DR. A P J ABDUL KALAM UNIVERSITY,

INDORE

SYLLABUS

of

BACHELOR OF ENGINEERING

Computer science & Engineering

(Fifth Sem, Grading System)

(Session July- December 2017)

College of Engineering

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Bachelor of Engineering

Computer science & Engineering

List of Subject (Fifth Sem, Grading System)

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SUBJECT NAME: - DATA COMMUNICATION **SUBJECT CODE:- CS501**

UNIT I

Introduction, component, data representation, data flow and basic model, Serial and parallel transmission, Modes of data transmission, Encoding: unipolar, Polar, Bipolar, Line & block codes Data compression: Loosy & lossless techniques Review of analog and digital transmission methods.

UNIT II

Multiplexing: introduction & history, FDM,TDM, WDM Synchronous & statistical TDM. Spread spectrum: frequency hopping & direct sequences Terminal handling & polling. Network switching techniques: circuit, message, packet & hybrid X.25, ISDN

UNIT III

Physical layer: introduction, interface, Standards, EIA-232-D, RJ-45, RJ-11 BNC connector & EIA-449 EIA-449 digital interface: connection, specification & configuration. Modem : types, features, signal constellation, Block schematic, connecting devices: active and passive hub Repeaters, bridges, two & three layer switches & gateway Network topology and their comparative study.

UNIT IV

Transmission media: transmission line characteristics Distortion, crosstalk Guided media: twisted pair cable, baseband & broadband coaxial Fiber optic cable unguided media Electromagnetic polarization, rays and waves front Electromagnetic spectrum, radiation & propagation of waves Inverse square law, wave attenuation and absortion Terrestrial propagation, skip distance, radio waves Microwave, infrared & satellite communication system Telephone network component, LATA's, signalling and services Digital subscriber line: ADSL, HDSL, SDSL, VDSL, Cable TV network for data transfer.

UNIT V

Transmission errors: content error, flow integrity error, Error detection, error correction, bit error rate Error detection & correction methods: parity checking, Checksum error detection, cyclic redundancy check Hamming distance, interleaved codes Block parity, convolution code, hardware implementation checksum

SUBJECT NAME: -OPERATING SYSTEM **SUBJECT CODE: - CS502**

UNIT I

Introduction to system programs & operating systems, Evolution of operating system, operating system services OS structure, system call & system boots Operating system design & implementations, system protection, buffering & spooling Types of operating system: Bare machine, batch processing, real time Multitasking & multiprogramming, time sharing system

UNIT II

File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization, sharing & implementation issues Disk & drum scheduling, I/O subsystem, Transforming I/O request to hardware operations. Device driver: path managements, sub module, procedure, scheduler, handler, interrupt service routing File system in Linux & windows.

UNIT III

Process: concept, Process control blocks(PCB), scheduling criteria preemptive & non preemptive process scheduling Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling Operations on processes, threads, inter process communication, precedence graphs Critical section problem, semaphores, classical problems of synchronization Deadlock: characterization, methods for deadlock handling, deadlock prevention deadlock avoidance Deadlock detection, recovery from deadlock, process management in linux.

UNIT IV

Memory hierarchy, concepts of memory management, M Contiguous and non contiguous allocation, paging, segmentation and paging combined with segmentation FT & MVT, Logical and physical address space, swapping Structure & implementation of page table Concepts of virtual memory, cache memory organization Demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation

UNIT V

Distributed operating system- design issues, file system, remote file access RPC, RMI, Distributed shared memory, basic concept of parallel processing & concurrent programming security & threats protection: security, violation through parameter, Computer worms & virus, security design principle, Authentications, protection mechanisms, Introduction to sensor network and parallel operating system, Case study of unix, linus, windows.

