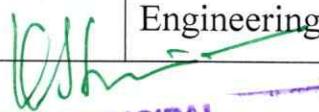


1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the curriculum

A. List of Courses

Sl.No.	Program Code	Program Name	Course Code	Name of the Course	Name of the Topics	Regulation of Anna University
1.	103	Civil Engineering	OME754	Industrial Safety	Environmental Control	2017
2.	103	Civil Engineering	ORO551	Renewable Energy Resources	Environmental Impact of Solar power	2017
3.	103	Civil Engineering	GE8076	Professional Ethics in Engineering	Engineering Ethics – Moral Issues	2017
4.	103	Civil Engineering	GE3451	Environmental Sciences and Sustainability	Importance of Environment, Environment Pollution	2021
5.	103	Civil Engineering	CE8020	Maintenance, Repair and Rehabilitation of Structures	Ethics due to climate, temperature, Structural Health Monitoring.	2017
6.	103	Civil Engineering	GE8071	Disaster Management	Climate Change Adaptation	2017
7.	103	Civil Engineering	EN8591	Municipal Solid based Management	Public health and economic aspects of open storage	2017
8.	103	Civil Engineering	GE8291	Environmental Science and Engineering	Environmental effects of extracting and using mineral resources	2017
9.	104	Computer Science and Engineering	GE8076	Professional Ethics in Engineering	Environmental Ethics, Computer Ethics	2017

  
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 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

10.	104	Computer Science and Engineering	GE8071	Disaster Management	Assessment, Response and Recovery Phases of Disaster	2017
11.	104	Computer Science and Engineering	GE3451	Environmental Sciences and Sustainability	Socio-economical and Technological change	2021
12.	104	Computer Science and Engineering	MG8591	Principles of Management	Use of Computers and IT in Management control	2017
13.	105	Electrical and Electronics Engineering	GE3451	Environmental Sciences and Sustainability	Environment and Sustainability	2021
14	105	Electrical and Electronics Engineering	MG8591	Principles of Management	Human Values	2017
15.	105	Electrical and Electronics Engineering	GE8071	Disaster Management	Environment and Sustainability	2017
16.	105	Electrical and Electronics Engineering	EE8703	Renewable Energy Systems	Environment and Sustainability	2017
17.	106	Electronics and Communication Engineering	GE3451	Environmental Sciences and Sustainability	Environment and Sustainability	2021
18.	106	Electronics and Communication Engineering	GE8076	Professional Ethics in Engineering	Professional Ethics	2017
19.	106	Electronics and Communication Engineering	MG8591	Principles of Management	Human Values	2017
20.	106	Electronics and Communication Engineering	ORO551	Renewable Energy Resources	Environment and Sustainability	2017

  
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Sipcot - IT Highway Egattur,  
Chennai - 603103.

21.	114	Mechanical Engineering	GE3451	Environmental Sciences and Sustainability	Environmental Pollution	2021
22.	114	Mechanical Engineering	GE8076	Professional Ethics in Engineering	Human Values	2017
23.	114	Mechanical Engineering	GE8071	Disaster Management	Inter-relationship between disasters and development	2017
24.	114	Mechanical Engineering	ORO551	Renewable Energy Resources	Environmental Impact of solar Power	2017
25.	205	Information Technology	GE3451	Environmental Sciences and Sustainability	Environment and Sustainability	2021
26.	205	Information Technology	GE8076	Professional Ethics in Engineering	Human Values	2017
27.	205	Information Technology	GE8071	Disaster Management	Approaches to disaster risk reduction	2017
28.	205	Information Technology	MG8591	Principles of Management	Evolution of Management	2017



**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (O.M.R)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

CSE

Date: 14/10/22

Place: Ms ASCE

From

Head of the Department,  
Department of Computer Science and Engineering,  
Mohamed Sathak A.J College of Engineering,  
Chennai.

To

The Principal,  
Mohamed Sathak A.J College of Engineering,  
Siruseri IT Park, OMR,  
Chennai.

Permitted as per norms  
A  
14/10/22

Respected Sir,

Subject: List of Elective Subjects –Reg

We have selected the following subjects for the upcoming semester (ODD-AY 2022-23). So, I kindly request you to approve the same to update in the Anna University Web portal.

**IV Year-CSE(R-2017)**

- 1. Professional Elective-III CS8079-Human Computer Interaction

Thanking You

**PRINCIPAL**  
Mohamed Sathak A.J. Collie  
No.34 Rajiv Gandhi  
Siruseri IT Hubwe  
Chennai - 603 103

Yours Faithfully

Head of the Department  
**DEPARTMENT OF CSE**  
Mohamed Sathak A.J.College of Engineering  
Siruseri IT Park, Chennai - 603 103

Date: 22-12-22

Place: Chennai.

From

Head of the Department,  
Department of Computer Science and Engineering,  
Mohamed Sathak A.J College of Engineering,  
Chennai.

To

~~The Principal,~~  
Mohamed Sathak A.J College of Engineering,  
Siruseri IT Park, OMR,  
Chennai.

Permitted

dm  
22/12/22

Respected Sir,

Subject: List of Elective Subjects –Reg

We have selected the following subjects for the upcoming semester (EVEN-AY 2022-23). So I kindly request you to approve the same to update in the Anna University Web portal.

**IV Year-CSE (R-2017)**

1. Professional Elective-V CS8080 – Information Retrieval Techniques
2. Professional Elective-VI GE8076 – Professional Ethics in Engineering ✓

Thanking You



Yours Faithfully  
CHOD-CSE

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 600103.

**OBJECTIVES:**

□ To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

**UNIT I HUMAN VALUES 10**

Morals, values and Ethics – Integrity – **Work ethic – Service learning** – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

114

**UNIT II ENGINEERING ETHICS 9**

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

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9**

**Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.**

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9**

Safety and Risk – Assessment of Safety and Risk – **Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.**

**UNIT V GLOBAL ISSUES 8**

Multinational Corporations – **Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.**

**TOTAL: 45 PERIODS**

**OUTCOMES:**

□ Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

**TEXT BOOKS:**

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

**REFERENCES:**

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd., New Delhi, 2013.
6. World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Satal (CWR)  
Sipcot - 17 Highway, Erode,  
Tamil Nadu.

**OBJECTIVES:**

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

**UNIT I INTRODUCTION TO DISASTERS 9**

Definition: Disaster, Hazard, **Vulnerability, Resilience, Risks – Disasters:** Types of disasters

–  
Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

**UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9**

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Process and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies

**UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9**

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - **Relevance of indigenous knowledge, appropriate technology and local resources.**

**UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9**

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – **Role of GIS and Information Technology Components in Preparedness, Risk**

**Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.**

**COURSE OBJECTIVES:**

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

**UNIT I ENVIRONMENT AND BIODIVERSITY 6**

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

**UNIT II ENVIRONMENTAL POLLUTION 9**

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and **E-Waste management**. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts .

**UNIT III RENEWABLE SOURCES OF ENERGY 6**

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. **Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion**. Concept, origin and power plants of geothermal energy.

**UNIT IV SUSTAINABILITY AND MANAGEMENT 6**

**Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-87**

**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 600103.

**OBJECTIVES:**

□ To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization .

**UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9**

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

**UNIT II PLANNING 9**

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

**UNIT III ORGANISING 9**

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority –

77

centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management

**UNIT IV DIRECTING 9**

Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.

**UNIT V CONTROLLING 9**

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

**TOTAL: 45 PERIODS OUTCOMES:**

□ Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

**TEXTBOOKS:**

1. Stephen P. Robbins & Mary Coulter, "Management", Prentice Hall (India) Pvt. Ltd., 10th Edition, 2009.
2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

**REFERENCES:**

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" Pearson Education, 7th Edition, 2011.
2. Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.
3. Harold Koontz & Heinz Weihrich "Essentials of management" Tata McGraw Hill, 1998.
4. Tripathy PC & Reddy PN, "Principles of Management", Tata McGraw Hill, 1999



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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
SIPCOT - IT Highway Egattur,  
Chennai - 603103.



