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 :Comp.Science Engg.** **Sem :Third**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
					SESSIONAL EXAM			ESE	SUB TOTAL	
		L	T	P	TA	CT	TOT			
CH-03	Energy Ecology Environment & Society	3	1	-	10	20	30	70	100	4
MA-03	Mathematics - III	3	1	-	10	20	30	70	100	4
IT-01	Object Oriented Methodology	3	1	-	10	20	30	70	100	4
EC-07	Electronic & Digital Circuits	3	1	-	10	20	30	70	100	4
CS-06	Data Structure & Algorithms	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
IT-02L	Java Technology Lab	-	-	2	20	-	20	30	50	2
EC-08L	Electronic & Digital Circuits Lab	-	-	2	20	-	20	30	50	2
CS-07L	Data Structure & Algorithms Lab	-	-	2	20	-	20	30	50	2
IT-03L	Object Oriented Methodology Lab	-	-	2	20	-	20	30	50	2
CS-43L	Self Study/ Professional Activity	-	-	2	50	-	50	-	50	2
CS-44L	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	
	ENERGY ECOLOGY ENVIRONMENT & SOCIETY	CH03	Min "D"	Min "D"	5.0

ENERGY ECOLOGY ENVIRONMENT & SOCIETY

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 pollutant. 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.

TEXT BOOKS

1. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi
2. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.
3. A text book of Environmental Chemistry and Pollution control by S.S. Dara & Dr. D. D. Mishra, S. Chand & Co, New Delhi
4. Energy,Environment Ecology and Society by Dr.Pushpendra,Vayu Education of India New Delhi .
5 Energy, Environment Ethics and Society, by Dr.S.Deswal & Dr.A.Deswal Dhanpat Rai Publishing Company, New Delhi

REFERENCE BOOKS

1. J.C. Kuriakose and J. Rajaram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi
2. Mars G. Fontana, "Corrosion Engineering", Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi.
3. F.Chau, Y. Liang, J. Gao and X. Shao, "Chemometrics", Wiley Inter Science.

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	
	MATHEMATICS- III	MA03	Min "D"	Min "D"	5.0

MATHEMATICS – III

Unit – I : Fourier Series : Conditions for a fourier expansion, having finite number of discontinuities, change of interval and half- rang series.

Laplace transform and inverse Laplace transform of simple functions, their elementary properties and application in solution of ordinary differential equations.

Unit – II : Analytic functions, Harmonic conjugates, Cauchy-Reimann equations, line integral, cauchy's theorem, Cauchy's integral formula, poles, residues, Residues theorem, evaluation of real integral, Bilinear transformation.

Unit – III : Difference operators, errors and approximation, interpolation (Newtons interpolation formulae, Central interpolation formulae, Lagranges interpolation, Newtons divided difference interpolation – formula inverse interpolation.

Numerical differentiation, maxima and minima.

Unit – IV : Numerical integration by using simpson's method, weddels rule, Gauss-Legendre open quadrature formula.

Solution of algebraic and transcendental equations by using Regula-Falsi, Newton-Rephson, iterative, Graffes root squaring method, Bairstow's method.

Unit – V : Solution of simultaneous algebraic equatins by using gauss elimination, Gauss-Jorden, Crout's jacobbi iterative, Gauss-siedal, Relaxation methods.

Solution of ordinary differential equations (Taylor series, Picard's Modified Euller method, Runge-kutta, predictor corrector method.)

References :

1. Laplace transform, by R.V. Churchill
2. Higher Engineering Mathematics by B.V Ramanna, TMH
3. Advanced Engineering Mathematics by Kreysizig E, willey Eastern Limited.
4. Introductory Methods of Numerical Analysis by S.S. Sastry
5. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.

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	
	OBJECT ORIENTED METHODOLOGY	IT01	Mid "D"	Mid "D"	5.0

Object Oriented Methodology

UNIT-I Introduction

Creation of Java, importance of Java to internet, byte code, Java buzzwords, OOP Principles, Abstraction, Encapsulation, Inheritance and Polymorphism, data types, variables, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program.

