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

SlNo	Course Code	Course Name	Remarks	Page No
1	EE14 805(C)	Organizational Behaviour	Professional Ethics, Gender, Human Values	2
2	BE 103	Introduction to Sustainable Engineering	Sustainability	4
3	CS09 405	Engineering Economics and Principles of Management	Professional Ethics	6
4	EN09 402	Environmental Science	Environment and Sustainability	7
5	EN09 302	Humanities	Human Values	9
6	OMT 613	Business Sustainability	Sustainability	14
7	EE14 705(D)	Professional Ethics	Professional Ethics	16
8	MCN 201	Sustainable Engineering	Sustainability	18
9	HS 210	Life Skills	Professional Ethics	20

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Course Objectives:

- *To develop a theoretical understanding among students about the structure and behaviour of organization.*
- *To make them capable of realizing the competitiveness for firms.*

Module I

INTRODUCTION: Organization - Definition – Organization Theories: Classical Theory- Features- limitations. Neoclassical Theory – features – limitations. Contemporary Organization Theory – features limitations. Systems Approach – Contingency Approach. Organizational Behaviour (OB) – Features –Scope – Fundamentals Concepts of OB – Challenges and Career Development for OB – Contributing disciplines to the OB.

10 Hours

Module II

UNDERSTANDING INDIVIDUAL AND GROUP BEHAVIOUR: Individual Behaviour – Personality Determinants – Big five Personality factors – Learning Theories. The Perceptual Process – Factors influencing perception – Internal & External; Attitudes and Behaviour- Attitude Formation and Attitude Change. Group Behaviour – Group Dynamics- Fundamentals of Groups – Stages of Development-Transaction Analysis (TA)- Important Factors influencing Team Effectiveness – Cohesiveness – Norms – Decision Making.

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20 Hours

Module III

MOTIVATION, MORALE AND CULTURE: Motivation- Theories of Motivation – Motivational Processes - Content Theories (Maslow, Alderfer ,Herzberg, McCleland) – Process Theories (Adam, Victor, Vroom and Lawler and Porter) – Learning and Reinforcement Theory - Morale – Factors influencing Morale - Organizational Culture – Concepts – Forming a Culture – Sustaining a Culture – Changing a Culture.

15 Hours

Module IV

ORGANISATIONAL POWER AND POLITICS AND CONFLICT & NEGOTIATIONS:

Power and Politics: Power Bases – Dependency – Individual Versus Organisational Power – Political process in Organisation – Factors contributing – Techniques of Organisational Politics – Managing Political Behaviour; Conflict – Transition in Conflict Thought – Functional and Dysfunctional Conflict – Process of Conflict – Managing Conflict - Negotiations – Process – Approaches – Issues in negotiations.

20 Hours

Module V

LEADERSHIP AND CHANGE: Leadership – Introduction – Leadership and Management – Leadership Styles - Theories of Leadership – Traits – Behavioral Model (Managerial Grid) – Contingency (Feilder, Path goal, Tri-dimensional) – Inspirational Approaches - Change – Challenges contributing to Change – Types of Change Approaches – Contemporary Issues in Change-Management of Change.

15 Hours

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Section 1I PRINCIPLES OF MANAGEMENT

Teaching scheme: 2 hours per week

Objective:

- *To provide knowledge on principles of management, decision making techniques, accounting principles and basic management streams*

Module III (18 hours)

Principles of management – Evolution of management theory and functions of management
Organizational structure – Principle and types
Decision making – Strategic, tactical & operational decisions, decision making under certainty, risk & uncertainty and multistage decisions & decision tree
Human resource management – Basic concepts of job analysis, job evaluation, merit rating, wages, incentives, recruitment, training and industrial relations

Module IV (18 hours)

Financial management – Time value of money and comparison of alternative methods
Costing – Elements & components of cost, allocation of overheads, preparation of cost sheet, break even analysis
Basics of accounting – Principles of accounting, basic concepts of journal, ledger, trade, profit &loss account and balance sheet
Marketing management – Basic concepts of marketing environment, marketing mix, advertising and sales promotion
Project management – Phases, organisation, planning, estimating, planning using PERT & CPM

Course No.	Course Name	L-T-P-Credits	Year of Introduction
BE103	INTRODUCTION TO SUSTAINABLE ENGINEERING	2-0-1-3	2016

