

## 19FYC21 ENVIRONMENTAL SCIENCE AND ENGINEERING

L	T	P	C
3	0	0	1

### ASSESSMENT : THEORY

#### COURSE OBJECTIVE

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

#### COURSE OUTCOME

The students completing the course will have

- An insight into the chemical reactions in water, air and soil environment.
- The ability to apply chemistry principles in analysing pollution of water, air and environment
- An understanding on the fate of chemicals on the environment and suggest relevant interventions
- An insight into the environmental protection act and associated rules knowledge on the institutional setup for environment management and pollution control.

#### NATURAL RESOURCES

Forest resources: Use and over-exploitation, deforestation, Water resources, Use and over-utilization of surfaces 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 agriculture

and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity  
(9)

### **RENEWABLE ENERGY RESOURCE AND ENVIRONMENTAL POLLUTION**

Energy resources – growing energy needs, renewable and non-renewable energy sources, uses of alternative energy sources – merits and limitation of solar energy-wind and tidal energy-OTEC-Geothermal energy-Hydel energy.

Sources, causes, effects and management of air pollution, water pollution, soil pollution, noise pollution, marine pollution and radioactive pollution Solid waste water Management (9)

### **ECOSYSTEM AND BIODIVERSITY**

Concept of an ecosystem-structure and functions-ecological succession, food chain, food webs and ecological pyramids: Introduction, types, characteristic features, structure and function of forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem (Ponds lakes, ocean and rivers).

Biodiversity-types, Importance and values of biodiversity, India as a mega diversity nation, Hot spots of biodiversity, Threats to biodiversity and Conservation of biodiversity, (9)

### **ENVIRONMENTAL AND BIOTECHNOLOGY AND GREEN CHEMISTRY**

Biotechnology and its applications in environment protection, Bioinformatics-Bioremediation-Bio deodorization, Green chemistry for green technology, significance of green chemistry-basic components of green chemistry, Industrial application of green chemistry –green fuels-e-green propellants and biocatalysts.

(9)

### **GLOBAL ENVIRONMENTAL ISSUES AND MANAGEMENT**

Water conservation, Rain water harvesting, Environmental Ethics, Climate change, Ozone depletion, Acid rain and Greenhouse effect and global warming, Environment (protection) Act, Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act, Wildlife protection Act and Forest (conservation) Act, Disaster management-Earthquakes, Floods, Landslides and cyclones. (9)

**TOTAL:45**

### **TEXT BOOKS**

1. Surender Deswal and Dr. Aunpama Deswal, A Basic Course in Environmental Studies, (2017) DhanpatRaj & Co.

2. Anubha Kaushik and CP Kaushik, Perspectives in Environmental Studies, 6<sup>th</sup> Edition (2015), New Age International (P) Ltd.

### **REFERENCE BOOKS**

1. Benny Joseph, Environmental Studies, (2017) 3<sup>rd</sup> Edition, McGraw Hill India

2. Dr. S.S. Dara and Dr. D.D. Mishra, A Text book of Environmental Chemistry and Pollution Control (2010), S Chand & Company.

## 19HSS01 - SCIENCE OF CREATIVITY AND PROFESSIONAL ETHICS

L	T	P	C
1	0	0	1

### ASSESSMENT : THEORY

#### COURSE OUTCOMES

**CO1** : Describe the principles of karma yoga and functioning of mind and consciousness.

**CO2** : Hypothesize the evolution of Universe and living beings in a global and societal context

**CO3** : Infer the principles of Yoga to practice it and know the value of health.

**CO4** : Interpret the philosophy of introspection procedures for better living

**CO5** : Assess, take personal responsibility and follow professional ethics for sustained growth in career and life.

#### LIFE FORCE, MIND AND CONSCIOUSNESS

Science of Creativity and Personality Development - Objectives - Principles of Karma Yoga - Duty Consciousness – Communism and Capitalism - Law of Nature - Life Force - Origin - Potentiality of the Life Force - Premordial State - Wave Theory - Consciousness- PanchaThanmatras - Secret of Revelations - Mind - Biomagnetism - Physical Transformation of Biomagnetism. (7)

#### EVOLUTION OF THE UNIVERSE AND LIVING BEINGS

Evolution of the Universe: Creation Theory - Evolution Theory - Theory of Permanence - Theory of Mithya - Evolution of Living Beings: Absolute Space and Force - Plants Experience Pain - Two Eyes and Two Ears - Seven Constituent Layers in the Body. (5)

