



Department of Computer Science
University of Lucknow, Lucknow
M.Sc. (Computer Science) Second Semester Syllabus

Course Title: Advance Operating system	Objective: The objective of the course to teach various operating systems such as Unix, Mac and Android to use computer in efficient manner. This course is also useful to understand the structure and organization of operating system, process and their synchronization and scheduling too.
Course Code: MCS -201	
Paper Number: I Credit : 04	
Maximum Marks: 100	

Unit –I

Operating system and its necessity, Unix kernel architecture diagram, Major Command line User interface operating systems, GUI based operating systems, Single and Multiprocessor system, symmetric and asymmetric multiprocessing, symmetric and asymmetric clustering, System Call, MS-DOS layer structure, UNIX system structure, microkernel architecture, Hybrid Systems,

Unit –II

Mac OS X, Mobile operating system: iOS, architecture of Apple's iOS, Android and its architecture, Linux Process States and System Calls, Process Groups, Sessions, Foreground and Background Processes, Operating system Debugging, System Boot, Process States diagram, process scheduling with queuing diagram representation, process schedulers and context switching.

Unit –III

Process creation and termination, inter-process communication, synchronization and buffering Signals, Pipes and Naming Pipes (FIFOs), Threads and pthread library, Mutexes and Condition Variables, Semaphores, Producer-Consumer Problem

Unit –IV

Study and Solutions using mutexes, condition variables and semaphores, File and File Meta-data, File Naming Systems, File System Operations, File System Implementation, File System Structures, Booting an OS, File System Optimisation, Devices and Types of Devices, Terminal, Disk,

Unit –V

SCSI, Tape and CD devices, Unification of Files and Devices, Device Drivers: Concepts and Implementation Details, Resource Management Issues, Types of Resources, Integrated Resource Scheduling, Queuing Models of Scheduling, Protection of Resources –hardware, software, and attacks, Security Policies.

Outcome of Course:

At the end of this Course, the successful students will be able to:

- Make the computer system convenient to use in an efficient manner.
- Provide users a convenient interface to use the computer system.
- Manage the resources of a computer system.
- Provide efficient and fair sharing of resources among users and programs.

Recommended Books

- [1] Abaaham Silberschatz, peter B Galvin and Gerg Gagne, "Operating system concepts", Ninth edition, WILEY publication, 2015.
- [2] Charles Crowley, "Operating Systems: A Design-Oriented Approach", Third edition, Tata McGraw-Hill, 2011.
- [3] Richard Stevens, Stephen Rago, "Advanced Programming in the Unix Environment", fourth edition, Addison-Wesley., 2007.

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Department of Computer Science
University of Lucknow, Lucknow
M.Sc. (Computer Science) Second Semester Syllabus

Course Title: Software Engineering

Course Code: MCS -202

Paper Number: II Credit : 04

Maximum Marks: 100

Objective: The objective of this course to learn software development process and models, in order to develop quality software with in specified cost and time. It also provides the knowledge of testing tools and management.

Unit –I

Introduction to System Engineering, A layered technology, A process framework, Systems and their Environment, Process models and System Modelling, System Engineering Process, System Procurement.

Unit –II

Software Processes: Software Process Models, Process Iteration, Software Specification, Design and Implementation. Building the analysis model, Software Requirements: Functional and Non-Functional Requirements, User Requirements, System Requirements, Software Requirements Document, Requirements Engineering Processes:

Unit –III

Feasibility Studies, Requirements Elicitation and Analysis, Requirements Validation, Requirements Project Management, Project planning, Project scheduling, Design within the context of Software Engineering, Design concerts, Design models, Pattern-based software design.

Unit –IV

Software architecture, data design, Architectural styles and patterns, Architectural design, mapping dataflow into software architecture, User interface analysis and design, Verification and Validation: Verification and Validation Planning, Software Inspections, Automated Static Analysis, Clean-room Software Development

Unit –V

Software Testing: Defect Testing, Integration Testing, Object-Oriented Testing, Testing Workbenches, Software Cost estimation, availability and Reliability.

Outcome of Course:

At the end of this Course, the successful students will be able to:

- Understand and demonstrate basic knowledge in software engineering.
- Identify requirements, analyse and prepare models.
- Plan, schedule and track the progress of the projects.
- Design & develop the software projects.
- Identify risks, manage the change to assure quality in software projects.
- Apply testing principles on software project and understand the maintenance concepts.

