E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with „A" Grade | Accredited by NBA (CSE,EEE,MECH,CIVIL,ECE,IT)

NAGAPATTINAM – 611 002

B.E. Civil Engineering

Full Time Curriculum and Syllabus

Second Year – Third Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1902ME301	Engineering Mechanics	3	0	0	3	40	60	100
1902CE301	Engineering Geology	3	0	0	3	40	60	100
1902CE302	Fluid Mechanics and Machines	3	0	0	3	40	60	100
1902CE303	Strength of Materials	3	0	0	3	40	60	100
1902CE304	Engineering Surveying	3	0	0	3	40	60	100
Laboratory Course								
1902CE351	Surveying Lab	0	0	2	1	50	50	100
1902CE352	Strength of Materials Lab	0	0	2	1	50	50	100
1902CE353	Fluid Mechanics and Machines Lab	0	0	2	1	50	50	100
1904GE351	Life Skills: Soft Skills	0	0	2	1	100	-	100
Audit Course								
1901MCX01	Environmental Science	3	0	0	0	-	-	-

L – Lecture | T – Tutorial | P – Practical | C – Credit | CA – Continuous Assessment | ES – End Semester

1902ME301	ENGINEERING MECHANICS (Common to B.E Civil and Mechanical Engineering)	L	T	P	C
		3	0	0	3

MODULE I	BASIC CONCEPTS AND FORCE SYSTEM	09 Hours

Introduction to mechanics - idealization of mechanics - laws of mechanics - principle of transmissibility - vector - addition, subtraction and product. Force- types - system of forces - resultant forces - composition of forces - resolution of force-free body diagram for real world systems.

MODULE II	STATICS OF PARTICLES AND FORCE SYSTEM	09 Hours

Equilibrium of particle in space, moment of couple-equilibrant Moment about point and specific axis-moment at couple- simplification of force and couple systems.

MODULE III	STATICS OF RIGID BODIES	09 Hours

Equilibrium of rigid bodies in two and three dimensions - beams - types of loads, supports and their reactions Two and three force Members-Static determinacy.

MODULE IV	PROPERTIES OF SURFACES AND SOLIDS	09 Hours

Determination of centroid of areas, volumes and mass - Pappus and Guldinus theorems - moment of inertia of plane and areas Parallel axis theorem radius of gyration of area- product of inertia- mass moment of inertia.

MODULE V	DYNAMICS OF PARTICLES AND FRICTION	09 Hours

Displacement, Velocity and Acceleration their relationship–Relative Motion–Curvilinear motion-
Introduction - mechanism of friction-types -laws of friction - friction on horizontal and inclined planes, ladder and wedge friction – rolling resistance.

TOTAL: 45 HOURS

Course outcomes:

CO1: Draw a free body diagram from the given real-world system and add or subtract or resolve the forces involved in the system.

CO2:. Calculate the moment created by the applied force with reference to any reference in a three-dimensional space.

CO3: Determine the appropriate support system for the given real-world system by calculating the reactions generated.

CO4: Suggest suitable cross section or geometry for a load bearing support to prevent it from collapsing due to bending

CO5: Calculate the frictional force involved in various real-world systems.

REFERENCES:

1. F.P. Beer, and Jr. E.R Johnston, Vector Mechanics for Engineers - Statics and Dynamics, Tata McGraw-Hill Publishing Company, New Delhi, 2007.
2. N.H. Dubey, Engineering Mechanics- Statics and Dynamics, Tata McGraw-Hill Publishing Company, New Delhi, 2013.
3. Irving H. Shames, Engineering Mechanics - Statics and Dynamics, Pearson Education Asia Pvt. Ltd., 2006.
4. R.C. Hibbeller, Engineering Mechanics: Combined Statics & Dynamics, Prentice Hall, 2009.
5. D. P. Sharma, Engineering Mechanics, Dorling Kindersley (India) Pvt. Ltd., New Delhi, 2010.
6. S. Rajasekaran and G. Sankarasubramanian, Fundamentals of Engineering Mechanics, Vikas Publishing House Pvt. Ltd., New Delhi, 2005.
7. Nptel.ac.in

1902CE301	ENGINEERING GEOLOGY	L	T	P	C
		3	0	0	3

UNIT I	PHYSICAL GEOLOGY	9 Hours

Geology in civil engineering – branches of geology – structure of earth and its composition – weathering of rocks – scale of weathering – soils - landforms and processes associated with river, wind, groundwater and sea – relevance to civil engineering. Plate tectonics – Earth quakes – Seismic zones in India.

