CHIRALA ENGINEERING COLLEGE

Where Professionalism Speaks

(Sponsored by G.S.R. & T.S.R. Educational Society, Approved by AICTE - New Delhi, Affiliated to JNTU - Kakinada, Awarded 'A' Grade by APSCHE, An ISO 9001:2008 Certified Institution)

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

CHIRALA Engineering College believes in fostering an inclusive, value-based educational community. CECC has a number of units, including the NSS (National Service Scheme) team and the WEC (Women Empowerment Cell). The coordinators of the following units organize activities for various units and students are active in numerous initiatives and themes relevant to their studies such as Professional Ethics and Human Values, Environment and Sustainability.

JNTUK has an affiliation with Chirala Engineering College. The College, being an affiliated College, follows the University's curriculum. Gender, Environment and Sustainability, Human Values, and Professional Ethics are all included into the curriculum of the University. Every year, the College hosts Gender Equality programs that emphasize Woman Empowerment, health screenings, and other activities.

Professional Ethics and Human Values:

- Encourages students to make informed decisions in both personal and professional settings.
- Encourages students to understand values in life
- Explores the challenges that professionals confront when doing their responsibilities.

It is theoretically taught as a subject in the curriculum and applied practically through participation in NSS programs, seminars, and other related events.

Gender Sensitization:

- It educates young boys and girls on the importance of gender equality and instills positive values that empower girls and promote their rights.
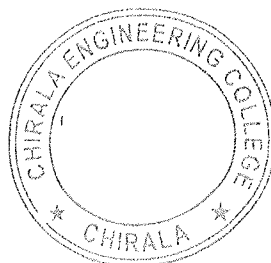
- Provides general leadership to the group in terms of gender mainstreaming in all areas of the Institution through targeted group discussion, debate, poster-building competitions, etc.
- It provides an integrated and cross-cutting perspective on the social and cultural pressures of gender that shape the lives of men and women in society.
- Generates awareness in regard to equality in law, social system and democratic activities.

Around 55% of the students in the college are girls. So, in order to facilitate a gender-sensitive environment, the college started WGC/ICC (Women Grievances Cell/Internal Compliance Committee in the year 2011 which creates awareness through lectures, seminars, talks, workshops, events and debates. Girls are motivated to participate and enroll in the NSS wing of the college as it develops strength, confidence and leadership qualities in them. It also deals with the complaints from girl students and resolves them through effective counseling.

Environment and sustainability:

Environmental science enables students to live a sustainable life and use natural resources effectively. Being aware of it allows students to work together to solve environmental issues that are present in our daily lives. Environmental Science is an integral part of the JNTUK curriculum that helps students understand our environmental challenges and find solutions to sustainably manage them. Through the course, students learn

- The Importance of Natural Resources and Conservation
- Rural and urban environmental issues and assessment
- Various attributes of pollution and its control
- Self-sustaining green campus: Water and waste management, plantation and rainwater harvesting

PRINCIPAL
CHIRALA ENGINEERING COLLEGE
CHIRALA.
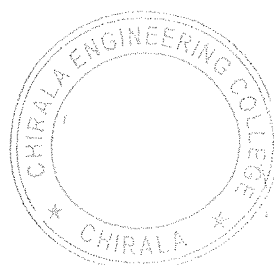
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India
DEPARTMENT OF MECHANICAL ENGINEERING

III B.TECH I SEMESTER

S No	Code	Course Title	Hours			Credits
			L	T	P	
1	PCC-7	Thermal Engineering-II	3	0	0	3
2	PCC-8	Design of Machine Members-I	3	0	0	3
3	PCC-9	Machining, Machine Tools & Metrology	3	0	0	3
4	OE-1	1. Sustainable Energy Technologies 2. Operations Research 3. Nano Technology 4. Thermal Management of Electronic systems	3	0	0	3
5	PE-1	1. Finite Element Methods 2. Industrial Robotics 3. Advanced Materials 4. Renewable Energy Sources 5. Mechanics of Composites 6. MOOCs (NPTEL/ Swayam) Course (12 Week duration)	3	0	0	3
6	PCC-L6	Machine Tools Lab	0	0	3	1.5
7	PCC-L7	Thermal Engineering Lab	0	0	3	1.5
8	SOC-3	Advanced Communication Skills Lab	1	0	2	2
9	MC – 4	Professional Ethics and Human Values	2	0	0	0
Evaluation of Summer Internship which is completed at the end of II B.Tech II Semester						1.5
					Total credits	**21.5**
		Honors/Minor courses	4	0	0	4

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DEPARTMENT OF MECHANICAL ENGINEERING

III Year - I Semester		L	T	P	C
		2	0	0	0
	PROFESSIONAL ETHICS AND HUMAN VALUES				

Course objective:
1) To understand the concepts of human values.
2) To gain knowledge about the principles of engineering ethics.
3) To interpret engineering as social experimentation.
4) To understand engineers' responsibility for safety and risk.
5) To gain knowledge about the engineers' rights and responsibilities.

UNIT– I:
HUMAN VALUES: Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing –Honesty –Courage – Value time – Co-operation – Commitment – Empathy –Self-confidence – Spirituality- Character.

