Semester IV(w.e.f. session 2016-2017, K.U.K.)

S. N.	Course No.	Course Title	Teaching Schedule				Allotment of Marks				Dur.of Exam (Hrs)
			L	T	P	Hrs/Week	Theory	Sessional	Practical	Total	
1	HS-201N	Fundamentals of Management	3	1		4	75	25		100	3
2	EE-202N	Digital Electronics	4	0		4	75	25		100	3
3	EE-204N	Electrical Measurements & Measuring Instruments	3	1		4	75	25		100	3
4	EE-206N	Signals & Systems	3	1		4	75	25		100	3
5	EE-208N	Electrical Machines-II	4	1		5	75	25		100	3
6	EE-210N	Electrical Engineering Materials & Processes	3	0		3	75	25		100	3
7	EE-212N	Digital Electronics Lab			2	2		25	25	50	3
8	EE-214N	Instrumentation Lab			2	2		50	50	100	3
9	EE-216N	Signals & Systems Lab			2	2		25	25	50	3
10	EE-218N	Electrical Machines-II Lab			2	2		50	50	100	3
11	MPC-201N	Environmental Studies*	3			3	75*	25*		100*	3
		Grand total	23	4	8	35	450	300	150	900	

* Environmental Studies is a mandatory course and student has to get passing marks in order to qualify for the award of degree, but its marks will not be added in the grand total.

Note: All the students have to undergo six weeks industrial training after IV sem and it will be evaluated in V

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, McGregor ; 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.Organizationalbehavior –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.

EE-202N	Digital Electronics					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
4	0	0	75	25	100	3 Hr.
Course Outcome						
CO1	To understand fundamentals of Digital techniques, Binary codes					
CO2	To design basic circuits using Gates and MSI Devices					
CO3	To understand design of synchronous and Asynchronous sequential circuits A/D and D/A convertors					
CO4	Concept of Digital logic families, programmable logic devices					

Unit-I

Fundamentals of Digital Techniques:
Digital signal, review of number systems, binary codes, BCD, Excess-3, Gray, EBCDIC, ASCII, logic gates- AND, OR, NOT, NAND, NOR, EX-OR, Boolean algebra, Error detection and correction, hamming code.

Unit-II

Combination Design using Gates:
Design using gates, K- map and Quine-Mccluskey methods of simplification.
Combinational design using MSI Devices
Multiplexers and Demultiplexers and their uses as logic elements, Decoders, Adders/Subtracters, BCD arithmetic circuits, Encoders, Decoders/Drivers for display devices.

Unit-III

Design of Sequential circuits:
Flip flops: S-R, J-K, T,D, master slave, edge triggered, shift registers, sequence generators, counters- asynchronous and synchronous, ring counters and Johnson Counter.
D/A &A/D Converters:
D/A converters- weighted resistor and R-2 R ladder, specifications for D/A converters, A/D converters: Sample and hold circuits, Quantization, Parallel-comparator, successive approximation, counting type, dual slope ADC, specifications of ADCs.

Unit-IV

Digital logic families:
Bipolar logic families: RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic, interfacing of CMOS and TTL families.
Programmable logic devices:
ROM, PLA, PAL, FPGA and CPLDS.

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.

REFERENCES:
1. Modern Digital Electronics (Edition III) : R.P. Jain, TMH.
2. Digital Integrated Electronics: Taub& Schilling, MGH
3. Digital Principles and Applications: Malvino & Leach, MGH
4. Digital Fundamentals,Floyd,11th Ed.,Pearson

EE-204N	Electrical Measurements & Measuring Instruments					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
3	1	0	75	25	100	3 Hr.
Course Outcomes						
CO1	To understand the concept of units, errors, measuring system fundamentals					
CO2	To understand the concept of measuring instruments					
CO3	To understand the concept of watt meters, energy meters, power factor & frequency meters					
CO4	To understand the concept of low & high resistance measurements, a.c.bridges					

UNIT – 1

UNITS, STANDARDS& ERRORS: S.I. units, Absolute standards (International, Primary, Secondary & Working Standards). True Value, Errors (Gross Systematic Random): Static characteristics of Instruments (Accuracy, precision, Sensitivity, Resolution & threshold).