Module	Contents	Hours	Sem. Exam Marks
I	Sustainability - Introduction, Need and concept of sustainability, Social-environmental and economic sustainability concepts. Sustainable development, Nexus between Technology and Sustainable development, Challenges for Sustainable Development. Multilateral environmental agreements and Protocols - Clean Development Mechanism (CDM), Environmental legislations in India - Water Act, Air Act.	L4	15%
	Students may be assigned to do at least one project eg: a) Identifying/assessment of sustainability in your neighbourhood in education, housing, water resources, energy resources, food supplies, land use, environmental protection etc. b) Identify the threats for sustainability in any selected area and explore solutions for the same	P1	
II	Air Pollution, Effects of Air Pollution; Water pollution- sources, Sustainable wastewater treatment, Solid waste - sources, impacts of solid waste, Zero waste concept, 3 R concept. Global environmental issues- Resource degradation, Climate change, Global warming, Ozone layer depletion, Regional and Local Environmental Issues. Carbon credits and carbon trading, carbon foot print.	L6	15%
	Students may be assigned to do at least one project for eg: a) Assessing the pollution status of a small area b) Programmes for enhancing public environmental awareness c) Observe a pond nearby and think about the different measures that can be adopted for its conservation	P3	

FIRST INTERNAL EXAM

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III	Environmental management standards, ISO 14000 series, Life Cycle Analysis (LCA) - Scope and Goal, Bio-mimicking, Environment Impact Assessment (EIA) - Procedures of EIA in India.	L4	15%
	Students may be assigned to do at least one project eg: a) Conducting LCA of products (eg. Aluminium cans, PVC bottles, cars etc. or activities (Comparison of land filling and open burning) b) Conducting an EIA study of a small project (eg. Construction of a building)	P2	
IV	Basic concepts of sustainable habitat, Green buildings, green materials for building construction, material selection for sustainable design, green building certification, Methods for increasing energy efficiency of buildings. Sustainable cities, Sustainable transport.	L5	15%
	Students may be assigned to do at least one project eg: a) Consider the design aspects of a sustainable building for your campus b) Explore the different methods that can be adopted for maintaining a sustainable transport system in your city.	P2	
	SECOND INTERNAL EXAM		
V	Energy sources: Basic concepts-Conventional and non-conventional, solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans, Geothermal energy.	L5	20%
	Students may be assigned to do at least one project eg: a) Find out the energy savings that can be achieved by the installation of a solar water heater b) Conduct a feasibility study for the installation of wind mills in Kerala	P2	
VI	Green Engineering, Sustainable Urbanisation, industrialisation and poverty reduction; Social and technological change, Industrial Processes: Material selection, Pollution Prevention, Industrial Ecology, Industrial symbiosis.	L5	20%
	Students may be assigned to do a group project eg: a) Collect details for instances of climate change in your locality b) Find out the carbon credits you can gain by using a sustainable transport system (travelling in a cycle or car pooling from college to home) c) Have a debate on the topics like: Industrial Ecology is a Boon or Bane for Industries?/Are we scaring the people on Climate Change unnecessarily?/Technology enables Development sustainable or the root cause of unsustainability?	P3	

ORGANIZATIONAL BEHAVIOUR

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Consumerism and waste products-Reduce, reuse and recycling of products-Value education.

Text Books

1. Clark R.S., Marine pollution, Clanderson Press Oxford.
2. Mhaskar A. K. Matter Hazrdous, Techno-science Publications.
3. Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co.
4. Townsend C., Harper J, Michael Begon, Essential of Ecology, Blackwell Science
5. Trivedi R. K., Goel P. K., Introduction to Air Pollution, Techno-Science Publications.

CE09 405: ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT

Credits: 4

Section 1 ENGINEERING ECONOMICS

Teaching scheme: 2 hours lecture per week

Objective:

- Impart fundamental economic principles that can assist engineers to make more efficient and economical decisions.

Pre-requisite: NIL

Module1 (14 Hrs.)

Economic reasoning, Circular Flow in an economy, Law of supply and demand, Economic efficiency. Element of costs, Marginal cost, Marginal Revenue, Sunk cost, Private and Social cost, Opportunity cost. Functions of Money and commercial Banking. Inflation and deflation: concepts and regulatory measures. Economic Policy Reforms in India since 1991: Industrial policy, Foreign Trade policy, Monetary and fiscal policy, Impact on industry.

