K.S. SCHOOL OF ENGINEERING AND MANAGEMENT,

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1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

Sl. No.	Description of crosscutting issue	Title of course wherein the issue is addressed	Unit/chapter no.	Remarks
1	Professional Ethics	15CV61: Construction Management and Entrepreneurship	Module1	Characteristics of management, functions of management, importance and purpose of planning process, types of plans Construction Project, project organization, management functions, and management styles Construction Planning and Scheduling.
2	Professional Ethics	15CS42 Software Engineering	Module 1: Introduction	Software engineers shall commit themselves to making the analysis, specification, design, development, testing and maintenance of software a beneficial and respected profession.
3	Professional Ethics	15CS51 Management and Entrepreneurship	Module 1 and 2 Introduction Directing and controlling	Ethics enable students to reason about the role of ethics in business in a complex, dynamic and global environment. It emphasis harms and benefits, rights and duties, principles and rules, moral and institutional leadership.

4	Professional Ethics	15CS61 Cryptography, Network security and Cyber law	Module 5: Cyber Law and Ethics	To develop the ethics for information Security to avoid cybercrime.
5	Professional Ethics	17CS51 Management and Entrepreneurship for IT industry	Module 1 and 2 Introduction Directing and controlling	Ethics enable students to reason about the role of ethics in business in a complex, dynamic and global environment. It emphasis harms and benefits, rights and duties, principles and rules, moral and institutional leadership.
6	Professional Ethics	(15EE51) Management and Entrepreneurship	Module 3	Social Responsibilities of Business: Meaning of Social Responsibility, Social Responsibilities of Business towards Different Groups, Social Audit, Business Ethics and Corporate Governance.
7	Professional Ethics	(17EE51) Management and Entrepreneurship	Module 3	Social Responsibilities of Business: Meaning of Social Responsibility, Social Responsibilities of Business towards Different Groups, Social Audit, Business Ethics and Corporate Governance.

8	Professional Ethics	15ME664 Total quality management	Module - 2 Leadership: Definition, characteristics of quality leaders, leadership concept, characteristics of effective people, ethics,	Students learn about the professional ethics and leadership Qualities.
9	Professional Ethics	14MBA14 Business, government and society	Module 1: The Study of Business, Government and Society (BGS)	Importance of BGS to Managers –Models of BGS relationships– Market Capitalism Model, Dominance Model, Countervailing Forces Model and Stakeholder Model – Global perspective – Historical Perspective.
10	Professional Ethics	14MBA14 Business, government and society	Module 2: Corporate Governance	Introduction, Definition, Market model and control model, OECD on corporate governance, A historical perspective of corporate governance, Issues in corporate governance, relevance of corporate governance, need and importance of corporate governance, benefits of good corporate governance, the concept of corporate, the concept of governance, theoretical basis for corporate governance, obligation to society, obligation to investors, obligation to employees, obligation to customers, managerial obligation.

11	Professional Ethics	14MBA14 Business, government and society	Module 5: Business Ethics	Business Ethics: Meaning of ethics, business ethics, relation between ethics and business ethics, evolution of business ethics, nature of business ethics, scope, need and purpose, importance, approaches to business ethics, sources of ethical knowledge for business roots of unethical behaviour, ethical decision making, some unethical issues, benefits from managing ethics at workplace, ethical organizations.
12	Professional Ethics	14MBA14 Business, government and society	Module 6: Corporate Social Responsibility	Corporate Social Responsibility: Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Arguments for and against CSR, CSR in Indian perspective, Indian examples.
13	Professional Ethics	16MBA24 Business law and policy	Unit 6: Corporate Social Responsibility	Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Arguments for and against CSR, CSR in Indian perspective.
14	Professional Ethics	16MBAHR402 Workplace ethics and value systems	Unit 1: Workplace Ethics	Workplace Ethics: Introduction, Needs, Principles, Development of Personal Ethics, Workplace Ethics for Employees-Ethical behavior in workplace-Professionalism, Ethical violations by employees, Employee Attitude and Ethics, Employee Etiquettes. Benefits of ethics in Workplace employee commitment, investor loyalty, customer satisfaction, profits
15	Professional Ethics	16MBAHR402 Workplace ethics and value systems	Unit 2; Professionalism at Workplace	Professionalism at Workplace: Unethical Conduct for employees and employers. Factors leading to unethical behaviors.

