List of courses related to Gender, Human values, Environment and Sustainability and Professional Ethics

1.3.1 List of courses related to Gender, Human values, Environment and Sustainability and Professional Ethics

S. No	Program Code	Program Name	Course Code	Name of the course	Name of the topics	Regulation of CSVTU
1.	18	B.Tech Biotechnology Engineering	D000701(046)	Universal Human Values 2	Human values	2020
2.	18	B.Tech Biotechnology Engineering	C000506(020)	Environmental Studies	Environment and Sustainability	2020
3.	18	B.Tech Biotechnology Engineering	C018514(018)	Biosafety and Bioethics	Professional Ethics	2020
4.	19	B.Tech Chemical Engineering	B000306(046)	Personality Development	Human values	2020
5.	20	B.Tech Civil Engineering	C020612(020)	Environmental Engineering	Environment and Sustainability	2020
6.	20	B.Tech Civil Engineering	C020533(020)	Groundwater Engineering	Environment and Sustainability	2020
7.	22	B.Tech Computer Science Engineering	B000406(046)	Environmental Sciences	Environment and Sustainability	2020
8.	28	B.Tech Electronics and Telecommunication Engineering	C000506(020)	Environmental Studies	Environment and Sustainability	2020
9.	25	B.Tech Electrical and Electronics Engineering	C000506(020)	Environmental Studies	Environment and Sustainability	2020
10.	33	B.Tech Information Technology Engineering	B000406(046)	Traditions, Culture & Constitution of India	Human values	2020
11.	37	B.Tech Mechanical Engineering	D000729(037)	Energy Conservation & Management	Environment and Sustainability	2020
12.	30	M.Tech Environmental Engineering	530112 (19)	Air Pollution Control	Environment and Sustainability	2017

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13.	**30**	M.Tech Environmental Engineering	530114 (19)	Water Pollution Control	Environment and Sustainability	2007
14.	**64**	M.Tech - Thermal Engineering	564213 (37)	Energy Management	Environment and Sustainability	2010
15.	**83**	M.Tech- Energy Management Engineering	583212(37)	Renewable Energy Sources and Technologies	Environment and Sustainability	2013
16.	**76**	Master in Business Administration	576223(76)	Human Consciousness Based Value Development	Human values	2007
17.	**21**	Master of Computer Application	521164(46)	Personality Development	Human values	2003

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Name of the Program: Bachelor of Technology
Semester: B. Tech – 7th **Branch: Biotechnology**
Subject: Universal Human values 2 **Course Code: D000701(046)**
Total Marks in End Semester Exam: **L: T: P: 2 Credits: 0**
Minimum number of Class Tests: 2

Course Objective(s):

- Development of a holistic perspective based on self- exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
- Strengthening of self-reflection.
- Development of commitment and courage to act.

UNIT-I Introduction- Need, Basic Guidelines, Content and Process for Value Education

- Purpose and motivation for the course, recapitulation from Universal Human Values-I.
- Self-Exploration–what is it? - Its content and process: 'Natural Acceptance' and Experiential Validation- as the process for self-exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority.
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.
- Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

UNIT-II Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility.
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
- Understanding the characteristics and activities of 'I' and harmony in 'I'.
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail.
- Programs to ensure Sanyam and Health.
- Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life.
- Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

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Name of the Program: Bachelor of Technology
Semester: B.Tech – 5th **Branch: Biotechnology**
Subject: Biosafety and Bioethics **Course Code: C018514(018)**
Total Marks in End Semester Exam: 100 **L: 2 T: 1 P: 0 Credits: 3**
Minimum number of Class Tests: 2

Course Objective(s):

- To make the students understand the regulations in biosafety in different committees.
- To make them learn about the biosafety procedures and protocols and to learn about the ethics and its socioeconomic impacts of biotechnology.
- To understand the laws governing biotechnology and related field at national and international level.
- To gain knowledge about safety precautions necessary during biotechnological work.
- To understand the ethical perspective of handling biomaterials