#### YOGA AND ITS BENEFITS

Simple and Safe Yoga - Upa Yoga Practices: Yoga for Peace - Yoga for Health - Yoga for Joy - Yoga for Love - Yoga for Wellbeing - Yoga for Success. Physical Exercise - Meditation - Seven Centers of Meditation - Benefits - Effect of Good Vibrations -Cause and Effect System -Food and Health. (6)

#### INTROSPECTION

Attachment, Detachment and Moderation in Enjoyment - Imaginary Expectations - Harmony in Life: Self, Family, Society and Nature - Introspection: Analysis of Thought, Moralization of Desire, Neutralization of Anger, Eradication of Worries and Self Realization. (6)

## **HUMAN VALUES**

Morals, Values and Ethics - Integrity - Work Ethics - Service Learning - Virtues - Respect for Others - Living Peacefully – Caring - Sharing - Honesty - Courage - Valuing Time - Co-operation - Commitment - Empathy - Self Confidence - Challenges in Work Place - Impact of cyberspace on individuals. (6)

**TOTAL : 30**

## **TEXT BOOKS**

1. YogirajVethathri Maharishi, "Karma Yoga - The Holistic Unity", Vethathri Publications, IV Edition, 2009. (Chapters 1-7, 10-12)
2. R.S.Naagarazan, "A Textbook on Professional Ethics and Human Values", New Age International Publishers, New Delhi, 2011.

## **REFERENCES**

1. Sadhguru, "Body the Greatest Gadget and Mind is your Business", Diamond Pocket Books Pvt. Ltd, Isha Foundations, 2013.
2. Swami Vivekananda and Swami Nikhilananda, "Karma Yoga and Bhakti Yoga", II Edition, Ramakrishna Vivekananda Publications, 2008.
3. Henry Dreyfuss, "The Measure of Man and Woman: Human Factors in Design", John Wiley and Sons Publications, 2012.
4. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", IV Edition, McGraw Hill, NewYork, 2005.
5. M. Govindarajan, S. Natarajan, V.S. Senthilkumar, "Engineering Ethics", I Edition, Prentice Hall of India, 2009.

## 15HSS01 - SCIENCE OF CREATIVITY AND PROFESSIONAL ETHICS

### ASSESSMENT: THEORY

L	T	P	C
1	0	0	1

### COURSE OUTCOME

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

- CO1. Describe the principles of karma yoga and functioning of mind and consciousness.
- CO2. Hypothesize the evolution of Universe and living beings in a global and societal context
- CO3. Infer the principles of Yoga to practice it and know the value of health.
- CO4. Interpret the philosophy of introspection procedures for better living
- CO5. Assess, take personal responsibility and follow professional ethics for sustained growth in career and life

### LIFE FORCE, MIND AND CONSCIOUSNESS

Science of Creativity and Personality Development – Objectives - Principles of Karma Yoga – Duty Consciousness – Communism and Capitalism – Law of Nature - Life Force – Origin – Potentiality of the Life Force - Premordial State – Wave Theory – Consciousness - Pancha Thanmatras – Secret of Revelations – Mind - Biomagnetism – Physical Transformation of Biomagnetism. (7)

### EVOLUTION OF THE UNIVERSE AND LIVING BEINGS

Evolution of the Universe: Creation Theory – Evolution Theory – Theory of Permanence – Theory of Mithya – Evolution of Living Beings: Absolute Space and Force - Plants Experience Pain – Two Eyes and Two Ears – Seven Constituent Layers in the Body. (5)

### YOGA AND ITS BENEFITS

Simple and Safe Yoga – Upa Yoga Practices: Yoga for Peace – Yoga for Health - Yoga for Joy – Yoga for Love – Yoga for Well-being - Yoga for Success. Physical Exercise - Meditation – Seven Centers of Meditation – Benefits - Effect of Good Vibrations - Cause and Effect System. (6)

### INTROSPECTION

Attachment, Detachment and Moderation in Enjoyment - Imaginary Expectations - Harmony in Life: Self, Family, Society and Nature – Introspection: Analysis of Thought, Moralization of Desire, Neutralization of Anger, Eradication of Worries and Self Realization. (6)