16	Professional Ethics	16MBAHR402 Workplace ethics and value systems	Unit 3: Business Ethics and Corporate Governance	Business Ethics and Corporate Governance: Overview of Business Ethics, Corporate Governance, Ethical issues in human resource management- The principal of ethical hiring, Firing, worker safety, whistle blowing, Equality of opportunity, Discrimination, Ethics and remuneration, Ethics in retrenchment. Ethical Dilemmas at workplace, Ethical issues in global business, corporate responsibility of employers.
17	Professional Ethics	16MBAHR402 Workplace ethics and value systems	Unit 4: Workplace Privacy & Ethics	Workplace Privacy & Ethics: Watching what you say and what you do in the workplace, Hardware, Software and Spyware, Plagiarism and Computer Crimes, Convenience and Death of Privacy, Defense of employee privacy rights.
18	Professional Ethics	16MBAHR402 Workplace ethics and value systems	Unit 5; Teamwork in the Workplace, Ethics, Discrimination and Harassment at Workplace & Ethics	Teamwork in the Workplace, Ethics, Discrimination and Harassment at Workplace & Ethics: Teams, Elements of team, Stages of team development, team meetings, team rules, and teams work and professional responsibility, rules of professional responsibility, ASME code of ethics .Discrimination, sexual harassment, creating awareness about workplace harassment, Vishaka Dutta vs. State of Rajasthan –Supreme Court directions, Compulsory workplace guidelines.
19	Professional Ethics	16MBAHR402 Workplace ethics and value systems	Unit 6:Managing Change in Workplace through Ethics	Managing Change in Workplace through Ethics: Introduction to Change Management, Models of change, the Ethics of Managing Change, the role of ethics and responsibilities in leading innovation and change, ethics based model for change management,

				ethics and risks of change management
20	Professional Ethics	18MBAHR402 Workplace ethics and value systems	Unit-1 -Leadership traits and ethics	Definition, Importance of leadership, Roles of a leader, Leadership theory paradigms, levels of analysis of leadership theory.
21	Professional Ethics	18MBAHR402 organizational leadership	Unit-2 -Introduction to Leadership	Leadership traits and ethics: Personality traits and leadership, traits of effective leaders, Leadership attitudes, ethical leadership, Achievement motivation theory.
22	Professional Ethics	18MBAHR402 organizational leadership	Unit-3 -Leadership behaviour and motivation, and contingency leadership	Leadership behaviour and styles, University of Michigan and Ohio studies, Leadership grid, Leadership and motivation, Content and process theories, Reinforcement theory, Contingency leadership theories and models, Leadership continuum theory, Normative leadership theory, Leadership substitute theory.
23	Professional Ethics	18MBAHR402 organizational leadership	Unit-5-Leader follower relations	Followers, Evolution of Dyadic theory, Leader member exchange theory, Fellowship, Delegation, Coaching, Managing conflict. Organizational Leadership: Charismatic and transformational leadership, Stewardship and servant leadership, Leadership of culture and diversity, Creating high performance culture, Strategic leadership.
24	Professional Ethics	18MBAHR402 organizational leadership	Unit-6 -Leadership development and succession	Development through self- awareness and self-discipline, Development through education, experience, and mentoring, succession, Leadership development programs, Evaluation of leadership development efforts, Leadership development programs, Evaluation of leadership

				development efforts, Leadership.
25	Professional Ethics	14CIP18 Constitution of India	Module-5	Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.
26	Professional Ethics	15CPH18/28 Constitution of India	Module-5	Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediment to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.
27	Professional Ethics	17CPH39/49 Constitution of India	Module-5	Scope & Aims of Engineering & Professional Ethics –Business Ethics, Corporate Ethics, Personal Ethics. Engineering and Professionalism, Positive and Negative Faces of Engineering Ethics, Code of Ethics as defined in the website of Institution of Engineers (India): Profession, Professionalism, and Professional Responsibility. Clash of Ethics, Conflicts of Interest. **Responsibilities in Engineering** Responsibilities in Engineering and Engineering Standards, the impediments to Responsibility. Trust and Reliability in Engineering, IPRs (Intellectual

