

Course of Study and Scheme of Examination
B.E. Computer Science & Engineering (Proposed Scheme)
SEMESTER – V

S. No.	Course Category	BOS Code	Course Code (Old)	Course Code (New)	Subject	Period Per Week				Distribution of Marks					
										Theory Exam	Practical Exam	Internal Assessment			Total
						MST	TW	Total							
L	T	P	C	I	II	III			I+II+III						
1.	DC-8		CS-5508	CS501	Data Communication	3	1	0	4	100	-	20	-	20	120
2.	DC-09		CS-5509	CS502	Operating System	3	1	2	6	100	50	20	30	50	200
3.	DC-10		CS-5510	CS/IT503	Data Base Management System	3	1	2	6	100	50	20	30	50	200
4.	DC-12		CS-5512	CS504	Computer Graphics & Multimedia	3	1	2	6	100	50	20	30	50	200
5.	DC-11		CS-5511	CS505	Theory of Computation	3	1	0	4	100	-	20	-	20	120
6.	IT-5		CS-5305	CS506	Computer Programming V (Unix/Linux Lab.)	0	0	4	4	-	50	-	50	50	100
7.	NECC-5		CS-5705	CS507	Self Study	0	0	2	2	-	-	-	30	30	30
8.	NECC-6		CS-5706	CS508	Seminar/Group Discussion etc.	0	0	2	2	-	-	-	30	30	30
Total						15	5	14	34	500	200	100	200	300	1000

Minimum Pass Marks

(A) Theory: 35 Percent

(B) Practical:50 Percent

Duration:

[C] Duration of Theory Paper 3 hrs.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 501 Data Communication

Course Contents

Category of Course	Course Title	Course Code	Credit-6C			Theory Paper (ES)
			L	T	P	
Departmental Core DC- 501	Data Communication	CS 501	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	0	

Branch: Computer Science and Engineering V Semester

Course: CS 501 Data Communication

RATIONALE:

The purpose of this subject is to cover the underlying concepts and techniques used in Data Communication. In this subject we discuss various principles, standards for communication over different type of Communication Media.

PREREQUISITE :-

The students should have general idea about the analog and digital communication.

UNIT :- I

Introduction to data communication: Components , data representation ,data flow and basic model ,data representation ,Serial & Parallel transmission , Modes of data transmission , Encoding:Unipolar,Polar ,Bipolar line & block codes ,Data compression ,Frequency dependant codes, Run length encoding ,Relative encoding ,LZ Compression ,Image and multimedia compression. Review of analog & digital transmission methods, Nyquist Theorem .

UNIT:-2

Multiplexing: FDM, TDM, WDM, Synchronous & Statistical TDM, North American digital multiplexing hierarchy, European TDM, Spread spectrum: Frequency Hopping & Direct Sequence spread spectrum. Terminal handling & polling. Switched Communication Networks: Circuit, Message, Packet & Hybrid Switching, Softswitch Architecture with their comparative study, X.25, ISDN.

UNIT:-3

Physical Layer: Introduction, Interface, Standards, EIA-232-D, RJ-45, RJ-11, BNC connector & EIA-449 digital Interface: Connection, specifications & configuration, X.21
 Modem: Types, features, signal constellation, block schematic, limited distance, dial up, baseband, line driver, Group Band and Null modems etc., ITU-T V-series modem standards
 Connecting Devices: Active and Passive Hubs, Repeaters, Bridges, Two & Three layer switches & Gateway. Study of various types of topology and their comparative study and introduction to queing theory.

UNIT:-4

Transmission Media: Transmission line characterestics, distortions, Crosstalk, Guided Media: Twisted Pair, Baseband & Broadband Coaxial.

Optical Fibre : Physics and velocity of propagation of light , Advantages & Disadvantages ,Block diagram ,Nodes and classification ,Comparison,losses , light source and detectors , Construction, Unguided media : Electromagnetic polarization ,Rays and wavesfront ,electromagnetic spectrum and radiation ,spherical wavefront and inverse square law , wave attenuation and absorption, optical properties of Radio waves , Terrestrial Propagation of electromagnetic waves , skip distance , free - space path loss ,Radio waves , Microwave , Infrared & Satellite Communication system .
Telephone Network: Components, LATAs, signaling and Services, Digital Subscriber Line: ADSL, HDSL, SDSL, VDSL, Cable TV network for data transfer.