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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

S.No	Year (II,III,IV)	Sem	Name of Elective	Related to Professional ethics, Gender, Human Values, Environment and Sustainability
1	II	IV	GE3451 Environmental Sciences and Sustainability	Environment and Sustainability
2	IV	VII	GE8071 Disaster Management	Environment and Sustainability
3	IV	VII	EE 8703 Renewable Energy Systems	Environment and Sustainability
4	IV	VIII	MG8591 Principles of Management	Human Values

HOD -EEE

Dr. JETHA.J

**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Eggenur,  
Chennai - 603103.

EEE

From  
Head of the Department,  
Department of Electrical and Electronics Engineering,  
Mohamed Sathak A J College of Engineering,  
Chennai.

To  
The Principal,  
Mohamed Sathak A J College of Engineering,  
Siruseri IT Park, OMR,  
Chennai.

2/10/23

Respected Sir,

Subject: List of Elective Subjects – Reg

We have selected the following subjects as electives for the upcoming semester (EVEN) (AY 2022-2023). So I kindly request you to approve the same to update in the Anna University web portal.

IV year EEE/VIII SEM (R-2017)

1. Professional Elective V - MG8591 – Principles of Management ✓
2. Professional Elective VI - EE8019 - Smart Grid

III year EEE/VI SEM (R-2017)

1. Professional Elective II - EE8005 – Special Electrical Machines

Thanking you

Academic Head  
2/10/2023

*[Handwritten signature]*

Yours Faithfully

*[Handwritten signature]*  
Dr. JETHA. J  
HOD- EEE

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 600103.

From

Head of the Department,  
Department of Electrical and Electronics Engineering,  
Mohamed Sathak A J College of Engineering,  
Chennai.

To

The Principal,  
Mohamed Sathak A J College of Engineering,  
Chennai.

Sub : List of Elective subjects – Reg

Respected sir,

We are handling the following subjects as electives for the ODD SEMESTER (AY 2022-2023). So kindly request you to approve the same to update in the Anna University web portal.

List of Elective subjects:

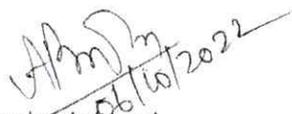
IV year EEE/VII SEM (R-2017)

1. Open elective II – OCS752 Introduction to C Programming
2. Professional elective III – GE8071 Disaster Management
3. Professional elective IV – GE8077 Total Quality Management

III year EEE/ V SEM (R-2017)

1. Open elective I – OMD551 Basics of Bio Medical Instrumentation

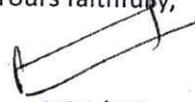
Thanking you

  
Academic Head

(Dr. A. Balakrishnan)

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Yours faithfully,

  
HOD/EEE

(Dr. J. Jeha)

EEE  
1.3.1

## UNIT V GLOBAL ISSUES

8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.

**TOTAL: 45 PERIODS**

### OUTCOMES:

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

### TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

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1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd., New Delhi, 2013.
6. World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

### Web sources:

1. [www.onlineethics.org](http://www.onlineethics.org)
2. [www.nspe.org](http://www.nspe.org)
3. [www.globalethics.org](http://www.globalethics.org)
4. [www.ethics.org](http://www.ethics.org)

MG8591

**PRINCIPLES OF MANAGEMENT**

LT P C  
3 0 0 3

### OBJECTIVES:

- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

## UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

9

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

126

**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (O.M.R.)  
SIPCOT - IT Highway Egattur,  
Chennai - 603103.

## UNIT II PLANNING

9

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

## UNIT III ORGANISING

9

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

## UNIT IV DIRECTING

9

Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.

## UNIT V CONTROLLING

9

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

**TOTAL: 45 PERIODS**

### OUTCOMES:

- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

### TEXT BOOKS:

1. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", 6th Edition, Pearson Education, 2004.
2. Stephen P. Robbins & Mary Coulter, "Management", Prentice Hall (India) Pvt. Ltd., 10<sup>th</sup> Edition, 2009.

### REFERENCES:

1. Harold Koontz & Heinz Weihrich, "Essentials of Management", Tata McGraw Hill, 1998.
2. Robert Kreitner & Mamata Mohapatra, "Management", Biztantra, 2008.
3. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management", 7<sup>th</sup> Edition, Pearson Education, 2011.
4. Tripathy PC & Reddy PN, "Principles of Management", Tata McGraw Hill, 1999

**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (GMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

**OBJECTIVES:**

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

**UNIT I INTRODUCTION TO DISASTERS**

9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

**UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR)**

9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

**UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT**

9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

**UNIT IV DISASTER RISK MANAGEMENT IN INDIA**

9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

**UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS**

9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

**OUTCOMES:**

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.

TOTAL: 45 PERIODS



**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, 103 Gandhi Satsi (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

**TEXTBOOKS:**

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerability India: A Geographical Study of Disasters, IAS and Sage Publishers, New Delhi, 2010.

**REFERENCES**

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

GE8074

HUMAN RIGHTS

L T P C  
3 0 0 3

**OBJECTIVES :**

- To sensitize the Engineering students to various aspects of Human Rights.

**UNIT I**

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights. 9

**UNIT II**

Evolution of the concept of Human Rights Magna carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights. 9

**UNIT III**

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance. 9

**UNIT IV**

Human Rights in India – Constitutional Provisions / Guarantees. 9

**UNIT V**

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disability persons, including Aged and HIV Infected People. Implementation of Human Rights – National and State Human Rights Commission – Judiciary – Role of NGO's, Media, Educational Institutions, Social Movements. 9

**TOTAL : 45 PERIODS**

**OUTCOME :**

- Engineering students will acquire the basic knowledge of human rights.

104



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Chennai - 600103.



TOTAL : 45 PERIODS

**OUTCOMES:**

- Ability to understand the day-to-day operation of electric power system.
- Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
- Ability to understand the significance of power system operation and control.
- Ability to acquire knowledge on real power-frequency interaction.
- Ability to understand the reactive power-voltage interaction.
- Ability to design SCADA and its application for real time operation.

**TEXT BOOKS:**

1. Olle.I.Elgerd, 'Electric Energy Systems theory - An introduction', McGraw Hill Education Pvt. Ltd., New Delhi, 34th reprint, 2010.
2. Allen. J. Wood and Bruce F. Wollen berg, 'Power Generation, Operation and Control', John Wiley & Sons, Inc., 2016.
3. Abhijit Chakrabarti and Sunita Halder, 'Power System Analysis Operation and Control', PHI learning Pvt. Ltd., New Delhi, Third Edition, 2010.

**REFERENCES**

1. Kothari D.P. and Nagrath I.J., 'Power System Engineering', Tata McGraw-Hill Education, Second Edition, 2008.
2. Hadi Saadat, 'Power System Analysis', McGraw Hill Education Pvt. Ltd., New Delhi, 21st reprint, 2010.
3. Kundur P., 'Power System Stability and Control, McGraw Hill Education Pvt. Ltd., New Delhi, 10th reprint, 2010.

EE8703

**RENEWABLE ENERGY SYSTEMS**

L	T	P	C
3	0	0	3

**OBJECTIVES:**

To impart knowledge on the following Topics

- Awareness about renewable Energy Sources and technologies.
- Adequate inputs on a variety of issues in harnessing renewable Energy.
- Recognize current and possible future role of renewable energy sources.