Module II. (13 Hrs).

Value Analysis – Function, aims, procedure.–Time value of money, Single payment compound amount factor, Single payment present worth factor, Equal payment series sinking fund factor, Equal payment series payment Present worth factor- equal payment series capital recovery factor-Uniform gradient series annual equivalent factor. Methods of project analysis (pay back, ARR, NPV, IRR and Benefit -Cost ratio) Break-even analysis-, Process planning.

Text books

1 Panneer Selvam, R, Engineering economics, Prentice Hall of India, New Delhi, 2002.
2. Wheeler R(Ed) Engineering economic analysis, Oxford University Press, 2004.

Internal Continuous assessment

Maximum marks15
One Series test (9marks),
One assignment (4 marks)
Regularity in attendance (2marks).

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EN09 402: ENVIRONMENTAL SCIENCE

(Common for all branches)

Teaching scheme **Credits: 3**

2 hours lecture and 1 hour tutorial per week

Objectives

- To understand the problems of pollution, loss of forest, solid waste disposal, degradation of environment, loss of biodiversity and other environmental issues and create awareness among the students to address these issues and conserve the environment in a better way.

Module I (8 hours)

The Multidisciplinary nature of environmental science

Definition-scope and importance-need for public awareness.

Natural resources

Renewable and non-renewable resources:

Natural resources and associated problems-forest resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their defects on forests and tribal people.- water resources: Use and over utilization of surface and ground water, floods ,drought ,conflicts over water, dams-benefits and problems.- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.- Food resources: World food problems, changes caused by agriculture over grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.-Energy resources: Growing energy needs, renewable and non-renewable energy resources, use of alternate energy resources, Land resources: Land as a resource, land degradation, man induced land slides, soil erosion and desertification.

Module II (8 hours)

Ecosystems-Concept of an ecosystem-structure and function of an ecosystem – producers, consumers, decomposers-energy flow in the ecosystem-Ecological succession- Food chains, food webs and Ecological pyramids-Introduction, types, characteristics features, structure and function of the following ecosystem-Forest ecosystem- Grassland ecosystem –Desert ecosystem-Aquatic ecosystem(ponds, streams, lakes, rivers, oceans , estuaries)

Biodiversity and its consideration

Introduction- Definition: genetic , species and ecosystem diversity-Biogeographical classification of India –value of biodiversity: consumptive use, productive use, social ethical , aesthetic and option values Biodiversity at Global, national , and local level-India at mega – diversity nation- Hot spot of biodiversity-Threats to biodiversity: habitat loss, poaching of wild life, man , wild life conflicts –Endangered and endemic species of India-Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Module III (10 hours)

Environmental pollution

Definition-Causes, effects and control measures of Air pollution-m Water pollution – soil pollution-Marine pollution-Noise pollution-Thermal pollution-Nuclear hazards-Solid waste management: Causes, effects and control measures of urban and industrial wastes-Role of an individual in prevention of pollution-pollution case studies-Disaster management: floods , earth quake, cyclone and landslides-Environmental impact assessment

Module IV (10 hours)

Environment and sustainable development-Sustainable use of natural resources-Conversion of renewable energy resources into other forms-case studies-Problems related to energy and Energy auditing-Water conservation, rain water harvesting, water shed management-case studies-Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust-Waste land reclamation-

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Module IV (14 hours)

Human relations and Professional ethics: Art of dealing with people, empathy and sympathy, hearing and listening. Tension and stress, Methods to handle stress

Responsibilities and rights of engineers- collegiality and loyalty – Respect for authority – Confidentiality – conflicts of interest – Professional rights, Rights of information, Social responsibility.

