# SCHEME OF INSTRUCTION & EXAMINATION

**B.E. III YEAR (COMPUTER SCIENCE & ENGINEERING)**

With effect from the Academic year 2013-2014

### SEMESTER - II

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Syllabus Ref. No.</th>
<th>SUBJECT</th>
<th>Scheme of Instruction</th>
<th>Scheme of Examination</th>
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<tr>
<td>1</td>
<td>CS351 UE</td>
<td>Design and Analysis of Algorithms</td>
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<td>2</td>
<td>CS365 UE</td>
<td>Computer Networks &amp; Programming</td>
<td>4 -</td>
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<td>3</td>
<td>CS353 UE</td>
<td>Software Engineering</td>
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<td>4</td>
<td>CS354 UE</td>
<td>Web Programming</td>
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<td>5</td>
<td>CM355 UE</td>
<td>Managerial Economics and Accountancy</td>
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<td>* Elective- I</td>
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<td>CS381 UE</td>
<td>Computer Networks &amp; Programming Lab</td>
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<td>Web Programming Lab</td>
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<td>** Summer Internship (8 weeks)</td>
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<td>** TOTAL</td>
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**Elective – I**

- CS 355 UE Artificial Intelligence
- CS 356 UE Simulation and Modeling
- EC 254 UE Signal Analysis and Transform Techniques

** Students will be attached to industry for 8 weeks during summer. The students will be submitting a report during 4th Year I Semester whose evaluation and grading is done during 4th Year I Semester. **
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<td><strong>1</strong></td>
<td><strong>CS 361 UE</strong></td>
<td>Operating Systems (Elective - I)</td>
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**THEORY**
CS 351 UE

DESIGN & ANALYSIS OF ALGORITHMS

<table>
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<tr>
<th>Instruction</th>
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<tr>
<td>Duration of University Examination</td>
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<td>75 Marks</td>
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UNIT–I

UNIT–II
Divide-and-Conquer Method: The general method, Binary search, Finding maximum and minimum, Merge sort, Quick sort and Selection sort.
Greedy Method: Knapsack problem, Optimal storage on tapes, Job sequencing with deadlines, Optimal merge pattern, Minimum spanning trees, Single source shortest path.

UNIT–III
Dynamic programming method and traversal techniques: Multistage graphs, All pairs shortest paths, Optimal binary search tress, 0/1 Knapsack problem, Reliability design, Traveling salesman problem, Game trees, Biconnected components and Depth first search.

UNIT–IV
Backtracking and Branch-and-bound methods: N-queens problem, Graph coloring, Hamiltonian cycles, Knapsack problem, 0/1 Knapsack problem, Traveling salesperson problem. Lower-bound Theory.

UNIT–V

Suggested Reading:
CS 365 UE

COMPUTER NETWORKS & PROGRAMMING

Instruction 4  Periods per week
Duration of University Examination 3  Hours
University Examination 75  Marks
Sessional 25  Marks
Credits 4

Objectives:
- To understand the state-of-the-art technology in network protocols, network architecture and networked systems
- To learn the design principles of network infrastructure
- To gain proficiency in network programming

Outcomes:
This course enables the student to develop and demonstrate the following
- Ability to compare different network architectures
- Ability to understand the design principles of networking
- Ability to develop applications using network programming

UNIT-I

UNIT-II
Internet working: How networks differ, Concatenated virtual circuits, Connectionless internet working, Tunneling, Internetwork routing, Fragmentation and Firewalls.
The Network Layer of the Internet: The IP protocol, IP addresses, Subnets, Internet control protocols, Gateway routing protocols, Multicasting, CIDR.

UNIT-III
Transport Layer: Service primitives, Addressing, Establishing a connection, Releasing a connection, Flow control, Buffering, Multiplexing and Crash recovery.

