VEL TECH MULTI TECH DR.RANGARAJAN DR.SAKUNTHALA ENGINEERING COLLEGE

DEPARTMENT OF INFORMATION TECHNOLOGY

Courses on Human Values					
S.NO	**SUBJECT CODE**	**SEMESTER**	**TYPE OF COURSE**	**CREDIT**	**COURSE TITLE**
1	191HS201	II	HSS	3	Environmental Science and Engineering
2	191HS301	III	HSS	2	Management Science
3	191CE542	V	OE	3	Air Pollution and Control Engineering
4	191BM545	V	OE	3	Principles Of Telemedicine
5	191CE5411	V	OE	3	Traffic Engineering and Management
6	191ME543	VI	OE	3	Energy Conservation and Management
7	191ME546	VII	OE	3	Renewable Energy Sources
8	191CE548	VIII	OE	3	Municipal Solid Waste Management
9	191HS801	VIII	PE	3	Professional Ethics in Engineering

YEAR	I	SEMESTER	II	L	T	P	C
COURSE CODE / COURSE TITLE	191HS201 / ENVIRONMENTAL SCIENCE AND ENGINEERING			3	0	0	3

COURSE OBJECTIVES

- This course provides the basic knowledge of structure and function of ecosystem and better understanding of natural resources, biodiversity and their conservation practices.
- It describes the need to lead more sustainable lifestyles, to use resources more equitably.
- It helps to create a concern for our environment that will trigger pro-environmental action, including activities we can do in our daily life to protect it.
- Furthermore, it deals the social issues and ethics to develop quality engineer in our country.

SYLLABUS

UNIT-I	ENVIRONMENT – AN OVERVIEW	9

Ecosystem - concept, structure, function, types, Energy flow in ecosystem, Biodiversity and its conservation, values of biodiversity, threats to biodiversity conservation of biodiversity, Natural resources - types, uses.

UNIT-II	ENVIRONMENTAL IMPACT OF ENERGY SOURCES	9

Sources of primary energy, present and future consumption of energy, environmental impacts of energy development- oil, natural gas, coal, hydro electric, nuclear power, wind mill and solar panels, Urban problems related to energy, case studies

UNIT-III	CLIMATIC CHANGE AND SOLID WASTE MANAGEMENT	9

Environmental pollution- air, water, soil, marine and noise pollution- green house gases- causes, effects- global warming, ozone layer depletion, acid rain-sources and effects. Pollution control strategies, preventive measures, green technologies, green building concepts, standards and regulations, role of individuals, Sustainable development, Hazardous wastes, e-waste, source effect, management, Nuclear waste-sources, effects, management, Recycling of waste, Future challenges.

UNIT-IV	HUMAN POPULATION AND THE ENVIRONMENT	9

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.

UNIT-V	ENVIRONMENTAL LAW AND ETHICS	9

Legal provision in India, environmental acts - air, water, forest, soil and wildlife. Environmental ethics, theories and codes, resource consumption patterns, equity-disparity, urban-rural equity issues, need for gender equity, preserving resource for future generation, right of animals, ethical basis of environment education and awareness, ethical problem solving- changing attitude, conservation ethics and traditional value systems of India, Effect of social media on the adolescent.

COURSE OUTCOMES

On completion of the course, students will be able to

CO 1	Interpret the concept of ecosystem, biodiversity and its conservation.
CO 2	Demonstrate the environmental impacts of energy development.
CO3	Categorize the various environmental pollutions and select suitable preventive measures.
CO4	Perceive the environmental effects of human population and the implementation of welfareprograms.
CO 5	Recall the environmental ethics and legal provisions.

TEXT BOOKS

1. Erach Bharucha, "Text book for Environmental sciences for Undergraduate courses", UGC, 2004.
2. Kaushik, A &Kaushik, CP, Environmental Science and engineering", 3rd Edition, New Age International (P) Limited, New Delhi, 2009.
3. Henry, JG &Heinke, GW, "Environmental Science and Engineering", 2nd Edition, PHI Learning Private limited, New Delhi, 2011.

REFERENCES

1. Masters, GM &Ela, WP, "Introduction to Environmental Engineering and Science", 3rd Edition, PHI Learning Private limited, New Delhi, 2009.
2. Encyclopedia of environmental ethics and philosophy. Available at www.gmu.ac.ir/download/booklibrary/e-library/Encyclopaedia of Environmental Ethics and philosophy.pdf.

YEAR	II	SEMESTER	III	L	T	P	C
COURSE CODE / COURSE TITLE	191HS301 / MANAGEMENT SCIENCE			2	0	0	2

COURSE OBJECTIVES

- It makes the students aware of what is management
- Students learn how to overcome unexpected problems themselves
- It makes them active listeners by which they can be effective speakers
- Students become expertise in their written communication particularly
- It improves the academic standards and the employability skills

SYLLABUS

UNIT-I	MANAGERIAL SKILLS	9

Management introduction - Time Management - Stress Management- employability and career Skills-grooming as a professional with values - General awareness of Current Affairs.

UNIT-II	LISTENING SKILLS	9

Importance of listening -Active listening -Asking questions - Responding to the questions - Listen to the Audio - visual components -Listening Comprehension

UNIT-III	SPEAKING SK1LLS	9

General Conversation - Question and Answer sessions - Role play activities - Telephone skills- Public Speaking

UNIT-IV	WRTTIGN SK1LLS	9

Effective writing - Letter writing - E-mail writing - Paragraph writing - Report writing

UNIT-V	PRESENTATION SKCLLS	9

Introduction to Presenta1ion - Building up confidence -Effective Presentation - Body Language - Poster presentations - seminars relevant to Management

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Overcome the stress in their respective field
CO2	Be an active listener so as to respond accurately and effectively
CO3	Raise and respond to the queries without any hesitation
CO4	Write effectively and to draft letters, E-mails impressively.
CO5	Deliver presentations confidently

TEXT BOOKS

1. The Quick & Easy Way to Effective Speaking by Dale Carnegie
2. The art of Public Speaking by Alex Mair
3. Art of Public Speaking by Utpal K Banerjee
4. Preparation Skills for the Upwardly Mobile by Roz Townsend

REFERENCES

1. Anderson, Williams,An introduction to management science 1976(Unit I)
2. Michael H.Hope, Active listening Improve your ability to listen and read 2002(Unit II)
3. David w.dugas,Ronald Des rosaiers,Speaking by speaking, 2004 (Unit III)
4. Judith F.olson, Writing skills Success in 20 Minutes a Day (Unit IV)
5. https://wiki.ubc.ca/presentation_skills(Unit V)

YEAR	III	SEMESTER	V	L	T	P	C
COURSE CODE / COURSE TITLE	191CE542/ AIR POLLUTION AND CONTROL ENGINEERING			3	0	0	3

COURSE OBJECTIVES

- To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseous air pollutant and its emerging trends.

SYLLABUS

UNIT-I	INTRODUCTION	7

Structure and composition of Atmosphere – Definition, Scope and Scales of Air Pollution – Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility- Ambient Air Quality and Emission standards –Ambient and stack sampling and Analysis of Particulate and Gaseous Pollutants.

UNIT-II	METEOROLOGY	6

Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Wind profiles and stack plume patterns- Atmospheric Diffusion Theories – Dispersion models, Plume rise.

UNIT-III	CONTROL OF PARTICULATE CONTAMINANTS	11

Factors affecting Selection of Control Equipment – Gas Particle Interaction – Working principle, Design and performance equations of Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, Electrostatic Precipitators – Operational Considerations.

UNIT-IV	CONTROL OF GASEOUS CONTAMINANTS	11

Factors affecting Selection of Control Equipment – Working principle, Design and performance equations of absorption, Adsorption, condensation, Incineration, Bio scrubbers, Bio filters – Process control and Monitoring – Operational Considerations.

UNIT-V	INDOOR AIR QUALITY MANAGEMENT	10

Sources, types and control of indoor air pollutants, sick building syndrome and Building related illness- Sources and Effects of Noise Pollution – Measurement – Standards –Control and Preventive measures.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
CO2	Ability to identify, formulate and solve air and noise pollution problems
CO3	Ability to design stacks and particulate air pollution control devices to meet applicable standards
CO4	Ability to select control equipment.
CO5	Ability to ensure quality, control and preventive measures.

TEXT BOOKS

1. Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, "Air Pollution Control Engineering", Tokyo, Springer Science + Science Media LLC, 2004.
2. Noel de Nevers, "Air Pollution Control Engineering", Waveland press, Inc 2017.
3.Anjaneyulu. Y, "Air Pollution and Control Technologies", Allied Publishers (P) Ltd., India 2002.

REFERENCES

1. David H.F. Liu, Bela G. Liptak, "Air Pollution", Lweis Publishers, 2000.
2. Arthur C. Stern, "Air Pollution (Vol.I – Vol.VIII)", Academic Press, 2006.
3. Wayne T.Davis, "Air Pollution Engineering Manual", John Wiley & Sons, Inc, 2000.
4. M.N Rao and HVN Rao, "Air Pollution",Tata Mcgraw Hill Publishing Company limited,2007.
5. C.S.Rao, "Environmental Pollution Control Engineering", New Age International (P) Limited Publishers, 2006.

YEAR	III	SEMESTER	V	L	T	P	C
COURSE CODE / COURSE TITLE	191BM545/ PRINCIPLES OF TELEMEDICINE			3	0	0	3

COURSE OBJECTIVES
• Know Scope, Benefits and Limitations of Telemedicine. • Know Security and Standards and their use in Telemedicine Applications

SYLLABUS		
UNIT-I	HISTORY AND FUNDAMENTALS OF TELEMEDICINE	9
History and Evolution of telemedicine, definition of telemedicine, Functional diagram of telemedicine system, Telemedicine, Tele health, Tele care, benefits & limitations of telemedicine, Introduction of Ethical and legal aspects of Telemedicine - Confidentiality, Social and legal issues, Safety and regulatory issues.		
UNIT-II	TYPES OF COMMUNICATION	9
Types of Communication and Network: PSTN, POTS, ATN, ISDN, Internet, Wireless Communications: GSM, satellite and Micro Wave. Types of information: Audio, Video, still Images, text and data, Fax.		
UNIT-III	DATA EXCHANGES	9
Network Configuration, Circuit and packet switching, H.320 series (Video phone based ISBN) T.120, h.324 (Video phone based PSTN), Video Conferencing.		
UNIT-IV	DATA SECURITY AND STANDARD	9
Encryption, Cryptography, Mechanisms of encryption, Phases of Encryption. Photocols: TCP/IP, ISO-OSI, Standards to followed DICOM, HL7. Ethical and legal aspects of Telemedicine: Confidentiality and Law, patient rights and consent, access to medical Records, Consent treatment.		
UNIT-V	APPLICATIONS OF TELEMEDICINE	9
Teleradiology, telepathology, telecardiology, teleoncology, teledermatology, telesurgery, e- Health care, Telemedicine in neurosciences.		

COURSE OUTCOMES	
On completion of the course, students will be able to	
CO1	Apply ethical and legal aspects of Telemedicine in Telehealth and Telecare.
CO2	Identify the fundamentals of the many forms of telemedicine communication
CO3	Choose the various multimedia conferencing standards for data exchanges
CO4	Make use of data security standards and protocols behind encryption techniques for secure transmission of data in telemedicine
CO5	Apply telemedicine's multimedia technology in the medical field

TEXTBOOKS

1.A.C.Norris, Essentials of Telemedicine and Telecare, John Wiley & Sons, 2002.

REFERENCES

1. Olga Ferrer-Roca, M.SosaLudicissa, Handbook of Telemedicine, IOS press 2002.

YEAR	III	SEMESTER	VI	L	T	P	C
COURSE CODE / COURSE TITLE	191CE5411/ TRAFFIC ENGINEERING AND MANAGEMENT			3	0	0	3

COURSE OBJECTIVES

- To give an overview of Traffic engineering, traffic regulation, management and traffic safety with integrated approach in traffic planning as well.

SYLLABUS

UNIT-I	TRAFFIC PLANNING AND CHARACTERISTICS	9

Road Characteristics – Road user characteristics – PIEV theory – Vehicle – Performance characteristics – Fundamentals of Traffic Flow – Urban Traffic problems in India – Integrated planning of town ,country ,regional and all urban infrastructure – Towards Sustainable approach. – land use & transport and modal integration.

UNIT-II	TRAFFIC SURVEYS	12

Traffic Surveys – Speed, journey time and delay surveys – Vehicles Volume Survey including non- motorized transports – Methods and interpretation – Origin Destination Survey – Methods and presentation – Parking Survey – Accident analyses -Methods, interpretation and presentation – Statistical applications in traffic studies and traffic forecasting – Level of service – Concept, applications and significance.

UNIT-III	TRAFFIC DESIGN AND VISUAL AIDS	8

Intersection Design - channelization, Rotary intersection design – Signal design – Coordination of signals — Grade separation - Traffic signs including VMS and road markings – Significant roles of traffic control personnel - Networking pedestrian facilities & cycle tracks.

UNIT-IV	TRAFFIC SAFETY AND ENVIRONMENT	8

Road accidents – Causes, effect, prevention, and cost – Street lighting – Traffic and environment hazards – Air and Noise Pollution, causes, abatement measures – Promotion and integration of public transportation – Promotion of non-motorized transport.

