Bachelor of Technology (Information Technology)
SCHEME OF STUDIES / EXAMINATIONS (KUK)

Semester – III (w.e.f. Session- 2016-17)

S. N.	Course No.	Course Title	Teaching Schedule				Allotment of Marks				Dur. of Exam (Hrs.)
			L	T	P	Hr /Wk	Theory	Sessional	Practical	Total	
1.	HS-201N	Fundamentals of Management	3	1	-	4	75	25	--	100	3
2.	IT-201N	Database Management Systems	3	1	-	4	75	25	--	100	3
3.	IT-203N	Data Structures	3	1	--	4	75	25	--	100	3
4.	IT-205N	Internet & Web Technology	3	1	--	4	75	25	--	100	3
5.	IT-207 N	Digital Electronics and Logic Design	3	1	--	4	75	25	--	100	3
6.	IT-209 N	Discrete Structures	3	1	--	4	75	25	--	100	3
7.	IT-211 N	Database Management Systems Lab	--	--	2	2	---	40	60	100	3
8.	IT-213 N	Data Structures Lab	--	--	2	2	---	40	60	100	3
9.	IT-215 N	Internet Lab	--	---	2	2	--	40	60	100	3
10.	IT-217 N	Digital Electronics Lab	--	--	2	2	--	40	60	100	3
		Total	18	6	8	32	450	310	240	1000	
11	MPC-202N*	Energy Studies*	3	--	--	3	75	25	.	100	3

* MPC-202N is a mandatory course which will be a non-credit subject and student has to get pass marks in order to qualify for the award of Degree.

HS-201 N	Fundamentals of Management			
Lecture Tutorial Practical		**Major Test**	**Minor Test**	**Total Time**
3 1		75	25	3H

Purpose : To make the students conversant with the basics concepts in management thereby leading to nurturing their managerial skills
COURSE OUTCOMES
CO1 An overview about management as a discipline and its evolution
CO2 Understand the concept and importance of planning and organizing in an organization
CO3 Enabling the students to know about the importance of hiring and guiding the workforce by understanding the concept of leadership and communication in detail
CO4 To understand the concept and techniques of controlling and new trends in management

UNIT-1

Introduction to Management: Meaning, Definition, nature, importance & Functions, Management as Art, Science & Profession-Management as social System, Concepts of management-Administration

Evolution of Management Thought: Development of Management Thought-Scientific management, Administrative Theory of Management, Bureaucratic Organization, Behavioral approach (Neo Classical Theory): Human Relations Movement; Behavioral Science approach; Modern approach to management –Systems approach and contingency approach.

UNIT-II

Planning: nature, purpose and functions, types of plans, planning process, Strategies and Policies: Concept of Corporate Strategy, formulation of strategy, Types of strategies, Management by objectives (MBO), SWOT analysis, Types of policies, principles of formulation of policies

Organizing: nature, importance, process, organization structure: Line and Staff organization, Delegation of Authority and responsibility, Centralization and Decentralization, Decision Making Process , Decision Making Models, Departmentalization: Concept and Types (Project and Matrix),formal & informal organizations

UNIT-III

Staffing: concept, process, features; manpower planning; Job Analysis: concept and process; Recruitment and selection: concept, process, sources of recruitment; performance appraisal, training and development Directing: Communication-nature, process, formal and informal, barriers to Effective Communication, Theories of motivation-Maslow, Herzberg, Mc Gregor ; Leadership–concept and theories, Managerial Grid, Situational Leadership. Transactional and Transformational Leadership

UNIT-IV

Controlling: concept, process, types, barriers to controlling, controlling Techniques: budgetary control, Return on investment, Management information system-MIS , TQM-Total Quality Management, Network Analysis-PERT and CPM. Recent Trends in Management:-Social Responsibility of Corporate Social Responsibility (CSR) and business ethics. Functional aspects of business: Conceptual framework of functional areas of management-Finance; Marketing and Human Resources