				Property Rights), Risks, Safety and liability in Engineering.
28	Professional Ethics	18CPC39/49 Constitution of India, professional ethics and cyber law	Module-5	**Internet Laws, Cyber Crimes and Cyber Laws:** Internet and Need for Cyber Laws, Modes of Regulation of Internet, Types of cyber terror capability, Net neutrality, Types of Cyber Crimes, India and cyber law, Cyber Crimes and the information Technology Act 2000, Internet Censorship. Cybercrimes and enforcement agencies.
29	Human Values	14CIP18 Constitution of India	Module-1	Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.
30	Human Values	14CIP18 Constitution of India	Module-2	Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India.
31	Human Values	14CIP18 Constitution of India	Module-3	State Executives – Governor Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42^{nd}, 44^{th}, 74^{th}, 76^{th}, 86^{th} &91^{st} Amendments.

32	Human Values	14CIP18 Constitution of India	Module-4	Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Powers and functions of Municipalities, Panchyats and Co - Operative Societies.
33	Human Values	15CPH18/28 Constitution of India	Module-1	Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.
34	Human Values	15CPH18/28 Constitution of India	Module-2	Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India.
35	Human Values	15CPH18/28 Constitution of India	Module-3	State Executives – Governor Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments.

36	Human Values	15CPH18/28 Constitution of India	Module-4	Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights-Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co - Operative Societies.
37	Human Values	17CPH39/49 Constitution of India	Module-1	Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development.
38	Human Values	17CPH39/49 Constitution of India	Module-2	**Union Executive and State Executive** Parliamentar y System, Federal System, Centre-State

				Relations. Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. State Executives – Governor Chief Minister, State Cabinet, State Legislature, High Court and Subordinate Courts, Special Provisions (Article 370.371,371J) for some States.
39	Human Values	17CPH39/49 Constitution of India	Module-3	Elections, Amendments and Emergency Provisions Elections, Electoral Process, and Election Commission of India, Election Laws. Amendments - Methods in Constitutional Amendments (How and Why) and Important Constitutional A m e n d m e n t s . Amendments – 7,9,10,12,42,44, 61, 73,74, ,75, 86, and

				91,94,95,100,101,118 and some important Case Studies. Recent Amendments with explanation. Important Judgments with Explanation and its impact on society (from the list of Supreme Court Judgments). Emergency Provisions, types of Emergencies and its Consequences.
40	Human Values	17CPH39/49 Constitution of India	Module-4	Constitutional Provisions/ Local Administration/ Human Rights. Special Constitutional Provisions for SC & ST, OBC, Special Provision for Women, Children & Backward Classes. Local Administration: Powers and functions of Municipalities and Panchyats System. Co – Operative Societies and Constitutional and Non-constitutional Bodies. Human Rights/values – Meaning and Definitions, Legislative Specific Themes in Human Rights and Functions/ Roles of National Human Rights Commission of India. Human Rights (Amendment Act)2006

41	Human Values	18CPC39/49 Constitution of India, professional ethics and cyber law	Module-1	The Necessity of the Constitution, The Societies before and after the Constitution adoption. Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly - Preamble and Salient features of the Constitution of India. Fundamental Rights and its Restriction and limitations in different Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building.
42	Human Values	18CPC39/49 Constitution of India, professional ethics and cyber law	Module-2	**Union Executive and State Executive:** Parliamentary System, Federal System, Centre-State Relations. Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. State Executives – Governor, Chief Minister, State Cabinet, State Legislature, High Court and Subordinate Courts, Special Provisions (Articles 370.371,371J) for some States.