**UNIT I RENEWABLE ENERGY (RE) SOURCES**

9

Environmental consequences of fossil fuel use, Importance of renewable sources of energy, Sustainable Design and development, Types of RE sources, Limitations of RE sources, Present Indian and international energy scenario of conventional and RE sources.

**UNIT II WIND ENERGY**

9

Power in the Wind – Types of Wind Power Plants(WPPs)–Components of WPPs-Working of WPPs- Siting of WPPs-Grid integration issues of WPPs.

 84

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### UNIT III SOLAR PV AND THERMAL SYSTEMS

9

Solar Radiation, Radiation Measurement, Solar Thermal Power Plant, Central Receiver Power Plants, Solar Ponds.- Thermal Energy storage system with PCM- Solar Photovoltaic systems : Basic Principle of SPV conversion – Types of PV Systems- Types of Solar Cells, Photovoltaic cell concepts: Cell, module, array ,PV Module I-V Characteristics, Efficiency & Quality of the Cell, series and parallel connections, maximum power point tracking, Applications.

### UNIT IV BIOMASS ENERGY

9

Introduction-Bio mass resources –Energy from Bio mass: conversion processes-Biomass Cogeneration-Environmental Benefits. Geothermal Energy: Basics, Direct Use, Geothermal Electricity. Mini/micro hydro power: Classification of hydropower schemes, Classification of water turbine, Turbine theory, Essential components of hydroelectric system.

### UNIT V OTHER ENERGY SOURCES

9

Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems. Wave Energy: Energy from waves, wave power devices. Ocean Thermal Energy Conversion (OTEC)- Hydrogen Production and Storage- Fuel cell : Principle of working- various types - construction and applications. Energy Storage System- Hybrid Energy Systems.

**TOTAL : 45 PERIODS**

#### OUTCOMES:

- Ability to create awareness about renewable Energy Sources and technologies.
- Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.
- Ability to recognize current and possible future role of renewable energy sources.
- Ability to explain the various renewable energy resources and technologies and their applications.
- Ability to understand basics about biomass energy.
- Ability to acquire knowledge about solar energy.

#### TEXT BOOKS:

1. Joshua Earnest, Tore Wizeliu, 'Wind Power Plants and Project Development', PHI Learning Pvt.Ltd, New Delhi, 2011.
2. D.P.Kothari, K.C Singal, Rakesh Ranjan "Renewable Energy Sources and Emerging Technologies", PHI Learning Pvt.Ltd, New Delhi, 2013.
3. Scott Grinnell, "Renewable Energy & Sustainable Design", CENGAGE Learning, USA, 2016.

#### REFERENCES

1. A.K.Mukerjee and Nivedita Thakur," Photovoltaic Systems: Analysis and Design", PHI Learning Private Limited, New Delhi, 2011
2. Richard A. Dunlap," Sustainable Energy" Cengage Learning India Private Limited, Delhi, 2015.
3. Chetan Singh Solanki, " Solar Photovoltaics : Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2011
4. Bradley A. Striebig,Adebayo A.Ogundipe and Maria Papadakis," Engineering Applications in Sustainable Design and Development", Cengage Learning India Private Limited, Delhi, 2016.
5. Godfrey Boyle, "Renewable energy", Open University, Oxford University Press in association with the Open University, 2004.
6. Shobh Nath Singh, 'Non-conventional Energy resources' Pearson Education ,2015.

 85

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**MS POWERPOINT:**

**10 Hours**

- Select slide templates, layout and themes
- Formatting slide content and using bullets and numbering
- Insert and format images, smart art, tables, charts
- Using Slide master, notes and handout master
- Working with animation and transitions
- Organize and Group slides
- Import or create and use media objects: audio, video, animation
- Perform slideshow recording and Record narration and create presentable videos

**TOTAL: 30 PERIODS**

**COURSE OUTCOMES:**

- On successful completion the students will be able to
  - Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
  - Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
  - Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

CEEM11

**ENVIRONMENTAL SCIENCES AND SUSTAINABILITY**

L	T	P	C
2	0	0	2

**COURSE OBJECTIVES:**

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

**UNIT I ENVIRONMENT AND BIODIVERSITY**

**6**

Definition, scope and importance of environment – need for public awareness. Eco-system and Ecological flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– value of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

**UNIT II ENVIRONMENTAL POLLUTION**

**6**

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions.

80

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 Chennai - 603103.

Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts .

### UNIT III RENEWABLE SOURCES OF ENERGY

6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

### UNIT IV SUSTAINABILITY AND MANAGEMENT

6

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols - Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

### UNIT V SUSTAINABILITY PRACTICES

6

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles-carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-economical and technological change.

**TOTAL: 30 PERIODS**

### COURSE OUTCOMES:

- To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
- To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
- To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
- To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
- To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

### TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

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## REFERENCES

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

## MAPPING OF COs WITH POs AND PSOs

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
Avg.	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-

EE3401

## TRANSMISSION AND DISTRIBUTION

L T P C  
3 0 0 3

### COURSE OBJECTIVES:

- To impart knowledge about the configuration of the electrical power systems.
- To study the line parameters and interference with neighboring circuits.
- To understand the mechanical design and performance analysis of transmission lines.
- To learn about different insulators and underground cables.
- To understand and analyze the distribution system.

### UNIT I TRANSMISSION LINE PARAMETERS

9

Structure of electric power system - Parameters of single and three phase transmission lines with single and double circuits -Resistance, inductance, and capacitance of solid, stranded, and bundled conductors - Typical configuration, conductor types - Symmetrical and unsymmetrical spacing and transposition – application of self and mutual GMD; skin and proximity effects - Effects of earth on the capacitance of the transmission line - interference with neighboring communication circuits.

### UNIT II MODELLING AND PERFORMANCE OF TRANSMISSION LINES

9

Performance of Transmission lines – short line, medium line and long line – equivalent circuits, phasor diagram, attenuation constant, phase constant, surge impedance – transmission efficiency and voltage regulation, real and reactive power flow in lines – Power Circle diagrams – Ferranti effect – Formation of Corona – Critical Voltages – Effect on line Performance.

*(Handwritten signature)*

**PRINCIPAL**  
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Sipcot - IT Highway Egattur,  
Chennai - 600103.


**DEPARTMENT OF ECE**
**1.3.1 Institution integrates crosscutting issues relevant to Professional ethics, Gender, Human Values, Environment and Sustainability into the Curriculum**

S.No	Year (II,III,IV)	Sem	Name of Elective	Related to Professional ethics, Gender, Human Values, Environment and Sustainability
1.	II	IV	GE3451 – Environmental Sciences and Sustainability	Environment and Sustainability
2.	III	VI	MG8591 - Principles of Management	Human Values
3.	III	V	ORO551- Renewable Energy Recourses	Environment and Sustainability
4.	IV	VIII	GE8076 - Professional Ethics in Engineering	Professional ethics

**PRINCIPAL**

 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

**From**

Head of the Department,  
Department of Electronics and Communication Engineering,  
Mohamed Sathak A J College of Engineering,  
Chennai.

**To**

The Principal,  
Mohamed Sathak A J College of Engineering,  
Siruseri IT Park, OMR,  
Chennai.

*Permitted*  
*J*  
*05/08/22*

**Respected sir,**

Subject: List of **Elective Subjects** – Reg.

We have selected the following subjects as electives for the odd semester (AY 2022-2023).  
So, I kindly request you to approve the same to update in the Anna University web portal.

