

Semester – I		Semester – II	
Cs-101-Advanced C++ Programming		CS-201-Advanced Java Programming	
CS-102-Automata Theory And Computability		CS-202 Machine Intelligence	
CS-103 Advanced Operating Systems		CS-203: Compiler Construction	
CS-104 Digital Image Processing		CS -204 Design and Analysis Of Algorithm	
CS-105-Lab-I Lab on Advance OS & Image Processing		CS-205-Lab-III- Lab on DAA and MI	
CS-106-Lab-II Lab on C++ Programming		CS-206-Lab-IV: Advanced Java Programming	
Semester - III		Semester – IV	
CS–301-Software Engineering		Cs-401-Natural Language Processing	
Cs-302-Optimization Algorithms		CS-402 Advance Network Programming	
CS-303-Internet Computing		CS-403-Data Mining	
CS-304: Windows and Visual C++ Programming		CS-404-Lab-VI: Lab on Network Programming and Data Mining	
CS-305-Lab-V: Lab on Windows Programming and VC++		CS-405-Mini Project	
CS-306-Lab-VI Lab on Internet Computing			

Career Opportunities

The career opportunities after M.Sc. (Computer Science) are quite huge. Many major national and multinational firms take in aspirants who have accomplished their graduation in these fields. The top IT firms such as Microsoft, Google, Yahoo, Rediff, Wipro, TCS, Infosys, Accenture, Capgemini etc. offer aspirants very attractive packages. Jobs for professionals in these fields can also be got with management consultancy organizations, Government organizations, Banks, Educational Institutions, Research Organizations and other organizations that use computers and computer-aided systems are but not limited to:

Programmer or Software Engineer

Computer Engineer

Web Designer

Hardware Designer/Engineer

Systems Engineer

System integrator

System Administration

Technical Support

Support Engineer

Technical Writer

Consultant

Management

Administration

IT Sales and Marketing

IT Officer

Computer Scientist

Professor

Research Staff Member

Systems Analyst

Logic Designer

Computer Scientist

Cs-101-Advanced C++ Programming

- Unit-1 Inheritance and Polymorphism:** [6]
Class Derivation, Access Control, Base Class Initialization, Initializing Class Type Members, Polymorphism and Virtual Functions, Pointer Conversion, Virtual Destructors, Abstract Classes and Pure Virtual Functions
- Unit-2 Advanced Polymorphism and Inheritance:** [4]
Orthodox Canonical Form, Public, Private and Protected Inheritance, Composition vs. Inheritance, Templates vs. Inheritance, Interface Encapsulation
- Unit-3 Exception Handling:** [6]
C++ Exception Mechanism, Exceptions Compared to Other Error Handling Techniques, throw, try and catch, Exception Context and Stack Unwinding, Uncaught Exceptions, Automatic Cleanup in Exception Handling
- Unit-4 Runtime Type Information:** [4]
Runtime Type Information (RTTI) Mechanism, type_info Class and typeid Operator, Type Safe Pointer Conversion, New C++ Cast Syntax
- Unit-5 Inheritance Hierarchies and Multiple Inheritance:** [6]
Smalltalk Style Class Hierarchies, Collection Classes in Object-Based Hierarchies, Independent Class Hierarchies in C++, Multiple Inheritance, Resolving Ambiguities, Duplicate Subobjects Virtual Base Classes, RTTI in Multiple Inheritance
- Unit-6 Applications of C++ Concepts:** [4]
Object Validation, Smart Pointers, Reference Counting, Generic Smart Pointers
- Unit-7 An Overview of Templates:** [6]
Templates, Overloading functions, Template functions, Specializing a template function, Disambiguation under specialization, Template classes, An array template class, Instantiating a template class object, Rules for templates, Non member function with a template argument Friends of template classes, Templates with multiple type parameters, Non type parameters for template classes, Comments regarding templates
- Unit-8 Overview of the Standard Template Library:** [4]
Perspective, History and evolution, New features in C++, The Standard Template Library, Design goals, Header files, STL components, Containers, Algorithms, Iterators
- Unit-9 Examples from STL:** [4]
Example: vectors, lists, Example: maps
Example: sets, Example: multiset,
Example: find with a vector,
Example: find with a list,
Example: merge, Iterators, Function objects, Adaptors
- Unit-10 STL Containers:** [4]
Vector, Deque, List, The beauty of STL, Associative Containers, Set, Multiset, Map, Multimaps
- Unit-11 STL Iterators:** [2]
Input iterators, Output iterators, Forward iterators, Backward iterators.

References:

1. C++ Programming, 7th Ed., Al Stevens, Wiley Publications
2. C++ How to Program, 7th Ed., Paul J. Deitel, Harvey M. Deitel, Pearson Education
3. Data Structures with STL, 1st Ed., William H. Murray, Chris H. Pappas, Prentice Hall.
4. The STL Primer, Graham Glass, Brett L. Schuchert, Prentice Hall.

CS-102-Automata Theory And Computability

Unit-1 Grammars

[10]

- Production systems - Chomskian Hierarchy - Right linear grammar and Finite state automata
- Context free grammars - Normal forms Subfamilies of CFL - Derivation trees and ambiguity.
Applications of CFG.

Unit-2 Finite state Automata

[8]

- Non deterministic and deterministic FSA, NFSA with ϵ - moves, Regular Expressions -
Equivalence of regular expression and FSA . FA with output.

Unit-3 Pumping Lemma

[4]

closure properties and decidability, Applications of Pumping lemma.