SUBJECT NAME: - Database Management system **SUBJECT CODE: - CS503**

UNIT I

DBMS concepts & architecture introduction, Database approach v/s Traditional file accessing approach, advantages of database systems, data models, schemas and instances, Data independence, data base language and interfaces, overall database structure, function of DBA and designer, ER data model: Entitles and attributes, Entry types, Defining the E-R diagram, Concept of generalization, Aggregation and specialization Transforming ER diagram into the tables, Various other data models object oriented data model, network data model and relational data model compare between the three types of models.

UNIT II

Relational data models: Domains, Tuples, Attributes, Relations characteristics of relations, keys, keys attributes of relation, Relational database Schemas, integrity constraints Referential, Relational database Schemas, integrity constraints Referential integrity, Intension and extension,Relational Query languages: SQL-DDL, DML, integrity constraints, complex queries, various joins, indexing, triggers Assertions', relational algebra and relational calculus, relational algebra operations like select, project, join, division, outer union, Types of relational calculus i.e. tuple oriented and domain oriented relational calculus and its operations

UNIT III

Data base design: introduction to normalization, Normal forms, Functional dependency, decomposition, dependency preservation and lossless join, Problem with null value and dangling tuples, multivalued dependencies, Query optimization: introduction, Stems of optimization, various algorithms to implement select, project and join operations of relational algebra Optimization methods: heuristic based, case estimation based

UNIT IV

Transaction Processing concepts:- Transaction system, testing of serilizability, serializability of schedules, conflict & view serializable schedule Recoverability recovery from transaction failures, conflict & view serializable schedule, recoverablility, recovery from transaction failures Log based recovery, checkpoints deadlock handling, concurrency control techniques:- concurrency control, Locking techniques for concurrency control, time stamping protocols for concurrency control, Validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction, Introduction to distributed databases, datamining, dataware housing,object technology and DBMS, Comparative study of OODBMS Vs DBMS, Temporal, deductive, multimedia, Web & mobile database.

UNIT V

Study of Relational database management systems through oracles/ postgres SQL/MySQL: architecture, physical files, memory structures, background process, Concept of table spaces, segments, extents and block , dedicated server, multi threaded server, distributed database, Database links and snapshot, profiles, invoker defined security model. SQL Queries, data extraction from single, multiple tables equi-join, non equi-join, self-join, outer join, Usage of like, any, all exists, in special operations. Hierarchical queries, inline queries, flashback queries, Introduction of ANSI SQL, anonymous block, nested anonymous block, branching and looping constructs in ANSI SQL, Cursor management: nested and parameterized cursors, oracle exception handling mechanism.

SUBJECT NAME: -COMPUTER GRAPHICS AND MULTIMEDIA SUBJECT CODE: - CS504

UNIT I

Introduction to raster scan displays, pixals frame buffer, vector and character generation, random scan systems Display devices, scan conversion techniques, line drawing: simple DDA, bresenham's algorithm, Circle drawing algorithms: Midpoint circle drawing and bresenham's algorithm polygan fill algorithm: Boundary- fill and flood fill algorithm

UNIT II

2-D transformation: translation, rotation, scaling, shearing, reflecting Inverse transformation, Homogenous cording system, matrices transformation, composite transformation Windowing and clipping: world coordinate system, screen coordinate system Viewing transformation, line clipping & polygan clipping algorithms

UNIT I**II** 3-D transformations: Translation, rotation and scalling, Paraller & perspective projection: type of paraller & perspective projection, hidden surface elimination: depth comparison, back face detection algorithm Painter's algorithm, z-buffer algorithm Curve generation, Bezier and b-spline methods Basic illumination model: deffuse reflection, specular reflection, phone shading, gouraud shading Ray tracing, color models like RGB, YIQ, CMY, HSV

UNIT IV

Multimedia :characteristics of a multimedia presentation, use of multimedia, text- types, Unicode standard Tex compression, text file formats, audio components of an audio system, digital audio, digital audio processing Sound cards, audio file formats, audio processing software, video- video color spaces Digital video, digital video processing, video file formats

UNIT V

Animation: uses of animation, principles of animation, computer based animation, 3D animation Animation file formats, animation softwares Compression: lossless/ lossy compression techniques, image, audio and video compressions MPEG standards, multimedia architecture, Multimedia databases

SUBJECT NAME: ARTIFICIAL INTELLIGENCE **SUBJECT CODE: - CS 505**

UNIT I

Definitions - Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Knowledge Inferring systems and Planning, Uncertainty and towards Learning Systems, Introduction to LISP programming: Syntax and numeric functions.

