American International University- Bangladesh (AIUB)
Faculty of Engineering (EEE)
Subject: Engineering Ethics and Environmental Protection

Course Name:	Engineering Ethics and Environmental Protection	**Course Code:**	EEE 3107
Semester:	Spring 2024	**Submission date:**	
Item:	CO2: Identify impact on society and environment for professional engineering solutions (P.g.2.C5)		
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Department:	**CSE**	**Section:**	**I**

Rubric:

Category	Proficient [6]	Good [5]	Average [4-3]	Poor [2-1]	Secured Marks
Risk and safety analysis	Risk and safety analysis related to the case is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Risk and safety analysis related to the case is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Risk and safety analysis related to the case is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Risk and safety analysis related to the case is stated without clarification or description.	
Comprehension of the role of engineering in society (K7)	Comprehension of the role of engineering in society is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Comprehension of the role of engineering in society is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Comprehension of the role of engineering in society is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Comprehension of the role of engineering in society is stated without clarification or description.	
Issues in engineering practice	Issues in engineering practice is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Issues in engineering practice is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issues in engineering practice is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Issues in engineering practice is stated without clarification or description.	
Engineering responsibility to public safety and Environment	Engineering responsibility to public safety and environment is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Engineering responsibility to public safety and environment is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Engineering responsibility to public safety and environment is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Engineering responsibility to public safety and environment is stated without clarification or description.	
Importance of 'Safety' to social, economic and sustainable development	Importance of 'Safety' to social, economic and sustainable development is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Importance of 'Safety' to social, economic and sustainable development is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Importance of 'Safety' to social, economic and sustainable development is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Importance of 'Safety' to social, economic and sustainable development is stated without clarification or description.	
	For complete Similarity with other (Negative Marking will be imposed)				
Comments:			Total Marks (Out of 30):		

Sustainable development (SD) is the blueprint to ensure a better future for all. The economy, society and the environment are the predominant pillars of SD. There is an inherent relation between socio-economic development and the environment. The activities involved in such development can bring both adverse and favorable consequence to the environment. The journey of mankind to an elevated socio-economic condition significantly depends on the industrial revolution; whichever depend well and truly on the generation and consumption of energy. Hence, extensive use of fossil fuels i.e. oil, gas, coal etc. to produce energy is the principal reason behind the emission of greenhouse gas, trace metals and similar type of pollutants. The by-product of fossil-fuel combustion is a significant threat to the environment which later brings a harmful effect on human health [3]. As a developing country, Bangladesh is not an exception in this regard. It is quite obvious that prolongation of such energy generation method certainly raises a conflict to the concept of SD. Further, it creates a confrontment situation concerning the projected timeline. Henceforth, a transition to renewable energy may mitigate all these adverse effects within a short time. Generating energy from clean and renewable source can significantly reduce carbon footprint and global warming, and it has numerous environmental and health benefits. Besides, using renewable sources for energy generation allow to build a reliable and affordable energy source; that lessen reliance on foreign energy sources as well. Above all, to ensure the sustainability of the three pillars of Sustainable Development and to safeguard the environment for a better future; there is no alternative to using renewable energy for energy generation.

Based on the concept of Social and Environmental Ethics, identify, discuss and analyze following issues from the given case:

(a) What are the adverse effects of the conventional power station that affect the safety and welfare of the public and the environment? **(Hint: Indicate the Risk and safety issues from the above discussion about the discussion about the use of different petroleum fuels in Electric Power generation**)

Answer:

Identification of Risk & Safety Issues:

In the past, most of our energy came from burning fuels like coal, oil, and natural gas. This burning created pollution in the air, like harmful gases and tiny metal bits. These are threat to the environment and public health as well as animals. These are responsible for global warming, air pollution, land degradation, water pollution, noise pollution. Exposure to these pollutants can lead to damage of internal organs and increase the risk of serious illnesses like cancer.

In this case study, sustainable development is the focus. One of the most crucial concepts for guaranteeing a brighter future, is sustainable development because power plants negatively impacts on Locality in different ways. When it comes to conditions affecting the general population, illnesses including asthma, chronic bronchitis, eye irritation, cardiac disease, lung cancer, congestive heart failure, and stomach cancer are now widespread. This type of pollution can hinder the proper development of children's nervous systems.

(b) What are the social and environmental impacts of renewable energy sources on the sustainable power generation of a country? (Hint: Discuss the **role of sustainable engineering techniques in the development of society and ecosystem)**

Answer:

Sustainable engineering plays important role for both society and the environment. Bangladesh uses renewable energy sources like windmills, dams, solar panels, they can be highly effective in term of lowering carbon footprint and fighting global warming. These makes less depended on buying energy from other countries. It creates a reliable and cost-effective way to get the power which is needed. Also These are more beneficial for health and the environment.

Here sustainable engineering comes in as a big player. Engineers can design and build projects like wind turbines that use the power of the wind, dams that use flowing water, and solar panels that capture the sun's energy. These projects are way better for humans & environment as well as earth.

(c) What are the ethical issues in engineering practice of the above case study? **(Hint: Identify the violations of standard ethical practices in engineering if any**)

Answer:

The ethical issue in the above case study is the extensive use of the fuel causes greenhouse gas which causes the pollutant to the environment. It a Duty of an engineer to ensure safety and health and respect for right of informed consent. An engineer also asses impacts and monitor them. In IEEE Code of Ethics, it is said in rule no. 1 that to hold paramount, the safety, health, and welfare of the public, to strive to comply with ethical design and sustainable development practices, to protect the privacy of others, and to disclose promptly factors that might endanger the public or the environment and in NSPE code of ethics it clearly states that the highest ethical obligation of engineers is to the safety, health, and welfare of the public. So, above practices in case study is clearly against those ethics. Because as an engineer it is most important that he should join any kind of activity that directly hampers public health or the environment. In the above scenario it is clearly seen that the use of fossil fuel is directly hampering the environment as well as public health

(d) What is the engineering responsibility in designing a power plant ensuring public safety, which uses fuel that is directly responsible for global warming? How might these responsibilities be fulfilled simultaneously? (Hint: **Evaluate the engineering responsibility to public safety and environment in the development if new power plant)**

Answer:

The engineering responsibilities when developing the industry must ensure the

1. storage of water
2. purification of water
3. plants should use natural gas because natural gas is the most environmentally friendly
4. power plant must perform maintenance & check for update and upgradation of equipment.
5. Reuse & Disposal of material

Besides those points, the primary duty of engineering are public health and the engineering role is to check for design flow, design area, design population and density.

(e) Discuss the importance of designing a sustainable Power Engineering Solution to support the development of a country **(Hint: Discuss the importance of 'Engineering Safety' to social, economic and sustainable development)**

Answer:

By planning and building the project that preserves natural resources, cost-efficient, support human and the natural environment, the engineers plays an important role in the development of the country. A closed ecosystem can be used to perform many activities of engineers that support sustainable development. By using sustainable energy power that can regenerate from the same source which saves a lot of money. Burning fossil fuel for energy is too harmful for health and environment. so it is important to apply sustainable power Engineering. So, it is cost efficient .Besides, It reduces the pollution in the environment and keeps public health safe. It creates a system where country does not to depends on energy sources from other contries.