Jabalpur Engineering College, Jabalpur

Semester III 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	**CH3001**	Energy, Environment, Ecology & Society	70	20	10	-	-	100	3	1	-	4	
2	**CS3002**	Object Oriented Concept with C++	70	20	10	30	20	150	3	1	2	6	
3	**CS3003**	Data Structure II	70	20	10	30	20	150	3	1	2	6	
4	**EC3104**	Electronics and Digital Circuits	70	20	10	30	20	150	3	1	2	6	
5	**MA3005**	Discrete structure	70	20	10	-	-	100	3	1	-	4	
6	**CS3006**	Programming-I (Java Technology Lab)	-	-	-	30	20	50	-	-	2	2	
7	**CS3007**	1.Rural Outreach/Social service Activities under digital India or clean India 2.Evaluation of Industrial training (Internal Assessment)	-	-	-	-	50	50	-	-	2	2	
8	**CS3008**	NSS/NCC/Professional society activities (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**

B.E.CBGS III SEMESTER
ENERGY ECOLOGY ENVIRONMENT & SOCIETY

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Energy Ecology Environment & Society	CH3001	Min. "D"	Min. "D"	5.0

Unit -I : Energy Sources and Energy Storing Devices :

World and Indian energy scenario, types of energy sources – renewable and non-renewable energy sources. Solar energy storage, application & maintenance of solar cell panel, introduction & applications of hydro, wind, biomass, ocean, tidal, wave and geothermal. Synergy between energy and environment. Global environment issues, greenhouse gas emission, global warming, green energy solution. Batteries – Primary and Secondary batteries- Alkaline battery – Lead (Pb) acid storage battery , Ni-cadmium battery ,Lithium battery, Fuel cell , Hydrogen Oxygen fuel cell ,Photo galvanic cell.

Unit -II : Ecosystem :

Structure & scope of ecology, Natural cycles of the environment, Hydrogen cycle, Oxygen Cycle, Carbon cycle, Nitrogen cycle, Phosphate cycle, Sulphur cycle, Biodiversity.

Society:-

Environmental problems and impact of P.A.T(Population, Affluence and Technology). Environmentally beneficial and harmful technologies, environment impact assessment policies (EIA).Ethics and regulatory act of environment.

Soil Pollution :

Sources & control measures. MSW, HWM.

Unit -III : Air Pollution :

Chemical composition of atmosphere, -primary, secondary, pollutants, Chemical and photochemical reaction, effects of CO, SOx, NOx, HC and particulates. Causes & effects of acid rain, ozone depletion: Monitoring and control of air pollutants.

Noise Pollution :

introduction, physiological effect, measurement and control of noise pollutants.

Unit -IV : Water Pollution :

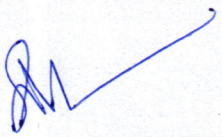
Sources causes of water pollution , types and nature of water pollutants. Pollution load determination i.e. particulates ,suspended matter, total dissolved solids ,dissolved gases DO, BOD & COD. EL NINO phenomenon. Waste water treatment Domestic – Aerobic & anaerobic treatment. Industrial waste water treatment (ETP plant.) Electro dialysis membrane technique and filtration by activated charcoal and synthetic resins.

Unite -V : Corrosion & its Prevention :

Theories of Corrosion and Mechanism – Dry (Direct Chemical attack), Wet (Electro Chemical Theory) Atmospheric corrosion, Galvanic Series, Galvanic & Concentration Cell Corrosion, Corrosion by sea water. Factors Influencing & control of Corrosion – Proper Design, Use of pure metal and metal alloys, passivity, cathodes protection – Sacrificial anode and Impressed Current. Modifying the environment, Use of inhibitors.

Books References :

1. J.C. Kuriakose and J. Raja ram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata Mcgraw Hill Publishing
2. Company (P) Ltd., New Delhi
3. Mars G. Fontana, "Corrosion Engineering", Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi.
4. F.Chau, Y. Liang, J. Gao and X. Shao, "Chemometrics", Wiley Inter Science.
5. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi
6. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.
7. A text book of Environmental Chemistry and Pollution control by S.S. Dara & Dr. D. D. Mishra, S. Chand & Co, New Delhi
8. Energy,Environment Ecology and Society by Dr.Pushpendra,Vayu Education of India New Delhi .
9. Energy, Environment Ethics and Society, by Dr.S.Deswal & Dr.A.Deswal Dhanpat Rai Publishing Company, New Delhi.



