

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Distributed Database Management

Course Code: MCA501A

L-T Scheme: 4-0

Course Credits: 4

Introduction

Database Management Systems (DBMS) consists of a set of interrelated data and a set of programs to access that data. They underpin any computer system and are therefore fundamental to any program of study in computer science. An understanding of DBMS is crucial in order to appreciate the limitations of data storage and application behavior and to identify why performance problems arise. Students who complete this course are expected to develop the ability to design, implement and manipulate databases. Students will apply and build databases for various day to day real life scenarios and real life applications. The course will by and large be structured but will introduce open-ended data base problems.

Course Objectives (Post-conditions)

Knowledge objectives:

- Ability to build normalized databases.
- Knowledge of storage and indexing, disks and files
- Familiarity with SQL, embedded SQL and PLSQL
- Familiarity with tree structured indexing
- Understanding of transaction processing and evaluating relational operators
- Ability to handle recovery and concurrency issues and typical relational query optimizer
- Familiarity with physical database design and tuning.

Outcomes:

- Develop the ability to design, implement and manipulate databases.
- Introduce students to build tree structured indexing.
- Apply DBMS concepts to recovery and concurrency issues and typical relational query optimizer.

Course Contents:

Unit 1: OVERVIEW OF STORAGE AND INDEXING, DISKS AND FILES: Data on external storage; File. Organizations and indexing; Index data structures; Comparison of file organizations; Indexes and Performance tuning. Memory hierarchy; RAID; Disk space management; Buffer manager; Files of records; Page formats and record formats.

Unit 2: TREE STRUCTURED INDEXING: Intuition for tree indexes; Indexed sequential access method; B+ trees, Search, Insert, Delete, Duplicates, B+ trees in practice.

Unit 3: HASH-BASED INDEXING: Static hashing; Extendible hashing, Linear hashing, comparisons.

Unit 4: OVERVIEW OF QUERY EVALUATION, EXTERNAL SORTING: The system catalog; Introduction to operator evaluation; Algorithms for relational operations; Introduction to query optimization; Alternative plans: A motivating example; what a typical optimizer does. When does a DBMS sort data? A simple two-way merge sort; External merge sort

Unit 5: EVALUATING RELATIONAL OPERATORS: The Selection operation; General selection conditions; The Projection operation; The Join operation; The Set operations; Aggregate operations; The impact of buffering; Concurrency control and recovery system: Lock based protocol, dead lock handling, time stamp based and validation based protocol, failure classification, storage, recovery algorithm, recovery and atomicity, backup.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Unit 6: A TYPICAL RELATIONAL QUERY OPTIMIZER: Translating SQL queries in to Relational Algebra; Estimating the cost of a plan; Relational algebra equivalences; Enumeration of alternative plans; Nested subqueries; Other approaches to query optimization.

Unit 7: PHYSICAL DATABASE DESIGN AND TUNING: Introduction; Guidelines for index selection, examples; Clustering and indexing; Indexes that enable index-only plans; Tools to assist in index selection; Overview of database tuning; Choices in tuning the conceptual schema; Choices in tuning queries and views; Impact of concurrency; DBMS benchmarking.

Unit 8: MORE RECENT APPLICATIONS: Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.

Text Books:

1. Silberschatz, Korth and Sudarshan, "Database System Concepts", 6th Edition, McGraw Hill, 2010
2. Elmasri and Navathe, "Fundamentals of Database Systems", 6th Edition, Pearson, Addison-Wesley, 2010

References:

1. C.J. Date, "An Introduction to Database Systems", 8th Edition, Addison-Wesley, 2003
2. Ramakrishnan & Gherke, Database Management Systems, 2nd Edn., McGraw
3. Connolly and Begg, "Database Systems", 4th Edn., Addison-Wesley, 2005
4. Toby, Lightstone and Jagadish, "Database Modeling and Design", 5th Edn, Elsevier, 2011
5. Coronel and Rob, "Database Systems", 9th Edn., Cengage, 2011
6. IEEE / ACM Transactions on Database Systems (TODS).
7. DBMS related Journals.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Image Processing

Course Code: MCA501B

L-T-P Scheme: 3-0-0

Course Credits: 3

Introduction:

Signal processing is a discipline that deals with analysis and processing of analog and digital signals. It deals with storing, filtering, and other operations on signals. These signals include transmission signals, sound or voice signals, image signals, and other signals e.t.c.

Out of all these signals, the field that deals with the type of signals for which the input is an image and the output is also an image is done in image processing. As its name suggests, it deals with the processing on images.