43	Human Values	18CPC39/49 Constitution of India, professional ethics and cyber law	Module-3	**Elections, Amendments and Emergency Provisions:**Elections, Electoral Process, and Election Commission of India, Election Laws. Amendments - Methods in Constitutional Amendments (How and Why) and Important Constitutional Amendments. Amendments – 7,9,10,12,42,44, 61, 73,74, ,75, 86, and 91,94,95,100,101,118 and some important Case Studies. Emergency Provisions, types of Emergencies and its consequences. **Constitutional special provisions:** Special Provisions for SC and ST, OBC, Women, Children and Backward Classes.
44	Human Values	18CPC39/49 Constitution of India, professional ethics and cyber law	Module-4	Scope & Aims of Engineering & Professional Ethics - Business Ethics, Corporate Ethics, Personal Ethics. Engineering and Professionalism, Positive and Negative Faces of Engineering Ethics, Code of Ethics as defined in the website of Institution of Engineers (India): Profession, Professionalism, and Professional Responsibility. Clash of Ethics, Conflicts of Interest. Responsibilities in Engineering Responsibilities in Engineering and Engineering standards, the impediments to Responsibility.

45	Environment	15CV563 Remote Sensing and GIS	Module 1	Basic concept of Remote sensing, Electromagnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, and vegetation).
46	Environment	15CV64 Water Supply and Treatment Engineering	Module 1	Need for protected water supply. Demand of Water: Types of water demands -domestic demand, industrial, institutional and commercial, public use, fire demand, Variations in demand of water, Peak factor, Different methods of population forecasting - with merits and demerits.
47	Environment	15CV661: Water Resources Management	Module 1	Hydrologic Cycle, Global water resources and Indian Water resources, Surface Water Resources, Water Balance, Available Renewable Water Resources, Water Scarcity, The Water Balance as a Result of Human Interference, Groundwater Resources, Types of Aquifers, Groundwater as a Storage Medium
48	Environment	15CV71 Municipal and Industrial Waste Water Engineering	Module 2: Design of sewers	Design of sewers, hydraulic formula for velocity, effects of variation on velocity, regime velocity, design of hydraulic elements for circular sewers for full flow and partial flow conditions, disposal of effluents by dilution, self-purification phenomenon, oxygen sag curve, zones of purification, sewage farming, sewage sickness, numerical problems on

				disposal of effluents, Streeter-Phelps equation
49	Environment	15CV73: Hydrology and Irrigation Engineering	Module 1	Importance of hydrology, Global and Indian water availability, Practical application of hydrology, Hydrologic cycle (Horton's) qualitative and engineering representation. Definition, Forms and types of precipitation, measurement of rain fall using Symon's and Syphon type of rain gauges, optimum number of rain gauge stations.
50	Environment	17CV563: Remote Sensing and GIS	Module 1: Remote Sensing	Basic concept of Remote sensing, Data and Information, Remote sensing data collection, Remote sensing advantages & Limitations, Remote Sensing process. Electromagnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, and vegetation), Resolution, image registration and Image and False color composite,
51	Environment	(17EE563) Renewable Energy Resources	Module 1	Introduction: Causes of Energy Scarcity, Solution to Energy Scarcity, Factors Affecting Energy Resource Development, Energy Resources and Classification, Renewable Energy – Worldwide Renewable Energy Availability, Renewable Energy in India. Energy from Sun: Sun- earth Geometric Relationship,

				Layer of the Sun, Earth – Sun Angles and their Relationships, Solar Energy Reaching the Earth's Surface, Solar Thermal Energy Applications.
52	Environment	(17EE563) Renewable Energy Resources	Module 2	Solar Thermal Energy Collectors: Types of Solar Collectors, Configurations of Certain Practical Solar Thermal Collectors, Material Aspects of Solar Collectors, Concentrating Collectors, Parabolic Dish – Sterling Engine System, Working of Sterling or Brayton Heat Engine, Solar Collector Systems into Building Services, Solar Water Heating Systems, Passive Solar Water Heating Systems, Applications of Solar Water Heating Systems, Active Solar Space Cooling, Solar Air Heating, Solar Dryers, Crop Drying, Space Cooing, Solar Cookers, Solar pond. Solar Cells: Components of Solar Cell System, Elements of Silicon Solar Cell, Solar Cell materials, Practical Solar Cells, I – V Characteristics of Solar Cells, Efficiency of Solar Cells, Photovoltaic Panels, Applications of Solar Cell Systems.
53	Environment	(17EE563) Renewable Energy Resources	Module 3	Hydrogen Energy: Benefits of Hydrogen Energy, Hydrogen Production Technologies, Hydrogen Energy Storage, Use of Hydrogen Energy, Advantages and Disadvantages of Hydrogen Energy, Problems Associated with Hydrogen Energy. Wind Energy: Windmills, Wind Turbines, Wind Resources, Wind Turbine Site Selection. Geothermal Energy: Geothermal Systems, Classifications, Geothermal Resource Utilization, Resource Exploration, Geothermal Based Electric