UNIT-I Biotechnology and Society

- Biotechnology and society Introduction to science, technology and society, issues of access-Case studies/experiences from developing and developed countries.
- Ownership, monopoly, traditional knowledge, biodiversity, benefit sharing, environmental sustainability, public vs. private funding, biotechnology in international relations, globalization and development divide.
- Public acceptance issues for biotechnology: Biotechnology and hunger: Challenges for the Indian Biotechnological research and industries

UNIT-II Definition and concept of property rights

- History and evaluation of IPR: duties and their correlations like: patent design and copy right.
- Distinction among the various forms of IPR, requirements of a patentable invention like novelty, inventive step and prior art and state of art.
- Special procedures for r-DNA based product production, TRIPS, international convention, patents and methods for patent application.

UNIT-III Rules and regulations

- Regulations on ethical principles in biotechnological practice: The Nuremberg code, the Belmont report, co-operational guidelines.
- WHO, guidelines of DBT (India), Guidelines of an informed consent.
- Public acceptance issues in biotechnology: issue of access, ownership, monopoly, traditional knowledge, biodiversity, benefit sharing, environmental sustainability and public verses private funding.

UNIT-IV Biosafety in laboratory

- Laboratory associated infections and other hazards, assessment of biological hazards and level of biosafety practices in the laboratory.
- Biosafety regulations and national and inter-national guideline regarding r-DNA.
- Experimental protocol approval, environmental aspects of biotechnological application; Biosafety: classification and description of biosafety levels; Design of clean rooms and biosafety labs.
- Biosafety regulations to protect nature; Growers and consumers interest and nation interest; Potential risk from genetically modified organisms; Ethical issues in research and case studies.

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Name of the Program: BTech | **Semester: V**
Subject: Environmental Studies | **Code: C000506(020)**
Period per week (L-T-P): (0-0-2) / Week | **Non-Credit**
Total Contact Hours: 40 | **No. of assignments to be submitted: 05**

PREREQUISITE: Knowledge of basic Chemistry, Physics and Mathematics.

COURSE OBJECTIVES:

1. Basic knowledge of environment, ecology, ecosystems, biodiversity and conservation.
2. Fundamentals of natural resources, control, uses and its impact on environment.
3. Human population, growth, growing needs and its impact on society and environment.
4. Types of environmental pollution, legislations, enactment and management.

COURSE DETAILS:

UNIT I: Introduction to environmental studies, ecology and ecosystems **(06 hours)**

Introduction to environment; Concept and structure of ecology and ecosystem, energy flow; Community ecology; Food chains and webs; Ecological succession; Characteristic features of forest, grassland, desert and aquatic ecosystem; Multidisciplinary nature of environmental studies, scope and importance; Concept of sustainability and sustainable development.

UNIT II: Biodiversity and conservation **(06 hours)**

Introduction to biological diversity and levels of genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots; Threats to biodiversity, habitat loss, conflicts and biological invasions; In-situ and Ex-situ conservation of biodiversity; Ecosystem and biodiversity services.

UNIT III: Natural resources and environment **(08 hours)**

Concept of Renewable and non-renewable resources; Land resources, land use change, land degradation, soil erosion; Desertification; Deforestation: causes, consequences and remedial measures; Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state); Energy resources: environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.

UNIT IV: Human communities, social issues and environment **(08 hours)**

Basic concept of human population, growth and communities; Impacts on environment, human health, welfare and human rights; Resettlement and rehabilitation; Environmental natural disaster: floods, earthquake, cyclones, tsunami and landslides; Manmade disaster; Environmental movements; Environmental ethics: role of gender and cultures in environmental conservation; Environmental education and public awareness; Human health risks and preventive measurements.

UNIT V: Environmental pollution, policies, legislations, assessment and practices **(12 hours)**

Environmental pollution: Causes, effects and controls of air, water, soil, noise and marine pollution; Concept of hazardous and non-hazardous wastes, biomedical and e-wastes; Solid waste management and control measures; Climate change, global warming, ozone layer depletion, acid rain and their societal impacts; Environment laws: Wildlife Protection Act, Forest Conservation Act, Water (Prevention and control of Pollution) Act, Air (Prevention & Control of Pollution) Act, Environment Protection Act, Biodiversity Act, International agreements negotiations, protocols and practices; EIA, EMP.