It can be further divided into analog image processing and digital image processing.

Objectives:

Digital image processing deals with manipulation of digital images through a digital computer. It is a subfield of signals and systems but focuses particularly on images. DIP focuses on developing a computer system that is able to perform processing on an image. The input of that system is a digital image and the system processes that image using efficient algorithms, and gives an image as an output.

Learning Outcomes:

Students will be able to apply various image processing concepts and models to input images or input signals for various purposes. For example: image compression, image de-noising, image enhancement, edge detection and sharpening etc.

Application :

- Remote Sensing picture processing :
 - Tracking of Earth Resources
 - Weather Forecasting
 - Geographical Mapping
 - Identifying different areas like – Water Body
 - area, Forest Area, Hilly area etc.
- Image Transmission & Storage
 - Image Compression technique is applied
- Medical applications :
 - X-Ray, Ultra sound, etc.
- Defence :
 - Tracking missiles, vehicles etc.
- Industrial machine vision
 - we can inspect different objects

Course Contents:

Unit 1: Introduction

Background, Digital Image Representation, Fundamental steps in Image Processing, Elements of Digital Image Processing – Image Acquisition, Storage, Processing, Communication, Display.

Unit 2: Digital Image Formation

A Simple Image Model, Geometric Model- Basic Transformation (Translation, Scaling, Rotation), Perspective Projection, Sampling & Quantization - Uniform & Non uniform.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Unit 3:Mathematical Preliminaries

Neighbour of pixels, Connectivity, Relations, Equivalence & Transitive Closure; Distance Measures, Arithmetic/Logic Operations, Fourier Transformation, Properties of The Two Dimensional Fourier Transform, Discrete Fourier Transform, Discrete Cosine & Sine Transform

Unit 4:Image Enhancement

Spatial Domain Method, Frequency Domain Method, Contrast Enhancement -Linear & Nonlinear Stretching, Histogram Processing; Smoothing - Image Averaging, Mean Filter, Low-pass Filtering; Image Sharpening. High-pass Filtering, High-boost Filtering, Derivative Filtering, Homomorphic Filtering; Enhancement in the frequency domain - Low pass filtering, High pass filtering.

Unit 5:Image Restoration

Degradation Model, Discrete Formulation, Algebraic Approach to Restoration - Unconstrained & Constrained; Constrained Least Square Restoration, Restoration by Homomorphic Filtering, Geometric Transformation - Spatial Transformation, Gray Level Interpolation

Unit 6 :Image Segmentation

Point Detection, Line Detection, Edge detection, Combined detection, Edge Linking & Boundary Detection - Local Processing, Global Processing via The Hough Transform; Thresholding - Foundation, Simple Global Thresholding, Optimal Thresholding; Region Oriented Segmentation - Basic Formulation, Region Growing by Pixel Aggregation, Region Splitting & Merging.

Text Books

1. Digital Image Processing, Gonzalves,Pearson
2. Digital Image Processing, Jahne, Springer India
- 3.Digital Image Processing &Analysis,Chanda&Majumder,PHI
- 4.Fundamentals of Digital Image Processing, Jain, PHI
- 5.Image Processing, Analysis & Machine Vision, Sonka, VIKAS
6. Getting Started with GIS- Clarke Keith. C; PE.
7. Concepts & Techniques of GIS - Lo C.P, Albert, Yeung K.W- PHI.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Parallel Programming

Course Code: MCA501C

L-T Scheme: 3-1

Course Credits: 3

Introduction:

This course examines the environment of parallel processing, organization, pipelining, algorithms, and parallel programming basics. The Topics to be covered (tentatively) include:

- Pipelining and Data Parallelism
- Parallel Processing organization
- Parallel Algorithms
- Linear system of equations
- Parallel Programming Languages

Objectives:

This is an introductory course on parallel programming, meant for graduate students in Computer Science. This course will teach practical aspects of parallel computing, so that you will be able to effectively use parallel machines. It will be particularly useful for those who plan to perform research on parallel computing. It should also be useful for those who want to learn programming multicore processors.

Learning Outcomes:

Knowledge:

At the end of this course, you should be able to accomplish the objectives given below.

