UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Operating System
Course Code: BCA301
L-T Scheme: 3-1 **Course Credits: 4**

Introduction:

This course examines operating system design concepts, data structures and algorithms, and systems programming basics. The Topics to be covered (tentatively) include:

- Computer and operating system structures
- Process and thread management
- Process synchronization and communication
- Memory management
- Virtual memory
- File system
- I/O subsystem and device management
- Selected examples in networking, protection and security

Objectives:

This course provides a comprehensive introduction to understand the underlying principles, techniques and approaches which constitute a coherent body of knowledge in operating systems. In particular, the course will consider inherent functionality and processing of program execution. The emphasis of the course will be placed on understanding how the various elements that underlie operating system interact and provides services for execution of application software.

Learning Outcomes:
Knowledge:

1. Master functions, structures and history of operating systems
2. Master understanding of design issues associated with operating systems
3 Master various process management concepts including scheduling, synchronization , deadlocks
4. Be familiar with multithreading
5. Master concepts of memory management including virtual memory
6. Master system resources sharing among the users
7. Master issues related to file system interface and implementation, disk management
8. Be familiar with protection and security mechanisms
9. Be familiar with various types of operating systems including Unix

Application:

1. To develop, implement, and debug various CPU scheduling algorithms
2. To develop algorithms to find deadlocks
3. To develop Disk scheduling algorithms

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Course Description

Course Contents:

Unit 1: Introduction, Operating system structure - Monolithic systems, Layered systems, Virtual machines, Client-Server model.

Unit 2: Process Management – process creation, deletion, inter process communication tools: pipe, FIFO, shared memory, process synchronization, synchronization primitives and Classical IPC problems.

Unit 3: Process scheduling, Processor Allocation - Allocation Model, Design issues for processor allocation algorithms, Threads and Deadlock.

Unit 4: Memory Management, paging scheme, segmentation, virtual memory concept, page replacement algorithms, threshing, working set model, issues in Virtual memory management.

Unit 5: File System management. Input output management, Disk scheduling, Case study of UNIX/LINUX.

Text Books

1. Silberschatz, P. Galvin and Greg Gagne, "Operating System Concepts", Wiley International Company.
2. A.S. Tanenbaum, Modern Operating Systems, Prentice Hall India.

References

1. J. Archer Harris, Operating systems – Schuam's outlines, Tata Mc Graw Hill.
2. Gary Nutt, Operating Systems – A modern perspective, Pearson Education.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Data Structures with C
Course Code: BCA302
L-T Scheme: 3-1 **Course Credits: 4**

Introduction:

This course examines data structures and algorithms basics. The Topics to be covered (tentatively) include:

- Abstract Data Type and Data Type
- Time and space analysis of algorithms
- Linear Data structures
- Non-linear Data structures
- Sorting, Searching and Hashing

Objectives:

In this course we will study the basic components of data structure and algorithm.Students are expected to be capable of understanding the data structures, their advantages and drawbacks, how to implement them in C, how their drawbacks can be overcome and what the applications are and where they can be used. The way different modules in the operating system interact and work together to provide the basic services of an operating system.

Learning Outcomes:

Knowledge:

1. To learn about the data structures/ methods/algorithms mentioned in the course with a comparative perspective so as to make use of the most appropriate data structure/ method/algorithm in a program to enhance the efficiency (i.e. reduce the run-time) or for better memory utilization, based on the priority of the implementation.
2. To understand at least the efficiency aspects of the graph and sorting algorithms covered in this course.
3. To convert an inefficient program into an efficient one using the knowledge gathered from this course.

Application:

1. To implement different types of linked list.
2. To implement graph algorithm for any network
3. To implement sorting and searching.

Course Contents:

Unit 1: Introduction-Data and data structure, Abstract Data Type and Data Type.Algorithm efficiency and analysis, time and space analysis ofalgorithms – order notations.

Unit 2: Linear Data structures–Array, Linked List, Stack, Queue and Recursion with their types, different operations and applications

Unit 3: Nonlinear Data structures–Graph, Trees, Minimum spanning tree with their types, different operations and applications.

Unit 4: Sorting, Searching and Hashing- Bubble sort and its optimizations, insertion sort, shell sort, selection sort, merge sort, quick sort, heap sort (concept of max heap, application – priority queue), radix sort. Sequential search, binary search, interpolation search. Hashing functions, collision resolution techniques.

