Jabalpur Engineering College, Jabalpur

Semester IV Credit Based Grading System (CBGS) w.e.f. July 2017

Scheme of Examination

Bachelor of Engineering B.E. (Computer Science & Engineering)

Subject wise distribution of marks and corresponding credits

Scheme of Examination w.e.f. July-2017 (Academic Session-2017-18)

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Hours / week.			Total Credits	Total Marks
			Theory			Practical		Total Marks					
			End Sem	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work		L	T	P		
1	**MA4301**	Mathematics-III	70	20	10	-	-	100	3	1	-	4	
2	**CS4002**	Data Base Management System	70	20	10	30	20	150	3	1	2	6	
3	**CS4003**	Computer System Organization	70	20	10	30	20	150	3	1	2	6	
4	**CS4004**	Analysis and Design of Algorithm	70	20	10	30	20	150	3	1	2	6	
5	**CS4005**	Data Communication	70	20	10	-	-	100	3	1	-	4	
6	**CS4006**	Departmental Lab-I (Departmental Choice) Python	-	-	-	30	20	50	-	-	2	2	
7	**CS4007**	Programming Tools (Departmental Choice) (Internal Assessment)MS-Access and SQL server	-	-	-	-	50	50	-	-	2	2	
8	**CS4008**	Professional Ethics/ Security and regulation act (Internal Assessment)	-	-	-	-	50	50	-	-	2	2	
		Total	**350**	**100**	**50**	**120**	**180**	**800**	**15**	**5**	**12**	**32**	**800**

MST: Minimum of two mid semester tests to be conducted.

L: Lecture T: Tutorial P: Practical

- **Students have to go for Industrial Training /Internship of 4 weeks at the end of IV Semester.**

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B.E. (CBGS) IV SEMESTER
COMPUTER SCIENCE & ENGINERRING
MATHEMATICS-III

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E. (CBGS)	Mathematics-III	MA4301	Min. "D"	Min. "D"	5.0

Unit-I:

Roots of algebraic and transcendental equations: Bisection method, Regula-Falsi method, Newton-Rap son method, iteration method, Giraffes root squaring method.

Solution of system of linear equations: Gauss elimination method, Gauss Jordan method, LU decomposition method, relaxation method, Jacobi and Gauss-Seidel methods.

Unit –II:

Interpolation: Finite difference operator and their relationships, difference tables, Newton, Gauss, Bessel and Stirling's interpolation formulae, Divided differences, Lagrange Interpolation and Newton's divided difference interpolation.

Numerical differentiation and Integration: First and second order derivatives by various interpolation formulae, Trapezoidal, Simpsons 1/3rd and 3/8th rules with errors and their combinations, Gauss Legendre 2-points and 3-points formulae.

Unit –III:

Numerical Solution of ordinary differential equations: Solution of ODE by Taylor series, Picard's method, Modified Euller method, Runge-kutta Method, predictor corrector method.

Numerical solution of Partial Differential Equations :Classification, Finite –difference approximation to derivatives, solution of Laplace's equation by Jecobi's and Gauss Seidel method, parabolic equation, Iterative method for the solution of equations, Hyperbolic equation and its numerical solution.

Unit –IV:

Stochastic process and Markov Analysis: Introduction to stochastic process , Simple stochastic processes, Markove process, transition probability, Transition probability matrix, Markov chain, Some theorems and problems.

Unit –V:

Queuing Theory: Queuing systems, Transient and steady state, traffic intensity, Distribution of queuing systems, classifications of queuing models (M/M/1: infinity/FCFS, M/M/1: N / FCFS, M/M/1: infinity/SIRO, M/M/S: infinity/ FCFS, M/M/C: infinity/FCFS, M/M/R: (k/GD); K<R, Power supply model)

Books References:

1. Numerical Methods in Engineering and science by B.S. Grewal, Khanna Publishers.
2. Numerical Methods by E. Balagurusamy, Tata Mc Graw- Hill Publishing CompanyLtd., New Delhi.
3. Numerical Methods for Scientific and Engineering Computation by Jain, M. K. , Iyengar, S. R. K. and Jain, R. K., New Age Pvt. Pub.New Delhi.
4. Operation Research, Taha H.A; PHI.
5. Introduction to OR, Hiller and Lieberman; TMH.