UNIT II	MINEROLOGY	9 Hours

Physical properties of minerals – Quartz group, Feldspar group, Pyroxene - hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsum and Clay minerals.

UNIT III	PETROLOGY	9Hours

Classification of rocks, distinction between Igneous, Sedimentary and Metamorphic rocks. Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite, Basalt, Sandstone, Limestone, Laterite, Shale, Quartzite, Marble, Slate, Gneiss and Schist.

UNIT IV	STRUCTURAL GEOLOGY AND GEOPHYSICAL METHODS	9Hours

Geological maps – attitude of beds, study of structures – folds, faults and joints – relevance to civil engineering. Geophysical methods – Seismic and electrical methods for subsurface investigations.

UNIT V	APPLICATION OF GEOLOGICAL INVESTIGATIONS	9Hours

Remote sensing for civil engineering applications; Geological conditions necessary for design and construction of Dams, Reservoirs, Tunnels, and Road cuttings – Hydro geological investigations and mining - Coastal protection structures. Investigation of Landslides, causes and mitigation.

Total:	45Hours

Course outcomes:

1. Illustrate the concepts of geological formations, weathering and plate tectonics above and below the surface of the earth.
2. Interpret the physical, mechanical and engineering properties of minerals.
3. Classify the rocks based on their origin, composition, engineering properties and uses.
4. Discuss the geological structures such as fold, fault, joints etc and Outline the subsurface the geological formation by geophysical investigation using seismic and electric method.
5. Describe the geological condition for construction of dams, tunnels, building and road cuttings.

References:

1. Parbin Singh. A "Text book of Engineering and General Geology", Katson publishing house, Ludhiana 2009.
2. Varghese, P.C., Engineering Geology for Civil Engineering Prentice Hall of India Learning Private Limited, New Delhi, 2012.
3. Venkat Reddy. D. Engineering Geology, Vikas Publishing House Pvt. Lt, 2010.
4. Blyth F.G.H. and de Freitas M.H., Geology for Engineers, Edward Arnold, London, 2010
5. Gokhale KVGK, "Principles of Engineering Geology", B.S. Publications, Hyderabad 2011.

1902CE302	FLUID MECHANICS AND MACHINES	L	T	P	C
		3	0	0	3

UNIT I	**FLUID PROPERTIES AND FLUID STATICS**	**9 Hours**

Fluid properties - density, specific weight, specific volume, specific gravity, viscosity, vapour pressure, capillarity and surface tension. Fluid statics- Hydrostatic law -Pascal's law - Pressure measurement - Buoyancy and meta-centre.

UNIT II	**FLUID KINEMATICS AND FLUID DYNAMICS**	**9 Hours**

Classification of fluid flow - Reynolds Transport Theorem - Velocity and acceleration - Continuity equation - Stream line, Streak line, Path line, Velocity Potential and Stream function. Dynamics: Euler's equations of motion - Bernoulli's theorem and proof - Application of Bernoulli's equation - Pitot tube, Orifice meter, Venturi meter.

UNIT III	**FLOW THROUGH PIPES AND FLOW PROFILE**	**9 Hours**

Development of laminar and turbulent flows in circular pipes - Hagen-Poiseuille equation - Darcy-Weisbach equation - Major and minor losses - pipes in series and in parallel. Empirical formulae for friction loss - Definition and differences between pipe flow and open channel flow - Types of Flow- gradually varied flows- rapidly varied flow (concept only) and application- Hydraulic jumps.

UNIT IV	**DIMENSIONAL ANALYSIS, SIMILITUDE AND MODEL ANALYSIS**	**9 Hours**

Dimensional homogeneity - Dimensionless numbers - Methods of dimensional analysis -Rayleigh's method - Buckingham's pi theorem - Method of selecting repeating variables - Types of similarities-Hydraulic similitude - Model analysis - Types of models - Similarity laws.