UNIT-V	TRAFFIC MANAGEMENT	8

Area Traffic Management System - Traffic System Management (TSM) with IRC standards –Traffic Regulatory Measures-Travel Demand Management (TDM) – Direct and indirect methods– Congestion and parking pricing – All segregation methods- Coordination among different agencies – Intelligent Transport System for traffic management, enforcement and education.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Analysis traffic problems and plan for traffic systems various uses.
CO2	Design Channels, Intersections, signals and parking arrangements.
CO3	Design visual Aids for traffic.
CO4	Understand Traffic safety and Environment.
CO5	Develop Traffic management Systems.

TEXT BOOKS

1. Kadiyali, L.R, "Traffic Engineering and Transport Planning", KhannaPublishers, Delhi, 2013
2. Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management.
3. Salter. R.I and Hounsell N.B, "Highway Traffic Analysis and design", Macmillan Press Ltd.1996.

REFERENCES

1. Fred L. Mannering, Scott S. Washburn and Walter P.Kilareski, “Principles of Highway Engineering and Traffic Analysis”, Wiley India Pvt. Ltd., New Delhi, 2011
2. Garber and Hoel, "Principles of Traffic and Highway Engineering", CENGAGE Learning, New Delhi, 2010
3. SP:43-1994, IRC Specification, "Guidelines on Low-cost Traffic Management Techniques" for Urban Areas, 1994
4. John E Tyworth, "Traffic Management Planning, Operations and control", Addison Wesly Publishing Company, 1996
5. Hobbs.F.D. "Traffic Planning and Engineering", University of Brimingham, Peragamon Press Ltd, 2005
6. Taylor MAP and Young W, "Traffic Analysis – New Technology and New Solutions", Hargreen Publishing Company, 1998.

YEAR	III	SEMESTER	VI	L	T	P	C
COURSE CODE / COURSE TITLE	191ME543/ ENERGY CONSERVATION AND MANAGEMENT			3	0	0	3

COURSE OBJECTIVES

- To expose students to analysis the energy data of industries, carryout energy accounting and balancing, conduct energy audit and suggest methodologies for energy savings and utilize the available resources in optimal ways.

SYLLABUS

UNIT-I	INTRODUCTION	9

Energy - Power – Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization – Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing.

UNIT-II	ELECTRICAL SYSTEMS	9

Components of EB billing – HT and LT supply, Transformers, Cable Sizing, Concept of Capacitors, Power Factor Improvement, Harmonics, Electric Motors - Motor Efficiency Computation, Energy Efficient Motors, Illumination – Lux, Lumens, Types of lighting, Efficacy, LED Lighting and scope of Encon in Illumination.

UNIT-III	THERMAL SYSTEMS	9

Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and encon measures. Steam: Distribution &U sage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators& Refractories

UNIT-IV	ENERGY CONSERVATION IN MAJOR UTILITIES	9

Energy conservation inPumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets.

UNIT-V	ECONOMICS	9

Energy Economics – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing –ESCO concept .

COURSE OUTCOMES

1. Relate the analyze the energy data of industries and carry out energy accounting and balancing
2. Calculate the energy savings in electrical systems.
3. Calculate the energy savings in thermal systems
4. Carry out energy conservation procedures in major utilities
5. Suggest methodologies for energy savings

REFERENCES

1. Energy Manager Training Manual (4 Volumes) available at www.energymanager training.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004.
2. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management and Utilisation" Hemisphere Pub., Washington, 1988.
3. Callaghn, P.W. "Design and Management for Energy Conservation", Pergamon Press, Oxford, 1981.
4. Dryden. I.G.C., "The Efficient Use of Energy" Butterworths, London, 1982
5. Turner. W.C., "Energy Management Hand book", Wiley, New York, 1982.
6. Murphy. W.R. and G. Mc KAY, "Energy Management", Butterworths, London 1987

YEAR		SEMESTER		L	T	P	C
COURSE CODE / COURSE TITLE	191ME546/ RENEWABLE ENERGY SOURCES			3	0	0	3

COURSE OBJECTIVES

- To introduce the new methodologies technologies for effective utilization of renewable energy sources.

SYLLABUS

UNIT-I	INTRODUCTION	9

World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy Utilisation – Renewable Energy Scenario in Tamil Nadu, India and around the World – Potentials – Achievements Applications – Economics of renewable energy systems.

UNIT-II	SOLAR ENERGY	9

Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT-III	WIND ENERGY	9

Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance – Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects

UNIT-IV	BIO ENERGY	9

Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Application, Biomass Feedstocks, Biomass to Biofuel Supply Chain

UNIT-V	OTHER RENEWABLE ENERGY SOURCES	9

Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems, Greenhouse Gas and its effect on climate change

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Identify the ways for effective utilization of renewable energy sources.
CO2	Relate and analyze the various solar energy based renewable energy generation.
CO3	Relate and analyze the various wind energy based renewable energy generation
CO4	Relate and analyze the various Bio-energy based renewable energy generation
CO5	Identify the merits of new methodologies and technologies for renewable energy generation

REFERENCES

1. Rai. G.D., "Non Conventional Energy Sources", Khanna Publishers, New Delhi, 2011.
2. Twidell, J.W. & Weir, A., "Renewable Energy Sources", EFN Spon Ltd., UK, 2006.
3. Sukhatme. S.P., "Solar Energy", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.
4. Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 1996.
5. Tiwari. G.N., Solar Energy – "Fundamentals Design, Modelling & Applications", Narosa Publishing House, New Delhi, 2002.
6. Freris. L.L., "Wind Energy Conversion Systems", Prentice Hall, UK, 1990.
7. Johnson Gary, L. "Wind Energy Systems", Prentice Hall, New York, 1985
8. David M. Mousdale – "Introduction to Biofuels", CRC Press, Taylor & Francis Group, USA 2010
9. Chetan Singh Solanki, Solar Photovoltaics, "Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2009.

YEAR	IV	SEMESTER	VIII	L	T	P	C
COURSE CODE / COURSE TITLE	191CE548/ MUNICIPAL SOLID WASTE MANAGEMENT			3	0	0	3

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

SYLLABUS		
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		

COURSE OUTCOMES	
On completion of the course, students will be able to	
CO1	Understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.
CO2	Reduction, reuse and recycling of waste.
CO3	Ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.
CO4	Design and operation of sanitary landfill.
CO5	Knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.

TEXT BOOKS

1. William A. Worrell, P. Aarne Vesilind, "Solid Waste Engineering", Cengage Learning, 2012.

2. John Pitchel, "Waste Management Practices-Municipal, Hazardous and industrial" CRC Press,Taylor and Francis, New York, 2014.

REFERENCES

1. CPHEEO, "Manual on Municipal Solid Waste Management", Central Public Health and Environmental Engineering Organisation, Government of India, New Delhi, 2014.

2 George Tchobanoglous and Frank Kreith, Handbook of Solid waste management, McGraw Hill, New York, 2002

YEAR	IV	SEMESTER	VIII	L	T	P	C
COURSE CODE / COURSE TITLE	191HS801 / PROFESSIONAL ETHICS INENGINEERING			3	0	0	3

COURSE 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.

SYLLABUS

UNIT-I	HUMAN VALUES	9

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- Auditing Standards, Statements and Guidance Notes- An overview, Audit Planning, Strategy and Execution.

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	9

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 – Case Studies for role morality.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Apply ethics to the society with moral values and ethical theories
CO2	Discuss the ethical issues related to engineering
CO3	Realize the responsibilities and rights to engineering
CO4	Identify the assessment of safety and risk and respect for authority
CO5	Analyze the global issues in engineering

TEXT BOOKS

1. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, NewDelhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall ofIndia, 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, “Fundametals of Ethics for Scientists andEngineers”, 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 SService Centre, " Value Education", Vethathiri publications, Erode,2011

VEL TECH MULTI TECH Dr.RANGARAJAN Dr.SAKUNTHALA ENGINEERING COLLEGE

DEPARTMENT OF EEE

Courses on Human Values

S.No	Subject Code	Sem	Type of Course	Credit	Subject Name
1	191HS201	II	HSS	3	Environmental Science and Engineering
2	191HS601	VI	HSS	3	Industrial Management and Economics
3	191HS701	VII	HSS	3	Professional Ethics in Engineering
4	191HS531	V	PE	3	Principles of Management
5	191EE633	VI	PE	3	Human Rights and Duties: Conceptual Perspectives
6	191EE834	VIII	PE	3	Intellectual Property Rights

SEMESTER – II

YEAR	I	SEMESTER	II	L	T	P	C
COURSE CODE / COURSE TITLE	191HS201 / ENVIRONMENTAL SCIENCE AND ENGINEERING			3	0	0	3

COURSE OBJECTIVES

- ✓ This course provides the basic knowledge of structure and function of ecosystem and better understanding of natural resources, biodiversity and their conservation practices.
- ✓ It describes the need to lead more sustainable lifestyles, to use resources more equitably.
- ✓ It helps to create a concern for our environment that will trigger pro-environmental action, including activities we can do in our daily life to protect it.
- ✓ Furthermore, it deals the social issues and ethics to develop quality engineer in our country.

SYLLABUS

UNIT - I	ENVIRONMENT – AN OVERVIEW	9

Ecosystem - concept, structure, function, types, Energy flow in ecosystem, Biodiversity and its conservation, values of biodiversity, threats to biodiversity conservation of biodiversity, Natural resources - types, uses.

UNIT - II	ENVIRONMENTAL IMPACT OF ENERGY SOURCES	9

Sources of primary energy, present and future consumption of energy, environmental impacts of energy development- oil, natural gas, coal, hydro electric, nuclear power, wind mill and solar panels, Urban problems related to energy, case studies

UNIT - III	CLIMATIC CHANGE AND SOLID WASTE MANAGEMENT	9

Environmental pollution- air, water, soil, marine and noise pollution- green house gases- causes, effects- global warming, ozone layer depletion, acid rain-sources and effects. Pollution control strategies, preventive measures, green technologies, green building concepts, standards and regulations, role of individuals, Sustainable development, Hazardous wastes, e-waste, source effect, management, Nuclear waste-sources, effects, management, Recycling of waste, Future challenges.

UNIT - IV	HUMAN POPULATION AND THE ENVIRONMENT	9

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.

UNIT - V	ENVIRONMENTAL LAW AND ETHICS	9

Legal provision in India, environmental acts - air, water, forest, soil and wildlife. Environmental ethics, theories and codes, resource consumption patterns, equity-disparity, urban-rural equity issues, need for gender equity, preserving resource for future generation, right of animals, ethical basis of environment education and awareness, ethical problem solving- changing attitude, conservation ethics and traditional value systems of India, Effect of social media on the adolescent.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Interpret the concept of ecosystem, biodiversity and its conservation.
CO2	Demonstrate the environmental impacts of energy development.
CO3	Categorize the various environmental pollutions and select suitable preventive measures.
CO4	Perceive the environmental effects of human population and the implementation of welfare programs.
CO5	Recall the environmental ethics and legal provisions.

TEXT BOOKS

1. Henry, JG & Heinke, GW, "Environmental Science and Engineering", 2nd Edition, PHI Learning Private limited, New Delhi, 2011.
2. Kaushik, A & Kaushik, CP, Environmental Science and engineering", 3rd Edition, New Age International (P) Limited, New Delhi, 2009.
3. Erach Bharucha, "Text book for Environmental sciences for Undergraduate courses", UGC, 2004.

REFERENCES

1. Masters, GM & Ela, WP, "Introduction to Environmental Engineering and Science", 3rd Edition, PHI Learning Private limited, New Delhi, 2009.
2. Encyclopedia of environmental ethics and philosophy. Available at www.gmu.ac.ir/download/booklibrary/e-library/Encyclopaedia of Environmental Ethics and philosophy.pdf.

YEAR	III	SEMESTER	VI	L	T	P	C
COURSE CODE / COURSE TITLE	191HS601 / INDUSTRIAL MANAGEMENT AND ECONOMICS			3	0	0	3

COURSE OBJECTIVES

- ✓ To impart the knowledge on fundamental of Industrial Management and Economics.
- ✓ To understand about the theory and demand of supply.
- ✓ To analyze the Indian financial system.

SYLLABUS

UNIT - I	MODERN CONCEPT OF MANAGEMENT	9

Concept of Management - Functions of management-Planning-Organizing- Staffing-Directing- Motivating- Communicating- Coordinating- Controlling-Organizational structures- Line and staff functional relationships- Span of control- Delegation- Management by Objectives.

UNIT - II	PERSONNEL MANAGEMENT	9

Objectives and functions of Personnel Management- Recruitment and Selection- Training and Development -Labour Welfare- Industrial Disputes-Trade Unions- Quality circles. Formation of Companies: Proprietary – Partnership-Joint stock companies- Public Sector – Private Sector.

UNIT - III	MARKETING MANAGEMENT	9

Marketing Definition - Marketing Mix – Product – Price – Place – Promotion - Market research- Segmentation – Targeting – Positioning – Production Concept – Product Concept – Selling Vs Marketing – Advertisement and Sales Promotion.

UNIT - IV	THEORY OF DEMAND AND SUPPLY	9

Law of demand and supply- Pricing Mechanism- Factors of production- Land, Labour, capital and organization- National Income - Taxation- Direct and Indirect Taxes - Progressive and Regressive – Inflation-Causes and consequences – Supply Chain Management.

