

Course Name: HUMANITIES I (WOMEN IN THIRD WORLD DEVELOPMENT)

Course Code: HU101 Credits: 3 LTP: 3-0-0

Pre-Req : NIL

**Lecture wise breakup**

**No of lectures**

**1 INTRODUCTION**

**(9)**

Sex and Gender, Gender Stereotypes in family, school and media, Development and growth, Sustainable Development, Deforestation, Eco-feminism.

**2 WOMEN AND DEVELOPMENT**

**(8)**

Approaches to Development, Impact of development on women's work, Impact of technology on women's work, National and International migration.

**3 WOMEN AND WORK**

**(9)**

Changing definitions of work, Gender division of work, Women in agriculture, Home based workers, Export oriented industry especially textile/garment and electronics industry, Sexual harassment at workplace, Obstacles to women's workforce participation.

**4 EMPOWERMENT**

**(9)**

Empowering women: social, political and economic, Obstacles to women's education, social, cultural, economic and infrastructural.

**5 DEVELOPMENT PROGRAMS**

**(10)**

Critical analysis of various development policies and programs from feminist perspective, Five year plans, World conferences on women, Human Rights, CEDAW, De-facto and De-jure position.

**TEXT BOOKS**

1. Seth, Mira, Women and Development, Sage Publications Limited
2. Devi, Laxmi, Women and Development, Anmol Publications

**REFERENCE BOOKS**

1. Momsen, J., Women and Development in the Third World, Routledge: London
2. Ostergaard, L., Gender and Development, Routledge: London
3. Rajput Pam, Women and Globalization, APH Publishing Corporation
4. Rose, K., Where Women are Leaders: The SEWA Movement in India, Zed London
5. Gender and Relationships- A Practicle Action Kit for young people Published by:  
The Commonwealth Secretarait, Marlborough House, Pall Mall, London

**Course Name: HUMANITIES I (SOCIOLOGY)**

**Course Code: HU102**

**Credits: 3**

**LTP: 3-0-0**

**Pre Req: NIL**

**Lecture wise breakup** **No of**

**Lectures**

- 1. SOCIOLOGY – THE DISCIPLINE** **(03)**  
Sociology as a Science, Impact of Industrial and French Revolution on the Emergence of Sociology, Relevance of Sociology for Engineering.
- 2. BASIC CONCEPTS** **(05)**  
Society, Association, Institution, Culture Relativism, Social Structure, Social System, Socialisation, Competition, Conflict, Accommodation, Social Mobility.
- 3. PIONEERING CONTRIBUTIONS TO SOCIOLOGY** **(04)**  
Seminal Views of Karl Marx, Emile Durkheim, Max Weber, Alwin Toeffler.
- 4. EVOLUTION OF SOCIETY** **(05)**  
Primitive, Agrarian, Industrial and Post-Industrial, Features of Industrial and Post-Industrial Society, Impact of Automation and Industrialization on Society.
- 5. ECONOMY AND SOCIETY** **(05)**  
Economic Systems of Simple and Complex Societies, Sociological Dimensions of Economic Life, Market (free) Economy and Controlled (planned) Economy.
- 6. INDUSTRIAL SOCIOLOGY** **(04)**  
Nature and Scope of Industrial Sociology, Pre-Conditions and Consequences of Industrialization
- 7. SCIENCE AND TECHNOLOGY** **(04)**  
Ethos of Science and Social Responsibility of Science.
- 8. SOCIAL CHANGE** **(05)**  
Theories of Change, Factors of Change, Directed Social Change, Social Policy and Social Development, Social Cost Benefit Analysis, Role of Engineers in Development.
- 9. UNDERSTANDING INDIAN SOCIETY** **(07)**  
Traditional Hindu Social Organization, Caste System, Agrarian Society in India, Social Consequences of Land Reforms and Green Revolution, Working of the Democratic Political System in a Traditional Society, Problem of Education in India, Gender Discrimination, Economic Reforms: Liberalization, Privatization and Globalization, Strategies for Development in India.