UNIT II

Problem Solving, Search and Control Strategies General problem solving, production systems, control strategies forward and backward chaining, exhausive searches depth first breadth first search. Heuristic Search Techniques Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem reduction & AO* algorithm, constraint satisfaction problems.

UNIT III

Knowledge Representations First order predicate calculus, skolemization, resolution principle & unification, interface mechanisms, horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

UNIT IV

Natural Language processing Parsing techniques, context free grammer, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammers, symantic analysis. Game playing Minimax search procedure, alpha-beta cutoffs, additional refinments. Planning Overview an example domain the block word, component of planning systems, goal stack planning, non linear planning.

UNIT V

Probabilistic Reasoning and Uncertainty Probability theory, bayes theorem and bayesian networks, certainty factor. Expert Systems Introduction to expert system and application of expert systems, various expert system shells, vidwan frame work, knowledge acquisition, case studies, MYCIN. Learning Rote learning, learning by induction, explanation based learning

BOOKS

1. Elaine Rich and Kevin Knight “Artifical Intelligence” - Tata McGraw Hill.
2. “Artifical Intelligence” 4 ed. Pearson .
3. Dan W. Patterson “Introduction to Artifical Intelligence and Expert Systems”, Prentice India.
4. Nils J. Nilson “Principles of Artifical Intelligence”, Narosa Publishing House.
5. Clocksin & C.S.Melish “Programming in PROLOG”, Narosa Publishing House.
6. M.Sasikumar,S.Ramani etc. “Rule based Expert System”, Narosa Publishing House

of data transmission, Encoding: Unipolar, Polar, Line & Block codes. Data compression: Lossy & Lossless

UNIT:-2 Multiplexing: Introduction & History, FDM, TDM, WDM, Synchronous & Statistical TDM. Spread spectrum: Frequency Hopping & Direct Sequence. Terminal handling & Polling. Network Switching Techniques: Circuit, Message, Packet & Hybrid. X.25, ISDN.

Unit 1: Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, Operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling Types of Operating System: Bare machine, Batch Processing, Real Time, Multitasking & Multiprogramming, time-sharing system.

Unit 2: File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization ,sharing & implementation issues, Disk & Drum Scheduling, I/0 devices organization, I/0 devices organization, I/0 buffering, I/O Hardware, Kernel I/O subsystem, Transforming I/O request to hardware operations. Device Driver: Path managements, Sub module, Procedure, Scheduler, Handler, Interrupt Service Routine. File system in Linux & Windows

Unit 3 Process: Concept, Process Control Blocks(PCB), Scheduling criteria Preemptive & non Preemptive process scheduling, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling, operations on processes, threads, inter process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock: Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Process Management in Linux.

Unit 4: Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Structure & implementation of Page table.Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.

Unit 5: Distributed operating system:-Types, Design issues, File system, Remote file access, RPC, RMI, Distributed Shared Memory(DSM), Basic Concept of Parallel Processing & Concurent Programming Security & threats protection: Security violation through Parameter, Computer Worms & Virus, Security Design Principle, Authentications, Protection Mechanisms. introduction to Sensor network and parallel operating system. Case study of Unix, Linux & Windows,

List of Experiment

[1]. Write a program to implement FCFS CPU scheduling algorithm.
[2]. Write a program to implement SJF CPU scheduling algorithm.
[3]. Write a program to implement Priority CPU Scheduling algorithm.
[4]. Write a program to implement Round Robin CPU scheduling algorithm.
[5]. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
[6]. Write a program to implement classical inter process communication problem(producer consumer).
[7]. Write a program to implement classical inter process communication problem(Reader Writers).
[8]. Write a program to implement classical inter process communication problem(Dining_Philosophers).
[9]. Write a program to implement & Compare various page replacement algorithm.
[10]. Write a program to implement & Compare various Disk & Drum scheduling Algorithms
[11]. Write a program to implement Banker's algorithms.
[12]. Write a program to implement Remote Proccedure Call(RPC).
[13]. Write a Devices Drivers for any Device or pheriperal.