MEASURING SYSTEM FUNDAMENTALS: Classification of instruments (Absolute & Secondary Instruments: indicating, recording &integrating instruments: based upon Principle of operation). Generalized instrument (Block diagram, description of blocks). Three forces in electromechanical indicating instrument (Deflecting, controlling & damping forces). Comparison between gravity & spring controls: comparison of damping methods & their suitability bearing supports, pivot-less supports (simple & taut-band). Scale information, instrument cases (covers).

UNIT – II

MEASURING INSTRUMENTS: Construction, operating principle, Torque equation, shape of scale, use as Ammeter or as Voltmeter (Extension of Ranges). Use on AC/DC or both. Advantages & disadvantages, errors (both on AC/ DC) of PMMC types, electrodynamic type, moving iron type (attraction, repulsion & combined types). Hot wire type & induction type, electrostatic type instruments. Introduction of Q meter, VTVM, B-H curve

UNIT – III

WATTMETERS & ENERGY METERS: Construction, operating principle, torque equation, shape of scale, errors, Advantages & disadvantages of Electrodynamics & induction type watt meters; single phase induction type Energy meter, Compensation & creep in energy meter.

POWER FACTOR & FREQUENCY METERS: Construction, operating principle, torque equation, advantages & disadvantages of Single phase power factor meters (Electrodynamics & moving iron types) & Frequency meters (Electrical Resonance type, Ferrodynamic & Electrodynamic types).

UNIT – IV

LOW & HIGH RESISTANCE MEASUREMENTS: Limitations of Wheat stone bridge; Kelvin's double bridge method, Difficulties in high resistance measurements, Measurement of high resistance by direct deflection, loss of charge method, Megaohm Bridge & meggar.

A.C.BRIDGES: General balance, Ckt. & Phasor diagram, applications, advantages/disadvantages of:Maxwell's inductance, inductance-capacitance, Hays, Anderson, Owens, De-Sauty's, Schering &Weins Bridges.Shielding & earthling

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.

REFERENCES:

1. A Course in Elect. & Electronics Measurement & Instrumentation by A.K. Sawhney; Khanna Pub.
2. Electronics & Electrical Measurement & Instrumentation by J.B. Gupta, Kataria& Sons.
3. Electronics Instrumentation & Measurement technique, W.D. Copper &A.dHelfrick.
4. Measuring Systems by E.O. Doeblin; TMH.

EE-206N	Signals & Systems					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
3	1	0	75	25	100	3 Hr.
Course Outcomes						
CO1	Introduce and classify signals and systems based on their properties.					
CO2	To understand the basic concepts of random variables and Linear time invariant systems.					
CO3	Familiarization with the sampling process and spectral analysis of signals using Fourier series.					
CO4	Apply transform techniques to analyze continuous-time and discrete-time signals and systems					

Unit-I

Introduction to Signals: Continuous and discrete time signals, deterministic and stochastic signals, periodic and aperiodic signals, even and odd signals, energy and power signals, exponential and sinusoidal signals and singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation.

Introduction to Systems: Linear and non-linear systems, time invariant and time varying systems ,lumped and distributed systems, deterministic and stochastic systems, casual and non-causal systems, analog and discrete/digital memory and memory less systems.

Unit-II

Random Variables: Introduction to Random Variables, pdf, cdf, moments, distributions, correlation functions.

Linear Time Invariant Systems: Introduction to linear time invariant (LTI) systems, properties of LTI systems, convolution integral, convolution sum, causal LTI systems described by differential and difference equations. Concept of impulse response.