UNIT - V	INDIAN FINANCIAL SYSTEM	9

Reserve bank of India: Functions- Commercial banking system-Development financial institutions- Investment institutions- Insurance companies- Indian capital market- Stock market - Role of the public sector- Privatization- Multinational corporations and their impact on the Indian economy.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Understand modern concept of management
CO2	Analyse the Recruitment and Selection process
CO3	Suggest market research concepts
CO4	Summarize the Direct and indirect tax details
CO5	Learn Indian financial system

TEXT BOOKS

1. Agarwal.A.N, Agarwal.M.K," Indian economy ", New Age International Publishers, 2019
2. Khanna.O.P," Industrial Engineering and Management ", Dhanpat Rai Publications, 2018.

REFERENCES

1. Philip Kotler,Keven Lane Keller," Marketing Management",Pearson,2017.
2. Ahuja.K.K, "Industrial Management and Organizational Behaviour", Khanna Publishers, 1998.
3. Dewett.K.K," Modern economic theory",Shyam Lal charitable trust,1995.

YEAR	IV	SEMESTER	VII	L	T	P	C
COURSE CODE / COURSE TITLE	191HS701 / PROFESSIONAL ETHICS IN ENGINEERING			3	0	0	3

COURSE 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.

SYLLABUS

UNIT - I	HUMAN VALUES	9

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	9

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

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Create an awareness on Engineering Ethics and Human Values
CO2	Instill Moral , Social Values and Loyalty
CO3	Apply ethics in society
CO4	Appreciate the rights of others
CO5	Discuss the ethical issues related to engineering

TEXT BOOKS

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

REFERENCES

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

PROGRAM ELECTIVES – I

YEAR	III	SEMESTER	V	L	T	P	C
COURSE CODE / COURSE TITLE	191HS531/ PRINCIPLES OF MANAGEMENT			3	0	0	3

COURSE OBJECTIVES

- ✓ To impart the knowledge on the functions and principles of Management
- ✓ To understand the application of the principles in an organization
- ✓ To analyze Managerial functions like planning, organizing, staffing, leading & controlling and have some basic knowledge on international aspect of management

SYLLABUS

UNIT - I	INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS	9

Definition of Management – Science or Art - Evolution of Management – Scientific, human relations, system and contingency approaches – Types of managers - Managerial roles and skills – Henry Fayol's 14 Principles - Current trends and issues in Management.

UNIT - II	PLANNING	9

Nature and purpose of planning – Planning process – Types of planning – Objectives – Policies – Planning premises – Strategic Planning – Planning Tools and Techniques – Decision making steps and process.

UNIT - III	ORGANIZING	9

Nature and purpose – Formal and informal organization – Organizational chart – Organization structure – types – Line and staff authority – Departmentalization – Delegation of authority –Centralization and Decentralization – Job Design

UNIT - IV	DIRECTING	9

Individual and group behaviour – Motivation – Motivation theories – Motivational techniques – Job satisfaction – Job enrichment – Leadership – Types and theories of leadership –Communication – Process of communication – Barriers in communication – Communication and IT.

UNIT - V	CONTROLLING	9

Process of controlling – Budgetary and non-budgetary control techniques – Role of computers and IT in controlling process – Productivity management – Cost Control - Purchase Control – Maintenance Control - Quality Control - Planning operations – reporting.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Summarize the evolution of management thoughts and various challenges of managerial activities in a global.
CO2	Explain the types of Planning and Decision making at various levels management in the Organizations.
CO3	Discuss various types of Organization structure.
CO4	Explain the elements in Direction.
CO5	Generalize various Controlling techniques to maintain standards in Organizations.

TEXT BOOKS

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&MamataMohapatra **—** "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.

YEAR	III	SEMESTER	VI	L	T	P	C
COURSE CODE / COURSE TITLE	191EE633 / HUMAN RIGHTS AND DUTIES: CONCEPTUAL PERSPECTIVES			3	0	0	3

COURSE OBJECTIVES

- ✓ To sensitize the Engineering students to various aspects of Human Rights.
- ✓ To understand about the theories of Human Rights and UN Laws
- ✓ To familiarize about Human Rights in India.

SYLLABUS

UNIT - I	FOUNDATIONS OF HUMAN RIGHTS	9

Definition, scope and Concept of Human Rights – Classification of Rights – Natural, Moral and Legal Rights

UNIT - II	DEVELOPMENT OF HUMAN RIGHTS	9

Development of Human Rights and Origin of United Nations Organization, Development of Human rights in India – National Human Rights Commission, State Human Rights Commission, National Commission for SC/St, Women and Children

UNIT - III	HUMAN RIGHTS AND DUTIES UNDER INDIAN CONSTITUTION	9

Constitution of India – Preamble, Fundamental Duties ; Directive Principles of State Policy, Emergency Provisions in Indian Constitution

UNIT - IV	PERSPECTIVES OF RIGHTS AND DUTIES	9

Rights: Inherent-Inalienable-Universal- Individual and Groups, Nature and concept of Duties, Interrelationship of Rights and Duties

UNIT - V	HUMAN RIGHTS OF DISADVANTAGED PEOPLE	9

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.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	An understanding of the principles and institutions of international human rights law, including their origins, assumptions, contents, limits and potential.
CO2	It will help students to understand the importance of the fundamental principle, its concept, Concern and Source of international obligations for Human Rights. As well as Capacity to exercise rights and comply with obligations under International law with international norms and standards for human rights and Duties.
CO3	An improved ability to think analytically about the implementation and development of international human rights law and to apply this body of law in your own professional and national setting.
CO4	Student(s) able to work in conjunction with human rights specialists and other scholars in expanding knowledge about human rights as well as promoting respect for the values they embody and symbolise.
CO5	An improved ability to conduct research on international human rights law and Duties.

TEXT BOOKS

1. Chandra U., "Human Rights", Allahabad Law Agency, Allahabad, 2014
2. Anuradha Kumar, Encyclopedia of Human Rights Development of under Privilege, New Delhi: Sarup, 2002
3. P.L. Mehata, NeenaVerma - Human Rights Under The Indian Constitution

REFERENCES

1. James Griffin," On Human Rights", OUP UK Publishers, 2009
2. Kaushuk Vijay, Women Movement and Human Rights Jaipur Pomta Publications – 1999

YEAR	IV	SEMESTER	VIII	L	T	P	C
COURSE CODE / COURSE TITLE	191EE834 / INTELLECTUAL PROPERTY RIGHTS			3	0	0	3

COURSE OBJECTIVES

- ✓ To give an idea about Intellectual Property Rights
- ✓ To impart the knowledge on registration of IPRs and its enforcement
- ✓ To understand about the Digital products and law

SYLLABUS

UNIT - I	INTRODUCTION	9

Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR

UNIT - II	REGISTRATION OF IPRs	9

Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

UNIT - III	AGREEMENTS AND LEGISLATIONS	9

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act

UNIT - IV	DIGITAL PRODUCTS AND LAW	9

Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection – Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws – Case Studies.

UNIT - V	ENFORCEMENT OF IPRs	9

Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1	Understand the basics of Intellectual Property Rights
CO2	Demonstrate the registration of IPRs in India and Abroad
CO3	Discuss the agreements and legislations of IPR
CO4	Summarize the various IP laws
CO5	Suggest enforcement measures of IPRs

TEXT BOOKS

1. V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012
2. S. V. Satakar, "Intellectual Property Rights and Copy Rights, Ess Publications, New Delhi,2002

REFERENCES

1. Derek Bosworth and Elizabeth Webster, "The Management of Intellectual Property", Edward Elgar Publishing Ltd., 2013.
2. Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets", Cengage Learning, Third Edition, 2012.
3. Prabuddha Ganguli," Intellectual Property Rights: Unleashing the Knowledge Economy", McGraw Hill Education, 2011

VEL TECH MULTI TECH DR.RANGARAJAN DR.SAKUNTHALA ENGINEERING COLLEGE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

AUTONOMOUS - R2019

Courses on Human Values					
SNo	Sub Code	Sem	Type of Course	Credit	Course Title
1	191HS201	II	HSS	3	Environmental Science and Engineering
2	191HS30A	III	HSS	1	Advanced Reading and Writing Laboratory
3	191HS50A	V	HSS	1	Professional Communication
4	191CS535	V	PE	3	Intellectual Property Rights
5	191ME546	V	OE	3	Renewable Energy Sources
6	191CE545	VI	OE	3	Disaster Management
7	191CS735	VII	PE	3	Principles of Management
8	191HS801	VIII	PE	3	Professional Ethics in Engineering

YEAR	I	SEMESTER	II	L	T	P	C
COURSE CODE / COURSE TITLE	191HS201 / ENVIRONMENTAL SCIENCE AND ENGINEERING			3	0	0	3

COURSE OBJECTIVES

- ✓ This course provides the basic knowledge of structure and function of ecosystem and better understanding of natural resources, biodiversity and their conservation practices.
- ✓ It describes the need to lead more sustainable lifestyles, to use resources more equitably.
- ✓ It helps to create a concern for our environment that will trigger pro-environmental action, including activities we can do in our daily life to protect it.
- ✓ Furthermore, it deals the social issues and ethics to develop quality engineer in our country.

SYLLABUS

UNIT-I	ENVIRONMENT – AN OVERVIEW	9

Ecosystem - concept, structure, function, types, Energy flow in ecosystem, Biodiversity and its conservation, values of biodiversity, threats to biodiversity conservation of biodiversity, Natural resources - types, uses.

UNIT-II	ENVIRONMENTAL IMPACT OF ENERGY SOURCES	9

Sources of primary energy, present and future consumption of energy, environmental impacts of energy development- oil, natural gas, coal, hydro electric, nuclear power, wind mill and solar panels, Urban problems related to energy, case studies

UNIT-III	CLIMATIC CHANGE AND SOLID WASTE MANAGEMENT	9

Environmental pollution- air, water, soil, marine and noise pollution- green house gases- causes, effects- global warming, ozone layer depletion, acid rain-sources and effects. Pollution control strategies, preventive measures, green technologies, green building concepts, standards and regulations, role of individuals, Sustainable development, Hazardous wastes, e-waste, source effect, management, Nuclear waste-sources, effects, management, Recycling of waste, Future challenges.

UNIT-IV	HUMAN POPULATION AND THE ENVIRONMENT	9

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.

UNIT-V	ENVIRONMENTAL LAW AND ETHICS	9

Legal provision in India, environmental acts - air, water, forest, soil and wildlife. Environmental ethics, theories and codes, resource consumption patterns, equity-disparity, urban-rural equity issues, need for gender equity, preserving resource for future generation, right of animals, ethical basis of environment education and awareness, ethical problem solving- changing attitude, conservation ethics and traditional value systems of India, Effect of

social media on the adolescent.	
COURSE OUTCOMES On completion of the course, students will be able to	
CO1	Interpret the concept of ecosystem, biodiversity and its conservation.
CO2	Demonstrate the environmental impacts of energy development.
CO3	Categorize the various environmental pollutions and select suitable preventive measures.
CO4	Perceive the environmental effects of human population and the implementation of welfare programs.
CO5	Recall the environmental ethics and legal provisions.

TEXT BOOKS

1. ErachBharucha, "Text book for Environmental sciences for Undergraduate courses", UGC, 2004.
2. Kaushik, A &Kaushik, CP, Environmental Science and engineering", 3rd Edition, New Age International (P) Limited, New Delhi, 2009.
3. Henry, JG &Heinke, GW, "Environmental Science and Engineering", 2nd Edition, PHI Learning Private limited, New Delhi, 2011.

REFERENCES

1. Masters, GM &Ela, WP, "Introduction to Environmental Engineering and Science", 3rd Edition, PHI Learning Private limited, New Delhi, 2009.
2. Encyclopedia of environmental ethics and philosophy. Available at www.gmu.ac.ir/download/booklibrary/e-library/Encyclopaedia of Environmental Ethics and philosophy.pdf.

CO-PO&PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	2	-	2	3	3	-	-	-	2	1	-	-
CO 2	3	3	2	2	-	2	3	-	-	-	-	2	1	-	-
CO 3	3	3	2	2	-	2	3	-	-	-	-	2	1	-	-
CO 4	3	3	2	2	-	2	3	-	-	-	-	2	1	-	-
CO 5	3	3	2	2	-	2	3	3	-	-	-	2	1	-	-
CO	3	3	2	2	-	2	3	3	-	-	-	2	1	-	-

YEAR	II	SEMESTER	III	L	T	P	C
COURSE CODE / COURSE TITLE	191HS30A / ADVANCED READING AND WRITING SKILL LABORATORY			0	0	2	1

COURSE OBJECTIVES
✓ Develop their communicative competence in English with specific reference to ✓ speaking and listening ✓ Enhance their ability to communicate effectively in interviews. ✓ Strengthen their prospects of success in competitive examinations.

