**19MC2201 – ENGINEERING ETHICS**

**(Civil Engineering)**

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| **Course Category**  | Mandatory Course | **Credits** | - |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 2 - 0 - 0 |
| **Prerequisite** | None | **Sessional Evaluation**  | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To create awareness on engineering ethics providing basic knowledge about engineering ethics, professional ideals and virtues.
2. To provide basic familiarity about engineers as responsible experimenters, research ethics, Industrial standards.
3. To inculcate knowledge and exposure on safety and risk, risk benefits analysis.
4. To have an idea about the collegiality and loyalty, collective bargaining, confidentiality, occupational crime.
5. To explain concept of intellectual property rights.
6. To have an adequate knowledge about MNC’s, business, environment, computer ethics, honesty, moral leadership and sample code of conduct.
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| **Course Outcomes** | CO1 | Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories. |
| CO2 | Understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field. |
| CO3 | Solve ethical problems. |
| CO4 | Aware of responsibilities of an engineer for safety and risk benefit analysis. |
| CO5 | Aware of professional rights and responsibilities of an engineer. |
| CO6 |  Perform various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives. |
| **Course****Content** | **UNIT-I**Introduction to professional ethics: Basic concepts – Governing ethics – Thoughts of ethics, ethics and Indian philosophy - Contemporary Indian philosophies, engineering ethics, ethics and law – Space shuttle challenger accident and other recent case studies.**UNIT-II**Professionalism – Profession, Engineering as a profession, difference between engineering and other professions and codes of ethics. Ethical problems- moral theories, utilitarianism, cost benefit analysis, Duty and right ethics, virtue ethics– Intel Pentium Chip, Runway concrete at the Denver International Airportand other recent case studies.**UNIT-III**Techniques for solving ethical problems – Line drawing method and flow chart method- The Disaster at Bhopal, and other significant national and international case studies.**UNIT-IV**Risk, safety- factors, engineers and safety and accidents- types of accidents – Designing for safety, risk benefit analysis – The crash of valujet flight 592, firestone tires and other recent incidents.**UNIT-V**Rights and responsibilities of engineers – Ethics in research – Computer ethics – Experimentation. Case studies – Goodrich A7-D Brake case, kevinmitnick and computer hacking, etc.**UNIT-VI**Global issues in professional ethics: Introduction – Current scenario – Business ethics and corporate governance – Media ethics – Bio ethics – War ethics – Intellectual property rights. |
| **Textbooks and Reference books** | **TEXTBOOKS:**1. Charles B. Fleddermann, *Engineering Ethics*, Pearson Education, 4thedition, 2012.
2. M. Govindarajan, S.Natarajan, V.S.Senthilkumar, *Engineering Ethics (Includes Human Values*), PHIPublications, 12thedition, 2012.
3. Jayshree Suresh and B.S.Raghavan, *Human Values and Professional Ethics*, S Chand, 3rdrevised edition, 2005.

**REFERENCE BOOKS:**1. R.S. Naagarazan,*A Text Book on Professional Ethics and Human Values,*NewAge International publishers, 2ndedition, 2017.
2. Mike W. Martin,RolandSchinzinger,*Ethics in engineering*, McGraw Hill Education, 4thedition, 2005.
3. William Lillie,*An Introduction to Ethics*, University Paperbacks, 2006.
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**CO-PO Mapping:**3-High Mapping, 2-Moderate Mapping, 1-Low Mapping, - -Not Mapping

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|  | **a** | **b** | **c** | **d** | **e** | **f** | **g** | **h** | **i** | **j** | **k** | **l** |
| CO1 | 2 | - | - | - | - | 2 | 3 | 3 | 2 | - | 2 | 1 |
| CO2 | 1 | 1 | - | - | - | 3 | 2 | 3 | 2 | - | 2 | 1 |
| CO3 | - | - | - | - | - | 3 | 2 | 3 | 2 | - | 2 | 1 |
| CO4 | 2 | - | - | - | - | 3 | 3 | 3 | - | - | 2 | 1 |
| CO5 | 1 | - | - | 2 | - | 3 | 3 | 3 | 2 | - | 2 | 2 |
| CO6 | - | - | - | - | - | 3 | 3 | 3 | 1 | - | 2 | 1 |