References

[1]. Silberschatz ,"Operating system", Willey Pub.
[2]. Stuart,"Operating System Principles, Design & Applications", Cengage Learning
[3]. Tannanbaum, "Modern operating system",PHI Learning
[4]. Dhamdhere, "Operating System",TMH.
[5]. Achyut S Godbole,"Operating System", TMH.
[6]. William stalling, "operating system" Pearson Edu.
[7]. Deitel & Deitel, "Operating Systems", Pearson Edu.
[8]. Flynn & Mchoes, "Operating Systems", Cengage Learning
[9]. Haldar, "Operating System", Pearson Edu.

Sub Code : CS 505 **Sub Name : Theory Of Computation** **4 Credits**

UNIT 1: Automata: Basic machine, FSM , Transition matrix,

UNIT 4: Turing Machines: Introduction, TM model, representation and

languages

acceptability of TM Design of TM,Universal TM & Other modification, Church's hypothesis, composite & iterated TM. Turing machine as enumerators.Properties of recursive & recursively enumerable languages,Universal Turing machine

UNIT 5: Tractable and Untractable Problems: P, NP, NP complete and NP hard problems, examples of these problems like satisfy ability problems, vertex cover problem, Hamiltonian path problem, traveling sales man problem, Partition problem etc.

References:

1. John E. Hopcroft, Jeffery Ullman,"Introduction to Automata theory, Langauges & computation" , Narosa Publishers.
2. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning
3. Michael Sipsev,"Theory of Computation",Cenage Learning
4. John C Martin, "Introdution to languages and theory of computation", McGraw Hill
5. Daniel I.A. Cohen,"Introduction to Computer Theory",Wiley India.
6. Kohavi,"Switching & Finite Automata Theory",TMH

Overview of Unix/Linux: - Concepts, Unix/Linux Installation Process, Hardware Requirements for Unix/Linux ,Advantages of Unix/Linux, Reasons for Popularity and Success of Linux/Unix Operating System, Features of Linux/Unix Operating System, Kernel, Kernel Functions, The Shell Basic Commands, Shell Programming:-Shell Variables, Branching Control Structures, Loop-Control Structure, Continue and break Statements, Sleep Command, Debugging Script. Use of Linux as web-server, file server, directory server, application server, DNS server, SMTP server, Firewall, Proxy server.

File System: - Definition of File System, Defining Geometry, Disk Controller, Solaris File System, Disk Based File Systems, Network-Based File Systems, Virtual File systems, UFS File System, The Boot Block, The Super Block, The Inode, Tuning File System, Repairing File System. Process Control: - Viewing a Process, Command to display

Process, Process Attributes, Process States, Process Fields, PS Commands options, PGREP, PRSTAT, CDE Process Manager, Scheduling Process, Scheduling Priorities, Changing the Priority of a time-sharing process, Killing Process.

System Security: - Physical Security, Controlling System Access, Restricted Shells Controlling File Access, File Access Commands, Access Control List(ACLs), Setting ACL Entries, Modifying ACL entries on a file, Deleting ACL entries on a file, Restricting FTP, Securing Super User Access, Restricting Root Access, Monitoring super user Access, TCP Wrappers.

