

Course Profile/Outline

Semester: Fall 2023

Year: 2024

Level/Term: 3-2

I. Course Code:	HUM 321		
II. Course Title:	Engineering Ethics and Environmental Protection		
III. Credit:	2.0	IV. Prerequisite:	
V. Contact Hours:	2 hours/week		
VI. Course Contents:			
<p>Human Values: Morals, Values and Ethics, Integrity, Work Ethic, Honesty, Courage, Empathy, Self Confidence, Character.</p> <p>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 and commitment.</p> <p>Engineering ethics: Perspective Bangladesh Engineering as Social Experimentation: Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, A balanced outlook on law, The challenger case study. Safety, Responsibilities and Rights: Safety and risk, Assessment of safety and risk, Risk-benefit analysis and reducing risk, Bhopal and Chernobyl case studies.</p> <p>Environmental Protection and Sustainability: Ethics of environmental protection, Environment issues from engineering aspects. Technology for a sustainable environment. Responsibility protection and sustainability.</p>			
VII. Course Rationale:			
Professional engineers have responsibility to serve the society and work to improve the welfare, health and safety, with the minimal use of natural resources and paying attention with regard to the environment and the sustainability of resource. They play an important and significant role to meet the sustainability. In their professional fields, they have to face ethical, social and environmental issues and their decisions affect the world or society			
VIII. Course Objectives:			

The objectives of this course are to:

- Develop the ability to identify the core human values and responsibilities of engineers.
- Make the students able to understand and apply the engineering code of ethics and moral development theories.
- Enable the students to critically assess the effects of engineering decisions on society and environment.
- Develop skills to ensure environmental protection and sustainability to balance engineering for sustainable growth of the environment.
- Develop an appreciation of ethical responsibilities and rights of engineers towards public safety and welfare to prevent any engineering hazards.

IX. Course Outcome (COs):

Sl. No.	COs (Upon successful completion of this course, students should be able to)	Corr esp ondi ng PO	Bloom's taxonomy domain/level *			Delivery Methods & activities	Assessme nt tools
			C	A	P		
CO CC-1	Understand and Apply the importance of human values and ethics: Morals, Values, Work Ethic, Integrity, Courage, Empathy, Self-Confidence, Character	PO1, 2,3	2	-	3	Lectures, Demonstration	CT, Exam, Assignments
CO CC-2	Evaluate and Apply ethical dilemmas and theories: 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	PO6, 7,8	5	-	3	Lectures, Demonstration	CT, Exam, Assignments
CO CC-3	Develop an ethical perspective on engineering in Bangladesh: Engineering ethics: perspective Bangladesh, Valuing time,	PO8, 9	6	3	-	Lectures, Demonstration	Assignments

	Cooperation and Commitment						
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* C: Cognitive, P: Psychomotor; A: Affective

**CC: Course Code

X. K-P-A Addressing:

Knowledge Profile (K)								Complex Engineering Problem (P)							Complex Engineering Activities (A)				
K1	K2	K3	K4	K5	K6	K7	K8	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5
-	X	X	X	X	X	-	-	X	X	X	-	-	-	-	X	X	-	-	-

XI. Lesson Plan with Detail Description:

Session	Contents/Topics	COs
Week 1	<p>Introduction to Human Values</p> <p>In the first week, the course will introduce the fundamental concepts of human values, including morals, ethics, and integrity. Students will explore the significance of values in shaping personal and professional behavior, particularly in engineering. Topics such as work ethic, integrity, and honesty will be discussed, helping students appreciate the role these values play in fostering ethical decision-making and personal growth.</p>	CO-1,2
Week 2	<p>Personal Values and Professional Ethics</p> <p>The second week will delve into personal values that are essential in professional life. Topics such as honesty, courage, empathy, self-confidence, and character will be explored. Students will reflect on these traits and learn how they contribute to building professional credibility and ensuring ethical behavior in challenging situations within engineering practices.</p>	CO-1,2
Week 3	<p>Introduction to Engineering Ethics</p> <p>In this week, students will be introduced to the foundations of engineering ethics. They will learn about the various senses of engineering ethics, different types of moral issues that arise in the profession, and the forms of inquiry used to address these issues. This session will lay the groundwork for understanding how ethical principles guide engineering practices and decision-making.</p>	CO-1,2
Week 4	Moral Dilemmas and Autonomy	CO-1,2,3