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Name of the Program: Bachelor of Technology
Semester: B.Tech – 3rd **Branch: Biotechnology**
Subject: Personality Development **Course Code: B000306(046)**
Total Marks in End Semester Exam: 10 **L: 0 T: 1 P: 2 Credits: 0**
Minimum number of Class Tests: 02

Course Objective(s):

- To understand the concept of personality and image.
- To develop leadership, listening and interacting skills.
- To develop attitudinal changes.
- To develop decision-making qualities.
- To communication skill.

UNIT-IPersonality Concepts

- What is Personality – its physical and psychic aspects. How to develop a positive self image, how to aim at Excellence and how to apply the cosmic laws that govern life and personality
- How to improve Memory – how to develop successful learning skills and how to develop and effectively use one'screative power.
- How to apply the individual MOTIVATORS that make you a self-power personality.

UNIT-IIInterpersonal Skills

- Leadership: Leaders who make a difference, Leadership: your idea, what do we know about leadership? If you are serious about Excellence.
- Concepts of leadership, two important keys toeffective leadership, Principles of leadership, Factors of leadership, Attributes.
- Listening: Listening skills, how to listen, saying a lot- just by listening, the words and the music, how to talk to a disturbed person,Listening and sometimes challenging. How to win friends and influence people, How to get along withothers. How to develop art of convincing others. How can one make the difference. How to deal with othersparticularly elders. Conflicts and cooperation.

UNIT-IIIAttitudinal Changes

- Meaning of attitude,benefits of positive attitudes, How to develop the habit of positive thinking..
- Negative attitude and wining:What is FEAR and how to win it. How to win loneliness. How to win overFAILURE. How to win over PAIN. How to win over one's ANGER and others anger. What is stress andhow to cope up with it.
- The art of self-motivation. How to acquire mental well-being. How to acquire physical well-being.

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Name of program: **B.Tech**
Branch: **Civil Engineering**
Subject: **Environmental Engineering**
Class Tests: **Two (Minimum)**
ESE Duration: **Three Hours**

Semester: **VI**
Code: **C020612(020)**
Assignments: **Two (Minimum)**
Maximum Marks: **100**
Minimum Marks: **35**

UNIT-1: Introduction to Water demand: Necessity and importance of water supply schemes. Sources of water. Classification of water demands, Per capita demand, factors affecting per capita demand, Population Forecasting Techniques.

Quality of water: Common impurities, physical, chemical and biological characteristics of water/wastewater, Drinking water quality standards for municipal and domestic supplies.

Unit-2: Water Processing: Objects of water processing Theory of sedimentation, Design of sedimentation tanks, Sedimentation with coagulations, Theory of filtration, Design of slow sand and rapid sand filters, Methods of disinfection,Methods of Softening, Miscellaneous treatment methods.

UNIT-3: Distribution System: Methods of distribution, layouts of distribution system, functions and its types of distribution reservoirs, storage capacity of distribution reservoir.

Sewage and Sewerage Systems: System of sanitation, Estimation of domestic and storm sewage, Design of circular sewers, Sewer appurtenances,

Sewage Treatment: Preliminary treatment systems, Screens, grit chamber, detritus tanks. Primary treatment systems-Plain Sedimentation Process, Design of Septic Tanks.

UNIT-4: Secondary treatment Systems: Trickling filters, Design of standard and high rates, ActivatedSludge Process, Oxidation Pond and oxidation ditch, Aeration and Mixing Techniques,

Sewage sludge Treatment: Importance, amount and characteristics of sludge, Sludge digestion process, Design of sludge digestion tank

UNIT-5: Sewage disposal: Disposal by dilution, self-purification of polluted streams, Oxygen Sag curve, Disposal on land surfaces.Stream standards and Effluent standards, Theories of waste treatment (Volume reduction, strength reduction, new Equalization and proportioning) Summery of Industrial waste, its origin, character and treatment.