Recommended Books

- [1] Ian Sommerville, "Software Engineering", Sixth edition, Addison Wesley publication, 2000.
- [2] Roger S. Pressman, "Software Engineering, eight edition, McGRAW-HILL publication, 2010.
- [3] K. K. Aggarwal and Y. Singh, "Software Engineering", Third edition, New Age publication, 2008.

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Department of Computer Science
University of Lucknow, Lucknow
M.Sc. (Computer Science) Second Semester Syllabus

Course Title: Compiler Design

Course Code: MCS -203

Paper Number: III Credit : 04

Maximum Marks: 100

Objective: The Objective of this course is to provide a comprehensive knowledge about compiler construction as well as to learn finite automata and construction of canonical LR parsing techniques, implementation of block structure languages.

Unit –I

Introduction to compilers.- Compilers and Translators - Assembly language Macros – Structure of compilers - Compiler writing tools - Boot strapping. Lexical analysis - Role of lexical analyzer - Regular expression, Deterministic finite automata, Nondeterministic Finite automata, Equivalence of Deterministic and Nondeterministic Finite Automata.

Unit –II

Finite Automata - Implementation of lexical analyzer -context free grammars - Derivation and parse trees Parser - Shift reduce parsing - Operator precedence parsing -Top down parsing – Predictive parsers - LR Parsers - Constructing SLR Parsing tables, Algebraic Laws for Regular Expression, Associativity and Commutativity, Identities and Annihilators, Distributive Laws, Idempotent Law.

Unit –III

Constructing canonical LR Parsing tables - Constructing LALR Parsing tables - Using ambiguous grammar. Syntax directed translation schemes Symbol table - Contents of symbol table - Data structures for symbol tables Implementation of simple stack allocation scheme.

Unit –IV

Implementation of block structure languages - Storage allocation in FORTRAN - Storage allocation in block structured language Errors - Lexical phase errors – Syntactic phase errors - Semantic errors.
Code optimization: The Principle sources of optimization - Loop optimization.

Unit –V

DAG Representation in basic blocks Code generation - Problem in code generation - A simple code generator - Register allocation and assignment - Code generation from DAG's - Peephole optimization, Pumping Lemma for Regular Languages, Application for Pumping Lemma, Closure Properties of Regular Languages.

Outcome of Course:

At the end of this Course, the successful students will be able to:

- Understand how real compilers work and how high-level language program are systematically translated into low-level assembly;
- Implement compiler analysis, transformation and code generation approaches based on real compiler infrastructures;

Recommended Books

- [1] Aho, Lam, Sethi, and Ullman, "Compilers: Principles, Techniques and Tools", Second Edition, Pearson Publication, 2006.
- [2] A.V. Aho and Jeffery Ullman, "The Principles of Compiler Design", Second edition, Narosa Publishing House, 2008.
- [3] John E JHopcroft, Rajeev Motwani, Jeffrey D Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Third edition, 2013.

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Paper-IV Course Code: MCS 204*

In the M.Sc. Computer science Course paper code MCS 204 is reserved for value added courses, in which students are required to choose one paper from the given list (below).

List of valued added course

1. MCS-204VA- Project Management
2. MCS-204VB-Constitution of India
3. MCS-204VC-Social Engineering
4. MCS-204VD- Maintenance management

**Department of Computer Science
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Course Title: Project Management	Objective: The objective of this course is to make student understand the concepts of Project Management for planning to execution of projects.
Course Code: MCS -204VA	
Paper Number: IV Credit : 04	
Maximum Marks: 100	

Unit -I

Basics of Project Management: Introduction, Need for Project Management, Project Management Knowledge Areas and Processes, The Project Life Cycle, The Project Manager (PM), Phases of Project Management Life Cycle, Project Management Processes, Impact of Delays in Project Completions, Essentials of Project Management Philosophy, Project Management Principles

Unit -II

Project Identification and Selection: Introduction, Project Identification Process, Project Initiation, Pre-Feasibility Study, Feasibility Studies, Project Break-even point.

Unit -III

Project Planning: Introduction, Project Planning, Need of Project Planning, Project Life Cycle, Roles, Responsibility and Team Work, Project Planning Process, Work Breakdown Structure (WBS).