UNIT:-5

Transmission Errors : Content Error , flow integrity error , methods of error control ,Error detection ,Error correction ,Bit error rate , Error detection methods: Parity checking , Checksum Error Detection ,Cyclic Redudancy Check ,Hamming code , Interleaved codes , Block Parity , Convolution code , Hardware Implementation, Checksum .

Suggested Reading:

1. Gupta Prakash C., "Data communication", PHI Learning
2. Tomasi, "Introduction to Data Communication & Networking, Pearson Education
3. Forouzan, "Data communication", TATA McGraw
4. Godbole, "Data Communication & Network" , TMH
5. Miller, "Data Network and Comunication", Cengage Delmar Learning
6. William Stallings , "Data & Computer Communication", Pearson Education
7. A.S Tanenbum, "Computer Network", Pearson Education.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 502 Operating System

Course Contents

Category of Course	Course Title	Course Code	Credits-6C			Theory Papers (ES)
			L	T	P	
Departmental Core DC-09	Operating System	CS 5509				Max.Marks-100 Min.Marks-35 Duration-3 hrs.
		CS 502	3	1	2	

Branch: Computer Science and Engineering V Semester

Course: CS 502 Operating System

RATIONALE:

The purpose of this subject is to cover the underlying concepts Operating System .This syllabus provides a comprehensive introduction of Operating System, Process Management, Memory Management, File Management and I/O management.

PREREQUISITE:-

The students should have general idea about Operating System Concept, types of Operating System and their functionality.

Unit I

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 II

File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization ,sharing & implementation issues, Disk & Drum Scheduling, I/O devices organization, I/O devices organization, I/O 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 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, 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 V

Distributed operating system:-Types, Design issues, File system, Remote file access, RPC, RMI, Distributed Shared Memory(DSM), 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, 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 Procedure Call(RPC).
13. Write a Devices Drivers for any Device or pheriperal.

Suggsted Reading:

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.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 503 Data Base Management System

Course Contents

Category of Course	Course Title	Course Code	Credits-6C			Theory Papers (ES)
			L	T	P	
Departmental Core DC-10	Data Base Management System	CS 5510 CS 503	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3 hrs.
			3	1	2	

Branch: Computer Science and Engineering V Semester

Course: CS 503 Data Base Management System

RATIONALE:

The purpose of this subject is to cover the underlying concepts and techniques used in creating a Data Base System. These techniques can be used in Software Developments.

PREREQUISITE

The students should have a general idea about data base concept, data models and sql statements.

Unit I

DBMS Concepts and 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, Functions of DBA and designer, ER data model:Entities and attributes, Entity 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, Comparison between the three types of models.

Unit II

Relational Data models: Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, 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 losless join, problems with null valued and dangling tuples, multivalued dependencies.

Query Optimization: Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based.

Unit IV

Transaction Processing Concepts: - Transaction System, Testing of Serilizability, Serializability of schedules, conflict & view serializable schedule, recoverability, 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, datawarehousing, 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 Oracle/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. Data dictionary, dynamic performance view. Security, role management, privilege management, 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 operators. 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. Stored procedures, in, out, in out type parameters, usage of parameters in procedures. User defined functions their limitations. Triggers, mutating errors, instead of triggers.

Suggested list of experiments: -

Lab Assignments:

1. Delete duplicate row from the table.
2. Display the alternate row from table.
3. Delete alternate row from table.
4. Update multiple rows in using single update statement.
5. Find the third highest paid and third lowest paid salary.
6. Display the 3rd, 4th, 9th rows from table.
7. Display the ename, which is start with j, k, l or m.
8. Show all employees who were hired the first half of the month.
9. Display the three record in the first row and two records in the second row and one record in the third row in a single sql statements.
10. Write a sql statements for rollback commit and save points.
11. Write a pl/sql for select, insert, update and delete statements.
12. Write a pl/sql block to delete a record. If delete operation is successful return 1 else return 0.
13. Display name, hire date of all employees using cursors.
14. Display details of first 5 highly paid employees using cursors.
15. Write a database trigger which fires if you try to insert, update, or delete after 7'o' clock.
16. Write a data base trigger, which acts just like primary key and does not allow duplicate values.
17. Create a data base trigger, which performs the action of the on delete cascade.
18. Write a data base trigger, which should not delete from emp table if the day is Sunday.
19. In this subject the students are supposed to prepare a small database application in complete semester like financial accounting system, Railway reservation system, institute timetable management system. Student record system, library management system, hospital management system etc. **in RDBMS** as follows:

Section A:

Solving the case studies using ER datamodel (design of the database)

Section B:

Implement a miniproject for the problem taken in section A.