Text books
1. Management Concepts -Robbins, S.P; Pearson Education India
2. Principles of Management -Koontz & O'Donnel; (McGraw Hill)

Recommended books
1. Business Organization and Management –Basu ; Tata McGraw Hill
2. Management and OB--Mullins; Pearson Education
3. Essentials of Management –Koontz, Tata McGraw-Hill
4. Management Theory and Practice –Gupta, C.B; Sultan Chand and Sons, New Delhi
5. Prasad, Lallan and S.S. Gulshan. Management Principles and Practices. S. Chand & Co. Ltd., New Delhi.
6. Chhabra T.N. Principles and Practice of Management. Dhanpat Rai & Co., Delhi.
7. Organizational Behavior –Robins Stephen P; PHI.
NOTE: Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-201 N			Data Base Management Systems			
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	1	-	75	25	100	3 Hour
Purpose	To familiarize the students with Data Base Management system					
Course Outcomes						
CO 1	To provide introduction to relational model.					
CO 2	To learn about ER diagrams and SQL.					
CO 3	To understand about the concept of functional dependencies.					
CO 4	To understand about Query Processing and Transaction Processing.					

UNIT I

Introduction
Concept & Overview of DBMS, Advantages of DBMS over file processing system, Database Languages, Responsibilities of Database Administrator, Database Users, Three Schema architecture of DBMS & Data Independence, Data Models.

Entity-Relationship Model:
Basic concepts, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features: Specialization and Generalization.

UNIT II

The Relational Data Model & Algebra
Relational Model: Structure of relational Databases, Relational Algebra & various operations(Set operation, select, project, joins, division), Relational Calculus: Domain , Tuple.

Integrity Constraints & Introduction To Sql:-
Domain Constraints, Referential Integrity Constraints, Basic Structure & Concept of DDL, DML, DCL, Aggregate Functions, Null Values, Introduction to views, Creating, modifying and deleting views.

UNIT III

Relational Database Design
Functional Dependency, Different anomalies in designing a Database., Normalization – 1NF, 2NF, 3NF, Boyce-Codd Normal Form, Normalization using multivalued dependencies, 4NF, 5NF.

UNIT IV

Transaction Processing Concept
Introduction to transaction processing, transaction model properties, serializability:-Serial, non-serial and Serializable Schedules, Conflict Serializability.

Concurrency Control
Need of concurrency control, Different concurrency control Techniques: locking based, timestamps based technique. Deadlock handling and Recovery Techniques:- Deferred update/ immediate update, shadow paging.

Text Books:
- Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 3rd edition, 2000, Addision-Wesley, Low Priced Edition.
- Introduction to Database Management system by Bipin Desai, 1991, Galgotia Pub.

Reference Books:
- Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.
- An Introduction to Database Systems by C.J. Date, 7th edition, Addison-Wesley, Low Priced Edition, 2000.
- Database Management and Design by G.W. Hansen and J.V. Hansen, 2nd edition, 1999, Prentice-Hall of India, Eastern Economy Edition.
- Database Management Systems by A.K. Majumdar and P. Bhattacharyya, 5th edition, 1999, Tata McGraw-Hill Publishing.
- A Guide to the SQL Standard, Date, C. and Darwen,H. 3rd edition, Reading, MA: 1994, Addison-Wesley.
- Data Management & file Structure by Looms, 1989, PHI

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

IT-203 N	Data Structures					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	1	-	75	25	100	3 Hour
Purpose	To introduce the principles and paradigms of Data Structures for design and implement the software systems logically and physically					
Course Outcomes (CO)						
CO 1	To introduce the basic concepts of Data structure, basic data types, searching and sorting based on array data types.					
CO 2	To introduce the structured data types like Stacks, Queue, and its basic operations' implementation.					
CO 3	To introduces dynamic implementation of linked list.					
CO 4	To introduce the concepts of Tree and graph and implementation of traversal algorithms.					

