIT I BASICS OF C LANGUAGE

9

Overview of C Language - Constants, Variables and Data Types - Operators, Expressions and Assignment statements - Managing Input/Output Operations - Formatted I/O - Decision Making - Branching - IF, Nested IF - Switch - goto - Looping- while, do, for statements.

UNIT II ARRAYS AND FUNCTIONS

9

Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings - String handling Functions - User defined Functions - Categories of Functions - Recursion.

UNIT III STRUCTURES AND UNIONS

9

Basics of Structures-Declaring a Structure - Array of Structures- passing Structures elements to Functions - Passing entire Structure to Function - Structures within Structures - Union - Union of Structures - Enumerated Data Types - typedef Statement.

UNIT IV POINTERS

9

Pointers - Declaration - Accessing a variable - Dynamic memory allocation - Pointers versus Arrays-Array of pointers- Pointers to functions and structure Pointers.

UNIT V FILE MANAGEMENT

9

File Management in C - Data hierarchy- Files and Streams - Sequential access file- Random access file – Preprocessors.

Course Outcomes

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

1. Choose appropriate data types, variables, statements for solving problems.
2. Construct program using arrays and functions for given problem.
3. Develop program using structure and union for given problem.
4. Apply the pointer concepts in real time application.
5. Develop program using file management for real time problem

Text Book:

1. Stephen G.Kochen,"Programming in C: A Complete Introduction to the C Programming Language", Third Edition, Pearson Education, 2008.

Reference Books:

1. Al Kelley, Ira Pohl,"A Book on C: Programming in C", Fourth Edition, Addison-Wesley Professional, 2010.
2. Yashavant P. Kanetkar,"Understanding Pointers in C", BPB Publications, New Delhi, 2009.
3. Byron C Gotfried,"Programming with C", Schuams' Outline series, Second Edition, Tata McGraw Hill, 2006.
4. M.T. Somashekara, "Programming in C", Prentice-Hall of India Pvt.Ltd, 2005.
5. Richard Johnsonbaugh,"Applications Programming In ANSI C", Third edition, Pearson Education, 2003.

Web References:

1. <https://www.eskimo.com/~scs/cclass/notes/top.html>
2. <https://www.cs.cf.ac.uk/Dave/C/CE.html>
3. https://onlinecourses.nptel.ac.in/iitk_cs_101/preview

Course Code: 141CA0105	Course Title: IT ESSENTIALS
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Basics of Computers

Course Objectives:

1. Outline the Importance of personal computers and its internal components
2. Assemble the computer with the help of hardware components
3. Experiment the Installation of operating Systems in a computer
4. Identify about the components in Laptop & Mobile devices.
5. Experiment the installation of Printers and troubleshooting of systems

Course Content

Hours

UNIT I THE PERSONAL COMPUTER

9

Introduction- Cases and Power Supplies-Internal PC Components – ROM and RAM -External Ports and Cables- Input and Output Devices -Selecting PC Components - Specialized Computer Systems-Lab Procedures and Tool Use- Safe Lab Procedures - Procedures to Protect Equipment and Data -Procedures to Protect the Environment -Proper Use of Tools

UNIT II COMPUTER ASSEMBLY

9

Open the Case and Install the Power Supply- Install the Motherboard - Install the Drives -Install the Adapter Cards - Install the Cables - POST and BIOS - BIOS Configuration - Motherboard and Related Components - Storage Devices - Input and Output Devices - Preventive Maintenance– Troubleshooting Process Steps.

UNIT III OPERATING SYSTEMS & NETWORKS

9

Modern Operating Systems- Types of Operating Systems - Operating System Installation- Directory Structure and File Attributes - Windows GUI and Control Panel -Client-Side Virtualization.

Networks –Principles-Basic Networking Concepts and Technologies- Network Topologies- Ethernet Standards - OSI and TCP/IP Data Models-Wireless and Wired Router Configurations-OS Configurations- ISP

UNIT IV LAPTOPS & MOBILE DEVICES

9

Introduction-Laptop Components -Internal Components- Laptop Wireless Communication Technologies- Laptop Hardware and Component Installation and Configuration. Mobile Devices-Mobile Device Hardware Mobile Operating Systems-Android Touch Interface -iOS Touch Interface- Mobile Device Synchronization - Securing Mobile Devices.

UNIT V PRINTERS, SECURITY & TROUBLE SHOOTING

9

Introduction-Types of Printers- Installing and Configuring Printers - Configuring Options and Default Settings- Optimizing Printer Performance . Security Threats-Security Procedures-Security Maintenance- Troubleshooting Process to Computer Components- Peripherals- Operating Systems-Networks- Laptops- Security.

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

1. Outline the Importance of personal computers and internal components of computer.
2. Assemble the computer with the help of hardware components
3. Experiment the Installation of Operating Systems in computer
4. Identify the components in Laptop and Mobile devices
5. Experiment the installation of Printers and troubleshooting of systems

Text Book:

1. IT Essentials Course Booklet: PC Hardware and Software, Version 6.0, CISCO Press, 2016.

Reference Books:

1. IT Essentials: PC Hardware and Software Companion Guide, Fifth Edition, CISCO Press, 2013.

Web References:

1. <https://www.netacad.com/courses/os-it/it-essentials>
2. <https://www.ccna7.com>

Course Code: 141CA0107	Course Title : PROBLEM SOLVING AND PROGRAMMING LABORATORY USING C
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Course objectives:

1. Apply the concepts of looping statements.
2. Use decision statements and functions concepts
3. Implement applications using Arrays and Pointers.
4. Apply Structure and Files for developing applications
5. Create applications using Functions and Files

List of Experiments

1. Develop Programs using Input, output, assignment statements and looping statements
2. Develop Programs using Functions and decision statements
3. Implement Programs using arrays and pointers for sorting the values
4. Design application using structures and file for storing, retrieving data in the form of reports
5. Create applications using Functions and file for text processing

Course Outcomes

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

1. Apply the concepts of looping statements for performing string manipulations.
2. Use decision statements and functions for date manipulation functions
3. Implement applications using arrays and pointers.
4. Apply Structure and Files for generation of reports
5. Create applications using Functions and file for text processing

Course Code: 141CA0108	Course Title: HARDWARE AND TROUBLE SHOOTING LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- IT Essentials
- Basics of Computers

Course Objectives

1. Assemble the various peripherals
2. Make use of hard disk partitioning.
3. Apply the basic settings of LAN.
4. Identify the printer device drivers.

LIST OF EXPERIMENTS:

1. Assemble and disassemble the components inside the PC
2. Install the necessary internal and external cables
3. Assign the partition in varying sizes and Install the Operating system for the assembled personal computer with predefined configurations.
4. Identify and fix the problem to get back the computer to its working condition.
5. Inspect LAN for accessing the Internet, where one can able to configure the TCP/IP settings for accessing the websites and email.
6. Install the printer drivers in a network for Windows operating systems that have varying methods of printer connection.

Course Outcomes

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

1. Assemble the various peripherals of a computer
2. Make use of hard disk partitioning and install the Operating System.
3. Apply the basic settings of LAN configurations.
4. Identify the device drivers available for printers.

Course Code: 141CA0109	Course Title: COMMUNICATION SKILLS LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Basic Vocabulary

Course Objectives

1. Understand the Communication skills based on writtern mode with grammatical informations.
2. Understand the Communication skills based on oral mode such as speaking ,listening with aids.
3. Explain the topic with stress and intonation with proper presentaion.

WRITTEN COMMUNICATION

1. Remedial English Subject- verb agreement - concord - tense forms - auxiliary verbs – different ways of rewriting sentences.
2. Scientific Style Clarity - simplicity - exactness - brevity - unity - coherence- objectivity.
3. Formal and Informal Writing.

ORAL COMMUNICATION

1. Stress and Intonation.
2. Delivery Techniques. The extemporaneous speech and the manuscript speech - The physical Aspects of speech – audience interaction.
3. The Use of Visual Aids Criteria of visual aids (visibility, clarity, simplicity, control) The tools of visual presentation*. (Chalk board, chart, and overhead projector and so on.)
4. Practice in Oral Communication
 - (a) Short speech *
 - (b) Group discussion – as a participant and as a moderator. *
 - (c) Mock press conference
 - (d) Seminar
 - (e) Mock interview
 - (f) Speech based on a situation *
 - (g) Extemporaneous speech

Practice will also be given in conducting a meeting - welcoming a gathering, presiding over a function and proposing vote of thanks.

*Case Studies Applicable.

Course Outcomes

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

1. Understand the Communication skills based on written mode with grammatical informations for presentation .
2. Understand the Communication skills based on oral mode such as speaking ,listening with aids presentation.
3. Explain the topic with stress and intonation with proper presentation methods.

END OF SEMESTER I

SEMESTER II

Course Code: 141CA0201	Course Title: RESOURCE MANAGEMENT TECHNIQUES
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours : 45

Prerequisites :

- Mathematical Foundations of Computer Science

Course Objectives:

1. Understand the opportunity of using various software package .
2. Apply the complex mathematical models
3. Apply the methodology for the solution of linear programs.
4. Apply the network models to find shortest path.
5. Utilize optimality conditions for single and multiple variables.

Course Content

Hours

UNIT I LINEAR PROGRAMMING SOLVING

9

Principal components of decision problem - Modeling phases - LP Formulation and graphical solution – Simplex method – Big M method.

UNIT II TRANSPORTATION AND ASSIGNMENT MODELS

9

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution-Optimal solution- Degeneracy- Mathematical formulation of Assignment models- Hungarian algorithm-Variables of the assignment problems.

UNIT III INTEGER PROGRAMMING

9

Cutting plan algorithm- Branch and bound methods, Multistage (Dynamic) Programming.

UNIT IV SCHEDULING BY PERT AND CPM

9

Network construction - Critical path method - Project Evaluation and Review Technique - Resource Analysis in Network scheduling.

UNIT V QUEUEING THEORY

9

Markovian models- M/M/1, M/M/C, finite and infinite capacity- M/M/ queues- Finite source model-M/G/1 queue (steady state solutions only).

Course Outcomes

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

1. Understand the opportunity of using various software package for solving linear programming and integer programming models
2. Apply the complex mathematical models in management science, industrial engineering and transportation science.
3. Apply the methodology for the solution of linear programs and integer programs.
4. Solve network models like the shortest path, minimum spanning tree, and maximum flow problems.
5. Utilize optimality conditions for single and multiple variable unconstrained and constrained non-linear optimization problems, and corresponding solution methodologies.

Text Books:

1. Taha H. A., "Operations Research- An Introduction", Seventh Edition, Pearson Education, Delhi, 2002.
2. Winston, "Operations Research", Thomson Learning, 2003.

Reference Books:

1. P K Gupta and D S Hira, "Operations Research", S Chand & Co., 2003.

Web References:

1. <http://nptel.ac.in/courses/111105039/>
2. <http://nptel.ac.in/courses/Webcourse-contents/IISc-BANG>

CourseCode: 141CA0202	Course Title: SYSTEM SOFTWARE
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 :3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Programming in C
- IT Essentials

Course Objectives:

1. Understand the relationship between system software and machine architecture.
2. Identify the phases of compiler and role of parsers.
3. Build the intermediate code generation.
4. Apply the optimized code to generate the target language .
5. Utilize the knowledge on loader and linkers.

Course Content

Hours

UNIT I BASICS OF SYSTEM SOFTWARE AND ASSEMBLER

9

Introduction – System software and SIC/XE machine architecture - Basic assembler functions – Assembler algorithms and data structures – Machine dependent assembler features- Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions – Program Blocks – Control Sections and Program Linking.

UNIT II COMPILER- LEXICAL ANALYSIS, SYNTAX ANALYSIS

9

Phases of compiler-Lexical Analysis- Role of a Lexical analyzer- input buffering- specification and recognition of tokens-Finite Automata- Designing a lexical analyzer generator- Pattern matching based on NFA's. Syntax Analysis: Role of Parser- Top-down parsing- recursive descent and predictive parsers (LL)- Bottom-Up parsing- Operator precedence parsing- LR, SLR and LALR parsers.

UNIT III COMPILER- CODE GENERATION

9

Intermediate languages: graphical representations- DAGs- Three address code- types of three address statements- syntax directed translation into three address code- Implementation of three address statements.

UNIT IV COMPILER OPTIMIZATION

9

Code Optimization- Machine dependent and machine independent code generation: Sources of optimization-Code Generation-Semantic stacks- Evaluation of expressions- Control structures and procedure calls

UNIT V LOADERS AND LINKERS

9

Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine dependent loader features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-independent loader features – Automatic Library Search – Loader Options Loader design options – Linkage Editors – Dynamic Linking – Bootstrap Loaders.

Course Outcomes

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

1. Understand the relationship between system software and machine architecture for the implementation of assemblers, linkers and loaders.
2. Identify the phases of compiler and role of parser for top down and bottom up parsing.
3. Build the intermediate code generation for the generated parse tree in semantic analyser.
4. Apply the optimized code to generate the target language for the given expression.
5. Utilize the knowledge on loader and linkers for linking and loading the executable target program.

Text Books:

1. Leland Beck , “System Software – An Introduction to Systems Programming “ , Third Edition, Pearson Education, Inc., 2008.(Unit I,IV,V)
2. A.V. Aho, R. Shethi and Ulman,” Compilers - Principles, Techniques and Tools”, Second Edition, Pearson Education, 2012.(Unit II,III,IV)

References Books:

- 1.D.M.Dhamdhere, “Systems Programming and Operating Systems”, Tata McGraw Hill Company, Second Edition, 2009.

Web References:

1. <http://www.capterra.com/learning-management-system-software/>
2. <http://www.brunel.ac.uk/courses/undergraduate/computer-systems-engineering-software-beng>

Course Code: 141CA0203	Course Title: OBJECT ORIENTED PROGRAMMING
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- C Programming
- Problem Solving Techniques

COURSE OBJECTIVES:

1. Identify the object oriented programming features.
2. Illustrate the use of constructor, friend functions,static members.
3. Create custom classes with Polymorphism
4. Apply Generic Function for Optimized code
5. Develop applications using Exception handling,Files ,STL

Course Content

Hours

UNIT I OOP PARADIGM

9

Programming Paradigms-Evolution - Introduction to OOP-Structured Versus Object Oriented Development-Elements of Object Oriented Programming-Popular OOP Languages-Merits and Demerits of OOMethodology-Expressions and Statements.

UNIT II CLASSES AND OBJECTS

9

Overview of C++ – Classes and Objects – constructor and destructor – Friend Functions – Friend Class Inline Function – Static Members – Arrays – Pointers – References – Dynamic Allocation

UNIT III OVERLOADING

9

Function Overloading–Overloading Constructor Functions–Copy Constructors–Default Argument–Operator Overloading–Member Operator Overloading–Overloading new and delete.

UNIT IV INHERITANCE AND TEMPLATES

9

Inheritance – Base Class – Access Control – Virtual Functions – Pure Virtual Functions– Templates –Generic Functions – Applying Generic Functions–Generic Classes

UNIT V ERROR HANDLING AND FILES

9

Exception Handling -Restricting Exceptions – C++ I/O Streams-Predefined Streams – Formatted I/O-Manipulators Functions - File I/O-Reading and Writing text files-Unformatted and Binary I/O-Random Access Files-STL.

Course Outcomes

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

1. Identify the object oriented programming features with C++ classes.
2. Illustrate the use of constructor, friend functions, static members in programs.
3. Create custom classes with Polymorphism for overloading function and operators.
4. Apply Generic Function for Optimized code to solve complex computing problems.
5. Develop C++ based applications using Exception handling, Files ,STL .