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Course Description

Text Books

1. YashavantKanetkar, Abduln A.P.J. Kalam," Data Structure Through C",2nd edition, BPB Publications
2. Seymour Lipschutz, "Data Structures",Revised First edition,McGraw Hill Education.

References

1. Langsam,Augestein, Tenenbaum:Data Structures using Cand C++, 2nd Edn, 2000,
2. Horowitz and Sahani:FundamentalofDataStructuresin C,2nd Edn, 2008
3. Kruse, Tonso, Leung: Data Structures and ProgramDesign in C, 2000
4. Richard F.Gilberg&BehrouzForouzan: Data Structures, APseudocodeApproach withC, 2001.
5. Weiss: DataStructuresand AlgorithmAnalysisin C/C++, 3rd Edn, 2006

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Graphics & Internet
Course Code: BCA303
L-T Scheme: 3-1 **Course Credits: 3**

Introduction:

This course presents an introduction to computer graphics designed to give the student an overview of fundamental principles. It covers the fundamental concepts in creating graphical images on the computer. Computer graphics uses ideas from Art, Mathematics, and Computer Science to create images. Course work stresses the reduction of concepts to practice in the form of numerous programming assignments. The course will include an overview of common graphics hardware, 2D and 3D transformations and viewing, and basic raster graphics concepts such as scan-conversion and clipping. Methods for modeling objects as polygonal meshes or smooth surfaces, and as rendering such as hidden-surface removal, shading, illumination, and shadows will be investigated.

Objectives:

- Develop an understanding and awareness of how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
- Be familiar with various software programs used in the creation and implementation of multi- media (interactive, motion/animation, presentation, etc.).
- Be aware of current issues relative between new emerging electronic technologies and graphic design (i.e. social, cultural, cognitive, etc).

understand the relationship between critical analysis and the practical application of design.

- Appreciate the importance of technical ability and creativity within design practice.

Learning Outcomes:
Knowledge:

1. Effectively and creatively solve a wide range of graphic design problems
2. Form effective and compelling interactive experiences for a wide range of audiences.
3. Use various software programs used in the creation and implementation of multi-media
4. (Interactive, motion/animation, presentation, etc.).
5. Discuss issues related to emerging electronic technologies and graphic design

Application:

1. To develop, implement line drawing, color fill, circle algorithm.

Course Contents

Unit 1: **Introduction**

Introduction, what is computer Graphics? Area of Computer Graphics, Design and Drawing, Animation Multimedia applications, Simulation, How are pictures actually stored and displayed, Difficulties for displaying pictures.

Unit 2: Output Primitives

Course Description

Co-ordinate systems, Homogenous co-ordinate Systems. Line drawing algorithm, Circle drawing algorithm, circle drawing algorithms.

Unit 3: Two Dimension Transformations

What is transformation?, Matrix representation of points, Basic transformation.

Unit 4: Two Dimensional Viewing

Need for Clipping and Windowing, Line Clipping Algorithms, The midpoint subdivision Method, Other Clipping Methods, Sutherland - Hodgeman Algorithm, Viewing Transformations

Unit 5: Three Dimensional Object Representation

Need for 3-Dimensional Imaging, Techniques for 3-Dimesional displaying, Parallel Projections, Perspective projection, Intensity cues, Stereoscope effect, Kinetic depth effect, Shading, Bezier curves and surfaces.

Unit 6: Transmission & Internet Protocol

Addressing in Internet, IP and Domains, Servers and Type of Connectivity.

Unit 7: Web Publishing

HTTP, Browsers, introduction to HTML, Java Script, uses of Java applet with in HTML files, Asp.

Unit 8: Electronic Mail services

Email, Protocols.

Unit 9: Other

Internet Security, Introductions to E-commerce, Electronic Payment Standard and Methods.

Text Books

1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education,2003.
2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.

References

1. Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 1998.
2. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd Edition, Pearson Education, 2003.

UNIVERSITY OF ENGINEERING & MANAGEMENT,JAIPUR

Course Description

Subject Name: Mathematics of Computing — Subject Code-BM301
Year:2nd Year — Semester: Third

Title of Course: Mathematics of Computing
Course Code:BM301
L-T Scheme: 3-1 **Course Credits: 4**

Introduction:

The goal of this course is to provide a very common simple intuition enables one to make right decisions and especially show how mathematics is applied to solve basic fundamental problems. The Topics to be covered (tentatively) include:

Propositional logic,Logicalequivalence

Permutation and combinations

Generating functions,Recurrence relations

GraphTheoryConceptsGraphs,sub-graphs, cyclicgraphs

Trees,spanningtrees, binarytrees,Algorithms- Prim's,Kruskal

Isomorphism,homomorphism

Objectives:

To introduce students to language and methods of the area of Discrete Mathematics. The focus of the module is on basic mathematical concepts in discrete mathematics and on applications of discrete mathematics in algortihms and data structures. To show students how discrete mathematics can be used in modern computer science (with the focus on algorithmic applications).