- Define terminology commonly used in parallel programming, such as *efficiency* and *speedup*.
- Describe different parallel architectures, inter-connect networks, programming models, and algorithms for common operations such as matrix-vector multiplication.
- Given a problem, develop an efficient parallel algorithm to solve it.
- Given a parallel algorithm, analyze its time complexity as a function of the problem size and number of processors.
- Given a parallel algorithm, an input to it, and the number of processors, show the steps performed by that algorithm on that input.
- Given a parallel algorithm, implement it using MPI, OpenMP, pthreads, or a combination of MPI and OpenMP.
- Given a parallel code, analyze its performance, determine computational bottlenecks, and optimize the performance of the code.
- Given a parallel code, debug it and fix the errors.
- Given a problem, implement an efficient and correct code to solve it, analyze its performance, and give convincing written and oral presentations explaining your achievements.

Application:

1. To develop an efficient parallel algorithm to solve it
2. To implement an efficient and correct code to solve it, analyze its performance, and give convincing written and oral presentations explaining your achievements.
3. Given a parallel algorithm, implement it using MPI, OpenMP, pthreads, or a combination of MPI and OpenMP.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Course Contents:

Unit 1: Introduction.-Parallel Processing Environment- Pipelining and Data Parallelism, Scalability, Flynn's Taxonomy. Parallel Processing organization- Mesh, Hyper-tree, Pyramid, Butterfly, Hypercube network.

Unit 2: Parallel Algorithms –Structure, cost, Analysis; Elementary Algorithms: Broadcast, Prefix sums, All sums Algorithms on Selection problem, Merging-Odd-even merging network, CREW Merging, N-ary searching Matrix Transposition, Matrix Multiplications- 2D Mesh SIMD, Hypercube SIMD, Shuffle-Exchange SIMD models. Discrete Fourier Transform, Fast Fourier Transform

Unit 3: Linear system of equations- Gaussian Elimination, Gauss-Seidel algorithm, Jacobi algorithm Sorting – Enumeration sort, Odd-even transposition sort, Bitonic merge, Ellis's Algorithm

Unit 4: Graph Algorithms, Spanning Tree Algorithms, Parallel Programming Languages – FORTRAN 90, OCCAM

Text Books

1. Parallel programming –Theory and Practice -Michael J.Quinn (McGraw Hill Inc.)
2. Design and Analysis of Parallel Algorithms- S.G. Akl (PH)

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: System Administration & Linux

Course Code: MCA502A

L-T Scheme: 3-1

Course Credits: 4

Introduction:

Batch process system programs, their components, operating characteristics, user services and limitations, implementation techniques for parallel, distributed and concurrent processing, interrupt handling, addressing techniques, file system design and management, system accounting, and other user-related services, traffic control, interprocess communication, remote procedure calls, design of system modules, and interfaces, system updating, documentation, and operation.

Objectives:

This course introduces basic understanding of UNIX OS, UNIX commands and File system and to familiarize students with the Linux environment. To make student learn fundamentals of shell scripting and shell programming. Emphases are on making student familiar with UNIX environment and issues related to it.

Learning Outcomes:

Knowledge:

1. Be familiar with basic UNIX OS concepts such as: process, program, process groups, signals, running programs, process control, address space, user and kernel modes, system calls, and context switching.
2. Master in file I/O (i.e. open, close, read, write, seek)
3. Be familiar with using sockets to implement client-server environment.
4. Be familiar with using thread execution models (e.g. Posix threads).
5. Be familiar to handle signals and exceptions within a process and to control processes.
6. Be familiar with different approaches of concurrent programming.
7. Be familiar with different batch processing systems.
8. Be familiar with remote execution techniques.

Application:

1. Master in using the C/C++ programming language, its constructs and grammar, to create system software.
2. Master in the usage of makefiles, linking, object files, loading, symbol resolution, shared and static libraries, debugging, and execution of system programs.

Course Contents:

Unit 1: The UNIX Operating System, File system, General-purpose utilities

Unit 2: The Bourne Shell, Simple filters

Unit 3: Advanced Filters – I, Advanced Filters - II

Unit 4: Line editing with ex, Vi editor

Unit 5: The Process, communication and scheduling

Unit 6: Programming with the Shell

Unit 7: Introduction to System administration.

Text Books

1. UNIX-Concepts & Applications, Sumitava Das, TMH
2. Learning UNIX Operating System, Peek, SPD/O'REILLY
3. Understanding UNIX, Srirengan, PHI

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

References

1. Learning the Vi Editor,Lamb, SPD/O'REILLY
2. Essentials Systems Administration,Frisch, SPD/O'REILLY

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Windows Programming with VB

Course Code: MCA502B

L-T Scheme: 3-1

Course Credits: 4

Introduction:

"Windows Programming" is programming that targets the Windows OS. The Windows API, informally WinAPI, is Microsoft's core set of application programming interfaces (APIs) available in the Microsoft Windows operating systems.

