JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)
Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)
Scheme of Study and Examination (w.e.f. July 2010)

B.E. Second Year **Branch : Information Tech.** **Sem : Fourth**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
					SESSIONAL EXAM			ESE	SUB TOTAL	
		L	T	P	TA	CT	TOT			
IT-04	Computer Architecture	3	1	-	10	20	30	70	100	4
MA-06	Discrete Structure	3	1	-	10	20	30	70	100	4
CS-08	Data Base Management System	3	1	-	10	20	30	70	100	4
IT-06	Principles of Communication	3	1	-	10	20	30	70	100	4
CS-10	Analysis & Design of Algorithms	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
IT-05L	Computer Architecture Lab	-	-	2	20	-	20	30	50	2
CS-09L	Data Base Management System Lab	-	-	2	20	-	20	30	50	2
CS-11L	Analysis & Design of Algorithms Lab	-	-	2	20	-	20	30	50	2
IT-07L	Principles of Communication Lab	-	-	2	20	-	20	30	50	2
IT-40L	Professional Activity	-	-	2	50	-	50	-	50	2
IT-41L	Seminar/Group Discussion	-	-	2	50	-	50	-	50	2
	Total	**15**	**5**	**12**	**230**	**100**	**330**	**470**	**800**	**32**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 800
Total Periods : 32, Total Credits : 32

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**COMPUTER ARCHITECTURE**	IT-04	Min "D"	Min "D"	5.0

COMPUTER ARCHITECTURE

Unit I Computer Basics and CPU: Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer.

Unit-II Control Unit Organization: Hardwired control unit , Micro programmed control unit Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer, Microprogramming, Arithmetic and Logic Unit: Arithmetic Processor, Addition, subtraction, multiplication and division, Floating point and decimal arithmetic and arithmetic units, design of arithmetic unit.

Unit-III System Organization: Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor , Multiprocessors: Pipeline and Vector processing, Instruction and arithmetic pipelines, Vector and array processors, Interconnection structure and inter-processor communication.

Unit-IV Memory organization: Memory Maps, Memory Hierarchy, Cache Memory - Organization and mappings. Associative memory, Virtual memory, Memory Management Hardware.

Unit V Introduction to Microprocessor: 8085 architecture and organization, instruction set , counters and timing delays, stacks and subroutines , 8085 I/O structure, Interrupts , basic Interfacing concept , memory mapped and I/O mapped I/O, basic programming.

Text Books:

1. Morris Mano: Computer System Architecture, PHI.
2. Gaonkar: Micro processor Architecture, Programming, Applications with 8085; Penram Int.

References:

1. Tanenbaum: Structured Computer Organization, Pearson Education
2. J P Hayes, Computer Architecture and Organizations, Mc- Graw Hills, New Delhi
3. William Stallings: Computer Organization and Architecture, PHI
4. ISRD group; Computer Organization; TMH
5. Cart er; Comp ut er Architecture (Schaum); TMH
6. Carl Hamacher: Computer Organization, TMH

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**DISCRETE STRUCTURE**	MA-06	Min "D"	Min "D"	5.0

DISCRETE STRUCTURE

Unit-I

Set Theory, Relation, Function Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Function: Definition, , one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction,

Unit-II

Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, , Rings and Fields: definition and examples

Unit-III

Propositional Logic : Proposition, first order logic, Basic Logical Operation, truth tables, tautologies, contractions, Algebra of Proposition, logical implications, logical equivalence, predicates, Introduction to finite state machines finite state machines as models of physical system equivalence machines, finite state machines as language recognizers.

Unit-IV

Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

Unit-V

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices.

Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions,

Text Books:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.

References:

1. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
2. Lipschutz; Discrete mathematics (Schaum); TMH
3. Deo, Narsingh, "Graph Theory With application to Engineering and Computer.Science.", PHI.
4. Krishnamurthy V; "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.
5. S k Sarkar " Discrete Mathematics", S. Chand Pub

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**DATA BASE MANAGEMENT SYSTEM**	CS-08	Min "D"	Min "D"	5.0

DATA BASE MANAGEMENT SYSTEM

Unit 1 Basic Concepts: DBMS Concepts and architecture Introduction, Database approach v/s Traditional tile accessing approach, Advantages of database systems, Data models, Schemas and instances, Data independence, database users and DBA.