UNIT V	**PUMPS AND TURBINES**	**9 Hours**

Impulse-momentum principle - Impact of jet - Velocity triangle - Types of pumps - Properties of centrifugal pump - Pump characteristics - Specific speed, NPSH, slip - Reciprocating pump -Indicator diagram - Classification of turbines - Efficiency of turbines.

	Total:	**45 Hours**

COURSE OUTCOMES:

1. Explain the fundamental properties of fluids and methods of pressure measurement in fluid statics.
2. Understand the principles of kinematics with specific emphasis on application of continuity equation, stream function etc.
3. Identify factors affecting flow through pipes to estimate head loss and understand the flow profile concept.
4. Assess the performance of a model by dimensional analysis and similitude.
5. Compute the efficiency and performance of pumps and turbines

REFERENCES:

1. Jain. A.K., "Fluid Mechanics", Khanna Publishers, Delhi,2010.
2. Modi P.N. and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi,2002.
3. Subramanya K., "Flow in open channels", Tata McGraw Hill, New Delhi,2000.
4. Ven Te Chow, "Open Channel Hydraulics", McGraw Hill, New York,2009.
5. Rajesh Srivastava, "Flow through open channels", Oxford University Press, New Delhi,2008.
6. Bansal, "Fluid Mechanics and Hydraulic Machines", Laxmi Publications, New Delhi,2008.
7. Mays L. W., "Water Resources Engineering", John Wiley and Sons (WSE), New York, 2005.

1902CE303	STRENGTH OF MATERIALS	L	T	P	C
		3	0	0	3

UNIT I	STRESS, STRAIN AND ENERGY PRINCIPLES	9 Hours

Stress and strain at a point – Tension, Compression, Shear Stress – Hooke's Law – Relationship among elastic constants – Stress Strain Diagram for Mild Steel, TOR steel, Concrete – Ultimate Stress – Yield Stress – Factor of Safety – Thermal Stresses –Resilience- Strain Energy due to Axial load, shear, flexure and torsion – Compound Bars. Castigliano's theorems - Principle of virtual work – application of energy theorems for computing deflections in beams and trusses.

UNIT II	SHEAR AND BENDING IN BEAMS	9 Hours

Theory of Simple Bending - Shear force and Bending Moment Diagrams for statically determinate beam and indeterminate beam with different loading conditions.

UNIT III	COLUMNS AND CYLINDER	9 Hours

Euler's theory of long columns – critical loads for prismatic columns with different end conditions; Rankine-Gordon formula for eccentrically loaded columns – Eccentrically loaded short columns – middle third rule – core section – Thin and Thick cylinders – Compound cylinders.

UNIT IV	TORSION	9 Hours

Theory of Torsion – Stresses and Deformations in Solid and Hollow Circular Shafts – combined bending moment and torsion of shafts - Power transmitted to shaft – Shaft in series and parallel – Closed and Open Coiled helical springs – springs in series and parallel – Design of buffer springs.

UNIT V	STATE OF STRESS IN TWO AND THREE DIMENSIONS	9 Hours

2D State of Stress – 2D Normal and Shear Stresses on any plane – Principal Stresses and Principal Planes – Mohr's circle - Determination of 3D principal stresses and principal planes – Volumetric strain –Theories of failure – Principal stress - Principal strain – shear stress – Strain energy and distortion energy theories – application in analysis of stress, load carrying capacity.

	Total:	45 Hours

Course outcomes After completion of the course, Student will be able to

1. Explain the fundamental concepts of stress and strain in mechanics of solids and structures.
2. Determine Shear force and bending moment in indeterminate beams and determinate beams.
3. Solve the long and short columns and determine the design loads.
4. Calculate the power transmission by the shaft and deflection of spring using torsional properties.
5. Discuss about the principal stresses and planes for an element in three-dimensional state of stress and study various theories of failure.