Objectives:

1. To understand Windows concepts and terminology
2. To explore the MFC programming concepts.

Learning Outcomes:

Knowledge:

After this course, the student will be able to

1. Implement and innovate commands using the basic tool kit.
2. Develop the practice of writing windows applications through OO concepts.

Course Contents:

Unit 1: Introduction to Windows Programming and Visual Basic:

Components of Windows Programming:

Graphical User Interface – Window and its elements – Dialog Box – Drop-Down and Pop-Up menus – Visual Basic – Event-Driven Programming – Steps in Building a Project – User Interface Design – Writing Code – Visual Basic IDE – Creating and Running a simple project

Unit2: Visual Basic Forms and Controls:

Form – Tool Box controls – Property window – Design and Run-time properties – Events – Keyboard, Mouse, Code and System events – Visual Basic Object oriented programming – Creating buttons at run-time through object declaration - Screen, Printer, Error Objects

Unit3: Visual Basic Programming:

Visual Basic Data Types - Constants: predefined constants – User-Defined constants – Variables – Scope Rules – Control Structures – If – Select Case – Loops – FOR , DO, WHILE loops – Goto – On Goto statements – Event procedures – User defined procedures – Library functions – Numeric, String, Boolean and miscellaneous functions – Sub Main() procedure – User-defined functions – Public, Private Scope rules – Creating EXE files – Arrays – User-defined data type – Type statement – Control Arrays – Graphics handling – Using multiple forms – Activating a form – Multiple Document Interface – A simple MDI application

Unit 4 : Visual Basic Advanced Features Creating a Database in VB – Accessing an external database with Data Control – Object Linking and Embedding (OLE): Linking and embedding an excel worksheet with VB project – Using third-party controls in VB - Creating an Active X control project – Activating other applications from VB – Windows Application Program Interface functions (WINAPI)

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Text Books:

Visual Basic 6 from ground up” by Garry Cornell, TMH, 1999.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Advanced Unix Programming

Course Code: MCA503A

L-T Scheme: 3-1

Course Credits: 4

Introduction:

This course will prepare students to develop software in and for Linux/UNIX environments. Topics to be covered include basic operating system concepts, effective command line usage, shell programming, the C language, programming development tools, system programming, network programming.

Objectives:

To introduce the student to programming on Unix Systems. The student will learn the general issues of the Unix system and how to use them to build adequate and efficient programs. The student will learn how to program shell-scripts, how to program in C using all the facilities Unix can offer. Furthermore, the student will also learn to program network applications in a client/server way.

Learning Outcomes:

Knowledge:

1. To learn to develop software for Linux/UNIX systems.
2. To learn the C language and get experience programming in C.
3. To learn the important Linux/UNIX library functions and system calls.
4. To understand the inner workings of UNIX-like operating systems.
5. To obtain a foundation for an advanced course in operating systems.

Application:

1. Be able to transfer and apply programming approaches and techniques for solving specific problems using C and advanced Unix facilities.

Course Contents:

Unit 1: Organization of UNIX. User interface, Programmer interface.

Unit 2: The environment of UNIX process System calls. Process control, File related system calls. Process related system calls. Signals programming using system calls.

Unit 3: Advanced I/O multiplexing. Memory mapped I/O.

Unit 4: Interprocess communication: Pipes, shared memory, semaphores, messages. Advanced inter-process communications. Streams, Pipes, Open server.

Text Books

1. Your UNIX, The Ultimate Guide, Sumitava Das, TMH
2. Design of Unix Operating System, Bach, PHI

References

1. UNIX Programming Environment, Kernigham & Pike, PHI
2. Learning UNIX Operating System, Peek, SPD/O'REILLY
3. Learning the Vi Editor, Lamb, SPD/O'REILLY
4. Essentials Systems Administration, Frisch, SPD/O'REILLY

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Object Oriented Programming Using Java

Course Code: MCA503B

L-T Scheme: 3-1

Course Credits: 4

Introduction:

This course presents a conceptual and practical introduction to imperative and object oriented programming, exemplified by Java. As well as providing grounding in the use of Java, the course will cover general principles of programming in imperative and object oriented frameworks. The course should enable you to develop programs that support experimentation, simulation and exploration in other parts of the computer science curriculum (e.g. the capacity to implement, test and observe a particular algorithm).

