UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: UNIX & Shell Programming
Course Code: MCA301
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

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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: Cloud Computing
Course Code: MCA302
L-T Scheme: 3-0 **Course Credits: 3**

Objectives: The course covers the fundamental concepts and practical aspects of Service Oriented Architecture. The current software development and delivery model is service oriented in nature. The applications are inherently getting distributed and shared by multiple clients. Thus, there is a need to get an insight into service oriented architectures.

Learning Outcome: After having undergone the course, the student shall be able to understand the issues related with detailed design aspects and standards of SOA.

Course Contents:
Unit-1: SOA Fundamentals, Technologies, Benefits, Challenges and basic mechanisms associated with other computing service (Delivery models - SAS, IAS & PAS, Common Cloud deployment models and cloud characters), Security threats and mechanisms.

Unit-2: Introduction and fundamental of SOA, Benefits and Goals, SOA Manifesto, SOA and network management architecture, Service as web services, Discovery and publishing of web services, Service roles, Service models, Description of services with WSDL, Messaging with SOAP.

Unit-3: Exchange patterns of message, Service activity, Coordination, Composition, Types, Activation and registration process, Business activities, Orchestration, Composition of heterogeneous web services Choreography, Addressing, Reliable messaging, Correlation, Policies, Notification and eventing.

Unit-4: Security threats and mechanisms, Essential techniques, Patterns, Security architecture for service oriented solutions, Infrastructure, Middleware, Multitenancy concepts.

Text Books
1. Service Oriented Architecture, Concepts Technology and Design, Thomas Erl,
Pearson Education, 2008
2. SOA in Practice: The Art of Distributed System Design, Nicolai M. Josuttis,
O'Reilly, 2007

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Course Description

Title of Course: Intelligent System
Course Code: MCA303
L-T: 3-1 **Course Credits: 4**

Objective: Introducing concepts, models, algorithms, and tools for development of intelligent systems. Example topics include artificial neural networks, genetic algorithms, fuzzy systems, swarm intelligence, ant colony optimization, artificial life, and hybridizations of the above techniques. Students will be able to sense these techniques from a machine learning perspective. This domain is called Computational Intelligence, and is a numerical interpretation of biological intelligence.

Learning Outcome: On the completion of this course, the student will have:

- An understanding of fundamental computational intelligence and machine learning models.
- Implemented neural networks, genetic algorithms, and other computational intelligence and machine learning algorithms.
- Applied computational intelligence and machine learning techniques to classification, prediction, pattern recognition, and optimization problems.

Course Contents:

Computational intelligences, agents, example application domains, Representation and reasoning systems, Datalog, syntax and semantics, variables, queries, answers, recursion. Proofs, soundness, completeness, top-down and bottom-up reasoning, function symbols, Searching, graphics, generic search engine, blind search strategies, heuristic search, A* search. Pruning the search space, search direction, iterative deepening, dynamic programming, constraint satisfaction, consistency algorithms, hill climbing, randomized algorithms. Knowledge representation issues, defining a solution, choosing a representation, semantic networks, frames, primitive and derived relations. Equality, inequality, unique names assumption, complete knowledge assumption, negation as failure. Actions and planning. STRIPS representation, situation calculus, forward planning, resolution and planning. The STRIPS planner, Midterm, Regression Planning. A building situated robots Robot Architectures

Textbooks:

1. Computational Intelligence : Concepts to Implementations by Eberhart & Shi

Reference Books:

1. Introduction to Genetic Algorithms by Melanie Mitchell
2. Handbook of Genetic Algorithms by Davis
3. Machine Learning by Tom Mitchell

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Operating System & System Software
Course Code: MCA304
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.

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Course Description

Title of Course: Management Accounting
Course Code: HU301
L-T: 2-0-0 **Course Credits: 2**

Course Objectives:

This course provides the students an understanding of relevance of cost in managerial decision making. This course provides a comprehensive knowledge of classification of cost, apportionment of overheads, process costing, activity based costing, segmental reporting, preparation of budgets and cost -volume profit analysis for decision making and cost control and

Course Outcome:

At the end of the course, students are able to

1. Explain the concepts of unit costing activity based costing, apportionment of overheads, process costing, segmental reporting and budgeting.