TEXT BOOKS:

1. K.R.Venugopal, Rajkumar Buyya, T.Ravishankar, " Mastering in C++", Second Edition, Tata McGraw Hill,2013. (Unit I).
2. Herbert Schildt, "C++ The Complete Reference", Fourth Edition, Tata McGraw Hill, 2007. (unit II to V).

REFERENCES:

1. Bjarne Stroustrup , "The C++ Programming Language", Addison-Wesley, Fourth Edition, 2013.
2. Stephen Prata, "C++ Primer Plus", Addison Wesley, Sixth Edition , 2012.

WEB REFERENCES

1. <http://nptel.ac.in/courses/106103115/36>
2. <http://nptel.ac.in/syllabus/106106110/>
3. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-00-introduction-to-computer-science-and-programming-fall-2008/video-lectures/>

Course Code: 141CA0204	Course Title: HUMAN VALUES AND PROFESSIONAL ETHICS
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Moral values
- Basics of internet

Course Objectives:

1. Understand the concepts of ethics and professional skill.
2. Interpret the threats in computing environment
3. Illustrate the role of computer crime and intellectual property
4. Infer the ethical and professional issues in Internet Technologies and Privacy
5. Interpret the intricacies of accessibility issues

Course Content

Hours

UNIT I HUMAN VALUES & ENGINEERING ETHICS

9

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty – Courage – Value time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality-Character - Engineering Ethics: The History of Ethics-Purposes for Engineering Ethics-Engineering Ethics-Consensus and Controversy –Professional and Professionalism –Professional Roles to be played by an Engineer –Self Interest, Customs and Religion-Uses of Ethical Theories-Professional Ethics-Types of Inquiry – Engineering and Ethics-Kohlberg’s Theory – Gilligan’s Argument –Heinz’s Dilemma.

UNIT II COMPUTER HACKING

9

A General Introduction – Computer Ethics: An Overview – Computer Hacking – Introduction – Definition of Hacking – Destructive Programs – Hacker Ethics – Professional Constraints – BCS Code of Conduct – To Hack or Not To Hack – Ethical Positions on Hacking.

UNIT III COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS

9

Aspects of Computer Crime Introduction – What is Computer Crime – Computer Security Measures –Professional Duties and Obligations – Intellectual Property Rights – The Nature of Intellectual Property– Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright – The Extent and Nature of Software Piracy – Ethical and Professional Issues – Free Software and Open Source Code.

UNIT IV REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY

9

Introduction – In Defense of Freedom Expression – Censorship – Laws Upholding Free Speech – Free Speech and the Internet – Ethical and Professional Issues – Internet Technologies and Privacy – Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk.

UNIT V COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES

9

Introduction – Principle of Equal Access – Obstacles to Access for Individuals – Professional Responsibility – Empowering Computers in the Workplace – Introduction – Computers and Employment – Computers and the Quality of Work – Computerized Monitoring in the Work Place – Telecommuting – Social, Legal and Professional Issues – Use of Software, Computers and Internet Based Tools – Liability for Software Errors – Documentation Authentication and Control – Software Engineering Code of Ethics and Practices – IEEECS – ACM Joint Task Force.

Course Outcomes

1. Understand the concepts of ethics and professional skills in working environment.
2. Interpret the threats in computing environment on ethical hacking
3. Illustrate the role of computer crime and intellectual property for free and open source software
4. Infer the ethical and professional issues in Internet Technologies and Privacy for the assessment of safety and risk.
5. Interpret the intricacies of accessibility issues in designing the software project.

Text Books:

1. M.Govindarajan, S.Natarajan and V.S.SenthilKumar, "Professional Ethics and Human Values", PHI Learning Pvt. Ltd, 2013 (unit I).
2. Penny Duquenoy, Simon Jones and Barry G Blundell, "Ethical, legal and Professional Issues in Computing", Middlesex University Press, 2008. (unit II to V).

Reference Books:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.
2. George Reynolds, "Ethics in Information Technology", Cengage Learning, 2011.
3. Caroline Whitback, "Ethics in Engineering Practice and Research", Cambridge University Press 2011
4. Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet", Third Edition, Prentice Hall, 2008.

WEB REFERENCES:

1. <http://nptel.ac.in/courses/109104032/>
2. <http://nptel.ac.in/syllabus/syllabus.php?subjectId=109104033>

Course Code: 141CA0205	Course Title: WEB PROGRAMMING
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 0 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Internet Concepts
- Object-oriented programming

Course Objectives:

1. Understand the concept of World Wide Web.
2. Design the Webpages.
3. Apply the scripting concepts to perform operations on webpages.
4. Apply the javascript concepts.
5. Design the webpages using Document Object Model .

Course Content

Hours

UNIT I INTRODUCTION TO WORLD WIDE WEB 9

Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages.

UNIT II UI DESIGN 9

Markup Language (HTML): Introduction to HTML - Formatting and Fonts– Commenting Code–Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.

Cascading Style Sheet (CSS): Introduction to CSS–Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds – Manipulating text - Margins and Padding - Positioning using CSS.

UNIT III JAVASCRIPT 9

Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling- Controlling Windows & Frames and Documents - Form handling and validations.

UNIT IV JAVASCRIPT 9

Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping .

UNIT V DOCUMENT OBJECT MODEL 9

Introduction- Document Object Model—Methods-Document – Elements-DOM HTML-DOM CSS-DOM Events-Event Listener-Navigation- Nodes-Node list.

Course Outcomes

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

1. Understand the concept of WWW ,request & response for webpage development.
2. Design the Webpages using HTML & CSS for real time applications.
3. Apply the scripting operations on webpages for realtime scenario.
4. Apply javascript concepts for data processing.
5. Design the webpages for dynamic operations using Document Object Model.

Text Books:

1. Harvey & Paul Deitel and Associates, Harvey Deitel and Abbey Deitel, " Internet and World Wide Web - How to Program", Fifth Edition, Pearson Education, 2011. (Unit I & II).
2. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, Tata McGraw Hill, 2013. (Unit III to V).

Reference Books:

1. Achyut S Godbole and AtulKahate, "Web Technologies", Second Edition, Tata McGraw Hill, 2012.
2. David Flanagan, "JavaScript: The Definitive Guide", Sixth Edition, O'Reilly Media, 2011.

Web References

- <http://nptel.ac.in/courses/106105084/>
- <http://nptel.ac.in/video.php?subjectId=106105084>

Course Code: 141CA0207	Course Title: OBJECT ORIENTED PROGRAMMING LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Course Objectives:

1. Apply the concepts of member functions, friend function, constructor and destructor
2. Use the Static member and static function features
3. Employ the concepts of templates and inheritance
4. Develop dynamic applications with constructor overloading and virtual function
5. Apply utility and input /output functions

List of Experiments

1. Apply the concepts of member functions, friend function, constructor and destructor
2. Use the Static member and static function
3. Employ the concepts of templates and inheritance
4. Develop application with constructor overloading and virtual functions
5. Apply file utility and input /output functions

Course Outcomes

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

1. Apply the concepts of member functions, friend function, constructor and destructor in solving problems.
2. Use the Static member and static function features in programs
3. Employ the concepts of templates and inheritance in complex problems for reusability.
4. Develop dynamic applications with constructor overloading and virtual function
5. Apply input /output functions for performing file operations.

Course Code: 141CA0208	Course Title: SYSTEM SOFTWARE LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- C Programming
- Problem Solving Techniques

Course Objectives:

1. Apply the concept of symbol table with functions
2. Develop one pass, two pass and single pass assembler
3. Apply the concept of absolute, relocating and direct-linking loader
4. Construct the features of simple text editor
5. Apply the concept of symbol table with hashing

LIST OF EXPERIMENTS:

1. Develop a symbol table with functions to create, insert, modify, search, and display.
2. Develop the pass one of a two pass assembler.
3. Implement the pass two of a two pass assembler
4. Construct a single pass assembler.
5. Implement an absolute loader.
6. Implement a relocating loader.
7. Develop the pass one of a direct-linking loader.
8. Implement the pass two of a direct-linking loader.
9. Construct a simple text editor with features like insertion / deletion of a character, word, and sentence.
10. Implement a symbol table with suitable hashing

Course Outcomes

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

1. Apply the concept of symbol table using functions
2. Develop one pass, two pass and single pass assembler
3. Apply the concept of absolute, relocating and direct-linking loader
4. Construct a simple text editor with different features
5. Develop a symbol table using different hashing techniques.

Course Code: 141CA0209	Course Title: WEB PROGRAMMING LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Basics of HTML, CSS, Java script

Course Objectives

1. Design static web page using HTML .
2. Design webpages using CSS
3. Develop webpages with DHTML.
4. Develop program using Javascript.
5. Develop the event handling and form handling.

LIST OF EXPERIMENTS:

1. Develop static web pages using HTML.
2. Develop web site with help of Cascading Style Sheets.
3. Develop an interactive web page with HTML and CSS.
4. Develop webpage with DHTML and CSS Concepts.
5. Develop interactive web page with Embedding of Images
6. Develop web page validation event using JavaScript.
7. Develop and demonstrate using JavaScript for errors and Form handling.
8. Develop web page using event Handling.

Course Outcomes

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

1. Design static web page using HTML for real time scenario.
2. Design webpages using CSS for interactive web pages.
3. Develop dynamic webpage using DHTML.
4. Develop program using Javascript for validation.
5. Develop the event handling and form handling using Javascript for validation.

END OF SEMESTER II

SEMESTER – III

Course Code: 141CA0306	Course Title: ADVANCED OPERATING SYSTEMS
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- IT Essentials
- Computer Organization

Course Objectives

1. Understand process management, CPU scheduling, memory management and file system
2. Apply synchronization and Dead Lock.
3. Apply the memory management algorithms.
4. Analyze the disk scheduling and directory methods
5. Interpret the concepts in Mobile Operating Systems.

Course Content

Hours

UNIT I INTRODUCTION

9

Evolution of OS - Operating Systems Structures: System Components – Operating System Services – Process Concepts – Process Scheduling – Process & Cooperating Process – Inter Process Communication – Threads.

UNIT II SCHEDULING & DEADLOCK

9

CPU Scheduling– Scheduling Algorithms – Process Synchronization: Critical Section Problems – Synchronization Hardware– Semaphores.
Deadlock - System Model – Deadlock Characterization – Methods for Handling Deadlocks - Deadlock Prevention – Deadlock Avoidance – Deadlock Detection -- Recovery from Deadlocks.

UNIT III MEMORY MANAGEMENT

9

Memory Management - Background – Swapping – Contiguous Memory Allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory: Demand Paging – Replacement Algorithms – Thrashing.

UNIT IV FILE MANAGEMENT

9

File Concept-Access Methods-Directory Structure-File System Structure-Implementation of File System & Directory - Allocation Methods-Free Space Management- Disk Structure & Scheduling-Disk Management-Swap–Space Management.

UNIT V MOBILE OPERATING SYSTEM

9

Mobile Operating Systems: ARM and Intel architectures - Power Management - Mobile OS Architectures - Kernel structure and native level programming - Runtime issues- Approaches to power management.

Course Outcomes

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

1. Understand process management, CPU scheduling, memory management and file system of an Operating system
2. Apply synchronization and Dead Lock for a process.
3. Apply the memory management algorithms for a given problem.
4. Analyze the disk scheduling and directory methods
5. Interpret the concepts in Mobile Operating Systems.

Text Book:

1. AviSilberschatz, P.B.Galvin, G.Gagne, "Operating System Concepts", Ninth Edition, Wiley & Sons, 2013.

Reference Books:

1. William Stallings, "Operating Systems: Internals and Design Principles", 8th Edition, Pearson Education, 2014.
2. H M Deitel, P J Deitel and D R Choffnes, "Operating Systems" ,Third edition, Pearson Education, 2011
3. Source Wikipedia, "Mobile Operating Systems", General Books LLC, 2010

Web References

1. https://www.tutorialspoint.com/operating_system/index.htm
2. <http://www.nptel.ac.in/courses/106108101/>

Course Code: 141CA0302R	Course Title: SOFTWARE ENGINEERING
Core/Elective: Core	L : T : P : C : M – 3 : 2 : 0 : 4 : 100
Type: Lecture	Total Contact Hours: 60

Prerequisites:

- System Software

Course Objectives

1. Understand the concepts of linear Generic & Prescriptive Process, Agile Process & Extreme Programming.
2. Understand the software requirements with behavioral modeling.
3. Design software using software architectural design & component level design.
4. Draw the diagrams using notations unified modeling language.
5. Analyze the various testing strategies and SCM.

Course Content

Hours

UNIT I INTRODUCTION

12

Introduction to Software Engineering – A Generic Process Model – Prescriptive Process Models: Waterfall, Incremental, Prototyping, and Spiral Model – The Unified Process – Agile Development: Agile Process – Extreme Programming (XP) – Adaptive Software Development – Scrum.

UNIT II SOFTWARE REQUIREMENTS

12

Modeling Principles – Understanding Requirements – Requirements Modeling: Scenario-Based, Data, Class-Based, Flow-Oriented, Behavioral Modeling.

UNIT III SOFTWARE DESIGN

12

Design Concepts – Design Models – Architectural Design: Software Architecture – Architectural Styles– Architectural Design – Component Level Design: Component – Designing Class Based and Traditional Components.

UNIT IV UNIFIED MODELING LANGUAGE

12

Introduction – Development Process – Use case – Class diagram - Sequence Diagram - Package Diagram - State Machine Diagram - Activity Diagram - Collaboration Diagram – Interaction Diagram

UNIT V TESTING AND MAINTENANCE

12

Testing Strategies- Strategic Approach- Issues- Test Strategy for Conventional Software- Validation Testing- System Testing- Testing fundamentals -White box testing – Basis path testing – Control structure testing – Black box testing-Model based testing- Software Configuration Management (SCM) – SCM Repository –SCM Process – Software Maintenance and Supportability -CMMI..

Course Outcomes

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

1. Understand the concepts of linear Generic & Prescriptive Process, Agile Process & Extreme Programming for software life cycle.
2. Understand the software requirements with behavioral modeling for project.
3. Design software model using architectural & component level design.
4. Draw the diagrams using notations in unified modeling language for real time scenario.
5. Analyze the various testing strategies and SCM for real time project development.

Text Books:

1. Roger Pressman S, "Software Engineering: A Practitioner's Approach", Tata McGraw Hill, Seventh Edition, 2010. (Unit I, II, III, V).
2. Martin Fowler, "UML Distilled", Pearson Education, Third Edition, 2003 (Unit IV).

Reference Books::

1. Ian Sommerville, "Software Engineering", Pearson Education, Ninth Edition, 2010.
2. Pfleeger and Atlee, "Software Engineering", Pearson Education, Fourth Edition, 2009

Web References:

1. <http://nptel.ac.in/courses/106105087/>
2. <http://nptel.ac.in/courses/106101061/>

Course Code: 141CA0310	Course Title: OBJECT ORIENTED PROGRAMMING WITH JAVA
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours :45

Prerequisites:

- Problem Solving Techniques
- Object Oriented Programming

Course Objectives

1. Explain the looping, conditions and operators.
2. Apply the exception handling and multithreading.
3. Apply the JDBC concepts.
4. Apply the various collections.
5. Build the JSP program.