Learning Outcomes:
Knowledge:

1. Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
2. Understand the basics of discrete probability and number theory, and be able to apply the methods from these subjects in problem solving.
3. Be able to use effectively algebraic techniques to analyse basic discrete structures and algorithms.
4. Understand asymptotic notation, its significance, and be able to use it to analyse asymptotic performance for some basic algorithmic examples.
5. Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

Application:

1. Introduction to combinatorics: counting techniques, pigeonhole principle, inclusion-exclusion.
2. Recurrence relations, solving recurrences using generating functions.
3. Master Theorem for solving recurrences.
4. Graphs. Basic graph algorithms. Trees. Applications of graphs.
5. Applications of linear algebra and matrix algebra in algorithms (e.g., in web searching).
6. Algorithmic applications of random processes and Markov chains, for example, cover time in graphs and card shuffling.
7. Partitions, enumerations with symmetries.

Books:

1. DiscreteMathematics,Mott,Kandel&Baker,PHI
2. GraphTheory,N.Deo,PHI
3.Discrete MathematicalStructure,C.L.Liu,TMH
4.Discrete MathematicalStructure,Somasundaram,PHI
5. DiscreteMathematicalStructure,G.S.Rao,NewAgeInternational
6. DiscreteMathematicswithApplications,Rosen,TMH
7. DiscreteMathematicalStructure,Dubey,EXCELBOOKS
8.Discrete Mathematics,Iyengar,VIKAS
9.DiscreteStructuresand GraphTheory,Rao,Scitech
10. MathematicalFoundations,Vijayarangan,Scitech
11. DiscreteStructuresandGraph Theory,Rathor, EPH.

UNIVERSITY OF ENGINEERING & MANAGEMENT,JAIPUR

Course Description

Subject Name: Management & Accounting
Subject Code-BBA301
L-T Scheme: 3-1 **Course Credits: 4**

Course Objectives:

This course provides students an understanding of company formation, issue of shares and debentures, procedure for issue, oversubscription, under subscription, fundamental concepts of Accounting, Preparation of Financial Statements, depreciation accounting methods, Accounting standards & IFRS, ratio analysis, cash flow statement, comparative, common size financial statements and trend analysis.

Course Outcomes:

At the end of the course students are able to:

1. Acquire basic concepts on managerial economics, both theory and application.

2. Apply quantitative techniques in analyzing the managerial economic problem in order to arrive at an appropriate solution

3. Exhibit appropriate managerial decisions under .given resource constraints and Objectives of the firm.

Unit I 7 Hours

Introduction to Financial Accounting – Concepts – Conventions – Importance and scope – Accounting Principles– Double entry system – Brief overview of accounting cycle – introduction to Balance Sheet and Income Statement.

Accounting for Fixed assets – Introduction – Valuation of Fixed assets – principles and norms of standard accounting treatment (AS 10)

Unit II 7 Hours

Depreciation – Methods – Accounting – Importance

Revenue Recognition - Introduction -Definitions -Sale of Goods -Rendering of Services -The Use by Others of Enterprise Resources Yielding Interest-Royalties and Dividends -Effect of Uncertainties on Revenue Recognition - accounting standard (AS 9)

Unit III 8 Hours

Provisions – Doubtful Debt – Bad Debt – Importance – Provisions – Reservations – Accounting Treatments

Financial Statements – Introduction to Corporate Final Accounts as per Schedule VI of Companies Act 1956. Income Statement – Interpretation of Annual Reports.

Unit IV 8 Hours

Cost Accounting : key terms, cost concepts, classifications, total cost components, cost accounting and management accounting, cost accounting and financial accounting.

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Unit V 9 Hours

Elements of Cost : Materials (Purchasing, Storekeeping, Issue, Pricing & Control); Labour (Costing & Control) ; Overheads (Analysis, Distribution and Control, Treatment of Special Items).