Unit-4 Pushdown automata

[6]

Acceptance by empty store and final state - Equivalence between pushdown automata
and context-free grammars - Closure properties of CFL – Deterministic pushdown automata,
Two Stack PDA.

Unit-5 Turing Machines

[10]

- Techniques for Turing machine construction - Generalized and restricted versions equivalent
to the basic model - Godel numbering - Universal Turing Machine -Recursively
enumerable sets and recursive sets - Computable functions - time space complexity
measures - context sensitive languages and linear bound automata, Multitape Turing machine,
Translation between turing machine.

Unit-6 Decidability

[6]

Post's correspondence problem; decidability of membership, emptiness and equivalence
problems of languages.

Unit-7 Complexity Measures

[8]

Time and tape complexity measures of Turing machines, Random access machines, The
classes P and NP, NP-Completeness, satisfiability Polynomial reduction and some NP-
complete problems.

Unit-8 Advanced topics

[2]

Regulated rewriting L systems; Grammar systems.

Unit-9 New paradigms of computing

[2]

DNA computing; Membrane computing.

References:

1. Introduction to Formal Languages, Automata Theory and Computation, K.Krithivasan and R.Rama, Pearson Education, 2009.
2. Introduction to Automata Theory Languages and computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, Pearson Education Asia, 2001.
3. An Introduction to Formal Language and Automata, 4th Ed., Peter Linz, Narosa Publishing house, 2006.
4. Introduction to the Theory of Computation, M.Sipser, Thomson Learning, 1997.
5. Introduction to the Languages and the Theory of Computation, 3rd Ed., John.C.martin, Tata McGrawHill, 2003.
6. Thoery of Computer Science, 3rd Ed., K.L.P Mishra, PHI, 2007.

CS-103 Advanced Operating Systems

Unit-1 Overview

[10]

Introduction to Kernel, Architecture of UNIX operating system , Introduction to system concepts, Introduction to shell programming and UNIX commands.

Unit-2 Buffer cache

[10]

Buffer headers, Structure of the buffer pool, Scenarios for retrieval of a buffer – Reading and writing disk blocks, Advantages and disadvantages of the buffer cache.

Unit-3 File Subsystem

[10]

Internal representation of files: Inodes, Structure of a regular file and Directories, Conversion of a path name to an Inode, Super block, Inode assignment to a new file, Allocation of disk blocks.

Unit-4 System Calls for the File System

[10]

Open – Read – Write – File and record locking – Adjusting the position of file I/O lseek – Close, File creation – Changing directory, root, owner, mode, stat and fstat, Pipes – Dup, Mounting and unmounting file systems - Link – unlink.

Unit-5 Processes

[10]

Process states and transitions, Layout of system memory, The context of a process, Saving the context of a process, Manipulation of the process address space - Sleep.

Unit-6 Process Control

[10]

Process creation Signals, Process termination, Awaiting process termination, Invoking other programs – user id of a process – Changing the size of a process, Shell – System boot and the INIT process– Process Scheduling.

Unit-7 Memory Management and I/O:

[10]

Memory Management Policies: Swapping – Demand paging, Driver Interface – Disk Drivers – Terminal Drivers, Streams ,Inter process communication.

Reference Books:

1. The Design of the Unix Operating System, Maurice J. Bach, Pearson Education.
2. The Magic Garden Explained , B. Goodheart, J. Cox, Prentice Hall of India.
3. The Design and Implementation of the 4.3 BSD Unix Operating System, S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman., Addison Wesley.
4. Windows System Programming, J. Hart, Pearson Education, 2008.
5. Linux Programming by Example: The Fundamentals, A. Robbins, Pearson Education, 2008.

CS-104 Digital Image Processing

Unit-1 Introduction to Digital Image Processing & Applications [5]

Digital Image Processing. Examples of Use of Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Image data types, image file formats(GIF,BMP,TIFF,JPEG).

Unit-2 Basic Relationship Between Pixels & Sampling and Quantization [5]

Elements of Visual Perception. Image Sensing and Acquisition. Image Sampling and Quantization. Some Basic Relationships Between Pixels. Linear and Nonlinear Operations.

Unit-3 Image Enhancement [8]

Background. Some Basic Gray Level Transformations. Histogram Processing. Enhancement Using Arithmetic/Logic Operations. Basics of Spatial Filtering. Smoothing Spatial Filters. Sharpening Spatial Filters. Combining Spatial Enhancement Methods. Introduction to the Fourier Transform and the Frequency Domain. Smoothing Frequency- Domain Filters. Sharpening Frequency Domain Filters. Homomorphic Filtering. Implementation.

Unit-4 Image Restoration and Transforms [8]

A Model of the Image Degradation/Restoration Process. Noise Models. Restoration in the Presence of Noise Only-Spatial Filtering. Periodic Noise Reduction by Frequency Domain Filtering. Linear, Position-Invariant Degradations. Estimating the Degradation Function. Inverse Filtering. Minimum Mean Square Error (Wiener) Filtering. Constrained Least Squares Filtering. Geometric Mean Filter. Geometric Transformations. Discrete Fourier transform, Walsh transform(WT), Hadamard transform, Cosine transform, Haar transform, Wavelet transform.

Unit-5 Color Image Processing [8]

Color Fundamentals. Color Models. Pseudocolor Image Processing. Basics of Full-Color Image Processing. Color Transformations. Smoothing and Sharpening Concept of Image, Audio and Video Compression.