Text Books:

1. Water Supply Engineering – S.K. Garg (Khanna Publication).
2. Water Supply Engineering – B.C. Punmia (Laxmi Publication, New Delhi)

Reference Books:

1. Environmental Engineering – Peavy& Rowe (Tata McGraw Hill, New Delhi).
2. Water Supply and Sanitary Engineering – G.S. Birdi (Dhanpat Rai Publications).
3. Introduction to Environmental Science – Y. Anjaneyulu (B.S. Publications)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: Bachelor of Technology
Branch: Civil Engineering **Semester: V**
Subject: Groundwater Engineering (Professional Elective –I) **Code: C020533(020)**
Class Tests: Two (Minimum) **Assignments: Two (Minimum)**
ESE Duration: Three Hours **Maximum Marks: 100**
Minimum Marks: 35

Unit 1 Introduction

Definition and scope, Hydrology & Hydrologic Cycle and components, The necessity for hydrologic data. Presence of water on earth and its distribution, ground water resources.

Unit 2 Groundwater hydrology

Occurrence of groundwater, well hydraulics and well construction, geo-physical explorations, groundwater quality and management of groundwater resources; Problems and perspectives regarding groundwater in India.

Unit 3 Hydrogeology:

Darcy's Equation; flow characteristics; general flow equations; unsaturated flow; Well Hydraulics: Steady and unsteady radial flows in aquifers; partially penetrating wells; multiple well systems; characteristic well losses , specific capacity.

Unit 4

Surface and Subsurface investigations: Geologic methods; remote sensing; geophysical explorations; electrical resistivity and seismic refraction.

Unit 5

Water Wells: Construction; completion, development, protection and rehabilitation of wells. Groundwater quality, Groundwater Management: Basin management, investigations, conjunctive use, modeling, artificial recharge.

Text Books:

1. Engineering Hydrology – K. Subramanya (Tata McGraw Hill)
2. A Text Book of Hydrology – Dr. P. Jaya Rami Reddy (Laxmi Publications)

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Program / Semester: **B.Tech (IV)**	Branch: **Computer Science &Engineering**
Subject: **Constitution of India**	Course Code: B000406(046)
Total Marks (Internal Assessment): 10	L: 0 T: 0 P: 2 Credits: 0
Internal Assessments to be conducted: 02	Duration (End Semester Exam): **NA**

Unit 1: The Constituent Assembly & The Constitution Of India: Historical Context of Constituent Assembly, Compositions & Functions, Critical Evaluation, Features of Indian Constitution, Preamble to the Constitution of India, Introduction to Fundamental Rights, Right to Equality, Right to Freedom, Constitutional Position of Some Democratic Rights, Right Against Exploitation, Right to Freedom of Religion, Right To Constitutional Remedies, Directive Principles

Unit 2: Organs Of The Government: The President of India, Powers and Functions of President, Emergency Powers and the Position of the President, Union Council of Ministers, Prime Minister, The Rajya Sabha, The Lok Sabha& Lok Sabha Speaker, Relation between Lok Sabha & Rajya Sabha

Unit 3: Indian Judiciary: The Structure and Organization of the Judiciary & the High Court, The Supreme Court, Role of The Supreme Court, Judicial Activism in India, Basic Structure Doctrine & PIL

Unit 4: Federalism & Decentralization: Legislative Procedures of the Parliament, Parliamentary Committees, Centre-State Legislative Relations, Centre-State Administrative Relations, Centre-State Financial Relations, The 5th & 6th Schedules

Unit 5: Indian Municipality and Gram Panchayats: Municipality-1 (History of Indian Municipality), Municipality-2 (Organization & Functions), Panchayat---1 (Idea of Panchayat), Organization and Powers of Panchayats in India

Text Books:

1. Durga Das Basu --- Introduction to the Constitution of India, 23rd Edition (Gurgaon; LexisNexis, 2018).
2. J.C.Johari -- The Constitution of India: A Politico-Legal Study (Greater Noida: Sterling Publishers Pvt. Ltd. 2013).
3. Himangshu Roy and M.P.Singh – Indian Political System, 4th Edition (Bengalaru; Pearson Education, 2018)
4. Vidya Bhushan &VishnooBhagwan--- Indian Administration (S. Chand, 2011)