	<p>The fourth week will focus on the concept of moral dilemmas, where engineers face conflicting ethical choices. Students will discuss the importance of moral autonomy and the ability to make independent ethical decisions. The week will also cover Kohlberg's theory of moral development, providing a framework to understand how individuals grow in their capacity for ethical reasoning.</p>	
Week 5	<p>Ethical Theories and Controversies</p> <p>This week will introduce students to various ethical theories such as utilitarianism, deontology, and virtue ethics, along with their application in engineering scenarios. Additionally, topics like Gilligan's theory of moral development and the nature of consensus and controversy in ethical discussions will be examined, enabling students to apply these theories to real-world engineering ethical challenges.</p>	CO-1,2,3
Week 6	<p>Models of Professional Roles and Ethical Theories</p> <p>The focus of this week will be on understanding the different professional roles engineers may adopt and how ethical theories guide their actions. Topics will include self-interest versus public interest, the role of customs and religion in ethical decisions, and the practical uses of ethical theories. Students will learn to navigate professional responsibilities while maintaining ethical integrity.</p>	CO-1,2,3
Week 7	<p>Time Management, Cooperation, and Commitment</p> <p>In this session, students will examine the importance of time management, cooperation, and commitment within the context of ethical engineering practices. They will explore how valuing time and working collaboratively with others not only enhances productivity but also ensures the fulfillment of ethical obligations in project execution and professional responsibilities.</p>	CO-1,2,3
Week 8	<p>Engineering Ethics in Bangladesh</p> <p>This week will address the specific ethical challenges and responsibilities faced by engineers in Bangladesh. Students will explore the local perspective on engineering ethics and examine case studies and real-world scenarios relevant to their professional context. This will help them understand how ethical principles are applied in the regional context and the cultural factors that influence ethical decision-making.</p>	CO-2,3
Week 9	<p>Engineering as Social Experimentation</p> <p>In this week, students will learn to view engineering as a form of social experimentation. They will discuss the role of engineers as responsible experimenters and examine how codes of ethics provide guidance for these experiments. The session will emphasize the responsibilities engineers hold towards society, especially when their work can significantly impact public safety and welfare.</p>	CO-2
Week 10	<p>Legal Framework and The Challenger Case Study</p> <p>This week will explore the relationship between ethics and law, highlighting the importance of a balanced outlook on legal regulations in engineering. The famous Challenger case study will be analyzed to illustrate how ethical missteps can lead to catastrophic consequences. Students will reflect on the</p>	CO-1,2,3

	ethical failures that led to the disaster and the lessons that can be applied to current engineering practices.	
Week 11	<p>Safety, Risk, and Responsibilities</p> <p>In this session, the course will cover topics related to safety and risk in engineering. Students will learn how to assess safety risks, conduct risk-benefit analyses, and implement strategies to reduce risks in engineering projects. The session will focus on the ethical responsibility of engineers to ensure safety and prevent harm in their work.</p>	CO-2,3
Week 12	<p>Case Studies on Engineering Disasters</p> <p>This week will focus on two significant engineering disasters: the Bhopal gas tragedy and the Chernobyl nuclear disaster. Students will study these events in detail to understand the ethical and engineering failures that led to the disasters. They will analyze the long-term consequences of these failures and discuss how similar disasters can be prevented in the future through ethical responsibility and adherence to safety standards.</p>	CO-2,3
Week 13	<p>Environmental Ethics and Protection</p> <p>This week will introduce students to the ethics of environmental protection, focusing on the environmental challenges that arise from engineering activities. The session will examine how engineers can contribute to environmental protection by making ethically sound decisions. Students will also discuss the broader societal responsibility engineers hold in promoting sustainable practices that protect the environment.</p>	CO-1,2,3
Week 14	<p>Technology for Sustainable Development</p> <p>In the final week, the focus will be on the role of technology in creating a sustainable environment. Students will explore how modern engineering innovations can be leveraged to promote sustainability and minimize environmental harm. The session will emphasize the responsibility engineers have in ensuring that their work contributes to a sustainable future while balancing societal and environmental needs.</p>	CO-1,2
Week 15	Revise, Assignment result analysis, Case study	CO-3

XII. Evaluation Policy/Procedures:

Marks Distribution:		
	Attendance	7%
	Quiz	15%
	Assignment	5%
	Presentation	8%
	Mid-Term	25%
	Final Exam	40%

	<table border="1"><tr><td>Total</td><td>100%</td></tr></table>	Total	100%
Total	100%		
Grading System:	As per DIU rules.		

XIII. Resources:

Textbook(s):

1.Charles E. Harris Jr., Michael S. Pritchard, Michael J. Rabins, “Engineering Ethics: Concepts and Cases”.

Reference(s):

2.Charles B. Fleddermann, “Engineering Ethics”, 4th Edition. 3.P. Aarne Vesilind, “Engineering, ethics, and the environment”

XIV. Course Link in BLC: <https://elearn.daffodilvarsity.edu.bd/course/view.php?id=27240>

XV. Course Instructor(s): Anjan Kumar Bagchi, Sourov Saha