Unit-6 Morphological Image Processing & Segmentation [10]

Detection of Discontinuities, Edge linking & Boundary Detection, Thresholding, Region based segmentation Laplacian of Gaussian, Derivative of Gaussian, Canny Edge Detection, Morphological operation : Dilation erosion, Opening & Closing, Basic Morphological Algorithm, Image representation schemes.

Unit-7 MATLAB Image processing toolbox [02]

Introduction to matrix operations, introduction to image processing tool box

Unit-8 Programming MATLAB

[08]

Image read & write, filters (spatial, frequency domain), Image Restoration and Reconstruction, morphological operations, edge detection and linking, segmentation.

References:

1. Digital Image Processing, 2nd Ed., Gonzalez & Woods, Pearson Education.
2. Digital Image Processing , S.Jayaraman, TMH (McGraw Hill) publication
3. Fundamentals of Image processing, A.K. Jain, Prentice Hall of India Publication, 1995.
4. Digital Image Processing using MATLAB, Gonzalez, Woods & Steven, Pearson Education.

CS-105-Lab-I Lab on Advance OS & Image Processing

Part-I Advanced OS:

1. Use of Unix/Linux – User Commands – Editors - Shell programming
2. C/C++ programming on Unix/Linux – use of make, version control
3. Use of system calls – files – processes – I/O – IPC
4. Experiments using C of mini unix systems (such as Minix) – File system – Processes – Memory Management – Drivers
5. Unix / Linux sources – build, run kernel – small modifications

Part-II DIP

1. Display of Grayscale Images, Color images.
2. Conversion between color spaces.
3. Histogram Equalization.
4. Non-linear Filtering.
5. 2-D DFT and DCT.
6. Filtering in frequency domain.
7. Edge detection using Operators.
8. Segmentation using Thresholding.

CS-106-Lab-II Lab on C++ Programming

1. Write a program to demonstrate encapsulation using of class Write a program to demonstrate use of all types of Inheritance
2. Write a program to demonstrate use of polymorphism
3. Write a program to demonstrate use of function overloading
4. Write a program to demonstrate use of operator overloading
5. Write a program to demonstrate use of array of objects
6. Write a program to demonstrate use of pointers
7. Write a program to demonstrate use of pointer to members of class
8. Write a program to demonstrate use of Exception handling.
9. Write a program to demonstrate use of function templates and class templates
10. Write a program to demonstrate use of containers , iterators ,adaptors , allocators specialized containers ,associative containers.

CS-201-Advanced Java Programming

Unit-1 Java Basics Review: [8]

Java streaming - Networking - Event handling - Multithreading - Byte code Interpretation - Customizing application - Data Structures - Collection classes.

Unit-2 Distributed Computing: [10]

Custom sockets - Remote Method Invocation - Activation - Object serialization -Distributed garbage collection - RMI - IIOP - Interface definition language - CORBA - JINI overview.

Unit-3 Java Beans and Swing: [12]

Bean concepts - Events in bean box - Bean customization - Persistence - Application - deployment using swing - Advanced swing techniques - JAR file handling.

Unit-4 Java Enterprise Applications: [12]

JNI - Servlets - Java Server Pages - JDBC - Session beans - Entity beans - Programming and deploying enterprise Java Beans - Java transactions.

Unit-5 Related Java Techniques: [10]

Java Media Frame work - 3D graphics - Internationalization - Case study - Deploying n-tier application, E- commerce applications.

References:

1. Java How to program , Deitel & Deitel , Prentice Hall.
2. Core Java Vol 1 and Vol 2, Gary Cornell and Cay S. Horstmann, Sun Microsystems Press.
3. Developing Java Enterprise Applications, Stephen Asbury, Scott R. Weiner, Wiley.
4. Object Oriented Programming with JAVA, Buyya, Selvi, Chu, TMH, 2010.

CS-202 Machine Intelligence

- Unit-1 Introduction:** [2]
What is Machine Intelligence?, The AI Problems, What is an AI Technique, Criteria for Success, AI Task domains, Some General References.
- Unit-2 Problems, Problem Spaces, and Search:** [6]
Defining the Problem as a State Space Search, Production systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs, Uninformed Search Techniques: DFS and BFS
- Unit-3 Heuristic Search Techniques:** [5]
Generate-and- Test, Hill Climbing, Best-First Search, A* Search, AO* Search.
- Unit-4 Knowledge Representation:** [4]
Knowledge Representation Issues, Representations and Mappings, Approaches to knowledge Representation, Issues in Knowledge Representation, The Frame Problem.
- Unit-5 Using Predicate Logic:** [8]
Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.
- Unit-6 Weak Slot-and-Filler Structures:** [5]
Semantic Nets, Frames.
- Unit-7 Strong Slot-and Filler Structures:** [5]
Conceptual Dependency, Scripts.
- Unit-8 Genetic algorithms** [6]
Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning, Approach to Knowledge Acquisition
- Unit-9 Learning** [3]
- What is learning? - Rote Learning ,Learning by taking advice ,Learning in problem solving ,Learning from examples, Explanation based learning
- Unit-10 Neural networks** [7]
Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks
- Unit-11 Fuzzy logic** [7]
Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

References:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Tata McGrawHill.
2. Artificial Intelligence – A modern approach, Stuart Russel, Peter Norwig, Pearson Education.

CS-203: Compiler Construction

Unit – 1: Introduction to Compilation

Compiler Basics, Issues in Compilation, Phases of Compilation: the Analysis – Synthesis Model, Compiler Construction Tools.