Text Books:

a. Bhattacharyya, Ashis K.: Financial Accounting for Business Managers, PHI
b. Gupta: Financial Accounting for Management, Pearson education
c. Narayanaswamy, R : Financial Accounting, PHI
d. Ramchandran, Kakani: Financial Accounting for managers, Tata McGraw-Hill
e. Shah : Basic Financial Accopunting For management, OUP

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Internet & Computer Graphics Lab
Course Code: BCA393
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:
This is an introductory course on principles of computer graphics. We will consider both 2D and 3D graphics. Broadly speaking, we will look at raster scan graphics including line and circle drawing, polygon filling, anti-aliasing algorithms, clipping, hidden-line and hidden surface algorithms including ray tracing and, of course, rendering - the art of making photo realistic pictures with local and global illumination models.
Lab course of two hours per week will supplement the theory. Implementation of basic and advanced algorithms will be done in OpenGL and C++. Basic knowledge of C/C++ programming is mandatory.
The course will involve four hours of contact including lectures, tutorials and lab classes. Students are strongly encouraged to participate actively in class discussions.

Learning Outcomes:
1. Using OpenGL for Graphics
2. Programming User-interface issues
3. Concepts of 2D & 3D object representation
4. Implementation of various scan & clipping algorithms
5. 2D modeling
6. Implementation of illumination model for rendering 3D objects
7. Visibility detection & 3D viewing
8. Implementation of a project based on learned concepts.

Course Contents:
Exercises that must be done in this course are listed below:
Exercise No.1: A program to draw a line using Digital Differential Analyzer (DDA)
Exercise No. 2: A program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes negative and less than 1.
Exercise No. 3:A program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes positive and less than 1.
Exercise No. 4:A program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes positive and greater than 1.
Exercise No. 5:A program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes negative and greater than 1.
Exercise No. 6: A program to draw a circle using Bresenham's Circle Algorithm.
Exercise No. 7: A program to draw a circle using MidPoint Circle Algorithm
Exercise No. 8: A program to draw a circle using Trigonometric Method.
Exercise No. 9: A program to draw a circle using Polynomial Method.
Exercise No. 10: A program to draw an ellipse using MidPoint Ellipse Algorithm.
Exercise No. 11: A program to draw an ellipse using Trigonometric Method.
Exercise No. 12: A program to draw an ellipse using Polynomial Method.
Exercise No. 13: A program to fill different types of geometric shapes using Flood Fill.Algo.
Exercise No.14: A program to fill different types of geometric shapes using Boundary Fill Algo.
Exercise No. 15: A program to draw a C-Curve of nth order.

Text Book:

1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education,2003.
2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.

Recommended Systems/Software Requirements:

1. 1 Turbo c for compile and run program.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Programming Lab (Data Structure with C) **Course Code: BCA392**
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:

1. Develop problem solving ability using Programming.
2. Develop ability to design and analyse algorithms.
3. Introduce students to data abstraction and fundamental data structures.
4. Develop ability to design and evaluate Abstract Data Types and data structures.
5. Apply data structure concepts to various examples and real life applications

Learning Outcomes:

The course will use hands on practice and applying the knowledge gained in theory course to different day to day real world applications.Upon the completion of data structure and algorithm practical course, the student will be able to:

- **Understand** and implement different type of data structure techniques
- **Analyze** the hashing method.
- **Implement** different type os sorting searching techniques.

Course Contents:

Exercises that must be done in this course are listed below:

Exercise No.1: Implementation of array operations
Exercise No. 2: Stacks and Queues: adding, deleting elements
Exercise No. 3: Circular Queue: Adding & deleting elements
Exercise No. 4: Merging Problem: Evaluation of expressions operations on multiple stacks & queues
Exercise No. 5: Implementation of linked lists: inserting, deleting, and inverting a linked list.
Exercise No. 6: Implementation of stacks & queues using linked lists, Polynomial addition, and Polynomial multiplication
Exercise No. 7: Sparse Matrices: Multiplication, addition.
Exercise No. 8: Recursive and Non-recursive traversal of Trees
Exercise No. 9: Threaded binary tree traversal. AVL tree implementation
Exercise No. 10: Application of Trees. Application of sorting and searching algorithms

Text Book:

1. YashavantKanetkar, Abduln A.P.J. Kalam," Data Structure Through C",2nd edition, BPB Publications
2. Seymour Lipschutz, "Data Structures",Revised First edition,McGraw Hill Education.

Recommended Systems/Software Requirements:

1. Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
2. Turbo C or TC3 complier in Windows XP or Linux Operating System.