B.E.CBGS III SEMESTER
OBJECT ORIENTED CONCEPTS WITH C++

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Object Oriented Concepts With C++	CS3002	Min. "D"	Min. "D"	5.0

Unit-I: Concept of Object Oriented Methodology:

Role of programming methodology in software development, Comparison between the concepts of structured-oriented programming (SOP) and object-oriented programming (OOP), Need for object oriented programming. Fundamental concepts of object-oriented programming (OOP): abstraction, encapsulation, modularity, data hierarchy through inheritance, Information Hiding, polymorphism and its types, parallelism and stability.

Unit-II: Elements of Object Oriented:

Object, Class, message passing, Relationship among objects:- links, aggregation, Relationship among classes:- association, aggregation, using, instantiation, meta-class. Implementation of relationship.

Beginning with C++: What is C++, Difference between C and C++, C++ program life cycle. Different forms of functions, function prototyping, call by value; call by Reference, Inline and friend Functions, Command Line Arguments

Unit-III: Encapsulation and Abstraction in C++:

Classes and Objects in C++, defining classes, defining member functions, declaration of objects to class, access to member variables from objects etc, Initialization and assignment for objects, Different forms of member functions, dependence on access specifiers (i.e. Private, public, protected), static data members,

Constructor and Destructor in C++: constructors, parameterized constructors Multiple constructors in class dynamic initialization of object destructors.

Unit-IV: Inheritance in C++:

Introduction, types of inheritance, single inheritance, multiple inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance etc, virtual base class, abstract class, constructors in derived class.

Unit-V: Polymorphism in C++:

Types of polymorphism, function overloading, operator overloading:- introduction, defining operator overloading, overloading -(unary, binary operators), overloading binary operators using friend function, Rules for overloading operators. Function overriding:- introduction to pointers, pointers to objects, this pointer, pointers to derived class, virtual functions, abstract class, pure virtual function. Introduction to C++ templates.

Books Reference:

1. Object Oriented Programming with C++ by E Balagurusamy, TMH.
2. Object Oriented Programming in C++ by Robert Lafore, Sams publishing.
3. Object Oriented Compitation in C++ & java Conrad weisert ,addiso - wesley .
4. Object Oriented Programming with C++, A. K. Sharma Pearson.

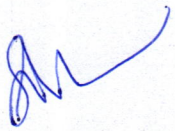
OBJECT ORIENTED CONCEPTS WITH C++

List of Experiment:

1. Write a C++ program to find the largest of three numbers using inline function.
2. Write a C++ program to sort an array of integer in ascending order using a function called exchange ( ) which accepts two integer arguments by reference.
3. Create a class 'COMPLEX' to hold a complex number. Write a friend function to add two complex numbers. Write a main function to add two COMPLEX objects.
4. Write a C++ program to illustrate multiple inheritance.
5. Write a C++ program to illustrate 'this' pointer and pointers to derived classes.
6. Create a base class called 'SHAPE' having – two data members of type double – member function get-data( ) to initialize base class data members – pure virtual member function display – area( ) to compute and display the area of the geometrical object. Derive two specific classes 'TRIANGLE' and 'RECTANGLE' from the base class .Using these three classes design a program that will accept dimension of a triangle / rectangle interactively and display the area
7. Write a C++ program that uses function using overloaded functions

a) To swap two integers,
b) To swap two characters ,
c) To swap two real numbers.

8. Write a C++ program to illustrate the use of overloaded constructor.
9. Write a C++ program to overload unary and binary operator, using a simple example.
10. Write a C++ program to calculate marks of postgraduate and graduate students using virtual function.
11. Write a C++ program to illustrate the use of static member function.
12. Write a program to illustrate templates in C++.



B.E.CBGS III SEMESTER
DATA STRUCTURE –II

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Data Structure -II	CS3003	Min. "D"	Min. "D"	5.0

Unit - I:

Trees: Basic terminology, Binary Trees: Array and Linked Representation of Binary trees, Traversing Binary trees, Complete Binary Tree, Extended Binary Trees, Threaded Binary trees, Binary Search Tree (BST), AVL Trees, Application of binary tree: Algebraic Expression, Huffman coding Algorithm.

Unit II

M-way search tree, B-tree, B+tree: definition, insertion and deletion operations and applications. Tries: definition, searching, insertion and deletion in trie. Red-Black trees and Splay trees

Unit III

Sorting: Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort algorithms and their Complexities.

Unit IV

Searching & Hashing: Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies: Linear Open Addressing and Chaining.