Unit II: Data models and their Comparison, Entities and attributes, Entity Sets, Relationships, Extended E-R Features Defining the E-R diagram of database Relational Data models: Domains, Tuples, Attributes, Relations, Integrity constraints.

Unit III: Structured Query Language ,Relational Query languages: Relational algebra, Relational algebra operations like select, Project, Join, Division, outer union. SQL: DDl, DML and their commands, Aggregate function, nested subquery, views in SQL, join Data retrieval queries, accessing SQL from programming language.

Unit IV: Database Design Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, multi-valued dependencies.

Unit V: Transaction Processing Concepts: - Transaction System, Testing of Serializability, 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, data mining, data warehousing.

Text Books:

1) Database System Concepts, Silberschatz, Korth and Sudarshan
2) Fundamental of database system by Elmasri / Navathe the Benjamin / Cunnings Publishing company inc.

Reference:

3) Data Base Management System by C.J. Date
4) Data Base Management System by Ullman
5) Data base design by Gio Wiederhold. McGraw Hill
6) Fundamental of Data Base Management System by Leon & Leon, Vikas Publishing House Pvt. Ltd.
7) Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press,TMH.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	PRINCIPLES OF COMMUNICATION	IT-06	Min "D"	Min "D"	5.0

PRINCIPLES OF COMMUNICATION

Unit I

Data and signal-Analog and digital signals, Time and frequency domain, Composite signals, Bandwidth, bit rate, bit length, Baseband and broadband transmission, Attenuation, distortion, noise, Nyquist bit rate ,Shannon capacity ,Throughout, delay ,Jitter, Bandwidth delay product.

Unit II

Sampling theorem, quantization, PCM, Delta modulation, Adaptive delta modulation, DPCM, bandwidth of PCM and delta modulation.ASK, BPSK, QPSK, DPSK, BFSK.

Unit III

Data transmission – Parallel and serial transmission, synchronous, and Asynchronous transmission, Simplex, half duplex and full duplex , unipolar and polar line codes, Non return to zero codes, return to zero codes, bipolar line codes, bauds , modem, Line configurations Point to point and point to multipoint configuration. Multiplexer: TDM, FDM, WDM. Data compression devices, Inverse multiplexer.

Unit IV

Digital interface standards: RS-232 standard, hand shaking, connecting a DTE in RS-232 C, RS –449, RS-422A and RS-423A standards. High-speed desktop serial interfaces. Remote digital transmission carrier ISDN, Packet data network, Modems, multispeed modems, high speed modems, Error Correcting modems, data compression in modems. Short-wave modems.

Unit V

Data Integrity, sources of error control approaches. Implementation of error control Echo checking parity checking and cyclical purity, Hammering code, checksums, Cyclical Redundancy check. Security and security measures.

Transmission media-Guided and unguided media, twisted pair, Unshielded twisted pair and Shielded twisted pair, coaxial cable.

Text Book:

1. Data & Computer Communication, William Stallings – Pearson Education.

References:

1 Data & Network Communication, Michael A. Miller – DELMAR (Thomson learning) / Vikas Publication.

2. Understanding Data Communication & Networks, William A Shay – Thomson Learning / Vikas Publication.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**ANALYSIS & DESIGN OF ALGORITHMS**	CS-10	Min "D"	Min "D"	5.0

ANALYSIS & DESIGN OF ALGORITHMS

Unit I

Algorithm properties. Analysis of Algorithms: Priori analysis and Posteriori analysis. Worst, Best and Average case analysis. RAM model for analysis. Space and Time Complexities of algorithms. Step count and Recurrence Relation. Asymptotic notations Big O , Big Ω, θ, little o, little ω.

Unit II

Introduction to divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, merge sort, quick sort, and Stassen's matrix multiplication.