Course Content

Hours

UNIT I JAVA FUNDAMENTALS & CLASSES

8

Java Fundamentals: Features of Java- OOPs concepts- Java virtual machine- Data types, variable, arrays, expressions, operators, and control structures. Classes and Objects: Classes – Objects - Abstract classes- Static classes- Inner classes- Packages - Wrapper classes- Interfaces- this –super keyword - String Handling functions.

UNIT II EXCEPTION HANDLING AND MULTITHREADING

12

Exception Handling : try and catch block - Multiple catch block -Nested try - finally block - throw keyword - Exception Propagation - throws keyword - Exception Handling with Method Overriding - Custom Exception. Multithreading :Life Cycle of a Thread - Creating Thread- Thread Scheduler - Sleeping a thread - Joining a thread - Thread Priority - Daemon Thread - Thread Pooling - Thread Group - ShutdownHook - Performing multiple task by multiple thread - Garbage Collection - Runnable class. Synchronization : synchronized method - synchronized block - static synchronization - Deadlock - Inter-thread Communication - Interrupting Thread.

UNIT III IO PACKAGE AND JDBC

9

IO package: Input streams- Output streams- types of Input & Output streams - Serialization- Deserialization. Database Connectivity (JDBC): JDBC Drivers -Steps to connect to the database - Connectivity - DriverManager - Connection interface - Statement interface - ResultSet interface - PreparedStatement - ResultSetMetaData - DatabaseMetaData - Storing image - Retrieving image - Storing file - Retrieving file - Stored procedures and functions - Transaction Management - Batch Processing.

UNIT IV- COLLECTIONS

8

Collection Framework - ArrayList class - LinkedList class - ListIterator interface - HashSet class - LinkedHashSet class - TreeSet class - PriorityQueue class - ArrayDeque class - Map interface - HashMap class - LinkedHashMap class - TreeMap class - Hashtable class - Comparable and Comparator - Properties class.

UNIT V - JSP

8

JSP: Basics - Life cycle - API - Scripting elements - Implicit Objects - Directive Elements - Exception Handling - Action Elements - MVC in JSP - JSTL - Custom tags.

Course Outcomes

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

1. Apply the looping, conditions and operators in various applications.
2. Apply the exception handling and multithreading in given problem.
3. Develop an application using JDBC connectivity.
4. Apply the collection algorithm in given applications.
5. Create a JSP program for real time applications.

Text Books:

1. H. M.Deitel, P. J. Deitel, "Java How to Program", Ninth Edition, Prentice Hall, 2014.
2. H. M.Deitel, P. J. Deitel, S. E. Santry, "Advanced Java 2 Platform How to program", Prentice Hall, 2007.

Reference Books:

1. Antonio Goncalves, "Beginning Java EE 7", Apress publication, 2013.
2. Herbert Schildt, "The Complete Reference JAVA2", Ninth edition, Tata McGraw-Hill, 2014.
3. Bart Baesens, Aimee Backiel, Seppe Vanden Broecke, "Beginning Java Programming: The Object Oriented Approach", John Wiley & Sons, 2015.
4. Daniel Liang, "Introduction to Java Programming, Comprehensive Version", Ninth Edition, Pearson Education, 2014.

Web References:

- https://www.cse.iitb.ac.in/~nlp-ai/javalect_august2004.html
- <http://www.learnerstv.com/Free-Computers-Video-lectures-ltv006-Page1.htm>
- <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-092-introduction-to-programming-in-java-january-iap-2010/lecture-notes/>
- <http://www.iitk.ac.in/esc101/08Jul/notes.html>
- <http://people.cs.aau.dk/~torp/Teaching/E01/Oop/handouts/collections.pdf>
- <https://cs.brown.edu/courses/cs015/docs/JavaFXGuide.pdf>

Course Code: 141CA0304	Course Title: DATA STRUCTURES AND ALGORITHMS
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Problem Solving Techniques
- C Programming
- Object Oriented Programming

Course Objectives:

1. Illustrate the data structures such as linked lists, Stacks
2. Apply the different choice of trees
3. Apply the Searching, Sorting and Heap algorithms
4. Apply graph computations in shortest path algorithms
5. Analyze the efficiency of algorithms.

Course Content

Hours

UNIT I INTRODUCTION

9

ADT - Linked Lists (Singly, Doubly and Circular) Implementation – Array, Pointer- Stack: Definition and Examples, Representing Stacks - Queues: Queue and its Representation – Applications of Stack, Queue and list.

UNIT II BASIC DATA STRUCTURES

9

Trees – General- Binary Tree - Binary Search trees- AVL Trees, B-Trees – Implementations – Tree Traversals. Hashing – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

UNIT III SORT AND SEARCH STRUCTURES AND HEAPS

9

General Background: Insertion Sort- Shell Sort- Quick Sort - Radix Sort - Merge Sort - Basic Search Techniques – Linear, Binary Search. Heap – Binary Heap – Leftist Heaps – Binomial Heaps – Fibonacci Heaps – Skew Heaps.

UNIT IV GRAPHS AND THEIR APPLICATIONS

9

Graphs – Representation – Topological Sort - Shortest Path Algorithm -Dijkstra's algorithm- Network Flow Problem – Minimum Spanning Tree – Prim's Algorithm - Kruskal's Algorithm – Graph Traversals– Applications of Depth–First Search.

UNIT V ALGORITHM DESIGN TECHNIQUES

9

Design Techniques – Greedy Algorithm- Divide and Conquer: Closest Point- The Selection Problem– Dynamic Programming: Ordering Matrix Multiplication-Optimal Binary Search Tree- Backtracking Algorithms: Turnpike reconstruction problem..

Course Outcomes

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

1. Illustrate the data structures such as linked lists, Stacks and Queues for real world applications
2. Apply the different choice of trees that effectively model the information in a problem.
3. Apply the various Searching, Sorting and Heaps for efficient searching and management of data.
4. Apply graph computations in shortest path algorithms for real word problems
5. Analyze the efficiency of algorithms of greedy, divide and conquer and dynamic programming for problem solving.

Text Book:

- 1.M. A. Weiss,“Data Structures and Algorithm Analysis in C”,Second Edition, Pearson Education,2011.

Reference books:

1. Data Structures using C, ISRD Group, Second Edition, McGraw Hill 2013.
2. T.H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein,“ Introduction to algorithms”,Third Edition, Prentice Hall of India Ltd, 2009.
3. V. Aho, J. E. Hopcroft, and J. D. Ullman,“Data Structures and Algorithms”,Pearson Education, Reprint Edition 2006.
4. Tanenbaum A.S., Langram Y and Augestien M.J,“Data Structures using C and C++”,Second Edition, Prentice Hall of India, 2004.

Web References

1. <http://nptel.ac.in/courses/106105085/4>
2. <http://nptel.ac.in/courses/106104019/>
3. <http://nptel.ac.in/courses/106101060/>

Course Code: 141CA0305	Course Title: DATABASE MANAGEMENT SYSTEMS
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 0 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- C programming
- Data structures and algorithms

Course objectives:

1. Illustrate the basic concepts of database systems
2. Build the SQL queries and authorization mechanism.
3. Construct a relational database using ER model and normalization
4. Apply the concepts of database storage structure and access techniques
5. Identify the recent database system architecture

Course Content

Hours

UNIT I INTRODUCTION TO RELATIONAL DATABASES

9

Database System Applications – Purpose of Database systems – View of Data – Database Languages – Relational Databases – Database Design – Data Storage and Querying – Transaction Management – Database Architecture – Database Users and Administration - Structure of Relational Databases – Database Schema – Keys – Schema Diagrams – Relational Query Languages – Relational Operations.

UNIT II SQL

9

Overview of the SQL Query Language – SQL Data Definition – Basic Structure of SQL Queries-Additional Basic Operations - Aggregate Functions – Nested Sub queries – Set Operations -Modification of the Database - Join Expressions – Views – Transactions – Integrity Constraints – SQL data types and Schemas – Authorization – Accessing SQL from a programming language – Functions and procedures – Triggers – Relational Algebra – Tuple relational calculus – Domain relational calculus.

UNIT III DATABASE DESIGN

9

Entity Relationship model – constraints – Entity Relationship Diagrams – Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory – Algorithms for Decomposition – Decomposition using Multivalued dependencies.

UNIT IV DATA STORAGE AND QUERYING

9

RAID – Ordered Indices – B+ Tree Index Files – B+ Tree Extensions – Multiple Key Access – Static Hashing – Dynamic Hashing – Measures of Query Cost – Selection Operations – Sorting – Join Operations – Overview of Query Optimization – Transformation of Relational Expressions – Estimating Statistics of Expression Results – Choice of Evaluation Plans.

UNIT V CASE STUDY

9

Introduction to PostgreSQL - User Interfaces – SQL Variations and Extensions – Transaction Management – Storage and Indexing – Query Processing and Optimization – System Architecture.

Course Outcomes

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

1. Illustrate the principles of Database systems and fundamentals of relational model
2. Build the SQL queries and authorization mechanism in relational tables
3. Construct relational database using ER model and normalization for real world problems
4. Apply the concepts of database storage structure and access techniques
5. Identify the concept of Postgresql system architecture

Text Book:

1. Abraham Silberschatz, Henry F. Korth and S. Sudharssan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011.

Reference Books:

1. Raghuram Ramakrishna & Johannes Gehrke, "Database Management System", McGrawHill, Third Edition, 2010.
2. C. J. Date, "An Introduction to Database Systems", Eighth Edition, Addison-Wesley, 2003.
3. Ramez Elmasri and Shamkant B. Navathe, "Fundamental Database Systems", Third Edition, Pearson Education, 2010.

Web References:

1. <http://nptel.ac.in/courses/106106093/>
2. http://www.tutorialspoint.com/dbms/dbms_overview.htm
3. <http://www.studytonight.com/dbms/database-normalization.php>

Course Code: 141CA0311	Course Title: OBJECT ORIENTED PROGRAMMING WITH JAVA LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours:45

Prerequisites:

- Problem Solving Techniques
- Object Oriented Programming

Course Objectives

1. Generate an application using package.
2. Develop applications using multi thread.
3. Develop applications using JDBC.
4. Develop applications using Collection.
5. Build the webapplications using JSP.

LIST OF EXPERIMENTS:

1. Develop their own package and use their package with typical application using Package and Exception Handling.
2. Develop applications using Multithread and Exception Handling.
3. Develop applications using Synchronized Multithread and Exception Handling.
4. Develop database applications using JDBC and Exception Handling.
5. Develop applications using Collection and JDBC.
6. Create JSP applications using JSP and JDBC.

Course Outcomes

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

1. Generate applications using package for real time problem.
2. Develop applications using multi thread for real time problem.
3. Develop applications using JDBC for real time problem.
4. Develop applications using Collection for real time problem.
5. Build the webapplications using JSP for real time problem.

Course Code: 141CA0308	Course Title: DATA STRUCTURES AND ALGORITHMS LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Problem Solving Techniques
- C Programming
- Object Oriented Programming

Course Objectives

1. Design and implement linear data structures
2. Implement nonlinear data structures
3. Employ hashing in applications
4. Perform BFS and DFS traversal for graph

LIST OF EXPERIMENTS: (C / C++ / Java)

1. Develop applications using stack
2. Perform applications using Queue
3. Implement applications using various lists
4. Perform sorting using heap tree
5. Construct Hash table
6. Apply the graph to find shortest path

Course Outcomes

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

1. Design and implement linear data structures for solving problems
2. Implement nonlinear data structures for the real time applications
3. Employ hashing for effective retrieval of data in applications
4. Perform BFS and DFS traversal for graph

Course Code: 141CA0309R	Course Title: DBMS LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Problem Solving Techniques
- Object Oriented Programming

Course objectives:

1. Build SQL queries to create and modify the table.
2. Develop web based application provided with exceptions.
3. Apply the concept of cursors.
4. Construct the packages in a database application.
5. Apply the concept of triggers with database connectivity.

LIST OF EXPERIMENTS:

1. Develop a web-based database application system using the concept of functions.
2. Design and implement a database application using exceptions.
3. Build database using the concept of cursors.
4. Design web based application with packages.
5. Develop real time application with database connectivity using triggers.

Recommended Databases: Oracle 11g ,PostgreSQL 6.3,MySQL 5.5,SQL Server 2008

Front End : Java 8 / Visual C# 2013 above.

Course Outcomes

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

1. Build SQL queries to create and modify the table using the concept of functions in database.
2. Develop web based application provided with exceptions for the real time scenario.
3. Apply the concept of cursors for the database.
4. Construct the packages in a database application for the given scenario.
5. Apply the concept of triggers with database connectivity for web based application.

Course Code: 141CA0313	Course Title: PROMOTION OF STUDENTS' WELLNESS
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 2 : 1 : 100
Type: Lecture	Total Contact Hours: 30

Course Objectives

1. Maintain Physical Wellbeing.
2. Maintain Mental Wellbeing.
3. Maintain Social Wellbeing.

UNIT I – PHYSICAL HEALTH

Physical structure and functions of human body-simplified physical exercises (hand exercises, leg exercises, breathing exercises, eye exercises –kapalpathi- Maharasanas 1-2 _Massages – Acupuncture –Relaxation – Importance and benefits, Suryanamaskar.

UNIT II – MENTAL HEALTH

Maintenance of youthfulness and life force –kayakalpa yoga – anti ageing process- benefits. Mind and its functions – mind wave frequency – meditation process-Agna, shanthi, thuriam – benefits

UNIT III- PERSONALITY DEVELOPMENT –I

Purpose of life and analysis of thought – Philosophy of life – introspection – practice Moralization of desires and neutralization of anger- practices

UNIT IV – PERSONALITY DEVELOPMENT –II

Eradication of worries and benefits of blessings – wave theory –practice, Genetic centre – purification –cause and effect theory

UNIT V – SOCIAL HEALTH

Greatness of guru – cultural education – love and compassion –fivefold culture, greatness of friendship and social welfare-individual, family and work peace.

Course Outcomes

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

1. Maintain physical wellbeing –grooming, BMI, flexibility, muscle strength, body compositions (vatha,pitha,kappa)
2. Maintain mental wellbeing – Perceptions, Attention/concentration, Memory, gunas
3. Maintain Social Wellbeing – etiquettes, emotional and psychological aspects, stress management , morality and values

Text Book:

1.Vethathiri Maharishi Institute For Spiritual and Intuitional Education, aliyar, “value education for harmonious life (Manavalakalai Yoga)”, Vethathri Publications, Erode, 2010.