**List of Elective Subjects**

**IV Year ECE/ VII SEM (R-2017)**

1. Professional Elective –III -GE8071 Disaster Management
2. Open Elective II - OMF751 Lean Six Sigma

**III Year ECE/V SEM (R-2017)**

1. Professional Elective I - EC8073 Medical Electronics
2. Open Elective I -ORO551 Renewable Energy Sources

Thanking you,

Yours Faithfully,

*S. M. M. M. M.*  
*5/8/22*

HOD ECE

*W. S. K.*

**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

**From**

Head of the Department,  
Department of Electronics and Communication Engineering,  
Mohamed Sathak A J College of Engineering,  
Chennai-603103

**To**

The Principal,  
Mohamed Sathak A J College of Engineering,  
Siruseri IT Park, OMR,  
Chennai-603103

Permitted  
08/11/22

Respected sir,

Subject: List of Elective Subjects – Reg

We have selected the following subjects as electives for the odd semester (AY 2022-2023).  
So, I kindly request you to approve the same to update in the Anna University web portal.

**List of Elective Subjects**

**IV Year ECE/ VIII SEM (R-2017)**

1. Professional Elective IV - GE8076 Professional Ethics in Engineering
2. Professional Elective V - EC8094 Satellite Communication

Thanking you,

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Yours Faithfully

  
HOD-ECE

5	3	3	3	3	2	1	1	-	-	-	1	1
Avg	3	3	3	3	2.5	1	1	-	-	-	1	1

1 - low, 2 - medium, 3 - high, '-' - no correlation

**GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY**

**L T P C**

**2 0 0 2**

**COURSE OBJECTIVES:**

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

**UNIT I ENVIRONMENT AND BIODIVERSITY**

**6**

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

**UNIT II ENVIRONMENTAL POLLUTION**

**6**

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts .

**UNIT III RENEWABLE SOURCES OF ENERGY**

**6**

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

**UNIT IV SUSTAINABILITY AND MANAGEMENT**

**6**

Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

**UNIT V SUSTAINABILITY PRACTICES**

**6**

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles-carbon cycle, emission and sequestration, Green Engineering. Sustainable urbanization- Socio-economical and technological change.

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Chennai - 603103.*

**TOTAL:30 PERIODS**

**COURSE OUTCOMES:**

**CO1:**To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.

**CO2:**To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.

**CO3:**To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.

**CO4:**To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

**CO5:**To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

**TEXT BOOKS :**

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

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1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 . edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

**CO's-PO's & PSO's MAPPING**

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
Avg.	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
85 Sipcot - IT Highway Egattur,  
Chennai - 603103.

**OBJECTIVE:**

- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization .

**UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9**

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations, system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

**UNIT II PLANNING 9**

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

**UNIT III ORGANISING 9**

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management, Career planning and management

**UNIT IV DIRECTING 9**

Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication –communication and IT.

**UNIT V CONTROLLING 9**

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

**TOTAL: 45 PERIODS****OUTCOME:**

- Upon completion of the course, students will be able to have clear understanding
- Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

**TEXTBOOKS:**

- Stephen P. Robbins & Mary Coulter, "Management", Prentice Hall (India) Pvt. Ltd., 10<sup>th</sup> Edition, 2009.
- JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

**REFERENCES:**

- Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" Pearson Education, 7th Edition, 2011.
- Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.
- Harold Koontz & Heinz Weihrich "Essentials of management" Tata McGraw Hill, 1998.
- Tripathy PC & Reddy PN, "Principles of Management" Tata McGraw Hill, 1999

Mohamed Sultan  
No 34, Rajiv Gandhi  
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Chennai - 603103.

**OBJECTIVES:**

- To get exposure on solar radiation and its environmental impact to power.
- To know about the various collectors used for storing solar energy.
- To know about the various applications in solar energy.
- To learn about the wind energy and biomass and its economic aspects.
- To know about geothermal energy with other energy sources.

**UNIT I PRINCIPLES OF SOLAR RADIATION****10**

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

**UNIT II SOLAR ENERGY COLLECTION****8**

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

**UNIT III SOLAR ENERGY STORAGE AND APPLICATIONS****7**

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

**UNIT IV WIND ENERGY****10**

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

**UNIT V GEOTHERMAL ENERGY:****9**

Resources, types of wells, methods of harnessing the energy, potential in India. OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics. DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, principles of DEC.

**TOTAL : 45 PERIODS****OUTCOMES:**

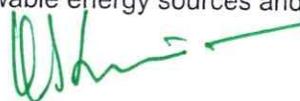
- Understanding the physics of solar radiation.
- Ability to classify the solar energy collectors and methodologies of storing solar energy.
- Knowledge in applying solar energy in a useful way.
- Knowledge in wind energy and biomass with its economic aspects.
- Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.

**TEXT BOOKS:**

1. Rai G.D. , "Non-Conventional Energy Sources", Khanna Publishers, 2011
2. Twidell & Wier, "Renewable Energy Resources", CRC Press (Taylor & Francis), 2011

**REFERENCES:**

1. Tiwari and Ghosal, "Renewable energy resources", Narosa Publishing House, 2007
2. Ramesh R & Kumar K.U , "Renewable Energy Technologies",Narosa Publishing House, 2004
3. Mittal K M , "Non-Conventional Energy Systems", Wheeler Publishing Co. Ltd, New Delhi, 2003
4. Kothari D.P, Singhal ., K.C., "Renewable energy sources and emerging technologies", P.H.I, New Delhi, 2010


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Chennai - 603103.

### TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson, Third Edition, 2010.
2. Anil K. Jain, 'Fundamentals of Digital Image Processing', Pearson, 2002.

### REFERENCES

1. Kenneth R. Castleman, 'Digital Image Processing', Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, 'Digital Image Processing using MATLAB', Pearson Education, Inc., 2011.
3. D.E. Dudgeon and RM. Mersereau, 'Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, 'Digital Image Processing', John Wiley, New York, 2002
5. Milan Sonka et al 'Image processing, analysis and machine vision', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999.

GE8076

## PROFESSIONAL ETHICS IN ENGINEERING

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### OBJECTIVE:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

### UNIT I HUMAN VALUES

10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

### UNIT II ENGINEERING ETHICS

9

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

### UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION

9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

### UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS

9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

### UNIT V GLOBAL ISSUES

8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.

TOTAL: 45 PERIODS

  
Mohamed Sathak A.J. College of Engineering,  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 600103.

**OUTCOMES:**

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

**TEXT BOOKS:**

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

**REFERENCES:**

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd.,New Delhi, 2013.
6. World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

**Web sources:**

1. www.onlineethics.org
2. www.nspe.org
3. www.globoethics.org
4. www.ethics.org

EC8010

**VIDEO ANALYTICS**

L	T	P	C
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**OBJECTIVES:**

The student should be made:

- To understand the need for video Analytics
- To understand the basic configuration of video analytics
- To understand the functional blocks of a video analytic system
- To get exposed to the various applications of video analytics

**UNIT I VIDEO ANALYTIC COMPONENTS 9**

Need for Video Analytics-Overview of video Analytics- Foreground extraction- Feature extraction-classifier - Preprocessing- edge detection- smoothing- Feature space-PCA-FLD-SIFT features

**UNIT II FOREGROUND EXTRACTION 9**

Background estimation- Averaging- Gaussian Mixture Model- Optical Flow based- Image Segmentation- Region growing- Region splitting-Morphological operations- erosion-Dilation-Tracking in a multiple camera environment

**UNIT III CLASSIFIERS 9**

Neural networks (back propagation) - Deep learning networks- Fuzzy Classifier- Bayesian classifier-HMM based classifier

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 Chennai - 603103.  
 113

Mech

Date: 02-02-2023

From

Dr. Prasath S,  
Head of the Department,  
Department of Mechanical Engineering,  
Mohamed Sathak A J College of Engineering,  
IT Sipcot, Siruseri, Chennai.

To

The Principal,  
Mohamed Sathak A J College of Engineering,  
IT Sipcot, Siruseri, Chennai.