REFERENCES (BOOKS):

1. Rajput.R.K. "Strength of Materials", S.Chand and Co, New Delhi,2007.
2. Bhavikatti. S., "Solid Mechanics", Vikas publishing house Pvt. Ltd, New Delhi,2010.
3. Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi,2009.
4. Bansal.R.K "Strength of materials", Laxmi Publications (P) Ltd, New Delhi2014.
5. Vazirani.V.N and Ratwani.M.M, "Analysis of Structures", Vol I Khanna Publishers, NewDelhi,1995.
6. Junnarkar.S.B. and Shah.H.J, "Mechanics of Structures", Vol I, Charotar Publishing House, NewDelhi-1997

REFERENCES (WEBSITES):

7. https://nptel.ac.in/courses/105105108/
8. https://nptel.ac.in/courses/105106172/

1902CE304	ENGINEERING SURVEYING	L	T	P	C
		3	0	0	3

UNIT I	CHAIN SURVEYING	9 Hours

Definition – Objectives and uses of surveying – Chain Surveying – Instrument used for chaining- Types of Chains and Tapes – Chaining – Ranging – Tape Correction – Problems.

UNIT II	COMPASS SURVEYING	9 Hours

Prismatic Compass: Construction Details functions and Temporary adjustment – Types of Bearings – Problems – Local Attraction – Direction correction – Problems.

UNIT III	LEVELING	9 Hours

Levelling – Levels – Functions – Accessories – Types of levels: Dumpy level – Leveling staff – Bench Mark – Reduced Level – Rise and Fall – Line of Collimation – Back Site – Fore Site – Intermediate Site – Change Point – Height of Instruments – Problems.

UNIT IV	CURVES	9 Hours

Types of Curves – Elements of simple circular curve – Simple curve – Transition curve – Vertical Curve.

UNIT V	GPS & TOTAL STATION SURVEYING	9 Hours

Basic Concept – Different Segment – Space Control and user segments – Signal structure – Hand Held receivers – Basic Principles – Measuring and Working Principles – Sources of errors – Maintenances of total station Instruments.

	Total:	45 Hours

Course outcomes:

1.	Appreciate the need for accurate and through note taking in field work to serve as a legal record.
2.	Gain a basic understanding of the principles and operation of the Compass.
3.	Gain the ability to measure difference in elevation, leveling the ground using Dumpy Level.
4.	Improve ability to design curves in Highways Alignment.
5.	Gain a basic understanding of the principles and operation of the global position system & Total Station.

REFERENCES:

1. Roy S.K.,"Fundamentals of Surveying", 2nd Edition, Prentice Ha of India,2004
2. Arora K.R.,"Surveying Vol 1& 2", Standard Book House, 10th Edition2008.
3. Alfred Leick,"GPS statellite Surveying", John Wiley & Sons Inc., 3rd Edition,2004.
4. Goucheng Xu,"GPS Theory, Agorithms and Appications", Springer – Berlin,2003.
5. Satheesh Gopi, rasathish Kumar, N. Madhu,"Advanced Surveying, Total Stations GPS and Remote Sensing" Pearson education,2007.
6. https://nptel.ac.in/courses/105/107/105107122/
7. https://nptel.ac.in/courses/105/107/105107121/

1902CE351	SURVEYING LAB	L	T	P	C
		0	0	2	1

LIST OF EXPERIMENTS:

1. Survey of an Area by Chain (Closed Traverse and Plotting).
2. Chaining Across Obstacles (Obstacles to Ranging but not Chaining).
3. Chaining Across Obstacles (Obstacles to Chaining but not Ranging).
4. Chaining Across Obstacles (Obstacles to both Chaining and Ranging).
5. Determination of Distance between Two Inaccessible Points with Compass.
6. Survey of a given area by Prismatic Compass (Closed Traverse) and plotting after adjustment.
7. Fly levelling using Dumpy level (Differential Leveling).
8. Longitudinal Section and Cross Section.
9. Study of Theodolite.
10. Measurement of Horizontal Angle by Repetition Method.
11. Measurement of Horizontal Angle by Reiteration Method.
12. Determining a Height of Object by Measuring Vertical Angle.
13. Stake Out suing Total Station (Demonstration).