				Power Generation, Associated Problems, environmental Effects. Solid waste and Agricultural Refuse: Waste is Wealth, Key Issues, Waste Recovery Management Scheme, Advantages and Disadvantages of Waste Recycling, Sources and Types of Waste, Recycling of Plastics.
54	Environment	(17EE563) Renewable Energy Resources	Module 4	Biomass Energy: Biomass Production, Energy Plantation, Biomass Gasification, Theory of Gasification, Gasifier and Their Classifications, Chemistry of Reaction Process in Gasification, Updraft, Downdraft and Cross-draft Gasifiers, Fluidized Bed Gasification, Use of Biomass Gasifier, Gasifier Biomass Feed Characteristics, Applications of Biomass Gasifier, Cooling and Cleaning of Gasifiers. Biogas Energy: Introduction, Biogas and its Composition, Anaerobic Digestion, Biogas Production, Benefits of Biogas, Factors Affecting the Selection of a Particular Model of a Biogas Plant, Biogas Plant Feeds and their Characteristics. Tidal Energy: Introduction, Tidal Energy Resource, Tidal Energy Availability, Tidal Power Generation in India, Leading Country in Tidal Power Plant Installation, Energy Availability in Tides, Tidal Power Basin, Turbines for Tidal Power, Advantages and Disadvantages of Tidal Power, Problems Faced in Exploiting Tidal Energy.

55	Environment	(17EE563) Renewable Energy Resources	Module 5	Sea Wave Energy: Introduction, Motion in the sea Waves, Power Associated with Sea Waves, Wave Energy Availability, Devices for Harnessing Wave Energy, Advantages and Disadvantages of Wave Power. Ocean Thermal Energy: Introduction, Principles of Ocean Thermal Energy Conversion (OTEC), Ocean Thermal Energy Conversion plants, Basic Rankine Cycle and its Working, Closed Cycle, Open Cycle and Hybrid Cycle, Carnot Cycle, Application of OTEC in Addition to Produce Electricity, Advantages, Disadvantages and Benefits of OTEC.
56	Environment	(15EE654) Solar and Wind Energy	Module 1	Fundamentals of Energy Science and Technology: Introduction, Energy, Economy and Social Development, Classification of Energy Sources, Importance of Non -conventional Energy Sources, Salient features of Non-conventional Energy Sources, World Energy Status, Energy Status in India. Energy Conservation and Efficiency: Introduction, Important Terms and Definitions, Important Aspects of Energy Conservation, Global Efforts, Achievements and Future Planning, Energy Conservation/Efficiency Scenario in India, Energy Audit, Energy Conservation Opportunities
				Solar Energy-Basic Concepts (continued): Measurement of Solar Radiation, Solar Radiation Data, Solar Time, Solar Radiation Geometry, Solar Day Length, Extraterrestrial Radiation on Horizontal Surface, Empirical Equations for Estimating

57	Environment	(15EE654) Solar and Wind Energy	Module 2	Terrestrial Solar Radiation on Horizontal Surface, Solar Radiation on Inclined Plane Surface. Solar Thermal Systems: Introduction, Solar Collectors, Solar Water Heater, Solar Passive Space Heating and Cooling Systems, Solar Industrial Heating Systems, Solar Refrigeration and Air Conditioning Systems, Solar Cookers.
58	Environment	(15EE654) Solar and Wind Energy	Module 3	Solar Photovoltaic Systems: Introduction, Solar Cell Fundamentals, Solar Cell Characteristics, Solar Cell Classification, Solar Cell Technologies, Solar Cell, Module, and Array Construction, Maximizing the Solar PV Output and Load Matching. Maximum Power Point Tracker. Balance of System Components, Solar PV Systems, Solar PV Applications.
59	Environment	(15EE654) Solar and Wind Energy	Module 4	Modern Small Business Enterprises: Role of Small Scale Industries, Concepts and definitions of SSI Enterprises, Government policy and development of the Small Scale sector in India, Growth and Performance of Small Scale Industries in India, Sickness in SSI sector, Problems for Small Scale Industries, Impact of Globalization on SSI, Impact of WTO/GATT on SSIs, Ancillary Industry and Tiny Industry (Definition only). Institutional Support for Business Enterprises: Introduction, Policies & Schemes of Central–Level Institutions, State-Level Institutions