## **10. SOCIAL PROBLEMS**

**(03)**

AIDS, Alcoholism, Drug Addiction, Corruption.

### **TEXT BOOK**

1. M. Haralambos, Sociology: Themes and Perspective, Collins Educational Publications.

### **REFERENCE BOOKS**

1. David Mandilbaum, Society in India, Popular Publications.
2. M.N. Srinivas, Social Change and Modern India, Orient Longman.
3. Etzioni, Amitai, Social Problems, Prentice Hall.
4. Scheneider, Industrial Sociology, Tata McGrawHill, London.
5. L. Broom, P. Selznick and D. Dorrock, Sociology, Harper International Publishing House.

**Course Name: HUMANITIES I (MICRO ECONOMICS)**

**Course Code: HU-103 Credits: 3 LTP: 3-0-0**

**Pre Req: NIL**

**Lecture wise Breakup  
Lectures**

**Number of**

### **1. INTRODUCTION TO ECONOMICS (08)**

Evaluation of Economic Thoughts: Wealth, Welfare and Scarcity Concepts, Division of Economic Activities, Relationship of Economics with other Social Sciences and Engineering

### **2. BASIC ECONOMIC CONCEPTS (08)**

Goods and Kinds of Goods, Value: Value- in-Use and Value-in-Exchange, Attribute of Value, Utility and Types of Utility, Wealth: Essentials of Wealth and Forms of Wealth

### **3. DEMAND (06)**

Kinds of Demand, Law of Demand, Shifts in Demand and Factors affecting Demand Elasticity of Demand: Degrees of Elasticity of Demand, Types of Elasticity of Demand and Factors governing Elasticity of Demand

### **4. LAW OF CONSUMPTION (05)**

Law of Diminishing Marginal Utility and Law of Equi-Marginal Utility, Applicability and Critical Evaluation of the Laws

### **5. NATURE AND BEHAVIOUR OF COST (05)**

Production: Factors of Production, Cost: Total Cost, Fixed Cost, Variable Cost and Marginal Cost, Economic Analysis of Costs

**6. ECONOMIES OF SCALE (05)**  
Internal Economies and Diseconomies , External Economies and Diseconomies

**7. RECENT EMERGING TRENDS IN ECONOMIES & WTO (08)**

**TEXT BOOKS**

1. Ahuja H. L., Business Economics Micro, S. Chand & Co. Ltd
2. Gupta M. L. & Gupta S. P., Economics For Engineers, ESS PEE Publications

**REFERENCE BOOKS**

1. Koutsoyiannis A., Modern Microeconomics, Macmillan
2. Gupta R.D., Elementary Economic Theory, Kalyani Publishers
3. Chadha G. K., (Ed.), WTO and the Indian Economy, Deep & Deep Publishing House
4. Aswathappa K., Essentials of Business Environment, Himalaya Publishing House
5. Kreps A., Course in Micro Economics Theory, Prentice Hall
6. Samuelson Paul A. & Nordhaus William D., Economics, Tata McGraw Hill

**Course Name: HUMANITIES I (PUBLIC ADMINISTRATION)**  
**Course Code: HU-104 Credits: 3 LTP: 3-0-0**  
**Pre Req: NIL**

**Lecture wise Breakup**

**Number of Lectures**

**2. INTRODUCTION**

Meaning, Scope and Significance, Evolution and Status of the discipline, New Public Administration and New Public Management, Public and Private Administration, Decision making with special reference to H. Simon. (8)

**3. UNION GOVERNMENT AND ADMINISTRATION:**

The President, Prime Minister and Council of Minister, Central Secretariat, Prime Minister Office, Planning Commission, Finance Commission, Election Commission, Comptroller and Auditor-General of India, Centre- State Relations, Public Sector Undertaking: Forms and Importance. (9)