Unit-1

Introduction to Data Structures: Definition & abstract data types, Real life applications with example; built in and user defined data structures, Ordered list and Operations on it.

Arrays: Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multidimensional arrays. Implementation of Data Structures like structure, Sparse matrices: implementation of transpose.

Sorting & Searching: Basic Searching techniques (Linear & binary), Introduction to Sorting. Sorting using selection, insertion, bubble, merge, quick, radix, heap sort.

Unit-2

Stacks : Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression, Converting Infix expression to Prefix and Postfix expression ,Applications.

Queues: Definition, Sequential implementation of linear queues, Operations. Circular queue: implementation (using arrays), Advantage over linear queue, Priority queues& Applications.

Unit-3

Linked Lists: Need of dynamic data structures, Operations on lists. Dynamic implementation of linked lists, Comparison between Array and Dynamic Implementation of linked list. Linked implementation of stacks and queues. Circular lists, implementation of primitive operations. Doubly linked lists: continuous & dynamic implementation, operations.

Unit- 4

Trees : Definition, Basic terminology, Binary tree, Array and Dynamic Implementation of a binary tree, primitive operations on binary trees. External and internal nodes.Binary tree traversals : preorder, inorder and postorder traversals. Representation of infix, postifix and prefix expressions using tree, Introduction to Binary Search Trees, B trees, B+ trees , AVL Trees, threaded trees, balanced multi way search trees.

Graphs: Definition of undirected & Directed Graphs & Networks, Basic terminology, Representation of graphs,. Graph traversals, minimum-spanning trees, computer representation of graphs.

Text Book:
1.   Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.

Reference Books:
1.   Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
2.   Fundamentals of Data structures by Ellis Horowitz &SartajSahni, Pub, 1983,AW
3.   Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
4.   Data Structures and Program Design in C By Robert Kruse, PHI,
5.   Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
6.   Introduction to Computers Science -An algorithms approach, Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

IT-205 N			Internet and Web Technology			
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	1	-	75	25	100	3
Purpose	To provide the conceptual knowledge of Internet and methodologies used in web based					
Course Outcomes						
CO 1	To study about basics of internet and networking.					
CO 2	To study inner working of email.					
CO 3	To learn web design languages					
CO 4	To study basic of internet security.					

Unit-1

The Internet: Introduction to networks and internet, history, Internet, Intranet & Extranet, Working of Internet, Internet Congestion, Network Topologies, Modes of Connecting to Internet, Internet Service Providers(ISPs), Internet address, standard address, Introduction to OSI and TCP/IP, domain name, DNS, Telnet and FTP, HTTP, IP.v6,Modems..

Unit-2

World Wide Web : Introduction, Miscellaneous Web Browser details, searching the www: Directories search engines and meta search engines, search fundamentals, search strategies, working of the search engines.
Electronic Mail: Introduction, advantages and disadvantages, User Ids, Pass words, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, MIME, Newsgroups, mailing lists, chat rooms, secure-mails, SMTP,POP,IMAP.

Unit-3

HTML:HTML basics; HTML tags; text formatting; text styles; lists: ordered, unordered and definition lists; layouts; adding graphics; tables; linking documents; images as hyperlinks; Form; frames and layers.
CSS – basic style sheet concept, using style sheet in your document.
JAVASCRIPT Features of JavaScript, Variables, Control Structures, operators, loping, conditional statements & functions in JavaScript

Unit-4

Privacy and security topics: Introduction, Need of Security, Attacks, Types of attacks, security policy, Introduction to Encryption and Decryption, Secure Web document, Digital Signatures, Firewalls, Intrusion detection systems, Proxy Server, VPN.
Introduction to Server:- Introduction to client-server architecture, Apache, Internet Information Server