UNIT– II:
ENGINEERING ETHICS:
The History of Ethics-Purposes for Engineering Ethics-Engineering Ethics-Consensus and Controversy –Professional and Professionalism –Professional Roles to be played by an Engineer – Self Interest, Customs and Religion-Uses of Ethical Theories-Professional Ethics-Types of Inquiry – Engineering and Ethics-Kohlberg's Theory – Gilligan's Argument –Heinz's Dilemma.

UNIT– III:
ENGINEERING AS SOCIAL EXPERIMENTATION:
Comparison with Standard Experiments – Knowledge gained –Conscientiousness – Relevant Information – Learning from the Past – Engineers as Managers, Consultants, and Leaders – Accountability – Role of Codes – Codes and Experimental Nature of Engineering.

UNIT– IV:
ENGINEERS' RESPONSIBILITY FOR SAFETY AND RISK:
Safety and Risk, Concept of Safety – Types of Risks – Voluntary v/s Involuntary Risk- Short term v/s Long term Consequences- Expected Probability- Reversible Effects- Threshold Levels for Risk-Delayed v/s Immediate Risk- Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

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UNIT– V:
ENGINEERS' RESPONSIBILITIES AND RIGHTS:
Collegiality-Techniques for Achieving Collegiality –Two Senses of Loyalty-obligations of Loyalty-misguided Loyalty – professionalism and Loyalty-Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Self-interest, Customs and Religion- Ethical egoism-Collective bargaining-Confidentiality-Acceptance of Bribes/Gifts-when is a Gift and a Bribe-examples of Gifts v/s Bribes-problem solving-interests in other companies-Occupational Crimes-industrial espionage-price fixing-endangering lives-Whistle Blowing-types of whistle blowing-when should it be attempted-preventing whistle blowing.

TEXT BOOKS:
1) Engineering Ethics and Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
2) Professional Ethics and Morals by Prof.A.R.Aryasri, Dharanikota, Suyodhana-Maruthi Publications.

REFERENCE BOOKS:
1) Professional Ethics and Human Values by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran-Laxmi Publications.
2) Professional Ethics and Human Values by Prof. D. R. Kiran, TMH.
3) Indian Culture, Values and Professional Ethics by P.S.R. Murthy-BS Publication.
4) Ethics in Engineering by Mike W. Martin and Roland Schinzinger– Tata McGraw-Hill – 2003.
5) Engineering Ethics by Harris, Pritchard and Robins, CENGAGE Learning, Indian Edition, 2009.

Course outcomes: At the end of the course, student will be able to
CO1: Judge the concepts of human values.
CO2: Justify knowledge about the principles of engineering ethics.
CO3: Interpret engineering as social experimentation.
CO4: Realize engineers' responsibility for safety and risk.
CO5: Learn about the engineers' rights and responsibilities.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE STRUCTURE

S. No	Course Code	Courses	L	T	P	Credits
**I Year – I SEMESTER**						
1	HS	Communicative English	3	0	0	3
2	BS	Mathematics - I (Calculus And Differential Equations)	3	0	0	3
3	BS	Applied Physics	3	0	0	3
4	ES	Programming for Problem Solving using C	3	0	0	3
5	ES	Computer Engineering Workshop	1	0	4	3
6	HS	English Communication Skills Laboratory	0	0	3	1.5
7	BS	Applied Physics Lab	0	0	3	1.5
8	ES	Programming for Problem Solving using C Lab	0	0	3	1.5
**Total Credits**				**19.5**		

S. No	Course Code	Courses	L	T	P	Credits
**I Year – II SEMESTER**						
1	BS	Mathematics – II (Linear Algebra And Numerical Methods)	3	0	0	3
2	BS	Applied Chemistry	3	0	0	3
3	ES	Computer Organization	3	0	0	3
4	ES	Python Programming	3	0	0	3
5	ES	Data Structures	3	0	0	3
6	BS	Applied Chemistry Lab	0	0	3	1.5
7	ES	Python Programming Lab	0	0	3	1.5
8	ES	Data Structures Lab	0	0	3	1.5
9	MC	Environment Science	2	0	0	0
**Total Credits**				**19.5**		

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I Year – II Semester		L	T	P	C
		2	0	0	0
	ENVIRONMENT SCIENCE				

Course Objectives:

The objectives of the course are to impart:

- Overall understanding of the natural resources.
- Basic understanding of the ecosystem and its diversity.
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
- An understanding of the environmental impact of developmental activities.
- Awareness on the social issues, environmental legislation and global treaties.

UNIT I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information technology in environment and human health.

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem; Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT II

Natural Resources: Natural resources and associated problems.

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.

Water resources: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

UNIT III

Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

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UNIT IV
Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Studies. Impact of Fire Crackers on Men and his well being.
Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.

UNIT V
Social Issues and the Environment: Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act - Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.

Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism, Green Campus – Green business and Green politics.