Unit III

Study of Greedy strategy, examples of greedy method like optimal merge patterns, Huffman coding, minimum spanning trees, knapsack problem, job sequencing with deadlines, single source shortest path algorithm, etc.

Unit IV

Concept of dynamic programming, problems based on this approach such as 0/1 knapsack, multistage graph, reliability design, Floyd-Warshall algorithm, etc. Backtracking concept and its examples like 8 queen's problem, Hamiltonian cycle, Graph coloring problem etc.

Unit V

Introduction to branch & bound method, examples of branch and bound method like traveling salesman problem etc. Lower bound theory and its use in solving algebraic problem. Deterministic and Non Deterministic Algorithm. NP-completeness: P, NP, NP-Hard and NP-Complete problems.

Text Books:

1. Horowitz & Sahani; Analysis & Design of Algorithm
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

References:

1. Coremen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Dasgupta; algorithms; TMH
3. Ullmann; Analysis & Design of Algorithm;
4. Michael T Goodrich, Robarto Tamassia, Algorithm Design, Wiely India

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**COMPUTER ARCHITECTURE LAB**	IT- 05L	Min "D"	Min "D"	5.0

COMPUTER ARCHITECTURE LAB

(Suggested Exercise)

1. REVERSING AN ARRAY : A block of 16 bytes are residing at locations standing from BLOCK1 WAP to transfer the block in reverse order at locations starting form BLOCK 2.
2. SORTING IN ASCENDING ORDER : A block (16 bytes are residing at locations starting from DATA : write a program to arrange the word in the same location in ascending order.
3. BINARY ADDITION : 16 bytes are residing at location starting from DATA WAP : to add all bytes and store the result location SUM and SUM+1
4. BCD ADDITION : 16 BCD NUMBER are residing at location starting from DATA WAP : to add all bytes and store the result location SUM and SUM+1
5. MULTIPLICATION : Two bytes are residing at location DATA 1 and DATA 2. Write a program to multiply the two bytes and store the result at location PROD 1 and PROD 2.
6. BINARY TO BCD : A binary number is residing at location BIN > WAP to convert the binary number into its equivalent BCD and store the result at BCD and BCD + 1
7. BCD TO BINARY : A BCD number is residing at location BCD; write a program to convert the BCD number into its equivalent binary and store the result at BIN
8. MULTIBYTE ADDITION : Two 10 bytes are residing at location starting from DATA 1 and DATA 2 respectively. Write a program to add them up and store the result at location starting from RESULT (result space 11 bytes)
9. MULTIBYTE BCD ADDITION : Two 6 digit BCD numbers are residing at location starting from DATA 1 and DATA 2 respectively. Write a program to add them up and store the result at locations starting from RESULT (Result space 7 bytes.)
10. RST 6.5: A block of 16 bytes is residing at location starting from DATA reverse the block and store the bytes at REVERSE whenever the RST 6.5 key is pressed.
11. EDITING OF ASCII STRING : A string of ASCII characters is residing at locations starting from READ which contain "I$ BE $ AN $ ENGINEER". Edit string in such a way that it should contain "I $ will $ be $ Engineer " keep the edited string in the same locations. Product the string from further editing. ($ stands for a blank)
12. SIGNED BINARY ADDITION : A block of 16 signed binary numbers is residing at location NUMBERS. Add them up and store the result (in signed binary) at locations from RESULT.
13. ASCII CODE CONVERSION : A string of 16 ASCII characters are residing at locations starting from DATA. The string consists of codes for capital letters, small letters and BCD digits (0-9) Convert the ASCII characters in such a way that the codes for capital letters be converted into corresponding codes for small letters, codes for small letters into that of capital letters and codes for BCD digits into that of BCD number and store them at the same locations.
14. PARITY CHECK : A block of 32 bytes is residing at DATA count the number (BCD) of times even and odd PARITY bytes are appearing consecutive memory locations. Keep the count at MATCH.
15. SERIES GENERATION : Two BCD number a and b are residing at locations DATA 1 and DATA 2 respectively. Write a program to form a series in BCD with the elements of a. a + 2b, a + 4b, a+ 6b, …… Stop the generation of the series whenever any element of the series in BCD with the elements of the series exceeds (99). Store the result at locations starting from RESULT. Count the number (BCD) of elements in the series and store it a NUMBER.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**DATA BASE MANAGEMENT SYSTEM LAB**	CS-09L	Min "D"	Min "D"	5.0