### HUMAN VALUES

Morals, Values and Ethics – Integrity – Work Ethics - Service Learning – Virtues – Respect for Others – Living Peacefully – Caring – Sharing - Honesty – Courage – Valuing Time – Co-operation - Commitment – Empathy – Self Confidence – Challenges in Work Place – Impact of cyberspace on individuals. (6)

**THEORY: 15**

**PRACTICE: 15**

**TOTAL: 30**

### TEXT BOOKS

1. Yogiraj Vethathri Maharishi, “Karma Yoga – The Holistic Unity”, Vethathri Publications, IV Edition, 2009. (Chapters 1-7, 10-12)
2. R.S.Naagarazan, “A Textbook on Professional Ethics and Human Values”, New Age International Publishers, New Delhi, 2011.

## REFERENCES

1. Sadhguru, "Body the Greatest Gadget and Mind is your Business", Diamond Pocket Books Pvt. Ltd, Isha Foundations, 2013.
2. Swami Vivekananda and Swami Nikhilananda, "Karma Yoga and Bhakti Yoga", II Edition, Ramakrishna Vivekananda Publications, 2008.
3. Henry Dreyfuss, "The Measure of Man and Woman: Human Factors in Design", John Wiley and Sons Publications, 2012.
4. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", IV Edition, McGraw Hill, NewYork, 2005.
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CIVIL ENGINEERING

19FYM11	Calculus and Fourier Series
19FYE11	Technical English
19FYP11	Physics for Civil Engineers
19FYC11	Engineering Chemistry
19MEL11	Engineering Graphics
19CSL11	C Programming Laboratory
19PCL11	Physics and Chemistry Laboratory - I
19FYEL11	Employability Skills
19FYM21	Matrices, Vector Calculus and Transforms
19FYE21	Language Elective
19FYP21	Statics and Dynamics
19FYC21	Environmental Science and Engineering
19CE21	Construction Materials
19EE21	Basic Electrical and Electronics Engineering
19PCL21	Physics and Chemistry Laboratory - II
19MEL12	Engineering Practices Laboratory
19FYEL21	English for Employability
19CEM31	DIFFERENTIAL EQUATIONS AND BOUNDARY VALUE PROBLEMS
19CE31	MECHANICS OF SOLIDS
19CE32	ENGINEERING GEOLOGY
19CE33	MECHANICS OF FLUIDS
19CE34	SURVEYING
19CE35	WATER SUPPLY ENGINEERING
19HSS01	SCIENCE OF CREATIVITY AND PROFESSIONAL ETHICS
19CEL36	STRENGTH OF MATERIALS LABORATORY
19CEL37	SURVEY LABORATORY

19CE41	CONSTRUCTION TECHNOLOGY
19CE42	STRENGTH OF MATERIALS
19CE43	TRANSPORTATION ENGINEERING
19CE44	APPLIED HYDRAULICS AND HYDRAULIC MACHINERY
19CE45	WASTE WATER ENGINEERING
19CE46	PROFESSIONAL PRACTICES AND ETHICS
19CEL47	HYDRAULICS LABORATORY
19CEL48	ENVIRONMENTAL ENGINEERING LABORATORY
19CE51	STRUCTURAL ANALYSIS - I
19CE52	DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS
19CE53	MECHANICS OF SOILS
19CE54	CONCRETE TECHNOLOGY
	PROFESSIONAL ELECTIVE - I
	OPEN ELECTIVE - I
19CEL55	COMPUTER AIDED CIVIL ENGINEERING DRAWING
19CEL56	HIGHWAY ENGINEERING LABORATORY
	ONE CREDIT COURSE

	MINI PROJECT
19CE57	INTERNSHIP*
<b>19HOC51</b>	<b><i>Employability and Personality Development Skills I<sup>#</sup></i></b>
19CE61	STRUCTURAL ANALYSIS - II
19CE62	DESIGN OF STEEL STRUCTURES
19CE63	FOUNDATION ENGINEERING
	PROFESSIONAL ELECTIVE - II
	OPEN ELECTIVE -II
19CEL64	SOIL MECHANICS LABORATORY
19CEL65	QUANTITY SURVEYING AND PROJECT PLANNING LABORATORY
	ONE CREDIT COURSE
19CE66	MINI PROJECT
19CE67	INTERNSHIP*
19CE71	IRRIGATION ENGINEERING
19CE72	EARTHQUAKE RESISTANT DESIGN OF STRUCTURES
19CE73	CONSTRUCTION MANAGEMENT
	PROFESSIONAL ELECTIVE - III
	PROFESSIONAL ELECTIVE - IV
19CEL74	COMPUTER APPLICATIONS LABORATORY
19CEL75	CONCRETE LABORATORY