Text Book:
• Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw &Ellen Hepp – 2001, TMH
• Internet & World Wide Programming, Deitel & Nieto, 2000, Pearson Education
Reference Books:
• HTML– Complete Reference By Thomas A Powell – TMH
• JavaScript – Unleased - 3 rd Edition from SAMS – Tech Media
• Complete idiots guide to java script,.Aron Weiss, QUE, 1997
• Network firewalls, Kironjeetsyan -New Rider Pub.
• Networking Essentials – Firewall Media.
• www.secinf.com
• www.hackers.com
• Alfred Glkossbrenner-Internet 101 Computing MGH, 1996

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

IT – 207 N			Digital Electronics and Logic Design			
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
3	1	-	75	25	100	3 Hour
Purpose	To learn the basic methods for the design of digital circuits					
Course Outcomes						
CO 1	To introduce Simplification of switching functions using K map and QM methods					
CO 2	To introduce to combinational circuit design					
CO 3	Digital circuit design using sequential method					
CO 4	To convert data from analog to digital form and vice versa.					

UNIT 1

Fundamentals of digital techniques:
Review of logic gates and number system; 1's and 2's compliment Arithmetic ; Introduction to Boolean algebra using basic postulates and theorems ; Binary codes: BCD, Excess-3, Gray codes ; Standard representation of logic functions : SOP and POS forms; Simplification of switching functions using K map and Quine-McCluskey methods

UNIT 2

Design of Combinational circuits
Adders; Subtractors ; Multiplexers and Demultiplexers / Decoders and their use as logic elements; BCD arithmetic Circuits; Encoders. Decoders / Drivers for display devices. , code converters

UNIT 3

Sequential circuits:
Latches, Flip Flops: S-R- J-K. T, D, master-slave, edge triggered flip flop ;Race around condition; Excitation table ; Interconversion among flip flop, Design of Synchronous and Asynchronous counters ; Modulo N counter design ; Shift registers ; sequence generators.

UNIT 4

A/D and D/A converters:
Sample and hold circuit, weighted resistor and R -2 R ladder D/A Converters, specifications for D/A converters. A/D converters: Quantization, parallel -comparator, successive approximation, counting type , Dual-slope ADC, specifications of ADCs.
Programmable Logic Devices:
 PLA and PAL. , Implementation of simple functions using PLA and PAL

Text book:
1. Modem Digital Electronics (Edition III): R. P. Jain; TMH
2**.** Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 8th Edition, TMH, 2003.M
Reference books:
1. Digital Integrated Electronics: Taub & Schilling: MGH
2. Digital Principles and Applications: Malvino & Leach: McGraw Hill.
3. Digital Design: Morris Mano: PHI,
4. Thomas L. Floyd, Digital Fundamentals, 8th Edition, Pearson Education Inc, New Delhi, 2003

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

IT-209 N			**Discrete Structures**			
Lecture	**Tutorial**	**Practical**	**Major Test**	**Minor Test**	**Total**	**Time**
3	1	-	75	25	100	3
Purpose	**To provide the conceptual knowledge of Discrete structure.**					
Course Outcomes						
CO 1	To study various fundamental concepts of Set Theory and Logics.					
CO 2	To study and understand the Relations, diagraphs and lattices.					
CO 3	To study the Functions and Combinatorics.					
CO 4	To study the Algebraic Structures.					

Unit 1

Set Theory & Logic Fundamentals-Sets and subsets, Venn Diagrams, Operations on sets, Laws of Set Theory, Power Sets and Products, Partition of sets, The Principle of Inclusion-Exclusion.Logic : Propositions and Logical operations, Truth tables, Equivalence, Implications, Laws of Logic, Normal forms, Predicates and quantifiers, Mathematical Induction.

Unit 2

Relations, diagraphs and lattices Product sets and partitions, relations and diagraphs, paths in relations and diagraphs, properties of relations, equivalence and partially ordered relations, computer representation of relations and diagraphs, manipulation of relations, Transitive closure and Warshall's algorithm, Posets and Hasse Diagrams, Lattice.