Senses of ethics – variety of moral issues – Moral dilemma – Moral autonomy – Attributes of an ethical personality – right action – self interest

Reference Books

1. Meenakshi Raman and Sangeeta Sharma, *Technical Communication- Principles and Practice* Oxford University press, 2006
2. Jayashree Suresh and B S Raghavan, *Professional Ethics*, S Chand and Company Ltd, 2005
3. Subrayappa, *History of Science in India*, National Academy of Science, India
4. R C Bhatia, *Business Communication*, Ane Books Pvt. Ltd, 2009
5. Sunita Mishra and C Muralikrishna, *Communicatin Skils for Engineers*, Pearson Education, 2007.
6. Jovan van Emden and Lucinda Becker, *Effective Communication for Arts and Humanities Students*, Palgrave macmillam, 2009
7. W C Dampier, *History of Science*, Cambridge University Press
8. Vesilind, *Engineering, Ethics and the Environment*, Cambridge University Press
9. Larson E, *History of Inventions*, Thompson Press India Ltd.
10. Bernal J.D, *Science in History*, Penguin Books Ltd
11. Encyclopedia Britannica, *History of Science, History of Technology*
12. Brownoski J, *Science and Human Values*, Harper and Row

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EN 09 302: Humanities and Communication Skills

(Common for all branches)

Teaching scheme **Credits: 3**

2 hours lecture and 1 hour tutorial per week

Objectives

- *To identify the most critical issues that confronted particular periods and locations in history*
- *To identify stages in the development of science and technology*
- *To understand the purpose and process of communication*
- *To produce documents reflecting different types of communication such as technical descriptions, proposals ,and reports*
- *To develop a positive attitude and self-confidence in the workplace and*
- *To develop appropriate social and business ethics.*

Module I (14 hours)

Humanities, Science and Technology: Importance of humanities to technology, education and society- Impact of science and technology on the development of modern civilization.

Contributions of ancient civilization: Chinese, Indian, Egyptian and Greek.

Cultural, Industrial, Transportation and Communication revolutions.

Advances in modern India: Achievements in information, communication and space technologies.

Module II (16 hours)

Concept of communication: The speaker/writer and the listener/reader, medium of communication, barriers to communication, accuracy, brevity, clarity and appropriateness

Reading comprehension: Reading at various speeds, different kinds of text for different purposes, reading between lines.

Listening comprehension: Comprehending material delivered at fast speed and spoken material, intelligent listening in interviews

Speaking: Achieving desired clarity and fluency, manipulating paralinguistic features of speaking, task oriented, interpersonal, informal and semi formal speaking, making a short classroom presentation.

Group discussion: Use of persuasive strategies, being polite and firm, handling questions and taking in criticisms on self, turn-taking strategies and effective intervention, use of body language.

Module III (16 hours)

Written Communication : Note making and taking, summarizing, notes and memos, developing notes into text, organization of ideas, cohesion and coherence, paragraph writing, ordering information in space and time, description and argument, comparison and contrast, narrating events chronologically. Writing a rough draft, editing, proof reading, final draft and styling text.

Technical report writing: Synopsis writing, formats for reports. Introductory report, Progress report, Incident report, Feasibility report, Marketing report, Field report and Laboratory test report

Project report: Reference work, General objective, specific objective, introduction, body, illustrations using graphs, tables, charts, diagrams and flow charts. Conclusion and references

Preparation of leaflets, brochure and C.V.

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Business and Society

Course code: 16

Course Objectives

The objectives of this course are the following:

- To develop a broad understanding of the business and society relationship.
- To help the student perceive and understand the importance of sound business ethical practices in the effective functioning of organizations.
- To understand major corporate social responsibilities of business.
- To understand the impact of the human activities on the environment and measures to combat them.

Syllabus

Business, society and government; socio-economic development and business; socio-cultural environment of business; economic growth and the environment; sustainable development.

Expected Outcomes

The successful completion of this course will impart an understanding of the relationship between business and society. This will enable students to perceive sound business ethics and social responsibilities of business and consider the social dimensions in business decision making.

References

1. John Steiner, George Steiner, Business, Government and Society: A Managerial Perspective, McGraw-Hill Higher Education, 2011.
2. Keith Davis and David L Blomstorm, Business, Society and Environment, McGraw-Hill, 1971.
3. Francis Cherunilam, Business Environment: Text and Cases, Himalaya Publishing House, 2016.
4. Barbara Parker, Globalisation and Business, Response Books, 2005.
5. Bala Krishnamurthy, Environmental Management: Text and Cases, PHI, New Delhi.
6. ArinditaBasak, Environmental Studies, Pearson Education, New Delhi.
7. Justin Paul, Business Environment -Text and Cases, Tata McGraw Hill Education, New Delhi, 2010.
8. C. K. Prahalad, The Fortune at the Bottom of the Pyramid, Wharton School Publishing/Pearson Education, 2006.
9. Govt. of India, annual Economic Survey.
10. Govt. of Kerala, annual Economic Review.
11. UNCTAD, Human Development Report (Annual)