PG

19MCM11	Statistical Methods and Research Methodology for Construction Management
19MCM12	Construction Project Management
19MCM13	Construction Project Formulation and Appraisal
19MCM14	Construction Resource Planning and Management
19MCM15	Construction Economics and Financial Management
	Program Elective - 1
19MCM16	Data Analysis Laboratory for Construction Management
19MCM21	Construction Planning, Scheduling and Control
19MCM22	Contract Management and Dispute Resolution
19MCM23	Quantitative Techniques in Construction Management

19MCE11	Applied Mathematics
19MCE12	Applied Elasticity and Plasticity
19MCE13	Matrix method of structural analysis
19MCE14	Advanced Reinforced Concrete Structures
19MCE15	Advanced Steel Structures
19MCE21	Structural Dynamics
19MCE22	Finite Element Method
19MCE23	Design of Foundation Structures

19MSEOE01	Disaster Management
19MSEOE02	Energy Efficient Building
19MCMOE01	Landscaping and architecture
19MENOE01	Climate change and adaptation

# **COIMBATORE INSTITUTE OF TECHNOLOGY**

(Government Aided Autonomous Institution Affiliated to Anna University, Chennai)

**COIMBATORE - 641 014, TAMILNADU, INDIA**

**DIAMOND JUBILEE**

(1956 - 2016)



**DEPARTMENT OF INFORMATION TECHNOLOGY**

**B.Tech. INFORMATION TECHNOLOGY**

**Curriculum and Syllabi**

**Under Choice Based Credit System**

(For the students admitted during the academic year 2019 - 2020 and onwards)

**HUMANITIES AND SOCIAL SCIENCES (HS)**

Course Code	Course Name	L	T	P	C	Semester
19FYE11	Technical English	2	0	1	2	I
19FYE21	Language Elective	2	0	1	2	II
19FYC21	Environmental Science and Engineering	3	0	0	1	II
19HSS01	Science of Creativity and Professional Ethics	1	0	0	1	III
19IT51	Economics for Engineers	2	0	0	2	V

**BASIC SCIENCES(BS)**

Course Code	Course Name	L	T	P	C	Semester
19FYM14	Matrices and Calculus	3	1	0	4	I
19FYP13	Engineering Physics	3	0	0	3	I
19FYC11	Engineering Chemistry	3	0	0	3	I
19PL11	Physics Laboratory-I	0	0	2	0.5	I
19CL11	Chemistry Laboratory-I	0	0	2	0.5	I
19MEL12	Engineering Practices Laboratory	0	0	2	1	I
19FYM24	Fourier Series and Partial Differential Equation	3	1	0	4	II
19PL21	Physics Laboratory-II	0	0	2	0.5	II
19CL21	Chemistry Laboratory-II	0	0	2	0.5	II
19CIM31	Linear Algebra, Complex Variables and Transform Techniques	3	1	0	4	III

**ENGINEERING SCIENCES (ES)**

Course Code	Course Name	L	T	P	C	Semester
19CSL12	Python Programming	1	0	4	3	I
19FYP24	Introduction to Electronic Devices	3	0	0	3	II
19CS21	C Programming	3	1	0	4	II
19CSL11	C Programming Laboratory	0	0	4	2	II
19MEL11	Engineering Graphics	1	0	4	3	II
19CI32	Digital Design	3	0	0	3	III
19CIL34	Digital Design Laboratory	0	0	3	1.5	III

# 19HSS01 - SCIENCE OF CREATIVITY AND PROFESSIONAL ETHICS

L	T	P	C
1	0	0	1

## ASSESSMENT : THEORY

### COURSE OUTCOMES

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## LIST OF ONE CREDIT COURSES