Reference Books:

1. Dr.R.Nagarathna, Dr.H.R. Nagendra, “ Integrated approach of yoga therapy for positive health”, Swami Vivekananda Yoga Prakashana Bangalore,2008 Ed.
2. Dr.R.Nagarathna, DR.H.R. Nagendra, “ New Perspectives in stress management”,Swami Vivekananda Yoga Prakashana Bangalore,Ed June 1986

OPERATIONAL MODALITIES**THEORY AND PRACTICE DEMONSTRATION:**

3 Days of Theory and Practice demonstration-7 hours/day for Syllabus Coverage
Follow-Up Practice : 12 Week x @ hours/Week : 24 Hours

EVALUATION

UNIT I :Practical

UNIT II & UNIT III : Written (Objective Type Test)

UNIT IV & UNIT V : Written (Objective Type Test)

Mid Semester & Model : Written and Practical

End semester : Written And Practical

Assessment: Using Measurement gadgets and questionnaires (As Suggested By SVYASA And Scoring Sheets (From ALiyar)

DIMENSIONS AND TOOLS IN MEASUREMENT

Dimension	Sub Dimension	Measurement Tools
Physical	BMI	Electronic Weighting Machine.Height Measurement
	Flexibility	Sit & Reach
	Muscle Strength	Handgrip DYnamometer
Mental	Perception	Critical Flicker Fusion
Social	Interpersonal Effectiveness & Self Concept	FIRO B
	Psychological Well Being	Short Wellbeing Scale
		Short Happiness Scale
		Barrat Impulsive Scale

Course Code: 141CA0312	Course Title: EMPLOYABILITY SKILLS-I
Core/Elective: Core	L : T : P : C : M –0 : 0 : 2 : 1 : 100
Type: Lecture	Total Contact Hours: 30

Course Objectives

1. Understand the knowledge about practical problem solving techniques
2. Develop C Programs using basic programming constructs
3. Develop C programs using arrays and strings
4. Develop applications in C using functions , pointers and structures

UNIT I

Number system - ratio & proportions – Ages –Average -Time and work -pipes and cistern -clocks -percentage -Profit, Loss and discount

UNIT II

Coding and decoding-numbers and alpha series-directions-analogy-Binary logic-puzzles-sequential output tracing-ranking and ordering

UNIT III

Role of programming languages, Need to study programming languages, Characteristics of Programming Languages C Fundamentals: Data types, Operators - Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements

UNIT IV

Arrays: Declaration, Initialization – One dimensional array – Multi Dimensional array - String Handling – String and String Buffer Class – String Handling functions - Function prototype, function definition, function call - Recursion

UNIT V

Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays Structure - definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions

Web References:

1. www.geeksforgeeks.org, www.hackerrank.com, www.techgig.com
2. <https://www.studytonight.com/c/>
3. <https://www.tutorialspoint.com/cprogramming/index.htm>

Book References:

1. Gayle Laakmann, "Cracking the coding interview: 150 programming questions and solutions", CareerCup, LLC, Seattle, WA.
2. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.

Course Outcomes

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

1. Understand the knowledge about practical problem solving techniques for real scenario
2. Develop C Programs using basic programming constructs for real scenario
3. Develop C programs using arrays and strings for real scenario
4. Develop applications in C using functions , pointers and structures for real scenario

END OF SEMESTER III

BoS Chairman

SEMESTER IV

Course Code: 141CA0404	Course Title: COMPUTER NETWORKING
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3: 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- IT Essentials
- Advanced Operating Systems

Course Objectives

1. Explain the basic concepts of computer networks.
2. Identify the concepts of application layer protocols and services provided in the network.
3. Select the suitable transport layer protocol and congestion control mechanism.
4. Apply the routing algorithm to find the best route.
5. Utilize the error detection techniques and security provided in the network.

Course Content

Hours

UNIT I INTRODUCTION

9

Internet - Network Edge-Network Core-Delay, Loss, and Throughput in Packet-Switched Networks-Protocol Layers and Their Service Models-Networks under Attack.

UNIT II APPLICATION LAYER

9

Principles of Network Applications-Network Application Architectures-Application-Layer Protocols-Web and HTTP-FTP-SMTP-Comparison with HTTP-DNS-Socket Programming.

UNIT III TRANSPORT LAYER

9

Transport-Layer Services – Connectionless Transport: UDP - Go-Back-N (GBN) - Connection-Oriented Transport: TCP - Approaches to Congestion Control- TCP Congestion Control.

UNIT IV NETWORK LAYER

9

Introduction - Virtual Circuit and Datagram Networks- Internet Protocol (IP)- Datagram Format- IPv4 Addressing- Internet Control Message Protocol (ICMP)- IPv6- Routing Algorithms- Link-State (LS) Routing Algorithm- Distance-Vector (DV) Routing Algorithm.

Services Provided by the Link Layer - Error-Detection and -Correction Techniques- Channel Partitioning Protocols- Random Access Protocols- Switched Local Area Networks- Principles of Cryptography- Firewalls.

Course Outcomes:

At the end of the course, students will be able to:

1. Explain the basic concepts of computer networks and the internet.
2. Identify the concepts of application layer protocols and services provided in the network based on the requirements of an application.
3. Select the suitable transport layer protocol and congestion control mechanism for given traffic scenario.
4. Apply the routing algorithm suitable for a given network
5. Utilize the error detection techniques and security provided in the network for a given scenario.

Text Book:

1. James F. Kurose, Keith W. Ross, "Computer Networking A top-down approach", Sixth Edition, Pearson Education, Inc, 2013.

Reference Books:

1. Behrouz A. Forouzan, "Data Communications and Networking", Fifth Edition, McGraw Hill, 2013.
2. William Stallings, "Data and Computer Communications", Ninth Edition, Prentice Hall, 2011.
3. Larry L. Peterson & Bruce S. Davie, "Computer Networks – A systems Approach", Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2008.
4. Andrew S. Tannenbaum David J. Wetherall, "Computer Networks", Fifth Edition, Pearson Education 2011.

Web References

- <http://nptel.ac.in/courses/106105081/1>
- <http://williamstallings.com/DataComm>

Course Code : 141CA0402R	Course Title : MOBILE PROGRAMMING
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Object Oriented Programming

Course Objectives:

1. Identify the software features provided by the Swift Programming Language
2. Practice with Swift user interfaces and layouts
3. Develop Multiscreen applications with different UI elements
4. Illustrate user-defined Interface elements and controls
5. Develop applications with persistence

Course Content

Hours

UNIT I INTRODUCTION TO SWIFT

9

Swift Basics- Playgrounds, Comments, Variables, and Constants-Predefined Types- Operators, and Control Statements –Strings- Booleans- Enumerations Arrays, Ranges, and Dictionaries Sets NSArray, NSDictionary, and NSSet –optional -Functions and Closures- Catching Errors Classes and Structures- Subclassing and Inheritance.

UNIT II USER INTERFACE DESIGN & ITS LAYOUTS

9

Writing user First App- Basic User Interactions- MVC Paradigm- Fixing Issues Using Auto Layout- Examining the Application Delegate- Adding Intermediate-Level User Interactions- Working with Device Rotations

UNIT III MULTIVIEW APPLICATION

9

Creating a Multiview Application - Tab Bars and Pickers- Introducing Table Views- Adding Navigation Controllers to Table Views

UNIT IV VIEWS & CONTROLLERS

9

Collection View –Using Split Views and Popovers-Application Settings and User Defaults

UNIT V PERSISTENCE BETWEEN APPS LAUNCHES

9

Application's Sandbox- Using Property Lists- Using iOS's Embedded SQLite3 Using Core Data

Course Outcomes

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

1. Identify the software features provided by the Swift Programming Language with playground
2. Practice with Swift user interfaces and layouts for different orientation of applications
3. Develop Multiscreen applications with different UI elements for real time problems
4. Illustrate variety of user-defined Interface elements and controls for the app
5. Develop application with different choice of persistence of data.

Text Books:

1. Molly K. Maskrey,"Beginning iPhone Development with Swift 4", Fourth Edition.Apress Publications,2017.

Reference Books:

1. Matt Neuburg ,"Programming iOS 11",Eighth Edition O'Reilly Media,2017.
2. Jon Hoffman,"Mastering Swift 4",Fourth Edition, Packt Publication,2017.
3. The Swift Programming Language by Apple ,2017.

Web References:

1. www.apple.com/in/itunes
2. <http://itunes.stanford.edu/>

Course Code: 141CA0403R	Course Title: WEB APPLICATION DEVELOPMENT
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Problem Solving Techniques
- Java Programming

Course Objectives

1. Apply the spring concepts.
2. Construct application using spring JDBC and MVC framework.
3. Describe the .Net framework and architecture.
4. Apply the concepts of C#.NET.
5. Apply the concepts of ASP.NET.

Course Content

Hours

UNIT I HOW BROWSERS WORK AND SPRING CORE BASICS

11

How browsers work: Introduction - The browser's main functionality - The browser's high level structure - The rendering engine - Rendering engines - The main flow - HTML Parser - CSS parsing - The order of processing scripts and style sheets - Render tree construction - Layout - Painting - CSS2 visual model.

Spring Introduction– Overview – Architecture – Hello World Example – IoC Containers – Bean Definition – Bean Scopes – Bean Life Cycle – Bean Post Processors.

UNIT II WEB MVC FRAMEWORK

10

Bean Definition Inheritance – Dependency Injection – Injecting Inner Beans – Injecting Collection – Beans Auto-Wiring - Annotation Based Configuration – Java Based Configuration – Event Handling in Spring – Custom Events in Spring – AOP with Spring Framework – JDBC Framework – Transaction Management – Web MVC Framework.

UNIT III .NET OVERVIEW

8

Introduction - .Net revolution - .Net framework and its architecture – Common Language Runtime (CLR) – Common Type System (CTS) – Common Language Specification (CLS) – Microsoft Intermediate Language (MSIL) – Assembly – Namespaces – Class Libraries.

UNIT IV C#.NET

8

Overview to C# - C # Compilation and Execution Process – C# Fundamentals (Data types, Operators, Programming constructs) – Inheritance – Classes & Interfaces – Overloading – Overriding – C# Property – Exception Handling - Delegates & Lambda Expressions – LINQ attributes.

UNIT V ASP.NET

8

ASP.Net- IIS – ASP.Net Page Life Cycle – ASP Vs ASP.Net – HTML Controls Vs Server side Controls– Validation Controls – Data binding in ASP.Net – Caching – Configuration in ASP.Net (web.config) – Session management – View State in ASP.Net – ASP.Net.

Course Outcomes

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

1. Apply the spring life cycle in given application.
2. Develop an application using JDBC and MVC framework for given problem.
3. Explain the concepts of .Net framework and architecture.
4. Develop an C#.NET application for real time problem.
5. Develop an ASP.NET application for real time problem.

Text Books:

1. Tali Garsiel and Paul Irish, "How Browsers Work: Behind the scenes of modern web browsers", 2011 (Unit I)
2. Rod Johnson, Juergen Hoeller, "Spring Java/J2EE Application Framework, The Spring Framework – Reference Documentation", Version 2.5.6, Copyright 2004-2008 (Unit I, II)
3. Jeff Prosise, "Programming Microsoft .NET", Microsoft Press, 2004. (Unit III)
4. Jesse Liberty, "Programming C#", Fourth Edition, O'Reilly Media. (Unit IV)
5. Mario Szpuszta, Matthew MacDonald, "Pro ASP.NET 4 in C# 2010", Third Edition, Apress (Unit V)

References Books:

1. David Winterfeldt, "Spring by Example", Version 1.5, Copyright © 2008-2015.
2. Seth Ladd and Keith Donald, "Expert Spring MVC and Web Flows", Apress, 2006.
3. Jason Beres, Bill Evjen, Devin Rader, "Professional Silverlight 4 Print", December 2012 www.free-ebooks-library.com.
4. David S Plat, "Introducing Microsoft .NET", Third Edition, Microsoft Press, 2013.
5. Chris Sells, Jon Flanders, Ian Griffiths, "Mastering Visual Studio .Net", Shroff/O'Reilly, 2013.

Web References

- <http://www.tutorialspoint.com/spring/>
- <http://www.ict.swin.edu.au/personal/mlumpe/CS430/LectureNotes/WhatIsDotNet.pdf>
- <https://www.cs.colorado.edu/~kena/classes/5448/f12/presentation-materials/dhall.pdf>
- http://www.tutorialspoint.com/asp.net/asp.net_introduction.htm
- <http://www.kunal-chowdhury.com/2010/04/57silverlight-tutorials-chapter-1.html#0Egt7S7DdZL7e7OI.97>
- <http://krishnaittraining.com/dotnet-syllabus.html>
- <https://www.html5rocks.com/en/tutorials/internals/howbrowserswork/>
- <http://taligarsiel.com/Projects/howbrowserswork1.htm>

Course Code: 141CA0407R	Course Title: MOBILE PROGRAMMING LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Object Oriented Programming

Course objectives:

1. Apply the basic UI elements
2. Develop applications with listings of values
3. Create multi view applications
4. Employ application with persistence Storage

LIST OF EXPERIMENTS:

1. Design applications with buttons and basic UI elements .
2. Create application with Collection view.
3. Design application for storing with Plist
4. Design application with ios Calendar.
5. Design application with Maps
6. Creating Simple Game Picker
7. Design application with coredata

Course Outcomes

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

1. Apply the UI elements in developing real time applications
2. Develop applications with collection view and table views
3. Create multi view application with maps and pickers
4. Employ application with persistence Storage using Core data/plist.

Course Code: 141CA0408R	Course Title: WEB APPLICATION DEVELOPMENT LABORATORY
Core/Elective: Core	L : T : P : C : M –0: 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Problem solving techniques
- Java Programming

Course Objectives

1. Apply the various attributes in Spring application.
2. Develop application using Spring JDBC and Spring MVC.
3. Construct program using C#.NET.
4. Build an application using ASP.NET.

LIST OF EXPERIMENTS:

1. Develop spring Application.
2. Develop spring application using spring JDBC.
3. Develop spring application using spring MVC.
4. Develop C#.NET application.
5. Develop ASP.NET application.
6. Develop ASP.NET application.

Course Outcomes

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

1. Apply the various attributes in developing spring application.
2. Develop an application using Spring JDBC and Spring MVC for real time problem.
3. Develop C#.NET application for problem.
4. Develop ASP.NET application for real time problem.

Course Code: 141CA0411	Course Title: Campus to Corporate
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 2 : 1 : 100
Type: Lecture	Total Contact Hours: 30

Course Objectives

1. Show gratitude and social responsibility.
2. Understand various Business environments.
3. Explain the Transition from a campus mind set to corporate mind set.
4. Infer the work culture.
5. Choose to be Presentable and agile.

UNIT I – GRATITUDE AND SOCIAL RESPONSIBILITY

Importance of gratitude : Finding opportunities to give back to society: Responsible Behavior in Public places; Volunteerism during calamities; Social relevancy during Engineering design and manufacturing –how social issue could be tackled by engineering solutions.

UNIT II- THE WORLDS OF BUSINESS (get to the specifics of behavioural responses to certain specific contexts)

World of business – Perceptions vs reality : Various business Types – B2B, B2C, & Other business models; various industry verticals – fundamentals, dynamics & nuances; Nature of work as per various functions – Sales & Marketing, Service, Research & Development , Production etc; Self-reflective questionnaire to identify the fitment to a particular field/function.

UNIT-III – TRANSITION FROM A CAMPUS MINDSET TO CORPORATE MINDSET

ROCK as an acronym (Responsibility, Ownership, Contribution, Knowledgeable (Continuous learning)); Responsibility – ways in which responsibility should be demonstrated; Ownership –owning one’s career, owning mistakes, desisting from complaining; contribution –focus on creating value, giving more than receiving (salary & Perks); Knowledgeable (continuous learning) – learning just begins after campus, aspects of learning mindset, various opportunities to learn and how they can be utilised at work.