Objectives:

In this course we will study the basic components of an operating system, their functions, mechanisms, policies and techniques used in their implementation and examples from popular operating systems. The way different modules in the operating system interact and work together to provide the basic services of an operating system. An introductory programming course for vocational computer majors and students transferring to universities in a business program. Course concentration includes object-oriented programming including data types, classes, objects, methods, decision and repetition structures, string and array manipulation, and Java applets.

Learning Outcomes:

Knowledge:

At the conclusion of the course, following learning objectives are expected to be achieved:

1. Explain what constitutes an object-oriented approach to programming and identify potential benefits of Object-oriented programming over other approaches.
2. Explain the benefits of object oriented design and the types of systems in which it is an appropriate methodology.
3. Apply an object-oriented approach to developing applications of varying complexities.
4. Augment a class definition using constructors, destructors, member functions, helper functions and custom input/output operators to add functionality to a programming solution.
5. Manage an object's resources using dynamic memory allocation and de-allocation to access data stored outside the object's memory.
6. Read from and write to files using objects from the standard input output library and custom file operators for future restoration.
7. Model specialization using single inheritance and abstract base classes to minimize code duplication.
8. Model polymorphic behavior using coercion, overloading, virtual functions and function templates to amplify reusability of code
9. knowledge of the structure and model of the Java programming language.

Application:

1. The lab work and homework portions of the course are intended to help you apply your understanding.
2. Basic programming techniques.
3. Design object oriented solutions for small systems involving multiple objects.
4. Apply good programming style and understand the impact of style on developing and maintaining programs.
5. Be able to justify programming style choices.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

6. Explain the steps in creating an executable program for a computer, including the intermediate representations and their purpose.
7. Trace the execution of program code to debug an application
8. Use the Java programming language for various programming technologies.
9. Develop software in the Java programming language.
10. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements.
11. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem

Course Contents:

Unit 1: Concepts of object oriented programming language, Major and minor elements, Object, Class, relationships among objects, aggregation, links, relationships among classes-association, aggregation, using, instantiation, meta-class, grouping constructs.

Unit 2: Difference between OOP and other conventional programming – advantages and disadvantages. Class, object, message passing, inheritance, encapsulation, polymorphism.

Unit 3: Basic concepts of java programming – advantages of java, byte-code & JVM, data types, access specifiers, operators, control statements & loops, array, creation of class, object, constructor, finalize and garbage collection, use of method overloading, this keyword, use of objects as parameter & methods returning objects, call by value & call by reference, static variables & methods, garbage collection, nested & inner classes, basic string handling concepts- String (discuss charAt(), compareTo(), equals(), equalsIgnoreCase(), indexOf(), length(), substring(), toCharArray(), toLowerCase(), toString(), toUpperCase(), trim(), valueOf() methods) & StringBuffer classes (discuss append(), capacity(), charAt(), delete(), deleteCharAt(), ensureCapacity(), getChars(), indexOf(), insert(), length(), setCharAt(), setLength(), substring(), toString() methods), concept of mutable and immutable string, command line arguments, basics of I/O operations – keyboard input using BufferedReader & Scanner classes.

Unit 4: Super class & subclasses including multilevel hierarchy, process of constructor calling in inheritance, use of super and final keywords with super() method, dynamic method dispatch, use of abstract classes & methods, interfaces. Creation of packages, importing packages, member access for packages.

Unit 5: Exception handling basics, different types of exception classes, use of try & catch with throw, throws & finally, creation of user defined exception classes. Basics of multithreading, main thread, thread life cycle, creation of multiple threads, thread priorities, thread synchronization, inter-thread communication, deadlocks for threads, suspending & resuming threads.

Unit 6: Basics of applet programming, applet life cycle, difference between application & applet programming, parameter passing in applets, concept of delegation event model and listener, I/O in applets, use of repaint(), getDocumentBase(), getCodeBase() methods, layout manager (basic concept), creation of buttons (JButton class only) & text fields.

Text Books

1. E. Balagurusamy – " Programming With Java: A Primer" – 3rd Ed. – , Tata Mc Graw Hill.
2. Herbert Schildt, Java: The Complete Reference (Tata McGraw Hill Education Private , 7th Ed).