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B.E. (CBGS) IV SEMESTER
COMPUTER SCIENCE & ENGINERRING
DATA BASE MANAGEMENT SYSTEM

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E. (CBGS)	Data Base Management System	CS4002	Min. "D"	Min. "D"	5.0

Unit –I:

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 sub query, 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.

Books References:

1. Database System Concepts, Silberschatz, Korth and Sudarshan
2. Fundamental of database system by Elmasri / Navathe the Benjamin / Cunnings Publishing company
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.
7. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press,TMH.

DATABASE MANAGEMENT SYSTEM LAB

List of Experiment:

1. Study and execute Data Definition Language commands.
2. Study and execute Data Manipulation Language commands.
3. Study and execute SELECT command with different clauses.
4. Study and execute AGGREGATE/GROUP functions (avg, count, max, min, sum).
5. Study and execute SQL commands using SET OPERATORS (Union, Intersect, Minus).
6. Study and execute SQL commands for enforcing various types of Integrity Constraints.
7. Study and execute SQL commands showing use of various types of JOINS.
8. Study and execute SQL commands to show the use of views.
9. Study and execute Data Control Language commands.

B.E. (CBGS) IV SEMESTER
COMPUTER SCIENCE & ENGINERRING
COMPUTER SYSTEM ORGANIZATION

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E. (CBGS)	Computer System Organization	CS4003	Min. "D"	Min. "D"	5.0

Unit-I:

Data representation and Computer arithmetic: Introduction to Computer Systems, Organization and architecture, evolution and computer generations; Fixed point representation of numbers, digital arithmetic algorithms for Addition, Subtraction, Multiplication using Booth's algorithm and Division using restoring and non restoring algorithms. Floating point representation with IEEE standards and its arithmetic operations.

Unit-II:

Basic Computer organization and Design: Instruction codes, stored program organization, computer registers and common bus system, computer instructions, timing and control, instruction cycle: Fetch and Decode, Register reference instructions; Memory reference instructions. Input, output and Interrupt: configuration, instructions, Program interrupt, Interrupt cycle, Micro programmed Control organization, address sequencing, micro instruction format and micro program sequencer.

Unit- III:

Central Processing Unit: General register organization, stack organization, instruction formats, addressing modes, Data transfer and manipulation, Program control. CISC and RISC: features and comparison. Pipeline and vector Processing , Parallel Processing, Pipelining, Instruction Pipeline, Basics of vector processing and Array Processors.

Unit- IV:

Input-output organization: I/O interface. I/O Bus and interface modules, I/O versus Memory Bus. Asynchronous data transfer: Strobe control, Handshaking, Asynchronous serial transfer. Modes of Transfer: Programmed I/O, Interrupt driven I/O, Priority interrupt; Daisy chaining, Parallel Priority interrupt. Direct memory Access, DMA controller and transfer. Input output Processor , CPU-IOP communication, I/O channel.

Unit- V:

Memory organization: Memory hierarchy, Primary memory, Auxiliary memory, Associative memory, Cache memory: mapping functions, Virtual memory: address mapping using pages, Memory management.

Books References:

1. Morris Mano: Computer System Architecture, PHI.
2. Gaonkar: Micro processor Architecture, Programming, Applications with 8085; Penram Int.
3. Tanenbaum: Structured Computer Organization, Pearson Education
4. J P Hayes, Computer Architecture and Organizations, Mc- Graw Hills, New Delhi
5. William Stallings: Computer Organization and Architecture, PHI
6. ISRD group; Computer Organization; TMH
7. Cart er; Comp ut er Architecture (Schaum); TMH
8. Carl Hamacher: Computer Organization, TMH

COMPUTER SYSTEM ORGANIZATION LAB

List of Experiments:

1. Study of Multiplexer and Demultiplexer.
2. Study of Half Adder and Subtractor.
3. Study of Full Adder and Subtractor.
4. WAP to add two 8 bit numbers and store the result at memory location 2000.
5. WAP to multiply two 8 bit numbers stored at memory location 2000 and 2001 and stores the result at memory location 2000 and 2001.