Reference Books:

1. S.R.Maheswari --- Indian Administration (Orient Blackswan, 2001)
2. Dr. A.Avasthi& A.P. Avasthi --- Indian Administration (L.N. Agarwal Educational Publishing, 2017).
3. B. L. Fadia --- Indian Government and Politics (Sahitya a. Bhawan, 13th Revised Edition, 2017).
4. P.M.Bakshi – The Constitution of India (Prayagraj, UP; a. Universal Law Publishing, January, 2018)

Course Outcomes [The students should be able to]:

1. The citizens of India learn to abide by the laws of Indian Parliament and the judiciary.
2. Indians become aware of their fundamental rights and duties from the Constitution of India.

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Energy Conservation & Management**	**Code:**	**D000729(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

COURSE OBJECTIVES:

- understand and analyze the energy data of industries
- carryout energy accounting and balancing
- conduct energy audit and suggest methodologies for energy savings and
- utilize the available resources in optimal ways

UNIT I	**Introduction** Energy – Power – Past & Present scenario of World; National Energy consumption Data–Environmental aspects associated with energy utilization –Energy Auditing: Need, Types , Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing. Energy intensity, Energy production and imports
UNIT II	**Energy Conservation in Major utilities** Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems–Cooling Towers – D.G. sets, Energy management programmes, Energy conservation measures.
UNIT III	**Thermal Systems Utilization** Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and enconomic measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories.
UNIT IV	Energy Storage Technologies Overview of storage technologies, Principal forms of stored energies, Application of energy storage, Specifying energy storage devices, Specifying fuels, Direct electric storage ,Electrochemical energy storage, Mechanical energy storage, Direct thermal storage, Thermochemical energy storage
UNIT V	**Industrial Energy Efficiency and Energy Management** Introduction, Industrial energy management and efficiency improvement, Improving industrial energy audits, Industrial electricity end uses and electrical energy management, Thermal energy management in industry, The role of new equipment and technology in industrial energy efficiency

Text books:

1. Energy Management and Conservation Handbook - D. Yogi Goswami, and Frank Kreith
2. Energy Management – W.R. Murphy, G. Mckay

References

1. Energy Management – Paul O'Callaghan
2. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies
3. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management andUtilisation"Hemisphere Publ, Washington, 1988.
4. Dryden. I.G.C., "The Efficient Use of Energy" Butterworths, London, 1982

Course Outcomes: Upon completion of this course, the students can able to analyse the energy data of industries

- Can carryout energy accounting and balancing
- Can suggest methodologies for energy savings

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: M.E. Ist | **Branch: Chemical Engg.(Environmental Engg.)**
Subject: Air Pollution Control | **Code: 530112 (19)**
Total Theory Periods: 40 | **Total Tutorial Periods: 12**
Total Marks in End Semester Exam: 100
Minimum number of class tests to be conducted :02

Unit I Sources And Classification of Air Pollutants; Emission Standards And Qualities; Nature And Characteristics of Gaseous And Particulate From Different Sources Like Automobiles And Thermal Power Plants; Primary And Secondary Air Pollutants, Effect of Air Pollution; Mechanism of Deterioration of Air Quality Due to Various Air Pollutants And Aerosols; Petrochemical Air Pollution; Pollution Due to Cement And Steel Industries; Pollutants – Carbon Mono-oxide, Oxides of Nitrogen, Oxides of Sulfur, Hydrocarbon And Dust.

Unit II Control of Gaseous Emission: Methods of Absorption, Adsorption, Condensation, Chemical Transformation, Cyclone Separation And Electrical – Magnetic Separation. Analysis And Characterization of Gaseous Pollutants, Air Pollution Monitoring Instruments: Principle; Mechanical Collectors, Bag Filters.