The student should Visit an Industry / Ecosystem and submit a report individually on an**y issues related to Environmental Studies course and make a power point presentation.**

Text Books:
1) Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2) Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3) Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

Reference Books:
1) Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2) A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3) Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4) Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014

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S. No	Course Code	Courses	L	T	P	Credits
		II Year – I SEMESTER				
1	BS	Mathematics III	3	0	0	3
2	CS	Object Oriented Programming through C++	3	0	0	3
3	CS	Operating Systems	3	0	0	3
4	CS	Software Engineering	3	0	0	3
5	CS	Mathematical Foundations of Computer Science	3	0	0	3
6	CS	Object Oriented Programming through C++ Lab	0	0	3	1.5
7	CS	Operating Systems Lab	0	0	3	1.5
8	CS	Software Engineering Lab	0	0	3	1.5
9	SO	**Skill oriented Course - I** Applications of Python-NumPy **OR** 2) Web Application Development Using Full Stack -Frontend Development – Module-I	0	0	4	2
10	MC	Constitution of India	2	0	0	0
		Total Credits				**21.5**

S. No	Course Code	Courses	L	T	P	Credits
		II Year – II SEMESTER				
1	BS	Probability and Statistics	3	0	0	3
2	CS	Database Management Systems	3	0	0	3
3	CS	Formal Languages and Automata Theory	3	0	0	3
4	ES	Java Programming	3	0	0	3
5	HS	Managerial Economics and Financial Accountancy	3	0	0	3
6	CS	Database Management Systems Lab	0	0	2	1
7	CS	R Programming Lab	0	1	2	2
8	ES	Java Programming Lab	0	0	3	1.5
9	SO	**Skill Oriented Course - II** Applications of Python-Pandas **OR** 2) Web Application Development Using Full Stack -Frontend Development –Module-II	0	0	4	2
		Total Credits				**21.5**
10	Minor	Operating Systems$	3	0	2	3+1
11	Honors	Any course from the Pool, as per the opted track	4	0	0	4

$- Integrated Course

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II Year - I Semester		L	T	P	C
		2	0	0	0
	CONSTITUTION OF INDIA				

Course Objectives:
- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative

Course Outcomes:

At the end of the course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
    1. Know the sources, features and principles of Indian Constitution.
    2. Learn about Union Government, State government and its administration.
    3. Get acquainted with Local administration and Pachayati Raj.
    4. Be aware of basic concepts and developments of Human Rights.
    5. Gain knowledge on roles and functioning of Election Commission

UNIT I
Introduction to Indian Constitution: Constitution meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

Learning outcomes: After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History, features of Indian constitution
- Evaluate Preamble Fundamental Rights and Duties

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UNIT II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre-State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, LokSabha, RajyaSabha, The Supreme Court and High Court: Powers and Functions;

Learning outcomes: After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of supreme court and High court

UNIT III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

Learning outcomes: After completion of this unit student will

- Understand the structure of state government
- Analyze the role Governor and Chief Minister
- Explain the role of state Secretariat
- Differentiate between structure and functions of state secretariat

UNIT IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: ZilaPanchayat, Elected officials and their roles, CEO ZilaPanchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

Learning outcomes:-After completion of this unit student will

- Understand the local Administration
- Compare and contrast district administration role and importance
- Analyze the role of Myer and elected representatives of Municipalities
- Evaluate Zillapanchayat block level organisation

UNIT V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

Learning outcomes: After completion of this unit student will
- Know the role of Election Commission apply knowledge
- Contrast and compare the role of Chief Election commissioner and Commissiononerate
- Analyze role of state election commission
- Evaluate various commissions of viz SC/ST/OBC and women

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KAKINADA–533003, Andhra Pradesh, India
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II B.Tech – I Semester

Sl. No	Course Components	Subjects	L	T	P	Credits
1	BSC	Mathematics– IV	3	0	0	3
2	PCC	Electronic Devices and Circuits	3	0	0	3
3	PCC	Electrical Circuit Analysis –II	3	0	0	3
4	PCC	DC Machines and Transformers	3	0	0	3
5	PCC	Electro Magnetic Fields	3	0	0	3
6	PCC	Electrical Circuits Lab	0	0	3	1.5
7	PCC	DC Machines and Transformers Lab	0	0	3	1.5
8	PCC	Electronic Devices and Circuits lab	0	0	3	1.5
9	SC	Skill oriented course - Design of Electrical Circuits using Engineering Software Tools	0	0	4	2
10	MC	Professional Ethics & Human Values	2	0	0	0
		Total Credits		**21.5**		

II B.Tech – II Semester

Sl. No	Course Components	Subjects	L	T	P	Credits
1	ESC	Python Programming	3	0	0	3
2	PCC	Digital Electronics	3	0	0	3
3	PCC	Power System-I	3	0	0	3
4	PCC	Induction and Synchronous Machines	3	0	0	3
5	HSMC	Managerial Economics & Financial Analysis	3	0	0	3
6	ESC	Python Programming Lab	0	0	3	1.5
7	PCC	Induction and Synchronous Machines Lab	0	0	3	1.5
8	PCC	Digital Electronics Lab	0	0	3	1.5
9	SC	Skill oriented course- IoT Applications of Electrical Engineering Lab	0	0	4	2
		Total Credits		**21.5**		
		Minors Course*	4	0	0	4
		Honors Course*	4	0	0	4

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II Year I Semester		L	T	P	C
		2	0	0	0

PROFESSIONAL ETHICS & HUMAN VALUES

Preamble:
This course is a mandatory course introduced to impart the Ethics and Human Values to the students in engineering education.

Course Objectives:
- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of others
- To create awareness on assessment of safety and risk

UNIT -I
Human Values:
Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others –Living Peacefully –Caring –Sharing –Honesty -Courage-Cooperation– Commitment – Empathy –Self Confidence Character –Spirituality.