Unit 3

Functions and Combinatorics Definitions and types of functions: injective, subjective and bijective, Composition, identity and inverse, Review of Permutation and combination-Mathematical Induction, Pigeon hole principle, Principle of inclusion and exclusion, Generating function-Recurrence relations.

Unit 4

Algebraic Structures Algebraic structures with one binary operation -semi groups, monoids and groups, Product and quotient of algebraic structures, Isomorphism, homomorphism, automorphism, Cyclic groups, Normal sub group, codes and group codes, Ring homomorphism and Isomorphism.

Books:
1. Elements of Discrete Mathematics C.L Liu, 1985, Reprinted 2000, McGraw Hill
2. Discrete mathematical structures by B Kolman RC Busby, S Ross PHI Pvt. Ltd.

Reference:
1. Discrete Mathematical Structures with Applications to Computer Science , by Tremblay J.P, and Manohar R., McGraw Hill Book Company, 1975, International Edition, 1987.
2. Discrete and Combinatorial mathematics ", Ralph P., Grimaldi, Addison-Wesley Publishing Company,
3. Reprinted in 1985.
4. Discrete Mathematics and its Applications ", Kenneth H.Rosen, McGraw Hill Book Company, 1999.
5. Sections: 7.1 to 7.5.
6. Discrete Mathematics for computer scientists and Mathematicians, Joe L. Mott, Abraham

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

Database Management Systems Lab
Paper- IT-211 N

L T P	**Sessional:** 40 Marks
- - 2	**Exam:** 60 Marks
	Total: 100 Marks
	Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS

1. Create a database and write the programs to carry out the following operation:
   - Add a record in the database
   - Delete a record in the database
   - Modify the record in the database
   - Generate queries
   - Data operations
   - List all the records of database in ascending order.
2. To perform various integrity constraints on relational database.
3. Create a database and perform the following operations:-
   - Arithmetic operators
   - Relational operators
   - Group by & having clauses
   - Like predicate for pattern matching in database
4. Create a view to display details of employees working on more than one project.
5. Create a view to display details of employees not working on any project.
6. Using two tables create a view which shall perform natural join, equi join, outer joins.
7. Write a procedure to give incentive to employees working on all projects. If no such employee found give app. Message.
8. Write a procedure for computing amount telephone bill on the basic of following conditions.
   1. telephone rent Rs. 205 including first 105 free units.
   2. if extra units>0 but <500 then rate is 80 paise per unit.
   3. if extra units>500 then rate is Rs. 1.20 per unit.
For this purpose create a table with name, Phone No., No. of units consumed, bill amount of a customer.
9. Write a procedure for computing income tax of employee on the basic of following conditions:-
   1. if gross pay<=40,000 then I.T rate is 0%.
   2. if gross pay>40,000 but <60000 then I.T rate is 10%.
   3. if gross pay>60,000 but <1,00,0000 then I.T rate is 20%.
   4. if gross pay>1,00,0000 then I.T rate is 30%.
For this purpose create a table with name, ssn, gross salary and income tax of the employee.
10. Write trigger for before and after insertion, deletion and updation process.

Usage of S/w:
1. VB, ORACLE and/or DB2
2. VB, MSACCESS
3. ORACLE, D2K
4. VB, MS SQL SERVER 2000

Data Structures Lab
Paper- IT-213 N

L T P
- - 2

Sessional:40 Marks
Exam: 60 Marks
Total:100 Marks
Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3.. Write a program to perform following operations on tables using functions only
a) Addition b) Subtraction c) Multiplication d) Transpose
4.. Write a program to implement Queue.
5.Write a program to implement Stack.
6. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
7. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies'.
8. Write a program to implement binary search tree. (Insertion and Deletion in Binary search Tree)
9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
10 .Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
11. Create a linked list and perform the following operations on it
a) add a node b) Delete a node
12. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
13. Write a program to simulate the various graph traversing algorithms.
14 Write a program which simulates the various tree traversal algorithms.
15 Write a program to implement various Searching Techniques.
16 Write a program to implement Sorting Techniques.