Permitted  
02/02/23

Respected Sir,

**Sub: Approval of Elective Subjects-Reg**

We have selected the following subjects as electives for the academic year of 2022-23 even semester. So, I kindly request you to approve the same to update in the Anna University web portal.

**IV Year / VIII Semester(R-2017)**

1. Professional Elective IV – IE8693 Production Planning and Control

**III Year / VI Semester(R-2017)**

1. Professional Elective I – PR8592 Welding Technology

Thanking You.



21/2/23  
Yours Sincerely,  
(Dr. S. Prasath)

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

**OBJECTIVES:**

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

**UNIT I****ENVIRONMENT AND BIODIVERSITY**

6

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

**UNIT II****ENVIRONMENTAL POLLUTION**

6

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

**UNIT III****RENEWABLE SOURCES OF ENERGY**

6 Energy management and conservation, New Energy Sources: Need of new sources.

Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

**UNIT IV****SUSTAINABILITY AND MANAGEMENT**

6

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols Sustainable Development Goals-targets, indicators and intervention areas Climate change-Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

**UNIT V****SUSTAINABILITY PRACTICES**

6

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socioeconomical and technological change.

TOTAL : 30 PERIODS

**OBJECTIVE:**

- To enable the students to create an awareness on Engineering Ethics and Human Values to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

**UNIT I HUMAN VALUES 10**

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

**UNIT II ENGINEERING ETHICS 9**

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

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9**

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9**

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

**UNIT V GLOBAL ISSUES 8**

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.

**TOTAL: 45 PERIODS****OUTCOME:**

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

**TEXT BOOKS:**

- Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
- Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.

**REFERENCES:**

- Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
- Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
- Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
- John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
- Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd., New Delhi, 2013.
- World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

116

PRINCIPAL

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

## OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

**UNIT I INTRODUCTION TO DISASTERS 9**

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

**UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9**

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

**UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9**

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

**UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9**

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

**UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9**

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

OUTCOMES: The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.

  
PRINCIPAL

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Chennai - 603103.

**OBJECTIVES:**

- To get exposure on solar radiation and its environmental impact to power.
- To know about the various collectors used for storing solar energy.
- To know about the various applications in solar energy.
- To learn about the wind energy and biomass and its economic aspects.
- To know about geothermal energy with other energy sources.

<b>UNIT I</b>	<b>PRINCIPLES OF SOLAR RADIATION</b>	<b>10</b>
Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.		
<b>UNIT II</b>	<b>SOLAR ENERGY COLLECTION</b>	<b>8</b>
Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.		
<b>UNIT III</b>	<b>SOLAR ENERGY STORAGE AND APPLICATIONS</b>	<b>7</b>
Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.		
<b>UNIT IV</b>	<b>WIND ENERGY</b>	<b>10</b>
Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.		
<b>UNIT V</b>	<b>GEO THERMAL ENERGY:</b>	<b>9</b>
Resources, types of wells, methods of harnessing the energy, potential in India. OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics. DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, principles of DEC.		

**TOTAL : 45 PERIODS****OUTCOMES:**

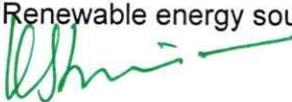
- Understanding the physics of solar radiation.
- Ability to classify the solar energy collectors and methodologies of storing solar energy.
- Knowledge in applying solar energy in a useful way.
- Knowledge in wind energy and biomass with its economic aspects.
- Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.

**TEXT BOOKS:**

1. Rai G.D. , "Non-Conventional Energy Sources", Khanna Publishers, 2011
2. Twidell & Wier, "Renewable Energy Resources", CRC Press (Taylor & Francis), 2011

**REFERENCES:**

1. Tiwari and Ghosal, "Renewable energy resources", Narosa Publishing House, 2007
2. Ramesh R & Kumar K.U , "Renewable Energy Technologies", Narosa Publishing House, 2004
3. Mittal K M , "Non-Conventional Energy Systems", Wheeler Publishing Co. Ltd, New Delhi, 2003
4. Kothari D.P, Singhal ., K.C., "Renewable energy sources and emerging technologies", P.H.I, New Delhi, 2010

  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34 Rajiv Gandhi  
 S.P.O.

Date: 30/09/2022  
MSAJCE

From  
Head of the Department  
Department of Information Technology  
MSAJCE

To  
~~The Principal~~  
MSAJCE

*om*  
*30/9/22*

Respected sir,

Sub: List of Elective Subjects – Reg.

We have selected the following subjects as elective for the upcoming semester (ODD SEM) (AY: 2022-2023). So, I kindly request you to approve the same to update in the Anna University web portal.

III – Year IT (R-2017)

- 1. Open Elective - I : OME 551 - Energy Conservation and Management (50)

IV – Year IT (R-2017)

- 1. Professional Elective - III : CS8079 - Human Computer Interaction (30)
- 2. Open Elective – II : OMF 751 – Lean Six Sigma (30) EI

Thanking you

*[Handwritten signature]*

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30/9/22  
Yours Faithfully

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai  
Sivakasi

Date: 19/01/2023  
MSAJCE

From  
Head of the Department  
Department of Information Technology  
MSAJCE

To  
The Principal  
MSAJCE

*am*  
*210323*

Respected sir,

Sub : List of **Elective Subjects** – Reg.

We have selected the following subjects as elective for the upcoming semester (EVEN SEMESTER) (AY: 2022-2023). So, I kindly request you to approve the same to update in the **Anna University web portal**.

IV – Year <sup>IT</sup> ~~EST~~ (R-2017)

1. Professional Elective – III – **Open Elective – Professional Ethics in Engineering**
2. Open Elective – II – **Open Elective – Information Retrieval Techniques**

*[Signature]*

*[Signature]*  
19/1/23  
Yours Faithfully



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



## DEPARTMENT OF INFORMATION TECHNOLOGY

ACADEMIC YEAR : 2022-2023

### 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 Anna University
1.	205	Information Technology	GE8076	Professional Ethics in Engineering	Human Values	2017
2.	205	Information Technology	GE3451	Environmental Sciences and Sustainability	Environment and Sustainability	2021
3.	205	Information Technology	GE8071	Disaster Management	Approaches to disaster risk reduction	2017
4.	205	Information Technology	MG8591	Principles of Management	Evolution of Management	2017

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**PRINCIPAL**





**DEPARTMENT OF INFORMATION TECHNOLOGY**

**ACADEMIC YEAR : 2022-2023**

**GE8071**

**DISASTER MANAGEMENT**

**LT P C 3 0 0 3**

**OBJECTIVES:**

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

**UNIT I INTRODUCTION TO DISASTERS**

**9**

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters –Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

**UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR)**

**9**

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

**UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT**

**9**

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

**UNIT IV DISASTER RISK MANAGEMENT IN INDIA**

**9**

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

  
**PRINCIPAL**  
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Chennai - 603103.



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



## DEPARTMENT OF INFORMATION TECHNOLOGY

ACADEMIC YEAR: 2022-2023

### GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY LTPC 2002

#### UNIT I ENVIRONMENT AND BIODIVERSITY 6

Definition, scope and importance of environment – need for public awareness. Ecosystem and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

#### UNIT II ENVIRONMENTAL POLLUTION 9

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

#### UNIT III RENEWABLE SOURCES OF ENERGY 6

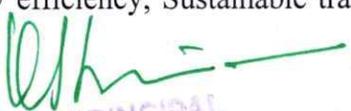
Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

#### UNIT IV SUSTAINABILITY AND MANAGEMENT 6

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and Protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

#### UNIT V SUSTAINABILITY PRACTICES 6

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-

  
PRINCIPAL  
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# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



## DEPARTMENT OF INFORMATION TECHNOLOGY

ACADEMIC YEAR : 2022-2023

**GE8076      PROFESSIONAL ETHICS IN ENGINEERING      LTPC3003**

### OBJECTIVE:

To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

### UNIT I      HUMAN VALUES      10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

### UNIT II      ENGINEERING ETHICS      9

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

### UNIT III      ENGINEERING AS SOCIAL EXPERIMENTATION      9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

### UNIT IV      SAFETY, RESPONSIBILITIES AND RIGHTS

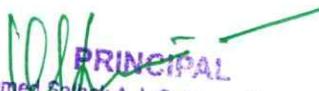
9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

### UNIT V      GLOBAL ISSUES      8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility

**TOTAL:45 PERIODS**

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

**TEXT BOOKS:**

1. K.S.Jagadish, B. U. Venkataramareddy and K. S. Nanjundarao. Alternative Building Materials and Technologies. New Age International, 2007.
2. Low Energy Cooling For Sustainable Buildings. John Wiley and Sons Ltd, 2009.
3. Sustainable Building Design Manual. Vol 1 and 2, Teri, New Delhi, 2004.