60	Environment	(15EE654) Solar and Wind Energy	Module 5	Project Management: Meaning of Project, Project Objectives & Characteristics, Project Identification-Meaning & Importance; Project Life Cycle, Project Scheduling, Capital Budgeting, Generating an Investment Project Proposal, Project Report-Need and Significance of Report, Contents, Formulation, Project Analysis-Market, Technical, Financial, Economic, Ecological, Project Evaluation and Selection, Project Financing, Project Implementation Phase, Human & Administrative aspects of Project Management, Prerequisites for Successful Project Implementation. New Control Techniques- PERT and CPM, Steps involved in developing the network, Uses and Limitations of PERT and CPM
61	Environment	18ME42 Applied thermodynamics	Module - 2: IC Engine fuels, Ratings and Alternate Fuels.	Students understand the Automotive emission controls, Controlling crankcase emissions, alternate fuels.
62	Environment	17ME43 Applied Thermodynamics	Module – 1: Alternate Fuels.	Students understand the alternate fuels and pollution effect on environment
63	Environment	17ME562- Energy and environment	Module - 1 Basic Introduction to Energy	Energy and power, forms of energy, primary energy sources, energy flows Energy prices and affordability, Social and environmental aspect ,investment

64	Environment	17ME562- Energy and environment	Module - 2 Energy storage systems, Energy Management, Economic Analysis	Students learn about methods of energy storage, energy management and economic analysis
65	Environment	17ME562- Energy and environment	Module - 3 Environment, Ecosystem	Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness. Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession.
66	Environment	17ME562- Energy and environment	Module - 4 Environmental Pollution	Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards , Solid waste Management, Disaster management Role of an individual in prevention of pollution, Pollution case studies.
67	Environment	17ME562 Energy and environment	Module - 5 Social Issues and the Environment	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
68	Environment	15ME562 Energy And Environment	Module - 1 Basic Introduction to Energy	Energy and power, forms of energy, primary energy sources, energy flows Energy prices and affordability, Social and environmental
69	Environment	15ME562 Energy And Environment	Module - 2 Energy storage systems, Energy Management, Economic Analysis	Students learn about methods of energy storage, energy management and economic analysis.
70	Environment	15ME562 Energy And Environment	Module - 3 Environment, Ecosystem	Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness. Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession.
71	Environment	15ME562	Module - 4 Environmental	Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and

		Energy And Environment	Pollution	Nuclear hazards , Solid waste Management, Disaster management Role of an individual in prevention of pollution, Pollution case studies.
72	Environment	15ME562 Energy And Environment	Module - 5 Social Issues and the Environment	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
73	Environment	15ME71 Energy Engineering	Module – I Thermal Energy conversion system	Review of energy scenario in India, General Philosophy and need of Energy , Different Types of Fuels used for steam generation..
74	Environment	15ME71 Energy Engineering	Module – III Solar Energy	Fundamentals; Solar Radiation; Estimation of solar radiation on horizontal and inclined surfaces; Measurement of solar radiation data, Solar Thermal systems: Introduction; Basics of thermodynamics and heat transfer; Flat plate collector; Evacuated Tubular Collector; Solar air collector; Solar concentrator; Solar distillation; Solar cooker; Solar refrigeration and air conditioning; Thermal energy storage

				systems, Solar Photovoltaic systems: Introduction; Solar cell Fundamentals; Characteristics and classification; Solar cell: Module, panel and Array construction; Photovoltaic thermal systems
75	Environment	15ME71 Energy Engineering	Module – IV Wind Energy, Tidal Power	Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, wind machines; Types of wind machines and their characteristics, horizontal and vertical axis wind mills, coefficient of performance of a wind mill rotor (Numerical Examples). Tidal Power: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, limitations.
76	Environment	15ME71 Energy Engineering	Module – V Biomass Energy, Green Energy	Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies; Urban waste to energy conversion; Biomass gasification. Green Energy: Introduction: Fuel cells: Overview; Classification of fuel cells; Operating principles; Fuel cell thermodynamics Nuclear, ocean, MHD, thermoelectric and geothermal energy applications; Origin and their types; Working principles, Zero energy Concepts