Suggested Reading:-

1. Date C J, "An Introduction To Database System", Pearson Educations
2. Korth, Silbertz, Sudarshan, "Fundamental of Database System", McGraw Hill
3. Rob, " Data Base System: Design Implementation & Management", Cengage Learning
4. Elmasri, Navathe, "Fundamentals Of Database Systems", Pearson Educations
5. Atul Kahate, " Introduction to Database Management System", Pearson Educations
6. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press, TMH.
7. Paneerselvam, "DataBase Management System", PHI Learning
8. dev.mysql.com
9. www.postgressql.org

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 504 Computer Graphics & Multimedia
Course Contents

Category of Course	Course Title	Course Code	Credit-6C			Theory Paper (ES)
			L	T	P	
Departmental Core DC-12	Computer Graphics & Multimedia	CS 5512/CS504	3	1	2	Max.Marks-100 Min.Marks-35 Duration-3hrs.

Branch: Computer Science and Engineering V semester
Course: CS 5512/ **CS504 Computer Graphics & Multimedia**

RATIONALE:

The purpose of this subject is to cover the underlying concepts and techniques used in Computer Graphics ,Animations & Multimedia.

PREREQUISITE :-

The students should have general Idea about input/output devices, graphics, text, audio, video and animation. In addition, a familiarity with general mathematical transformations is required..

Unit-I Introduction to raster scan displays, Pixels, frame buffer, Vector & Character generation, random scan systems, Graphics Primitives, Display devices, Display file structure, Scan Conversion techniques, line drawing: simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms. Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

Unit-II 2D transformation: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping, Cohen Sutherland, Midpoint Line clipping algorithms, Polygon Clipping: Sutherland –Hodgeman, Weiler-Atherton algorithms.

Unit-III 3D transformations: translation, rotation, scaling. Parallel & Perspective Projection, Types of Parallel & Perspective Projection. Hidden Surface elimination: Depth comparison, Back face detection algorithm, Painters algorithm, Z-buffer algorithm. Curve generation, Bezier and B-spline methods.

Unit-IV Basic Illumination Model, Diffuse reflection, Specular reflection, Phong Shading Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV.

Unit –V Multimedia System: An Introduction, Multimedia hardware, Multimedia System Architecture. Data & File Format standards. i.e RTF, TIFF, MIDI, JPEG, DIB, MPEG,Audio: digital audio, MIDI, processing sound, sampling, compression. Video: Avi, 3GP,MOV, MPEG , compression standards, compression through spatial and temporal redundancy. Multimedia Authoring .

LIST OF PRACTICAL

1. A BRIEF STUDY OF VARIOUS TYPES OF INPUT AND OUTPUT DEVICES.
2. PROGRAM TO IMPLEMENT A LINE USING SLOPE INTERCEPT FORMULA.
3. PROGRAM TO IMPLEMENT LINE USING DDA ALGORITHM.
- 4 .PROGRAM TO IMPLEMENT LINE USING BRESENHAM'S ALGORITHM.
5. PROGRAM TO IMPLEMENT CIRCLE USING MID POINT ALGORITHM.
6. PROGRAM TO IMPLEMENT TRANSLATION OF A LINE AND TRIANGLE
7. PROGRAM TO IMPLEMENT ROTATION OF A LINE AND TRIANGLE
8. PROGRAM TO IMPLEMENT SCALING TRANSFORMATION.
9. PROGRAM TO IMPLEMENT 3D ROTATION ABOUT AN ARBITRARY AXIS .
10. PROGRAM TO IMPLEMENT COHEN SUTHERLAND LINE CLIPPING .
11. PROGRAM TO IMPLEMENT SUTHERLAND HODGMAN POLYGON CLIPPING .
12. PROGRAM TO DRAW BEZIER CURVE.
13. PROGRAM TO DRAW B-SPLINE CURVE .