UNIT-IV
Application Layer:
Domain Name System: DNS name space, Resource records, Name services.
SMTP and MIME, HTTP, SNMP, Telnet, ftp, Multimedia.
UNIT-V


Suggested Reading:
CS353 UE

SOFTWARE ENGINEERING

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

Objectives:
- To introduce the basic concepts of software development
- To impart knowledge on various phases, approaches and practices of software development
- To make the student industry ready with study of different techniques and tools

Outcomes:
- Working knowledge of alternative approaches and techniques for each phase of software development
- Skills necessary for independently developing a complete software project

UNIT-I
Introduction to Software Engineering:


UNIT-II


UNIT-III

UNIT-IV


UNIT-V


Suggested Reading:
CS 354 UE

WEB PROGRAMMING

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

UNIT-I

UNIT-II
Introduction to XML, XML document structure, Document Type Definition, Namespaces, XML Schemas, Displaying raw XML documents, Displaying XML documents with CSS, XPath Basics, XSLT, XML Processors.

UNIT-III

UNIT-IV
Java Servlets: Java Servlets and CGI Programming, Benefits of Java Servlet, Life Cycle of Java Servlet, Reading data from client, HTTP Request Header, HTTP Response Header, working with Cookies, Tracking Sessions. Java Server Pages: Introduction to JSP, JSP Tags, Variables and Objects, Methods, Control Statements, Loops, Request String, User Sessions, Session Object, Cookies.

UNIT-V
Introduction to PHP: Overview of PHP, General Syntactic Characteristics, Primitives, Operations, Expressions, Control Statements, Arrays, Functions, Pattern matching, Form handling, Files, Cookies, Session Tracking. Database access through Web: Architectures for Database Access-Database access with Perl - Database access with PHP-Database access with JDBC.

Suggested Reading:
CM 355 UE

MANAGERIAL ECONOMICS AND ACCOUNTANCY

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

Objectives:
• To learn important concepts of Managerial Economics and apply them to evaluate business decisions.
• To understand various parameters that determine the consumers' behavior.
• To evaluate the factors that affect production.
• To understand the concepts of capital budgeting and payback period.
• To study the concepts of various book-keeping methods.

Unit-I

Unit-II
Consumer Behavior: Law of Demand, Determinants, Types of Demand; Elasticity of Demand (Price, Income and Cross-Elasticity); Demand Forecasting, Law of Supply and Concept of Equilibrium. (Theory questions and small numerical problem can be asked)

Unit - III
Theory of Production and Markets: Production Function, Law of Variable Proportion, ISO quants, Economics of Scale, Cost of Production (Types and their measurement), Concept of Opportunity Cost, Concept of Revenue, Cost-Output relationship, Break-Even Analysis, Price - Output determination under Perfect Competition and Monopoly (theory and problems can be asked)

Unit-IV
Capital Management: Significance, determination and estimation of fixed and working capital requirements, sources of capital, Introduction to capital budgeting, methods of payback and discounted cash flow methods with problems. (Theory questions and numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities can be asked)

Unit-V

Suggested Reading:
With effect from Academic Year 2013-2014

CS 355 UE

ARTIFICIAL INTELLIGENCE
(Elective –I)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

Objectives:
a. To impart knowledge of the principles of Artificial Intelligence
b. To impart proficiency in the techniques for knowledge representation and inference
c. To cover issues and techniques involved in the creation of Intelligent Systems.
d. To cover various applications like Game Playing, Expert Systems, Machine Learning and Natural Language Processing

Outcome:
This course enables the student to develop and demonstrate the following
a. Ability to analyze and think logically
b. Ability to understand and analyze the working of an AI Technique
c. Ability to apply the knowledge acquired in this course to build real life applications and also explore the tremendous potential for research

UNIT-I

UNIT-II

UNIT-III
UNIT-IV

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

UNIT-V
Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web.
Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

Suggested Reading:
1. Saroj Kaushik, Artificial Intelligence, Cengage Learning, 2011
CS 356 UE

SIMULATION AND MODELING  
(Elective –I)

Instruction 4 Periods per week  
Duration of University Examination 3 Hours  
University Examination 75 Marks  
Sessional 25 Marks  
Credits 4

UNIT-I


UNIT-II

Overview of Statistical Models and Queuing Systems, Programming Languages for Simulation. Continuous and Discrete Simulation Languages – FORTRAN, GPSS, SIMAN, SIMSCRIPT, SLAM and MODSIM III.

UNIT-III


Acceptance / Rejection techniques: Poisson distribution, Gamma distribution.