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heir roles. Business ethics; triple bottom line /corporate social responsibility- meaning and scope of CSR/TBL, principles of CSR, Sections of the Indian Companies Act pertaining to CSR. Socio-economic implications of Indian Constitution; functions of state, economic roles of government; regulation of business. NGOs – types and roles

Unit 2

Socio-economic Development and Business Economic growth, poverty and inequality – socio-political dimensions, causes and consequences of poverty and inequality; measurement of poverty and inequality, impact on and implications for business; fortune at the bottom of the pyramid strategy; rural-urban dynamics and business; importance of urbanization to economic and business growth.

Unit 3

Socio-Cultural Environment of Business Relevance of customs, traditions, religion, language and other demographic factors to business; demographic trends (global and India) and its implications for business. Gobalisation – meaning and dimensions – socio-economic impact and implications for business: social transformation of India and implications for business

Unit 4

Economic Growth and Environment The ecosystem; renewable and non-renewable resources; a bird's eye view (global and Indian) of some important resource- forest, water, mineral, land & food, and energy (including energy conservation) resources. Impact of economic growth

The basic objective of the course is to sensitise the student on the various ethical aspects concerning the functioning of business enterprises, and to provide awareness about, how the society and business are interdependent for the survival of both. The course aims to equip the students to be honest and be responsible to the society. The knowledge of the subject will improve ethical reasoning by correlating moral concepts to business practices. The course aims to create awareness among students on the importance of Corporate Governance.

Syllabus

Values and its transformation to Ethics – Business Ethics, Stakeholder approach — Law & Ethics — Ethical Philosophies – Ethical Dilemma – Whistle blowing – Corporate Ethics, Ethics Programme – Ethics in functional areas of business – Corporate Governance

Expected Outcome

On successful completion of the course, the student will be well aware that ethical decision making in business management is a must for any organisation for its long term survival and consistent growth. Knowledge on business ethics will motivate the Managers to be more

roducts vs. Services Examples of failures- Business strategies for sustainable development-

lternate Energy and Waste Management

lternate energy resources from solar, wind, fuel cells, bio fuel, tidal and geothermal. Waste to - Energy - Sustainable waste water treatment-solid waste management-zero waste oncept and green buildings.

Unit 4

Sustainable Engineering Consumption challenges-Business innovation-framework for Sustainability in action- Resource Optimization, Triple Bottom line concept

Lean start-up, Lean Government, Agility of processes-Lean tool kit- cracking the unsolvable innovatively in business- Nano technology - case studies

Unit 5

Environmental Laws and Legislation CSR Guidelines for companies on sustainability-Clean Development Mechanism- ISO 14000- Environment Legislation in India- Air Act, Water Act

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Business Sustainability

Course Code: OMT613

Course Objectives

The major objective of this course is to build awareness and acquaint students with the tools to analyze, evaluate, improve, develop framework and create business models that alleviate challenges to mankind related to climate change, energy, waste, labor, and poverty in the global scenario. It aims to review green technologies that are relevant for entrepreneurs and managers.

Syllabus

The course addresses global problems like climate change leading to global temperature rise, poor availability of water and its management, and their impact on potential economy, society and environment. It helps reiterate private and public initiatives including their CSR responsibilities on sustainability and generation of corresponding regulations for better management. Sustainability metrics tools, their measurement for relative positioning of companies and products aid better management from the sustainability point of view. Sustainable market opportunities, carbon mitigation technologies, reduction in risk in each stage of technology innovation process before going for mass production also form subject matter for this course.

Expected Outcomes

The students should gain sufficient insight on global issues related to global warming, cleaner production techniques, tools for sustainability measurement and management, CSR responsibility including responsibility to provide inputs for improving regulatory framework and innovation that satisfy green and cleaner environmental needs for the new generation professional and budding entrepreneurs among them.

