Professional Ethics
Assignment 1

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Professional Ethics

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"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

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Submitted to:
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Statement:
Write a brief note on Engineering as Experimentation and Engineers as Experimenters.

Introduction
Engineering, a diverse field encompassing the application of mathematical and scientific principles to resolve complex challenges, is inherently experimental. This exploration delves into the concept of "Engineering as Experimentation" and posits that engineers are fundamentally experimenters. Drawing from relevant literature and examples spanning various engineering domains, we investigate the experimental aspect of engineering and its profound impact on the profession.

1. Engineering as Experimentation: Engineering is commonly defined as the practical application of scientific principles to address real-world issues. Yet, this application is not a straightforward process; instead, it involves a series of systematic experiments and refinements. Engineers engage in experimentation at every stage of the engineering process, from conceptualization and design to prototyping, testing, and eventual implementation.

1.1 The Iterative Design Approach: The design process in engineering is iterative, encompassing the creation of prototypes, testing, and continuous refinement. This iterative nature serves as a form of experimentation, allowing engineers to enhance their designs based on insights gained from previous tests. This process ensures incremental improvements and the development of a final product meeting specified requirements.

1.2 Prototyping and Validation: Prototyping is a pivotal element of engineering experimentation. Engineers develop prototypes to test and validate their designs before full-scale implementation. These prototypes function as experiments, offering valuable insights into the functionality, reliability, and safety of the proposed solution. Testing under diverse conditions enables engineers to comprehend limitations and potential failure modes, leading to more resilient designs.

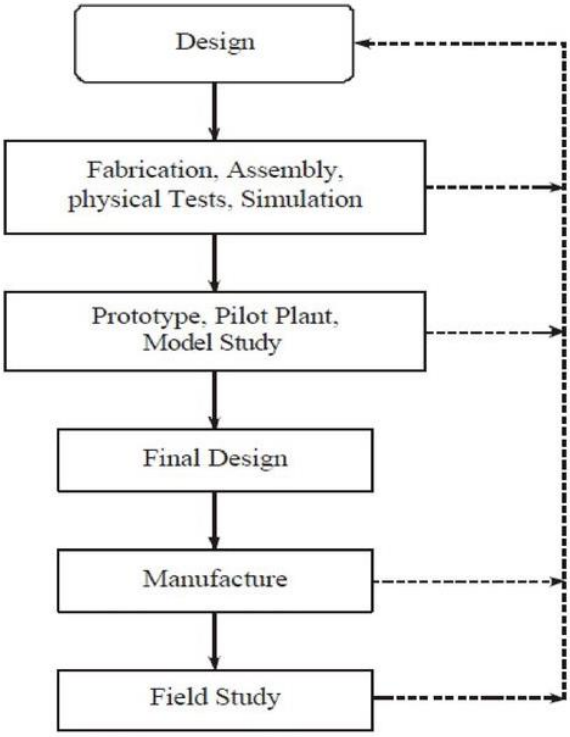

Figure 1- Engineering as Experimentation is an iterative process

2. Engineers as Experimenters

Engineers inherently embody the spirit of experimenters, navigating the uncertainties inherent in problem-solving. They leverage their expertise, skills, and intuition to formulate hypotheses, design experiments, and interpret results. This experimental mindset is evident across various engineering disciplines.

2.1 Computer Engineering: Computer Engineers conduct experiments either on hardware or software components to look for the optimal solutions that would benefit the society directly or indirectly. The sole purpose revolves around the beneficial service of the people by using the product.

2.2 Electrical Engineering: Electrical engineers conduct experiments on circuit designs, components, and electronic systems. These experiments aim to optimize power consumption, signal processing, and overall reliability, contributing to the development of efficient electronic devices.

3. Case Study:

3.1 SpaceX and Innovative Rocketry: SpaceX, under Elon Musk's leadership, has transformed space exploration by experimenting with reusable rocket technology.

The development of the Falcon 9 rocket involved numerous experiments, failures, and refinements, underscoring the experimental nature of cutting-edge engineering endeavors.

3.2 The Founding of Apple Computer, Inc.: Apple, discovered by Steve Jobs, remains the revolutionary turning event in the domain of digitalization. The development of Apple products are used in the world even now with its reliable and efficient features.

Conclusion

In summary, engineering is synonymous with experimentation, and engineers are inherently pioneers. The iterative design process, prototyping, and continuous testing are integral aspects of engineering practice. Through case studies and examples, we have illustrated how engineering as experimentation has led to groundbreaking innovations. Embracing this experimental mindset is essential for engineers to tackle emerging challenges and propel technological advancements.

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