References

1. Rambaugh, James Michael, Blaha – "Object Oriented Modelling and Design" – Prentice Hall, India.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

2. Ali Bahrami – "Object Oriented System Development" – Mc Graw Hill.
3. Deitel and Deitel – "Java How to Program" – 6th Ed. – Pearson.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Compiler Design

Course Code: MCA504A

L-T Scheme: 3-1

Course Credits: 3

Introduction:

This course examines compiler design concepts, phases of compiler in detail and cousins of compiler. The Topics to be covered (tentatively) include:

- Introduction to Compiler
- Lexical Analysis
- Syntax Analysis
- Type Checking
- Intermediate Code Generation
- Code Generation
- Code Optimization

Objectives:

In this course the students will study the introduction to the major concept areas of language translation and compiler design. To enrich the knowledge in various phases of compiler and its use, code optimization techniques, machine code generation, and use of symbol table. To extend the knowledge of parser by parsing LL parser and LR parser. To provide practical programming skills necessary for constructing a compiler. To provide practical programming skills necessary for constructing a compiler.

Learning Outcomes:

Knowledge:

1. To apply the knowledge of lex tool & yacc tool to develop a scanner & parser.
2. To design & conduct experiments for Intermediate Code Generation in compiler.
3. To design & implement a software system for backend of the compiler.
4. To deal with different translators.
5. To develop program to solve complex problems in compiler
6. To learn the new code optimization techniques to improve the performance of a program in terms of speed & space.
7. To acquire the knowledge of modern compiler & its features.
8. To learn & use the new tools and technologies used for designing a compiler
9. To use the knowledge of patterns, tokens & regular expressions for solving a problem in the field of data mining.

Application:

1. To apply compiler design techniques.
2. To relate theory of compiler design to practice
3. To learn to build domain specific generators
4. The students shall acquire the generic skills to design and implement a compiler along with analysis of practical aspects.

Course Contents:

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Unit 1: Introduction to Compiling

Compilers, Analysis-synthesis model, The phases of the compiler, Cousins of the compiler.

Lexical Analysis

The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of tokens, Finite automata, From a regular expression to an NFA, From a regular expression to NFA, From a regular expression to DFA, Design of a lexical analyzer generator (Lex).

Unit 2: Syntax Analysis

The role of a parser, Context free grammars, Writing a grammar, Top down Parsing, Non-recursive Predictive parsing (LL), Bottom up parsing, Handles, Viable prefixes, Operator precedence parsing, LR parsers (SLR, LALR), Parser generators (YACC). Error Recovery strategies for different parsing techniques.

Syntax directed translation

Syntax directed definitions, Construction of syntax trees, Bottom-up evaluation of S attributed definitions, L attributed definitions, Bottom-up evaluation of inherited attributes.

Unit 3: Type checking

Type systems, Specification of a simple type checker, Equivalence of type expressions, Type conversions

Run time environments

Source language issues (Activation trees, Control stack, scope of declaration, Binding of names), Storage organization (Subdivision of run-time memory, Activation records), Storage allocation strategies, Parameter passing (call by value, call by reference, copy restore, call by name), Symbol tables, dynamic storage allocation techniques.

Unit 4: Intermediate code generation

Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).

Code optimization

Introduction, Basic blocks & flow graphs, Transformation of basic blocks, Dag representation of basic blocks, The principle sources of optimization, Loops in flow graph, Peephole optimization.

Code generations

Issues in the design of code generator, a simple code generator, Register allocation & assignment.

Text Books

1. Aho, Sethi, Ullman - "Compiler Principles, Techniques and Tools" - Pearson Education.
2. Holub - "Compiler Design in C" – PHI
3. Tremblay and Sorenson Compiler Writing-McgrawHill International .
4. Chattopadhyay , S- Compiler Design (PHI)

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: E-Commerce

Course Code: MCA504B

L-T Scheme: 3-0

Course Credits: 3

Introduction:

This course examines E-Commerce concepts, and Business technique basics. The Topics to be covered (tentatively) include:

- Introduction
- Business to Business E-Commerce
- Legal issues
- Security Issues
- Business to Consumer E-Commerce
- E-business

Objectives:

In this course we will study the basic components of an E-Commerce, their functions, mechanisms, policies and techniques used in their implementation and examples from popular E-Commerce Application. The way different modules in the E-Commerce interact and work together to provide the basic services of an E-Commerce.

Learning Outcomes:

Knowledge:

1. Understand the theory and logic behind the design and construction of E-Business.
2. You will differentiate between various E-commerce functionalities in terms of performance.
3. Become aware of the issues in the management of resources like EDI, SET, RSA etc.
4. Know the problems in the design of E-Commerce and study the probable solutions.
5. Understanding various type of Business policies.
6. An overview of advanced E-Commerce and compare the technical aspects of all the advanced E-Commerce.

Application:

1. To develop, implement, and debug various VB & ASP.
2. To develop, implement, and demonstrate the algorithms of EDI.
4. To develop E-Business.