Detailed Lesson Plan

Unit 1: Introduction to Business Sustainability:

Energy Consumption and its Relationship to Climate Change- The Potential Impacts of Climate Change- Global warming-Technologies and Wedges- Relationship between risk and sustainability

Unit 2: Carbon Mitigation and Carbon Adaptation

Technological Solutions for Carbon Mitigation and Carbon Adaptation- carbon credits, carbon trading, carbon foot print-ozone layer depletion-measurement sustainability-Life Cycle Analysis-Green House Gas inventories- Measuring social impacts and benefits

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Management – Pricing issues like Price discrimination, Price fixing, Price skimming, Ethics in advertising (surrogate, deceptive advertising), Distribution issues like tying arrangement, black market– Production Management – Process issues like effluents, optimisation of resources like power & water, Product issues like additive & intrinsically hazardous products, genetically modified products, flawed products– Ethics in Information Technology – Ethics in customer and vendor relationship

Unit 4

Ethics Programme – code of ethics – ethics training – ethics committee – ethics officer, Ethics Audit, Transparency International - Whistle Blowing – classification – legal support to Whistle-Blower – Tips to successful Whistle Blowing - Corporate Governance - Definition - need for corporate governance - evidence of corporate governance from Arthashasthra - elements of good corporate governance - corporate governance theories - Agency Theory - Shareholder Theory - Stake Holder Theory - Stewardship Theory

Unit 5

Developments in corporate governance - evolution in US, UK and India – board effectiveness - issues and challenges - role and types of directors - corporate board committees - corporate disclosure - emerging trends in corporate governance - corporate board duties - responsibilities and liabilities. Legal framework for corporate governance Companies Act, Basel III

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Code.	Course Name	L	T	P	Hrs	Credit
HUT 200	**Professional Ethics**	2	0	0	2	2

Preamble: To enable students to create awareness on ethics and human values.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the core values that shape the ethical behaviour of a professional.
CO 2	Adopt a good character and follow an ethical life.
CO 3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
CO 4	Solve moral and ethical problems through exploration and assessment by established experiments.
CO 5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO 1								2			2	
CO 2								2			2	
CO 3								3			2	
CO 4								3			2	
CO 5								3			2	

Assessment Pattern

Bloom's category	Continuous Assessment Tests		End Semester Exam
	1	2	
Remember	15	15	30
Understood	20	20	40
Apply	15	15	30

Mark distribution

Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours

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Syllabus

Module 1 – Human Values.

Morals, values and Ethics – Integrity- Academic integrity-Work Ethics- Service Learning- Civic Virtue- Respect for others- Living peacefully- Caring and Sharing- Honestly- courage-Cooperation commitment- Empathy-Self Confidence -Social Expectations.

Module 2 - Engineering Ethics & Professionalism.

Senses of Engineering Ethics - Variety of moral issues- Types of inquiry- Moral dilemmas –Moral Autonomy – Kohlberg's theory- Gilligan's theory- Consensus and Controversy-Profession and Professionalism- Models of professional roles-Theories about right action –Self interest-Customs and Religion- Uses of Ethical Theories.

Module 3- Engineering as social Experimentation.

Engineering as Experimentation – Engineers as responsible Experimenters- Codes of Ethics- Plagiarism- A balanced outlook on law - Challenges case study- Bhopal gas tragedy.

Module 4- Responsibilities and Rights.

Collegiality and loyalty – Managing conflict- Respect for authority- Collective bargaining- Confidentiality- Role of confidentiality in moral integrity-Conflicts of interest- Occupational crime- Professional rights- Employee right- IPR Discrimination.

Module 5- Global Ethical Issues.

Multinational Corporations- Environmental Ethics- Business Ethics- Computer Ethics -Role in Technological Development-Engineers as Managers- Consulting Engineers- Engineers as Expert witnesses and advisors-Moral leadership.

Text Book

1. M Govindarajan, S Natarajan and V S Senthil Kumar, Engineering Ethics, PHI Learning Private Ltd, New Delhi,2012.
2. R S Naagarazan, A text book on professional ethics and human values, New age international (P) limited ,New Delhi,2006.

Reference Books

1. Mike W Martin and Roland Schinzinger, Ethics in Engineering,4th edition, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi,2014.
2. Charles D Fleddermann, Engineering Ethics, Pearson Education/ Prentice Hall of India, New Jersey,2004.
3. Charles E Harris, Michael S Protchard and Michael J Rabins, Engineering Ethics- Concepts and cases, Wadsworth Thompson Learning, United states,2005.
4. http://www.slideword.org/slidestag.aspx/human-values-and-Professional-ethics.