Unit-III

Discretization of Analog Signals: Introduction to sampling, sampling theorem and its proof. Effect of under sampling, reconstruction of a signal from sampled signal.

Fourier Series : Continuous time Fourier series (CTFS), Properties of CTFS, Convergence of Fourier series, Discrete time Fourier Series (DTFS), Properties of DTFS , Fourier series and LTI system, Filtering.

Unit-IV

Fourier Transform: Continuous Time Fourier Transform (CTFT), Properties of CTFT, Systems characterized by linear constant- coefficient differential equations.

Discrete time Fourier transform (DTFT), Properties of DTFT, Duality, Systems characterized by linear constant coefficient difference equations.

Laplace Transform: Introduction to Laplace transform, Region of convergence for laplace transform, Inverse Laplace transform, Properties of Laplace transform, Analysis and characterization of LTI systems using Laplace transform, System function algebra and block diagram representations,

Unilateral Laplace transform.

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.

REFERENCES :

1. Oppenheim, Willsky, Nawab, Signals and Systems, Prentice Hall India, 2nd Edition, 2009
2. Simon Haykins – "Signal & Systems", Wiley Eastern
3. Tarun Kumar Rawat, Signals and Systems, Oxford University Press.

EE-208N	Electrical Machines-II					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
4	1	0	75	25	100	3 Hr.
Course Outcomes						
CO1	To study working & testing of three phase induction motor , special purpose induction motors ,starting methods					
CO2	To study Basic Concept of Electrical Machines and working of single phase induction motors					
CO3	To study working & testing of three phase Synchronous Generators					
CO4	To study working & testing of three phase synchronous motors					

UNIT-I

Induction Machines(A):

Basic concept of Induction machines: winding factors, generated e.m.f. and m.m.f distribution, a.c. winding, rotating magnetic field.

3-phase Induction Motor: Construction, features, production of torque, phasor diagram, equivalent circuit, performance analysis, torque -slip characteristics, running, light and blocked rotor test, load test on 3-ph I.M.

UNIT-II

Induction Machines(B):

Effect of rotor resistance, Effect of space harmonics, deep bar and double cage 3ph-induction motor.

Starting of 3-ph I.M. Starting methods of squirrel cage and wound rotor induction motor.

Induction Generator-Operation, applications, advantages.

Single phase induction motors:-

Constructional features & double revolving field theory, equivalent circuit, determination of parameters. Split phase, starting methods, types& applications.

UNIT-III

Three Phase Synchronous Generators: Principle, construction, EMF equation, armature winding, armature reaction, equivalent circuit, voltage regulation - synchronous reactance method , Rothert's m.m.f method, Potier triangle method, Output power equation, power angle curve, two reactance theory, slip test, Transient and sub-transient reactance, synchronization, parallel operation. S.C.R. and its significance, cooling of generators

UNIT-IV

Three Phase Synchronous Motor: Construction, Principle of operation, Equivalent circuit, torque, power developed , starting, V-curve, Hunting-causes , effects &reduction , synchronous condenser applications. Comparison between induction motor and synchronous motor, high startig torque motors.

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.

REFERENCES :

1. Electrical Machines, P.S. Bhimbra, Khanna Publishers Delhi
2. Electric Machines, Ashfaq Hussain, Dhanpat Rai
3. Theory of alternating current machinery: A.S. Langsdorf (TMH)
4. Generalized theory of Electrical Machines: P.S. Bhimbra

EE-210N	Electrical Engineering Materials & Processes					
Lecture	Tutorial	Practical	Theory	Sessional	Total	Time
3	0	0	75	25	100	3 Hr.
Course Outcomes						
CO1	To study properties of conductors and super conductors and other alloys.					
CO2	To study properties of insulators, diaelectric, semiconductor materials.					
CO3	To study properties of dia ,ferro, and paramagnetic materials					
CO4	To study various processes					

UNIT-I

Conductors, Properties of conductors, ACSR, High resistivity materials and their properties, Alloys, Soldering and brazing materials, superconductivity, super conductor materials and their applications.