SYLLABUS		
UNIT-I		**9**
Reading – Strategies for effective reading-Use glosses and footnotes to aid reading comprehension- Read and recognize different text types-Predicting content using photos and title **Writing**-Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence –Write a descriptive paragraph		
UNIT-II		**9**
Reading-Read for details-Use of graphic organizers to review and aid comprehension Writing-State reasons and examples to support ideas in **writing**– Write a paragraph with reasons and examples- Write an opinion paragraph		
UNIT-III		**9**
Reading– Understanding pronoun reference and use of connectors in a passage- speed reading techniques-**Writing**– Elements of good essay-Types of essays- descriptive-narrative- issue-based-argumentative-analytical.		
UNIT-IV		**9**
Reading– Genre and Organization of Ideas- **Writing**– Email writing- visumes – Job application- project writing-writing convincing proposals.		
UNIT-V		**12**
Reading– Critical reading and thinking- understanding how the text positions the reader- identify **Writing**– Statement of Purpose- letter of recommendation- Vision statement		

COURSE OUTCOMES On completion of the course, students will be able to	
CO1	Demonstrate understanding of elements of writing such as brainstorming for generating topic sentence, central ideas, supporting ideas, organization patterns, editing and drafting different types of paragraphs and essays.
CO2	Understand the strategies of skimming and scanning to read a text analytically and critically respond to it.
CO3	Apply critical thinking skills and infer a text logically in relation to various professional concerns.

TEXT BOOKS

1. Gramer F. Margot and Colin S. Ward Reading and Writing (Level 3) Oxford University Press: Oxford, 2011.
2. Debra Daise, CharlNorloff, and Paul Carne Reading and Writing (Level 4) Oxford University Press: Oxford, 2011.

REFERENCES

1. Davis, Jason and Rhonda LIss. Effective Academic Writing (Level 3) Oxford University Press: Oxford, 2006.
2. E. Suresh Kumar and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Black swan: Hyderabad, 2012.
3. Withrow, Jeans and et al. Inspired to Write. Readings and Tasks to develop writing skills. Cambridge University Press: Cambridge, 2004.
4. Goatly, Andrew. Critical Reading and Writing. Routledge: United States of America, 2000.
5. Petelin, Roslyn and Marsh Durham. The Professional Writing Guide: Knowing Well and Knowing Why. Business & Professional Publishing: Australia, 2004.

CO-PO & PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	1	2	1	-	3	2	2
CO2	3	3	3	3	-	-	-	-	2	1	1	1	3	2	2
CO3	3	3	3	3	3	2	2	1	1	1	1	1	3	2	2
CO	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	3	2	2

YEAR	III	SEMESTER	V	L	T	P	C
COURSE CODE / COURSE TITLE	PROFESSIONAL COMMUNICATION			3	0	0	3

COURSE OBJECTIVES
➢ Develop their communicative competence in English with specific reference to Speaking and listening. ➢ Enhance their ability to communicate effectively in interviews. ➢ Strengthen their prospects of success in competitive examinations.

LIST OF EXPERIMENTS	
1	Letter Writing i. Formal letter ii. Informal letter
2	Report Writing i. Event report ii. Project report
3	Resume Writing
4	Non-Technical Presentation
5	Technical Presentation
6	Interview Skills
7	Group Discussion
8	Listening Comprehension
9	Reading Comprehension
10	Common Errors in English
Beyond the Syllabus	
1	Familiarize different Genres of texts.
2	Different types of speeches, debates and Model UN.

COURSE OUTCOMES On completion of the course, students will be able to	
CO1	➢ Equip students with technology driven language skills required for successful undertaking of academic studies with primary emphasis on academic speaking and listening and to prepare students for competitive exams.
CO2	➢ Identify different genres of reading and writing, and be able to reflect and respond critically on formal communication such as letters, reports and memos.
CO3	➢ Learn to understand the role of multiple intelligences and incorporate them in communication in a diverse team.

CO-PO & PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO2	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO3	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**2**	**2**	**3**	**-**	**-**

YEAR	III	SEMESTER	V	L	T	P	C
COURSE CODE / COURSE TITLE	191CS535 / INTELLECTUAL PROPERTY RIGHTS			3	0	0	3

COURSE OBJECTIVES

- ✓ To give an idea about IPR, about the origin and development of WIPO and TRIPS Agreement.
- ✓ To understand the knowledge of patents, copy right, trademarks, designs and information Technology Act.
- ✓ To get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements.
- ✓ To learn Digital Innovations and Developments as Knowledge Assets related to IP law and Cyber law
- ✓ To explain the importance of Intellectual property protection and emerging issues

SYLLABUS

UNIT-I	INTRODUCTION	9

Introduction to IPRs, Basic concepts and need for Intellectual Property, Patents, Copyrights, Geographical Indications, IPR in India and Abroad, Genesis and Development, the way from WTO to WIPO, TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations, Important examples of IPR.

UNIT-II	REGISTRATION OF IPRs	9

Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad.

UNIT-III	AGREEMENTS AND LEGISLATIONS	9

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

UNIT-IV	DIGITAL PRODUCTS AND LAW	9

Digital Innovations and Developments as Knowledge Assets, IP Laws, Cyber Law and Digital Content Protection, Unfair Competition, Meaning and Relationship between Unfair Competition and IP Laws, Case Studies.

UNIT-V	ENFORCEMENT OF IPRs	9

Infringement of IPRs, Enforcement Measures, Emerging issues, Case Studies.

COURSE OUTCOMES	
On completion of the course, students will be able to	
CO1	Ability to manage Intellectual Property portfolio to enhance the value of the firm.
CO2	Understand the knowledge of patents, copy right, trademarks, designs and information Technology Act.
CO3	Appreciate the policy applied to patents, copyrights and trademarks
CO4	Analyze the relationship between intellectual property law and Cyber Law
CO5	Apply ethical and professional issues which arise in the intellectual property law context

TEXT BOOKS

1. V. ScopleVinod, "Managing Intellectual Property", Prentice Hall of India pvt Ltd, 2012.

2. S. V. Satakar, "Intellectual Property Rights and Copy Rights", EssEss Publications, New Delhi, 2002.

REFERENCES

1. Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets", Cengage Learning, Third Edition, 2012.

2. PrabuddhaGanguli, "Intellectual Property Rights: Unleashing the Knowledge Economy", McGraw Hill Education, 2011.

3. Edited by Derek Bosworth and Elizabeth Webster, "The Management of Intellectual Property", Edward Elgar Publishing Ltd., 2013.

CO-PO & PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	-	-	-	3	2	1
CO2	3	2	1	1	-	1	-	-	-	-	-	1	3	2	1
CO3	3	2	2	1	-	-	-	-	-	-	-	-	3	2	1
CO4	3	2	2	1	-	-	-	-	-	-	-	1	3	2	1
CO5	3	3	2	1	-	1	-	-	-	-	-	1	3	2	1
CO	**3**	**3**	**1**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**2**	**1**

COURSE CODE	COURSE NAME	L	T	P	C
191ME636	RENEWABLE SOURCES OF ENERGY	3	0	0	3

COURSE OBJECTIVES

- At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.

UNIT 1	INTRODUCTION	9

World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy Utilisation – Renewable Energy Scenario in Tamil Nadu, India and around the World – Potentials - Achievements / Applications – Economics of renewable energy systems.

UNIT 2	SOLAR ENERGY	9

Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT 3	WIND ENERGY	9

Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance – Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects

UNIT 4	BIO - ENERGY	9

Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Applications

UNIT 5	OTHER RENEWABLE ENERGY SOURCES	9

Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On successful completion of the course, students will be able to

CO1	Discuss the importance and Economics of renewable Energy
CO2	Discuss the method of power generation from Solar Energy
CO3	Discuss the method of power generation from Wind Energy
CO4	Explain the method of power generation from Bio Energy
CO5	Explain the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems

REFERENCES

1. Rai. G.D., "Non Conventional Energy Sources", Khanna Publishers, New Delhi, 2011.
2. Twidell, J.W. & Weir, A., "Renewable Energy Sources", EFN Spon Ltd., UK, 2006.
3. Chetan Singh Solanki, Solar Photovoltaics, "Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2015.
4. David M. Mousdale – "Introduction to Biofuels", CRC Press, Taylor & Francis Group, USA 2017
5. Freris. L.L., "Wind Energy Conversion Systems", Prentice Hall, UK, 1990.
6. Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 2012. 5. Johnson Gary, L. "Wind Energy Systems", Prentice Hall, New York, 1985

191CE545 DISASTER MANAGEMENT L T P C
3 0 0 3

COURSE 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 Processess 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.

TOTAL: 45 Periods

Text Books

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.

Reference Books

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

YEAR	IV	SEMESTER	VII	L	T	P	C
COURSE CODE / COURSE TITLE	191CS735 / PRINCIPLES OF MANAGEMENT			3	0	0	3

COURSE OBJECTIVES
✓ To study the evolution, functions and principles of management. ✓ To understand the various planning tools and techniques. ✓ To learn the organization structures and get familiar with the responsibilities of Human Resource Management.

SYLLABUS		
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, Types and nature of motives, Theories of motivation and productivity, 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, Design of control techniques, use of computers and IT in Management control, Productivity problems and management, control and performance, direct and preventive control, reporting.		

COURSE OUTCOMES	
CO1	Describe the basic of management and its types, skills, management roles, types of business organization and current trends in business.
CO2	Explain the nature and purpose of planning, types, objectives of planning and decision process.
CO3	Classify the different organization structures, authorities and responsibilities, human resource management and training and development.
CO4	Estimate the individual and group behavior, motivation, job satisfaction types and theories of leadership, communication and IT.
CO5	Discuss the process of controlling and use of computer and IT in management control and reporting.

TEXT BOOKS

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&MamataMohapatra, "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.

CO-PO & PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO5	PO 6	PO 7	PO 8	PO9	PO 10	PO11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	2	-	2	2	-	2	1	-	2	-
CO 2	3	3	3	3	2	2	-	2	-	-	2	1	-	3	-
CO 3	3	3	3	2	2	2	-	2	3	-	-	1	-	-	-
CO 4	3	3	3	2	1	1	-	1	3	3	-	1	-	-	-
CO 5	3	3	3	2	1	1	-	1	1	1	-	1	-	1	-
CO	**3**	**3**	**3**	**2**	**2**	**2**	**-**	**2**	**2**	**2**	**2**	**1**	**-**	**2**	**-**

YEAR	IV	SEMESTER	VIII	L	T	P	C
COURSE CODE / COURSE TITLE	191HS801 / PROFESSIONAL ETHICS IN ENGINEERING			3	0	0	3

COURSE OBJECTIVES

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

SYLLABUS

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, Auditing Standards, Statements and Guidance Notes – An Overview, Audit Planning, Strategy and Execution.

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,Case Studies for role morality.

COURSE OUTCOMES	
On completion of the course, students will be able to	
CO1	Apply ethics to the society with moral values and ethical theories
CO2	Discuss the ethical issues related to engineering
CO3	Realize the responsibilities and rights to engineering
CO4	Identify the assessment of safety and risk and respect for authority
CO5	Analyze the global issues in engineering

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",McGraw Hill education, India Pvt. Ltd.,New Delhi, 2013.

6. World Community Service Centre, "Value Education", Vethathiri publications, Erode, 2011.

VELTECH MULTITECH DR.RANGARAJAN DR.SAKUNTHALA ENGINEERING COLLEGE
DEPARTMENT OF BIOMEDICAL ENGINEERING

REGULATION 2019

COURSES ON HUMAN VALUES

S.NO	COURSE CODE	COURSE NAME	SEMESTER	CATEGORY	CREDIT
1	191BM425	Bioethics & Intellectual Property Rights (IPRs)	IV	PC	3
2	191HS40A	Reading And Writing Skill Laboratory	IV	HSS	1
3	191HS60A	Communication Skills Lab	VI	HSS	1
4	191HS201	Environmental Science and Engineering	II	HSS	3
5	191OME546	Renewable Energy sources	VI	OE	3
6	191BM522	Hospital management	V	PC	3
7	191BM833	Principles of management	VIII	PE	3

191BM425-BIOETHICS & INTELLECTUAL PROPERTY RIGHTS (IPRs)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

The student should be made to

1. Understand the need of bioethics
2. Get knowledge of biosafety and genetically modified organisms
3. Explain the concepts of regulatory mechanisms for GMO's
4. Understand the concepts of IPR
5. Discuss about biosafety

UNIT I INTRODUCTION TO BIOETHICS **9**

Bioethics and its scope – Different approaches to ethics – Disease prevention and right to privacy – Biological weapons and their social and ethical implications – morality – Professional conducts and responsibility – Business ethics.

UNIT II INTRODUCTION TO BIOSAFETY AND GENETICALLY MODIFIED ORGANISMS (GMOs) **9**

Overview of biosafety and risk assessment – Cartagena protocol for biosafety – Introduction to GMOs – Transgenic technology – Gene flow – Biosafety of GMO – NGOs for biosafety.

UNIT III REGULATORY MECHANISMS FOR GMOs **9**

Introduction – National regulatory mechanism – International regulatory mechanism – Regulatory measures for biosafety – Biosafety guidelines evolved in India by DBT – Prevention food adulteration act – Food and safety standard bill and seed policy- Rules for manufacture and storage of hazardous GMOs.

UNIT IV INTRODUCTION TO IPRs **9**

Introduction to IPRs – Concept of IPRs – Designs – Trademarks – Trade secrets – Domain names – Geographical indications – Copyrights – Patents – Patent laws – Classification of patents.