Suggested Reading:

1. Donald Hearn and M.P. Becker "Computer Graphics" Pearson Pub.
2. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill
3. Foley Vandam, Feiner, Hughes "Computer Graphics Principle & Practice" , Pearson Pub.
4. Sinha and Udai , "Computer Graphics", Tata McGraw Hill
5. Parekh "Principles of Multimedia" Tata McGraw Hill
6. Prabhat k Andleigh, Kiran Thakral , "Multimedia System Design " PHI Pub.
7. Shuman "Multimedia in Action", Cengage Learning

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 505 Theory of Computation
Course Contents

Category of Course	Course Title	Course Code	Credit-4C			Theory Paper (ES)
			L	T	P	
Departmental Core DC-11	Theory of Computation	CS 5511/ CS505	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

Branch: Computer Science and Engineering V Semester
Course: CS 505 Theory of Computation

RATIONALE:

The purpose of this subject is to cover the underlying concepts and techniques used in Theory of Computation. In this syllabus we cover finite automata, pushdown automata, Context free grammars and Turing machines.

PREREQUISITE:-

The students should have general idea about computing and mathematical concepts , Transition graph, Transition matrix .

UNIT 1:

Automata:

Basic machine, FSM , Transition graph, Transition matrix, Deterministic and non-deterministic FSM'S, Equivalence of DFA and NFA, Mealy & Moore machines, minimization of finite automata, Two-way finite automata.

Regular Sets and Regular Grammars:

Alphabet, words, Operations, Regular sets, Finite automata and regular expression, Myhill-Nerode theorem Pumping lemma and regular sets, Application of pumping lemma, closure properties of regular sets.

UNIT 2:

Context –Free Grammars:

Introduction to CFG, Regular Grammars, Derivation trees and Ambiguity, Simplification of Context free grammars, Normal Forms (Chomsky Normal Form and Greibach Normal forms).

UNIT 3:

Pushdown Automata:

Definition of PDA, Deterministic Pushdown Automata, PDA corresponding to given CFG, CFG corresponding to a given PDA.

Context Free Languages:

The pumping lemma for CFL's, Closure properties of CFL's, Decision problems involving CFL's.

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.

Suggested Reading:

1. John E. Hopcroft, Jeffery Ullman, "Introduction to Automata theory, Languages & 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, "Introduction 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

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, V Semester
Course: CS 506 Computer Programming V(Unix/Linux-Lab)

Course Contents

Category of Course	Course Title	Course Code	Credit-4C		
			L	T	P
CSE	Computer Programming V (Unix/Linux-Lab.)	CS 5305/ CS506	0	0	4

Branch: Computer Science and Engineering V Semester

Course: CS 5305/ **CS506** Computer Programming V (Unix/Linux-Lab).

RATIONALE:

The purpose of this subject is to cover the concepts, Installation Process, Hardware Requirements and features of Unix/Linux. Basic Commands & Shell Programming.

PREREQUISITE

The students should have general Idea about computing fundamentals & operating system and at least one year of experience in programming .

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 users.u.
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

Course of Study and Scheme of Examination
B.E. Computer Science & Engineering (Proposed Scheme)
SEMESTER – VI

S.No	Course Category	BOS Code	Course Code (Old)	Course Code (New)	Subject	Period Per Week				Distribution of Marks					
										Theory Block	Practical Exam	Internal Assessment			Total
						MST	TW	Total	I			II	III	I+II+III	
L	T	P	C	I	II	III	I+II+III								
1.	DC-13		CS-6513	CS601	Micro Processor and Interfacing	3	1	2	6	100	50	20	30	50	200
2.	DC-14		CS-6514	CS602	PPL	3	1	0	4	100	-	20	-	20	120
3.	DC-16		CS-6516	CS603	Software Engineering & Project managements	3	1	2	6	100	50	20	30	50	200
4.	DC-15		CS-6515	CS604	Computer Networking	3	1	2	6	100	50	20	30	50	200
5.	DC-17		CS-6517	CS605	Advance Computer Architecture(ACA)	3	1	0	4	100	-	20	-	20	120
6.	DC-18		CS-6517	CS606	Minor Project – I	0	0	4	4	-	50	-	50	50	100
7.	NECC-7		CS-6707	CS607	Self Study	0	0	1	1	-	-	-	30	30	30
8.	NECC-8		CS-6708	CS608	Seminar/Group Discussion etc.	0	0	1	1	-	-	-	30	30	30
Total						15	5	12	32	500	200	100	200	300	1000