DATA BASE MANAGEMENT SYSTEM LAB

(Suggested Exercise)

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 mini project for the problem taken in section A.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**ANALYSIS & DESIGN OF ALGORITHM LAB**	CS-11L	Min "D"	Min "D"	5.0

ANALYSIS & DESIGN OF ALGORITHM LAB

(Suggested Exercise)

1. Perform recursive binary and linear search
2. Short a given set of elements using Heap sort technique.
3. Sort a given set of elements using Merge short technique
4. Find solution of Knapsack problem using Greedy approach
5. Implement o/1 knapsack problem using dynamic progeamming.
6. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
7. Sort a given set of elements using Quick sort technique.
8. Find minimum cost spanning tree of a given undirected graph using Kruskal's algorithm.
9. Print all the nodes reachable from a given starting node in a digraph using Breadth first search technique.
10. Implement all pair shortest paths problem using Floyd's algorithm.
11. Find minimum cost spanning tree for a given undirected graph using Prim's algorithm.
12. Print all the nodes reachable from a given starting node in a given digraph using Depth firt search technique.
13. Compute the transitive closure of a given directed graph using Warshall's algorithm.
14. Implement n-Queens problem using backtracking technique.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**PRINCIPLES OF COMMUNICATION LAB**	IT- 07L	Min "D"	Min "D"	5.0

PRINCIPLES OF COMMUNICATION LAB

(Suggested Exercise)

1. To study basic introduction to Data Communication and importance of data communication.
2. To Perform Sampling & Reconstruction of original signal & to calculate the Sampling Frequency
3. To Perform Amplitude shift keying (ASK) thereby determining relative change in Amplitude.
4. To perform frequency shift keying (FSK) thereby determining relative change in Frequency.
5. To perform phase shift keying (PSK) thereby determining relative change in phase.
6. To perform Quadrature phase shift keying (QPSK) thereby determining relative change in Phase.
7. To perform Quadrature Amplitude Modulation (QAM)
8. To perform Adaptive Delta Modulation, Demodulation.
9. To perform Delta Modulation and Compare it with Adaptive Delta Modulation (ADM)
10. To study & perform Transmission & Reception of signal using TDM Technique.
11. To study Quadrature phase shift keying Modulation.
12. Study of PCM Generation & Detention.
13. To study serial interface RS-232 and its applications.
14. To configure the modem of a computer.
15. To study different types of Medium in data communication.
16. To create a network cable for communicating two PC's
17. To study PC to PC communication
18. Write a program in 'C' for PC to PC communication using RS-232 port.
19. To study different types of transmission media.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**PROFESSIONAL ACTIVITY**	IT-40L	Min "D"	Min "D"	5.0

PROFESSIONAL ACTIVITY
(Suggested Exercise)

- Student shall visit a nearby Industry and shall prepare a technical report suggesting some improvement in operation.
- Student shall Design and fabricate a new laboratory equipment. He shall prepare a design report.
- Student shall improve an existing lab equipment and prepare chart or lab manual .
- Student shall publish a review paper in some Indian Journal.
- Student shall make a report on an Industry employing latest technology/ Innovation.
- Student shall prepare a working model of a machine part.
- Student shall make a software/ comp. program for the Institute to enhance efficiency in its working.
- Student shall prepare a detailed project report to start a small-medium enterprise.
- A group of student shall register with the Industry cell and submit a report on work done there about Institute-Industry linkage.
- Experimental work on a new set of equipments.
- Seminar Presentation with a report submitted to the supervisor.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
B.E CS/IT	**SEMINAR/GROUP DISCUSSION**	IT-41L	Min "D"	Min "D"	5.0

Objectives of Group Discussion & 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.