Total: 45 Hours

ADDITIONAL EXPERIMENTS:

1. Using in the field for taking levelling checking and measurements.
2. Electronic instrument

Course outcomes:

After completion of the course, Student will be able to

CO1	On completion of this course student shall be able to understand the Surveying of the Lands and Plots using various method.
CO2	Understanding the working principle of all surveying instruments.
CO3	Understanding the usage of Surveying equipment's in various construction fields.

REFERENCES:

1. G. Brancato, S. Macchia, M. Murgia, M. Signore, G. Simeoni - Italian National Institute of Statistics, ISTAT.
2. K. Blanke, T. Körner, A. Nimmergut - Federal Statistical Office Germany, FSO.
3. P. Lima, R. Paulino - National Statistical Institute of Portugal, INE
4. J.H.P. Hoffmeyer-Zlotnik - German Center for Survey Research and Methodology, ZUMA.
5. Surveying Lab Manual – A.Pirakasam, AP/Civil, EGSPEC

1902CE352	STRENGTH OF MATERIALS LABORATORY	L	T	P	C
		0	0	2	1

LIST OF EXPERIMENTS:

1. Tension test on Mild steel rod
2. Tension test on tor steel rod
3. Torsion test on MS bar
4. Tension and compression test on springs
5. Compression test on bricks and concrete cubes
6. Water absorption test on bricks
7. Brinell and Rockwell Hardness test
8. Compression and bending test on wood specimens
9. Charpy and Izod Impact Test
10. Double shear test
11. Test on cement

Total: 45 Hours

Course Outcomes:

1.The experimental works involved in this laboratory make the student to determine the properties of different structural elements.

2.The student should be able to obtain the strength of the material and stiffness properties of structural elements.

REFERENCES:

1. Strength of Materials Laboratory Manual, Anna University, Chennai - 600 025.
2. IS1786-2008, Specification for cold worked steel high strength deformed bars for concrete reinforcement, 2008.
3. Strength of Materials Lab Manual – G.Prakash, AP/Civil, EGSPEC

1902CE353	FLUID MECHANICS AND MACHINES LAB	L	T	P	C
		0	0	2	1

LIST OF EXPERIMENTS:

1. Calibration of Rotometer
2. Flow through Venturimeter Orifice meter
3. Flowthrough variable ductarea -Bernoulli's Experiment
4. Flow through Orifice, Mouthpiece and Notches
5. Determination of friction coefficient in pipes
6. Determination of loss coefficients for pipe fittings
7. Characteristics of Centrifugal pumps
8. Characteristics of Gear pump
9. Characteristics of Submersible pump
10. Characteristics of Reciprocating pump
11. Characteristics of Pelton wheel turbine
12. Characteristics of Francis turbine
13. Characteristics of Kaplan turbine

Total: 45Hours

COURSE OUTCOMES:

1.measure the flow properties of fluid

2.conduct the experiment to find the losses in pipes

3.conduct experiment to find characteristics curves of various pumps

4.conduct experiment to find characteristics curves of various turbines

ADDITIONAL EXPERIMENTS:

1.Characteristics of multi stage Centrifugal pumps

2.Characteristics of jet on vane

REFERENCES:

1. Sarbjit Singh."Experiments in Fluid Mechanics", Prentice Hall of India Pvt. Ltd,Learning
2. Private Limited, Delhi,2009.
3. "Hydraulic Laboratory Manual", Centre for Water Resources, Anna University, 2004.
4. Modi P.N. and Seth S.M., "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi, 2000.
5. Subramanya K. "Flow in open channels", Tata McGraw Hill Publishing. Company, 2001
6. Fluid Mechanics and Machinery Lab Manual – E.Venkatesan, AP/Civil, EGSPEC