S. No.	Course Code	Title of the Course
		<b>GROUP-I</b>
		<b>Personality and Skill Development Courses</b>
1	19CHOC01	Critical Thinking
2	19CHOC02	Creativity & Innovation
3	19CHOC03	Leadership
4	19CHOC04	Emotional Intelligence
5	19CHOC05	Health and Lifestyle
6	19CHOC06	Psychology for Engineers
		<b>GROUP-II</b>
		<b>Social Responsibility &amp; Environment Audit Courses</b>
7	19CHOC07	Fundamentals of Nanoscience
8	19CHOC08	An Introduction to Environmental Ethics
9	19CHOC09	Corporate Social Responsibilities
10	19CHOC10	Composite Material Preparation and Characterization
11	19CHOC11	Environmental Impact Assessment and Audit
		<b>GROUP-III</b>
		<b>Control and Automation Courses</b>
12	19CHOC12	Factory Automation
13	19CHOC13	Controller Tuning
14	19CHOC14	Neural Networks and Fuzzy Systems
15	19CHOC15	Internet of Things
16	19CHOC16	Process Automation and Fault Diagnosis
17	19CHOC17	Process Control in Petrochemical Industries
18	19CHOC18	Power Plant Instrumentation
19	19CHOC19	Industrial Automation
20	19CHOC20	Biomedical Instrumentation
		<b>GROUP-IV</b>
		<b>Energy and Nano Technology Courses</b>
21	19CHOC21	Energy Materials, Devices and Systems
22	19CHOC22	Surface Engineering of Nanomaterials
23	19CHOC23	Nano sensors : Basic components, Characterization and Application
24	19CHOC24	Nanopolymers : Synthesis, Characterization and Applications
25	19CHOC25	An approach to Nanotribology and Nanomechanics
26	19CHOC26	Nanomaterials and Nanofibers
27	19CHOC27	Biomass Conversion to Biofuels and Bioenergy
28	19CHOC28	Biofuel: Fate and Future
29	19CHOC29	Dimensional Analysis and Theory of Models
30	19CHOC30	Pinch Technology
31	19CHOC31	Drug Delivery Systems

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**DIAMOND JUBILEE**

(1956 - 2016)



**DEPARTMENT OF COMPUTING**  
**M.Sc. (DECISION AND COMPUTING SCIENCES)**  
**Curriculum and Syllabi**  
**Under Choice Based Credit System**

( For the students admitted during 2017 - 2018 and onwards )

**Semester VIII**

Course Code	Course Name	L	T	P	C	Category
	<b>THEORY</b>					
17MDC81	Modeling and Simulation	3	0	0	3	PC
17MDC82	Decision Support Systems	3	0	0	3	PC
17MDC83	Game Theory and Decision Analysis	3	0	0	3	PC
	Elective - III	3	0	0	3	PE
	Elective - IV	3	0	0	3	PE
	<b>PRACTICALS</b>					
17MDC84	Business Intelligence Laboratory	0	0	4	2	PC
17MDC85	Decision Analysis Laboratory (Game Theory)	0	0	4	2	EEC
17MDC86	Entrepreneurship Development*					EEC
	Elective - Laboratory II	0	0	4	2	PC
	<b>Total Credits</b>				<b>21</b>	

**Semester IX**

Course Code	Course Name	L	T	P	C	Category
	<b>THEORY</b>					
17MDC91	Principles of Information Security	3	0	0	3	PC
17MDC92	Project Management	3	0	0	3	PC
17MDC93	Human Computer Interface and Interaction	3	0	0	3	PC
	Elective - V	3	0	0	3	PE
	Elective - VI	3	0	0	3	PE
	<b>PRACTICALS</b>					
17MDC94	Human Computer Interface and Interaction Laboratory	0	0	4	2	PC
17MDC95	Minor Project - Decision Tool Development	0	0	8	4	EEC
17MDC96	Business Ethics *					EEC
	<b>Total Credits</b>				<b>21</b>	

**Semester X**

Course Code	Course Name	L	T	P	C	Category
17MDC101	Project Work and Viva Voce- II	0	0	0	18	EEC
	<b>Total Credits</b>				<b>18</b>	
	<b>Grand Total of Credits</b>				<b>210</b>	

\*Pass is required

# 17MDC96 - BUSINESS ETHICS

## PRE-REQUISITES

Consent of the Instructor

## ASSESSMENT : PRACTICAL

## COURSE OUTCOME

- *Understand the inhereent conflicts in being ethical*
- *Analyse the ethical dilemmas in common business situations and the ways to solve them.*
- *Broaden the understanding of the way to act rightly in different business situations*
- *Learn to commit to mutual ethical treatment of the human person and do ethical business and ethical leadership.*
- *Make ethical decisions effectivelu and decisively based on ethical thinking and decision making frameworks.*