UNIT V CASE STUDIES IN IPR AND BIOSAFETY **9**

Diamond Vs Chakraborty case (1980) – Dimminaco A.G. Case (2002) – Neem patient case – Turmeric patent case – Bt Cotton – Bt Brinjal – Golden Rice.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student should be able to:

- Apply bioethics in health care
- Discuss the nature of genetically modified organisms
- Outline the concepts of regulatory mechanisms for GMO's
- Explain the concepts of Intellectual property rights
- Describe the concept of Biosafety.

TEXT BOOKS

1. Shomini Parashar, Deepa Goel, " IPR, Biosafety and Bioethics", Pearson India, 2013.
2. Flemind OD and Hunt LD. "Biological Safety: Principles and Practices". ASM Press, 2006.

REFERENCE

1.WIPO Academy – Intellectual Property and Bioethics: An overview.

PO,CO,PSO MAPPING															
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	-	-	-	2	-	1	1	3	-	1	-	1	1	-	-
CO 2	-	-	-	2	-	1	1	3	-	1	-	1	1	-	-
CO 3	-	-	-	2	-	1	1	3	-	1	-	1	1	-	-
CO 4	-	-	-	2	-	1	1	3	-	1	-	1	1	-	-
CO 5	-	-	-	2	-	1	1	3	-	1	-	1	1	-	-
CO	-	-	-	2	-	1	1	3	-	1	-	1	1	-	-

191HS40A-READING AND WRITING SKILLS LABORATORY

L T P C
0 0 2 1

COURSE OBJECTIVES

1. It makes the students free of their inferiority complex regarding language
2. It amplifies the student's level of confidence in his/her personal career
3. It elevates the success rate of the students in their professional career
4. It improves the academic standards and the employability skills
5. It helps to overcome the cultural barriers

LIST OF EXPERIMENTS

ACTIVE LISTENING AND RESPONDING
Active listening - Asking questions – Responding to the questions - Listen to the Audio – visual components – Listening Comprehension
PRESENTATION SKILLS
Introduction to Presentation – Building up confidence - Effective Presentation – Body Language - Poster presentations – subject relevant seminars –
SPEAKING SKILLS
General Conversation – Short speech - Role play activities - Question and Answer sessions
WRITING SKILLS
Effective writing - Letter writing – E-mail writing – Paragraph writing – Story writing
GROUP DISCUSSION
Importance of Group Discussion – Understanding the dynamics of GD – Activities to improve the GD Skills – Mock GD – Video samples

COURSE OUTCOMES

Co1: Student will be an active listener so as to respond accurately and effectively
Co2: Students becomes confident enough to present anything successfully
Co3: Student becomes free for making queries and answer to queries without hesitation.
Co4: Student learns to write effectively and be able to draft letters, E-mails impressively.
Co5: Student understands the dynamics of GD and so participates in GDs confidently.

REFERENCE BOOKS

1. Butterfield, Jeff Soft Skills for Everyone. Cengage Learning: New Delhi, 2015
2. Interact English Lab Manual for Undergraduate Students,.OrientBalckSwan: Hyderabad, 2016.
3. E. Suresh Kumar et al. Communication for Professional Success. Orient Blackswan: Hyderabad, 2015
4. Raman, Meenakshi and Sangeeta Sharma. Professional Communication. Oxford University Press: Oxford, 2014
5. S. Hariharanetal. Soft Skills. MJP Publishers: Chennai, 2010.
6. Brooks,Margret. Skills for Success. Listening and Speaking. Level 4 Oxford University Press, Oxford: 2011.
7. Richards,C. Jack. & David Bholke. Speak Now Level 3. Oxford University Press, Oxford: 2010

WEB SERIES

1.https://learnenglishteens.britishcouncil.org/skills/writing/upper-intermediate-b2-writing/report
2. https://www.ted.com/talks

PO,CO,PSO MAPPING														
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	-	-	-	-	-	-	-	2	3	3	-	3	1	-	-
CO 2	-	-	-	-	-	-	-	2	3	3	-	3	1	-	-
CO 3	-	-	-	-	-	-	-	2	3	3	-	3	1	-	-
CO 4	-	-	-	-	-	-	-	2	3	3	-	3	1	-	-
CO 5	-	-	-	-	-	-	-	2	3	3	-	3	1	-	-
CO	-	-	-	-	-	-	-	2	3	3	-	3	1	-	-

191HS60A-COMMUNICATION SKILLS LABORATORY

L T P C
0 0 3 2

COURSE OBJECTIVES

The student should be made to:

1. To equip students of engineering and technology with effective speaking and listening skills in English.
2. To help them develop their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their job.
3. To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises

I. PC based session (Weightage 40%)

A. English Language Lab

1. Listening Comprehension:

6Listening and typing – Listening and sequencing of sentences – Filling in the blanks -Listening and answering questions.

2. Reading Comprehension: **6**

Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

3.Speaking: **6**

Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English. Conversations: Face to Face Conversation – Telephone conversation – Role play activities

B. Viewing and discussing audio-visual materials

(Samples are available to learn and practice)

1. Resume / Report Preparation / Letter Writing **1**

Structuring the resume / report - Letter writing / Email Communication - Samples.

2. Presentation skills: **1**

Elements of effective presentation – Structure of presentation - Presentation tools – Voice

Modulation – Audience analysis - Body language – Video samples

3. Soft Skills: **2**

Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

4. Group Discussion: **1**

Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD -Video samples

5. Interview Skills: **1**

Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews-Video samples.

II. Practice Session (Weightage – 60%)

1. Resume / Report Preparation / Letter writing: Students prepare their own resume and report.

2.Presentation Skills: Students make presentations on given topics. 8

3.Group Discussion: Students participate in group discussions. 6

4.Interview Skills: Students participate in Mock Interviews 8

COURSE OUTCOME

At the end of the semester the students will be able to:
CO1:To be totally learner-centric with minimum teacher intervention as the course revolves around practice.
CO2:Suitable audio/video samples from Podcast/YouTube to be used for illustrative purposes.
CO3:Portfolio approach for writing to be followed. Learners are to be encouraged to blog, tweet, text and email employing appropriate language.
CO4:GD/Interview/Role Play/Debate could be conducted off the laboratory (in a regular classroom) but learners are to be exposed to telephonic interview and video conferencing.
CO5:Learners are to be assigned to read/write/listen/view materials outside the classroom as well for graining proficiency and better participation in the class.

REFERENCE

1. Anderson, P.V, Technical Communication, Thomson Wadsworth , Sixth Edition, New Delhi, 2007.
2. Prakash, P, Verbal and Non-Verbal Reasoning, Macmillan India Ltd., Second Edition, New Delhi, 2004.
3. John Seely, The Oxford Guide to Writing and Speaking, Oxford University Press, New Delhi, 2004.
4. Evans, D, Decisionmaker, Cambridge University Press, 1997.
5. Thorpe, E, and Thorpe, S, Objective English, Pearson Education, Second Edition, New Delhi, 2007.
6. Turton, N.D and Heaton, J.B, Dictionary of Common Errors, Addision Wesley Longman Ltd., Indian reprint 1998.

LAB REQUIREMENTS

1. Teacher console and systems for students.
2. English Language Lab Software
3. Career Lab Software

CO-PO and PSO Mapping															
Cos	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO 1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO 2	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	1	3	3	-	-	-	-
CO 4	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO 5	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO	-	-	-	-	-	-	-	-	1	3	3	-	-	-	-

191HS201-ENVIRONMENTAL SCIENCE ENGINEERING **L T P C**
3 0 0 3

COURSE OBJECTIVES:

1. This course provides the basic knowledge of structure and function of ecosystem and better understanding of natural resources, biodiversity and their conservation practices.
2. It describes the need to lead more sustainable lifestyles, to use resources more equitably.
3. It helps to create a concern for our environment that will trigger pro-environmental action, including activities we can do in our daily life to protect it.
4. Furthermore, it deals the social issues and ethics to develop quality engineer in our country.

UNIT 1: ENVIRONMENT - AN OVERVIEW:

(9)

Ecosystem - concept-structure-function-types. Energy flow in eco-system. Biodiversity and its conservation- values of bio- diversity-threats to biodiversity conservation of biodiversity. Natural resources- types, uses.

UNIT 2*:* ENVIRONMENTAL IMPACT OF ENERGY SOURCES:

(9)

Sources of primary energy- present and future consumption of energy- environmental impacts of energy development- oil, natural gas, coal, hydro electric, nuclear power, wind mill and solar panels- Urban problems related to energy - case studies. .

UNIT 3: CLIMATIC CHANGE AND SOLID WASTE MANAGEMENT:

(9)

Environmental pollution- air, water, soil, marine and noise pollution-green house gases- causes, effects-global warming, ozone layer depletion, acid rain-sources and effects. Pollution control strategies-preventive measures- green technologies-green building concepts- standards and regulations- role of individuals. Sustainable development. Hazardous wastes- e-waste- source- effect, management. Nuclear waste-sources, effects, management. Recycling of waste. Future challenges.

UNIT 4: HUMAN POPULATION AND THE ENVIRONMENT

(9)

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.

UNIT 5*:* ENVIRONMENTAL LAWS AND ETHICS:

(9)

Legal provision in India- environmental acts-air, water, forest, soil and wildlife. Environmental ethics-theories and codes- resource consumption patterns, equity-disparity, urban-rural equity issues, need for gender equity, preserving resource for future generation, right of animals, ethical basis of environment education and awareness, ethical problem solving- changing attitude, conservation ethics and traditional value systems of India. Effect of social media on the adolescent.

TEXT BOOKS:

1. ErachBharucha, “Text book for Environmental sciences for Undergraduate cources”, UGC, 2004 (Unit I, III &IV)

2. Kaushik, A &Kaushik, CP, Environmental Science and engineering", 3rd Edition, New Age International (P) Limited, New Delhi, 2009. (Unit I)
3. Henry, JG &Heinke, GW, "Environmental Science and Engineering", 2nd Edition, PHI Learning Private limited, New Delhi, 2011. (Unit II)

REFERENCE BOOKS:

1. Masters, GM & Ela, WP, "Introduction to Environmental Engineering and Science", 3rd Edition, PHI Learning Private limited, New Delhi, 2009. (Unit III)
2. Encyclopaedia of environmental ethics and philosophy. Available at www.gmu.ac.ir/download/booklibrary/e-library/Encyclopaedia of Environmental Ethics and philosophy.pdf (Unit IV)

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1 Interpret the concept, structure and function of an ecosystem.

CO2 Identify the values and conservation methods of biodiversity.

CO3 Demonstrate the environmental impacts of energy development.

CO4 Categorize the various environmental pollutions and select suitable preventive measures.

CO5 Perceive the environmental effects of human population and the implementation of welfare programs.

CO6 Recall the environmental ethics and legal provisions.

Course outcome	**Mapping CO's with PO's**														
CO's	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO3**
CO1	3	3	2	2	-	2	3	-	-	-	-	2	-	-	-
CO2	3	3	2	2	-	2	3	2	-	-	-	2	-	-	-
CO3	3	3	2	2	-	2	3	-	-	-	-	2	-	-	-
CO4	3	3	2	2	-	2	3	-	-	-	-	2	-	-	-
CO5	3	3	2	2	-	2	3	-	-	-	-	2	-	-	-
CO6	3	3	2	2	-	2	3	2	-	-	-	2	-	-	-
Average CO	3	3	2	2	-	2	3	2	-	-	-	2	-	-	-

191OME546 RENEWABLE ENERGY SOURCES

UNIT 1 INTRODUCTION 9

World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy Utilisation – Renewable Energy Scenario in Tamil Nadu, India and around the World – Potentials – Achievements Applications – Economics of renewable energy systems.

UNIT 2 SOLAR ENERGY 9

Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT 3 WIND ENERGY 9

Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance – Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects

UNIT 4 BIO ENERGY 9

Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Application, Biomass Feedstocks, Biomass to Biofuel Supply Chain

UNIT 5 OTHER RENEWABLE ENERGY SOURCES 9

Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems, Greenhouse Gas and its effect on climate change. TOTAL: 45 PERIODS

COURSE OUTCOMES: Upon the completion of this course the students will be able to,

CO1 Identify the ways for effective utilization of renewable energy sources.

CO2 Relate and analyze the various solar energy based renewable energy generation.

CO3 Relate and analyze the various wind energy based renewable energy generation

CO4 Relate and analyze the various Bio-energy based renewable energy generation

CO5 Identify the merits of new methodologies and technologies for renewable energy generation

REFERENCES

1. Rai. G.D., "Non Conventional Energy Sources", Khanna Publishers, New Delhi, 2011.

2. Twidell, J.W. & Weir, A., "Renewable Energy Sources", EFN Spon Ltd., UK, 2006.

3. Sukhatme. S.P., "Solar Energy", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.

4. Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 1996.

5. Tiwari. G.N., Solar Energy – "Fundamentals Design, Modelling & Applications", Narosa Publishing House, New Delhi, 2002.

6. Freris. L.L., "Wind Energy Conversion Systems", Prentice Hall, UK, 1990.

7. Johnson Gary, L. "Wind Energy Systems", Prentice Hall, New York, 1985
8. David M. Mousdale – "Introduction to Biofuels", CRC Press, Taylor & Francis Group, USA 2010
9. Chetan Singh Solanki, Solar Photovoltaics, "Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2009.