Unit -IV

Organisational Structure and Organisational Issues: Introduction, Concept of Organisational Structure, Roles and Responsibilities of Project Leader, Relationship between Project Manager and Line Manager, Leadership Styles for Project Managers, Conflict Resolution, Team Management and Diversity Management, Change management.

Unit -V

Project Risk Management: Introduction, Risk, Risk Management, Role of Risk Management in Overall Project Management, Steps in Risk Management, Risk Identification, Risk Analysis, Reducing Risks.

Outcome of Course:

At the end of this Course, the students will be able to:

- Manage the cost, timing, and quality of the project
- Understand project characteristics and various stages of a project.
- Use the various techniques for Project planning, scheduling and execution.

Recommended Books

- [1] Royce, "Software Project Management", First edition, pearson, 2002.
- [2] Bob Hughes, Mike Cotterell and Rajib Mall, "Software Project Management", sixth edition, 2017.
- [3] Rishabh Anand, "Software Project Management", First Edition, S.K. Kataria & Sons, 2013

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Department of Computer Science
University of Lucknow, Lucknow
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Course Title: Constitution of India		Objective: The objective of this course is to provide basic information about the Indian constitution to student and making them aware about their role and ethical responsibility towards society. With this course student know human rights and its implication procedures.
Course Code: MCS -204VB		
Paper Number: IV	Credit : 04	
Maximum Marks: 100		
Unit –I		
Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.		
Unit –II		
Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties, Union Executives – President, Prime Minister Parliament Supreme Court of India.		
Unit –III		
State Executives – Governor, Chief Minister, State Legislature High Court of State, Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th & 91st Amendments.		
Unit –IV		
Special Provision for SC & ST, Special Provision for Women, Children & Backward Classes Emergency Provisions, Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co – Operative Societies..		
Unit –V		
Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.		
Outcome of Course:		
At the end of this Course, the students will be have:		
<ul style="list-style-type: none">• General knowledge about constitutions of India.• Understanding about state and central policies together with fundamental duties.• Understanding about Electoral Process and special provisions.• Understanding about powers and functions of Municipalities, Panchayats and Cooperative Societies		

Recommended Books

- [1] P.K. Agrawal, K.N. Chaturvedi, "The constitution of India", Kindle edition, Prabhat Prakashan, 2019
[2] Durga Das Basu, "Constitution of India", 23rd edition, LexisNexis, 2018.


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Department of Computer Science University of Lucknow, Lucknow M.Sc. (Computer Science) Third Semester Syllabus	
Course Title: Social Engineering	Objective: The objective of this course is to make student aware about the importance of social media nowadays and its impacts on society. Further, to provide the knowledge to students about how to handle their social media accounts.
Course Code: MCS -204VC	
Paper Number: IV Credit : 04	
Maximum Marks: 100	
Unit –I	
The Beginnings of Social Media Intelligence, What Is Social Media Monitoring, Anecdotal Referencing of Social Media Comments, Text Mining, Using Social Media as an Early Warning System, Fundamentals of Opinion Formation, Affecting Opinion versus Biasing Expression, How Do We Form Opinions,	
Unit –II	
Posters versus Lurkers, What Motivates Us to Post, Posting Motivations and Selection Effects, Implications for Social Media Intelligence, The Social Effects of Strangers, How Does Social Context Affect Our Behaviour, How Influential Is the Social Context, How Does Social Context Affect Opinion Expression, Differentiating Our Opinions, Multiple Audience Effects, Can We Trust the Wisdom of Crowds.	
Unit –III	
Building Social Media Intelligence into Our Strategies, How Can Social Media Intelligence Help Integrate an Organization's Strategy, Multichannel Strategies, Rapid Response Systems, Integrated CRM, Leveraging Social Data, Seeding Strategies.	
Unit –IV	
Moving from Social Media, Monitoring to Social Media Intelligence, Social Media Intelligence Today, Social Media Intelligence, Tomorrow Building on the Science of Opinion Tapping into Opinion Ecosystems, Developing an Integrated Strategy.	
Unit –V	
Do Expectations Affect Opinion, How Do Expertise and Knowledge Influence, How We Form Opinions, Opinion Formation in a Social Context, Implications for Social Media Intelligence.	
Outcome of Course:	
At the end of this Course, the students will be able to:	
<ul style="list-style-type: none">• Know how to handle their social media account.• Protect their privacy.• Be safe during their virtual relations.• Protect themselves by not to reveal their personal information.	