Unit V

Graphs: Introduction, Representations of Graphs: Adjacency List, Adjacency Matrices. Graph Traversals: Depth First Traversal, Breadth First Traversal. Connected Component and Spanning Trees, Minimum Cost Spanning Trees. Application: Dijkstra's Algorithm for shortest path.

Evaluation:

Evaluation will be continuous an integral part of the class followed by final examination.

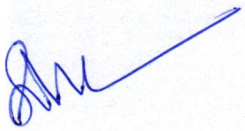
Books References:

1. R. Kruse et al, Data Structures and Program Design in C, Pearson Education Asia, Delhi-2002
2. ISRD Group: Data structures using C, TMH
3. Lipschutz, Data structure (Schaum), TMH
4. Horowitz and Sahani, Fundamentals of data Structures, Galgotia Publication Pvt. Ltd., N Delhi.
5. A. M. Tenenbaum, Data Structures using C & C++, Prentice-Hall of India Pvt. Ltd., New Delhi.
6. Trembley and Sorenson, Data Structures, TMH
7. Pai, Data structure and algorithm, TMH
8. Thomas H. Corman et al, Introduction to Algorithm, AWL

DATA STRUCTURES - II

List of Experiment:

1. Program to sort elements of a list using Bubble Sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
2. Program to sort elements of a list using Insertion Sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
3. Program to sort elements of a list using Quick Sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
4. Program to sort elements of a list using Heap Sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
5. Program to sort elements of a list using Merge Sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
6. Program to search an element in a given list using
   a) Sequential Search
   b) Binary Search
7. Program to create a Binary Search Tree, display its elements and search a node in the Binary Search Tree.
8. Program to create a Height Balance Tree (or AVL Tree) and display its elements.
9. Program to create perform Depth First Traversal (DFT) and Breadth First Traversal (BFT) in a graph.
10. Program to generate Minimum cost spanning tree of a given graph using Prim's algorithm.
11. Program to generate Minimum cost spanning tree of a given graph using Kruskal's algorithm.
12. Program to find the Shortest path in a graph using Dijkstra's Algorithm.



B.E.CBGS III SEMESTER
ELECTRONICS AND DIGITAL CIRCUITS

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Electronics And Digital Circuits	EC3104	Min. "D"	Min. "D"	5.0

Unit- I:

Semiconductor device, theory of P-N junction, temperature dependence and break down characteristics, junction capacitances. Zener diode, Transistors BJT, FET, MOSFET, types, working principal, characteristics, and region of operation, load line biasing method. Transistor as an amplifier, Feedback amplifier, negative feedback, voltage-series, voltage shunt, current series and current shunt feedback.

Unit-II:

Switching characteristics of diode and transistor, turn ON, OFF time, reverse recovery time, transistor as switch, Multivibrators, Bistable, Monostable, Astable multivibarators. Operational amplifier characteristics, slew rate, full power bandwidth, offset voltage, bias current, application ,inverting, non inverting amplifier , summer , averager , differentiator, integrator, differential amplifier, instrumentation amplifier , log and antilog amplifier , voltage to current and current to voltage converters , comparators.

Unit-III:

Number systems & codes, Binary arithmetic , Boolean algebra and switching function. Minimization of switching function, Concept of prime implicant , Karnaugh map method, Quine & McCluskey's method, Cases with don't care terms, Multiple output switching function.

Unit-IV:

Introduction to logic gates, Universal gate, Analysis and design procedure of Combinational circuits, Half adder, Half subtractor, Full adder, Full subtractor circuits, Series & parallel addition, BCD adders, Look-ahead carry generator. Decoders, Encoders, Multiplexers, Demultiplexers, Introduction to various semiconductor memories & designing with ROM and PLA.

Unit-V:

Analysis and design procedure of synchronous Sequential circuits, Introduction to Shift Registers, Counters, Synchronous & asynchronous counters.

Books Reference :

1. Digital Design, PHI, 2/e and digital logic and computer design, PHI, by M. Morris Mano
2. Microprocessor Arch. Programming & Application with 8085 by R.S. Gaonkar
3. Digital Computer & Electronics by A.P. Malwino and J.A. Brown, TMH, 3/e
4. 0000 to 8085 Introduction to Microprocessors by P.K. Ghosh & P.R. Sridhar, PHI, 2/e
5. Logic Design Theory, by N.N. Biswas, PHI
6. Milliman Hallkias -Integrated Electronics; TMH Pub.
7. Gayakwad; OP-amp and linear Integrated Circuits; Pearson Education
8. Salivahanan; Electronic devices and circuits; TMH
9. Miliman Grabel; Micro electronics , TMH 10. RobertBoylestad & Nashetsky; Electronics Devices and circuit Theory; Pearson Ed.