**4. STATE AND LOCAL ADMINISTRATION**

Governor, Chief Minister, Secretariat, Chief Secretariat, Changing role of District Collector, Local Government: Rural and Urban Local Government, Main Features, 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendment Acts, Structure and Problem areas. (8)

**5. ACCOUNTABILITY AND CONTROL**

The Legislative, Executive and Judicial Control over Administration, Good Governance, E-Governance, People's Participation and Right to Information. (6)

**6. PERSONNEL ADMINISTRATION**

Civil Services in India: Recruitment to All India and Central Services, Union Public Service Commission, Training of Civil Servants. (6)

## 7. FINANCIAL ADMINISTRATION

Budget: Concepts and forms, Formulation and Enactment of Budget, Accounts and Audit, Line item budgeting, Zero-based budgeting, Performance budgeting and Gender budgeting, Parliamentary Committees - Public Accounts Committee, Estimate Committee, Committee on Public Undertaking. (8)

### TEXT BOOKS

3. B.L. Fadia and Kuldeep Fadia, Public Administration: Administrative Theories and Concepts, Sathiya Bhawan Publication, Agra.
4. Sharma and Sadana, Public Administration in Theory and Practice, Kitab Mahal Publication, Allahabad.

### REFERENCE BOOKS

1. Robin Jack, Hildreth and J. Miller, Handbook of Public Administration, Marcel Decker Publication, New York.
5. D.D. Basu, Introduction to Constitution of India, Wadhwa Sales Corporation, Nagpur.
6. Mohit Bhattacharya, New Horizon of Public Administration, Jawahar Publications, New Delhi.
7. Awasthi and Maheshwari, Public Administration, Lakshmi Narayan Aggarwal Publications, Agra.
8. Prasad and Prasad, Administrative Thinkers, Sterling Publishers, New Delhi.
9. Ramesh .K. Arora and Rajni Goyal, Indian Public Administration, New Age International (P) Limited, New Delhi.

**Course Name: MATHEMATICS I**

**Course Code: MA101 Credits : 4 LTP : 3 2 0**

**Pre Req :**

**Lecture wise breakup**

**No. of Lectures**

**1. FUNCTIONS OF ONE VARIABLE (13)**

Infinite series and convergence, Power series, Taylor's theorem, Approximation by polynomials, Curvature, Asymptotes, Curve tracing (Cartesian and Polar coordinates).

**2. FUNCTIONS OF SEVERAL VARIABLES (9)**

Limit, Continuity, Partial derivatives, Total derivative, Euler's theorem for homogeneous functions, Composite functions, Taylor's theorem, Errors and increments, Maxima and minima

**3. SOLID GEOMETRY (5)**

Cylinder, Cone, Quadric surfaces, Surfaces of revolution.

**4. DOUBLE AND TRIPLE INTEGRALS (6)**

Change of variables, Change of order of integration, Applications to area, volume and surface of revolution.

**5. DIFFERENTIATION OF VECTOR FUNCTIONS (5)**

Gradient, Divergence and Curl – their physical interpretation and representation in cylindrical and spherical coordinates.

**6. INTEGRATION OF VECTOR FUNCTIONS (7)**

Line, Surface and Volume integrals, Green's theorem in the plane, Stoke's theorem, Divergence theorem, Irrotational and Solenoidal Fields, Applications to Science and Engineering.

**TEXT BOOK**

1. Calculus and Analytic Geometry, Thomas and Finny, Pearson Education Asia,

**REFERENCE BOOKS**

1. Advanced Engineering Mathematics, Kreyszig, John Wiley and Sons.
2. Advanced Engineering Mathematics, Greenberg, Pearson Education Asia.
3. Advanced Engineering Mathematics, Wylie and Barrett, McGraw Hill
4. Calculus, James Stewart, Thomson

**Course Name :** INTRODUCTION TO COMPUTING

**Course Code :** TAN 101

**Credits :** 5

**L T P :** 3 1 3

**Pr-req. :** ----

**Lecture wise breakup**

**No of Lectures**

**ALGORITHM DESIGN**

(07)

Concept of an algorithm, Algorithms to programs specification, Natural language, Flow-charts, Data Flow diagrams, Top-down development and stepwise refinement.