Internet Lab
Paper- IT-215 N

L T P
- - 2

Sessional: 40 Marks
Exam: 60 Marks
Total: 100 Marks
Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS

1. Create a new document that takes the format of a business letter. Combine <P> and <BR> tags to properly separate the different parts of the documents. Such as the address, greeting, content and signature.
2. a) Create a seven-item ordered list using Roman numerals. After the fifth item, increase the next list value by 5.
   b) Beginning with an ordered list, create a list that nests both an unordered list and a definition list.
3. Create a table using HTML basic tags.
4. Create a online form in HTML.
5. Create frame with anchor tag.
6. Create links in HTML with the graphics embedding.
7. Create a style sheet in HTML.
8. Find the factorial of a number using looping conditional statement in javascript.
9. Create a program to find out whether the string is palindrome or not using javascript.
10. Create a form & check the form validation through javascript.

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Digital Electronics Lab
Paper-IT- 217 N

L T P
- -   2

Sessional :40 Marks
 Practical: 60Marks
Total: 100 Marks
Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS

1.   Study of TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2.   Design & realize a given function using K-maps and verify its performance.
3.   To verify the operation of multiplexer & Demultiplexer.
4.   To verify the operation of comparator.
5.   To verify the truth tables of S-R, J-K, T & D type flip flops.
6.   To verify the operation of bi-directional shift register.
7.   To design & verify the operation of 3-bit synchronous counter.
8.   To design and verify the operation of synchronous UP/DOWN decade counter using J K
         flipflops & drive a seven-segment display using the same.
9.   To design and verify the operation of asynchronous UP/DOWN decade counter using J
         K flipflops & drive a seven-segment display using the same.
10.   To design & realize a sequence generator for a given sequence using J-K flip-flops.
11.   Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.
12.   Design a 4-bit shift-register and verify its operation .

Note :   A student has to perform at least ten experiments.
         Seven experiments should be performed from the above list. Remaining three experiments
         may either be performed from the above list or designed & set by the concerned institution as
         per the scope of the syllabus.

MPC-202N   ENERGY STUDIES

L   T   P   Sessional: 25 Marks
3   -   -   Exam: 75 Marks
                                                                         Total: 100 Marks
                                                                         Time: 3 hrs

UNIT-I

Introduction: Types of energy, Conversion of various forms of energy, Conventional and Nonconventional sources, Need for Non-Conventional Energy based power generation.
Energy Management: General Principles of Energy Management, Energy Management Strategy.
Energy Audit & Tariffs: Need, Types, Methodology and Approach.

UNIT-II

Conventional Energy sources: Selection of site**,** working of Thermal, Hydro, Nuclear and Diesel power plants and their schematic diagrams & their comparative advantages- disadvantages.

UNIT-III

Non Conventional Energy sources: Basic principle, site selection and power plant layout of Solar energy, photovoltaic technologies, PV Systems and their components, power plant layout of Wind energy, layout of Bio energy plants ,Geothermal energy plants and tidal energy plants.

UNIT-IV

Energy Scenario: Lay out of power system, Role of Energy in Economic development, energy demand, availability and consumption, Commercial and Non-commercial energy, Indian energy scenario, long term energy scenario, energy pricing, energy sector reforms in India, energy strategy for the future.
Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.
Suggested Text Books & References:

1. Energy Studies-Wiley and Dream tech India
2. Soni, Gupta, Bhatnagar: Electrical Power Systems – Dhanpat Rai& Sons
3. NEDCAP: Non Conventional Energy Guide Lines
4. G.D. Roy: Non conventional energy sources
5. B H Khan: Non Conventional energy resources - - McGraw Hill
6. Meinel A B and Meinel M P,Addison :Applied Solar Energy- Wesley Publications
7. George Sutton: Direct Energy Conversion - McGraw Hill