Recommended Books

- [1] Wendy W. Moe, "Social Media Intelligence", first edition, Cambridge University Press, 2014.
- [2] Gail Z. Martin, "The Essential Social Media Marketing Handbook: A New Roadmap for Maximizing Your Brand, Influence and Credibility", first edition, Rupa Publications India, 2018

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Course Title: Maintenance Management

Course Code: MCS -204VD

Paper Number: IV Credit : 04

Maximum Marks: 100

Objective: The objective of this course is to encourage to students to develop quality software in order to ensure their reliability, maintenance and reusability.

Unit –I

Issues in software Maintenance, users perception of software maintenance Issues, Maintainers perceptions of software maintenance issues, software maintenance body of Knowledge, software maintenance definition, difference between operations, development and Maintenance, Which organization is responsible for software maintenance, software maintenance standards, software maintenance categories.

Unit –II

Maintenance measurement, maintenance process measurement, software product measurement, service measurement, internal service-level agreement, maintenance service contracts-external service agreement, software maintenance benchmarking.

Unit –III

Process and maturity, Does CMMi Cover software maintenance adequately, Difference between maturity model, Quality standards and evaluation method, choosing between ISO9001 and CMMi, The evaluation method and evaluation types,

Unit –IV

The maturity model, trillium Design Process, ISO 15504 Design Process, CMMi for Service Design Process, Initial validation of Maturity model, IT service CMM Model- Initial validation approach, ISO 15504 model-Initial validation approach, CMMI for Service Model- Initial validation approach.

Unit –V

Maturity Model architecture, The ISO 15504 (SPICE) Model, An Inventory of Software engineering Maturity Models, classification of software maintenance process, software maintenance operational process, software maintenance support process, software maintenance organizational process, Identification of process Domains and key process areas in software maintenance.

Outcome of Course:

At the end of this Course, the students will be able to:

- Design Manual Test cases for checking software reliability.
- Identify the realistic problem for different category of software.
- Explain different types of testing to understand realistic problem
- Develop analyzing techniques through automation testing tool

Recommended Books

- [1] Alain April, Alain Abran, "Software Maintenance Management: Evaluation and Continuous Improvement", first edition, Wiley & Sons, 2015.
- [2] Penny Grubb, Armstrong A. Takang, "Software Maintenance: Concepts and Practice", first edition, world scientific, 2014.



Paper V Course Code: MCS 305A

In the M.Sc. Computer Science Course paper code MCS 305 is reserved for skilful based course papers, in which students are required to choose one paper from the given list (below) and have to study this subject by its own. This is self study course and classes for this course shall not be conducted in Department.

List of skill based course

1. MCS 305A: Web Technology and Multimedia
2. MCS 305B: Software Development
3. MCS 305C: System Administration
4. MCS 305D: Computer Proficiency in Hardware

Department of Computer Science University of Lucknow, Lucknow M.Sc. (Computer Science) Third Semester Syllabus	
Course Title: Web Technology and Multimedia Course Code: MCS 305A Paper Number: V Credit : 04 Maximum Marks: 100	Objective: The objective of this course is to provide students with a basic understanding of web technologies and multimedia systems.
Unit - I	
Introduction and Web Development Strategies, History of Web and Internet, Protocols governing Web, Writing Web Projects, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing, HTML: list, table, images, frames, forms, CSS, Document type definition, XML: DTD, XML schemes, Object Models, presenting and using XML.	
Unit - II	
Using XML Processors: DOM and SAX, Dynamic HTML, Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, Sharing data between JSP pages	
Unit - III	
Multimedia, Multimedia Objects, Multimedia in business and work, Multimedia hardware, Memory & Storage devices, Communication devices, Presentation tools, object generation which includes video sound, image capturing, Authoring tools, card and page based authoring tools.	
Unit - IV	
Perception of sound, hearing sensitivity, frequency range, sound- wave length, the speed of sound, measuring the sound, musical sounds, noise signal, dynamic range, pitch, harmonics-equalization reverberation time, Sound isolation and room acoustics- treatments- studio layout -room dimensions. The Basic set-up of recording system; The production chain and responsibilities. Microphones types -phantom power, noise, choosing the right mike; Mixing console; Input devices, Output devices; Audio Publishing	
Unit - V	
Image file formats and how and where it is used, Principles of animation, 2D and 3D animation, Morphing, Kinematics, tweening, Motion capture, character animation, modelling, special effects, and compositing, Video Conferencing, Web Streaming, Video Streaming, Internet Telephony - Virtual Reality - Artificial Intelligence.	
Outcome of Course:	
At the end of this Course, the students will be able to:	
<ul style="list-style-type: none"> • Develop web and window applications. • Develop Multimedia application • Use JavaScript to add dynamic content to pages. • Apply a structured approach to identifying needs, interests, and functionality of a website. 	