UNIT-IV –PREPAREDNESS TO ADAPT TO WORK CULTURE

Skills to get through selection process – interview conversations, resume writing, group discussion & presentation;

Handling cultural differences; Handling Gender dynamics; Alignment to Ethics and values; Alignment to work processes & code of conduct; Handling multiple (often conflicting) demands; handling peer influence; Conducting Sensitively with Subordinates,

peers & boss; Managing Personal Finance; Maintaining Work-life balance-work & social life, hobbies etc;

UNIT V - PRESENTABLE AND AGILE

Dressing & grooming – Reasons For good dressing & grooming; Professional etiquette what is etiquette, professional etiquette vs social etiquette, Aspects of professional etiquette; wellness – Healthy eating habits, importance of sleep, Importance of fitness; Importance of Cleanliness of surroundings – desk, Work Area, Place of stay(5S);

Mode of delivery:

1. A 2 day Learning Workshop guided by Learner's workbook.
2. Continuous learning guided by learning journal and reviews by faculty

Assessments and Evaluation:

Assessment	Details	Weightage	Administration	By Whom	When
Workbook record assessment	Assess the necessary elements to be entered in the workbook	20%	Individual workbooks reviewed by the faculty		Immediately after the learning workshop
Initial Knowledge Test and Scenario based knowledge test	Multiple choice questions (20)	25%	Pen and Paper	Internal Team	Immediately after the learning workshop
Review of student journal	Student held journal for the whole semester	30%	Individual journals reviewed by the faculty	Trained faculty members	Once in a week
Final Knowledge test and scenario based knowledge test	Multiple Choice Questions (40)	10%		Internal team	End of semester
Review of student journal by external expert		15%	Student journal comprehensive review	Trained faculty members	End of semesters

Course Outcomes

At the End of the course the student will be able to :

1. Show gratitude and social responsibility.
2. Understand various business environments – Industry & Function Wise.
3. Explain the transition from a campus mindset to corporate mindset.
4. Infer to adapt to the future work culture.
5. Choose to be Presentable and agile.

Course Code: 141CA0410	Course Title: Employability Skills-II
Core/Elective: Core	L : T : P : C : M –0 : 0 : 2 : 1 : 100
Type: Lecture	Total Contact Hours: 30

Course Objectives

1. Understand the knowledge about non verbal reasoning problems.
2. Develop C++ Programs using basic programming constructs
3. Develop C++ programs using Object oriented programming concepts
4. Develop applications in C++ using Data structure concepts

UNIT I

simple interest & compound interest - Time speed and distance - boats and stream - permutation & combination – probability - mixtures and alligations- partnership- geometry & mensuration- calendar

UNIT II

Seating arrangement - blood relationship- syllogism- venn diagrams- cubes- sequential output tracing- Data sufficiency- non-verbal reasoning

UNIT III

Introduction – Procedure vs. object oriented programming – Data types – control structures – Arrays and Strings – User defined types – Functions and Pointers

UNIT IV

Classes and Objects – Operator Overloading – Inheritance – Polymorphism and Virtual Functions – Case study

UNIT V

File Handling-Linked List, Stack and Queue data structures- Trees - Graphs- OOPs Concepts using C++ /Java

Book References:

1. HM Deitel and PJ Deitel “C++ How to Program”, Seventh Edition, 2010, Prentice Hall.
2. Gayle Laakmann,”Cracking the coding interview:150 programming questions and solutions”,CareerCup, LLC, Seattle, WA.

Web References:

1. www.geeksforgeeks.org, www.hackerrank.com
2. www.techgig.com
3. <https://www.studytonight.com/cpp/>
4. <https://www.tutorialspoint.com/cplusplus/index.htm>

Course Outcomes

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

1. Understand the knowledge about non verbal reasoning problems.
2. Develop C++ Programs using basic programming constructs
3. Develop C++ programs using Object oriented programming concepts
4. Develop applications in C++ using Data structure concepts

ELECTIVES OF IV SEMESTER

Course Code: 141CA9112	Course Title: HUMAN COMPUTER INTERFACE
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites: The student should have undergone the course(s):

- Web programming
- Java Programming

Course Objectives:

1. Understand the foundations & design of hci with evaluation techniques.
2. Apply the Multimedia UI Design with its architecture ,navigation and media selection.
3. Understand the Mobile architecture,applications and mobile elements.
4. Apply the concepts of front end Web designing interfaces.
5. Analyze the aspects of advanced Web designing interfaces.

Course Content

Hours

UNIT I FOUNDATIONS & DESIGN OF HCI

10

Interaction Models – Frameworks – Ergonomics – Styles – Elements – Interactivity – Paradigms. HCI in software process – Software life cycle – Usability engineering – Prototyping – Design Rationale – Design rules – Evaluation Techniques- Universal Design.

UNIT-II MULTIMEDIA UI

9

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. Multimedia UI :Multimedia User Interface Design - Cognitive Background - Information Architecture - Media Selection and Combination - Interaction and Navigation.

UNIT-III MOBILE HCI

9

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets-Applications- Games- Mobile Information Architecture- Mobile 2.0, Mobile Design: Elements of Mobile Design- Tools.

UNIT-IV WEB INTERFACE DESIGN

8

Drag & Drop- Direct Selection- Contextual Tools- Overlays & its types- Inlays & its types - Virtual Pages.

UNIT- V WEB INTERFACE DESIGN

9

Process Flow – Google blogger –Interactive single page process- Inline assistant process- dialog overlay process-static single page process. Provide an Invitation: Static and dynamic invitations.

Course Outcomes

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

1. Understand the foundations & design of HCI with evaluation techniques.
2. Apply the Multimedia UI Design with its architecture ,navigation and media selection for website .
3. Understand the Mobile architecture, mobile elements and applications for developement.
4. Apply the concepts of front end web designing interfaces for real websites.
5. Analyze the aspects of advanced web designing interfaces for transactions .

Text Books:

1. Alan Dix,Janet Finlay, Gregory Abowd,Russell Beale,“Human Computer Interaction”,Third Edition, Pearson Education, 2004.(Unit I & II)
2. Brian Fling,“Mobile Design and Developmen”t, O’Reilly Media Inc., First Edition , 2009.(Unit III)
3. Bill Scott and Theresa Neil, “Designing Web Interfaces”, O’Reilly, First Edition, 2009.(Unit IV)

Reference Books:

1. Andrew Sears, Julie A. Jacko,“The Human Computer Interaction Handbook”,Second Edition,Lawrence Erlbaum Associates, New York, 2008.

Web References

1. <http://nptel.ac.in/courses/106103115/>
2. <http://iiscs.wssu.edu/drupal/node/4607>

Course Code: 141CA9113	Course Title: CYBER SECURITY
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Computer Organization
- Computer Networks

Course Objectives

1. Understand network security policies.
2. Choose cryptography and cipher techniques.
3. Apply authentication techniques and key management.
4. Identify the concepts of intrusion detection, network security and system security.
5. Apply the concepts of user security and program security.

Course Content

Hours

UNIT I COMPUTER SECURITY AND NETWORK SECURITY POLICIES

9

Overview of Computer Security: Basic Components – threats-policy and mechanism-Assurance-operational issues-human issues. Information and Network Security Policies: Security policies-confidentiality policies-integrity policies-hybrid policies.

UNIT II BASIC CRYPTOGRAPHY AND CIPHER TECHNIQUES

9

Basic Cryptography: Classical cryptosystems-public key cryptography-cryptographic checksums. Cipher Techniques: Problems-stream and block ciphers-networks and cryptography-Secure Electronic mail PEM-Security at the Network Layer IPsec.

UNIT III AUTHENTICATION & KEY MANAGEMENT

9

Authentication: Basics-passwords-Challenge Response-Biometrics. KEY Management:Key Exchange-cryptographic key infrastructures-storing and revoking keys-digital signatures.

UNIT IV INTRUSION DETECTION SYSTEM

9

Intrusion Detection: Principles-basic intrusion detection-models-architecture-organization of intrusion detection system-intrusion response. Network Security: Introduction-policy development-network organization. System Security: Introduction-policy-networks-users-authentication-processes-files-retrospective.

UNIT V USER SECURITY & PROGRAM SECURITY

9

User Security: Policy-access-files and devices-processes-electronic communications. Program Security: Introduction-Design-refinement and implementation-common security related programming problems-testing, maintenance and operation.

Course Outcomes

1. Understand the network security policies in internet and cyberlaws.
2. Choose the concepts of cryptography and cipher techniques and apply in real time scenario.
3. Apply authentication techniques and key management for safety measures.
4. Identify the concepts of intrusion detection, network security and system security for stopping hacking.
5. Apply the concepts of user security and program security in development.

Text Book:

1. Sathyanarayana S.Venkatramanayya,"Introduction to Computer Security", Pearson Education, 2013.

Reference Books:

1. William Stallings,"Cryptography And Network Security: Principles And Practice",Fifth Edition, Pearson Education, 2013.
2. Bernard Menezes,"Network Security and Cryptography",Cengage Learning, 2011.

Web References:

1. <http://web.mit.edu/6.857/OldStuff/Fall95/www/home.html>
2. <http://www-inst.eecs.berkeley.edu/~cs161/fa05/>
3. http://www.vssut.ac.in/lecture_notes/lecture1423183198.pdf

Course Code: 141CA9114	Course Title: DATA MINING AND DATA WAREHOUSING
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Database Management Systems

Course Objectives:

1. Understand the principle of data warehousing on various business problems.
2. Apply the data mining functionalities and association rule mining.
3. Develop various classification models.
4. Apply the various clustering algorithms to solve problems
5. Apply mining concepts in spatial, multimedia, Text and Web Data.

Course Content

Hours

UNIT I INTRODUCTION TO DATA WAREHOUSE

9

Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II DATA MINING & DATA PREPROCESSING

9

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation. Association Rule Mining: Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III CLASSIFICATION & PREDICTION

9

Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree-Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT IV CLUSTERING

9

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V SPATIAL DATA ANALYSIS

9

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

Course Outcomes:

1. Explore the various components of a data warehouse.
2. Apply the data mining functionalities and association rule to solve problems
3. Apply the classification algorithms to develop various models.
4. Apply various clustering algorithms to solve problems
5. Apply the concepts of spatial, multimedia, Text and Web mining for real time scenario.

Text Book:

1. Jiawei Han & MichelineKamber,"Data Mining: Concepts and Techniques", Third Edition, Elsevier Publishers, 2013.

Reference Books:

1. Alex Berson& Stephen J. Smith,"Data Warehousing, Data Mining & OLAP", Tata McGrawHill, 2010.
2. UsamaM. Fayyad, Gregory Piatetsky ,ShapiroPadhrai Smyth & Ramasamy Uthurusamy,"Advances In Knowledge Discovery and Data Mining",The M.I.T Press, 2010.
3. Ralph Kimball,"The Data Warehouse Life Cycle Toolkit",John Wiley & Sons, Second Edition, 2009.
4. Sean Kelly,"Data Warehousing in Action",John Wiley & Sons Inc., 2009.
5. Gupta. G.K,"Introduction to Data Mining with case studies",Prentice Hall of India, 2014.

Web References:

- 1) <http://nptel.ac.in/courses/106106093/32>
- 2).https://onlinecourses.nptel.ac.in/noc18_cs14/preview

Course Code: 141CA9116	Course Title: UNIX AND NETWORKING PROGRAMMING
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Computer Networks

Course Objectives:

1. Understand the environment of UNIX .
2. Apply Process Control and Creation of Sessions.
3. Apply the interprocess communication in Pipes & Semaphores.
4. Apply the TCP & UDP Sockets in UNIX..
5. Develop programs using the Client-Server Model.

Course Content

Hours

UNIT I INTRODUCTION TO UNIX AND FILE SYSTEM

9

Unix Architecture and Command Usage - General Purpose Utilities – File System – Handling Ordinary Files – Basic File Attributes – File I/O – Files and Directories – System Data Files and Information: Password File – Group File – Login Accounting.

UNIT II PROCESSES

9

Process Environment – Process Control – Process Relationships: Terminal Logins – Network Login –Process Groups – Session – Job Control – Signals.

UNIT III INTERPROCESS COMMUNICATION

9

Introduction – Message Passing (SVR4) – Pipes – FIFO – Message Queues – Semaphores – Shared Memory.

UNIT IV SOCKETS

9

Introduction – Transport Layer – Socket Introduction – Elementary TCP Sockets – UDP Sockets –Socket Options – Name and Address conversions.

UNIT V APPLICATIONS

9

Debugging Techniques – TCP Echo Client Server – UDP Echo Client Server – Ping – Trace Route – Client Server Applications like File Transfer and Chat.

Course Outcomes:

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

1. Understand the environment of UNIX and implement the concepts of file system
2. Apply Process Control and Creation of Sessions for session management.
3. Apply the interprocess communication in Pipes & Semaphores of a process.
4. Apply the TCP & UDP Sockets in UNIX Environments.
5. Develop programs using the Client-Server Model.

Text Books:

1. W. Richard Stevens, Advanced Programming in the UNIX Environment, Addison Wesley, New Delhi, 2013.(Unit I to III)
2. Unix Network Programming, The Sockets Networking API, Volume-1, Addison-Wesley Professional, 2011.(Unit IV & V).

Reference Books:

1. Maurice J. Bach, Design of the Unix Operating System Prentice Hall, New Delhi,2007.

Web References

1. <http://www.people.fas.harvard.edu/~lib215/lectures/>
2. <https://www.tutorialspoint.com/unix>

Course Code: 141CA9133	Course Title: ARTIFICIAL INTELLIGENCE
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Programming language
- Mathematical Foundations of Computer Science

Course Objectives

1. Describe the agent type and behaviour
2. Analyze the efficiency of various searching techniques
3. Apply Inference rules to the given knowledge Base
4. Choose the appropriate planning technique
5. Explain the application of artificial Intelligence techniques

Course Content

Hours

UNIT I- INTELLIGENT AGENTS

9

Foundation and history of artificial intelligence – Agents and Environments-Nature of environments-Structure of Agents.

UNIT-II PROBLEM AND SEARCHING

9

Problem solving agents – Measuring Problem Solving Performance- Uninformed Search Strategies : BFS, DFS, DLS, IDS, Bidirectional Search – Informed Search Strategies : Greedy BFS- A* Search – Heuristic function – Local search algorithms- Online Search Agent – Constraint Satisfaction Problem – Backtracking Search for CSP – Adversarial Search.

UNIT III- KNOWLEDGE AND REASONING

9

Logical Agents – Propositional Logic – Reasoning Patterns- Resolution – Forward And Backward chaining- First order Logic – Syntax And Semantics of FOL – Using first order logic_ knowledge engineering in FOL-Inference in FOL – Unification and lifting- Forward and Backward chaining – Resolution

UNIT IV- PLANNING

9

Classical Planning – Planning As state space search- Planning and acting in Real world and Non Deterministic domains- Hierarchical Planning- Multiagent Planning

UNIT V- APPLICATIONS

9

Natural Language Processing – Language Model- Text classification –Information retrieval – Information extraction- Speech recognition.

Course Outcomes

At the end of the course the student should be able to :

1. Describe the type and behaviour for given agent.
2. Analyze the efficiency of various searching techniques for solving a problem
3. Apply inference rules to the given knowledge Base for theorem Proving.
4. Choose the appropriate planning technique to solve the given problem
5. Explain the application of artificial Intelligence techniques in Real World System

Text Book:

1. Stuart Russell, Peter Norving, "Artificial Intelligence-A Modern Approach", Prentice Hall, Third Edition, 2010.

Reference Books:

1. Elaine Rich And Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, Second Edition, 2003
2. Patrick Henry Winston, "Artificial Intelligence", Pearson Education /PHI, Third Edition, 2004.