Unit III Definitions of Pollutant Concentrations And Relationship Between These Concentrations, Smoke And Its Control, Dust And Solid Particulates, Nighalmann Smoke Chart, Smoke Prevention And Control, Air Pollution Control By Process Absorption And Adsorption. Design of Air Pollution Control Equipments: Cyclone Separator, ESP, Gravity Settling Chamber, Wet Scrubbers, ESP; Advantages And Disadvantages of ESP; Chimney Height, Plume Dispersion of Smoke In Atmosphere, Integrated Air Pollution Control System.

Unit IV Air Pollution Indices, Definition of Air Pollution Indices, Type And Use of Air Pollution Indices. The Standardized Indices And Its Criterion Air Pollution Legislation And Regulations, Pollution Board & Its Function, Duties And Power of State And Central Boards of Pollution, Air Pollution Act 1981 And Its Amendment.

Unit V Air Pollution And Its Control In: Fertilizer Industries, Cement Industries, Paper Industries, Refinery, Mining And Metallurgical Industries. Automobile Emission Control And Remedies, Thermal Power Plant Pollution And Its Control.

Text Books:

1. Air Pollution – M.N. Rao
2. Industrial Pollution Control – W.W. Eckenfelder
3. Air Pollution Control Theory – Martin Crewford

Reference Books

1. Hand Book of Air Pollution Engineering – S. Clavert & H.M. Englund
2. Air Pollution Control Technology – R.M. Betheaven Van Nosterd

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**
Subject: : Environmental Pollution & Control
Total Theory Periods: **40**
Class Tests: **Two(Minimum)**
ESE Duration: **Three Hours** **Maximum Marks:100**

Semester: **VI**
Code: **C000610(037)**
Total Tutorial : **Ten(Minimum)**
Assignments: **2(Minimum)**
Minimum Marks:35

Course Objectives:

- To provide an introduction to Environmental Pollution.
- To develop an understanding of the causes, chemistry and effects of pollution.
- To build awareness of the strategies used to control and manage pollution.
- To make aware of Environmental Laws & Acts

UNIT-I Environmental Pollution – Introduction & Classification

Sources and classification of air pollutants, aerosols, primary and secondary air pollutants, effect of air pollution on human health, effect of SO2, CO2, NO2 H2S and lead, economic effect of air pollution, mechanism of deterioration in polluted atmosphere. Factors influencing atmospheric deterioration,

UNIT – II Environmental Pollution - Sources

Air pollution due to automobiles, exhaust, Crankcase and evaporative emissions and their control, effect of various parameters of I.C. engines on air pollution, photochemical air pollution, air pollution from ferrous metallurgical operations and thermal power plants.

UNIT – III Chemistry of Pollution

Definition of pollutant concentrations, mass concentration, volume concentration, mass-volume concentration and relationship between these concentrations, smoke and its control.Ningalmam smoke chart, smoke prevention and control of air pollution by process change, elementary ideas of control of gaseous contaminants for combustion and absorption.

UNIT – IV Pollution Control

Control of air pollution by equipment, objectives of using control equipment, settling chambers, inertial separators, cyclones, principle of electroscopic precipitators, descriptive study of the above equipment only, merits and demerits of the equipment, choice of equipment.

UNIT – V Environmental Laws & Acts

Air pollution indices, definition of air pollution index, type and use of air pollution indices, criteria for a standardized index, acid rain, causes of acid rain and its remedy, green house and its effect, air pollution legislation and regulations, constitution of the Board, functions of the central board and state boards, classification of pollution sources under Air Act 1981 and 1986.

TEXT BOOKS

1. Environmental Chemistry and Pollution Control - S SDara – S Chand , New Delhi
2. Air Pollution - M.N. Rao and H.V.N. Rao – TMH, New Delhi.

REFERENCE BOOKS

1. Air Pollution Control Theory - Martin Crawford.- TMH, New Delhi
2. Encyclopaedia of Environment Control Technology & Air Pollution Control – Cheremisinott P N – Gulf Publication,
London

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: M.E. Ist | **Branch: Chemical Engg.(Environmental Engg.)**

Subject: Water Pollution Control | **Code: 530114 (19)**

Total Theory Periods: 40 | **Total Tutorial Periods: 12**

Total Marks in End Semester Exam: 100

Minimum number of class tests to be conducted :02

Note: Internal choice may be given in any three units.