Recommended Books

- [1] Tay Vaughan, "Multimedia: Making it Work", 8th Edition, McGraw Hill Education, 2011
- [2] Jeffrey C. Jackson, "Web Technologies: A Computer Science Perspective", 1st Edition, Pearson, 2013.

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**Department of Computer Science
University of Lucknow, Lucknow
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Course Title: Software Development	Objective: The objective of this course to learn software development process and models, in order to develop quality software with in specified cost and time. It also provides the knowledge of testing tools and management.
Course Code: MCS -2055B	
Paper Number: V Credit : 04	
Maximum Marks: 100	

Unit –I

The Evolving Role of Software, Software: A Crisis on the Horizon and Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development, Process, Product and Process.

Unit –II

Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis & Management (Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation)., Understanding the Requirement, Requirement Modelling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.

Unit –III

Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design) (MS Visio Tool), User Interface Design, Web Application Design.

Unit –IV

Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Techniques and Test Case, Test Suites Design, Testing Conventional Applications, Testing Object Oriented Applications, Testing Web and Mobile Applications, Testing Tools (Win runner, Load runner).

Unit –V

Quality Concepts and Software Quality Assurance, Software Reviews (Formal Technical Reviews), Software Reliability, The Quality Standards: ISO 9000, CMM, Six Sigma for SE, SQA Plan, Software Maintenance and Configuration Management Types of Software Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering, The SCM Process, Identification of Objects in the Software Configuration, Version Control and Change Control

Outcome of Course:

At the end of this Course, the successful students will be able to:

- Understand and demonstrate basic knowledge in software engineering.
- Identify requirements, analyse and prepare models.
- Plan, schedule and track the progress of the projects.
- Design & develop the software projects.
- Identify risks, manage the change to assure quality in software projects.
- Apply testing principles on software project and understand the maintenance concepts.

Recommended Books

- [1] Ian Sommerville, "Software Engineering", Sixth edition, Addison Wesley publication, 2000.
- [2] Roger S. Pressman, "Software Engineering, eight edition, McGRAW-HILL publication, 2010.
- [3] K. K. Aggarwal and Y. Singh, "Software Engineering", Third edition, New Age publication, 2008.

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Department of Computer Science
University of Lucknow, Lucknow
M.Sc. (Computer Science) Third Semester Syllabus

Course Title: System Administration

Course Code: MCS -205SC

Paper Number: V Credit : 04

Maximum Marks: 100

Objective: The objective of this course is to impart the knowledge of system installation, troubleshooting and backing up the system, and preparing the system for the use of individuals or for the group with sharing it over network.

Unit –I

What is System Administration? History of System Administration, System Administration Roles, Basics of Windows NT/2000/2003/2008/2010 and Unix/Linux. History, System Administration Topics, system backup and recovery strategies

Unit –II

Basic Info and Account Management. File and directory layout, File Systems (NTFS, FAT, UFS), File permissions, Installing the Operating System, Performance Monitoring and Optimization, system troubleshooting.

Unit –III

Basic DOS/Windows/Unix commands and tools. Command Line vs. GUI, Start up (booting) and Shutdown, Task Manager. More Account Management, installing/upgrading hardware/software/O.S, email server, web server, dns/dhcp server, telnet/ftp/ssh, unix-windows interoperability (samba), user communications and documentation, problems.

Unit –IV

System Processes. Scheduling jobs (scheduler/cron), job monitoring, (event viewer/ps), start and stop jobs. At command vs. Scheduled Tasks, GUI tool, More Task Manager, Disk administration. File systems/partitions. Disk De-Fragmentation. RAID, Basic client/server file sharing, Files, Directories and Memory Management, Permissions.