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CODE	SUSTAINABLE ENGINEERING	CATEGORY	L	T	P	CREDIT
MCN201			2	0	0	NIL

Preamble: Objective of this course is to inculcate in students an awareness of environmental issues and the global initiatives towards attaining sustainability. The student should realize the potential of technology in bringing in sustainable practices.

Prerequisite: NIL

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
CO 2	Explain the different types of environmental pollution problems and their sustainable solutions
CO 3	Discuss the environmental regulations and standards
CO 4	Outline the concepts related to conventional and non-conventional energy
CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1						2	3					2
CO 2						2	3					2
CO 3						2	3					2
CO 4						2	3					2
CO 5						2	3					2

Assessment Pattern

Mark distribution

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	20	20	40
Understand	20	20	40
Apply	10	10	20
Analyse			
Evaluate			
Create			

Continuous Internal Evaluation Pattern:

Attendance : 10 marks
Continuous Assessment Test (2 numbers) : 25 marks
Assignment/Quiz/Course project : 15 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks

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Syllabus

Sustainability - need and concept, technology and sustainable development-Natural resources and their pollution, Carbon credits, Zero waste concept, Life Cycle Analysis, Environmental Impact Assessment studies, Sustainable habitat, Green buildings, green materials, Energy, Conventional and renewable sources, Sustainable urbanization, Industrial Ecology.

Module 1

Sustainability : Introduction, concept, evolution of the concept; Social, environmental and economic sustainability concepts, Sustainable development, Nexus between Technology and Sustainable development; Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), Clean Development Mechanism (CDM).

Module 2

Environmental Pollution: Air Pollution and its effects, Water pollution and its sources, Zero waste concept and 3 R concepts in solid waste management; Greenhouse effect, Global warming, Climate change, Ozone layer depletion, Carbon credits, carbon trading and carbon foot print, legal provisions for environmental protection.

Module 3

Environmental management standards: ISO 14001:2015 frame work and benefits, Scope and goal of Life Cycle Analysis (LCA), Circular economy, Bio-mimicking, Environment Impact Assessment (EIA), Industrial ecology and industrial symbiosis.

Module 4

Resources and its utilisation: Basic concepts of Conventional and non-conventional energy, General idea about solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans and Geothermal energy.

Module 5

Sustainability practices: Basic concept of sustainable habitat, Methods for increasing energy efficiency in buildings, Green Engineering, Sustainable Urbanisation, Sustainable cities, Sustainable transport.

Reference Books

1. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
2. Bradley, A.S, Adebayo,A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning
3. Environment Impact Assessment Guidelines, Notification of Government of India, 2006
4. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998
5. ECBC Code 2007, Bureau of Energy Efficiency, New Delhi Bureau of Energy Efficiency Publications-Rating System, TERI Publications - GRIHA Rating System
6. Ni bin Chang, Systems Analysis for Sustainable Engineering: Theory and Applications, McGraw-Hill Professional
7. Twidell, J. W. and Weir, A. D., Renewable Energy Resources, English Language Book Society (ELBS).
8. Purohit, S. S., Green Technology - An approach for sustainable environment, Agrobios Publication

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Course No.	Course Name	L-T-P-Credits	Year of Introduction
HS210	LIFE SKILLS	2-0-2	2016

Course Objectives

- To develop communication competence in prospective engineers.
- To enable them to convey thoughts and ideas with clarity and focus.
- To develop report writing skills.
- To equip them to face interview & Group Discussion.
- To inculcate critical thinking process.
- To prepare them on problem solving skills.
- To provide symbolic, verbal, and graphical interpretations of statements in a problem description.
- To understand team dynamics & effectiveness.
- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others.
- To learn leadership qualities and practice them.

Syllabus

Communication Skill: Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills, Technology-based Communication.
Critical Thinking & Problem Solving: Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Six thinking hats Mind Mapping & Analytical Thinking.
Teamwork: Groups, Teams, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts.
Ethics, Moral & Professional Values: Human Values, Civic Rights, Engineering Ethics, Engineering as Social Experimentation, Environmental Ethics, Global Issues, Code of Ethics like ASME, ASCE, IEEE.
Leadership Skills: Leadership, Levels of Leadership, Making of a leader, Types of leadership, Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation.