191BM522- HOSPITAL MANAGEMENT **L T P C**
3 0 0 3

COURSE OBJECTIVES

The student should be made to:

- To understand the fundamentals of hospital administration and management.
- To know the market related research process
- To explore various information management systems and relative supportive services.
- To learn the quality and safety aspects in hospital.

UNIT I OVERVIEW OF HOSPITAL ADMINISTRATION **9**

Distinction between Hospital and Industry, Challenges in Hospital Administration – Hospital Planning- Equipment Planning – Functional Planning - Current Issues in Hospital Management – Telemedicine - Bio-Medical Waste Management.

UNIT II HUMAN RESOURCE MANAGEMENT IN HOSPITAL **9**

Principles of HRM – Functions of HRM – Profile of HRD Manager – Tools of HRD –Human Resource Inventory – Manpower Planning. Different Departments of Hospital, Recruitment, Selection, Training Guidelines –Methods of Training – Evaluation of Training – Leadership grooming and Training, Promotion – Transfer, Communication – nature, scope, barriers, styles and modes of communication.

UNIT III MARKETING RESEARCH PROCESS **9**

Marketing information systems - assessing information needs, developing & disseminating information - Market Research process - Other market research considerations – Consumer Markets &Consumer Buyer Behaviour - Model of consumer behaviour - The buyer decision process - Model of business buyer behavior – Major types of buying situations - WTO and its implications.

UNIT IV HOSPITAL INFORMATION SYSTEMS & SUPPORTIVE SERVICES **9**

Management Decisions and Related Information Requirement - Clinical Information Systems - Administrative Information Systems - Support Service Technical Information Systems – Medical Transcription, Medical Records Department – Central Sterilization and Supply Department – Pharmacy– Food Services - Laundry Services.

UNIT V QUALITY AND SAFETY ASPECTS IN HOSPITAL **9**

Quality system – Elements, implementation of quality system, Documentation, Quality auditing, International Standards ISO 9000 – 9004 – Features of ISO 9001 – ISO 14000 – Environment Management Systems. NABA, JCI, NABL. Security – Loss Prevention – Fire Safety – Alarm System – Safety Rules. Health Insurance & Managing Health Care – Medical Audit – Hazard and Safety in a hospital Setup.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student should be able to:

- Explain the principles of Hospital administration.
- Identify the importance of Human resource management.
- List various marketing research techniques
- Identify Information management systems and its uses
- Explain safety procedures followed in hospitals.

TEXT BOOKS

1. R.C.Goyal, ―Hospital Administration and Human Resource Management‖, PHI – Fourth Edition, 2006.
2. G.D.Kunders, ―Hospitals – Facilities Planning and Management – TMH, New Delhi – Fifth Reprint 2007.

REFERENCES

1. Cesar A.Caceres and Albert Zara, ―The Practice of Clinical Engineering, Academic Press, New York, 1977.
2. Norman Metzger, ―Handbook of Health Care Human Resources Management‖, 2nd edition Aspen Publication Inc. Rockville, Maryland, USA, 1990.
3. Peter Berman ―Health Sector Reform in Developing Countries‖ - Harvard University Press, 1995. 4. William A. Reinke ―Health Planning For Effective Management‖ - Oxford University Press.1988
5. Blane, David, Brunner, ―Health and SOCIAL Organization: Towards a Health Policy for the 21st Century‖, Eric Calrendon Press 2002.
6. Arnold D. Kalcizony& Stephen M. Shortell, ―Health Care Management‖, 6th Edition Cengage Learning, 2011.

CO,PO, PSO MAPPING															
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	-	-	-	-	-	1	1	2	1	-	2	1	-	-	2
CO 2	-	-	-	-	-	1	1	1	2	-	3	1	-	-	2
CO 3	-	-	-	-	-	1	1	1	2	-	3	1	-	-	2
CO 4	-	-	-	-	-	1	1	3	2	-	3	1	-	-	2
CO 5	-	-	-	-	-	3	2	3	1	-	2	1	-	-	2

191BM833-PRINCIPLES OF MANAGEMENT **L T P C**

3 0 0 3

COURSE OBJECTIVES

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

UNIT I INTRODUCTION TO ANAGEMENT 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

COURSE OUTCOMES

Students would be able to
Elucidate basics of organization and management
Gain knowledge on managerial function planning
Gain basic knowledge on organizing skills
Acquire knowledge on leadership qualities
Gain knowledge on managerial function controlling

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&MamataMohapatra, ― 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.

CO, PO, PSO MAPPING

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P O7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO 1	3	-	-	-	-	3	3	3	3	2	2	2	-	-	-
CO 2	3	-	-	-	-	3	3	3	3	2	2	2	-	-	-
CO 3	3	-	-	-	-	3	3	3	3	2	2	2	-	-	-
CO 4	3	-	-	-	-	3	3	3	3	2	2	2	-	-	-
CO 5	3	-	-	-	-	3	3	3	3	2	2	2	-	-	-
CO	3	-	-	-	-	3	3	3	3	2	2	2	-	-	-

Vel Tech Multi Tech Dr.Rangarajan Dr.Sakunthala Engineering College
(An Autonomous Institution affiliated to Anna University)
B.Tech – Computer Science and Business Systems
Curriculum (Regular)

Courses of Human Values

S.No	Sub Code	Sem	Type of Course	Credit	Course Title
1	191HS201	II	HSS	3	Environmental Science and Engineering
2	191HS30A	III	HSS	1	Advanced Reading and Writing Skills Laboratory
3	191HS50A	V	HSS	1	Professional Communication
4	191ME546	V	OE	3	Renewable Energy Sources
5	191CE545	VI	OE	3	Disaster Management

YEAR	I	SEMESTER	II	L	T	P	C
COURSE CODE / COURSE TITLE	191HS201 / ENVIRONMENTAL SCIENCE AND ENGINEERING			3	0	0	3

COURSE OBJECTIVES

- ✓ This course provides the basic knowledge of structure and function of ecosystem and better understandingof natural resources, biodiversity and their conservation practices.
- ✓ It describes the need to lead more sustainable lifestyles, to use resources more equitably.
- ✓ It helps to create a concern for our environment that will trigger pro-environmental action, including activities we can do in our daily life to protect it.
- ✓ Furthermore, it deals the social issues and ethics to develop quality engineer in our country.

SYLLABUS

UNIT-I	ENVIRONMENT – AN OVERVIEW	9

Ecosystem - concept, structure, function, types, Energy flow in ecosystem, Biodiversity and its conservation, values of biodiversity, threats to biodiversity conservation of biodiversity, Natural resources - types, uses.

UNIT-II	ENVIRONMENTAL IMPACT OF ENERGY SOURCES	9

Sources of primary energy, present and future consumption of energy, environmental impacts of energy development- oil, natural gas, coal, hydro electric, nuclear power, wind mill and solar panels, Urban problems related to energy, case studies

UNIT-III	CLIMATIC CHANGE AND SOLID WASTE MANAGEMENT	9

Environmental pollution- air, water, soil, marine and noise pollution- green house gases- causes, effects- global warming, ozone layer depletion, acid rain-sources and effects. Pollution control strategies, preventive measures, green technologies, green building concepts, standards and regulations, role of individuals, Sustainable development, Hazardous wastes, e-waste, source effect, management, Nuclear waste-sources, effects, management, Recycling of waste, Future challenges.

UNIT-IV	HUMAN POPULATION AND THE ENVIRONMENT	9

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.

UNIT-V	ENVIRONMENTAL LAW AND ETHICS	9

Legal provision in India, environmental acts - air, water, forest, soil and wildlife. Environmental ethics, theories and codes, resource consumption patterns, equity-disparity, urban-rural equity issues, need for gender equity, preserving resource for future generation, right of animals, ethical basis of environment education and awareness, ethical problem solving- changing attitude, conservation ethics and traditional value systems of India, Effect of

social media on the adolescent.

COURSE OUTCOMES	
On completion of the course, students will be able to	
CO1	Interpret the concept of ecosystem, biodiversity and its conservation.
CO2	Demonstrate the environmental impacts of energy development.
CO3	Categorize the various environmental pollutions and select suitable preventive measures.
CO4	Perceive the environmental effects of human population and the implementation of welfare programs.
CO5	Recall the environmental ethics and legal provisions.

TEXT BOOKS

1. ErachBharucha, "Text book for Environmental sciences for Undergraduate courses", UGC, 2004.
2. Kaushik, A &Kaushik, CP, Environmental Science and engineering", 3rd Edition, New Age International (P) Limited, New Delhi, 2009.
3. Henry, JG &Heinke, GW, "Environmental Science and Engineering", 2nd Edition, PHI Learning Private limited, New Delhi, 2011.

REFERENCES

1. Masters, GM &Ela, WP, "Introduction to Environmental Engineering and Science", 3rd Edition, PHI Learning Private limited, New Delhi, 2009.
2. Encyclopedia of environmental ethics and philosophy. Available at www.gmu.ac.ir/download/booklibrary/e-library/Encyclopaedia of Environmental Ethics and philosophy.pdf.

CO-PO&PSO Mapping

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

YEAR	II	SEMESTER	III	L	T	P	C
COURSE CODE / COURSE TITLE	191HS30A / ADVANCED READING AND WRITING SKILL LABORATORY			0	0	2	1

COURSE OBJECTIVES
✓ Develop their communicative competence in English with specific reference to ✓ speaking and listening ✓ Enhance their ability to communicate effectively in interviews. ✓ Strengthen their prospects of success in competitive examinations.

SYLLABUS		
UNIT-I		**9**
Reading – Strategies for effective reading-Use glosses and footnotes to aid reading comprehension- Read and recognize different text types-Predicting content using photos and title **Writing**-Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence –Write a descriptive paragraph		
UNIT-II		**9**
Reading-Read for details-Use of graphic organizers to review and aid comprehension Writing-State reasons and examples to support ideas in **writing**– Write a paragraph with reasons and examples- Write an opinion paragraph		
UNIT-III		**9**
Reading– Understanding pronoun reference and use of connectors in a passage- speed reading techniques- **Writing**– Elements of good essay-Types of essays- descriptive-narrative- issue-based- argumentative-analytical.		
UNIT-IV		**9**
Reading– Genre and Organization of Ideas- **Writing**– Email writing- visumes – Job application- project writing-writing convincing proposals.		
UNIT-V		**12**
Reading– Critical reading and thinking- understanding how the text positions the reader- identify **Writing**– Statement of Purpose- letter of recommendation- Vision statement		

COURSE OUTCOMES On completion of the course, students will be able to	
CO1	Demonstrate understanding of elements of writing such as brainstorming for generating topic sentence, central ideas, supporting ideas, organization patterns, editing and drafting different types of paragraphs and essays.
CO2	Understand the strategies of skimming and scanning to read a text analytically and critically respond to it.
CO3	Apply critical thinking skills and infer a text logically in relation to various professional concerns.

TEXT BOOKS

1. Gramer F. Margot and Colin S. Ward Reading and Writing (Level 3) Oxford University Press: Oxford, 2011.
2. Debra Daise, CharlNorloff, and Paul Carne Reading and Writing (Level 4) Oxford University Press: Oxford, 2011.

REFERENCES

1. Davis, Jason and Rhonda LIss. Effective Academic Writing (Level 3) Oxford University Press: Oxford, 2006.
2. E. Suresh Kumar and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Black swan: Hyderabad, 2012.
3. Withrow, Jeans and et al. Inspired to Write. Readings and Tasks to develop writing skills. Cambridge University Press: Cambridge, 2004.
4. Goatly, Andrew. Critical Reading and Writing. Routledge: United States of America, 2000.
5. Petelin, Roslyn and Marsh Durham. The Professional Writing Guide: Knowing Well and Knowing Why. Business & Professional Publishing: Australia, 2004.

CO-PO & PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	1	2	1	-	3	2	2
CO2	3	3	3	3	-	-	-	-	2	1	1	1	3	2	2
CO3	3	3	3	3	3	2	2	1	1	1	1	1	3	2	2
CO	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	3	2	2

YEAR	III	SEMESTER	V	L	T	P	C
COURSE CODE / COURSE TITLE	PROFESSIONAL COMMUNICATION			3	0	0	3

COURSE OBJECTIVES
➢ Develop their communicative competence in English with specific reference toSpeaking and listening. ➢ Enhance their ability to communicate effectively in interviews.

LIST OF EXPERIMENTS	
1	Letter Writing i. Formal letter ii. Informal letter
2	Report Writing i. Event report ii. Project report
3	Resume Writing
4	Non-Technical Presentation
5	Technical Presentation
6	Interview Skills
7	Group Discussion
8	Listening Comprehension
9	Reading Comprehension
10	Common Errors in English
Beyond the Syllabus	
1	Familiarize different Genres of texts.
2	Different types of speeches, debates and Model UN.

COURSE OUTCOMES	
On completion of the course, students will be able to	
CO1	➢ Equip students with technology driven language skills required for successful undertaking of academic studies with primary emphasis on academic speaking and listening and to prepare students for competitive exams.
CO2	➢ Identify different genres of reading and writing, and be able to reflect and respond critically on formal communication such as letters, reports and memos.
CO3	➢ Learn to understand the role of multiple intelligences and incorporate them in communication in a diverse team.