Unit –V

Networking, TCP/IP, DNS, DHCP, Domains/NIS, File Sharing. Client/Server, NFS. NetBeui, PDC/BDC, Active Directory, Setting up a file server (and client/server network), Ethernet Addresses, Hostnames, Automating System Admin Tasks. Scripts. Regedit (shell, perl C).

Outcome of Course:

At the end of this Course, the successful students will be able to:

- Understand the principles, practices and goals of system administration.
- Understand the various system components.
- Understand Installation and configuring systems.
- Troubleshoot the system.
- Take the backup of system.

Recommended Books

[1] Randal E. Bryant, David R. O'Hallaron, "Computer Systems: A Programmer's Perspective", Third edition, Pearson Education, 2016

[2] Brendan Gregg, "Systems Performance", First Edition, Prentice Hall, 2013.

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Department of Computer Science
University of Lucknow, Lucknow
M.Sc. (Computer Science) Third Semester Syllabus

Course Title: Computer Proficiency in Hardware

Course Code: MCS -2055D

Paper Number: V Credit : 04

Maximum Marks: 100

Objective: The objective of this course is to Provide knowledge of basic assembling, maintenance, and repair of computer systems to students.

Unit –I

Basic PC Concepts and Terminology, An Introduction to Digital Logic, Digital versus Analog, Computing in Binary Numbers, The Hexadecimal Number System, Working with Number Systems on the PC, Electricity and the PC, AC Power and DC Power, External Power Issues, Protecting Against ESD, A Quick Overview of the Electronics of the PC, Conductors, Insulators, and Semiconductors, The Electronic Building Blocks of the PC.

Unit –II

An Introduction to Digital Logic, Two-State Logic, Binary Data, Storing Data in a Byte, Conductors and Insulators, How an IC Is Made, The Transistor, Storing Electricity, Integrated Circuit, The Microprocessor, CPU's Bus System, Packaging, Cooling the Processor, Sockets and Slots, The Evolution of the PC Microprocessor, Pentium, Motherboard Design, Motherboards, Backplanes, Video Card Standards, Connector, x PC Hardware, Video Card Components, Video Processor, Video Memory, Resolution, Color Depth, Aspect Ratio, How Much Video Memory Is Needed, 3D Video Memory, Video RAM Technologies, Bus Mastering, Video Chipsets, Video BIOS.

Unit –III

Installing a Video Card, Troubleshooting the Video Card, Determining the Type of Video Card in a PC, Troubleshooting Video Problems, Getting the CPU's Attention, Communicating to Devices, Taking Control The PC's System Resources Interrupt Request (IRQ) Checking Out IRQ Settings, IRQ Connections, IRQ Assignments, Configuring IRQ Settings, Programmable Interrupt Controllers I/O Addresses, Common I/O Address Assignments, I/O Addresses in Windows, Logical Devices, Memory Addresses, Direct Memory Access (DMA), DMA Operation, DMA Channels, DMA Modes, DMA Parties Resolving Resource Conflicts, Plug and Pray, Troubleshooting DMA Channels Running Windows Troubleshooting.

Unit –IV

The Power Supply, Good Power Signal, Soft Switches, Voltages, Power Supply Form Factors, Operational Ratings, Electrical Power Issues, Protecting the Power Supply, Watts and Volt-amps Ratings, Tower versus Desktop, System Case Form Factors, PC Hardware: A Beginner's Guide, System Case Features, I/O Templates, Power Supply Auxiliary Fans, LEDs, the Speaker, and Some Connecting Wires, Cooling Vents, Mounting Hardware, CRTs versus Flat-Panels, The PC Monitor, CRT Displays, Flat-Panel Displays, Flat-Screen versus Flat-Panel, Viewable Size, Dots and Pixels, Resolution, Aspect Ratio, Monitor Size and Resolution, Color Depth, Refresh Rate, Signals and Connectors, Monitor Controls, Video Display Standards Video Cards.