Unit - 2: Designing a Lexical Analyzer

Role of Lexical Analysis, Input Buffering, Specification of Tokens, Recognition of Tokens, Finite automata, Conversion from regular expression to NFA, Deterministic finite automata, Conversion from NFA to DFA, Minimization of DFA, Creating Lexical Analyzer with LEX.

Unit – 3: Designing Syntax Analyzer

Role of Syntax Analyzer, Classification of parsers, **Top-Down Parsing:** Introduction, Problems in top-down parsing, Recursive Parsing, Problems in Recursive Procedures, Predictive Parsing, Error Handling in Predictive Parsers, **Bottom Up Parsing:** Shift Reduce Parser, Actions of shift reduce parser, Construction of parse tree, Operator Precedence Parsing, Components of operator precedence parsers, Parsing action, Construction of operator precedence parsers, Error reporting and recovery in operator precedence Parsers, Advantages and disadvantages of operator precedence Parsing. LR Parsing: Simple LR parser, LR(1) parser, LALR parser.

Unit – 4: Intermediate Code Generation

Need For Intermediate Code Generation, Intermediate Forms: Polish Notation, Quadruples, Triples, Indirect Triples & Bloks.

Unit – 5: Code Optimization

Introduction, need for code optimization, Classification of code optimization techniques: Optimization techniques that work on machine code, Optimization techniques that work on intermediate forms of source code i.e. Optimization with in Basic Blocks: Folding, Redundant operation elimination, Optimization with in Loop: Strength Reduction, Dead code elimination, Moving operation within block out of block.

Unit – 6: Symbol Table Organization

Introduction, Methods of organizing a symbol table: Unsorted, sorted symbol tables, binary search, hashing, its advantages, disadvantages, Collision, collision resolution techniques: Rehashing, Chaining.

References:

1. Compiler Principle, Techniques and Tools, Aho A.V., R. Sethi and J.D. Ullman, Addison Wesley.
2. Compiler Construction Theory and Practice, Barret, Couch, Computer Science series, Asian Student Edition.
3. Compiler Construction Principle and Practice , Dhamdhare D.M, McMillan India.
4. Compiler Construction for Digital Computer, Gres D., Wiley.
5. Modern Compiler Design, David Galles, Pearson Education, 2009.

CS -204 Design and Analysis Of Algorithm

UNIT- 1 Introduction: [14]

Euclid's algorithm, Problem, Instance, Recursion(Removal of Recursion),Asymptotic complexity, Some stylistic issues, Analysis of Algorithms, Principles of Algorithm Design, Heaps(Insert, Adjust),Set Union and Find, Finding Maximum and Minimum

UNIT - 2 Divide and Conquer: [8]

Introduction, Control Abstraction, Binary Search, Sorting(Merge, Quick), Matrix Multiplication

UNIT- 3 Greedy Algorithm: [12]

Introduction, Single source shortest path, minimum cost spanning tree(Kruskal, prims), Fractional knapsack, Huffman Coding,

UNIT- 4 Dynamic Programming: [14]

Dyanamic Programming 1: All pair Shortest path

DP2:Knapsack(0/1)

DP3:Matrix chain multiplication

DP4:Longest commom subsequence

DP5:A machine scheduling Problem

UNIT - 5 Backtracking: [6]

General Method,8-Queen's problem, Sum of subset problem, graph coloring problem

Hamiltonian cycle

UNIT - 6 Problem Classification: [6]

Nondeterministic Algorithm, The class of P,NP, NP-hard and NP-Complete problem, significance of cook's theorem

REFERENCES:

1. Fundamentals of Computer Algorithms, Horowitz and Sahni, Galgothia publications.
2. Introduction to the design and analysis of Algorithms, Anany Levitin : Pearson Education,
3. Design and Analysis of Algorithms, P. Dave, H. Dave, Pearson Education, 2008.
4. Introduction to Algorithms, Cormen, Leiserson and Rivest : Prentice Hall of India.
- 5.Graph,Network and Algorithms,Jungnickel,Springer,ISBN:3540219056.
- 6.The Design and Analysis of Computer Algorithms, A. Aho, J.Hopcroft,&J.Ullman,Addison Wesley,1974.

CS-205-Lab-III- Lab on DAA and MI

Following Practical's has to implemented in C/C++/Java Language.

1. Implementation of uninformed search techniques like ,
 - a. Breadth first Search
 - b. Depth First Search
2. Implementation of informed(Heuristic) search techniques like
 - a. Best first Search
 - b. Branch and Bound Search
 - c. A* Search
 - d. Hill Climbing search
 - e. AO* Search
3. Implementation of Water Jug problem.
4. Implementation of Missionaries and Cannibals problem.
5. Implementation of Tic-Tac-Toe game.
6. Implementation of Tower of Hanoi Problem.
7. Implementation of 8 queen problem.

DAA:

1. Write a program to implement removal of recursion for
 - Finding maximum from array
 - Binomial coefficient $B(n,m) = B(n-1, m-1) + B(n-1, m)$, $B(n,n) = B(n,0) = 1$
 - Searching element from array
2. Write a program for creating max./min. heap using
 - INSERT
 - ADJUST/HEAPIFY
3. Write a program to implement union and find operation.
4. Write a program to find minimum and maximum form a given array.
5. Write a program for searching element form given array using binary search for $n=1000,2000,3000$ find exact time of execution.
6. Write a program for sorting given array in ascending/descending order with $n=1000,2000,3000$ find exact time of execution using
 - Heap sort
 - Merge sort
 - Quick sort
7. Write a program for matrix multiplication using Strassen's matrix multiplication.
8. Write a program to find solution of Knapsack instant.
9. Write a program to find minimum spanning tree using prim's/kruskal's algorithm.
10. Write a program to find shortest path using single source shortest path.
11. Write a program to find shortest path using all pair path.
12. Write a program to find all solutions for 8-queen problem using backtracking.