Unit I Waste Water: Industrial Wastewater – Characterization, Treatability Studies, Segregation, Battery Limits Treatment, and Pretreatment, Control of Pollutants.

Unit II Municipal Sewage: Definition of Sewage Water Carriage System, Cross –Sections And Classification of Sewers; Sewage Treatment: Various Processes: Preliminary, Primary. Secondary Treatment, Attached And Suspended Growth Processes, Activated Sludge, Sludge Digestion, Septic Tank, Imhoff Tank, Oxidation Ponds.

Unit III Industrial Waste Water Treatment & Design of Equipments: Coagulation, Sedimentation, Thickening, Precipitation, Biological Oxidation, Biomethanation, Adsorption, Ion Exchange, Membrane Separation, Chemical Oxidation, Sludge Dewatering And Disposal Methods..

Unit IV Control of Water Pollution From Organic Chemicals: Refinery, Petrochemical, Distillery, Pulp And Paper, Textile Fertilizer, Tanneries, Food And Pharmaceutical Industries, Coke Ovens And Steel Plants.

Unit V Wastewater Disposal: Disposal By Dilution Factors Affecting Self-Purification of Polluted Streams, Oxygen Sag Curve, Disposal on the Surfaces.

Text Books:

1. Water and waste water Technology ,Marks and Hammer.
2. Water and waste water Treatment, Humenick M.J. (Mc Graw Hill)
3. Wastewater Engineering, Metcalf and Eddy.

Reference books:

1. Waste water Treatment for pollution control, Areeivala S.J. (Tripathi private Ltd)
2. Industries pollution control, W.W. Eckenfelder (Mc Graw Hill)

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: **II M.E (Thermal Engg.)** Branch: **Mechanical Engineering**
Subject: **Energy Management** Code: **564213 (37)**
Total Theory Periods: **40** Total Tutorial Periods: **12**
Total Marks in End Semester Exam. : **100**
Minimum number of class test to be conducted: 02

Unit – I

Introduction : Energy Scenario, various forms of energy, energy management and its importance, recent trends in energy conservation.

Energy Auditing and Instrumentation: Definition, methodology, analysis of past trends (plan data), closing the energy balance, laws of thermodynamics, measuring instruments, portable and online instruments. Role of Instrumentation in Energy Conservation.

Unit – II

Energy Economics : Simple payback period, time value of money, IRR NPV, life cycle costing, cost of saved energy, cost of energy generated.

Unit-III

Monitoring and Targeting: Defining monitoring and targeting, elements of monitoring and targeting, data and information, analysis techniques, energy consumption, production, cumulative sum of difference.

Unit-IV

Energy Efficiency in Thermal Utilities: Boilers, steam systems, furnaces insulation and refractories, FBC boilers, cogeneration, waste heat recovery.

Unit-V

Energy Efficiency in Electrical Utilities : Electrical systems, electric motors, compressed air system, HVAC and refrigeration systems, fans and blowers, pumps and pumping systems, cooling towers, lighting system, diesel generating system.

Text Books:

1. Witte L.C., Schmidt P.S., Brown D.R., Industrial Energy Management and Utilization, Hemisphere, 1982
2. Gyftopoulos E.P., Industrial Energy Conservation Manuals, MIT Press, 1988
3. Dryden IGC, The Efficient Use of Energy, 2nd Ed., Butterworth Heinemann, 1982

References:

1. Capehart B.L, Turner W.C., Kennedy W.J., Energy Management Handbook, John Wiley and Sons, 1982
2. Technology Menu for Efficient Energy Use: Motor Drive Systems, Prepared by National Productivity Council and Centre for Environmental Studies, Princeton University, 1993
3. F. Krieth & RE West, Economics of Solar Energy & Conservation Systems, Vol. I & II, CRC Press,
4. D.A. Reay, Industrial Energy Recovery, Wiley

