

PROFESSIONAL AND SOCIAL ENGINEERING

ENCE 405

Lecture : 4
Tutorial : 0
Practical : 0

Year : IV
Part : I

Course Objectives:

The objective of this course is to introduce the interrelationship among technology, environment, and society, emphasizing the ethical, professional, and legal responsibilities of engineers. It aims to develop the ability to apply professional ethics, comply with institutional and legal provisions, communicate effectively, and engage responsibly with stakeholders and communities while recognizing the broader societal role of engineering practice.

1 Technology, Environment and Society (12 hours)

- 1.1 Early civilization and engineering practices
- 1.2 Cultural and social influence of technology
- 1.3 Environment and society; Role and impact of technology
- 1.4 Environmental conservation
 - 1.4.1 Ecosystem and conservation of environment
 - 1.4.2 Conservation of natural resources and wildlife in infrastructure development (Impact on natural resources; Significance; Ecology and behavior; Conservation)
 - 1.4.3 Global and regional environmental issues
- 1.5 Resource efficiency and sustainable technologies
 - 1.5.1 Renewable and non-renewable resources
 - 1.5.2 Waste management and recycling technologies
 - 1.5.3 Green engineering and design practices
- 1.6 Natural resources safeguards: Principle and practices

2 Ethics and Professionalism (10 hours)

- 2.1 Ethics, morality, and professionalism
- 2.2 Ethical responsibilities toward sustainability and safety
- 2.3 Code of conduct and professional behavior
- 2.4 Responsibility, liability, and negligence
- 2.5 Conflict of interest, corruption, and whistleblowing
- 2.6 Ethical decision-making and case studies

3 Engineering Practice and Legal Framework (14 hours)

- 3.1 Engineering Council and professional associations
- 3.2 Professional regulations

- 3.3 Engineering enterprises
- 3.4 Licensing and disciplinary procedures
- 3.5 Contract types and Public Procurement Act
- 3.6 Labor law and occupational safety
- 3.7 Intellectual property and arbitration
- 3.8 Conflict resolution techniques

4 Professional Skill and Career Development (6 hours)

- 4.1 Proposal writing and reporting
- 4.2 Professional correspondence
- 4.3 Communication, teamwork, and leadership
- 4.4 Continuing Professional Development (CPD)

5 Social Engineering (8 hours)

- 5.1 Concept and scope of social engineering
- 5.2 Elements of society and community and their difference
- 5.3 Social inclusion and decision making
- 5.4 Stakeholders: Identification, mapping, analysis, engagement and communication
- 5.5 Corporate social responsibility (CSR)

6 Engineers in Society (10 hours)

- 6.1 Engineer as an agent of change
- 6.2 Public accountability and ethical citizenship
- 6.3 Balancing technical and social expectations
- 6.4 Contribution to Sustainable Development Goals (SDGs)

Assignments

1. Debate to apply ethical principles in practical engineering situations.
2. Group discussion to analyze interactions among technology, environment, and society.
3. Case critique to evaluate professional conduct and legal obligations.
4. Class room workshop to demonstrate proposal writing and professional communication skills.
5. Stakeholder mapping exercise to identify and analyze interests and influence in infrastructure projects.
6. Discussion to explore social inclusion and corporate social responsibility (CSR) practices.
7. Reflective session to assess teamwork, leadership, and continuing professional development (CPD).
8. Case presentation to synthesize ethical, legal, and social dimensions of engineering practice.

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapter	Hours	Marks distribution*
1	12	12
2	10	10
3	14	14
4	6	6
5	8	8
6	10	10
Total	60	60

* There may be minor deviation in marks distribution.

References

1. Whitbeck, C. (2012), Ethics in Engineering Practice and Research, Cambridge University Press.
2. Martin, M. W., Schinzinger, R. (2004). Ethics in engineering. New York, NY: McGraw-Hill.
3. Environmental and Construction Engineering: Reality and the Future: Selected Papers. (2021). Germany: Springer International Publishing.
4. Nepal Engineering Council. Act, Regulations, and Code of Conduct.
5. Government of Nepal. Public Procurement Act (2063) and Regulations (2064).
6. World Federation of Engineering Organizations. (2016). Model Code of Ethics for Engineers.