1904GE351	LIFE SKILLS: SOFT SKILLS	L	T	P	C
		0	0	2	1

MODULE I	**INTRODUCTION TO SOFT SKILLS**	**6 Hours**
Soft Skills an Overview - Basics of Communication – Body Language – Positive attitude –Improving Perception and forming values – Communicating with others.		
MODULE II	**TEAM VS TRUST**	**6 Hours**
Interpersonal skills – Understanding others – Art of Listening - Group Dynamics –Essential of an effective team - Individual and group presentations - Group interactions – Improved work Relationship		
MODULE III	**SELLING ONESELF**	**6 Hours**
How to brand oneself – social media – job hunting – Resume writing – Group Discussion – Mock G.D - .Interview skills – Mock Interview		
MODULE IV	**PROPERTIES OF PURE SUBSTANCES**	**6 Hours**
What is Etiquette – Key Factors – Greetings – Meeting etiquette – Telephone etiquette – email etiquette – Dining etiquette – Dressing etiquette		
MODULE V	**GAS MIXTURES AND PSYCHROMETRIC PROPERTIES**	**6 Hours**
1. My family. Myself. 2. Meeting people. Making Contacts. 3. A city. Getting about town. 4. Our flat. Home life. 5. Travelling. Going abroad. 6. Going through Customs.7. At a hotel. 8. Shopping. 9. Eating out.10. Making a phone call.11.A modern office.12. Discussing business.		
		TOTAL: 30 HOURS

REFERENCES:

1. Dr. K. Alex, “soft skills”, Third Edition, S.Chand& Publishing Pvt Limited,2009.
2. Arunakoneru, “Professional Communication”, Second Edition, Tata McGraw-Hill Education,2008.
3. D.K.Sarma, “You & Your Career”, First Edition Wheeler Publishing & Co Ltd,1999.
4. Shiv Khera “You Can Win”, Third Edition Mac Millan Publisher India Pvt Limited,2005.

1901MCX01	ENVIRONMENTAL SCIENCE (Common to all Branches of B.E/ B.Tech)	L	T	P	C
		2	0	0	0

MODULE I	ECOSYSTEMS AND BIODIVERSITY	10 Hours

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers- Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – hot-spots of biodiversity – threatstobiodiversity:habitatloss,poachingofwildlife,man-wildlifeconflicts–endangeredandendemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Documentation of the medicinal plants in your native place

MODULE II	NATURAL RESOURCES	10 Hours

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 overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, 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 nonrenewable energy sources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – 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 lifestyles.
Documentation of the effect of modern Agriculture in your nearby Village.

MODULE III	ENVIRONMENTAL POLLUTION	9 Hours

Definition – Source, causes, effects and control measures of: (a) Air pollution - Mitigation procedures- Control of particulate and gaseous emission, Control of SO_X, NO_x, CO and HC) -Technology for capturing CO_2 (metallo organic frame works)(b) Water pollution – Waste water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies.
Documentation study of local polluted site – Urban / Rural / Industrial / Agricultural.

MODULE IV	SOCIAL ISSUES AND THE ENVIRONMENT	8 Hours

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management -environmental ethics: Issues and possible solutions – 12 Principles of green chemistry – consumerism and waste products – environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments- scheme of labeling of environmentally friendly products (Ecomark) central and state pollution control boards- disaster management: floods, earthquake- Public awareness. Analyze the recent steps taken by government of India to prevent pollution (Green India and Clean India)

MODULE V	HUMAN POPULATION AND THE ENVIRONMENT	8 Hours

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – Environmental impact analysis (EIA) -GIS-remote sensing-role of information technology in environment and human health – Case studies.
Documentation study of the Human health and the environment in nearby Hospital (Statistical report)

TOTAL: 45 HOURS

Course outcomes:

CO1: Describe the physical, chemical and biological components of the ecosystem and their function.

CO2:Explain the water quality parameters and removal of pollutants.

CO3: Explain the scientific principles to analysis various environment implications in day to day life.

CO4: Describe the various environmental protection acts for key social system affecting the environment.

CO5: Summarise the major diseases, women welfare, child development and the impacts of population explosion

REFERENCES:

1. Trivedi.R.K., "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media, 3rd edition, BPB publications, 2010.

2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.

3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi,2007.

4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.
5. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006
6. Ravikrishnan“Environmental Science and Engineering” Sri Krishna Hi-tech Publishing Company Pvt
7. https://en.wikipedia.org/wiki/Carbon_capture_and_storage