ELECTRONICS AND DIGITAL CIRCUITS

List of Experiments:

1. To Plot the V-I Characteristic of PN Junction Diode.
2. To Plot the V-I Characteristic of Zener Diode in Reverse Bias.
3. To Verify the Truth Table of Half Adder.
4. To Verify the Truth Table of Full Adder.
5. To Verify the Truth Table of Half Subtractor.
6. To Verify the Truth Table of Full Subtractor.
7. Study of Encoder.
8. Study of Decoder.
9. Study of Multiplexer.
10. Study of De Multiplexer.
11. Study of BJT Common Emitter Configuration.
12. Study of FET Characteristics.

B.E.CBGS III SEMESTER
DISCRETE STRUCTURE

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Discrete Structure	MA3005	Min. "D"	Min. "D"	5.0

Unit-I:

Set Theory, Relation, and 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.

Unit-II:

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. Propositional Logic : Proposition, first order logic, Basic Logical Operation, truth tables, tautologies, contractions, Algebra of Proposition, logical implications, logical equivalence, Rules of inference , Predicates, the statement function.

Unit-III:

Theorem proving Techniques: Mathematical induction. 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.

Unit-IV:

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

Unit-V:

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.

Books Reference :

1. 1 Elements of Discrete Mathematics by C.L. Liu Tata Mc Graw-Hill Edition.
2. Discrete Mathematical Structure with Application in CS by Trembley ,J.P & Manohar;, Mc Graw Hill.
3. Graph Theory with application to Engineering and computer science by Deo , Narsingh ; PHI.
4. Discrete Mathematics by Seymour Lipschutzand and Mark Lipson, Schaum's Outlines, Tata McGraw-Hill Pub.

B.E.CBGS III SEMESTER
JAVA TECHNOLOGY LAB

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Java Technology Lab	CS3006	Min. "D"	Min. "D"	5.0

Unit- I:

Why Java: Flavors of Java, Java Designing Goal. Role of Java Programmer in Industry, Features of Java Language, JVM –The heart of Java,Java's Magic Byte code.

The Java Environment:: Installing Java, Java Program Development, Java Source File Structure, Compilation, Execution.

Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data types, Operators, Assignments.

Unit -II:

Object Oriented Programming: Class Fundamentals, Object & Object reference, Object Life time & Garbage Collection, Creating and Operating Objects, Constructor & initialization code block, Access Control, Modifiers, methods , Inner Class & Anonymous Classes, Abstract Class & Interfaces. Defining Methods, Argument Passing Mechanism, Method Overloading, Recursion. Dealing with Static Members, Finalize() Method, Native Method, Use of "this" reference, Use of Modifiers with Classes & Methods. Design of Accessors and Mutator Methods, Cloning Objects, shallow and deep cloning, Generic Class Types.

Unit -III:

Extending Classes and Inheritance: Use and Benefits of Inheritance in OOP,Types of Inheritance in Java, Inheriting Data Members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, Use of "super", Polymorphism in inheritance. Implementing interfaces.

Package: Organizing Classes and Interfaces in Packages. Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import, Naming Convention For Packages.

Unit -IV:

Exception Handling: The Idea behind Exception, Exceptions & Errors, Types of Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.

Unit -V:

Array & String :Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Operation on String, Mutable & Immutable String, Using Collection Bases Loop for String, Tokenizing a String, Creating Strings using String Buffer.

Thread : Understanding Threads, Needs of Multi-Threaded Programming. Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads, Critical Factor in Thread – Deadlock.

Books References:

1. Java How to Program, Sixth Edition, H. M. Dietel and P. J. Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Beginning in Java 2, Iver Horton, Wrox Publications.
4. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
5. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.

JAVA TECHNOLOGY

List of Experiment :

1. Write a program to print "HELLOWORLD" in java.
2. Write a program to print the Sum of two numbers using wrapper class in java.
3. Write a program to print area of rectangle using scanner class in java.
4. Write a program constructor in java.
5. Write a program to print single inheritance in java.
6. Write a program to print polymorphism in java.
7. Write a program to print abstract class in java.
8. Write a program to print method overloading and method overriding in java.
9. Write a program to print multiple inheritance in java.
10. Write a program to create package in java.
11. Write a program to explain the concept of exception handling in java.
12. Write a program to create thread in java.
13. Write a program to find the certain number of colors in java applet.
14. Write a program to print the normal rectangle and rectangle with round corners in java applet.
15. Write a program to find the labels in java applet.