6. WAP to add two 16-bit numbers. Store the result at memory address starting from 2000.
7. WAP which tests if any bit is '0' in a data byte specified at an address 2000. If it is so, 00 would be stored at address 2001 and if not so then FF should be stored at the same address.
8. Assume that 3 bytes of data are stored at consecutive memory addresses of the data memory starting at2000. Write a program which loads register C with (2000), i.e. with data contained at memory address 2000, D with (2001), E with (2002) and A with (2001).
9. Sixteen bytes of data are specified at consecutive data-memory locations starting at 2000. Write a program which increments the value of all sixteen bytes by 01.
10. WAP to add t 10 bytes stored at memory location starting from 3000. Store the result at memory location 300A.

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B.E. (CBGS) IV SEMESTER
COMPUTER SCIENCE & ENGINERRING
ANALYSIS AND DESIGN OF ALGORITHM

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E. (CBGS)	Analysis and Design of Algorithm	CS4004	Min. "D"	Min. "D"	5.0

Unit-I:

Algorithm Analysis: Time, Space Tradeoff ,Asymptotic Notations ,Conditional asymptotic notation ,Removing condition from the conditional asymptotic notation, Properties of big-Oh notation ,Recurrence equations ,Solving recurrence equations

Unit-II:

Divide and Conquer: Design and analysis of algorithms: Binary Search, Heap Sort, Merge Sort, Quick Sort. Multiplication of Large Integers, Strassen's Matrix Multiplication.

Unit-III:

Greedy Algorithms: Knapsack Problem, Job scheduling algorithm, Huffman Code, Spanning Tree.

Unit-IV:

Dynamic Programming: General Method , Multistage Graphs ,All-Pair shortest paths ,Optimal binary search trees ,0/1 Knapsack ,Travelling salesperson problem .

Backtracking: General Method, 8 Queens problem ,sum of subsets ,graph coloring ,Hamiltonian problem ,knapsack problem. Graph Traversals.

Unit-: V

Branch and Bound: General Methods (FIFO & LC) ,0/1 Knapsack problem . Introduction to NP-Hard and NP-Completeness.

Books References:

1. Horowitz & Sahani; Analysis & Design of Algorithm
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.
3. Coremen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
4. Dasgupta; algorithms; TMH
5. Ullmann; Analysis & Design of Algorithm;
6. Michael T Goodrich, Robarto Tamassia, Algorithm Design, Wiely India

ANALYSIS AND DESIGN OF ALGORITHM LAB

List of Experiment:

1. Implement Recursive Binary search and Linear search and determine the time taken to search an element.
2. Sort a given set of elements using the Heap sort method and determine the time taken to sort the elements.
3. Sort a given set of elements using Merge sort method and determine the time taken to sort the elements.
4. Sort a given set of elements using Selection sort and hence find the time required to sort elements.
5. Sort a given set of elements using Quick sort method and determine the time taken to sort the elements.
6. Implement 0/1 Knapsack problem using dynamic programming.
7. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
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 method.
10. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.