**REFERENCES:**

1. Osman Attmann Green Architecture Advanced Technologies and Materials. McGraw Hill, 2010.
2. Jerry Yudelson Green building Through Integrated Design. McGraw Hill, 2009.
3. Fundamentals of Integrated Design for Sustainable Building By Marian Keeler, Bill Burke

**OME754**

**INDUSTRIAL SAFETY**

**LT P C  
3 0 0 3**

**OBJECTIVE :**

- To impart knowledge on safety engineering fundamentals and safety management practices.

**UNIT I INTRODUCTION 9**  
Evolution of modern safety concepts – Fire prevention – Mechanical hazards – Boilers, Pressure vessels, Electrical Exposure.

**UNIT II CHEMICAL HAZARDS 9**  
Chemical exposure – Toxic materials – Ionizing Radiation and Non-ionizing Radiation - Industrial Hygiene – Industrial Toxicology.

**UNIT III ENVIRONMENTAL CONTROL 9**  
Industrial Health Hazards – Environmental Control – Industrial Noise - Noise measuring instruments, Control of Noise, Vibration, - Personal Protection.

**UNIT IV HAZARD ANALYSIS 9**  
System Safety Analysis –Techniques – Fault Tree Analysis (FTA), Failure Modes and Effects Analysis (FMEA), HAZOP analysis and Risk Assessment

**UNIT V SAFETY REGULATIONS 9**  
Explosions – Disaster management – catastrophe control, hazard control ,Safety education and training - Factories Act, Safety regulations Product safety – case studies.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

- Students must be able to identify and prevent chemical, environmental mechanical, fire hazard through analysis and apply proper safety techniques on safety engineering and management.

**TEXT BOOK:**

1. John V.Grimaldi, "Safety Management", AITB S Publishers, 2003.

**REFERENCES:**

1. Safety Manual, "EDEL Engineering Consultancy", 2000.
2. David L.Goetsch, "Occupational Safety and Health for Technologists", 5<sup>th</sup> Edition, Engineers and Managers, Pearson Education Ltd., 2005.

  
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**OBJECTIVES:**

- To get exposure on solar radiation and its environmental impact to power.
- To know about the various collectors used for storing solar energy.
- To know about the various applications in solar energy.
- To learn about the wind energy and biomass and its economic aspects.
- To know about geothermal energy with other energy sources.

**UNIT I PRINCIPLES OF SOLAR RADIATION 10**

Role and potential of new and renewable source, the solar energy option, **Environmental impact of solar power**, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

**UNIT II SOLAR ENERGY COLLECTION 8**

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

**UNIT III SOLAR ENERGY STORAGE AND APPLICATIONS 7**

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

**UNIT IV WIND ENERGY 10**

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

**UNIT V GEOTHERMAL ENERGY: 9**

Resources, types of wells, methods of harnessing the energy, potential in India. OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics. DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, principles of DEC.

**TOTAL : 45 PERIODS****OUTCOMES:**

- Understanding the physics of solar radiation.
- Ability to classify the solar energy collectors and methodologies of storing solar energy.
- Knowledge in applying solar energy in a useful way.
- Knowledge in wind energy and biomass with its economic aspects.
- Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.

**TEXT BOOKS:**

1. Rai G.D. , "Non-Conventional Energy Sources", Khanna Publishers, 2011
2. Twidell & Wier, "Renewable Energy Resources", CRC Press (Taylor & Francis), 2011

**REFERENCES:**

1. Tiwari and Ghosal, "Renewable energy resources", Narosa Publishing House, 2007
2. Ramesh R & Kumar K.U , "Renewable Energy Technologies", Narosa Publishing House, 2004
3. Mittal K M , "Non-Conventional Energy Systems", Wheeler Publishing Co. Ltd, New Delhi, 2003
4. Kothari D.P, Singhal ., K.C., "Renewable energy sources and emerging technologies", P.H.I, New Delhi, 2010

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2. Ven Te Chow, Maidment, D.R. and Mays, L.W. "Applied Hydrology", McGraw Hill International Book Company, 1998.
3. Raghunath .H.M., "Hydrology", Wiley Eastern Ltd., 1998.

GE8076

**PROFESSIONAL ETHICS IN ENGINEERING**

L T P C  
3 0 0 3

**OBJECTIVE:**

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

**UNIT I HUMAN VALUES 10**

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

**UNIT II ENGINEERING ETHICS 9**

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

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9**

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9**

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

**UNIT V GLOBAL ISSUES 8**

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.

**TOTAL: 45 PERIODS**

**OUTCOME:**

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

**TEXT BOOKS:**

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V, S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

114

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9. IRC 58-2012. The Indian Road Congress, Guideline for the Design of Rigid Pavements for Highways, New Delhi
10. Saxena Subhash, C. and Satyapal Arora, A Course in Railway Engineering, Dhanapat Rai and Sons, Delhi, 1998.

### COs- PO's & PSO's MAPPING

PO/PSO		Course Outcome					Over all Correlation of Cos to POs
		CO1	CO2	CO3	CO4	CO5	
<b>PROGRAM OUTCOMES (PO)</b>							
PO1	Knowledge of Engineering Sciences	3	2	2	3		2
PO2	Problem analysis		3	3			3
PO3	Design / development of solutions		3	2		3	3
PO4	Investigation	2	2	2			2
PO5	Modern Tool Usage		2	2		2	2
PO6	Engineer and Society	3		3	3		3
PO7	Environment and sustainability	1	2	3			2
PO8	Ethics	3	3	3	3		3
PO9	Individual and Team work		2			2	2
PO10	Communication				1		1
PO11	Project Management and Finance		2	3			3
PO12	Life Long Learning		3	3		2	3
<b>PROGRAM SPECIFIC OUTCOMES (PSO)</b>							
PSO1	Knowledge of Civil Engineering discipline	3	3	3	3	3	3
PSO2	Critical analysis of Civil Engineering problems and Innovation	2	3	3	2	3	3
PSO3	Conceptualization and evaluation of engineering solutions to Civil Engineering Issues				2	3	2

GE3451

**ENVIRONMENTAL SCIENCES AND SUSTAINABILITY**

L T P C  
2 0 0 2

### COURSE OBJECTIVES:

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

### UNIT I

### **ENVIRONMENT AND BIODIVERSITY**

6

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow – ecological succession. Types of biodiversity: genetic, species and ecosystem diversity – values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ

**UNIT II ENVIRONMENTAL POLLUTION** 6  
Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts .

**UNIT III RENEWABLE SOURCES OF ENERGY** 6  
Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

**UNIT IV SUSTAINABILITY AND MANAGEMENT** 6  
Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

**UNIT V SUSTAINABILITY PRACTICES** 6  
Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles-carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-economical and technological change.