UNIT-II

Insulators, classifications of insulators, dialectical materials, glass and ceramics, refractory materials and their uses, optical fibers, laser and opto-electronics materials, semiconductor materials, properties of semiconductor materials, thermosetting and thermoplast materials.

UNIT-III

Classification of material, Dia, Para, and Ferro magnetic materials-curie law and curie Weiss law (qualitative study).Ferromagnetism-Qualitative study of domain theory – Hysteresis phenomena. Hard and soft magnetic material and their applications. Ferrites, Structure and property.

UNIT-IV

Processes used in Plano technology e.g. Lapping, polishing, cleaning, masking, photolithography, diffusion, oxidation and metallization, welding, wire bonding, packaging and encapsulation, Heating- induction and dielectric, Electron beam welding and cutting, annealing, cold &Hot rolling.

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.

REFERENCES :

1. SP Seth "A course in Electrical Engg. Material" (Dhanpat Rai & Sons).
2. Dekker, "Electrical Engg. Materials" (PHI).
3. PL Kapoor,"A text book of Electrical Engg. Material" (Khanna Publishers).

EE-212N	Digital Electronics Lab					
Lecture	Tutorial	Practical	External	Sessional	Total	Exam Time
0	0	2	25	25	50	3 Hr.

LIST OF EXPERIMENTS:

1) Study of TTL gates- AND, OR, NOR, NAND, NOT, EX-OR, EX-NOR.
2) Design & realize a given function using K-Map and verify its performance.
3) To verify the operation of multiplexer &Demultiplexers.
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 JK flip flop & drive a seven segment display using the same.
9) To design and verify the operation of asynchronous UP/DOWN decade counter using JK flip flop & drive a seven segment display using the same.
10) To design and realize sequence generator for a given sequence using JK Flip flop.
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 of a ring counter and a Johnson counter.

Note: At least ten experiments are to be performed; at least seven experiments should be performed from above list. Remaining three experiments may either perform from the above list or designed and set by the concerned institution as per the scope of the syllabus.

EE-214N	Instrumentation Lab					
Lecture	Tutorial	Practical	External	Sessional	Total	Exam Time
		2	50	50	100	3 Hr.

LIST OF EXPERIMENTS:

1. To identify the meters from the given lot w.r.t application.
2. To convert & calibrate a D'Arsonnal type galvanometer into a voltmeter & an ammeter.
3. To calibrate an energy meter with the help of a standard wattmeter & a stop watch
4. To measure power & p.f. in 3-phase circuit by 2-watmeter method using P. T and C.T.
5. To measure capacitance by De Sauty's bridge.
6. To measure inductance by Maxwell's bridge.
7. To measure frequency by Wien's bridge.
8. To measure magnitude & phase angle of a voltage by rectangular type potentiometer.
9. To measure magnitude & phase angle of a voltage by polar type potentiometer.
10. To measure low resistance by Kelvin's Double bridge.
11. To measure high resistance by loss of charge method.
12. To measure R,L,C, by Q metre

Note: At least seven experiments should be performed from above list. Remaining three experiments may either be performed from above list or designed & set by concerned institution as per scope of syllabus.

EE-216N	Signal and System Lab					
Lecture	Tutorial	Practical	External	Sessional	Total	Exam Time
		2	25	25	50	3 Hr.

LIST OF EXPERIMENTS:

1) To demonstrate some simple signal.

2) To explore the effect of transformation of signal parameters (amplitude-time-scaling and time-shifting).

3) To explore the various properties of the impulse signals.

4) To visualize the complex exponential signal and real sinusoids.

5) To identify a given system as linear or non-linear.

6) To explore the time variance and time invariance property of a given system.

7) To explore causality and non-causality property of a system.

8) To visualize the relationship between the continuous-time Fourier series and Fourier transform of a signal.