Learning outcomes:
1. Learn about morals, values & work ethics.
2. Learn to respect others and develop civic virtue.
3. Develop commitment
4. Learn how to live peacefully

UNIT -II
Engineering Ethics:
Senses of 'Engineering Ethics-Variety of moral issued –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 –Valuing time –Cooperation –Commitment.

Learning outcomes:
1. Learn about the ethical responsibilities of the engineers.
2. Create awareness about the customs and religions.
3. Learn time management
4. Learn about the different professional roles.

UNIT -III
Engineering as Social Experimentation:
Engineering As Social Experimentation –Framing the problem –Determining the facts – Codes of Ethics –Clarifying Concepts –Application issues –Common Ground -General Principles –Utilitarian thinking respect for persons.

Learning outcomes:
1. Demonstrate knowledge to become a social experimenter.
2. Provide depth knowledge on framing of the problem and determining the facts.
3. Provide depth knowledge on codes of ethics.
4. Develop utilitarian thinking

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT -IV
Engineers Responsibility for Safety and Risk:
Safety and risk –Assessment of safety and risk –Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety-Intellectual Property rights (IPR).
Learning outcomes:
1. Create awareness about safety, risk & risk benefit analysis.
2. Engineer's design practices for providing safety.
3. Provide knowledge on intellectual property rights.

UINIT- V
Global Issues:
Globalization –Cross-culture issues-Environmental Ethics –Computer Ethics –Computers as the instrument of Unethical behavior –Computers as the object of Unethical acts – Autonomous Computers-Computer codes of Ethics –Weapons Development -Ethics and Research –Analyzing Ethical Problems in research.
Learning outcomes:
1. Develop knowledge about global issues.
2. Create awareness on computer and environmental ethics
3. Analyze ethical problems in research.
4. Give a picture on weapons development.

Course outcomes:
Students will be able to:
- Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
- Identify the multiple ethical interests at stake in a real-world situation or practice
- Articulate what makes a particular course of action ethically defensible
- Assess their own ethical values and the social context of problems
- Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
- Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
- Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.

Text Books:
1) "Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan and, V.S.Senthil Kumar-PHI Learning Pvt. Ltd-2009
2) "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
3) "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger –Tata McGraw-Hill–2003.
4) "Professional Ethics and Morals" by Prof.A.R.Aryasri, DharanikotaSuyodhana-Maruthi Publications.
5) "Professional Ethics and Human Values" by A.Alavudeen, R.KalilRahman and M. Jayakumaran, Laxmi Publications.
6) "Professional Ethics and Human Values" by Prof.D.R.Kiran-"Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication

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KAKINADA – 533 003, Andhra Pradesh, India
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE-R19

III Year – I SEMESTER

S. No	Course Code	Subjects	Category	L	T	P	Credits
1		Power Systems-II	EE	3	--	--	3
2		Power Electronics	EE	3	--	--	3
3		Linear IC Applications	ES	3	--	--	3
4		Digital Signal Processing	EE	3	--	--	3
5		Microprocessors and Microcontrollers	EE	3	--	--	3
6		Electrical Machines-II Laboratory	EE	--	--	3	1.5
7		Control Systems Laboratory	EE	--	--	2	1
8		Electrical Measurements & Instrumentation Laboratory	EE	--	--	3	1.5
9		Socially Relevant Projects	MC	--	--	1	1
		Total Credits		**15**	**0**	**9**	**20**

III Year – II SEMESTER

S. No	Course Code	Subjects	Category	L	T	P	Credits
1		Electric Drives	EE	3	--	--	3
2		Power System Analysis	EE	3	--	--	3
3		Data Structures	ES	3	--	--	3
4		Digital Control Systems	EE	3	--	--	3
5		**Elective - I**	EL	3	--	--	3
6		**Open Elective - I**	OE	3	--	--	3
7		Power Electronics Laboratory	EE	--	--	3	1.5
8		Microprocessors & Microcontrollers Laboratory	EE	--	--	3	1.5
9		Employability Skills	MC	3	--	--	0
		Total Credits		**18**		**6**	**21**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE-R19

III Year – I SEMESTER		L	T	P	C
		0	0	1	1
	SOCIALLY RELAVENT PROJECTS				

Preamble:

There is lot of scientific and technological changes in the nation during last few decades in almost all the sectors. The state and central governments are introducing many schemes to all classes of people of the nation to increase the productivity in various sectors. India is a rural centric nation and the fruits of the scientific inventions and new technology shall be shared among all remote corners of the nation. With this aim, a socially relevant project is newly introduced in the curriculum with an objective of taking up the projects relevant to the societal needs.

Objectives:

(1) The student(s) shall explore the technological needs of society

(2) The student(s) shall understand the technological problems of society

General guidelines:

- A socially relevant project shall be a community service based project and it shall be innovative.
- A student has to pursue the socially relevant project to solve real life and pressing problems of society.
- The pursued socially relevant projects shall contribute to national development goals and priorities.
- Socially relevant project can be carried out by an individual student or by a team of maximum 5 of concerned department.
- The student(s) shall visit the society (Villages/Hospitals/Social Service Organizations etc) to identify the problem and conduct literature survey and provide a feasible solution.
- The socially relevant project selected shall be in the broad area of concerned discipline of course. Preference shall be given to rural societal problems.
- Each team shall work under the supervision of a faculty member of the concerned department.
- If the course is offered in II Year I Semester, the student or team of students shall complete this project during the vacation after I Year and so on.
- The duration of the project is about 15 to 20 hrs in total and students may split total duration into 2 to 3 hrs per day based convenience. The attendance shall be maintained by the supervisor.