Minimum Pass Marks
(A) Theory: 35 Percent
(B) Practical:50 Percent

Duration:
[C] Duration of Theory Paper 3 hrs.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 601 Micro Processor and Interfacing

Course Contents

Category of Course	Course Title	Course Code	Credit-6C			Theory Paper (ES)
			L	T	P	
Departmental Core DC- 601	Micro Processor and Interfacing	CS 601	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	2	

Branch: Computer Science and Engineering VI Semester

Course: CS 601 Micro Processor and Interfacing

RATIONALE:

The purpose of this subject is to cover the underlying concepts and techniques used in Micro Processor and Interfacing. In this subject we cover the unique issues associated with designing, testing, integrating, and implementing microcontroller/microprocessor-based embedded systems.

PREREQUISITE

The students should have acquired fundamental microcontroller-associated programming skills using both the C programming language and assembly language

UNIT –I

Evolution of microprocessor, single chip micro computers, Micro processor Application, Microprocessor and its architecture, addressing modes, instruction, Instruction sets, Arithmetic and Logic Instruction, Program control instruction, Introduction – 8086 family, procedure and macros, connection , Timing and Trouble shooting interrupt, 80286, 80836 and 80486 micro processor system concept.

UNIT – II

Microprocessor Cycle, AIU, Timing and control Unit, Register data, Address bus, Pin Configuration, Intel 8086 instruction, Opcode and operands, limitation word size. Programming the microprocessor Assembly language, The Pentium and Pentium Pro Micro Processor with features, Pentium II, Pentium III and Pentium – IV Microprocessor with software changes.

Instruction set for Intel 8086, Introduction Intimation and data formats, Addressing modes, Status flags, Symbols and abbreviations, programming of microprocessors, Assembly language, high level language, areas of application of various languages, Stacks, Sub routines system, software, commands in assembly language, software Development, Debugging program, Modular programming, Structured programming, Top-down, Bottom- up design , MACRO microprogramming

UNIT-III

Assembly language programming with Examples like Addition of 8/16-bit Binary number, subtraction of 8/16 bit binary number, Address partitioning, addressing mode, type of addressing mode, memory and I/o interfacing, Data transfer schemes, Interfacing device and I/o devices I/o ports, Basic I/o Interfacing MDS, Micro controllers, I/o processor and co- processors ,Microcomputer Development system, Single chip micro computers, intel 8748 intel 8051, inter 8096, intel 8049intel 2920/2921, I/o processor UPI-425,UPI-41,42, Co-processor, math processor math co-processor – 8087, 80287, 80387DX 803875x.

UNIT –IV

Bus Interface I/o port Addressing, decoding 8279, Programmable key board/display interface, 8254 Internal Timer, 16550 programmable communication interface A/D, 8259A Programmable Interrupt Controller, 8237 DMA Controller, Shared bus operation, disk Memory system Video display. ISA Bus, Extended ISA (EISA) and VESA Local Buses, Peripheral Component Inter Connect (Pc I) Bus, Parallel Printer interface (LPT) Universal serial Bus (USB) Accelerated graphics port (AGP),Programmable Communication interfere 8251 VSART CRT Controller 8275, 6854, Floppy disk Controller 8272, I/o processor 8089.

UNIT – V

Memory Unit, RAM,SRAM, DRAM,ROM, PROM EPROM, EEPROM Nonvolatile RAM semiconductor Technology for memory, Shift register, Magnetic Memory, Tap, disc, main memory and secondary memory cache memory, program memory and Data Memory, Real and virtual memory Buses, memory Addressing capacity of CPU, processing speed of computer.