2. Exhibit skills in Identifying, Measuring and analyzing costing data.

3. Provide alternative solutions to cost control and related cost management applications in practice.

Unit I

Background - Nature of Management Accounting

Financial Analysis - Cash Flow Statement (as per AS3), Financial Statements Analysis

Unit II

Cost Accumulation - Fundamentals of Job-Order Batch & Process Costing, Variable Costing and Absorption (Full) Costing, Activity Based Costing System

Unit III
Profit Planning - Cost -Volume-Profit Analysis, Budgeting and Profit Planning, Flexible Budgeting

Unit IV
Cost Control - Standard Costs and quality Costs, Cost Variance Analysis, Revenue and Profit Variance Analysis, Responsibility Accounting

Relevant Costing – Introduction – Relevant Costs and Revenues- Cost Concepts – Outsourcing Decision – Decision to accept or reject a special order – Decision to continue or abandon a project

Unit V

Total Cost Management – Introduction – TCM and Business competitive edge - TCM Principles and implementation

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Course Description

Text Books:

1) Jiambalvo, lames. (2004), Managerial Accounting, 2nd Edition, Wiley India Publications, New Delhi.

Reference Books:

1) Khan, MY. Jain, P K (2000), Management Accounting, 3rd Edition; Tata McGraw Hill, New Delhi.

2) Jain, S P. Narang, K L. (2012), Cost Accounting: Principles and Practice, 23rd. Edition, Kalyani Publishers, ludhiana.

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Reference:

Hansen & Mowen: Cost Management, Thomson Learning

Kaplan: Advanced Management accounting, Pearson education

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Statistics & Numerical Techniques
Course Code: M301
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:

Objectives:
The primary goal is to provide engineering majors with a basic knowledge of numerical methods including: root finding, elementary numerical linear algebra, integration, interpolation, solving systems of linear equations, curve fitting, and numerical solution to ordinary differential equations.'C' language and SCILAB is the software environment used for implementation and application of these numerical methods. The numerical techniques learned in this course enable students to work with mathematical models of technology and systems.

Learning Outcomes:

Knowledge:
1. Students would be able to assess the approximation techniques to formulate and apply appropriate strategy to solve real world problems.
2. Be aware of the use of numerical methods in modern scientific computing.
3. Be familiar with finite precision computation.
4. Be familiar with numerical solution of integration, linear equations, ordinary differential equations, interpolations.

Application:
1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs within realistic constraints
4. such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
5. An ability to function on multidisciplinary teams

Course Contents:
Approximation in numerical computation, Truncation and rounding errors, Interpolation: Lagrange's interpolation, Newton forward and backward differences interpolation, Newton divided difference. Numerical Integration: Trapezoidal rule, Simpson 1/3 rule,Weddle's rule. Numerical solution of a system of linear equation: Gausse limination method, Matrix inversion, LU factorization method ,Gauss- Jacobi method, Gauss Seidel method. Algebraic Equation: Bisection method, Secant method, Regula–Falsi method, Newton Raphson method, Method of Iteration.Numerical solution of ordinary differential equation: Taylor'sseries method, Euler'smethod, Runga– kutta method, predictor–correction method.

Books:
1. NumericalMathematicalAnalysis, Sastry,PHI

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Course Description

Subject Name: Statistics Numerical Method and Algorithm Subject Code-BCA401
Year: 2nd Year Semester: Forth

2. NumericalMathematicalAnalysis (ByJ.B.Scarborough)
3. NumericalAnalysis&Algorithms,PradeepNiyogi,TMH
4. NumericalMathematicalAnalysis, Mathews,PHI
5. Clanguageand NumericalMethods(ByC.Xacier)
6. NumericalAnalysis(ByS.AliMollah)
7. IntroductoryNumericalAnalysis (ByDutta&Jana)
8. NumericalMethods(Problems and Solution) (ByJain,Iyengar&Jain), NewAgeInternational
9. ComputerOriented NumericalMethods,N.Dutta,VIKAS
10. NumericalMethods,Arumugam,Scitech
11. NumericalMethodsin ComputerApplications,P.U.Wayse.EPH.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Unix LAB
Course Code: MCA391
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 complier in Windows XP or Linux Operating System.