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B.E. (CBGS) IV SEMESTER
COMPUTER SCIENCE & ENGINERRING
DATA COMMUNICATION

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E. (CBGS)	Data Communication	CS4005	Min. "D"	Min. "D"	5.0

Unit-I:

Data Communications, Data Networking, and the Internet: What is communication, uses of communication; General block diagram of communication system, types of communication, Data communications, Applications of data communications Data Communications and Networking for Today's Enterprise, A Communications Model, Networks, Internet

Unit-II:

Data Transmission: Fourier analysis, Band limited signals, The communication channel, Maximum data rate of a channel, Electromagnetic spectrum, electromagnetic waves, frequency and wave length, bandwidth, bandwidth and channel capacity, Modulation, types of Modulation, Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity

Unit-III:

Transmission Media: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission, Optical Fiber -Physics & velocity of propagation of light, Advantages & disadvantages, unguided media: Electromagnetic polarization, attenuation and absorption, optical properties of radio waves, terrestrial propagation of electromagnetic waves, skip distance free-space path loss, microwave, infrared & satellite communication system.

Unit-IV:

Signal Encoding Techniques: Digital Data, Digital Signals; Digital Data, Analog Signals; Analog Data, Digital Signals; Analog Data, Analog Signals, Digital Data Communication Techniques: Digital communication, advantages of digital communication, Nyquist theorem ,Sampling Theory, Analog to digital conversion -Pulse Code Modulation (PCM), Delta modulation (DM); encoding of digital signals, Multiplexing and Modulation of Digital Signals, digital radio, digital amplitude modulation, frequency shift keying (FSK), phase shift keying (PSK), quadrature amplitude modulation (QAM), band width efficiency, carrier recovery, differential phase shift keying,(DPSK), clock recovery, probability of error & bit error rate, trellis encoding, Asynchronous and Synchronous Transmission.

Unit-V:

Data Link Control Protocols: Types of Errors, Error Detection, Error Correction, Line Configurations, Flow Control, Error Control, High-Level Data Link Control (HDLC) Multiplexing: Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing, Statistical Time-Division Multiplexing, Asymmetric Digital Subscriber Line, xDSL Spread Spectrum: The Concept of Spread Spectrum, Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum, Multiple Access- Random Access, Aloha- Carrier Sense Multiple Access (CSMA)- Carrier Sense Multiple Access with Collision Detection (CSMA)- Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), - Frequency- Division Multiple Access (FDMA), Time - Division Multiple Access (TDMA), - Code - Division Multiple Access (CDMA).

Books References:

1. Peterson and Davie. *Computer Networks (2nd Edition)*. San Francisco, CA: Morgan Kaufmann Publishers, 1999. ISBN: 1558605142 .
2. Walrand and Varaiya. *High Performance Communication Networks*. San Francisco, CA: Morgan Kaufmann Publishers, 1996. ISBN: 1558603417.
3. Tanenbaum, A. S. *Computer Networks*. 4th ed. Upper Saddle River, NJ : Prentice Hall, 2003. ISBN: 0130661023.
4. Stevens. *TCP/IP Illustrated*. Reading, MA: Addison-Wesley Pub. Co., c1994-c1996. ISBN: 0201633469.
5. Kleinrock, Leonard. *Queueing Systems, Vol 1: Theory*. New York, NY: Wiley J., 1975. ISBN: 0471491101.

B.E. (CBGS) IV SEMESTER
COMPUTER SCIENCE & ENGINERRING
DEPARTMENTAL LAB – I PYTHON

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E. (CBGS)	Departmental Lab – I Python	CS4006	Min. "D"	Min. "D"	5.0

Unit- I:

Introduction to Python Programming Language. : Introduction to Python Language, Strengths and Weaknesses, IDLE, Dynamic Types, Naming Conventions, String Values, String Operations, String Slices, String Operators, Numeric Data Types, Conversions, Built In Functions

Unit- II:

Data Collections and Language Component : Introduction, Control Flow and Syntax, Indenting, The if Statement, Relational Operators, Logical, Operators, True or False, Bit Wise Operators, The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections.