Dynamic Host Configuration Protocol: - Introduction, DHCP Leased Time, DHCP Scopes, DHCP IP Address, Allocation Types, Planning DHCP Deployment, DHCP Configuration files, Automatic Startup of DHCP Server, Configuration of DHCP Clients, Manually Configuring the DHCP. Case Study: - Installation of Linux, Customization of Linux, Installation of SAMBA, APACHE, TOMCAT, Send MAIL, Postfix, Implementation of DNS, LDAP services, Firewall, Proxy server

List of Experiments:-

1. To Study basic & User status Unix/Linux Commands.
2. Study & use of commands for performing arithmetic operations with Unix/Linux.
3. Create a file called wlcc.txt with some lines and display how many lines, words and characters are present in that file.
4. Append ten more simple lines to the wlcc.txt file created above and split the appended file into 3 parts. What will be the names of these split files? Display the contents of each of these files. How many lines will be there on the last file?
5. Given two files each of which contains names of students. Create a program to display only those names that are found on both the files.
6. Create a program to find out the inode number of any desired file.

7. Study & use of the Command for changing file permissions.

8. Write a pipeline of commands, which displays on the monitor as well as saves the information about the number of users using the system at present on a file called usere.ux.

9. Execute shell commands through vi editor.

10. Installation, Configuration & Customizations of Unix/Linux.

11. Write a shell script that accepts any number of arguments and prints them in the reverse order.

12. Write a shell script to find the smallest of three numbers that are read from the keyboard.

13. Write a shell script that reports the logging in of a specified user within one minute after he/she logs in. The script automatically terminates if the specified user does not login during a specified period of time.

14. Installation of SAMBA, APACHE, TOMCAT.

15. Implementation of DNS, LDAP services, 16. Study & installation of Firewall & Proxy server

Suggested Reading:

1. Venkatesh Murthy, "Introduction to Unix &Shell", Pearson Edu
2. Forouzan, "Unix &Shell Programming", Cengage Learning
3. Sumitab Das,"Unix Concept & Application",TMH
4. Gopalan, Shivaselvan,"Beginners Guide to Unix " PHI Learning
5. Venkateshwavle,"Linux Programming Tools Unveil`ed", BS Publication.
6. Richard Peterson,"Linux Complete Reference",TMH
7. Richard Peterson,"Unix Complete Reference",TMH

Unit 1: **Development of Proficiency in English :** Practice on Oral and spoken communication skill & testing – ,voice & accent, voice clarity, voice modulation & intonation,word stress etc. Feedback and questioning Technique ,Objectiveness in Argument,Development etiquettes and manners ,Study of different pictorial expression of non-verbal communication and its analysis

Unit 2: Microsoft office: Microsoft word, Microsoft power point, Microsoft Excel, use of skype, use of internet.

Unit 3: Communication skills: Visual, nonverbal and aural communication, Understanding the communicative environment,Understanding the communicative environment, What to listen for and why, When to speak and how, Starting and sustaining a conversation

Unit 4: Communication skills Visual, nonverbal and aural communication, The world of visual culture, Visual perception, The aural: Its relevance and impact, The body and the way it communicates, The face, its expressions and what it says.

Unit 5: Concept of 4 method for presentation,Preparation & introduction ,Presentation ,Evaluation / feedback Summarization / Conclusion,Presentation Skill practice ,Preparing in presentation ,Delivery of presentation.

References:

1. E.H. Mc Grath: S.J.:Basic Managerial Skills for All (Published by Phi)
2. Allen Pease:Body Language(published by agreement and Pease international)
3. Joan Lambert: Microsoft Office 2016 Step by Step (Step By Step (Microsoft)

Sub Code: CS-508 Sub Name: Seminar / Group Discussion (Internal Assessment) 1 Credit

Objective of GD and seminar:

Objective of GD and seminar is to improve the MASS COMMUNICATION and CONVINCING/ Understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point Presentation.

Sub Code: HU223P	Sub Name: NSS/NCC	0 Credits

Objective of NSS/NCC:

Objective of NSS/NCC is to improve the Helping Nature in Social/ Develop Skills, Respect to each other, Communication and Convincing/ Understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on Qualifier

Unit-I Microprocessor and Microprocessor Development Systems: Evolution of Microprocessor, Microprocessor architecture and its operations, memory, inputs-outputs (I/Os), data transfer schemes interfacing devices, architecture advancements of microprocessors, Typical microprocessor development system.