CS-206-Lab-IV: Advanced Java Programming

1. Write a java program that demonstrates
 - a. FileInputStream and FileOutputStream.
 - b. FileReader and FileWriter.
 - c. BufferedReader & BufferedWriter.
 - d. DataInputStream and DataOutputStream.
2. Implement the Java program for echo server and echo client to demonstrate networking in Java using Sockets.
3. Create a simple java bean and demonstrate it using Bean Box.
4. Create a Java bean that demonstrates
 - a. Indexed Property.
 - b. Bound Property.
 - c. Constrained Property.
 - d. Event Handling and communication between two beans.
5. Write a Java program that demonstrates user define packages.
6. Write a Java program that demonstrates JDBC.
7. Write a Java program that demonstrates JSP.
8. Write a Java program that demonstrates different types of EJB.
9. Write a Java program to demonstrate the use of Swing Classes/Components.
10. Write a Java program(s) that demonstrates the use of collection classes listed below
 - a) Stack b) Queue c) Array d) Vector
 - e) Map f) Multi-map g) Set h) Multi-set
 - i) TreeSet j) List k) Linked list l) HashMap

 - m) HashSet n) LinkedHashMap o) LinkedHashSet

CS-301-Software Engineering

Unit – 1 Software and Software Engineering : [9]
The nature of Software, Defining Software, Software Application Domain, Legacy Software, Software Engineering, Software Process

Unit-2 Software Process Models: [9]
Incremental Process Model, Evolutionary Process Model, Specialized Process Model

Unit-3 Requirements Specifications:
Requirements Engineering, Establishing the ground work, Eliciting Requirements, Developing Use Cases, Building the requirements model, Validating Requirements.

Unit-4 Design Concepts: [15]
Design Process, Concepts, Design Models, Architectural Design – Software Architecture, Styles, Alternative architectural, Design, Component level Design - An object oriented view, Traditional view, Process related view, User Interface Design – Analysis and Design

Unit-5 Testing: [9]
Levels of Testing- Functional, Structural, Test Plan, Test case specification, Reliability Assessment.

Unit-6 Quality Management: [9]
What is Quality?, Garvins Quality Dimensions, McCalls Quality Factors, ISO 9126 Quality factors, Targeted Quality Factors, Review Techniques- Formal Technical Reviews.

Unit-7 Software Configuration Management (SCM) and Project Scheduling [9]
Software Configuration Items, SCM Repository, SCM process, Scheduling Timeline Charts, Tracking the schedule

References:

1. A Practitioner's Approach, 7th Ed., Roger S. Pressman, McGraw Hill International Publication.
2. Software Engineering 3rd Ed., K.K. Aggarwal, Yogesh Singh, new age international publishers.
3. Software Engineering, Rajib Mall, PHI PUBLICATION.

Cs-302-Optimization Algorithms

Unit-1 Overview Of Operations Research: [2]

OR Models – OR Techniques

Unit-2 Linear Programming: [15]

Introduction – Graphical Solution; Graphical Sensitivity Analysis– The Standard Form Of Linear Programming Problems – Basic Feasible Solutions -Unrestricted Variables – Simplex Algorithm – Artificial Variables – Big M And Two Phase Method – Degeneracy - Alternative Optimal – Unbounded Solutions – Infeasible Solutions.

Unit-3 Dual Problems: [7]

Relation between Primal and Dual Problems – Dual Simplex Method

Unit-4 Transportation Model: [12]

Starting Solutions. North West Corner Rule - Lowest Cost Method–Vogels Approximation Method – MODI Method, Stepping Stone Method, Transportation Algorithms –Assignment Problem –Hungarian Method.

Unit-5 Game Theory: [8]

Introduction, Two-Person Zero-Sum Games, Some Basic Terms, the Maxmini Minimax Principle, Games Without Saddle Points-Mixed Strategies, Graphic Solution of $2 * N$ And $M*2$ Games, Dominance Property.

Unit-6 Network Models: [9]

Definitions – CPM and PERT Network Minimization, Shortest Route Problem, Critical Path Calculations, PERT Calculation, Float Analysis.

Unit-7 Sequencing Models [7]

Processing N Jobs through 2 Machines, N Jobs through 3 Machines, Two Jobs through M Machines.

References:

1. Handy A Taha, “Operations Research – An Introduction”, Pearson Education.
2. Prem Kumar Gupta, D. S. Hira, “Operations Research”, S. Chand & Company LTD.
3. Panneer Selvan, “Operations Research”, Prentice Hall of India.
4. L.C. Jhamb, “Quantitative Techniques for Managerial Decisions: Vol. I”, Everest Publishing House.
5. V.K.Kapoor, “Operation Research: Techniques for Management”, S. Chand.

CS-303-Internet Computing

Unit-1: Introduction to web technology [5]
Introduction, communicating on the Internet, Domain Name System, URL, HTTP, MIME, routers, Gateway, Firewall, HTML, working with HTML forms

Unit-2: The Basics of PHP [10]
Web Server Installation and configuration, Overview of PHP, Benefits, Drawbacks in Running PHP as a server side script, Data types, variables, constants, operators, arrays, conditional statements, iterations, functions, regular expressions.