**DESIGN OF A PROGRAM**

(04)

Iterative versus recursive style, problem solving using procedural style and object oriented style Correctness and efficiency issues in programming. Use of a high level programming language for systematic, correct, efficient and maintainable development of programs

**ELEMENTS OF C PROGRAMMING**

(25)

Data types and operators, C programming constructs and control flow statements, Standard Library Functions Arrays, String handling and C string library, Program modularization, functions, Calls and definition of function. Recursive Techniques Pointers, Array of Pointers, Memory allocation, Structures, Unions, Enumerated data, Basic Searching and Sorting techniques, Elementary debugging tools and other IDE tools, Using preprocessor directive File handling, Stream and record I/O, Command line arguments.

**CONCEPTS OF OBJECT ORIENTED PROGRAMMING,**

(06)

Classes and objects, constructors, destructors Polymorphism and Inheritance

**BOOK:**

1. Ajay Mittal, "Programming in C- A practical approach", Pearson Education
2. Balaguruswamy, B. "Object Oriented Programming with C++" McGraw Hill Publication

**REFERENCES:**

1. Rajaraman V., "Fundamentals of Computers", PHI.
2. Sanders, D.H., "Computers Today", McGraw Hill.
3. Balaguruswamy B, "Programming in C" McGraw Hill Publication.
4. Byron Gottfried , "Programming with C", McGraw Hill

5. Kernighan & Ritchie, “ The C Language Programming”, Pearson

**Course Name** : **ENGINEERING GRAPHICS**  
**Course Code** : **TAN 102 Credits : 4 L T P : 2 0 4**

**Pre Req:**

<b>Lecturer wise breakup</b>	<b>No. of lectures</b>
1. Introduction to Engineering Graphics. System of Projections. Technical lettering, scales, Orthographic Projections. 3 - views. Projection of oblique areas. Circular features.	<b>(06)</b>
2. Reading of orthographic Views, Meaning of lines and areas. Pictorial sketching. Missing views and missing lines, Dimensioning, rules of dimensioning.	<b>(06)</b>
3. General Introduction to isometric Projections.	<b>(06)</b>
4. Projection of Points, Lines and Planes, Geometrical Constructions. Elements of descriptive geometry. True length, True shape, minimum distance, true angles.	
5. Projection of Solids, Sectioning, intersection of Solids.	<b>(06)</b>
6. Auxiliary, Planes and views.	<b>(06)</b>
7. Development of Surfaces.	<b>(06)</b>
8. Introduction to AutoCAD, Practice of Simple Drawings on AutoCAD	<b>(06)</b>

**BOOKS:**

1. Engineering Drawing by P.S. Gill
2. Engineering Drawing by N.D. Bhatt
3. Engineering Graphics with Autocad by James D. Bethune, Pearson Education

**REFERENCES:**

- 1 Fundamentals of Engineering Drawing by Luzadder and Duff, PHI.

**Course Name :** **INTRODUCTION TO ENGINEERING DESIGN**  
**Course Code :** **TAN 103 Credits : 4 L T P : 3 0 2**  
**Pr-req. :** **----**

**Lecture wise breakup** **No. of Lectures**

- 1. ENERGY CONVERSION PROCESSES (10)**  
Thermodynamic work, p-dv work in various processes, p-V representation of various thermodynamic processes and cycle, Properties of pure substance, Statements of I and II laws of thermodynamics and their applications in Mechanical Engineering. Carnot cycle for Heat engine, Refrigerator and Heat pump.  
Statement and explanation of Fourier’s law of heat conduction, Newton’s law of cooling, Stefan Boltzmann’s law, Conducting and insulating materials and their properties. Selection of heat sink and heat source.
- 2. ENERGY CONVERSION DEVICES (09)**  
(Theoretical study using schematic diagrams only)  
Package Boiler, Turbine Impulse & Reaction turbine (Steam Gas Turbines).  
Working principle and applications of Reciprocating I.C. engines, Air motor,

Reciprocating pumps (single acting & double acting), reciprocating compressor, rotary compressors, fans, blowers, Study of household refrigerator, window air conditioner, split air conditioner Ratings and selection criteria of above devices. Refrigerants and their impact on environment.