**TOTAL : 30 PERIODS**

**COURSE OUTCOMES:**

- CO1** To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
- CO2** To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
- CO3** To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
- ~~**CO4** To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.~~
- CO5** To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

**TEXTBOOKS:**

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

**REFERENCES :**

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro-Media. 38 . Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhan, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India, PVT. LTD, New Delhi, 2007.

**REFERENCES:**

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd.,New Delhi, 2013.
6. World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

**Web sources:**

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

CE8019

**COMPUTER AIDED DESIGN OF STRUCTURES**

**L T P C**  
**3 0 0 3**

**OBJECTIVES:**

- To introduce the students about computer graphics, structural analysis, design and optimization and expert systems, applications in analysis.

**UNIT I INTRODUCTION**

**9**

Fundamental reason for implementing CAD - Software requirements – Hardware components in CAD system – Design process - Applications and benefits.

**UNIT II COMPUTER GRAPHICS**

**9**

Graphic Software – Graphic primitives - Transformations - 2 Dimensional and 3 Dimensional transformations – Concatenation - Wire frame modeling - Solid modeling - Graphic standards - Drafting packages .

**UNIT III STRUCTURAL ANALYSIS**

**9**

Principles of structural analysis - Fundamentals of finite element analysis - Concepts of finite elements – Stiffness matrix formulation – Variational Method – Weighted residual method – Problems – Convergence criteria – Analysis packages and applications.

**UNIT IV DESIGN AND OPTIMIZATION**

**9**

Principles of design of steel and RC structures - Beams and Columns - Applications to simple design problems - Optimization techniques - Algorithms - Linear programming – Simplex Method

**UNIT V EXPERT SYSTEMS**

**9**

Introduction to artificial intelligence - Knowledge based expert systems – Applications of Knowledge Based Expert Systems - Rules and decision tables - Inference mechanisms - simple applications

## OUTCOMES:

On successful completion of this course, students will be able to:

- Understand the concepts of Computer-Aided Design, Software requirements and Hardware components in CAD system.
- Acquire the knowledge in Computer Graphics and Computer aided drafting using Auto CAD software.
- Understand the fundamentals of finite element analysis and be able use software for modeling, analysis and design of structures.
- Understand the concepts of Optimization techniques and its practical applications to structural engineering.
- Acquire the knowledge in Artificial Intelligence and Knowledge based expert systems.

## TEXTBOOKS:

1. Groover M.P. and Zimmers E.W. Jr., "CAD/CAM, Computer Aided Design and Manufacturing", Prentice Hall of India Ltd, New Delhi, 1993.
2. Krishnamoorthy C.S.Rajeev S., "Computer Aided Design", Narosa Publishing House, New Delhi, 2001.

## REFERENCES:

1. Harrison H.B., "Structural Analysis and Design", Part I and II Pergamon Press, Oxford, 1990.
2. Rao S.S., "Optimisation Theory and Applications", Wiley Eastern Limited, New Delhi, 1984.
3. Richard Forsyth (Ed), "Expert System Principles and Case Studies", Chapman and Hall, London, 1989.

**CE8020 MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES L T P C**  
**3 0 0 3**

## OBJECTIVE:

- To acquire the knowledge on Quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.

### UNIT I MAINTENANCE AND REPAIR STRATEGIES 9

Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating damaged structure, causes of deterioration.

### UNIT II STRENGTH AND DURABILITY OF CONCRETE 9

Quality assurance for concrete—Strength, Durability- Cracks, different types, causes—Effects due to climate, temperature, Sustained elevated temperature, Corrosion

### UNIT III SPECIAL CONCRETES 9

Polymer concrete, Sulphur infiltrated concrete, Fibre reinforced concrete, High strength concrete, High performance concrete, Vacuum concrete, Self compacting concrete, Geopolymer concrete, Reactive powder concrete, Concrete made with industrial wastes.

### UNIT IV TECHNIQUES FOR REPAIR AND PROTECTION METHODS 9

Non-destructive Testing Techniques, Load Test for Stability-Epoxy injection, Shoring, Underpinning, Corrosion protection techniques—Corrosion inhibitors, Corrosion resistant steels, Coatings to reinforcement, cathodic protection.

**UNIT V REPAIR, REHABILITATION AND RETROFITTING OF STRUCTURES 9**

Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, leakage, earthquake-Transportation of Structures from one place to other –Structural Health Monitoring- demolition techniques-Engineered demolition methods-Case studies

**TOTAL: 45 PERIODS**

**OUTCOMES:**

Students will be able to understand

- the importance of maintenance and assessment method of distressed structures.
- the strength and durability properties ,their effects due to climate and temperature.
- recent development in concrete
- the techniques for repair and protection methods
- repair, rehabilitation and retrofitting of structures and demolition methods.

**TEXT BOOKS:**

1. Shetty.M.S.ConcreteTechnology-Theory and Practice,S.Chandand Company, 2008.
2. Vidivelli.B Rehabilitation of Concrete Structures Standard Publishes Distribution.1<sup>st</sup> edition 2009.
3. Varghese.P.C Maintenance Repair and Rehabilitation & Minor works of building, Prentice Hall India Pvt Ltd 2014.
4. Dodge Woodson.R Concrete Structures, Protection, Repair and Rehabilitation, Butterworth- Heinemann,Elsevier,New Delhi 2012

**REFERENCES:**

1. DovKominetzky.M.S.,-Design and Construction Failures, Galgotia, Publications Pvt.Ltd.,2001
2. Ravishankar.K. Krishnamoorthy.T.S, Structural Health Monitoring, Repair And Rehabilitation of Concrete Structures, Allied Publishers, 2004.
3. Hand book onSeismic Retrofit of Buildings,CPWD and Indian Buildings Congress, Narosa Publishers, 2008.
4. 4.Hand Book on "Repair and Rehabilitation of RCC Buildings"-Director General works CPWD ,Govt of India , New Delhi-2002

**CE8021 STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING**

**L T P C  
3 0 0 3**

**OBJECTIVE:**

- To understand the behaviour of dynamic loading. Study the effect of earthquake loading on the behaviour of structures. Understand the codal provisions to design the structures as earthquake resistant.

**UNIT I SINGLE DEGREE OF FREEDOM SYSTEM**

**9**

Definition of degree of freedom – Idealization of structure as Single Degree of Freedom (SDOF) system – Formulation of equation of motion for various SDOF system – D' Alemberts Principles – Effect of damping – Free and forced vibration of damped and undamped structures – Response to harmonic forces and periodic forces.

**UNIT II MULTI DEGREE OF FREEDOM SYSTEM**

**9**

Formulation of equation of motion for multidegree of freedom (MDOF) system – Evaluation of natural frequencies and modes – Eigen values and Eigen vectors – Response to free and forced vibration of undamped and damped MDOF systems – Modal superposition methods.

## REFERENCES :

1. R.Subramanian, Surveying and Levelling, Oxford University Press, Second Edition, 2012.
2. Laurila, S.H. Electronic Surveying in Practice, John Wiley and Sons Inc, 1993.
3. Guocheng Xu, GPS Theory, Algorithms and Applications, Springer - Verlag, Berlin, 2003.
4. Alfred Leick, GPS satellite surveying, John Wiley & Sons Inc., 3<sup>rd</sup> Edition, 2004.
5. Seeber G, Satellite Geodesy, Walter De Gruyter, Berlin, 1998

GE8071

## DISASTER MANAGEMENT

LT P C  
3 0 0 3

### OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

### UNIT I INTRODUCTION TO DISASTERS 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

### UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

### UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

### UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

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**UNIT V            DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS** **9**

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

**TEXTBOOKS:**

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

**REFERENCES:**

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

**GE8074**

**HUMAN RIGHTS**

**L T P C**  
**3 0 0 3**

**OBJECTIVE:**

- To sensitize the Engineering students to various aspects of Human Rights.