List of Experiments

1. Add a data byte located at offset 0500H in 2000H segment to another data byte available at 06000H in same segment and store the resulting 0700H in same segment?
2. Add the contents of memory location 2000H, offset 0500H to the contained of accumulator.
3. Write a program to find the average to two temperature name HI-TEMP and LO-TEMP and puts the result in the memory location AV-TEMP.
4. Find out the largest number from an unordered array of sixteen 8-bit numbers stored sequentially in the memory locations starting at offset 0500H in the segment 2000H
5. Move a byte string, 16 bytes long, from the offset 0200H to 0300H in the segment 7000H.
6. Write a program to add a profit factor to each element in a cost array and puts the result in a PRICES array, where profit factor is 15H and COST =20H, 28H, 15H, 26H, 19H, 27H, 16H, 29H.
7. Write a program to find out the number of positive numbers and negative numbers from a given series of signed numbers.
8. Write a program that performs the addition, subtraction, multiplications, division of the given operands. Perform BCD operation for addition and subtraction.
9. A Program to find out the number of even and odd numbers from a given series of 16 bit hexad4ecimal numbers.

Suggested Reading:

1. Douglas V Hall, "Microprocessors and interfacing – Programming & Hardware" TMH
2. Barry B. Brey, "The intel Microprocessor – 8086", Pearson Education
3. Kenneth J.Ayala,"The 8086 Microprocessor: Programming & Interfacing The PC",Cengage Learning
4. Krishna Kant,"Microprocessors and Microcontrollers", PHI Learning
5. A.K.Ray KM Bhurchandi, "Advanced Microprocessor and peripherals" McGraw Hill
6. R.S. Gaonkar , "Microprocessors and interfacing", TMH

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 602 Principles Of Programming Languages

Category of Course	Course Title	Course Code	Credit - 4C			Theory Paper (ES)
Departmental Core DC-14	Principles Of Programming Languages	CS 6514/	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
		CS602	3	1	0	

Branch: Computer Science and Engineering VI Semester

Course: CS 602 Principles Of Programming Languages

RATIONALE:-

The purpose of this subject is to cover the underlying concepts and techniques used in Programming Languages. It provides general idea related to operating & Programming environment.

PREREQUISITE:-

The students should have general idea about programming language . In addition, a familiarity with Elementary and Structured Data Types is needed for better understanding.

UNIT-I

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-II

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-III

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-IV

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, message passing, Java threads, C# threads.

UNIT – V

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.

Suggested Reading:

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

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 603 Software Engineering & Project Managements

Course Contents

Category of Course	Course Title	Course Code	Credits-6C			Theory Papers (ES)
			L	T	P	
Departmental Core DC-16	Software Engineering & Project Management	CS 6516/ CS603				Max.Marks-100 Min.Marks-35 Duration-3 hrs.
			3	1	2	

Branch: Computer Science & Engineering VI Semester

Course: CS 6516/ **CS603** Software Engineering & Project Management

RATIONALE:

The purpose of this subject is to cover the underlying concepts and techniques used in Software Engineering & Project Management. Some of these techniques can be used in software design & its implementation.

PREREQUISITE:-

The students should have at least one year of experience in programming a high-level language and databases. In addition, a familiarity with software development life cycle will be useful in studying this subject..

Unit I: 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 II: 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 III: 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 IV: 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 V: 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.

Suggested Reading:

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 Engineering", Pearson Education.
5. Richard H. Thayer, "Software Engineering & Project Managements", Willey India
6. Waman S. Jawadkar, "Software Engineering", TMH
7. Schwalbe, "IT Project Managements", Cengage Learning.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 604 Computer Networking

Course Contents

Category of Course	Course Title	Course Code	Credit-6C			Theory Paper (ES)
			L	T	P	
Departmental Core DC-15	Computer Networking	CS 6515/ CS604	3	1	2	Max.Marks-100 Min.Marks-35 Duration-3hrs.

Branch: **Computer Science & Engineering VI Semester.**

Course: CS 6515/ **CS604** Computer Networking

RATIONALE:-

The purpose of this subject is to cover the underlying concepts and techniques used in Computer Networking. This syllabus provides a comprehensive introduction to computer network, network architecture and protocols.

PREREQUISITE:-

The students should have thorough exposure in Analog and Digital Communication and Data Communications. Knowledge of Topology and protocol will help in better understanding

Unit I

Computer Network: Definitions, goals, components, structure, Architecture, Classifications & types, Growth, Complexity and applications etc. Layered Architecture: Protocol hierarchy, Connection Oriented & Connectionless Services, Service permutative Design issues & its functionality. ISO-OSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP. Network standardization.

Examples of Networks: Telecommunication Network, Corporate Networks, Connection oriented network i.e., X.25, Frame relay & ATM, Wireless LAN 802.11, internet, Intranet, Extranet, SNA & DNA etc.