Course Code: 141CA9111	Course Title: DESIGN PATTERNS
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Object Oriented Programming
- Java Programming

Course Objectives

1. Explain the knowledge about patterns
2. Develop design solutions
3. Identify solution that can solved with JFC
4. Apply Structural Patterns in problems
5. Relate the different Design patterns

Course Content

Hours

UNIT I BACKGROUND ON DESIGN PATTERNS

9

Pattern concept - Pattern taxonomy - Design structures - Design principles- The singleton classifying patterns - Design patterns - The learning process - Studying design patterns - Object oriented approaches - The java foundation classes - Java design patterns – The development challenge.

UNIT II DESIGN PATTERN CATALOG

9

Creational patterns - Factory pattern - Abstract factory pattern - Builder pattern - Factory method – Prototype pattern – Singleton pattern - Summary of creational patterns.

UNIT III JAVA FOUNDATION CLASSES

9

Installing and using the JFC - Ideas behind swing - The swing class hierarchy - Writing a simple JFC program - Buttons and toolbars -Menus and actions - The JList class - The JTable class - The JTree class.

UNIT IV STRUCTURAL PATTERNS

9

Structural Patterns Adapter - Bridge – Composite – Decorator – Façade – Flyweight – Proxy -Comparison with structural patterns.

UNIT V BEHAVIORAL PATTERNS

9

Behavioral Patterns Chain of responsibility- Command - Interpreter – Iterator – Mediator – Memento – Observer – State – Strategy - Template method – Visitor - Discussion of behavioral patterns.

Course Outcomes

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

1. Explain the knowledge about patterns with java programming language
2. Develop design solutions using creational patterns
3. Identify the appropriate design patterns to be solved with JFC
4. Apply Structural Patterns to solve design problems
5. Relate the Creational, Structural , behavioural Design patterns

Text Book:

1. James W. Cooper, "The Design Patterns Java Companions", Addison Wesley Design Patterns Series, 2012

Reference Books:

1. Bruce Eckel, "Thinking in Patterns with Java", MindViewInc, 2006.
2. Cay S. Horstmann, "Object-Oriented Design and Patterns", John Wiley & Sons, 2005.
3. Dr. Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides, "Design Patterns: Elements of Reusable Object-Oriented Software", Pearson publications Ltd, 2004.

Web References

1. http://www.tutorialspoint.com/design_pattern/
2. <http://nptel.ac.in/courses/106101061/15>

Course Code: 141CA9115	Course Title: AGILE SOFTWARE DEVELOPMENT
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Software Engineering

Course Objectives:

1. Understand the foundations of agile methodologies with classification.
2. Understand about the EXTREME PROGRAMMING and its practicing.
3. Understand the Scrum concepts with different job roles .
4. Apply the concepts of Scrum in teamwork with real time scenarios.
5. Apply the aspects of scrum specifications and user stories.

Course Content

Hours

UNIT I AGILE METHODOLOGY

8

Understanding Success-Beyond deadlines-importance of Organizational Success-Agile model - classification of agile methods –Road to Mastery-Find a mentor

UNIT II EXTREME PROGRAMMING(XP)

10

Method overview – lifecycle – XP Team-XP concepts –practicing XP –Thinking – collaborating-Releasing-Development .Mastering Agility :XP values and principles: commonalities – About values, principles and practices - Improve the process.

UNIT III SCRUM PRACTICES AND INDIVIDUALS

10

Individual Roles – Scrum Master – Product Owner – Changed Roles: Analysts, Project Managers, Architects, Functional Managers, Programmers, DB Administrators, Testers, User Experience Designers - Technical Practices – Strive for Excellence - Test-driven development – Refactoring – Collective Ownership – Continuous Integration – Pair Programming –Design: Intentional yet Emergent Guiding the Design

UNIT IV SCRUM TEAMWORK

8

Team Structures – Small Team Productivity – Feature Teams – Component Teams – Guidelines for Good Team Structure – Team Responsibility – Foster Team Learning – Self Organizing Team – Influencing Evolution: Selecting Environment, Defining Performance, Manage Meaning, Energizing the System.

UNIT V SCRUM SPECIFICATION

9

Product Backlog – Documents to Discussions – Written Documentation Disadvantages – User Stories Progressively Refine Requirements – Emergent Requirements – Backlog Iceberg – Refining User Stories – Specify by Example.

Course Outcomes

1. Understand the Agile Methods and its classifications
2. Understand the extreme programming with its values principles
3. Understand the concepts of SCRUM Technology for various job roles.
4. Apply the concepts of SCRUM in agile-based software development including practices, individuals and team work
5. Apply about the scrum specifications and user stories in product development.

Text Books:

1. James Shore and Shane Warden, "The Art of Agile Development", O'Reilly Media, 2007. (Unit I & II).
2. Mike Cohn, "Succeeding with Agile: Software Development Using Scrum", Addison-Wesley Professional, First Edition, 2009. (Unit III to V.)

Reference Books:

1. Craig Larman, "Agile and Iterative Development A Manager's Guide", Pearson Education 2004.
2. Alistair, "Agile Software Development series", Cockburn - 2007
3. Elisabeth Hendrickson, "Agile Testing ", Quality Tree Software Inc 2008.

Web References

1. <http://nptel.ac.in/courses/106101061/26>

Course Code: 141CA9117	Course Title: SERVICE ORIENTED ARCHITECTURE
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Object Oriented Programming
- Java Programming
- Web Application Development

Course Objectives:

1. Identify the standards and technologies web services
2. Design a service-oriented system
3. Employ development standards
4. Identify Implementation Issues
5. Develop Web Services

Course Content

Hours

UNIT I SOA BASICS

9

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- components in an SOA interrelate - Principles of service orientation– Service Layers.

UNIT II XML AND WEB SERVICES

9

XML structure – Elements – Creating Well-formed XML - Name Spaces – Schema Elements, Types, Attributes – XSL Transformations – Parser –Web Services Overview – Architecture

UNIT III WEB SERVICES STANDARDS

9

WS-Coordination overview -WS-Addressing language basics-WS-Reliable Messaging language basics-WS-Policy language basic-WS-Security language basics.

UNIT IV WSDL, SOAP and UDDI

9

WSDL - Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure –Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments – UDDI.

UNIT V SOA in J2EE and .NET

9

SOA platform basics – SOA support in J2EE – Platform overview- Primitive SOA support- Support for service-orientation principles- Contemporary SOA support- SOA support in .NET- Platform overview-Primitive SOA support- Support for service-orientation principles- Contemporary SOA support

Course Outcomes

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

1. Identify the standards and technologies of modern web services implementations
2. Design a service-oriented system using architectural principles
3. Employ development standards in web services
4. Identify Web Services Implementation Issues with Design patterns
5. Develop, publish, and consume the Web Services

Text Books:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2006. (Unit I, III, V).
2. Frank. P. Coyle, XML, "Web Services and The Data Revolution", Pearson Education, 2007 (Unit II, IV)

Reference Books:

1. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services. An Architect's Guide", Pearson Education, 2005.
2. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
3. Dan woods and Thomas Mattern, "Enterprise SOA designing IT for Business Innovation ", O'Reilly, First Edition, 2006.

Web References:

1. <http://nptel.ac.in/syllabus/110106045/>
2. <http://www.cse.iitm.ac.in/~sdas/>

Course Code: 141CA9118	Course Title: PRINCIPLES OF MANAGEMENT
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Human Values and Professional Ethics

Course Objectives

1. Explain the various functions adopted for managerial activities.
2. Articulate the importance of various objectives.
3. Elaborate the functional area of any organization.
4. Explain the various factors involved in motivation and directions.
5. Select suitable controlling strategies.

Course Content

Hours

UNIT I INTRODUCTION

9

Historical developments –approaches to management– Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organization

UNIT II MANAGERS & ENVIRONMENT

9

Social responsibility–Planning – Objectives – Setting Objectives – Process of Managing through Objectives – Strategies- Policies & Planning Premises- Forecasting Techniques – Decision-making

UNIT III FUNCTIONAL AREA OF ORGANISATION

9

Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and Limitations– De-Centralization and Delegation of Authority – Staffing – Selection Process – Techniques

UNIT IV MOTIVATION & DIRECTIONS

9

Objectives– Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication-Types

UNIT V CONTROLLING STRATEGIES

9

System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology– Computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management

Course Outcomes

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

1. Explain the various functions adopted for managerial activities.
2. Articulate the importance of various objectives in different roles.
3. Elaborate the functional area of any organization in specific business.
4. Explain the various factors involved in motivation and directions of organization.
5. Select suitable controlling strategies for any organization.

Text Books:

1. Harold Koontz & Heinz Weihrich, "Essentials of Management", Tata McGraw- Hill-8th Edition, 2011.
2. Tripathy PC And Reddy PN, "Principles of Management", Tata McGraw-Hill-2nd Edition, 2004.

Reference Books:

1. Maheswari S N, "Principles of management accounting", Sultan chand&sons, 2003
2. Vilas Bagad, "Principles of Management", Technical Publishers, Fifth Edition, 2014

Web References

1. <http://nptel.ac.in/courses/110102016/1>
2. <http://nptel.vtu.ac.in/VTU-NMEICT/MS1/MODULE%201%20-%20INTRODUCTION%20TO%20MANAGEMENT.pdf>
3. <http://www.slideshare.net/thadeshvar/principles-of-management-presentation-731212>.

Course Code : 141CA9129	Course Title: INFORMATION RETRIEVAL TECHNIQUES
Core/Elective : Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type : Lecture	Total Contact Hours : 45

Prerequisites:

- Object Oriented Programming
- Data Structures

Course Objectives:

1. Understand the basics of information retrieval with pertinence to modeling.
2. Apply the information retrieval with query operations.
3. Apply the text operations like text classification, clustering and indexing.
4. Apply various information retrieval techniques
5. Develop the applications of information retrieval.

Course Content

Hours

UNIT I INTRODUCTION

9

Basic concepts – Retrieval process – Classic Information retrieval – set probabilistic models –Structured Text Retrieval models –Retrieval evaluation.

UNIT II QUERYING

9

Languages –Keyword based querying –Pattern Matching –Structural Queries –Query Operations –User Relevance Feedback-Local and Global analysis – Text and Multimedia language.

UNIT III TEXT OPERATIONS AND USER INTERFACE

9

Document preprocessing –Clustering –Text Compression –Indexing and searching – Inverted files –Boolean Queries –Sequential searching –User Interface and Visualization –Query Specification.

UNIT IV MULTIMEDIA INFORMATION RETIREVAL

9

Data Models – Query Languages –Spatial Access Methods –Generic Approach –One Dimensional Time series –Two Dimensional Color Images –Feature Extraction.

UNIT V APPLCIAITONS

9

Searching the web – Challenges – Characterizing the web – Search Engines-Browsing- Meta-searchers –Parallel Information Retrieval –Distributed Information retrieval.

Course Outcomes:

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

1. Understand the basics of information retrieval with pertinence to modeling.
2. Apply the information retrieval with query operations.
3. Apply the text operations like text classification, clustering and indexing.
4. Apply various information retrieval techniques for emphasis multimedia IR and web search.
5. Develop the applications of information retrieval for the given scenario.

Text Books:

1. Ricardo Baeza-Yates, Bethier Ribeiro-Neto,"Modern Information Retrieval", Second Edition, ACM Press Books, 2011.

Reference Books:

1. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze,"Introduction to Information Retrieval", Cambridge University Press, 2008.
2. D.A. Grossman, O. Frieder,"Information Retrieval: Algorithms and Heuristics", Springer,2004
3. Stefan Buttcher, Charles L.A.Clarke,"Information Retrieval,Implementing and Evaluating search Engines", Massachusetts Institute of Technology, 2010

Web References

1. <http://nlp.stanford.edu/IR-book/>
2. <http://cse.iitkgp.ac.in/~pabitra/course/ir06/ir06.html>

Semester V

Course Code: 141CA0504	Course Title: MACHINE LEARNING
Core/Elective: Core	L : T : P : C : M – 3 : 2 : 0 : 4 : 100
Type: Lecture	Total Contact Hours: 60

Prerequisites:

- Programming Languages
- Mathematical Foundations of Computer Science

Course objectives:

1. Understand the concepts of supervised learning systems.
2. Understand the techniques of parametric and non parametric classification.
3. Apply the process of various clustering algorithm
4. Apply construction decision tree using diverse methods
5. Apply knowledge of reinforcement learning models.

Course Content

Hours

UNIT I INTRODUCTION & SUPERVISED LEARNING

12

Introduction – Examples of ML Applications - Supervised Learning: Learning from examples –VC dimension – Handling Noise – Model selection and Generalization – Dimensions of a supervised Machine learning.

UNIT II : PARAMETRIC MODELS AND NON-PARAMETRIC MODELS

12

PARAMETRIC MODELS: Maximum Likelihood Estimation – Baye’s Estimators – Parametric Classification- model selection procedures. NON-PARAMETRIC MODELS: Density Estimation –Generalization to Multivariate data –Non parametric Classification

UNIT III: CLUSTERING & ASSESSING AND COMPARING CLASSIFICATION ALGORITHMS

12

CLUSTERING : Introduction: k-Means Clustering - Supervised Learning after Clustering- Hierarchical Clustering- Choosing the Number of Clusters .
ASSESSING AND COMPARING CLASSIFICATION ALGORITHMS: Introduction – Cross validation and resampling methods – Measuring error –Hypothesis testing.

UNIT IV: DECISION TREES & LINEAR DISCRIMINATION

12

DECISION TREES :Introduction - Univariate Trees -Classification Trees - Regression Trees - Rule Extraction from Trees -Learning Rules from Data.
LINEAR DISCRIMINATION : Introduction - Generalizing the Linear Model –Geometry of Linear discriminant- Pairwise separation.

UNIT V : REINFORCEMENT LEARNING

12

Introduction - Elements of Reinforcement Learning - Model-Based learning: Value iteration- policy iteration - Temporal Difference Learning: Exploration strategies, Deterministic and non deterministic Rewards and actions –Generalization – partially observable states.

Course Outcomes

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

1. Understand the concepts of supervised learning systems to apply in learning models.
2. Understand the techniques of parametric, non-parametric models and non parametric classification for information classification.
3. Apply process of various clustering algorithm and concepts assessing and comparing Classification algorithms to improve efficiency.
4. Apply construction decision tree using diverse methods and analyze using linear discrimination techniques for storing datasets.
5. Apply knowledge of reinforcement learning models for learning models.

Text Books

1. Ethem Alpaydin, "Introduction to Machine Learning", Prentice Hall of India, Second Edition ,2010

Referenece Books

1. Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012.
2. Stephen Marsland, "Machine Learning –An Algorithmic Perspective", CRC Press, 2009.
3. Per Harrington, "Machine Learning in Action", Wiley India Pvt Ltd ,2012.

Web Referneces

1. https://onlinecourses.nptel.ac.in/noc16_cs03/
2. https://onlinecourses.nptel.ac.in/noc16_cs18

Course Code: 141CA0502R	Course Title: CLOUD COMPUTING
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Computer Networks
- Virtualization Techniques

Course objectives:

1. Explain the architecture , characteristics and services of cloud computing
2. Relate the issues of building cloud networks for an enterprise
3. Apply managing and resource sharing in cloud systems
4. Identify the issues in the deployment model of private/public/Hybrid cloud
5. Apply the best practices in cloud solutions.