UNIT-IV


UNIT-V


Suggested Reading:
EC 254 UE

SIGNAL ANALYSIS AND TRANSFORM TECHNIQUES
(Elective –I)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

UNIT-I
Definitions and classification of various signals and systems, The exponential signal, Analogy
between a vector and a signal, Signal representation by a discrete set of orthogonal functions,
Orthonormality and completeness, Exponential and trigonometric Fourier series, Convergence,
Dirichlet’s conditions, The Discrete spectrum, Application of Fourier series to electrical networks.

UNIT-II
Signal representation by continuous exponentials, The direct and inverse Fourier transform,
Continuous spectrum, Existence and properties of Fourier transform, Singularity functions,
Parseval’s theorem.

UNIT-III
Signal representation by generalized exponentials, The Laplace transform, Properties of Laplace
transform, Initial and Final value theorems, Solution of networks by Laplace transform, Response
of networks to periodic excitation.

UNIT-IV
Sampling of continuous time signals, Discrete time signals, Discrete system, The Z-transform and
its properties, Difference equations, Realization of discrete systems.

UNIT-V
Random signals, Continuous and discrete random variables, Stochastic processes, Auto and cross-
correlation functions and their properties.

Suggested Reading:
3. G.R. Cooper, C.D. McGillem, Probabilistic Methods of Signal and System Analysis,
   Holt, Rinehart and Winston, 1971
CS 361 UE

OPERATING SYSTEMS
(Service Course)
(Elective - I)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

Objectives:
- To understand CPU, Memory, File and Device managements
- To learn about concurrency control, protection and security
- To gain knowledge of Unix and Windows NT internals

UNIT-I

UNIT-II
Memory management: Swapping, Contiguous allocation, Paging, Static and dynamic partitions, Demand paging, Page replacement algorithms, Thrashing, Segmentation, Segmentation with paging.
File system interface: File concepts, Access methods and protection.
File system implementation: File system structure, Allocation methods, Directory implementation.

UNIT-III
Deadlocks: Necessary conditions, Resource allocation graph, Methods for handling deadlocks, Prevention, Avoidance, Detection and recovery.
Protection: Goals, Domain of protection, Access matrix.

UNIT-IV
Device Management: Disk scheduling methods, Disk management, Device drivers and interfaces, CPU-device interactions, I/O optimization.

UNIT-V
Case Studies:
Unix Operating system – General architecture, Unix system calls, Unix Shell, Files and directories in Unix.

Suggested Reading:
CS 381 UE

COMPUTER NETWORKS & PROGRAMMING LAB

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks
Credits 2

1. Examples using IPC
2. Echo Server using TCP(Concurrent or Iterative) and UDP
3. Time of the day server
4. Talker and Listener
5. Ping routine
6. Trace route
7. Mini DNS

Note: The above experiments [2-7] have to be carried out using socket programming interface. Multithreading has to be employed wherever it is required.
CS 382 UE

WEB PROGRAMMING LAB

Instruction: 3 Periods per week
Duration of University Examination: 3 Hours
University Examination: 50 Marks
Sessional: 25 Marks
Credits: 2

1. Develop College Website using HTML5 and CSS
2. Develop HTML5 form with client validations using Java Script
3. Publishing XML document using XSLT
4. XML document processing using SAX and DOM
5. Write a program to encrypt the given number to display the encrypted data using Java Script
6. Write a Python program which generates an output file based on one-line instructions in an input file
7. Develop a simple Java Servlet application
8. Develop a Java Servlet application with session tracking
9. Develop a simple JSP application
10. Creation of an application to have access from a database using JDBC
11. Develop a full-fledged web application with database access spreading over to 3 sessions
12. Write a web application using Ajax to do the following:
   - A. check to make sure that the credit card number is composed of exactly 16 numerical digits
   - A check to make sure that a Visa card number starts with a "4" and a MasterCard number starts with a "5"

You can check for these things using regular expressions in combination with the PHP function preg_match. A really good regex will allow for an optional "-" between every grouping of 4 numbers. For example, 4111111111111111 and 4111-1111-1111-11111 would both be valid credit card numbers. If the user has not supplied a card number with the correct number of digits, show an error message.