Unit-II 8085 Micrprocessor : Architetcure of 8085 microprocessor ,Instruction set and Adressing modes of 8085 microprocessor, Assembly language programs of 8085 microprocessor, Stack, Subroutines, Time-Delay loops, Modular programming, Macro .

Unit-III 8086 Microprocessor : Architecture , Registers ,Memory Segmentation ,8086 Memory Addressing ,Memory Read and Write Bus Cycle of 8086,Demultiplexing of the system Bus in 8086 and 8088 microprocessors, Instruction set and Addressing modes of 8086 microprocessor ,Assembly language programs of 8086 microprocessor.

Unit-IV I/O and Memory Interfacing Using 8085/8086: memory interfacing, Interrupts of 8085/8086 Microprocessors, 8259A Programmable Interrupt Controller, Programmable peripheral Interface, 8253 Programmable Counter/Interval Timer. Communication and Bus Interfacing with 8085/8086 Microprocessor :Serial Communication Interface, DMA Controller 8257, 8279-Programmable Keyboard and Display I/O Interface, Bus Interface,8089 I/O processor

Unit-V 8051 Microcontroller: Architetcure of 8051 microcontroller, Memory organization, Timers/Counters, Interrupts, Addressing modes, 8051 Instruction set , Assembly language Programs, Applications of microcontrollers.

References:

[1]. Douglas V Hall, "Microprocessors and interfacing – Programming & Hardware" TMH
[2]. Gaonkar, "Microprocessor Architecture, Programming & Applications with 8085", TMH Grading System 2013 - 14
[3]. Rafiquzzaman, "Microprocessors-Theory & Applications", PHI
[4]. Savaliya, "8086 Programming & Advance Processor Architecture", Wiley India
[5]. Ray, Bhurchandi, "Advanced Microprocessor and peripherals" TMH Pub
[6]. Soumitra Kumar Mandal, "Microprocessors and Microcontroller" TMH Pub

List of Experiments

1. To study 8085 based microprocessor system
2. To study 8086 based microprocessor system
3. To develop and run a program for finding out the largest/smallest number from a given set of numbers.
4. To develop and run a program for arranging in ascending/descending order of a set of numbers.
5. To perform multiplication/division of given numbers
6. To perform conversion of temperature from 0F to 0C and vice-versa
7. To perform computation of square root of a given number
8. To perform floating point mathematical operations (Addition, Subtraction, Multiplication and Division).
9. To obtain interfacing of RAM chip to 8085/8086 based system
10. To obtain interfacing of keyboard controller
11. To obtain interfacing of DMA controller
12. To obtain interfacing of PPI
13. To perform microprocessor based temperature control of hot water.

Unit 1: Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Issues in Language Translation: Syntax, Semantics, Stages, analysis and synthesis, Parse Tree, CFG and BNF grammar.

Unit 2: Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names ,Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Sequence control with Expressions, Conditional Statements, Loops, Exception handling.

Unit 3: Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, design issues for functions overloaded operators, co routines.

Unit 4: Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, Static and Stack-Based Storage management. heap based storage management. Garbage Collection. object oriented programming in small talk, C++, Java, C#, PHP, Perl . Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

Unit 5: Exception handling, Exceptions, exception Propagation, Exception handler in C++ and Java. Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming. Functional Programming Languages: Introduction, fundamentals. Introduction to 4GL.