Course Content

Hours

UNIT I CLOUD COMPUTING AND MIGRATING INTO CLOUD

9

Cloud Computing in a Nutshell – Roots of Cloud Computing – Layers and Types of Clouds – Desired Features of a Cloud – Cloud Infrastructure Management – Infrastructure as a Service Providers – Platform as a Service Providers – Challenges and Risks Migrating into a Cloud-Broad Approaches to Migrating into the Cloud – The Seven-Step Model of Migration into a Cloud

UNIT II BUILDING CLOUD NETWORKS (IAAS)

9

MSP Model to Cloud -Computing and Software-as-a-Service - From Single-Purpose Architectures to Multipurpose Architectures - Data Center Virtualization-The Cloud Data Center -Collaboration –Enterprise Cloud Computing Paradigm-Introduction – Background – Issues for Enterprise Applications on the Cloud – Transition Challenges -Business Drivers–The Cloud Supply Chain.

UNIT III MANAGEMENT CLOUD INFRASTRUCTURES

9

Virtual Machines Provisioning and Migration Services-Introduction -Background– Virtual Machines Provisioning and Manageability – Virtual Machine Migration Services- Anatomy of Cloud Infrastructures Distributed Management of Virtual Infrastructures –Scheduling Techniques for Advance Reservation of Capacity.

UNIT IV PLATFORM AND SOFTWARE AS A SERVICE (PAAS)

9

Secure Distributed Data Storage-Introduction – Cloud Storage: from LANs TO WANs – Technologies for Data Security in Cloud Computing Integration of Private and Public Clouds–Introduction –Technologies and Tools for Cloud Computing –Aneka Cloud Platform – Aneka Resource Provisioning Service – Hybrid Cloud Implementation.

UNIT V APPLICATIONS

9

Best Practices in Architecting Cloud Applications in the AWS Cloud- Cloud Concepts- Cloud Best Practices- Grep The Web Case Study

Course Outcomes

1. Explain the architecture , characteristics and services of cloud computing of different deployment models
2. Relate the issues of building the cloud network with enterprise network.
3. Apply open-source solutions for managing cloud systems and evaluate their applicability for cloud-based resource sharing.
4. Identify the issues in the deployment model of private/public/Hybrid cloud for Aneka Cloud Platform
5. Apply the best practices in developing and usage of cloud solutions.

Text Books:

1. Rajkumar Buyya, James Broberg, Andrzej Goscinski ,“Cloud Computing Principles and Paradigms”, John Wiley & Sons, 2011.
2. John W. Rittinghouse, James F. Ransome,” “Cloud Computing Implementation, Management,and Security,” CRC Press,2010.

Reference Books:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. Anthony T. Velte, Toby J. Velte, Ph.D., Robert Elsenpeter, “Cloud Computing: A Practical Approach”, Tata McGraw-Hill, 2009.
3. RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi,”Mastering Cloud Computing”,TMGH, 2013.

Web References

1. <http://nptel.ac.in/courses/106105033/41>
2. <http://nptel.ac.in/courses/106106129/28>
3. <https://aws.amazon.com/>
4. <https://cloud.google.com/>

Course Code: 141CA0503R	Course Title: BIG DATA ANALYTICS
Core/Elective: Core	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours : 45

Prerequisites:

- Database Management Systems
- Java Programming
- Data Mining

Course Objectives:

1. Explain Big Data Technology
2. Explain the features of NoSQL and MongoDB
3. Explore the features of Python and Jupyter Notebook
4. Demonstrate the distributed data processing in Hadoop
5. Develop Map Reduce programming model

Course Content

Hours

UNIT I:INTRODUCTION TO BIG DATA

7

Classification of Digital Data, Structured Data, Semi-Structured data, Unstructured Data, Characteristic of Data, Evolution of Big Data, Definition of Big Data, 3Vs of Data- Volume, Velocity and Variety, Big Data requirement, Traditional Business intelligent versus Big Data. Introduction to Big Data Analytics.

UNIT II: OVERVIEW OF THE BIG DATA TECHNOLOGY

9

NoSQL (Not only SQL): Use of NoSQL, Types of NoSQL, Advantages of NoSQL. Use of No SQL in Industry, NoSQL Vendors, SQL versus NoSQL, NewSQL.

MongoDB: MongoDB definition, MongoDB Using JSON, creating and generating unique key, support for dynamic queries, Replications, Sharding, Create Database and Drop Database, MongoDB Query Language.

UNIT III: INTRODUCTION TO PYTHON AND JUPYTER NOTEBOOK

9

Introduction to Python: Variables, Expressions, Statements – Functions – Case Study: Interface Design - Introduction to Jupyter Notebook – Notebook documents - Starting the notebook server - Opening notebooks - Notebook user interface - Structure of a notebook document - User interface components - Interactive User Interface of the Notebook - Notebook Examples – Running simple code - Introduction to Kaggle – Kaggle datasets.

UNIT IV: HADOOP

10

Hadoop: Features of Hadoop, Version of Hadoop, Hadoop Ecosystems, Hadoop Distributions, Hadoop versus SQL. Hadoop definition, Not RDBMS , RDBMS versus Hadoop, Distributed computing challenges, Hadoop Components, HDFS (Hadoop Distributed File System), HDFS Daemons, Anatomy of File read, Write, Replica management Strategy, working with HDFS Commands, Processing Data with Hadoop, Managing Resources and applications with Hadoop YARN (Yet Another Resource Negotiator).

UNIT V: MAPREDUCE PROGRAMMING

10

Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression, Interacting With Hadoop Ecosystem, Pig, Hive, Sqoop, HBase, Introduction to Hive, Hive Query Language.

Course Outcomes:

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

1. Explain about Big Data paradigm
2. Illustrate the features of NoSQL and MongoDB
3. Implement the Python code in Jupyter Notebook
4. Apply the concepts and commands of Hadoop in distributed data processing.
5. Develop programs with the MapReduce and Hive in distributed computing.

TEXT Books:

1. Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley, 2015
2. Allen B. Downey, "Think Python", O'Reilly, 2014.

References Books:

1. Tom White, "Hadoop: The Definitive Guide", O'Reilly Publication, 2014.
2. Chuck Lam, "Hadoop in action", Dream Tech Press, Reprint Edition, 2016.
3. Vignesh Prajapati, "Big Data analytics with R and Hadoop", PACKT Publishing, 2013.
4. Chodorow Kristina, "MongoDB : Definitive Guide", O'Reilly Publication, 2014.

Web References:

1. <http://www.mongodb.com/nosql-explained>
2. <http://nosql-database.org/>
3. <http://hadoop.apache.org/>
4. <https://www.datacamp.com/courses/intro-to-python-for-data-science>
5. <https://www.datacamp.com/community/tutorials/tutorial-jupyter-notebook>
6. <https://github.com/jupyter/help>
7. <https://ipython.org/notebook.html>
8. <https://jupyter.readthedocs.io/en/latest/>
9. <https://www.kaggle.com/>
10. <https://www.kaggle.com/datasets>
11. <http://hadoop-online-tutorials.com/>
12. <https://developer.ibm.com/hadoop/>
13. <https://hbase.apache.org/>
14. <https://pig.apache.org/>
15. <https://hive.apache.org/>

Course Code: 141CA0507R	Course Title: SOFTWARE TESTING LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Software Engineering

Course objectives:

1. Apply the testing basic concepts, tools and techniques.
2. Apply Selenium tool for test cases and test suite.
3. Apply the testing operation.
4. Analyze the website load testing

List of Experiments

1. Study and draw the following class diagram, Deployment Diagram, Sequence Diagram, using rational rose for any typical applications.
2. Write java program to perform JUnit testing to demonstrate test cases success and failure.
3. Write java program to perform the web application connectivity test case using Selenium tool.
4. Write java program to create a test suite for Gmail login page using Selenium tool.
5. Write program to perform load testing using Jmeter.

Course Outcomes

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

1. Apply the testing basic concepts, tools and techniques for UML diagrams.
2. Apply the testing operation for Junit testing.
3. Apply Selenium tool for test cases and test suite for the given problem.
4. Analyze the website load testing using Jmeter.

Course Code: 141CA0508R	Course Title: CLOUD AND BIG DATA ANALYTICS LABORATORY
Core/Elective: Core	L : T : P : C : M – 0 : 0 : 4 : 2 : 100
Type: Practical	Total Contact Hours: 45

Prerequisites:

- Computer Networks
- Virtualization Techniques
- Data Mining
- Java Programming

Course objectives:

1. Apply the virtualization tools in cloud environment
2. Make use of open-source solutions in cloud hosting.
3. Apply the MongoDB commands and Python code
4. Demonstrate MapReduce Application in Hadoop
5. Demonstrate the various plots and statistical functions using R

LIST OF EXPERIMENTS:

CLOUD COMPUTING

1. Construct the procedure to run the virtual machine of different configuration.
2. Install C compiler in the virtual machine and execute sample program.
3. Create web applications with GoogleAppEngine and Host it
4. Show the virtual machine creation on Eucalyptus private cloud setup

BIG DATA ANALYTICS

1. Execute the MongoDB basic commands with suitable collection.
2. Execute the MapReduce function in MongoDB with suitable collection.
3. Demonstrate a Swampy package with specific output.
4. Develop a Map Reduce application that counts the number of occurrences of similar words either from a single file or multiple file in Hadoop.
5. Demonstrate the Boxplots and Scatterplots with an appropriate data set in the R environment.
6. Demonstrate the simple Linear Correlation and Regression with an appropriate data set using R.

Software Requirements: Apache Hadoop 2.6, Ubuntu 14, MongoDB 2.6.12, R Studio 3x., Python 3.x, Anaconda/Jupyter

Course Outcomes

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

1. Apply the virtualization tools to set up private cloud environment and run application on it.
2. Make use of open-source solutions for developing web applications in cloud
3. Apply the MongoDB queries and Python function in Jupyter Notebook.
4. Develop MapReduce application in Hadoop
5. Demonstrate the various plots and statistical functions using R

ELECTIVES V SEMESTER

Course Code: 141CA9122	Course Title: SOFTWARE PROJECT MANAGEMENT
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Software Engineering
- Principles of Management

Course Objectives:

1. Understand the process of project management and stepwise project planning
2. Apply the evaluation techniques and forecasting involved in Software projects development
3. Apply the techniques available for software effort estimation
4. Apply the risk management analysis techniques
5. Apply the project control metrics

Course Content

Hours

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

8

Project Definition – Contract Management – Activities Covered by Software Project Management – Overview of Project Planning – Stepwise Project Planning.

UNIT II PROJECT EVALUATION

9

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III SOFTWARE EFFORT ESTIMATION

10

Problems with over and under estimates - Software effort estimation techniques - Function Point –Object Point –COCOMO Parametric Model.

ACTIVITY PLANNING: Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration.

UNIT IV RISK MANAGEMENT

9

Nature of Risk – Managing Risk – Risk Identification – Risk Analysis – Reducing the Risk –Evaluating risks to the schedule.

MONITORING AND CONTROL: Creating Framework – Collecting the Data – Visualizing Progress – Cost Monitoring –Earned Value – Prioritizing Monitoring – Getting Project Back to Target – Change Control .

UNIT V PROJECT CONTROL METRICS

9

The seven core metrics -management indicators -quality indicators -life cycle expectations -pragmatics software metrics - metrics automation.

Change Metrics: Overview –Metrics Derivation –Pragmatic Metrics

Course Outcomes

1. Understand the process of project management and stepwise project planning for delivering successful software projects.
2. Apply the evaluation techniques and forecasting involved in Software projects development with various cost benefit analysis.
3. Apply the techniques available for software effort estimation and activity planning for smooth progress of project development.
4. Apply the risk management analysis techniques to quantify efficiency and monitoring & control.
5. Apply the project control metrics and its effect on changing /updating the project.

Text Books:

1. Bob Hughes & Mike Cotterell, "Software Project Management", Tata McGraw- Hill Publications, Fifth Edition 2012. (Unit I - IV)
2. Walker Royce, "Software Project Management –A unified Framework", Pearson Education, 2005. (Unit –V)

Reference Books :

1. S. A. Kelkar, "Software Project Management", PHI, New Delhi, Third Edition, 2013.
2. Roger Pressman S., "Software Engineering: A Practitioner's Approach", Tata McGraw Hill, Seventh Edition, 2010

Web References

1. <http://nptel.ac.in/syllabus/106101061/>
2. <http://www.nptelvideos.com/video.php?id=918>

Course Code: 141CA9124	Course Title: DATABASE ARCHITECTURE AND ADMINISTRATION
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Database Management Systems

Course objectives:

1. Explain the Oracle 11g Database architecture.
2. Understand the logical, memory, and physical structures
3. Infer the Monitoring Space Usage.
4. Apply the Transactions with Undo Tablespaces & Database Tuning
5. Apply the Backup and Recovery Operations.

Course Content

Hours

UNIT I ORACLE 11G ARCHITECTURE

8

An Overview of Databases and Instances - Oracle Logical Storage Structures - Oracle Logical Database Structures.

UNIT II PHYSICAL & MEMORY STRUCTURES

8

Oracle Physical Storage Structures - Multiplexing Database Files - Oracle Memory Structures - Backup/Recovery overview.

UNIT III MONITORING SPACE USAGE

9

Common Space Management Problems - Oracle Segments, Extents, and Blocks - Data Dictionary Views and Dynamic Performance Views.

UNIT IV MANAGING TRANSACTIONS WITH UNDO TABLE SPACES & TUNING

10

Transaction Basics - Undo Basics - Rollback - Managing Undo Tablespaces - Database Tuning: Tuning Application Design - Tuning SQL - Tuning Memory Usage.

UNIT V BACKUP AND RECOVERY OPTIONS & RMAN

10

Logical Backups - Physical Backups - Using Data Pump Export and Import - Data Pump Import Options - Integration of Backup Procedures - Using Recovery Manager (RMAN): RMAN Features and Components - Overview of RMAN Commands and Options - Backup Operations - Recovery Operations.

Course Outcomes

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

1. Explain the Oracle 11g Database architecture.
2. Understand the logical, memory, and physical structures of a database.
3. Infer the Monitoring Space Usage.
4. Apply the Transactions with Undo Tablespaces & Database Tuning
5. Apply the Backup and Recovery Operations of a database.

Text Book:

1. Bob Bryla , Kevin Loney, "Oracle Database 11g DBA Handbook", Oracle Press, McGraw-Hill Edition 2008.

Reference Books:

1. Thomas Kyte, "Expert Oracle Database Architecture 9i and 10g Programming Techniques and Solutions", Apress, 2010.
2. Iggy Fernandez, "Beginning Oracle Database 11g Administration from Novice to Professional", Apress 2009.
3. John Watsonoca, "Oracle Database 11g:Administration 1 Exam guide", Tata McGraw Hill, Editon 2008.

Web References:

1. <http://www.oracle-dba-online.com/>
2. <http://nptel.ac.in/courses/106106093/>

Course Code: 141CA9130	Course Title: CRYPTOGRAPHY AND NETWORK SECURITY
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Basics of Internet
- Computer Networks

Course Objectives

1. Apply the encryption standards and cipher techniques.
2. Apply the public key cryptography and hash functions.
3. Apply the digital signatures and key management.
4. Describe the network security essentials.
5. Apply the system level security concepts.

Course Content

Hours

UNIT I : INTRODUCTION AND ENCRYPTION TECHNIQUES

9

Overview: Computer Security Concepts - the OSI security architecture –Security Attacks-Security Services-Security Mechanisms. **Classical Encryption techniques:** Symmetric cipher model-substitution techniques-transposition techniques- steganography. **Block Ciphers and the Data Encryption Standard:** Traditional Block Cipher Structure -The Data Encryption Standard -A DES Example -The Strength of DES -Block Cipher Design Principles.