Course Contents:

Unit 1: Definition, Scope of E-Commerce, Hardware requirements, E-Commerce and Trade Cycle, Electronic Markets, Electronic Data Interchange and Internet Commerce.

Unit 2: Electronic Markets, Electronic Data Interchange (EDI): Technology, Standards (UN/EDIFACT), Communications, Implementations, Agreements, Security, EDI and Business, Inter-Organizational E-commerce.

Unit 3: Risks: Paper Document vs. Electronic document, Authentication of Electronic document, Laws, Legal issues for Internet Commerce: Trade marks and Domain names, Copyright, Jurisdiction issues, Service provider liability, Enforceable online contract.

Unit 4: Security Solutions: Symmetric and Asymmetric Cryptosystems, RSA, DES, and Digital Signature, Protocols for secure messaging, Secure Electronic Transaction (SET) Protocol, Electronic cash over internet, Internet Security.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Unit 5: Consumer trade transaction, Internet, Page on the Web, Elements of E-Commerce with VB, ASP,SQL.

Unit 6: Internet book shops, Software supplies and support, Electronic Newspapers, Internet Banking, Virtual Auctions, Online Share Dealing, Gambling on the net, E-Diversity, Case studies through internet.

Text Books

1. E- Commerce-Strategy, Technologies & Applications by David Whitley, TMH.
2. Beginning E-Commerce with VB, ASP, SQL Server7.0 & MTS by Mathew Reynolds, Wrox Publishers.

References

1. E-Commerce-The cutting edge of business by Kamlesh K.Bajaj, TMH.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Values & Ethics in Profession

Course Code: HU501

L-T Scheme: 3L+1T

Course Credits: 3

Introduction:

This course teaches students the basic principles of Values and Ethics within profession. These deals mainly with

- Values in professional life
- Ethics in professional life
- Resources depletion
- Conservation of resources for future generations
- Technology transfer
- Eco friendly Technology
- Value crisis in society
- Present society without values and Ethics.

Objectives:

This course relates to the present world and teaches students the need and importance of values and the problems faced by the present society in terms of depletion of natural resources and how to control the same for the sake of future generations.

Learning Outcomes:

Knowledge:

1. Understand the present scenario of degradation of values and Ethics system
2. Depletion of resources and how to conserve them.
3. Club Of Rome and what all stalwarts have thought to improve the situation
4. Sustainable Development.
5. Value spectrum of a good life
6. Present societal changes in terms of values and ethics
7. What steps to be taken to improve value system?
8. How to avoid conflicts to have a peaceful job life.
- 9.

Course Contents:

Unit 1: Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: Sustainable development Energy Crisis: Renewable Energy Resources Environmental degradation and pollution. co-friendly Technologies. Environmental Regulations, Environmental Ethics Appropriate Technology Movement of Schumacher; later developments Technology and developing notions. Problems of Technology transfer, Technology assessment impact analysis. Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology.

Unit 2: Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond.

Unit 3: Values Crisis in contemporary society Nature of values: Value Spectrum Of good life Psychological values: Integrated personality; mental health Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution. Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity Moral and ethical values: Nature of moral judgments; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

Books:

AN Tripathi ,Human values in the Engineering Profession, Monograph published byIIM,Calcutta1996

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: System Administration & Linux Lab

Course Code: MCAE592A

L-T-P scheme: 0-0-3

Course Credit: 2

Objectives:

This course introduces basic understanding of UNIX OS, UNIX commands and File system and to familiarize students with the Linux environment. To make student learn fundamentals of shell scripting and shell programming. Emphases are on making student familiar with UNIX environment and issues related to it..

Learning Outcomes:

Upon completion of this course, the student will be able to:

1. You will be able to run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system).
2. You will be able to run C / C++ programs on UNIX.
3. You will be able to do shell programming on UNIX OS.
4. You will be able to understand and handle UNIX system calls.

Course Contents:

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

Exercise No.1: Installation of Unix/Linux operating system.

Exercise No. 2: Write a C program to emulate the UNIX ls-l command.

Exercise No. 3: Write a C program to check the given integer is prime or not.

Exercise No. 4: Write a C program to display Largest of three numbers.

Exercise No. 5: Write a shell script program to display list of user currently logged in.

Exercise No. 6: Write a shell script program to display HELLO WORLD

Exercise No. 7: Write a shell script program to develop a scientific calculator

Exercise No. 8: Write a grep/egrep script to find the number of words character, words and lines in a file.

Exercise No. 9: Shell programming.