Unit-3: Database Driven Programming: [5]
Introduction to MYSQL, MYSQL Installation and administration, working with MYSQL databases, Interaction between PHP and MYSQL

Unit-4: Object Oriented Programming [5]
Objects, Class, Instantiation, accessing methods and properties, constructors, destructors, class constants, keywords, extending a class, class abstraction, object interfaces, object cloning, object comparison.

Unit-5: Advanced Techniques [10]
Introduction to cookies. Creating cookies using PHP, Automatic login, Introduction to Sessions, PHP Session management rules, Storing, retrieving and deleting data from session variables, PHP session functions

Unit-6: Using XML [10]
Introduction to XML, Use of XML, Comparison between XML and HTML, DTD, CSS, XSL, DSO, DOM, working with XML using PHP.

Unit-7: PHP Frameworks: JOOMLA [05]
Creating MYSQL database and user for JOOMLA, Installing JOOMLA, Basic principals, working with JOOMLA, Applications and Hands on.

References:

1. Professional PHP Programming by Sascha Schumann , Deepak Veliath , Harish Rawat, Jesus Castagnetto , Chris Scollo by Peer Information Inc.
2. Beginning PHP5, Apache, and MySQL Web Development (Programmer to Programmer) by Elizabeth Naramore , Jason Gerner , Yann Le Scouarnec, Jeremy Stolz , Michael K. Glass , Wrox Publications,ISBN:0-7645-7966-5
3. Web Technology by Pradnya Gotmare, Vijayalaxmi Jeure by Technical Publications Pune, ISBN 978-81-8431-185-3
4. PHP 5.1 for Beginers by Ivan Bayross , Sharanam Shah by Shroff Publishers and Distributers Pvt. Ltd., ISBN 13: 978-81-8404-075-3
5. MySQL/PHP Database Applications by Jay Greenspan, Brad Bulger and David Wall by WILEY dreamtech India Pvt. Ltd. ISBN 81-265-0471-4

CS-304: Windows and Visual C++ Programming

Unit-1. Windows Programming: [8]

Windows environment – a simple windows program – windows and messages – creating the window – displaying the window – message loop – the window procedure – message processing – text output – painting and repainting – introduction to GDI – device context – basic drawing – child window controls.

Unit-2. Visual C++ Programming – Introduction: [10]

Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – colors – fonts – modal and modeless dialog – windows common controls – bitmaps.

Unit-3. The Document and View Architecture: [10]

Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI and MDI documents – splitter window and multiple views – creating DLLs – dialog based applications.

Unit-4. Active X and Object Linking and Embedding (OLE): [10]

ActiveX controls Vs. Ordinary Windows Controls – Installing ActiveX controls – Calendar Control – ActiveX control container programming – create ActiveX control at runtime – Component Object Model (COM) – containment and aggregation Vs. inheritance – OLE drag and drop – OLE embedded component and containers – sample applications.

Unit-5. Advanced Concepts: [12]

Database Management with Microsoft ODBC – Structured Query Language – MFC ODBC classes – sample database applications – filter and sort strings – DAO concepts – displaying database records in scrolling view – Threading – VC++ Networking issues – Winsock – WinInet – building a web client – Internet Information Server – ISAPI server extension – chat application – playing and multimedia (sound and video) files.

References:

1. Windows Programming, Charles Petzold, Microsoft press, 1996.
2. Programming Visual C++, 5th Ed., David J.Kruglinski, George Shepherd and Scot Wingo, Microsoft press, 2006.
3. Visual C++ 6 Programming, Steve Holtzner, Wiley Dreamtech India Pvt. Ltd., 2003.

CS-Lab-V: Lab on Windows Programming and VC++

Windows Programming:

1. Write a window program to demonstrate line drawing with left mouse button. The color & width of the line should change with every new line.
2. Write a Window Program that displays a small rectangle with every left mouse button. Double Clicking on existing rectangle should erase the rectangle.
3. Write a Window Program to display size of window and no. of left clicks; no. of right clicks and no. of double clicks. The data should be display at the center of the window. Size should be updated when user resizes the window object.
4. Write a Window Program to create filled rectangle and circle. on alternate left click. New figure should not erase the previous one. If user clicks inside any figure a mistake box is display.
5. Write a Window Program to create various brushes and change the background color to brushes on left mouse click.
6. Write a Window program to create a window object. Drag the left mouse buttons & display rectangle for which dragged line is a diagonal. Also demonstrate mouse capturing.
7. Write a window program to Move a ball horizontally inside the client area using timer. At each time lapse the ball should move left of the window and when it touches the left boundary of the window it should go to, the right of the window. and so on .
8. Write a window program to display the characters entered by user from the keyboard. [Consider only alphabets and numbers only.