9) To visualize the relationship between the discrete-time Fourier series and Fourier transform of a signal.

10) To visualize the relationship between continuous-time and discrete-time Fourier transform of a signals.

11) To demonstrate the time domain sampling of band limited signals (Nyquist theorem).

12) To demonstrate the time domain sampling of non-band limited signals and anti aliasing filter.

13) To demonstrate the signal reconstruction using zero-order hold and first-order hold filters.

14) To demonstrate the sampling in frequency domain (Discrete Fourier Transform).

15) To demonstrate the spectral analysis using Discrete Fourier Transform.

17) To demonstrate the convolution and correlation of two continuous-time signals.

18) To demonstrate the convolution and correlation of two discrete-time sign

Note: At least ten experiments should be performed from above list.

EE-218N	Electrical Machine-II LAB					
Lecture	Tutorial	Practical	External	Sessional	Total	Exam Time
0	0	2	50	50	100	3 Hr.

LIST OF EXPERIMENTS:

1) To perform load test on a 3-phase induction motor & DC generator set and to determine the efficiency of induction motor.

2) Determine mechanical losses by light running of a 3-phase induction motor.

3) Study and starting of 1-phase induction motor. To perform light running and block rotor test and to determine the parameters of the equivalent circuit.

4) To perform the open circuit test and block rotor test on 3-phase induction motor and draw the circle diagram.

5) To perform & study effect of rotor resistance on a poly phase slip ring induction motor.

6)To calculate regulation by synchronous impedance method:-

a) Conduct open and short circuit test on a three phase alternator.

b) Determine and plot variation of synchronous impedance with I_f

c) Determine SCR

d) Determine regulations for 0.8 lagging power factor, 0.8 leading power factor and unity PF.

7) To plot V curves of a synchronous machine.

a) Determination of X_o of a synchronous machine.

b) Measurement Xd&Xq (Direct axis and Quardrature axis reactance) by slip test

8) To measure Xq of synchronous machine (negative sequence reactance).

9) To calculate regulation by ZPF method.

10) To perform and study parallel operation of synchronous generators.

Note: At least ten experiments are to be performed; at least eight experiments should be performed from above list. Remaining two experiments may either be performed from the above list or designed and set by the concerned institution as per the scope of the syllabus.

MPC- 201NENVIRONMENTAL STUDIES

L	T	P	Sessional	Exam	Tim
3	-	-	25	75	3H

UNIT I

The multidisciplinary nature of environmental studies. Definition, Scope and Importance. Need for public awareness. Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water Resources- Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral Resources- Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources- World Food Problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy Resources- Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

(f) Land Resources- Land as a resource, land, degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyle.

UNIT II

Ecosystem- Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food Chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem.

a. Forest Ecosystem

b. Grassland Ecosystem

c. Desert Ecosystem

d. Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, esturaries

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/ hill/ mountain. Visit to a local polluted site- Urban /Rural/Industrial/Agricultural. Study of common plants, insects and birds. Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

Biodiversity and its conservation. Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity of global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity. Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts. Endangered and endemic species of India.Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution: Definition, Cause, effects and control measures of- (a) Air Pollution (b) Water Pollution (c) Soil Pollution (d) Marine Pollution (e) Noise Pollution (f) Thermal Pollution (g) Nuclear Hazards

Solid waste management- cause, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides

UNIT IV

Social Issues and the Environment, From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people: Its problems and concerns. Case Studies. Environmental ethics-issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies.

Wasteland Reclamation, Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public Awareness, Human population and the Environment, Population growth, variation among nations. Population explosion-Family Welfare Programme, Environment and human health, Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies.

Suggested Text Books & References:

1. Environmental Studies- Deswal and Deswal. Dhanpat Rai & Co.

2. Environmental Science & Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India

3. Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.

4. Environmental Science- Botkin and Keller. 2012. Wiley, India.