Exercise No. 10: Write a shell script program to display the process attributes.

Exercise No. 11: Write a shell script program to check variable attributes of file and processes.

Exercise No. 12: Installation of VirtualBox (VMWare) on a PC having other operating system.

Exercise No. 13: Shell Script program for changing process priority.

Text Book:

1. Maurice J. Bach, Design of the UNIX Operating System, PHI.

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 compiler in Windows XP or Linux Operating System.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Windows Programming with VB Lab

Course Code: MCAE592B

L-T-P scheme: 0-0-3

Course Credit: 2

Objectives:

- Students will learn to evaluate engineering problems, formulate one or more solution techniques or algorithms, and code the solution using Microsoft Visual Basic for Applications (VBA) software and connect database with Microsoft Access.
- Professionalism in completing and presenting laboratory exercises is emphasized.

Learning Outcomes: Student learns about Visual Basic's Integrated Development Environment (IDE).

- Student write Visual Basic programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, and inheritance, and polymorphism.
- Understand windows applications using forms, controls, and events.
- Understand design, create, build, and debug Visual Basic applications.
- Understand database design, connectivity with backend tool.
- Create one and two dimensional arrays for sorting, calculating, and displaying of data.
- Write and apply procedures, sub-procedures, and functions to create manageable code.
- Write and apply decision structures for determining different operations.
- Analyze a given problem and implement an algorithm to solve the problem.
- Improve upon a solution to a problem.
- Implement the Visual Basic language constructs in the right way.
- Design, develop and test Applications written in Visual Basic.

Course Contents:

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

- i. Controls & Properties. Idea about Labels, Buttons, Text Boxes.
- ii. Data basics, Different type variables & their use in VB,
- iii. Sub-functions & Procedure details, Input box () & MsgBox ().
- iv. Making decisions, looping
- v. List boxes & Data lists, List Box control, Combo Boxes, data Arrays.
- vi. Frames, buttons, check boxes, timer control,
- vii. Programming with data, ODBC data base connectivity.
- viii. Data forms Wizard, query, and menus in VB Applications,
- ix. Graphics.

Text Book:

1. Greg Perry, Snajaya Hettihewa, "SAMS Teach Yourself Visual Basic 6 in 24 Hours", Pearson Education.
2. Tim Anderson, "Visual Basic 6 in Easy Steps", Dreamtech Press.

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 compiler in Windows XP or Linux Operating System.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Project Part-II

Course Code: MCA591

L-T –P Scheme: 0-0-12

Course Credits: 9

Project: an activity where the participants have some degree of *choice* in the outcome. The result is complete and functional, that is, it has a beginning, middle and end. Usually, it spans multiple lab periods and requires work outside scheduled lab periods. Since there are choices in implementation, *design* is inherently a component of a project. A project is inherently different from an *analysis* or *exercise*, in which the solution has a predictable form. Projects span a wide variety of possibilities: design and build, identify a system, do a forensic analysis, evaluate a product or assess some environmental situation.

Program Objective 1

Graduates shall make their way to the society with proper scientific and technical knowledge in mechanical engineering.

Program Objective 2

Graduates shall work in design and analysis of mechanical systems with strong fundamentals and methods of synthesis.

Program Objective 3

Graduates shall adapt to the rapidly changing environment in the areas of mechanical engineering and scale new heights in their profession through lifelong learning.

Program Objective 4

Graduates shall excel in career by their ability to work and communicate effectively as a team member and/or leader to complete the task with minimal resources, meeting deadlines.

Program Outcomes:

1. Ability to apply knowledge of mathematics, science and mechanical engineering fundamentals for solving problems.
2. Ability to Identify, formulate and analyze mechanical engineering problems arriving at meaningful conclusions involving mathematical inferences.
3. Ability to design and develop mechanical components and processes to meet desired needs considering public health, safety, cultural, social, and environmental aspects.
4. Ability to understand and investigate complex mechanical engineering problems experimentally.
5. Ability to apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of the limitations.
6. Ability to understand the effect of mechanical engineering solutions on legal, cultural, social, public health and safety aspects./li>

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

7. Ability to develop sustainable solutions and understand their impact on society and environment.
8. Ability to apply ethical principles to engineering practices and professional responsibilities.
9. Ability to function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
10. Ability to comprehend, design documentation, write effective reports, make effective presentations to the engineering community and society at large.
11. Ability to apply knowledge of engineering and management principles to lead teams and manage projects in multidisciplinary environments.
12. Ability to engage in independent and life-long learning in the broad context of technological changes and advancements.