

**BE V SEMESTER COMPUTER SCIENCE & ENGG.****COURSE CONTENTS (UEC SCHEME)**

CS-5008	Microprocessor and Interfacing	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

**UNIT-I**

**Microprocessor Introduction:** Evolution of microprocessor, Microprocessor architecture, Simple model of microprocessor, Different phases in instruction execution. **Architecture of 8086:** Register organization, Physical memory organization and Types of memory i.e. RAM, SRAM, DRAM, ROM, PROM, EPROM, EEPROM Nonvolatile RAM. Flag register structure, Address and data bus, Bus interface unit and Execution unit.

**UNIT-II**

**Intel 8086:** Pin Configuration and Signal description in Maximum and Minimum modes. Timing and control Unit, Instruction execution cycle, 8086 instruction format, opcode and operands, Instruction word size. Instruction sets: Data movement, Arithmetic, Logical, and Branching instructions, Stack and Procedure. Addressing mode, types of addressing mode. **Memory interfacing:** Bank selection, basic memory interfacing and memory addressing.

**UNIT-III**

8086 Assembly language programming with Examples like Addition of 8/16-bit Binary number, subtraction of 8/16 bit binary number. Assembler directives and Macro. **I/O Interfacing:** Introduction, Data transfer schemes: Programmed I/O and Interrupt driven I/O, I/O Interfacing techniques: Direct I/O and Memory mapped I/O. I/O port Addressing, Introduction to 8255 I/O port. **8086 Interrupt:** Introduction, Interrupt types, 8259A Programmable Interrupt Controller.

**UNIT-IV**

**8254 Programmable Interval Timer:** Features, Description, Programming examples, and Interfacing with 8086. **8237A DMA Controller:** Features, Description, DMA Transfer modes, DMA Interfacing. Introduction to 8279 Programmable keyboard / display interface. **Bus Interface:** Introduction to ISA Bus, Extended ISA (EISA) and VESA Local Buses, Peripheral Component Inter Connect (PCI) Bus, Parallel Printer interface (LPT), Universal serial Bus (USB), Accelerated graphics port (AGP), and Programmable Communication interfere 8251A.

**UNIT-V**

Introduction to 80286, 80836, 80486 and Pentium microprocessor systems. I/O Processor 8089, Math co-processor– 8087, 80287, and 80387. **Microcontroller 8051:** Features, Architecture: Pin-out of 8051, Internal RAM and ROM, I/O Ports, and Register set. Memory organization, Timer and Counters in 8051. Microcomputer Development system, Single chip micro computers.

**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

**BE V SEMESTER COMPUTER SCIENCE & ENGG.****COURSE CONTENTS (UEC SCHEME)**

<b>CS-5002</b>	<b>Theory of Computation</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Max. Marks</b>	<b>Min. Marks</b>
Duration	3 Hours	3	1	0	4	100	35

**UNIT- I**

**Automata:** Basic machine, FSM , Transition graph, Transition matrix, Deterministic and non-deterministic FSM'S, Equivalence of DFA and NDFA, 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-II**

**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-III**

**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-IV**

**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- V**

**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

**BE V SEMESTER COMPUTER SCIENCE & ENGG.****COURSE CONTENTS (UEC SCHEME)**

CS-5003	Operating System	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	100	35

**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 peripheral.

**Suggested 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.

BE V SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-5004	Database Management System	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	100	35

**Unit I:**

DBMS Concepts and architecture Introduction, Database approach v/s Traditional file accessing approach. Review of file organization techniques. Database schemas and Instances, Data independence. Database users, functions of DBA and database Designer. Various data models, basic concepts of Hierarchical data model, Network data model, and Relational data model, Comparison between the three types of models.

**Unit II:**

**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.  
**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.

**Unit III :**

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. Relational Query languages: SQL-DDL, DML, Complex queries, various joins, indexing, triggers, assertions.

**Unit IV :**

**Data Base Design:** Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multivalued dependencies.

**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.

**Unit V:**

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. Introduction to Distributed databases, data mining, data warehousing, Object Technology and DBMS, Comparative study of OODBMS Vs DBMS . Temporal, Deductive, Multimedia, Web & Mobile database. Study of Relational Database Management Systems through Oracle/MS-Access/MySQL.

**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 data model (design of the database)

**Section B:**

Implement a mini project 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

**BE V SEMESTER COMPUTER SCIENCE & ENGG.****COURSE CONTENTS (UEC SCHEME)**

<b>CS-5005</b>	<b>Data Communication</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Max. Marks</b>	<b>Min. Marks</b>
Duration	3 Hours	3	1	2	6	100	35

**UNIT-1:** 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, Soft switch 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, base band, 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 queuing theory.

**UNIT-4:** Transmission Media: Transmission line characteristics, distortions, Crosstalk, Guided Media: Twisted Pair, Base band & 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 waves front ,electromagnetic spectrum and radiation ,spherical wave front 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 Redundancy 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.

**BE V SEMESTER COMPUTER SCIENCE & ENGG.****COURSE CONTENTS (UEC SCHEME)**

CS-5006	Linux & Shell Programming Lab	L	T	P	C	PRACTICAL	
						Max. Marks	Min. Marks
Duration	3 Hours	0	0	4	4	50	25

**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, 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

**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

**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 wccc.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 wccc.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