Sample Projects (but not limited to):

(i) Energy Auditing in a rural village (ii) Smart starting and control of motors in agriculture and aqua fields (iii) TV Remote Operated Domestic Appliances Control (iv) Solar Powered Auto Irrigation System (v) Auto Intensity Control of Street Lights (vi) Hidden Active Cell Phone Detector (vii) Railway Track Security System (viii) Solar

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE-R19

Power Charge Controller (ix) Home Automation System Using Digital Control (x) Intelligent Overhead Tank Water Level Indicator (xi) Pre Stampede Monitoring and Alarm System (xii) Detect Rash Driving Speed Checker System on Highways

Outcomes

(1) The student(s) are be able to provide a solutions the technological problems of society

(1) The student(s) is able suggest technological changes which suits current needs of society

(2) The student(s) are able to explain new technologies available for problems of the society.

Reference:

(1) Web Link: http://iitk.ac.in/new/socially-relevant-research

(2) https://csie.iitm.ac.in/SocialProjectsIITM.html

(3) http://www.iitkgp.ac.in/files/csr/csr_education.pdf

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III Year – I Semester

S. No.	Course	Category	L	T	P	Credits
1	Linear Integrated Circuits and Applications	PC	3	0	0	3
2	Microprocessor and Microcontrollers	PC	3	0	0	3
3	Digital Communications	PC	3	0	0	3
4	Electronic Measurements & Instrumentation	PC	3	0	0	3
5	Professional Elective (PE 1)	PE	3	0	0	3
6	Linear Integrated Circuits and Applications - Lab	LC	0	0	3	1.5
7	Digital Communications Lab	LC	0	0	3	1.5
8	Microprocessor and Microcontrollers - Lab	LC	0	0	3	1.5
9	Mini Project with Hardware Development	PR	0	0	3	1.5
10	Essence of Indian Traditional Knowledge	MC	3	0	0	0
					Sub-Total	**21**

III Year – IISemester

S. No.	Course	Category	L	T	P	Credits
1	Wired and Wireless Transmission Devices	PC	3	0	0	3
2	VLSI Design	PC	3	0	0	3
3	Digital Signal Processing	PC	3	0	0	3
4	Professional Elective (PE2)	PE	3	0	0	3
5	Open Elective (OE1)	OE	3	0	0	3
6	Internet of Things	PC	3	0	0	3
7	VLSI Lab	LC	0	0	3	1.5
8	Digital Signal Processing Lab	LC	0	0	3	1.5
9	Intellectual Property Rights (IPR) & Patents	MC	3	0	0	0
					Sub-Total	**21**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

III Year - I Semester		L	T	P	C
		3	0	0	0
	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE				

Course Objectives:
To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system

- The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledgesystem
- To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act2003
- The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge andprotection
- To know the student traditional knowledge in differentsector

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

- Understand the concept of Traditional knowledge and itsimportance
- Know the need and importance of protecting traditionalknowledge
- Know the various enactments related to the protection of traditionalknowledge
- Understand the concepts of Intellectual property to protect the traditionalknowledge

UNIT I
Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge
Learning Outcomes:
At the end of the unit, the student will able to:

- Understand the traditionalknowledge.
- Contrast and compare characteristics importance kinds of traditionalknowledge.
- Analyze physical and social contexts of traditionalknowledge.
- Evaluate social change on traditionalknowledge.

UNIT II
Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.
Learning Outcomes:
At the end of the unit, the student will able to:

- Know the need of protecting traditionalknowledge.
- Apply significance of tkprotection.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

- Analyze the value of tk in globaleconomy.
- Evaluate role ofgovernment

UNIT III

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

Learning Outcomes:

At the end of the unit the student will able to:

- Understand legal framework ofTK.
- Contrast and compare the ST and other traditional forestdwellers
- Analyze plant variantprotections
- Evaluate farmers rightact

UNIT IV

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Learning Outcomes:

At the end of the unit, the student will ableto:

- Understand TK andIPR
- Apply systems of TKprotection.
- Analyze legal concepts for the protection ofTK.
- Evaluate strategies to increase the protection ofTK.

UNIT V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Learning Outcomes:

At the end of the unit, the student will able to:

- Know TK in differentsectors.
- Apply TK inengineering.
- Analyze TK in varioussectors.
- Evaluate food security and protection of TK in thecountry.

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Reference Books:
1) Traditional Knowledge System in India, by Amit Jha,2009.
2) Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, PratibhaPrakashan2012.
3) Traditional Knowledge System in India by Amit Jha Atlantic publishers,2002
4) "Knowledge Traditions and Practices of India" Kapil Kapoor, MichelDanino

e-Resources:
1) https://www.youtube.com/watch?v=LZP1StpYEPM
2) http://nptel.ac.in/courses/121106003/

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III Year - II Semester		L	T	P	C
		3	0	0	0
	Intellectual Property Rights (IPR) & Patents				

UNIT I

Introduction to Intellectual Property Rights (IPR): Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO -Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR - Layout Designs and Integrated Circuits – Use and Misuse of Intellectual PropertyRights.