References:

1. Sebesta,"Concept of programming Language", Pearson Edu.
2. Louden, "Programming Languages: Principles & Practices" , Cengage Learning
3. Tucker, " Programming Languages: Principles and paradigms ", Tata McGraw –Hill
4. Terrance W Pratt, "Programming Languages: Design and Implementation" Pearson Edu.
5 Cavlo Ghezzi & Mehdi Jazayeri " Programming Languages Concepts", Willey India
6 E Horowitz, "Programming Languages", 2nd Edition, Addison Wesley Grading System
2013 - 14

Unit 1: The Software Product and Software Process: Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics

Unit 2: Requirement Elicitation, Analysis, and Specification Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability

Unit 3: Software Design The Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics

Unit 4: Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, Test Oracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit Testing Frameworks, Integration Testing, System Testing and other Specialized Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured software engg.

Unit 5: Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA). Project Plan, Project Metrics.

Practical and Lab work: Lab work should include a running case study problem for which different deliverables at the end of each phase of a software development life cycle are to be developed. This will include modeling the requirements, architecture and detailed design. Subsequently the design models will be coded and tested. For modeling, tools like Rational Rose products. For coding and testing, IDE like Eclipse, NetBeans, and Visual Studio can be used.

References:

1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning
3. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.
4. Sommerville,"Software Enginerring",Pearson Education.
5. Richard H.Thayer,"Software Enginerring & Project Managements",Willey India
6. Waman S.Jawadekar,"Software Enginerring", TMH
7. Schwalbe,"IT Project Managements",Cengage Learning.

Unit –1 Computer Network: Definitions, goals, components, Architecture, Classifications & Types. Layered Architecture: Protocol hierarchy, Design Issues , Interfaces and Services, Connection Oriented & Connectionless Services, Service primitives, Design issues & its functionality. ISOOSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP. Network standardization. Queueing Models: Little's Theorem, Queueing System: M/M/1, M/M/m, M/M/∞, M/M/m/m, M/G/1

Unit-2 Data Link Layer: Need, Services Provided, Framing , Flow Control, Error control. Data Link Layer Protocol: Elementary & Sliding Window protocol: 1-bit, Go-Back-N, Selective Repeat, Hybrid ARQ. Bit oriented protocols: SDLC, HDLC, BISYNC, LAP and LAPB. Protocol verification: Finite State Machine Models & Petri net models.

Unit-3 MAC Sublayer: MAC Addressing, Binary Exponential Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and SlottedALOHA), for Local-Area Networks (CSMA, CSMA/CD, CSMA/CA), Collision Free Protocols: Basic Bit Map, BRAP, Binary Count Down, MLMA Limited Contention Protocols: Adaptive Tree Walk, URN Protocol, High Speed LAN: Fast Ethernet, Gigabit Ethernet, FDDI, Performance Measuring Metrics. IEEE Standards 802 series & their variant.

Unit-4 Network Layer: Need, Services Provided , Design issues, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing, Congestion Control Algorithms: General Principles of Congestion control, Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram subnets. IP protocol, IP Addresses, Comparative study of IPv4 & IPv6, Mobile IP.

Unit-5 Transport Layer: Design Issues, UDP: Header Format, Per-Segment Checksum, Carrying Unicast/Multicast Real-Time Traffic, TCP: Connection Management, Reliability of Data Transfers, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management. Session layer: Authentication, Authorisation, Session layer protocol (PAP, SCP, H.245). Presentation layer: Data conversion, Character code translation, Compresion, Encryption and Decryption, Presentation layer protocol (LPP, Telnet, X.25 packet Assembler/Disassembler).Application Layer: WWW and HTTP, FTP, SSH, Email (SMTP, MIME, IMAP), DNS, Network Management (SNMP). Grading System 2013 - 14

References:

1. Andrew S. Tanenbaum, David J. Wetherall, "Computer Networks" Pearson Education.
2. Dimitri Bertsekas, Robert Gallager, "Data Networks", PHI Publication, Second Edition.
3. Kaveh Pahlavan, Prashant Krishnamurthy, "Networking Fundamentals", Wiley Publication.
4. Uyless Black, "Computer Networks", PHI Publication, Second Edition.
5. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", McGraw Hill.