POWER PLANTS (Description with Block Diagrams)

Thermal, Hydroelectric, Nuclear and Solar-Wind Hybrid Power Plants.

**3. FLUID MECHANICS (08)**

Introduction to Fluids & Flows: Fluid Properties; type of flow; stream line, path line, and streak line. Introduction to flow measurement Pitot tube, Venturimeter, Orifice meter & Notches & Weirs (Rectangular & Triangular) Rotameter. Brief Introduction & classification of turbine & pumps.

**4. MATERIALS USED IN ENGINEERING AND THEIR APPLICATIONS (04)**

Metals – ferrous and Non-Ferrous, Nonmetallic materials, Material selection criteria.

**5. Design Principles (05)**

The design process; nature of design process; iteration and decision making / morphology, need identification and analysis; the specifications problem; divergence; convegence; detailing, testing, Standardisation and modularity, Design for manufacturing assembly, use, maintenance, safety, Reliability and robustness

**Term work shall consist of record of any seven experiments and creative design project as per the following:**

1. Study of water cooler, domestic refrigerator (conventional & frost free).
2. Study of window & split a.c.
3. Study of two stroke engine (petrol & diesel).
4. Study of four stroke engine (petrol & diesel).
5. Study of Cochran Boiler.
6. Flow measurement using. (a) Pitot tube  
(b) Venturimeter
7. Experimental verificational effect of insulating material on heat transfer.
8. Fabricating designed project using appropriate material to show creativity of design and implementing principles of design.

**BOOKS**

1. P.K. Nag, Thermodynamics, Tata McGraw – Hill publishing co. Ltd.
2. Hajra-Chaudhari, Workshop Technology.
3. Fluid Mechanics by D.S. Kumar.

**REFERENCE BOOKS**

1. Yunus A. Cengel and Boles, Thermodynamics, Tata McGraw – Hill Publishing Co. Ltd.
2. Arora and Domkunwar, Dhanpat Rai and Sons.
3. R.K. Rajput, Heat Transfer, S. Chand Publication, Delhi.
4. V.B. Bhandari, Design of Machine Elements, Tata McGraw-Hill Publishing Co. Ltd.

**Course Name: MECHATRONICS**  
**COURSE NO: TAN 104 CREDIT: 5 LTP: 3 1 3**

**Pre Req:**

**Lecture wise break up No of Lectures**

**1.INTRODUCTION TO MECHTRONICS**

Mechatronics Case Study, Introduction to Mechatronics Engineering Laboratory. (03)

**2.REVIEW OF BASIC ELECTRONICS**

Ohm's Law, Semi conductors (PN Junction Diode, AC Rectification, Zener Diode),Power Supplies (03)

**3.PRINCIPLE AND APPLICATIONS OF TRANSISTORS AND OPERATIONAL AMPLIFIERS**

Transistor (Common Emitter Characteristics, Emitter Follower Circuit, FET), Thyristor ,Triac Operational Amplifiers, (Inverting, Unity Gain, Non-inverting, current –to-voltage (C/V) and voltage –to –current (V/C) Amplifiers, Differential Amplifier, (Instrumentation Amplifier) (03)

**4.DIGITAL ELECTRONICS**

Boolean Algebra, Digital Electronics Gates, Combinational Logic System (Simple Gates, NAND,NOR, Latches, Positive and Negative Logic, Tri-state Logic) Sequential Logic Systems (J-K flip-flop ,registers and Counters, Timers and Pulse Circuits (06)