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Course Description

Title of Course: Statistics & Numerical Analysis Lab
Course Code: M392
L-T–P Scheme: 0-0-3 **Course Credits: 2**

Introduction:

This course offers an advanced introduction to numerical linear algebra. Topics include direct and iterative methods for linear systems, eigen value decompositions and QR/SVD factorizations, stability and accuracy of numerical algorithms, the IEEE floating point standard, sparse and structured matrices, preconditioning and linear algebra software. Problem sets require some knowledge of MATLAB

Objectives:

1. To give an overview of what can be done.
2. To give insight into how it can be done.
3. To give the confidence to tackle numerical solutions.
4. An understanding of how a method works aids in choosing a method. It can also provide an indication of what can and will go wrong, and of the accuracy which may be obtained.
5. To gain insight into the underlying physics.
6. The aim of this course is to introduce numerical techniques that can be used on computers, rather than to provide a detailed treatment of accuracy or stability.

Learning Outcomes:

Knowledge:

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

1. Demonstrate skills in using computer programming tools for engineering calculations.
2. Demonstrate ability to construct simple computer algorithms using a programming tool.
3. Apply simple numerical methods to solve mathematical problems with relevance to civil engineering.
4. Appreciate the limitations and the applicability of the numerical methods.
5. Apply computer-based numerical methods for the solution of engineering problems.

Course Contents:

1. Assignments on Newton forward /backward, Lagrange's interpolation.
2. Assignments on numerical integration using Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule.
3. Assignments on numerical solution of a system of linear equations using Gauss elimination and Gauss-Seidel iterations.
4. Assignments on numerical solution of Algebraic Equation by Regular-falsi and Newton Raphson methods.
5. Assignments on ordinary differential equation: Euler's and Runga-Kutta methods.
6. Introduction to Software Packages: Matlab / Scilab / Labview / Mathematica.

Text Books:

1. Introductory method of numerical analysis, Sastry S.S
2. Computer Programming in fortran 77, Rajaraman V
3. Numerical methods: for scientific and engineering computation,Mahinder Kumar Jain

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Course Description

Title of Course: Computer Networks Lab
Course Code: MCA392
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:
This practical course provides students with hands on training regarding the design, troubleshooting, modeling and evaluation of computer networks. In this course, students are going to experiment in a real and simulation based test-bed networking environment, and learn about network design and troubleshooting topics and tools such as: network addressing, Address Resolution Protocol, basic troubleshooting tools (like ping, ICMP), IP routing (e.g. RIP), TCP and UDP,DHCP,ACL and many others. Student will have the opportunity to build some simple networking models using the tool and perform simulations that will help them evaluate their design approaches and expected network performance.

Learning Outcomes: The students will have a detailed knowledge network topology, Local area network, IP addressing, familiarization with network simulator, idea about networking devices, network cable and connectors, different types routing protocols, concept of remote access and different types of application layer protocol. Upon the completion of Computer network practical course, the student will be able to:

- **Learn** various network commands.
- **Understand** and implement basic of Network and Network Topology.
- **To get** idea about IP addressing schemes.
- **Understand** the benefits of network.
- **Configure** and simulate various protocols.
- **Access** remote desktop.
- **Connect** to different computer using LAN.
- **Understand** the concepts of access control.

Course Contents:
Exercises that must be done in this course are listed below:
Exercise No.1: Study of different types of Network cables and practically implements the cross-wired cable and straight through cable using clamping tool.
Exercise No. 2: Familiarization with some network devices.
Exercise No. 3: Study of Network IP.
Exercise No. 4: Connect the computers in LAN.
Exercise No. 5: Introduction to Packet Tracer.
Exercise No. 6: Configure network topology using packet tracer.
Exercise No. 7: Configure network topology using packet tracer to find the routing path by IPRoute Command.
Exercise No. 8: Network Configuration using distance vector routing protocol.
Exercise No. 9: Configuration of DHCP Protocol
Exercise No. 10: Telnet Configuration.
Exercise No. 11: Configuration of Access Control List.

Text Book:
1. B. A. Forouzan – "Data Communications and Networking (3rd Ed.) " – TMH
Reference Book:
1. Authorized Self-Study Guide "Interconnecting Cisco Network Devices, Part 1(ICND1), 2nd Edition, January, 2008.

Recommended Systems/Software Requirements:
1. CAT-5/CAT-6 Cables, RJ 45, Cutter, Clamping Tool, Router , Switch and Hub.
2. Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
3. Turbo C or TC3 complier in Windows XP or Linux Operating System.