Unit II

Data Link Layer: Need, Services Provided, Framing & its methods, Flow Control, Error control. DLL Protocol: Elementary & Sliding Window. Piggybacking & Pipelining. Protocol verification: Finite State Machine Models & Petri net models. Example in Data Link Layers: HDLC & Internet. Comparison of BISYNC and HDLC Features. Bridges and layer-2 switches

Unit III

MAC Sub layer: Static & Dynamic channel allocation, Media access control for LAN & WAN. Classification of MAC Sub layer protocol, Study of various collision, Collision free & limited contention protocol i.e., ALOHA : pure, slotted , CSMA, CSMA/CD, CSMA/CA, Bit Map, Binary count down, BRAP, MLMA, Adaptive tree walk & urn protocol etc. IEEE 802 standards for LAN & MAN & their comparison. Ethernet: Cabling, Binary exponentials algorithms, performance fast Ethernet, Gigabit Ethernet, FDDI. Wireless LANs, Broadband Wireless, Bluetooth: Architecture, Application & Layering.

UNIT - IV

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, Routing for mobile hosts, Routing in Ad Hoc Networks Routing Strategies, 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 V

Processes to Processes Delivery – Transmission Control Protocol (TCP) - User Datagram Protocol, Data Traffic, Congestion Control and Quality of Service, Techniques to improve QOS, Integrated Services, and Differentiated Services. Network Security: Cryptography, Message Security, Digital Signature, User Authentication, Key Management, Security Protocols in Internet ,DNS,SMTP, FTP, HTTP, WWW, Virtual Terminal Protocol, VoIP: Basic IP Telephone System,H.323 Characteristic & Layering, SIP Characteristics, Method & Sessions.

List of Experiments

1. To study Communication Guiding system
2. To study various types of connectors.
3. To study of different type of LAN equipments.
4. Study and verification of standard Network topologies i.e. Star, Bus, Ring etc
5. LAN installations and their Configurations.
6. To implement various types of error correcting techniques.
7. To implement various types of framing methods.
8. To implement various types of DLL protocols.
9. To study & configure various types of router & Bridges.
- 10.To implement various types of routing algorithm.
11. To study of Tool Command Language(TCL).
- 12.Study and Installation of Standard Network Simulator, N.S-2.
13. Study & Simulation of MAC Protocols like Aloha, CSMA, CSMA/CD and CSMA/CA using Standard Network Simulator.
14. Study & Simulation of Routing Protocols using Standard Network Simulator.
15. Study & implementations of VoIP Concepts.
- 16.Implementation & Comparisons of various types of Cryptographic algorithms.

Suggested Reading:

1. Tanenbaum A. S ,”Computer Networks “Pearson Education.
2. Stalling W, “Computer Networks”, Pearson Education
3. Douglas E. Comer & M.S Narayanan,”Computer Network & Internet”, Pearson Education
4. Behraj A Forouzan,”Data Communication & Networking”, McGraw-Hill.
5. Natalia Olifar & Victor Olifer,”Computer Networks”, Willey Pub.
6. Prakash C. Gupta, “Data Communications and Computer Networks”, PHI
7. Bertsekas & Gallager “Data Network” , PHI
- 8 Gallo,”Computer Communication & Networking Technologies”,Cengage Learning

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
PROGRAMME: B.E. Computer Science & Engineering, VI Semester
Course: CS 605 Advance Computer Architecture

Course Contents

Category of Course	Course Title	Course Code	Credit-6C			Theory Paper (ES)
			L	T	P	
Departmental Core DC- 605	Advance Computer Architecture	CS 605	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

Branch: Computer Science and Engineering VI Semester

Course: CS 605 Advance Computer Architecture

RATIONALE:

The purpose of this subject is to cover the underlying concepts and techniques used in Advance Computer Architecture. The Syllabus discusses principles of parallel algorithms design and different parallel programming models

PREREQUISITE

The students should have general Idea of Computer Organization. In addition, a familiarity with Memory organization, Computational models is required.

Unit-I

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- II

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-III

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-IV

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-V

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.

Suggested Reading:

1. Kai Hwang, "Advanced computer architecture", TMH.
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3. V.Rajaraman & 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, Taylor & Francis, "Advance Computer Architecture