**UNIT I**

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights. **9**

**UNIT II**

Evolution of the concept of Human Rights Magna carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights. **9**

**UNIT III**

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance. **9**

**UNIT IV**

Human Rights in India – Constitutional Provisions / Guarantees. **9**



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**REFERENCES:**

1. Chris Hendrickson and Tung Au, "Project Management for Construction – Fundamentals Concepts for Owners", Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.
2. Moder.J., Phillips. C. and Davis E, "Project Management with CPM", PERT and Precedence Diagramming, Van Nostrand Reinhold Co., 3<sup>rd</sup> Edition, 1985.
3. Willis., E.M., "Scheduling Construction projects", John Wiley and Sons, 1986.
4. Halpin,D.W., "Financial and Cost Concepts for Construction Management", John Wiley and Sons, New York, 1985.

**EN8591**

**MUNICIPAL SOLID WASTE MANAGEMENT**

**L T P C  
3 0 0 3**

**OBJECTIVE:**

- To make the students conversant with the types, sources, generation, storage, collection, transport, processing and disposal of municipal solid waste.

**UNIT I SOURCES AND CHARACTERISTICS 9**  
Sources and types of municipal solid wastes- Public health and environmental impacts of improper disposal of solid wastes- sampling and characterization of wastes - factors affecting waste generation rate and characteristics - Elements of integrated solid waste management – Requirements and salient features of Solid waste management rules (2016) — Role of public and NGO"s- Public Private participation – Elements of Municipal Solid Waste Management Plan.

**UNIT II SOURCE REDUCTION , WASTE STORAGE AND RECYCLING 8**  
Waste Management Hierarchy - **Reduction, Reuse and Recycling** - source reduction of waste – On-site storage methods – Effect of storage, materials used for containers – segregation of solid wastes – **Public health and economic aspects of open storage** – case studies under Indian conditions – Recycling of Plastics and Construction/Demolition wastes.

**UNIT III COLLECTION AND TRANSFER OF WASTES 8**  
Methods of Residential and commercial waste collection – Collection vehicles – Manpower – Collection routes – Analysis of waste collection systems; Transfer stations –location, operation and maintenance; options under Indian conditions – Field problems- solving.

**UNIT IV PROCESSING OF WASTES 12**  
Objectives of waste processing – Physical Processing techniques and Equipment; Resource recovery from solid waste composting and biomethanation; Thermal processing options – case studies under Indian conditions.

**UNIT V WASTE DISPOSAL 8**  
Land disposal of solid waste- Sanitary landfills – site selection, design and operation of sanitary landfills – Landfill liners – Management of leachate and landfill gas- Landfill bioreactor – Dumpsite Rehabilitation

**TOTAL: 45 PERIODS**

**OUTCOMES:**

The students completing the course will demonstrate

- understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.
- Reduction, reuse and recycling of waste.

103

  
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- ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.
- knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.
- Design and operation of sanitary landfill.

**TEXTBOOKS:**

1. William A. Worrell, P. Aarne Vesilind (2012) Solid Waste Engineering, Cengage Learning, 2012.
2. John Pitchel (2014), Waste Management Practices-Municipal, Hazardous and industrial – CRC Press, Taylor and Francis, New York.

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1. CPHEEO (2014), "Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organisation, Government of India, New Delhi.
2. George Tchobanoglous and Frank Kreith (2002). Handbook of Solid waste management, McGraw Hill, New York.

**GE8077**

**TOTAL QUALITY MANAGEMENT**

**LT PC  
3 0 0 3**

**OBJECTIVE:**

- To facilitate the understanding of Quality Management principles and process.

**UNIT I INTRODUCTION**

**9**

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

**UNIT II TQM PRINCIPLES**

**9**

Leadership - Quality Statements, Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

**UNIT III TQM TOOLS AND TECHNIQUES I**

**9**

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

**UNIT IV TQM TOOLS AND TECHNIQUES II**

**9**

Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

**UNIT V QUALITY MANAGEMENT SYSTEM**

**9**

Introduction—Benefits of ISO Registration—ISO 9000 Series of Standards—Sector-Specific Standards—AS 9100, TS16949 and TL 9000-- ISO 9001 Requirements—Implementation—Documentation—Internal Audits—Registration--**ENVIRONMENTAL MANAGEMENT SYSTEM:** Introduction—ISO 14000 Series Standards—Concepts of ISO 14001—Requirements of ISO 14001—Benefits of EMS.

**TOTAL: 45 PERIODS**

104



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**UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS 9**  
Introduction - Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation.  
Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal Amplifier.

**UNIT IV DIGITAL ELECTRONICS 9**  
Binary Number System – Boolean Algebra theorems– Digital circuits - Introduction to sequential Circuits– Flip-Flops – Registers and Counters – A/D and D/A Conversion – digital processing architecture.

**UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 9**  
Introduction – Elements of Communication Systems– Modulation and Demodulation: Principles of Amplitude and Frequency Modulations. Digital Communication - Communication Systems: Radio, Antenna, TV, Fax, ISDN, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).  
**TOTAL: 45 PERIODS**

**OUTCOMES:**

- ability to identify the electrical components and explain the characteristics of electrical machines.
- ability to identify electronics components and understand the characteristics

**TEXT BOOKS:**

1. D P Kothari and I.J Nagarath, "Electrical Machines "Basic Electrical and Electronics Engineering", McGraw Hill Education(India) Private Limited, Third Reprint ,2016
2. S.K.Bhattacharya "Basic Electrical and Electronics Engineering", Pearson India, 2011
3. Sedha R.S., "Applied Electronics", S. Chand & Co., 2006

**REFERENCES:**

1. A.E. Fitzgerald, David E Higginbotham and Arvin Grabel, "Basic Electrical Engineering", McGraw Hill Education(India) Private Limited, 2009
2. Del Toro, "Electrical Engineering Fundamentals", Pearson Education, New Delhi, 2007
3. Leonard S Bobrow, " Foundations of Electrical Engineering", Oxford University Press, 2013
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
5. Mehta V/K, "Principles of Electronics", S.Chand & Company Ltd, 1994.
6. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press 2005.

**GE8291**

**ENVIRONMENTAL SCIENCE AND ENGINEERING**

**L T P C**  
**3 0 0 3**

**OBJECTIVES:**

- To study the nature and facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth"s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.



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29  
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## **UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY**

14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

## **UNIT II ENVIRONMENTAL POLLUTION**

8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

## **UNIT III NATURAL RESOURCES**

10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over- utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

## **UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT**

7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

## **UNIT V HUMAN POPULATION AND THE ENVIRONMENT**

6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

**TOTAL: 45 PERIODS**

  
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30  
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## OUTCOMES:

- Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions
- Development and improvement in std. of living has lead to serious environmental disasters

## TEXTBOOKS:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2<sup>nd</sup> edition, Pearson Education, 2004.

## REFERENCES :

1. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India Pvt Ltd, New Delhi, 2007.
2. Erach Bharucha, "Textbook of Environmental Studies", Universities Press(I) Pvt, Ltd, Hydrabad, 2015.
3. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD, Delhi, 2014.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

GE8292

ENGINEERING MECHANICS

L T P C  
3 2 0 4

## OBJECTIVES:

- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.

### UNIT I STATICS OF PARTICLES

9+6

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces – Vectorial representation of forces – Vector operations of forces - additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility .

### UNIT II EQUILIBRIUM OF RIGID BODIES

9+6

Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

### UNIT III PROPERTIES OF SURFACES AND SOLIDS

9+6

Centroids and centre of mass – Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus - Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem – Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia –mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

31

  
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