Unit- III:

Object and Classes : Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods, File Organization, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification , Custom Exception Classes

Unit- IV:

Functions and Modules : Introduction ,Defining Your Own Functions, Parameters, Function Documentation , Keyword and Optional Parameters, Passing Collections to a Function ,Variable Number of Arguments , Scope , Functions - "First Class Citizens", Passing Functions to a Function, Mapping Functions in a Dictionary ,Lambda, Modules, Standard Modules – sys □ Standard Modules – math ,Standard Modules – time ,The dir Function

Unit- V:

I/O and Error Handling In Python : Introduction, Data Streams, Creating Your Own Data Streams, Access Modes , Writing Data to a File , Reading Data From a File ,Additional File Methods , Using Pipes as Data Streams, Handling IO Exceptions ,Working with Directories ,Metadata , Errors , Run Time Errors, The Exception Model ,Exception Hierarchy, Handling Multiple Exceptions.

Reference Books:

1. Programming & Problem solving with Python by A. Kamthane. TMH Publication.

PYTHON LAB

List of Experiments:

1. To study of python programming language.
2. Translate the following algorithms into python code:-
   (i) Initialize variable named "Pound" with value 10.
   (ii) Multiply pound by 0.45 & assign it to a variable kilogram.
   (iii) Display the value of variable pound & kilogram.
3. Write a python program to read the marks of 5 subjects through the keyboard. Find out the aggregate & percentage of marks obtained by the student.
4. Write a python program to calculate the square of only those numbers whose least significant digit is 5.
5. Write a python program to display multiplication table from 1 to 5.
6. Write a python program to calculate compound interest for principal amount as Rs.10,000 at rate of interest as 5% deposited as 7 year.
7. Write a function that accepts two positive integer 'a' and 'b' and return a list that contains all the odd numbers between a & b (including a and b if applicable) in descending order.

8. Write a python program to perform insertion sort.
9. Write a python program to perform following operations on complex numbers:-
   (i) Addition
   (ii) Subtraction
   (iii) Multiplication
   (iv) Check if C1>=C2
   (v) Check if C1<=C2

10. Write a python program to convert an octal

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B.E. (CBGS) IV SEMESTER
COMPUTER SCIENCE & ENGINERRING
PROGRAMMING TOOLS (DEPARTMENTAL CHOICE) (INTERNAL ASSESSMENT) MS-ACCESS AND SQL SERVER

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E. (CBGS)	Programming Tools (Departmental Choice)(Internal Assessment)MS-Access and SQL server	CS4007	Min. "D"	Min. "D"	5.0

List of Experiments:

1. Add the following fields to the table, with the appropriate data types: L Name (for last name), Tel Num (for telephone number), DOB (for date of birth), Data Joined, Salary, Address, City, Postal Code, On Leave and Gender . Note some fields may have more than one correct data type.
2. Modify the field properties so that the SIN, F Name, and LName are required fields. F Name and LName should not allow zero length entries. Set the default value for Date Joined to today's date (enter Date ()). As the caption of DOB , type in Birth Date.
3. Set validation rules (and respective validation texts) for the DOB and Date Joined fields so that they are always before or equal to today's date.
4. Set a validation rule and text for the salary field so that it is empty or greater than zero.
5. Add an input mask to the Tel Num field that allows entry of numbers like: (403) 789-1234. The code should be optional. (Hint: don't forget to change the data type of Tel Num first. Also, consider using #).
6. Enter an input mask foe the postal code so that it restricts the format to three alphanumeric characters, followed by a space, followed by three other alphanumeric characters, followed by three other alphanumeric characters(for instance, T2N 1N4)
7. Fill in at least one record in your table. Try to enter incorrect data into some fields with validation rules to see how your validation text is displayed. Also, notice that DOB is displayed as Birth Date because of the caption that was set.
8. Fill in the blank record then use the arrow buttons to navigate between your records. Make sure you save your form. You will also notice that the same validation rules apply in the form.
9. Arjun kapoor is the manager of the IT department. Rohit Dubey is the manager of the marketing department. Create a field in the Department table named MGR_SIN that contains the SIN of the manager.
10. Create a new query that- a) shows all the information in the table Book: Authors and Titles. b) display title ID, title name, the publisher's name, and author's first and last names.

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