List of Experiments:

1. Study of Different Type of LAN& Network Equipments.
2. Study and Verification of standard Network topologies i.e. Star, Bus, Ring etc.
3. LAN installations and Configurations.
4. Write a program to implement various types of error correcting techniques.
5. Write a program to Implement various types of framing methods.
6. Study of Tool Command Language (TCL).
7. Study and Installation of Standard Network Simulator: N.S-2, N.S-3.OpNet,QualNet etc
8. Study & Installation of ONE (Opportunistic Network Environment) Simulator for High Mobility Networks .
9. Configure 802.11 WLAN.
10. Implement & Simulate various types of routing algorithm.
11. Study & Simulation of MAC Protocols like Aloha, CSMA, CSMA/CD and CSMA/CA using Standard Network Simulators.
12. Study of Application layer protocols- DNS, HTTP, HTTPS, FTP and TelNet.

Sub Code : CS 605 **Sub Name : –Advance Computer Architecture (ACA) 4 Credits**

Unit-1 Flynn's Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and multicomputers, Multivector and SIMD Computers. Data and resource dependences,Hardware and software parallelism,Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks,Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks

Unit- 2 Instruction set architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization- memory interleaving, pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System :Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

Unit-3 Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscaler pipeline design, Super pipeline processor design.

Unit-4 Cache coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization: distributed memory model and shared memory model. Principles of Multithreading: Multithreading Issues and Solutions, Multiple-Context Processors

Unit-5 Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

References:

[1]. Kai Hwang, "Advanced computer architecture", TMH.

[2].J.P.Hayes, "computer Architecture and organization"; MGH.

[3].V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI Learning. .

[4]. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning

[5].M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing.

[6]. Hwang and Briggs, "Computer Architecture and Parallel Processing"; MGH.

[7]. David E. Callav & Jaswinder Pal Singh Marge Kaufmann"Advance Computer Architecture", EIS India.

[8]. Sajjan G. Shiva, Taylar & Francis, "Advance Computer Architecture

COURSE GUIDELINES

The Minor Project Work provides students an opportunity to do something on their own and under the supervision of a guide. Each student shall work on an approved project, which may involve fabrication, design or investigation of a technical problem that may take design, experimental or analytical character or combine element of these areas. The project work involves sufficient work so that students get acquainted with different aspects of manufacture, design or analysis. The students also have to keep in mind that in final semester they would be required to implement whatever has been planned in the Major Project in this semester. It is possible that a work, which involves greater efforts and time may be taken up at this stage and finally completed in final semester, but partial completion report should be submitted in this semester and evaluated also at the end of the semester. At the end of semester, all students are required to submit a synopsis and be assessed by an external Examiner.

Objectives: To make students well versed with at the business communication skills.

UNIT I Essential and vocational skills: survival strategies

i. Managing time ii. Managing stress
iii. Resilience iv. Work-life balance
v. Applying soft-skills to workplace

UNIT II Written Communication Skill Practice for:

i. Correction of errors ii. Making of Sentences
iii. Paragraph Writing iv. Leave Application and simple letter writing

UNIT III Team Building / Coordination Skills

i. Team Building Practices through group exercises , team task / role play
ii. Ability to mixing & accommodation
iii. Ability to work together

UNIT IV Self Management

i. Self Evaluation ii. Self Discipline
iii Self Criticism iv. Recognition of one's own limits and deficiencies
v. Independency etc. vi. Thoughtful & Responsible
vii. Self Awareness

UNIT V Team Management Technique

i. Practice by game play & other
ii. learning methodology for achieving
iii targets and getting of right first time

References

1. Soft skills Training – A workbook to develop skills for employment by Fredrick H. Wentz
2. Personality Development and Soft skills , Oxford University Press by Barun K. Mitra
3.The Time Trap : the Classic book on Time Management by R. Alec Mackenzi

Sub Code: CS-608 Sub Name: Seminar / Group Discussion (Internal Assessment) 1 Credits

Objective of GD and seminar:

Objective of GD and seminar is to improve the MASS COMMUNICATION and CONVINCING/ Understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point Presentation.