SENG 11232 · Engineering Foundation
STUDENT PRE-LECTURE NOTES · LECTURE 01

The Engineering Discipline & the Software Engineer's Role

Module 1 — Thinking Like an Engineer

HOW TO USE Read these notes BEFORE the lecture. Highlight terms you don't recognise. Bring your questions to class. Use the blank spaces for your own notes.

Learning Objectives

By the end of this lecture, you should be able to:

- 1. Explain what engineering is and how software engineering fits within the broader discipline
- 2. Distinguish software engineering from computer science and information technology
- 3. Describe the ACM/IEEE Software Engineering Code of Ethics
- 4. Explain professional responsibility and legal exposure in software development
- 5. Identify major career pathways for software engineering graduates

What is Engineering?

Engineering is the application of scientific and mathematical principles to design, build, test and maintain systems that solve real-world problems under real-world constraints.

Core Engineering Constraints

- Cost: must be affordable to build and maintain
- Time: must be delivered within acceptable schedules
- Safety: must not harm users or the public
- Performance: must meet specified functional requirements
- Reliability: must work consistently over its lifetime

KEY Engineering is not just programming. It is the disciplined, professional practice of building reliable systems responsibly.

SE vs CS vs IT

- Computer Science: theoretical foundations — algorithms, computability, complexity
- Information Technology: deployment, administration, support of existing systems
- Software Engineering: applying engineering discipline to build reliable software at scale

Your notes:

ACM/IEEE Code of Ethics

The ACM/IEEE Software Engineering Code of Ethics defines 8 principles. The most important for a 1st-year student:

- PUBLIC: act in the public interest — safety is paramount above commercial pressure
- PRODUCT: ensure the software you build meets the highest professional standards
- JUDGMENT: maintain professional independence — do not let others override your engineering judgement on safety

NOTE	Real consequences: Therac-25 race condition killed 6 patients. Boeing 737 MAX MCAS contributed to 346 deaths. UK Post Office Horizon wrongly convicted 736 people. These were engineering failures.

Your notes:

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Key Terms for This Lecture

Term	Your Definition (fill in during/after lecture)
Engineering	
Software Engineering	
Computer Science	
ACM/IEEE Code	
Stakeholder	
Technical Liability	
Profession	

Self-Check Questions

Answer these after the lecture to test your understanding:

- Q1. What is the key difference between software engineering and computer science?

Answer: _____

- Q2. Name three real-world engineering constraints that apply to software projects.

Answer: _____

- Q3. State the most important principle of the ACM/IEEE Code of Ethics and explain why it matters.

Answer: _____

- Q4. Describe one famous software failure and identify which engineering principle was violated.

Answer: _____

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