77	Environment	15ME655 Automotive	MODULE 5 Automotive emission control systems and emission standards	Different air pollutants, formation of photochemical smog and causes. Automotive emission controls, Controlling crankcase emissions, Controlling evaporative emissions, Cleaning the exhaust gas, Controlling the air-fuel mixture, Controlling the combustion process, Exhaust gas recirculation, Treating the exhaust gas, Air-injection system, Air aspirator system, Catalytic converter. EMISSION STANDARDS: Euro I, II, III and IV norms, Bharat Stage II, III, IV norms. Motor Vehicle Act.
78	Environment	15ME43 Applied thermodynamics	Module-III IC Engine, topic: Pollution and its effects on environment	Students understand the Automotive Pollutions and its effects on environment.
79	Environment	14MBA14 Business, government and society	Module 4: Environmental concerns and corporations	Environmental concerns and corporations: History of environmentalism, environmental preservation-role of stakeholders, international issues, sustainable development, costs and benefits of environmental regulation, industrial pollution, role of corporate in environmental management, waste management and pollution control, key strategies for prevention of pollution, environmental audit, Laws governing environment

80	Environment	14CIV18/28 Environmental studies	Module-1	**Introduction:** Environment - Components of Environment Ecosystem: Types. & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development.
81	Environment	14CIV18/28 Environmental studies	Module-2	**Natural Resources, Water resources:** Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. **Energy:** Different types of energy, Conventional sources & Non-Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.
82	Environment	14CIV18/28 Environmental studies	Module-3	**Environmental Pollution:** Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. **Global Environmental Issues:** Population Growth, Urbanization, Land Management, Water & Waste Water Management.

83	Environment	14CIV18/28 Environmental studies	Module-4	Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures. Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods.
84	Environment	14CIV18/28 Environmental studies	Module-5	Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education & Women Education.
85	Environment	15CIV18/28 Environmental studies	Module-1	Introduction: Environment -Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development.
86	Environment	15CIV18/28 Environmental studies	Module-2	Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. Energy – Different types of energy, Conventional sources & Non-Conventional sources

				of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy
87	Environment	15CIV18/28 Environmental studies	Module-3	Environmental Pollution – Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. Global Environmental Issues: Population Growth, Urbanization, Land Management, Water & Waste Water Management
88	Environment	15CIV18/28 Environmental studies	Module-4	Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures. Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal method.
89	Environment	15CIV18/28 Environmental studies	Module-5	Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices. Environmental Acts &Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education & Women Education.
90	Environment	17CIV18/28 Environmental studies	Module-1	Introduction: Environment -Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic.

				Impacts of Agriculture & Housing Impacts of Industry, Mining &Transportation Environmental Impact Assessment, Sustainable Development
91	Environment	17CIV18/28 Environmental studies	Module-2	Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. Energy – Different types of energy, Conventional sources & Non-Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy
92	Environment	17CIV18/28 Environmental studies	Module-3	Environmental Pollution – Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. Global Environmental Issues: Population Growth, Urbanization, Land Management, Water & Waste Water Management
93	Environment	17CIV18/28 Environmental studies	Module-4	Air Pollution & Automobile Pollution: Definition, Effects –Global Warming, Acid rain & Ozone layer depletion. Solid Waste Management, E -Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods

94	Environment	17CIV18/28 Environmental studies	Module-5	Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices. Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs).
95	Sustainability	15CV653 Alternative Building Materials	Module 1	Energy in building materials, Environmental issues concerned to building materials, Embodied energy and life-cycle energy, Global warming and construction industry, Green concepts in buildings, Green building ratings – IGBC and LEED manuals – mandatory requirements, Rainwater harvesting & solar passive architecture. Environmental friendly and cost effective building technologies.