Expected outcome

- Communicate effectively.
- Make effective presentations.
- Write different types of reports.
- Face interview & group discussion.
- Critically think on a particular problem.
- Solve problems.
- Work in Group & Teams
- Handle Engineering Ethics and Human Values.
- Become an effective leader.

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Syllabus

Module 1 – Human Values.

Morals, values and Ethics – Integrity- Academic integrity-Work Ethics- Service Learning- Civic Virtue- Respect for others- Living peacefully- Caring and Sharing- Honestly- courage-Cooperation commitment- Empathy -Self Confidence -Social Expectations.

Module 2 - Engineering Ethics & Professionalism.

Senses of Engineering Ethics - Variety of moral issues- Types of inquiry- Moral dilemmas -Moral Autonomy – Kohlberg's theory- Gilligan's theory- Consensus and Controversy-Profession and Professionalism- Models of professional roles-Theories about right action –Self interest-Customs and Religion- Uses of Ethical Theories.

Module 3- Engineering as social Experimentation.

Engineering as Experimentation – Engineers as responsible Experimenters- Codes of Ethics- Plagiarism- A balanced outlook on law - Challenges case study- Bhopal gas tragedy.

Module 4- Responsibilities and Rights.

Collegiality and loyalty – Managing conflict- Respect for authority- Collective bargaining- Confidentiality- Role of confidentiality in moral integrity-Conflicts of interest- Occupational crime- Professional rights- Employee right- IPR Discrimination.

Module 5- Global Ethical Issues.

Multinational Corporations- Environmental Ethics- Business Ethics- Computer Ethics -Role in Technological Development-Engineers as Managers- Consulting Engineers- Engineers as Expert witnesses and advisors-Moral leadership

Text Book

1. M Govindarajan, S Natarajan and V S Senthil Kumar, Engineering Ethics, PHI Learning Private Ltd, New Delhi,2012.
2. R S Naagarazan, A text book on professional ethics and human values, New age international (P) limited ,New Delhi,2006.

Reference Books

1. Mike W Martin and Roland Schinzinger, Ethics in Engineering,4th edition, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi,2014.
2. Charles D Fleddermann, Engineering Ethics, Pearson Education/ Prentice Hall of India, New Jersey,2004.
3. Charles E Harris, Michael S Protchard and Michael J Rabins, Engineering Ethics- Concepts and Cases, Wadsworth Thompson Learning, United states,2005.
4. http://www slideword.org/slidestag aspx/human-values-and-Professional-ethics.

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References:

- Barun K. Mitra; (2011). *"Personality Development & Soft Skills"*, First Edition; Oxford Publishers.
- Kalyana; (2015) "*Soft Skill for Managers*"; First Edition; Wiley Publishing Ltd.
- Larry James (2016); "*The First Book of Life Skills*"; First Edition; Embassy Books.
- Shalini Verma (2014); *"Development of Life Skills and Professional Practice"*; First Edition; Sultan Chand (G/L) & Company
- John C. Maxwell (2014); "The 5 Levels of Leadership", Centre Street, A division of Hachette Book Group Inc.

Course Plan

Module	Contents	Hours L-T-P T	P	Sem. Exam Marks
I	Need for Effective Communication, Levels of communication; Flow of communication; Use of language in communication; Communication networks; Significance of technical communication, Types of barriers; Miscommunication; Noise; Overcoming measures, Listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listening skills. **Technical Writing:** Differences between technical and literary style, Elements of style; Common Errors, **Letter Writing:** Formal, informal and demi-official letters; business letters, **Job Application**: Cover letter, Differences between bio-data, CV and Resume, **Report Writing:** Basics of Report Writing; Structure of a report; Types of reports. **Non-verbal Communication and Body Language:** Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language **Interview Skills**: Types of Interviews; Ensuring success in job interviews; Appropriate use of non-verbal communication, **Group Discussion**: Differences between group discussion and debate; Ensuring success in group discussions, **Presentation Skills**: Oral presentation and public speaking skills; business presentations, **Technology-based Communication:** Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software.	2 3	2 4 4	
II	Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of Creativity	2		

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