UNIT II :PUBLIC KEY CRYPTOGRAPHY AND HASH FUNCTIONS

10

Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems - the RSA Algorithm - Diffie-Hellman Key Exchange - Elliptic Curve Arithmetic - Elliptic Curve Cryptography. **Cryptographic Hash Functions:** Applications of Cryptographic Hash Functions -Two Simple Hash Functions - Requirements and Security - Hash Functions Based on Cipher Block Chaining - Secure Hash Algorithm (SHA) -SHA-3. **Message Authentication Codes:** Message Authentication Requirements-Message Authentication Functions -Requirements for Message Authentication Codes -Security of MACs.

UNIT III : KEY MANAGEMENT AND USER AUTHENTICATION

10

Digital Signatures - Digital Signatures - Elgamal Digital Signature Scheme - Schnorr Digital Signature Scheme - NIST Digital Signature Algorithm - Elliptic Curve Digital Signature Algorithm. **Key Management and Distribution:** Symmetric Key Distribution Using Symmetric Encryption-Symmetric Key Distribution Using Asymmetric Encryption-Distribution of Public Keys- X.509 Certificates -Public-Key Infrastructure. **User Authentication:** Remote User-Authentication Principles-Remote User-Authentication Using Symmetric Encryption-Kerberos-Remote User Authentication Using Asymmetric Encryption-Federated Identity Management-Personal Identity Verification.

UNIT IV : NETWORK SECURITY

8

Wireless Network Security: Wireless Security-Mobile Device Security-IEEE 802.11 Wireless LAN Overview -IEEE 802.11i Wireless LAN Security. **Electronic Mail Security:** Pretty Good Privacy- S/MIME- DomainKeys Identified Mail. **IP Security:** IP Security Overview-IP Security Policy-Encapsulating Security Payload- Combining Security Associations-Internet Key Exchange-Cryptographic Suites.

UNIT V : SYSTEM SECURITY

8

Intruders: Intruders - Intrusion detection – password management. **Malicious Software:** Viruses and Related Threats - Virus Countermeasures - Distributed Denial of Service Attacks. **Firewalls:** Firewall Design Principles - Trusted Systems - Common Criteria for Information Technology Security Evaluation.

Course Outcomes:

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

1. Apply the data encryption standards and block ciphers for given input.
2. Apply the various public key cryptography and hash functions for any input.
3. Apply the digital signatures, key management and user authentication for any input.
4. Describe the wireless network security, E-mail security and IP security.
5. Apply the concepts of Intruders using malicious software and firewalls.

Text Books:

1. William Stallings, "Cryptography and Network Security", 6th Edition, Pearson Education, March 2014.

References Books:

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
4. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.
5. Douglas R Simson "Cryptography – Theory and practice", Third Edition, CRC Press, 2006.

Web References:

- <http://nptel.ac.in/courses/106105031/>
- <http://williamstallings.com/Cryptography/>
- <https://lecturenotes.in/subject/112/cryptography-and-network-security-cns>
- <https://www.cse.iitk.ac.in/users/braman/cs425/slides/security-overview.pdf>
- www.cse.iitd.ac.in/~shweta/notes/Lec1.pdf

Course Code: 141CA9131	Course Title: Open Source Technologies
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites :

- Problem solving techniques
- Object Oriented Programming

Course Objectives:

1. Demonstrate the basic features of the python language
2. Apply the data structure concepts in python
3. Apply the object oriented features and GUI designing using tkinter in python
4. Apply the features of groovy and grails
5. Develop simple application using Grails scaffolding

Course Content

Hours

UNIT-I INTRODUCTION TO PYTHON

9

Variables, Expressions and Statements – Functions - Interface Design-Conditionals and Recursion - Fruitful Functions- Iteration.

UNIT-II DATA STRUCTURES IN PYTHON

9

Strings - Word Play – Lists – Dictionaries - Tuples- Data Structure Selection - Files.

UNIT-III OOPS CONCEPTS IN PYTHON

9

Classes and Objects - Classes and Functions - Classes and Methods – Inheritance - Tkinter: GUI - Buttons and Callbacks - Canvas Widgets-Coordinate Sequences - More Widgets - Packing Widgets - Menus and Callable - Binding

UNIT IV INTRODUCTION TO GROOVY AND GRAILS

9

Installation-Groovy by Example-Groovy language key features-Groovy Basics-scripts- Assertions-Strings-Regular Expressions-Collective Datatypes-control structure-Grails Features-Grails Architecture-Installing Grails -Collab- TODO application.

UNIT V BUILDING THE APPLICATION USING GRAILS SCAFFOLDING

9

Scaffolding-Grails Plugins-Interactive Mode-Building the User Interface-Starting with the End in Minds-Making the Topbar Functional-Externalizing Strings-Errors and Validation-Flash and Flash Messages-Creating an Audit Log Using Action Interceptors-Using Filters.

Course Outcomes:

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

1. Demonstrate the basic features of the python language using variables, expressions and functions
2. Apply the data structure concepts in python for an application using list,tuples and dictionaries.
3. Apply the object oriented features using tkinter in python for GUI based application
4. Apply the features of groovy and grails for a given problem
5. Develop web based application using Grails scaffolding

Text Books

1. Allen Downey, "Think Python" ,Second Edition, Green Tea Press, 2012(Unit I,II,III)
2. Vishal Layka, Christopher M. Judd, Joseph Faisal Nusairat, Jim Shingler,"Beginning Groovy,Grails and Griffon", ApressPublication,2013(Unit-IV,V)

References Books

1. Laura Cassell, Alan Gauld, "Python Projects", Wrox Publication,2015
2. Jeffrey Elkner, Chris Meyers Allen Downey, "Learning with Python",Fourth Edition Dream Tech Press Publication,,2015
3. Jeff Scott Brown, Graeme Rocher,"The Definitive Guide to Grails 2",Apress Publication,2013
4. AndreyAdamovich,Luciano Fiandesio,"Groovy 2 Cookbook",Packt Publication,2013

Web References

1. <https://www.coursera.org/learn/python>
2. <http://www.w effbot.org/tkinterbook/tkinter-index.html>
3. <http://www.vogella.com/tutorials/Groovy/article.html>
4. <https://netbeans.org/kb/docs/web/grails-quickstart.html>

Course Code: 141CA9121	Course Title: ADHOC AND SENSOR NETWORKS
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 0 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Computer Organization
- Computer Networks

Course objectives:

1. Explain the basics of Ad-hoc & Sensor Networks
2. Interpret the fundamental and emerging protocols in ad-hoc network
3. Outline the issues in Transport Layer protocol for Ad hoc networks
4. Apply the constraints of the wireless physical layer, protocols, and applications
5. Analyze the issues in routing and QoS performance of ad hoc and sensor networks.

Course Content

Hours

UNIT I INTRODUCTION

9

Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs) :concepts and architectures. Applications of Ad Hoc and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.

UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS

9

Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocols- Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11 .

UNIT III ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS

9

Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

UNIT IV WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS

9

Single node architecture: hardware and software components of a sensor node - WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4

UNIT V WSN ROUTING, LOCALIZATION & QOS

9

Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization- absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design- Synchronization-Transport Layer issues.

Course Outcomes

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

1. Explain the basics of Ad-hoc & Sensor Networks
2. Interpret the fundamental and emerging protocols of all layers in ad-hoc network
3. Outline the issues pertaining to major obstacles in designing a routing and Transport Layer protocol for Ad hoc networks
4. Apply the constraints of the wireless physical layer that affect the design and performance of ad hoc and sensor networks, protocols, and applications
5. Analyze the issues in routing and QoS performance of ad hoc and sensor networks

Text Book:

1.C.Siva Ram Murthy, and B.S.Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols", Prentice Hall Professional Technical Reference, 2008.

Reference Books:

1. Carlos De MoraesCordeiro, Dharma Prakash Agrawal, "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.
2. Feng Zhao and LeonidesGuibas, "Wireless Sensor Networks", Elsevier Publication - 2002.
3. Holger Karl and Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2005
4. KazemSohraby, Daniel Minoli, &TaiebZnati, "Wireless Sensor Networks- Technology, Protocols, and Applications", John Wiley, 2007.
5. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003

Web References

1. <http://nptel.ac.in/courses/108102045/27>

Course Code: 141CA9125	Course Title: BUSINESS INTELLIGENCE
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Database Management Systems
- Data Mining & Data Warehousing

Course Objectives:

1. Understand the basic rudiments of business intelligence system.
2. Understand the modelling aspects.
3. Choose the CCR algorithm
4. Apply the business intelligence models.
5. Apply the emerging technologies in business intelligence.

Course Content

Hours

UNIT I BUSINESS INTELLIGENCE

9

Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence

UNIT II KNOWLEDGE DELIVERY

9

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT III EFFICIENCY

9

Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis

UNIT IV BUSINESS INTELLIGENCE APPLICATIONS

9

Marketing models – Logistic and Production models – Case studies.

UNIT V FUTURE OF BUSINESS INTELLIGENCE

9

Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

Course Outcomes:

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

1. Understand the basic rudiments of business intelligence system.
2. Understand the modelling aspects for knowledge delivery.
3. Choose the CCR algorithm for efficiency measures..
4. Apply the various models for business intelligence applications.
5. Apply the emerging technologies in business intelligence applications.

Text Book:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", Ninth Edition, Pearson Education, 2011.

Reference Books:

1. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
2. Carlo Verellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
3. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager's Guide", Second Edition, 2012.
4. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.
5. Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc., 2007.

Web References:

- 1) <http://www.umsl.edu/~sauterv/DSS4BI>

Course Code: 141CA9126	Course Title : VISUALIZATION TECHNIQUES
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 :3 : 100
Type: Lecture	Total Contact Hours : 45

Prerequisites:

- Software Engineering

Course objectives:

1. Outline the foundation of data visualization
2. Explain the visual perception and attention pertaining to visualization
3. Choose the concepts of Patterns, Visual objects and Space perception
4. Apply the interaction with visualization.
5. Make use of DOM and Web technologies.

Course Content

Hours

UNIT I FOUNDATIONS OF DATA VISUALIZATION

8

A Model of Perceptual processing - Types of Data – Environment - Eye - Optimal display- Luminance, Brightness, lightness and Gamma.

UNIT II VISUAL INFORMATION

8

Color Standards- Appearance and Applications in Visualization - Visual Attention and Information - Visual field- Iconic Buffer-Gabor Model- Texture in Visualization, -glyphs and Multivariate Discrete data.

UNIT III PATTERNS AND OBJECTS

10

Static and Moving Patterns-Gestalt laws-Contours-Patterns in Motion - Visual Objects and Data Objects- Image-Based Object recognition-Structure-based Object Recognition- Geon diagram-Depth Cue Theory - Task Based Space Perception.

UNIT IV INTERACTING WITH VISUALIZATIONS

9

Interacting with Visualizations- Data Selection and Manipulation loop- Exploration and Navigation loop- Memory systems -Eye movements -Problem Solving with Visualizations.

UNIT V VISUALIZATION TECHNIQUES AND SYSTEMS

10

Structural Analysis - Statistical Exploration- Practical problems in conducting user studies- Data Driven Documents(D3)Technology Fundamentals- web DOM - web CSS -web JavaScript - Data for visualization.

Course Outcomes

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

1. Outline the foundation of data visualization
2. Explain the visual perception and Attention pertaining to Visualization
3. Choose the concepts of Patterns, Visual objects and Space perception
4. Apply the interaction with visualization for the given scenario.
5. Make use of DOM and Web technologies for developing Visualization systems.

Text Books:

1. Colin Ware, "Information Visualization: Perception for Design", Morgan Kaufmann, 2004. (Unit 1,2,3,4,5)
2. Scott Murray,"Interactive Data Visualization for the Web-An Introduction to Designing with D3", O'Reilly, 2013(Unit 5)

Reference Books:

1. Ben Fry,"Visualizing Data",First Edition, O'Reilly, 2008
2. Stephen Few,"Now you see it: Simple Visualization techniques for quantitative analysis",Analytics Press, 2009.

Web References:

1. <https://www.coursera.org/learn/datavisualization/>
2. <https://www.udacity.com/course/data-visualization-and-d3js--ud507>

Course Code: 141CA9132	Course Title: INTERNET OF THINGS APPLICATIONS
Core/Elective: Elective	L : T : P : C : M – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites:

- Basics of Internet
- Computer Networks

Course Objectives

1. Explain the fundamentals of Internet of Things.
2. Apply the various domain specific Internet of Things.
3. Describe the concepts of M2M to IoT.
4. Explain the concepts of M2M and IoT technology & architecture.
5. Apply the concepts of IoT in Real-World Applications.

Course Content

Hours

UNIT-I: IOT INTRODUCTION

9

Overview: Key features – Advantages – Disadvantages - IoT Hardware - IoT Software - IoT Technology and Protocol. **Introduction:** Definition & Characteristics of IoT – Physical Design of IoT – Logical Design of IoT – IoT enabling Technologies - IoT Levels & deployment Templates.

UNIT-II: DOMAIN SPECIFIC IOTS

9

Introduction: Home Automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestyle. **IoT and M2M:** Introduction – M2M – Difference between IoT and M2M – Software Defined Networking (SDN) and Network Function Virtualization (NFV) for IoT. **IoT System Management with NETCONF-YANG:** Need for IoT System Management – SNMP – Network Operator Requirements – NETCONF – YANG – IoT System Management with NETCONF-YANG.

UNIT-III: M2M to IOT

9

M2M to IoT-the Vision: Introduction - From M2M to IoT – M2M towards IoT - the Global context. **M2M to IoT - A Market Perspective:** Introduction – Definition - M2M value chains - IoT value chains - An emerging industrial structure for IoT. **M2M to IoT-an Architectural Overview:** Building architecture - Main design principles and needed capabilities - An IoT architecture outline - Standards considerations.

UNIT-IV: M2M AND IOT TECHNOLOGY & ARCHITECTURE

9

M2M and IoT Technology Fundamentals: Devices and gateways - Local and wide area networking - Data management - Business processes in IoT - Everything as a service (XaaS) - M2M and IoT analytics - Knowledge management. **Architecture Reference Model:** Introduction - Reference model and architecture - IoT domain model - Information model - Functional model - Functional model - Safety, privacy, trust, security model.

UNIT V CASE STUDIES AND REAL-WORLD APPLICATIONS

9

Real world design constraints - Asset management - Industrial automation - Smart grid - Commercial building automation - Smart cities - participatory sensing.

Course Outcomes:

1. Explain the fundamental concepts of Internet of Things.
2. Apply the domain specific Internet of Things in various Industry domains.
3. Describe the concepts of M2M to IoT.
4. Explain the concepts of M2M and IoT technology & architecture reference model.
5. Apply the concepts of IoT in various Real-World Applications.

Text Books:

1. Arshdeep Bahga, Vijay Madiseti, "Internet of Things—A hands-on approach", Universities Press, 2017.
2. Jan Ho Iler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.

References Books:

1. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
2. Tutorialspoint, "Internet of Things", Tutorialspoint (I) Pvt. Ltd, 2016.
3. Peter Waher, "Learning Internet of Things", packt publishing, Birmingham Mumbai, 2015.
4. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
5. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things –Key applications and Protocols", Wiley, 2012

Web References:

- https://www.tutorialspoint.com/internet_of_things/internet_of_things_overview.htm
- http://kartolo.sby.datautama.net.id/PacktPub/9781783553532-learning_internet_of_things.pdf
- <https://www.codeproject.com/Learn/IoT/>
- www.buildinginternetofthings.com/