**5.SENSORS AND TRANSDUCER PRINCIPLES AND APPLICATIONS**

Introduction to Sensors and Transducers; General Transducer Characteristics (Static and Dynamic performance Characteristics), Calibration, Signal Conditioning, Sensor and Transducer Applications, Measurement of :Angular Position, Linear Displacement, Rotational Speed, Force, Pressure, Strain ,Flow Rate, Temperature (08)

**6.DRIVE TECHNOLOGY :PRINCIPLE AND APPLICATION**

Physical Principle, Solenoid-type devices, DC Machines, A C Machines, Stepper Motors Drive Technology Applications  
Linear Motors, Voice Coil Motors, Electro-pneumatic and Electro-hydraulic Actuators (06)

**7.ELECTRO MECHANICAL SYSTEM PRINCIPLE AND APPLICATIONS**

Rotary to Linear Motion Conversion, Power Transmission ,Electromechanical System Applications, Coupling, gearing, Belts, Pulleys, Bearings

**8. A/D, D/A CONVERSION :BASIC PRINCIPLE (02)**

**9. INTRODUCTION TO PLC**

PLC Hardware, plc Memory Structure , Basic Applications (05)

**10 MICROPROCESSOR AND MICROCONTROLLER BASIC OPERATION AND APPLICATIONS (04)**

**TEXT BOOK:**

MECHATRONICS By W. Bolton ;Pearson Education

**REFERENCE BOOKS:**

1. Dan Necsulescu Mechatronics published by Pearson Education (Singapore) Pvt. Ltd. Indian Branch, 482 FIE, Patparganj, Delhi India.

2. Book by H M T Limited, Mechatronic Tata McGraw Hill Publishing Company Ltd. New Delhi.

3. Mechatronic Principles, Concepts & Applications by Nitaigour P Mahalik published by TMH.

**Course Name : INTRODUCTION TO MANUFACTURING**

**Course Code : TAN 105**

**Credits : 4**

**L T P : 2 0 4**

**Pre-Req. : ----**

<b>Lecture wise breakup</b>	<b>No of Lectures</b>
<b>MANUFACTURING MATERIALS AND THEIR MANUFACTURING PROPERTIES</b>	<b>(03)</b>
Plastic Deformation of Materials, Cold Warm & Hot working of metals.	
<b>CONCEPT OF MANUFACTURING</b>	<b>(05)</b>
Examples of Manufacturing Products, Selecting Materials and Manufacturing Processes, Global Competitiveness and Manufacturing Costs	
<b>METAL CASTING PROCESSES &amp; EQUIPMENT</b>	<b>(05)</b>
Fundamental of Metal Casting, Principles of Various Metal Casting Processes and Their Applications	
<b>FORMING &amp; SHAPING PROCESSES AND EQUIPMENT</b>	<b>(04)</b>
Rolling, Forging, Extrusion & Drawing of Metals, Sheet Metal Working	
<b>MATERIAL REMOVAL PROCESSES AND MACHINES</b>	<b>(04)</b>
Fundamentals of Cutting, Cutting Tool Materials and Cutting Fluids, Machining Processes Used For Producing Round Shapes, Flat Surfaces and Other Shapes	
Abrasive Machining & Finishing Operations, Advanced Machining	
<b>JOINING PROCESS AND EQUIPMENT</b>	<b>(04)</b>
Weld-ability of Metals, Principles and Applications of Various Welding Processes. Brazing, Soldering, Adhesive Bonding	
<b>SURFACE TREATMENT</b>	<b>(03)</b>
Principles and Applications of various types of Surface Treatments	
<b><u>WORKSHOP EXERCISES</u></b>	
<b>CARPENTRY AND PATTERN MAKING</b>	<b>(06)</b>
Exercises including the use of important carpentry tools to practice various operations and making joints	
<b>FOUNDRY SHOP</b>	<b>(06)</b>
Preparation of small sand moulds and castings, firing a furnace	
<b>FORGING PRACTICE</b>	<b>(06)</b>
Simple smithy, forging exercises	
<b>MACHINE SHOP</b>	<b>(06)</b>
Exercise involving machining on a machine tool(s)	
<b>WELDING SHOP</b>	<b>(06)</b>
Exercises involving use of gas/ electric arc welding	
<b>ELECTRICAL AND ELECTRONICS SHOP</b>	<b>(06)</b>
Preparation of PCBs, Soldering applied to electrical and electronic applications	