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Raipur Institute of Technology
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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: **II M.E (Energy Management)** Branch: **Mechanical Engineering**
Subject: **Renewable Energy Sources and Technologies** Code: **583212(37)**
Total Theory Periods: **40** Total Tutorial Periods: **12**
Total Marks in End Semester Exam. : **100**
Minimum number of class test to be conducted: 02

Unit I

Wind Energy: Wind potential in India and world, basic principle of wind energy Conservation characteristics of wind power, Extractable wind power, Site selection, wind data analysis and predictions, Use of statistical tools, Different types of Wind Machines, Performance Estimation of Wind turbines

Unit II

Small Scale Hydroelectric : Classification of Small Hydro Power Stations, Components of a Hydroelectric Scheme, Civil Works Design Considerations for Mini and Micro Hydel Projects, Turbines and Generators for Small Scale Hydro Electric, Hybrid Systems, Hydraulic Ram and its Applications

Unit III

Geothermal Energy : Estimations of Geothermal Power, Hot-Dry Rocks Resources, Magma Resources, Applications of Geothermal Energy

Ocean Energy: Basic Theory of OTEC, Basic Theory of Wave Energy, Basic Theory of Tidal Energy, Potential and Technologies.

Unit IV

Hybrid systems : Wind-PV systems, Wind-DG systems, Wind-Hydel systems, Gasifier DG - Wind systems) and Application areas, Hydrogen energy production, storage & application.

Unit V

Hydrogen Energy

Production, Electrolysis, Thermo-chemical methods, Fossil fuel methods, Solar Energy Methods,Storage, Transportation, Applications.

Fuel Cells

Basic Principle of working, potential, classification of Fuel Cells, Conversion efficiency of fuel cells, Applications, Thermo – Electric Generators and Refrigeration

Text Books & References

1. Twidell& AW. Wier, Renewable energy resources, English Language book, Society I E& FN Spon
1. Grey & O.K. Ganhus, Tidal power, Plenum Press, New York
2. Goswami. Alternative energy in agriculture, Vol. II CRC Press Inc. Florida
3. E.R. Berman, Geothermal Energy; Noyes DATA Corporation, New Jersey

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

MBA SEM II **576223(76): HUMAN CONSCIOUSNESS BASED VALUE DEVELOPMENT**

CREDITS: 1 **LECTURE SCHEME: (L-0; T-0; P-2)**

OBJECTIVES

The various happenings in the business world demand attention to develop and instill a value system among students. This course is designed to impart student with an understanding of basic human values so that they can understand their responsibility towards themselves and the society at large.

COURSE CONTENTS

- **Study of Basic Human Objectives:** Everlasting Solution, Prosperity, trust in self and other and coexistence for balance in nature. Need and importance of aforesaid basic human objectives and how to achieve these.
- **Concept and Understanding of human happiness:** Meaning and Concept of "happiness", incessant happiness, its relationship with guarantee of physical needs, comforts, physical and sensory pleasures with its transient nature, misery, The only method to minimize incessant happiness: gaining right understanding about oneself, one's body, one's relationship with other human beings, Nature and total existence.
- **Proper Understanding** about the order in Nature and co-existence at various levels, such as, I and my body, family, society, Nature and existence.
- **Understanding the Self:** Understanding human reality 'I' and my body, present understanding of the self, physical needs, relation with others and with Nature, gaining proper understanding of the self, discrimination between 'I' and my 'body', characteristics and the needs of 'I', of my 'body' and 'body' & 'I'.
- **Synergatic Order and Coexistence among Human in nature and in Existence:** Conceptual understanding of natural relations and consequent values, of family and relation therein, of society and role of manager therein, overall excellence'. Inanimate and consciousness aspects of Nature, Four distinct synergetic orders in Nature - Padartha Awastha, Prana Awastha, Jiva Awastha, and Gyana Awastha; complementary supplementary evolutionary connection amongst above orders.
- **Path for Sustainability:** Evolution of understanding work and behavior

TEXT BOOKS

- An Introduction to Jeevan Vidya by Shri A. Nagaraj
- Human Consciousness and life by Dr P B Deshmukh & Deepak Kaushik
- Jeevan Vidya Camp: Notes

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