## UNIT I

Introduction to Ethics - Moral Development in human theories and Concepts- Definitions of ethics- theories of Ethics and Ethics Projects -Case Study. (6)

## UNIT II

**Decision Making Model** : Ethics as Making Decisions and Choices - Decision Making frameworks-Conflicts and Ethical Dilemmas - Moral and Ethical dilemmas-Case Study. (6)

## UNIT III

**Ethics and Business** : A sense of Business Ethics - Ethics and International Business - Ethics issues beyond borders- Ethics and economics: Ethical concerns of economic individuals and societies. (6)

## UNIT IV

**Business Disciplines** : Ethics of Marketing and advertising - Ethics of Finance and accounting- Ethics of HR and related aspects-Production and related issues -Ethics of IT. (6)

## UNIT V

**Ethics and Environment** : Environmental Ethics awareness-Business and Social Responsibility-Business response to environmental problems and ethics-International standards-Global Impact. (6)

**Total : 30**

## REFERENCE BOOKS

1. *William. H. Shaw, "Business Ethics", Cengage Advantage Books, 2013.*
2. *Stephen. M. Byars and Kurt Stanberry, "Business Ethices", 2018.*
3. *Das Gupta, Anandha, "Business Ethics", Springer, 2014.*
4. *Denis Collins, "Business Ethics", Second Edition, Sage Publications, 2018*

# **COIMBATORE INSTITUTE OF TECHNOLOGY**

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**COIMBATORE - 641 014, TAMILNADU, INDIA**

**DIAMOND JUBILEE**

(1956 - 2016)



**Department of Computing**

**M.Sc. (Software Systems)**

**Curriculum and Syllabi**

**Under Choice Based Credit System**

( For the students admitted during 2015 - 2016 and onwards )

**Semester VIII**

Course Code	Course Name	L	T	P	C	CAT
	<b>THEORY</b>					
15MSS81	Software Project Management	3	0	0	3	PC
15MSS82	Internet of Things	3	0	0	3	PC
	Elective - V	3	0	0	3	PE
	Elective - VI	3	0	0	3	PE
	Elective - VII	3	0	0	3	PE
	<b>PRACTICALS</b>					
15MSS83	Internet of Things Laboratory	0	0	4	2	PC
	Elective Laboratory - III	0	0	4	2	PE
	Elective Laboratory - IV	0	0	4	2	PE
	<b>TOTAL CREDITS</b>				<b>21</b>	

**Semester IX**

Course Code	Course Name	L	T	P	C	CAT
	<b>THEORY</b>					
15MSS91	Information Security	3	0	0	3	PC
15MSS92	Professional Ethics	3	0	0	3	EEC
	Elective - VIII	3	0	0	3	PE
	Elective - IX	3	0	0	3	PE
	Elective - X	3	0	0	3	PE
	<b>PRACTICALS</b>					
15MSS93	Information Security Laboratory	0	0	4	2	PC
	Elective Laboratory - V	0	0	4	2	PE
	Elective Laboratory - VI	0	0	4	2	PE
	<b>TOTAL CREDITS</b>				<b>21</b>	

**Semester X**

Course Code	Course Name	L	T	P	C	CAT
15MSS101	Project Work and Viva Voce - II	0	0	0	18	EEC
	<b>TOTAL CREDITS</b>				<b>18</b>	
	<b>GRAND TOTAL OF CREDITS</b>				<b>215</b>	

# 15MSS92 - PROFESSIONAL ETHICS

L	T	P	C
3	0	0	3

## PRE-REQUISITES

Consent of the Instructor

## ASSESSMENT : THEORY

### COURSE OUTCOME

- *Given a problem scenario, analyse the situation and suggest solutions based on human values like honesty, courage, empathy, character and morality*
- *When presented with a moral dilemma, critically analyse and present solutions using theories of moral autonomy and theories of right action.*
- *Examine a given scenario in the professional life of an Engineer and present a critical note on possible behaviours using professional codes of conduct of Engineers*
- *Engage in informed critical reflection on the nature of professionalism and ethical challenges inherent in professionalism in matters relating to collegiality, loyalty, occupational crime, confidentiality and conflicts of interest*
- *When presented with case on moral issues relating to weapons development or such matters of conflicting interest, critical evaluation of the case using the various professional codes of conduct and present ethical solutions*