MFC Programming:

1. Create a SDI application to display size of window & total number of Left clicks, right clicks and double clicks in the center of the client area.
2. Create a SDI application that displays a dialog box with two field's viz. User name, Password and two push buttons. The dialog box is invoked as the user starts the application. After user pressed on 'OIL' button display the contents of username and password in the client area& the, password should be in the farm of sequences Of *.
3. Create a SDI application, which invokes a dialog box from a menu option. The dialog box has three scroll bars called red scroll, blue scroll, green scroll and a multiline edit box. As the user scrolls through these scroll bars the background color of the edit box changes.
4. Create a SDI application that displays a dialog box with five fields: Name, Age (Spinner control.), Qualification it has three check boxes-for MCA. M.Sc., M.Sc.-IT, Radio buttons for Sex & drop down combo box for Designation. As the user fills this information in this dialog box & pressed the 'OK' button. The information is display on the client area. The dialog should be invoked through a Menu option.
5. Create A SDI Application that invokes a dialog box from a menu called Dialog. The dialog has a track bar slider control, progress bar control and spinner control. As the slides through slider control the progress bar and spinner control should set the status. Display the value of current position set in trace bar.
6. Create a SDI application and implement modeless dialog box; data of one dialog box should be display in another dialog box when ok button of first dialog is press.
Note: - Both dialogs should be visible at same time.
7. Create a SDI application to create a dialog box with Multi column list control & display the student information in different columns. Student information: name, seat no, and class, rank should be considered.
8. Demonstrate splitter window, take Form view and simple view. The data entered in form should be displayed in the sample view.

9. Create an SDI application that contains an edit box; two buttons viz. Add, Remove & a list box. Whenever user enters a string in the edit box & presses the Add button data should be added to the List box & remove the data if :

i). It is present in the list.

ii). Press remove button at runtime.

10. Write a Program that capture Home, Page Up, Page Down, End & all arrows keys as user presses these keys. Program should display appropriate message in the client window.

11. Write a Window Program to draw sine wave.

12. Create a SDI application and create a dialog box with Single Column list box & a tree control. List contains family name and tree control contains family, hierarchy. As the user selects a family name from list a particular family in the tree control.

13. Create SDI application to Demonstrate Bitmaps. Also change the background color and icon of your application

14. Create a SDI application. Create a access database with a single table of your choice. Fill at least five six records in it. Display the contents of table in the multi column list view.

15. Create a SDI application with the following menu options. Display the selected menu item in the client area. Menu item should have check marks on it when selected.

Cricket ----- Football

One run -----Corner

Four run-----Goal

Sixer-----Penalty Kick

CS-306-Lab-VI Lab on Internet Computing

1. Design web pages to demonstrate HTML elements.
2. Design a web site using HTML that will contain online forms for
 - a. Admission to M.Sc. Computer Science
 - b. Examination Registration
 - c. Email Registration
3. Write PHP scripts that demonstrate fundamentals PHP.
4. Write PHP script that will display grade based on criteria given below using the marks obtained in M.Sc. examination.
 - a. Distinction (70 and above)
 - b. First Class (60 - 69)
 - c. Pass (40 - 59)
 - d. Fail (below 40)
5. Write a PHP script that will demonstrate regular expressions.
6. Design a PHP application that will provide a form containing fields to fill book detail (Book title, Author, Publication, ISBN, Price and category). Display filled details to the user.
7. Design a database in MYSQL. Grant permissions on the database. Create table in database. Store, Update, Delete and Retrieve data from the table.
8. Design a database in MYSQL using PHP. Create table in database. Store, Update, Delete and Retrieve data from the table. Display the data from the table.
9. Write a PHP script that will demonstrate various built in PHP functions.
10. Create automatic login form using PHP.
11. Design XML application(s) that will be displayed using
 - a. CSS
 - b. Single and multiple XSL templates
 - c. DOM
12. Design XML application(s) and validate it using internal and external DTD.
13. Write a PHP script to store, retrieve and delete cookies on your local machine.
14. Write a PHP script to store, retrieve and delete data using session variables.
15. Implement PHP script that demonstrate inheritance and object cloning.
16. Design a sample website(s) using Joomla to demonstrate
 - a. Creating user
 - b. Changing default template.
 - c. Adding static contents
 - d. Designing a template.

Cs-401-Natural Language Processing

Unit-1 [5]
Introduction To NLP, Brief History, Challenges/Open Problems, Natural Language (NL) Characteristics And NL Computing Techniques, NL Tasks: Segmentation, Chunking, Tagging, NER, Parsing, Word Sense Disambiguation, NL Generation,

Unit-2 [8]
Natural Language Processing Applications: Speech To Text, Story Understanding, QA System, Machine Translation, Text Summarization, Text Classification, Sentiment Analysis, Chatterbox, Web 2.0 Applications : Sentiment Analysis; Text Entailment; Cross Lingual Information Retrieval (CLIR).

Unit-3 [8]
ML Basics, Algorithms, Naïve Bayes, Bayesian Statistics, HMM, CRF

Unit-4 [15]
Word Forms, Pos Tagging And Chunking: Morphology Fundamentals; Morphological Diversity Of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields, Pos Tagging Techniques, Chunking Techniques: CRF.

Unit-5 [12]
Structures : Theories Of Parsing, Parsing Algorithms; Robust And Scalable Parsing On Noisy Text As In Web Documents; Dependency Parsing; Hybrid Of Rule Based And Probabilistic Parsing: MST, Malt Parser; Scope Ambiguity And Attachment Ambiguity Resolution.

Unit-6 [12]
Meaning: Lexical Knowledge Networks, WordNET Theory; Indian Language Word nets And Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors; Co references.

References:

1. Natural Language Understanding, 2nd Ed., Allen, James, Benjamin/Cumming, 1995.
2. Statistical Language Learning, Charniack, Eugene, MIT Press, 1993.
3. Speech And Language Processing, 2nd Ed., Jurafsky, Dan and Martin, James, Prentice Hall, 2008.
4. Foundations of Statistical Natural Language Processing, Christopher and Heinrich, Schutze, MIT Press, 1999.
5. Natural Language Processing: A Paninian Perspective, Aksharbharti, Vineetchaitanya, Rajeev Sangal.