UNIT-II Classes and Objects

Concepts of classes and objects, class fundamentals, class relationships, association, composition, aggregation. Declaring objects, assigning object reference variables, introducing methods, constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing - call by value, recursion,nested classes and inner classes, exploring the String class.

UNIT-III Inheritance and Polymorphism

Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

Types of polymorphism, dynamic binding.

UNIT-IV Packages and Interfaces

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-V Exception Handling and Multithreading

Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads,deadlocks, thread groups.

TEXT BOOKS

Object Oriented Programming, David Parsen, BPB publication.

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, NewDelhi.
5. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.

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	
	ELECTRONIC & DIGITAL CIRCUITS	EC07	Min "D"	Min "D"	5.0

Electronics and Digital Circuits

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,

Text Books

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.

Name of Text Books

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	
	DATA STRUCTURES & ALGORITHMS	CS06	Min "D"	Min "D"	5.0

DATA STRUCTURES AND ALGORITHMS

Unit – I Introduction: Data types and its classification. Array Definition, Representation of Arrays in memory, Single and Multidimensional Arrays, Address calculation, Array as Parameters, Ordered List and operations, Sparse Matrices. Linked list, Implementation of Singly Linked List, Doubly linked list, Circular Linked List. Application

UNIT – II Stack: Array and Linked Implementation of stack, Application of stack: Conversion of Infix to Prefix and Postfix Expressions and Expression evaluation, Recursion, simulating recursion, Recursive algorithms, Tail recursion, Removal of recursion.

Queue: Array and linked implementation of queues, Circular queues, D-queues and Priority Queues.

UNIT – III : 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, B-tree, B+tree. Application of binary tree: Algebraic Expression, Huffman coding Algorithm, parse tree.

UNIT – IV : Internal and External sorting, Insertion Sort, Bubble Sort, selection sort Quick Sort, Merge Sort, Heap Sort, Radix sort algorithms and their Complexities.
Searching & Hashing: Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies.
UNIT – V : Graphs: Introduction, Sequential 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: Shortest path in routing.

Reference:

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.

A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.

5. Data Structures Trembley and Sorenson, TMH Publications
6. Pai; Data structure and algorithm; TMH
7. Introduction to Algorithm- Corman, AWL

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	
	JAVA TECHNOLOGY LAB	IT02L	Min "D"	Min "D"	5.0

Java Technology Lab

Introduction

- Creation of Java, importance of Java to internet, Java buzzwords
- JVM –The heart of Java, Java's Magic Bytecode

Language Fundamentals

- **The Java Environment:** Installing Java., Java Program Development
- Java Source File Structure, Compilation, Executions.
- **Basic Language Elements:** Lexical Tokens,Identifiers
- Keywords,Literals, Comments, Primitive Datatypes,Operators
- Assignments., Console Input and output in java, Branch control and loop control statements

Object Oriented Programming

- Class Fundamentals., Object & Object reference., Creating and Operating Objects.
- Constructor & initialization code block, Use of Modifiers with Classes & Methods.

Extending Classes and Inheritance

- Use and Benefits of Inheritance in OOP, Types of Inheritance in Java
- Inheriting Data Members and Methods, Interfaces.

Exception Handling:

- The Idea behind Exception, Exceptions & Errors
- Types of Exception, Use of try, catch, finally, throw, throws in Exception Handling.

Thread :

- Understanding Threads, Needs of Multi-Threaded Programming.
- Thread Life-Cycle

Applet

- Applet & Application, Applet Architecture.
- Embedding Applets in Web page.

GUI Programming

- Components and Containers, Basics of Components
- Using Containers, Layout Managers, AWT Components

Advanced Java Programming Concepts

- Creating GUI with swing, JavaBeans
- JDBC Database Access, RMI, NetBeans IDE

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	
	ELECTRONIC & DIGITAL CIRCUITS LAB	EC08L	Min "D"	Min "D"	5.0

Experiments to be performed (Minimum 10 experiments)