CO-PO & PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO2	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO3	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**2**	**2**	**3**	**-**	**-**

COURSE CODE	COURSE NAME	L	T	P	C
191ME636	RENEWABLE SOURCES OF ENERGY	3	0	0	3

COURSE OBJECTIVES

- At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.

UNIT 1	INTRODUCTION	9

World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy Utilisation – Renewable Energy Scenario in Tamil Nadu, India and around the World – Potentials - Achievements / Applications – Economics of renewable energy systems.

UNIT 2	SOLAR ENERGY	9

Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT 3	WIND ENERGY	9

Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance – Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects

UNIT 4	BIO - ENERGY	9

Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Applications

UNIT 5	OTHER RENEWABLE ENERGY SOURCES	9

Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On successful completion of the course, students will be able to

CO1	Discuss the importance and Economics of renewable Energy
CO2	Discuss the method of power generation from Solar Energy
CO3	Discuss the method of power generation from Wind Energy
CO4	Explain the method of power generation from Bio Energy
CO5	Explain the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems

REFERENCES

1. Rai. G.D., "Non Conventional Energy Sources", Khanna Publishers, New Delhi, 2011.
2. Twidell, J.W. & Weir, A., "Renewable Energy Sources", EFN Spon Ltd., UK, 2006.
3. Chetan Singh Solanki, Solar Photovoltaics, "Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2015.
4. David M. Mousdale – "Introduction to Biofuels", CRC Press, Taylor & Francis Group, USA 2017
5. Freris. L.L., "Wind Energy Conversion Systems", Prentice Hall, UK, 1990.
6. Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 2012. 5. Johnson Gary, L. "Wind Energy Systems", Prentice Hall, New York, 1985

COURSE CODE	COURSE NAME	L	T	P	C
191CE545	DISASTER MANAGEMENT	3	0	0	3

COURSE 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 disasterresponse in areas where they live, with due sensitivity

UNIT 1	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 2	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 Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT 3	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 4	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 5	DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELDWORKS	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
TEXTBOOKS	
1.	Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427ISBN-13: 978-9380386423
2.	Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management,NIDM, New Delhi, 2011.
3.	Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers,New Delhi, 2010.
REFERENCE BOOKS	
1.	Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2	Government of India, National Disaster Management Policy,2009

Vel Tech Multi Tech Dr.Rangarajan Dr.Sakunthala Engineering College
(An Autonomous Institution affiliated to Anna University)
B.Tech - Artificial Intelligence and Data Science
Curriculum (Regular)

Courses of Human Values

S.No	Sub Code	Sem	Type of Course	Credit	Course Title
1	191HS201	II	HSS	3	Environmental Science and Engineering
2	191HS30A	III	HSS	1	Advanced Reading and Writing Skills Laboratory
3	191HS50A	V	HSS	1	Professional Communication
4	191ME546	V	OE	3	Renewable Energy Sources
5	191CE545	VI	OE	3	Disaster Management
6	191AI735	VIII	PE	3	Ethics of Engineers

YEAR	I	SEMESTER	II	L	T	P	C
COURSE CODE / COURSE TITLE	191HS201 / ENVIRONMENTAL SCIENCE AND ENGINEERING			3	0	0	3

COURSE OBJECTIVES

- ✓ This course provides the basic knowledge of structure and function of ecosystem and better understandingof natural resources, biodiversity and their conservation practices.
- ✓ It describes the need to lead more sustainable lifestyles, to use resources more equitably.
- ✓ It helps to create a concern for our environment that will trigger pro-environmental action, including activities we can do in our daily life to protect it.
- ✓ Furthermore, it deals the social issues and ethics to develop quality engineer in our country.

SYLLABUS

UNIT-I	ENVIRONMENT – AN OVERVIEW	9

Ecosystem - concept, structure, function, types, Energy flow in ecosystem, Biodiversity and its conservation, values of biodiversity, threats to biodiversity conservation of biodiversity, Natural resources - types, uses.

UNIT-II	ENVIRONMENTAL IMPACT OF ENERGY SOURCES	9

Sources of primary energy, present and future consumption of energy, environmental impacts of energy development- oil, natural gas, coal, hydro electric, nuclear power, wind mill and solar panels, Urban problems related to energy, case studies

UNIT-III	CLIMATIC CHANGE AND SOLID WASTE MANAGEMENT	9

Environmental pollution- air, water, soil, marine and noise pollution- green house gases- causes, effects- global warming, ozone layer depletion, acid rain-sources and effects. Pollution control strategies, preventive measures, green technologies, green building concepts, standards and regulations, role of individuals, Sustainable development, Hazardous wastes, e-waste, source effect, management, Nuclear waste-sources, effects, management, Recycling of waste, Future challenges.

UNIT-IV	HUMAN POPULATION AND THE ENVIRONMENT	9

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.

UNIT-V	ENVIRONMENTAL LAW AND ETHICS	9

Legal provision in India, environmental acts - air, water, forest, soil and wildlife. Environmental ethics, theories and codes, resource consumption patterns, equity-disparity, urban-rural equity issues, need for gender equity, preserving resource for future generation, right of animals, ethical basis of environment education and awareness, ethical problem solving- changing attitude, conservation ethics and traditional value systems of India, Effect of

social media on the adolescent.	
COURSE OUTCOMES On completion of the course, students will be able to	
CO1	Interpret the concept of ecosystem, biodiversity and its conservation.
CO2	Demonstrate the environmental impacts of energy development.
CO3	Categorize the various environmental pollutions and select suitable preventive measures.
CO4	Perceive the environmental effects of human population and the implementation of welfare programs.
CO5	Recall the environmental ethics and legal provisions.

TEXT BOOKS

1. ErachBharucha, "Text book for Environmental sciences for Undergraduate courses", UGC, 2004.
2. Kaushik, A &Kaushik, CP, Environmental Science and engineering", 3rd Edition, New Age International (P) Limited, New Delhi, 2009.
3. Henry, JG &Heinke, GW, "Environmental Science and Engineering", 2nd Edition, PHI Learning Private limited, New Delhi, 2011.

REFERENCES

1. Masters, GM &Ela, WP, "Introduction to Environmental Engineering and Science", 3rd Edition, PHI Learning Private limited, New Delhi, 2009.
2. Encyclopedia of environmental ethics and philosophy. Available at www.gmu.ac.ir/download/booklibrary/e-library/Encyclopaedia of Environmental Ethics and philosophy.pdf.

CO-PO&PSO Mapping

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

YEAR	II	SEMESTER	III	L	T	P	C
COURSE CODE / COURSE TITLE	191HS30A / ADVANCED READING AND WRITING SKILL LABORATORY			0	0	2	1

COURSE OBJECTIVES
✓ Develop their communicative competence in English with specific reference to ✓ speaking and listening ✓ Enhance their ability to communicate effectively in interviews. ✓ Strengthen their prospects of success in competitive examinations.

SYLLABUS		
UNIT-I		**9**
Reading – Strategies for effective reading-Use glosses and footnotes to aid reading comprehension- Read and recognize different text types-Predicting content using photos and title **Writing**-Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence –Write a descriptive paragraph		
UNIT-II		**9**
Reading-Read for details-Use of graphic organizers to review and aid comprehension Writing-State reasons and examples to support ideas in **writing**– Write a paragraph with reasons and examples- Write an opinion paragraph		
UNIT-III		**9**
Reading– Understanding pronoun reference and use of connectors in a passage- speed reading techniques- **Writing**– Elements of good essay-Types of essays- descriptive-narrative- issue-based- argumentative-analytical.		
UNIT-IV		**9**
Reading– Genre and Organization of Ideas- **Writing**– Email writing- visumes – Job application- project writing-writing convincing proposals.		
UNIT-V		**12**
Reading– Critical reading and thinking- understanding how the text positions the reader- identify **Writing**– Statement of Purpose- letter of recommendation- Vision statement		

COURSE OUTCOMES On completion of the course, students will be able to	
CO1	Demonstrate understanding of elements of writing such as brainstorming for generating topic sentence, central ideas, supporting ideas, organization patterns, editing and drafting different types of paragraphs and essays.
CO2	Understand the strategies of skimming and scanning to read a text analytically and critically respond to it.
CO3	Apply critical thinking skills and infer a text logically in relation to various professional concerns.

TEXT BOOKS

1. Gramer F. Margot and Colin S. Ward Reading and Writing (Level 3) Oxford University Press: Oxford, 2011.
2. Debra Daise, CharlNorloff, and Paul Carne Reading and Writing (Level 4) Oxford University Press: Oxford, 2011.

REFERENCES

1. Davis, Jason and Rhonda LIss. Effective Academic Writing (Level 3) Oxford University Press: Oxford, 2006.
2. E. Suresh Kumar and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Black swan: Hyderabad, 2012.
3. Withrow, Jeans and et al. Inspired to Write. Readings and Tasks to develop writing skills. Cambridge University Press: Cambridge, 2004.
4. Goatly, Andrew. Critical Reading and Writing. Routledge: United States of America, 2000.
5. Petelin, Roslyn and Marsh Durham. The Professional Writing Guide: Knowing Well and Knowing Why. Business & Professional Publishing: Australia, 2004.

CO-PO & PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	1	2	1	-	3	2	2
CO2	3	3	3	3	-	-	-	-	2	1	1	1	3	2	2
CO3	3	3	3	3	3	2	2	1	1	1	1	1	3	2	2
CO	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	3	2	2

YEAR	III	SEMESTER	V	L	T	P	C
COURSE CODE / COURSE TITLE	PROFESSIONAL COMMUNICATION			3	0	0	3

COURSE OBJECTIVES
➢ Develop their communicative competence in English with specific reference toSpeaking and listening. ➢ Enhance their ability to communicate effectively in interviews.

LIST OF EXPERIMENTS	
1	Letter Writing i. Formal letter ii. Informal letter
2	Report Writing i. Event report ii. Project report
3	Resume Writing
4	Non-Technical Presentation
5	Technical Presentation
6	Interview Skills
7	Group Discussion
8	Listening Comprehension
9	Reading Comprehension
10	Common Errors in English
Beyond the Syllabus	
1	Familiarize different Genres of texts.
2	Different types of speeches, debates and Model UN.

COURSE OUTCOMES	
On completion of the course, students will be able to	
CO1	➢ Equip students with technology driven language skills required for successful undertaking of academic studies with primary emphasis on academic speaking and listening and to prepare students for competitive exams.
CO2	➢ Identify different genres of reading and writing, and be able to reflect and respond critically on formal communication such as letters, reports and memos.
CO3	➢ Learn to understand the role of multiple intelligences and incorporate them in communication in a diverse team.

CO-PO & PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO2	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO3	3	-	-	-	-	-	-	-	3	3	2	2	3	-	-
CO	**3**	-	-	-	-	-	-	-	**3**	**3**	**2**	**2**	**3**	-	-

COURSE CODE	COURSE NAME	L	T	P	C
191ME636	RENEWABLE SOURCES OF ENERGY	3	0	0	3

COURSE OBJECTIVES

- At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.

UNIT 1	INTRODUCTION	9

World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy Utilisation – Renewable Energy Scenario in Tamil Nadu, India and around the World – Potentials - Achievements / Applications – Economics of renewable energy systems.

UNIT 2	SOLAR ENERGY	9

Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT 3	WIND ENERGY	9

Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance – Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects

UNIT 4	BIO - ENERGY	9

Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Applications

UNIT 5	OTHER RENEWABLE ENERGY SOURCES	9

Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On successful completion of the course, students will be able to

CO1	Discuss the importance and Economics of renewable Energy
CO2	Discuss the method of power generation from Solar Energy
CO3	Discuss the method of power generation from Wind Energy
CO4	Explain the method of power generation from Bio Energy
CO5	Explain the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems

REFERENCES

1. Rai. G.D., "Non Conventional Energy Sources", Khanna Publishers, New Delhi, 2011.
2. Twidell, J.W. & Weir, A., "Renewable Energy Sources", EFN Spon Ltd., UK, 2006.
3. Chetan Singh Solanki, Solar Photovoltaics, "Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2015.
4. David M. Mousdale – "Introduction to Biofuels", CRC Press, Taylor & Francis Group, USA 2017
5. Freris. L.L., "Wind Energy Conversion Systems", Prentice Hall, UK, 1990.
6. Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 2012. 5. Johnson Gary, L. "Wind Energy Systems", Prentice Hall, New York, 1985

COURSE CODE	COURSE NAME	L	T	P	C
191CE545	DISASTER MANAGEMENT	3	0	0	3

COURSE 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 disasterresponse in areas where they live, with due sensitivity

UNIT 1	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 2	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 Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT 3	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 4	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 5	DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELDWORKS	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
TEXTBOOKS	
1.	Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427ISBN-13: 978-9380386423
2.	Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management,NIDM, New Delhi, 2011.
3.	Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers,New Delhi, 2010.
REFERENCE BOOKS	
1.	Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2	Government of India, National Disaster Management Policy,2009