CS-402 Advance Network Programming

Unit-1. Understanding Network fundamentals: [10]

Project model IEEE 802, Network topologies Network infrastructure, Network Protocols UDP, TCP, Introduction to TCP/IP Architecture of the TCP/IP model.

Unit-2. Client server Programming and Application: [25]

The client server model and software design, the socket interface, concurrent processing in client-server software, program interface to protocol algorithms & issues in client Software design, example client software, algorithms & issues in server software design Iterative connectionless server, iterative connection oriented server, single process Concurrent server concurrent connection oriented server, multiprotocol server , multi-service server concurrency in client external data representation remote procedure call concept, RPCgen concept.

Unit-3. Network Interface Layer: [15]

Overview of network interface layer media access control standards, mapping the Physical address to the IP address. Internet Layer: Purpose of the internet layer, classes of Ipv4 addresses, basics of routing, IP datagram ICMP, IGMP Transport Layer Types of data transfer connection-less data transfer, connection-oriented data transfer

Unit-4. Mobile Ad-Hoc Network [10]

Overview of Wireless Ad-Hoc Network, Routing in Ad-Hoc Network, Routing Protocols for Ad-Hoc Network- Wireless Sensor Network; Sensor Network & and Protocol Structure, Clustering Protocols, Routing Protocols.

References:

1. Intranetworking with TCP/IP volume III Client Server Programming and Applications, Douglas E. Comer, David Stevens, PHI, ISBN-81-7808-488-0.
2. Internetworking with TCP/IP volume I, Principles protocols & Architecture, Douglas E. Comer, 3rd Ed., PHI, ISBN-81-203-1053-5.
3. Internetworking with TCP/IP volume II Design Implementation, and internals, 3rd Ed., Douglas E. Comer, David Stevens, PHI, ISBN-81-203-0927-8.
4. TCP/IP Bible, 1st Ed., Scriver LaSalle, Parihar Gupta, Hungry Minds IDG Looks India (P) Ltd.
5. Guide to Ad-hoc Network, Misra S., Woungang I., Springer, ISBN 978-1-84800-328-6.
6. Mobile Ad-Hoc Network, Basagni S., Conti M., Willy Publication, ISBN: 0471373133.

CS-403-Data Mining

Unit-1 Introduction to Data Warehousing and Mining [8]

Data Warehousing Components and Architecture, Decision Support System, Data Mining Concepts and Functionalities - Classification of Data Mining Systems –Basic Data Mining Task - Data Mining Issues

Unit-2 Data Preprocessing [8]

Data Summarization – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

Unit-3 Association Rule Mining [10]

Efficient and Scalable Frequent Item Set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

Unit-4 Classification and Prediction [14]

Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – 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-5 Cluster Analysis [12]

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-6 Advanced Techniques [8]

Web Mining, Spatial Mining.

References:

1. Data Mining Concepts and Techniques, 2nd Ed., Jiawei Han and MichelineKamber, Elsevier, Reprinted 2008.
2. Data Mining: Introductory and Advanced Topics, M. H. Dunham, Pearson Education, 2001.
3. Data Mining: Practical Machine Learning Tools and Techniques I. H. Witten and E. Frank, Morgan Kaufmann, 2000.
4. Principles of Data Mining, D. Hand, H. Mannila and P. Smyth,Prentice-Hall, 2001.

CS404-Lab-VI: Lab on Network Programming and Data Mining

Preferred Platform Linux C / Windows VC++, JAVA

1. Implement TCP and UDP Client-Server programs for following services:
Printing the Host ID, local port, also the client should indicate connection status
 - Echo Service
 - Day Time Service
 - Chargen Service
 - Mathematical Operation on numbers
 - Checking number for prime, palindrome etc.
 - Calculating factorial
 - Calculating Fibonacci series
 - Case conversion in given string
2. Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using single process.
3. Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using multiple processes.
4. Implement Telnet Server program for providing different types of Telnet Services.
5. Demonstrate and implement the file transfer using FTP.
6. Develop a simple web server capable of accepting request from standard client like IE, Netscape, Opera etc (use standard protocol HTTP).

Lab course on data mining

1. Demonstration of preprocessing on any sample data set with WEKA.
 2. Demonstration of association rule process on data set using apriori algorithm.
 3. Demonstration of classification rule process on data set using decision tree analysis (J48 algorithm).
 4. Demonstration of clustering rule process on dataset using simple K-means.
 5. Create your own data set using WEKA and cluster the data using K-means.
[Note : Use WEKA software for all above practical assignment.
- For assignment no. 1 to 4 use sample database available in WEKA.
- Web Reference : [www.cs.waikato](http://www.cs.waikato.ac.nz/)

CS-405-Mini Project

Mini project Guidelines

1. Project will be of 200 marks.
2. One project per student
3. Project title must be unique.
4. Duration of project completion will be full semester.
5. Project should be completed under the guidance of allocated guide by HOD.
6. All project work should be completed in the college laboratory under the supervision of guide.
7. For project report the specifications are – Font size 12, Name – Times New Roman, Spacing 1.5 with header and footer.
8. Project report should be with spiral binding having maximum 90-100 pages only.
9. Project report should be submitted with two hard copies.
10. Evaluation of project will be done as per university rules.