UNIT II

Copyrights and Neighboring Rights: Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers **–** Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip ProtectionAct.

UNIT III

Patents: Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations - Ownership and Transfer –– Revocation of Patent – Patent Appellate Board - Infringement of Patent – Compulsory Licensing –– Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer relatedInnovations

UNIT IV

Trademarks: Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities

Likelihood of Confusion - Dilution of Ownership – Trademarks Claims and Infringement – Remedies – Passing Off Action.

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UNIT V

Trade Secrets & Cyber Law and Cyber Crime: Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets–

Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law.

Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions –

E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers.

References:

1) Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, NewDelhi.
2) Deborah E.Bouchoux: Intellectual Property, Cengage Learning, NewDelhi.
3) PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, NewDelhi
4) Richard Stim: Intellectual Property, Cengage Learning, NewDelhi.
5) Kompal Bansal &Parishit Bansal Fundamentals of IPR for Engineers, B. S. Publications (Press).
6) Cyber Law - Texts & Cases, South-Western's Special TopicsCollections.
7) R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.
8) M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, SerialsPub.

Course Outcomes:

- IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seekPatents
- Student get an insight on Copyrights, Patents and Software patents which are instrumental for furtheradvancements
- advanced Technical and Scientific disciplines
- Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latestdevelopments

III Year - I Semester

S.No.	Subjects	L	T	P	Credits
1	Computer Architecture and Organization	4	--	--	3
2	Linear I C Applications	4	--	--	3
3	Digital I C Applications	4	--	--	3
4	Digital Communications	4	--	--	3
5	Antenna and Wave Propagation	4	--	--	3
6	Pulse and Digital Circuits Lab	--	--	3	2
7	Linear I C Applications Lab	--	--	3	2
8	Digital I C Applications Lab	--	--	3	2
MC	Professional Ethics & Human Values	--	3	--	--
	Total Credits				**21**

III Year - II Semester

S.No.	Subjects	L	T	P	Credits
1	Micro Processors & Micro Controllers	4	--	--	3
2	Micro Wave Engineering	4	--	--	3
3	VLSI Design	4	--	--	3
4	Digital Signal Processing	4	--	--	3
5	**OPEN ELECTIVE** 1. OOPs through Java 2. Data Mining 3. Industrial Robotics 4. Power Electronics 5. Bio-Medical Engineering 6. Artificial Neural Networks	4	--	--	3
6	Micro Processors & Micro Controllers Lab	--	--	3	2
7	VLSI Lab	--	--	3	2
8	Digital Communications Lab	--	--	3	2
MC	IPR & Patents	--	2	--	--
	Total Credits				**21**

	L	**T**	**P**	**C**
III Year - I Semester	**0**	**3**	**0**	**0**

PROFESSIONAL ETHICSAND HUMAN VALUES

Course Objectives:

*To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
*Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

UNIT I: Human Values:
Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT: II: Principles for Harmony:
Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias - Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT III: Engineering Ethics and Social Experimentation:
History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism — Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument –Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past –Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:
Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/sInvoluntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk - Delayed v/sImmediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:
Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights –Confidential and Proprietary Information - Conflict of Interest-Ethical egoism - Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes- Industrial Espionage- Price Fixing-Whistle Blowing.

UNIT VI: Global Issues:
Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics - Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights.

- Related Cases Shall be dealt where ever necessary.

Outcome:
***It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.**
***It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.**

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana - Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M. Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill - 2013
9. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

II Year – ISemester

S. No.	Course	Category	L	T	P	Credits
1	Electronic Devices and Circuits	PC	3	0	0	3
2	Switching Theory and Logic Design	PC	3	0	0	3
3	Signals and Systems	PC	3	0	0	3
4	Random Variables and Stochastic Processes	PC	3	0	0	3
5	Object Oriented Programming through Java	ES	3	0	0	3
6	Managerial Economics & Financial Analysis	HS	3	0	0	3
7	Electronic Devices and Circuits - Lab	LC	0	0	3	1.5
8	Switching Theory and Logic Design - Lab	LC	0	0	3	1.5
9	Constitution of India	MC	3	0	0	0
			Sub-Total			**21**

II Year – IISemester

S. No.	Course	Category	L	T	P	Credits
1	Electronic Circuit Analysis	PC	3	0	0	3
2	Linear Control Systems	PC	3	0	0	3
3	Electromagnetic Waves and Transmission Lines	PC	3	0	0	3
4	Analog Communications	PC	3	0	0	3
5	Computer Architecture and Organization	ES	3	0	0	3
6	Management and Organizational Behavior	HS	3	0	0	3
7	Electronic Circuit Analysis - Lab	LC	0	0	3	1.5
8	Analog Communications - Lab	LC	0	0	3	1.5
			Sub-Total			**21**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

II Year-II Semester		**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
	MANAGEMENT and ORGANISATIONAL BEHAVIOUR				

Course Objectives:

- To familiarize with the process of management, principles, leadership styles andbasic concepts onOrganization.
- To provide conceptual knowledge on functional management that is on Human resource management and Marketingmanagement.
- To provide basic insight into select contemporary management practices and Strategic Management.
- To learn theories of motivationand also deals with individual behavior, their personality and perception ofindividuals.
- To understand about organizations groups that affect the climate of anentire organizations which helps employees in stressmanagement.