YEAR	IV	SEMESTER	VII	L	T	P	C
COURSE CODE / COURSE TITLE	191AI735/ETHICS OF ENGINEERS			3	0	0	3

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

SYLLABUS		
UNIT-I	EDUCATION AND VALUES	9
Importance of Value Education - Definition, Concept, Classification, Criteria And Sources Of Values - Aims And Objectives Of Value Education -Role And Need For Value Education In The Contemporary Society - Role Of Education In Transformation Of Values In Society - Role Of Parents, Teachers, Society, Peer Group And Mass Media In Fostering Values -Teaching Approaches And Strategies To Inculcate Values Through Curricular And Co-Curricular Activities-Need Of Yoga And Meditation For Professional Education And Stress Management.		
UNIT-II	ETHICS, HUMAN VALUES AND PERSONAL DEVELOPMENT	9
Ethics: Morals, Values And Ethics ,Work Ethic, Environmental Ethics, Computer Ethics Code Of Conduct - Human Values: Truthfulness, Constructivity, Sacrifice, Sincerity, Self-Control, Altruism, Scientific Vision, Relevancy Of Human Values To Good Life Spirituality-Personal Development :Character Formation Towards Positive Personality -Modern Challenges Of Adolescent: Emotions And Behavior – Self-Analysis And Introspection: Sensitization Towards Gender Equality, Physically Challenged, Intellectually Challenged, Respect To - Age, Experience, Maturity, Family Members, Neighbors, Co-Workers.		
UNIT-III	ENGINEERING ETHICS AND MORAL DILEMMAS	9
Need of Engineering Ethics- The code of ethics for engineers – Societies for engineers -NSPE Code of Ethics-Ethical and Unethical practices -Engineering As An Ethical Profession- Ethical Issues Faced By Engineers-Moral Dilemmas - Procedures For Facing Moral Dilemmas- Moral Dilemma Scenarios- Resolving An Moral Dilemma- Solving The Dilemmas In Students Life Case studies – situational decision making		
UNIT-IV	VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT	9
Personal values: Self-Strengths, Weaknesses -Professional Values: Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, Faith- Constitutional Values: Sovereign, Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, Fraternity- Social Values: Pity and Probity, Self-Control, Universal Brotherhood- Religious and Moral Values: Tolerance, Wisdom and Character.		
UNIT-V	CODE ETHICS IN SOFTWARE DEVELOPMENT	9

Need A Code Of Ethics For Software Development-Ethics, Values And Practices For Software Professionals- Ethics In Computing, From Academia To Industry-Principles Of Software Ethics – Rewriting The Code For Ethics In Software Development-Ethics Of Security-Privacy Ethics – Ethics In A Psychological Perspective- Ethical Issues In Software Industry-Issues In Professional Ethics In Software Project Management-Ethical Issues InInformation Technology.

COURSE OUTCOMES On completion of the course, students will be able to	
CO1	Define the importance of value education in society.
CO2	Identify the ethics, human values that supports individual growth and their personal development.
CO3	Use Engineering ethics in solving moral dilemma problems.
CO4	Analyze the importance of value education towards national and global development.
CO5	Develop professionals in software industry with idealistic, practical and moral values.

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. Govindarajan M, Natarajan‖ S, Senthil Kumar‖ V.S, ‚Engineering Ethics‘, Prentice Hall Of India, New Delhi, 2004.
2. Monica J. Taylor. Values in Education and Education in Value. Routledge, 1996.

CO- PO MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12
CO1	3	3	3	3	-	3	2	3	3	-	-	-
CO2	3	3	3	3	-	2	2	3	3	-	-	-
CO3	3	3	3	3	-	3	1	3	3	-	-	-
CO4	3	3	3	3	-	1	1	3	3	-	-	-
CO5	3	3	3	3	-	2	2	3	3	-	-	-
CO	**3**	**3**	**3**	**3**	-	**2**	**2**	**3**	**3**	**-**	**-**	**-**

Vel tech Multi tech Dr.Rangarajan Dr.Sakunthala Engineering College

Department of Mechanical Engineering
B.E Mechanical Engineering
Courses on Human Values

Sl. No.	Name of the course	Course Code	Type of Course	Semester	Credit
1	Professional ethics in engineering	191ME633	PE	VI	3
2	Systems Enginering	191ME637	PE	VI	3
3	Industrial Safety Engineering	191ME736	PE	VII	3
4	Design Thinking	191ME542	PE	V	3
5	Energy Conservation and Management	191ME543	PE	V	3

COURSE CODE	COURSE NAME	L	T	P	C
191ME633	PROFESSIONAL ETHICS IN ENGINEERING	3	0	0	3

COURSE 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 1	HUMAN VALUES	9

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 2	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 3	ENGINEERING AS SOCIAL EXPERIMENTATION	9

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

UNIT 4	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 5	GLOBAL ISSUES	9

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

COURSE OUTCOMES:

On successful completion of the course, students will be able to	
CO1	Apply engineering ethics in society related problems
CO2	Discuss the ethical issues related to engineering
CO3	Relate the responsibilities and rights in the society
CO4	Explain the safety, responsibilities and rights
CO5	Discuss global issues related to ethical way of functioning as engineers

REFERENCES

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
2. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
3. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
4. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
5. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
6. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
7. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" McGraw Hill education, India Pvt. Ltd., New Delhi, 2013.

COURSE CODE	COURSE NAME	L	T	P	C
191ME637	SYSTEMS ENGINEERING	3	0	0	3

COURSE OBJECTIVES

- To introduce system engineering concepts to design the manufacturing system for optimum utilization of source for effective functioning

UNIT 1	INTRODUCTION	9

Definitions of Systems Engineering, Systems Engineering Knowledge, Life cycles, Life-cycle phases, logical steps of systems engineering, Frame works for systems engineering.

UNIT 2	SYSTEMS ENGINEERING PROCESSES	9

Formulation of issues with a case study, Value system design, Functional analysis, Business Process Reengineering, Quality function deployment, System synthesis, Approaches for generation of alternatives.

UNIT 3	ANALYSIS OF ALTERNATIVES- I	9

Cross-impact analysis, Structural modelling tools, System Dynamics models with case studies, Economic models: present value analysis – NPV, Benefits and costs over time, ROI, IRR; Work and Cost breakdown structure.

UNIT 4	ANALYSIS OF ALTERNATIVES–II	9

Reliability, Availability, Maintainability, and Supportability models; Stochastic networks and Markov models, Queuing network optimization, Time series and Regression models, Evaluation of large scale models.

UNIT 5	DECISION ASSESSMENT	9

Decision assessment types, Five types of decision assessment efforts, Utility theory, Group decision making and Voting approaches, Social welfare function; Systems Engineering methods for Systems Engineering Management

Total: 45 Periods

COURSE OUTCOMES

Upon the completion of this course the students will be able to,

CO1	Explain in detail about core principles of Systems Engineering

CO2	Describe different Systems Engineering processes
CO3	Perform analysis of alternatives in Systems Engineering for dynamics models
CO4	Perform analysis of alternatives in Systems Engineering for large scale models
CO5	Describe the different ways for decision assessment for designing effective system

REFERENCES

1. George A Hazelrigg "Systems Engineering: An Approach to Information-Based Design", Prentice Hall, 1996.
2. Benjamin A and Walter J Fabrycky "Systems Engineering and Analysis", Prentice Hall, 1998.
3. Alexander Kossiakoff and William N Sweet "Systems Engineering Principles and Practice", Wiley Series in Systems Engineering and Management, 2011.
4. Charles S Wasson, "System Engineering Analysis, Design, and Development: Concepts, Principles, and Practices", Wiley Series in Systems Engineering and Management, 2005.
5. Ralph M. Stair, George Walter Reynolds, Thomas Chesney, "Principles of Business Information Systems", Cengage Learning, 2008.

COURSE CODE	COURSE NAME	L	T	P	C
191ME736	INDUSTRIAL SAFETY ENGINEERING	3	0	0	3

COURSE OBJECTIVES

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

UNIT 1	INTRODUCTION	9

Evolution of modern safety concepts – Fire prevention – Mechanical hazards – Boilers, Pressure vessels, Electrical Exposure.

UNIT 2	CHEMICAL HAZARDS	9

Chemical exposure – Toxic materials – Ionizing Radiation and Non-ionizing Radiation - Industrial Hygiene – Chemical Fire Hazards, Industrial Toxicology.

UNIT 3	ENVIRONMENTAL CONTROL	9

Industrial Health Hazards – Environmental Control – Industrial Noise - Noise measuring instruments, Control of Noise, Vibration, - Personal Protection.

UNIT 4	HAZARD ANALYSIS	9

System Safety Analysis –Techniques – Fault Tree Analysis (FTA), Failure Modes and Effects Analysis (FMEA), HAZOP analysis and Risk Assessment

UNIT 5	SAFETY REGULATIONS	9

Explosions – Disaster management – Pandemic related standards, OSHA standards, catastrophe control, hazard control, Safety education and training - Factories Act, Safety regulations Product safety – case studies.

Total: 45 Periods

COURSE OUTCOMES

Upon the completion of this course the students will be able to,

CO1	Explain modern safety concepts for engineering operations.
CO2	Identify and prevent chemical hazards through analysis.
CO3	Identify and prevent environmental hazards through analysis.
CO4	Identify and prevent mechanical hazard through analysis.

CO5	Apply proper safety techniques on safety engineering and management

REFERENCES

1. John V.Grimaldi, “Safety Management”, AITBS Publishers, 2003.
2. Safety Manual, “EDEL Engineering Consultancy”, 2000.
3. David L.Goetsch, “Occupational Safety and Health for Technologists”, 5th Edition, Engineers and Managers, Pearson Education Ltd., 2005.

COURSE CODE	COURSE NAME	L	T	P	C
191ME542	DESIGN THINKING	3	0	0	3

COURSE OBJECTIVES

- To provide step by step in-depth understanding on various aspects of innovation, creativity and evolving business modelsto students.

UNIT 1	INTRODUCTION TO DESIGN THINKING	9

Introduction - Create Thinking - Generating Design Ideas - Lateral Thinking – Analogies – Brainstorming - Mind mapping - National Group Technique – Synectics - Development of work - Analytical Thinking.

UNIT 2	EMPATHIZE PHASE	9

Identifying a design challenge- ways to conduct design research by observing and engaging- Deliverables for the Empathy Stage-A framework for empathy in design.

UNIT 3	ANALYZE PHASE	9

Use of empathy map, Organization of design concept and design methods, Engineering Design - Descriptive and prescriptive model, Design decisions and development of design.

UNIT 4	IDEATION PHASE	9

Steps in Ideate Phase, creative process and creative principles, Creativity techniques, Evaluation of ideas, How to prototype, Prototype Phase, Lean Startup Method for Prototype Development, Visualization and presentation techniques.

UNIT 5	TEST PHASE	9

Steps in test Phase, Tips for interviews, Tips for surveys, Kano Model, Desirability Testing, ways to conduct a workshop, Requirements for the space, Material requirements, Agility for Design Thinking.

Total: 45 Periods

COURSE OUTCOMES

Upon the completion of this course the students will be able to,

CO1	Apply the basic techniques for design thinking
CO2	Apply the techniques for empathizing a design thinking

CO3	Apply the techniques of design thinking for analysis
CO4	Apply the techniques of design thinking for ideation
CO5	Apply the techniques of design thinking for testing

REFERENCES

1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) Second Edition, 2013.
2. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011.
3. Otto. K and Wood, K, Product Design, Pearson Education, 2001.
4. Pahl. G and Beitz. G, Engineering Design, Springer, 1996.

COURSE CODE	COURSE NAME	L	T	P	C
191ME543	ENERGY CONSERVATION AND MANAGEMENT	3	0	0	3

COURSE OBJECTIVES

- To expose students to analysis the energy data of industries, carryout energy accounting and balancing, conduct energy audit and suggest methodologies for energy savings and utilize the available resources in optimal ways.

UNIT 1	INTRODUCTION	9

Energy - Power – Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization – Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing.

UNIT 2	ELECTRICAL SYSTEMS	9

Components of EB billing – HT and LT supply, Transformers, Cable Sizing, Concept of Capacitors, Power Factor Improvement, Harmonics, Electric Motors - Motor Efficiency Computation, Energy Efficient Motors, Illumination – Lux, Lumens, Types of lighting, Efficacy, LED Lighting and scope of Encon in Illumination.

UNIT 3	THERMAL SYSTEMS	9

Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and encon measures. Steam: Distribution &U sage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators& Refractories.

UNIT 4	ENERGY CONSERVATION IN MAJOR UTILITIES	9

Energy conservation inPumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets.

UNIT 5	ECONOMICS	9

Energy Economics – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing –ESCO concept .

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon the completion of this course the students will be able to,

CO1	Relate the analyze the energy data of industries and carry out energy accounting and balancing
CO2	Calculate the energy savings in electrical systems.

CO3	Calculate the energy savings in thermal systems
CO4	Carry out energy conservation procedures in major utilities
CO5	Suggest methodologies for energy savings

REFERENCES

1. Energy Manager Training Manual (4 Volumes) available at www.energymanager training.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004.
2. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management and Utilisation" Hemisphere Pub., Washington, 1988.
3. Callaghn, P.W. "Design and Management for Energy Conservation", Pergamon Press, Oxford, 1981.
4. Dryden. I.G.C., "The Efficient Use of Energy" Butterworths, London, 1982
5. Turner. W.C., "Energy Management Hand book", Wiley, New York, 1982.
6. Murphy. W.R. and G. Mc KAY, "Energy Management", Butterworths, London 1987.