Unit –V

Network Addressing, MAC Addresses, IP Addresses, Network Names, Configuring a PC for Network Connection, Dialling Up a Network Modem Types, Internal versus External Modems, AT Commands Dial-up Connections, Troubleshooting Modem Connections, Digital Subscriber Lines (DSL), DSL Modems, Bridges, and Routers, Cable Modems, ISDN Terminal Adapters, Wireless Networking, Access Points and Network Adapters, Bluetooth

Outcome of Course:

At the end of this Course, the students will be able to:

- Develop computer system configuration
- Conduct diagnostics - testing and inspection
- Conduct repair and maintenance of PC's
- Carry out installation of operating system and applications
- Have Basic knowledge of Networking and system connectivity

Recommended Books

- [1] Craig Zacks, John Rourke, "PC Hardware: The Complete Reference", first edition, McGraw Hill Education, 2017.
[2] Manahar Lotia, "Modern Computer Hardware Course", second edition, BPB Publications, 2006.

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Department of Computer Science
University of Lucknow, Lucknow
M.Sc. (Computer Science) Second Semester Syllabus

Course Title: Lab based on MCS 201 and MCS 202

Course Code: MCS -206

Practical

Credit : 04

Maximum Marks: 100

Objective: The objective of this course is to familiarize the students with the various components of different operating systems and with different phases of software development.

Practical Paper

List of Exercise based on Advance operating system and software engineering

1. Installation of Linux Operating system
2. Implementation of shortest Job first scheduling
3. Implementation of first come first serve scheduling
4. Implementation of Priority scheduling
5. Implementation of Shortest Job First scheduling
6. Implementation of Round Robin scheduling
7. Verification of CPU Scheduling Criteria
8. Verification of Physical and Logical address of CPU
9. Development of SRS.
10. Preparing Questionnaire
11. Working with Data Analysis, Data Processing Tools like SPSS etc.
12. Prototype designing.
13. Development of Projects as per SDLC.
14. Verification of Cohesion and Coupling.
15. Cost estimation of Projects.
16. Risk Analysis of Projects.
17. Implementation of verification and validation
18. Performing Testing like unit testing, Module Testing, Black Box Testing etc.

Outcome of Course:

At the end of this Course, the successful students will be able to:

- Design the algorithms for CPU Scheduling.
- Measure the performance of CPU against the various Scheduling criteria
- Verify and validate the different phases of software during software construction
- Perform testing of software.

Recommended Books

- [1] Abaaham Silberschatz, peter B Galvin and Gerg Gagne, "Operating system concepts", Ninth edition, WILEY publication, 2015.
- [2] Charles Crowley, "Operating Systems: A Design-Oriented Approach", Third edition, Tata McGraw-Hill, 2011.
- [3] Ian Sommerville, "Software Engineering", Sixth edition, Addison Wesley publication, 2000.
- [4] K. K. Aggarwal and Y. Singh, "Software Engineering", Third edition, New Age publication, 2008.

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Course Title: Lab based on MCS 203

Course Code: MCS -207

Practical Credit : 04

Maximum Marks: 100

Objective: The objective of this course is to make students familiar with basic techniques of compiler construction and tools that can be used to perform syntax-directed translation of a high-level programming language into an executable code. Students will design and implement language processors in C by using Compiler construction software to automate parts of the implementation process.

Practical Paper

List of Exercise based on Compiler Design

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines. It should also ignore comments.
2. Write a C program to identify whether a given line is a comment or not.
3. Write a C program to recognize strings under 'a', 'a*b+', 'abb'.
4. Write a C program to test whether a given identifier is valid or not.
5. Write a C program to simulate lexical analyzer for validating operators.
6. Implement the lexical analyzer using JLex, flex or other lexical analyzer generating tools.
7. Write a C program for constructing of LL (1) parsing.
8. Write a C program for constructing recursive descent parsing.
9. Write a C program to implement LALR parsing.
10. Write a C program to implement operator precedence parsing tools.
11. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree for the mini language.
12. Write a C program to generate machine code from abstract syntax tree generated by the parser.

Outcome of Course:

At the end of this Course, the successful students will be able to:

- Understand the working of lex and yacc compiler for debugging of programs.
- Understand and define the role of lexical analyzer, use of regular expression and transition
- Understand and use of Context free grammar and parse tree construction.
- Develop program for solving parser problems

Recommended Books

- [1] Aho, Lam, Sethi, and Ullman, "Compilers: Principles, Techniques and Tools", Second Edition, Pearson Publication, 2006.
- [2] A.V. Aho and Jeffery Ullman, "The Principles of Compiler Design", Second edition, Narosa Publishing House, 2008.
- [3] John E JHopcroft, Rajeev Motwani, Jeffrey D Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Third edition, 2013.

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