## HUMAN VALUES

Morals, Values and Ethics - Integrity - Work Ethic - Honesty - Courage -Empathy - Self-Confidence - Character **(8)**

## ENGINEERING ETHICS

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. Valuing Time - Co-operation - Commitment **(10)**

## ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study **(8)**

## SAFETY, RESPONSIBILITIES AND RIGHTS

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - Collegiality and Loyalty - Respect for Authority - Collective Bargaining - Confidentiality - Conflicts of Interest - Occupational Crime - Professional Rights - Employee Rights - IPR - Discrimination **(10)**

## **GLOBAL ISSUES**

Multinational corporations - Environmental Ethics - Computer Ethics - Weapons Development - Engineers as Managers-Consulting Engineers-engineers as expert witnesses and advisors -moral leadership - sample code of conduct. **(9)**

**TOTAL : 45**

## **TEXT BOOKS**

1. *Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996. (para 2,3,4,5)*
2. *M. Govindarajan, S. Natarajan, V. S. Senthilkumar, "Professional Ethics and Human Values", Prentice Hall, 2013. (para 1)*

## **REFERENCE BOOKS**

1. *Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.*
2. *Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004*
3. *Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics - Concepts and Cases", Wadsworth Thompson Learning, United States, 2000*
4. *John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.*

## 9MAME01 - ETHICS IN AI

### PRE-REQUISITES

Consent of the Instructor

### ASSESSMENT: THEORY

Contact Hours

L	T	P	C
3	0	0	3

### COURSE OUTCOMES

**CO1:** Understand the concept of building ethics in machines

**CO2:** Develop and designs test cases for hypothetical cases in Self driving cars

**CO3:** Able to build the methodologies for ethical AI

**CO4:** Identify Ethical priorities in AI systems

**CO5:** Design AI with rights, consciousness, and freedom

### ETHICAL LEARNING, NATURAL AND ARTIFICIAL

Introduction - A Social Perspective -A Developmental Perspective - Default Trust and Default Cooperation - Ethical Development and Ethical Judgment - Artificial Ethical Psychology.

(8)

### USE TROLLEY AND ETHICAL OPT-OUT PROBLEM

A Hypothetical Case - Standard Trolley Cases - Other Cases - New and Old Threats - Particular Moral Issues in Self Driving Cars – Case studies - Passengers and Other Drivers - Introduction - Methodological Challenges - Second-Order Ethical Challenges.

(12)

### REASONING PREFERENCES AND ETHICAL PRIORITIES IN AI SYSTEMS

Introduction - Background: Frameworks to Model Constraints and Preferences - Modeling Ethical Theories via Hard and Soft Constraints - Using CP-nets to Model Preferences and Ethical Priorities -A Notion of Distance between (Orderings Induced by) CP-nets - Using Distance to Support Ethical Decisions - Distance and Meta preference.

(8)

### AUTONOMOUS WEAPONS AND ETHICS OF ARTIFICIAL INTELLIGENCE

Defining Autonomous Weapons - The Moral Problems Raised by Autonomous Weapons - Arguments for the Moral Desirability of Autonomous Weapons.

(5)

### DESIGNING AI WITH RIGHTS, CONSCIOUSNESS, SELF-RESPECT, AND FREEDOM

Public policy and Super intelligent AI : The Prospect of Radically Transformative AI - A “Vector Field” Approach to Normative Analysis - The No- Relevant- Difference Argument and Its Two Central Parameters - Two Broad Moral Theories and the Ethical Precautionary Principle - The Puzzle of Consciousness and the Design Policy of the Excluded Middle - Cheerfully Suicidal AI Servants and the Self- Respect Design Policy – Case studies

(12)

**TOTAL HOURS: 45**

### TEXTBOOKS

1. Y S. Matthew Liao, “Ethics of Artificial Intelligence”, First Edition, Oxford University Press, 2020.
2. John C. Havens, “Heartificial Intelligence: Embracing Our Humanity to Maximize Machines”, Tarcher Perigee, 2016

### REFERENCE

1. Mark Coeckelbergh, “AI Ethics”, The MIT Press, 2020.