1. To draw the characteristics of a semi conductor diode and to find cut-in voltage, reverse resistance, static resistance and dynamic resistance.
2. To draw the characteristics of a zener diode
3. To design a half wave rectifier and to determine its efficiency and ripple factor.
4. To design a- full wave rectifier and determine the ripple factor and efficiency with filter.
5. To design a- full wave rectifier and determine the ripple factor and efficiency without filter.
6. To draw the characteristics of FET using BFW – 10
7. To draw the characteristics of CE configuration of a transistor amplifier.
8. To draw the characteristics of CB configuration of a transistor amplifier.
9. To draw the characteristics of CC configuration of a transistor amplifier.
10. To design a Zener regulator circuit and to find the regulation characteristics.
11. To draw the load line of a transistor amplifier under CE configuration.
12. To design and verify the self bias circuit operation.
13. To design and verify the voltage divider biasing circuit.
14. To verify the effect of emitter bypass capacitor.
15. To design a regulator circuit using Zener diode.

List of Equipments/Machine Required:

Circuit components, Breadboard, Hook-up wire, Power supply, CRO, Function generator

Recommended Books:

1. Laboratory Manual for Electronic Devices and Circuits, 4th Ed., David A. Bell, PHI

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	
	DATA STRUCTURE & ALGORITHMS LAB	CS07L	Min "D"	Min "D"	5.0

List of experiments

1. Program to generate and print the results of n students using array of structure.
2. Program to create a singly linked list and perform following operations on it:
   A. Insert a node at head
   B. Insert a node at tail
   C. Insert a node after given node
   D. Insert a node after nth node
   E. Delete a node from head
   F. Delete a node with x in data part.
   G. Display the list
3. Program to create a doubly linked list and perform following operations on it:
   A. Insert a node at head
   B. Insert a node at tail
   C. Insert a node after given node
   D. Insert a node after nth node
   E. Delete a node from head
   F. Delete a node with x in data part.
   G. Display the list
4. Program to interchange m^{th} and n^{th} node in a doubly linked list.
5. Program to evaluate polynomial using singly linked list and to find sum of two polynomials using linked list.
6. Program to find solution of josephus problem using circular linked list.
7. Program to implement stack using static memory allocation and to perform following operations on it.
   A. Push operations B.Pop operations C.Peek operations D.Display contents of stack.
8. Program to implement two stacks in a single array.
9. Program to convert expression in infix notation to postfix notation
10. Program to evaluate postfix expression
11. Program to implement circular queue using static memory allocation and to perform following operations on it.
    A. Insert operations B. Delete operations C. Display contents of queue.
12. Program to simulate various CPU scheduling schemes using queue.
13. Program to sort elements of an array using insertion sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
14. Program to sort elements of an array using bubble sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
15. Program to sort elements of an array using quick sort and to print the number of passes, number of comparisons in each pass and total number of comparisons.
16. Program to search an element in a given list
    A. Sequential Search B. Binary Search
    and to print the number of comparison in each.
17. Program to create binary search tree and search a node in a binary search tree
18. Program to create a binary tree and to perform in order, pre order and post order traversals.
19. Program to evaluate binary arithmetic expressions using tree.
20. Program to find the shortest path between two cities using graph.

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	
	OBJECT ORIENTED METHODOLOGY LAB	IT03L	Min "D"	Min "D"	5.0

OBJECT ORIENTED METHODOLOGY- LAB

1. Write and run a java program add ten natural numbers.
2. Write and run a java program that initialize a string object with your first name and then print it three times on the same line separated by space.
3. Write a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2 -4ac is negative, display a message stating that there are no real solutions.
4. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
5. Design a class for Complex numbers in Java. In addition to methods for basic operations on complex numbers, provide a method to return the number of active objects created.
6. Design a Date class similar to the one provided in the java.util package.
7. Write a program for Interface and create two class that access this interface.
8. Write a program to create Package
9. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
10. Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
11. Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
12. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.
13. Write a program that implement Runnable interface
14. Write a program to show dynamic method dispatching.
15. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe. Design another thread that generates fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers common to both.

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	
	SELF STUDY/ PROFESSIONAL ACTIVITY	CS-43L	Min "D"	Min "D"	5.0

Objective of Self Study : is to induce the student to explore and read technical aspects of his area of interest/ hobby or new topics suggested by faculty.

Evaluation will be done by assigned faculty based on report/seminar presentation and viva.

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	
	SEMINAR/GROUP DISCUSSION	CS-44L	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.