Unit I

Introduction: Management and organizational concepts of management and organization-Nature and Importance of Management, Functions of Management, System approach to Management - Taylor's Scientific Management Theory, Fayol's Principles of Management, Leadership Styles, Social responsibilities of Management. Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, MBO, Process and concepts.

Unit II

Functional Management: Human Resource Management (HRM) Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Wage and Salary Administration Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating. - Marketing Management: Concepts of Marketing, Marketing mixelements and marketingstrategies.

Unit III

Strategic Management: Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

Unit IV

Individual Behavior: Perception-Perceptual process- Impression management- Personality development – Socialization – Attitude- Process- Formation- Positive attitude- Change – Learning – Learning organizations- Reinforcement Motivation – Process- Motives – Theories of

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Motivation: Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation,

Unit V
Group Dynamics: Types of Groups, Stages of Group Development, Group Behaviour and Group Performance Factors, Organizational conflicts: Reasons for Conflicts, Consequences of Conflictsin
Organization, Types of Conflicts, Strategies for Managing Conflicts, Organizational Climate and Culture, Stress, Causes and effects, coping strategies of stress.

Reference Books:
1. Subba Rao P., *Organizational Behaviour,* Himalaya Publishing House.Mumbai.
2. Fred Luthans *Organizational Behaviour*, TMH, NewDelhi.
3. Robins, Stephen P., *Fundamentals of Management,* Pearson,India.
4. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI,2007
5. Koontz & Weihrich: *Essentials of Management*, 6/e, TMH,2007
6. Kanishka Bedi, *Production and Operations Management*, Oxford University Press,2007.

Course Outcomes:
- After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizationalstructure.
- Will familiarize with the concepts of functional management that is HRM and Marketing of new productdevelopments.
- The learner is able to think in strategically through contemporary managementpractices.
- The learner can develop positive attitude through personality development and can equip with motivationaltheories.
- The student can attain the group performance and grievance handling in managing the organizationalculture.

III Year - I Semester

S. No.	Subjects	L	T	P	Credits
1	Compiler Design	4	--	--	3
2	Unix Programming	4	--	--	3
3	Object Oriented Analysis and Design using UML	4	--	--	3
4	Database Management Systems	4	--	--	3
5	Operating Systems	4	--	--	3
6	Unified Modeling Lab	--	--	3	2
7	Operating System & Linux Programming Lab	--	--	3	2
8	Database Management System Lab	--	--	3	2
MC	Professional Ethics & Human Values	--	3	--	--
	Total Credits				**21**

III Year - II Semester

S. No.	Subjects	L	T	P	Credits
1	Computer Networks	4	2	--	3
2	Data Warehousing and Mining	4	--	--	3
3	Design and Analysis of Algorithms	4	--	--	3
4	Software Testing Methodologies	4	--	--	3
5	**Open Elective:** i. Artificial Intelligence ii. Internet of Things iii Cyber Security iv.Digital Signal Processing v.Embbeded Systems vi. Robotics	4	--	--	3
6	Network Programming Lab	--	--	3	2
7	Software Testing Lab	--	--	3	2
8	Data Warehousing and Mining Lab	--	--	3	2
9	IPR & Patents	--	2	--	--
	Total Credits				**21**

	L	T	P	C
III Year – I Semester	0	3	0	0

PROFESSIONAL ETHICSAND HUMAN VALUES

Course Objectives:

*To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.

*Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

UNIT I: Human Values:

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UNIT: II: Principles for Harmony:

Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias - Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

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History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism —Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument – Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past – Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:

Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/sInvoluntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk - Delayed v/sImmediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:

Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights – Confidential and Proprietary Information - Conflict of Interest-Ethical egoism - Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes-Industrial Espionage- Price Fixing-Whistle Blowing.

UNIT VI: Global Issues:

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics - Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights.

- Related Cases Shall be dealt where ever necessary.

Outcome:
*It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
*It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.

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3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana - Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
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6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M. Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill - 2013
9. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications

	L	T	P	C
III Year - II Semester	0	2	0	0

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

UNIT I: Introduction to Intellectual Property Rights (IPR)
Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO -Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR - Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.

UNIT II: Copyrights and Neighboring Rights
Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers **–** Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act.

UNIT III: Patents
Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations - Ownership and Transfer — Revocation of Patent – Patent Appellate Board - Infringement of Patent – Double Patenting — Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related Innovations.

UNIT IV: Trademarks
Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership – Trademarks Claims and Infringement – Remedies – Passing Off Action.

UNIT V: Trade Secrets
Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreements – Breach of Contract – Law of Unfair Competition – Trade Secret Litigation – Applying State Law.

UNIT VI: Cyber Law and Cyber Crime
Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions - E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers.

- Relevant Cases Shall be dealt where ever necessary.

References:

1. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.
2. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
3. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, New Delhi
4. Richard Stim: Intellectual Property, Cengage Learning, New Delhi.
5. Kompal Bansal &Parishit Bansal Fundamentals of IPR for Engineers, B. S. Publications (Press).
6. Cyber Law - Texts & Cases, South-Western's Special Topics Collections.
7. R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.
8. M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, Serials Pub.