**FITTING SHOP** (06)  
An exercise on fitting involving use of different fitting tools

**SHEET METAL SHOP** (06)  
Exercise involving use of sheet metal forming operations for small jobs

**ELECTROPLATING SHOP** (06)  
Exercise involving electroplating operations

**AUTOMOBILE SHOP** (06)  
Exercises involving use of automotive tools and automobile operations

**TEXT BOOKS:**

1. Manufacturing Engineering. & Technology by Kalpakjian & Schmid – Pearson Education Asia 2002 Edition

**REFERENCES:**

1. Materials & Processes in Manufacturing by Degarmo, Black & Kohser – Prentice Hall India
2. Manufacturing Technology by P. N. Rao - Tata McGraw Hill
3. Fundamentals of Metal Cutting & Machine Tools by Juneja & Sekhon – Wiley Eastern Ltd.

**COURSE NAME:** ENVIRONMENTAL STUDIES  
**COURSE CODE:** TAN-106  
**L T P:** 4 0 0 **CREDITS** 4

**Unit-1: The Multidisciplinary nature of Environmental Studies :** Definition, Scope and Importance ,  
Need for public awareness. (4)

**Unit- 2: Natural Resources : Renewable and Non-Renewable Resources :** Natural resources and associated problems ;Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people ; Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems; Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources , case studies; Food resources: World food problem, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies ; Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies; Land resources: Land as 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 lifestyles. (8)

**Unit-3: Ecosystems :** Concept of an ecosystem ,Structure and friction 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 ;Forest ecosystem, Grassland ecosystem ,Desert ecosystem , Aquatic ecosystem (ponds, stream, lakes, rivers, oceans, estuaries)

(8)

**Unit-4: Biodiversity and Its Conservation :**Introduction-Definition: Genetic, species and ecosystem diversity , Bio-geographical classification of India , Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and option values ,Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts, Conservation of biodiversity : In-situ Ex-situ conservation of biodiversity.

(8)

**Unit -5: Environmental Pollution :** Definition, ,Causes, effects and control measures of ; Air pollution, Water pollution, Soil pollution, Marine Pollution, Noise Pollution , Thermal Pollution ,Nuclear Hazards; Solid waste Management: Causes, 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.

(8)

**Unit -6: 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.

(8)

**Unit-7: Human Population and the Environment:** Population growth variation among nations, Population explosion- Family Welfare Programme , Environmental and human, health, Human Rights ,Value Education, HIV /AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health ,Case Studies.

(8)

**Unit-8: Field Work :** Visit to local area to document environmental assets- river/grassland/hill/mountain, Visit to a local polluted site- Urban/Rural/Industrial/Agricultural , Study of common plants, insects, birds ,Study of simple ecosystems- pond, river, hill slopes etc.(Field work Equal to 5 lecture hours)

(8)

#### **Suggested Text books:**

1. Deswal S & Deswal A, Basic Course in Environmental Studies, Dhanpat Rai & Company Ltd., New Delhi.

#### **Selected References:-**

1. Agarwal, K C 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. De A.K. Environmental Chemistry, Wiley Eastern Ltd.

3. Heywood, V.H.& Watson, R.T.1995. Global Biodiversity Assessment Cambridge Univ. Press.
4. Odum, E.P.1971. Fundamentals of Ecology. W.B. Saunders Co. USA.
5. Rao M.N. & Datta, A.K.1987. Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd.
6. Sharma B.K.,2001. Environmental Chemistry , Goel Publ. House, Meerut.