III Year - I Semester

S. No.	Subjects	L	T	P	Credits
1	Management Science	4	--	--	3
2	Engineering Geology	4	--	--	3
3	Structural Analysis -II	4	--	--	3
4	Design & Drawing of Reinforced Concrete Structures	4	2	--	3
5	Transportation Engineering - II	4	--	--	3
6	Concrete Technology Lab	--	--	3	2
7	Geology Lab	--	--	3	2
8	Transportation Engineering Lab	--	--	3	2
	Total Credits				**21**

III Year - II Semester

S. No.	Subjects	L	T	P	Credits
1	Design & Drawing of Steel Structures	4	2	--	3
2	Geotechnical Engineering - I	4	--	--	3
3	Environmental Engineering -I	4	--	--	3
4	Water Resource Engineering -I	4	--	--	3
5	**OPEN ELECTIVE** i. Electronic Instrumentation ii. Data Base Management Systems iii. Alternative Energy Sources iv. Waste water Management v. Fundamentals of Liquefied Natural Gas vi. Green Fuel Technologies	4	--	--	3
6	Geotechnical Engineering Lab	--	--	3	2
7	Environmental Engineering Lab	--	--	3	2
8	Computer Aided Engineering Lab	--	--	3	2
	Total Credits				**21**

GREEN FUEL TECHNOLOGIES

Learning Objectives:

The students will be imparted the knowledge of:

- Various green fuel technologies available worldwide.
- Production of Bio-ethanol from crops, molasses and cellulosic bio mass.
- Production of Bio-diesel from plant seeds, algae, and by utilizing supercritical process.
- Methane gas production utilizing bio digesters.

UNIT-I:

Introduction: Plant based biofuels- World biofuels scenario- Thermochemical conversion of biomass to liquids and gaseous fuels.

UNIT-II:

Bioethanol from crops – Cane sugar: Production of ethanol from molasses - Bioethanol from starchy biomass: Production of starch Saccharifying enzymes - Hydrolysis and fermentation.

UNIT-III:

Bioethanol from lignocellulosic biomass: Pretreatment of the substrates-Production of Cellulases and Hemicellulases- Hydrolysis and fermentation.

UNIT-IV:

Biodiesel production technologies and substrates- Lipase-catalyzed preparation of biodiesel-Biodiesel production with supercritical fluid technologies; Biodiesel from algae: Algaculture-Challenges-Algaculture for biodiesel production

UNIT-V:

Biodiesel from different plant seeds: Palm oil diesel production and its experimental test on a diesel engine - Biodiesel production using karanja (pongamia pinnata) and jatropha (jatropha curcas) seed oil - Biodiesel production form rubber seed oil and other vegetable oils.

UNIT-VI:

Microbial production of methane: Different types of bio-digesters and biogas technology in India.

Outcomes:

The students will have basic knowledge on:

- What are green fuel technologies
- How bio-ethanol, bio diesel & Methane are produced from crops, cellulosic biomass, plant seeds & bio digester.

TEXT BOOKS:

1. Hand book of Plant Based Biofuels, Ashok Pandey, CRC Press, 2009.
2. Biofuels Engineering Process Technology, Caye M. Drapcho, Nghiem Phu Nhuan, Terry H. Walker, McGraw-Hill, 2008.

L	T	P	C
0	0	3	2

III Year - II Semester

ENVIRONMENTAL ENGINEERING LAB

Course Learning Objectives:

The course will address the following:

- Estimation some important characteristics of water and wastewater in the laboratory
- It also gives the significance of the characteristics of the water and wastewater

Course Outcomes:

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

- Estimation some important characteristics of water and wastewater in the laboratory
- Draw some conclusion and decide whether the water is potable or not.
- Decide whether the water body is polluted or not with reference to the state parameters in the list of experiments
- Estimation of the strength of the sewage in terms of BOD and COD

SYLLABUS:

List of Experiments

1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil.

2. Determination and estimation of Total Hardness–Calcium & Magnesium.

3. Determination of Alkalinity/Acidity

4. Determination of Chlorides in water and soil

5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone.

6. Determination of Iron.

7. Determination of Dissolved Oxygen with D.O. Meter & Wrinklers Method and B.O.D.

8. Determination of N, P, K values in solid waste

9. Physical parameters – Temperature, Colour, Odour, Turbidity, Taste.

10. Determination of C.O.D.

11. Determination of Optimum coagulant dose.

12. Determination of Chlorine demand.

13. Presumptive Coliform test.

NOTE: At least 10 of the above experiments are to be conducted.

List of Equipments

1) pH meter

2) Turbidity meter

3) Conductivity meter

4) Hot air oven

5) Muffle furnace

6) Dissolved Oxygen meter

7) U–V visible spectrophotometer

8) COD Reflux Apparatus

9) Jar Test Apparatus

10) BOD incubator

11) Autoclave

12) Laminar flow chamber

13) Hazen's Apparatus

Text Books

1. Standard Methods for Analysis of Water and Waste Water – APHA

2. Chemical Analysis of Water and Soil by KVSG Murali Krishna, Reem Publications, New Delhi

Reference

1. Relevant IS Codes.

2. Chemistry for Environmental Engineering by Sawyer and Mc. Carty.