# August 26, 2019 Lecture

GMU Fall 2019 CS 321

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## What is Software Engineering

According to the IEEE (IEEE93a):

> Software Engineering:
>
> 1. The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.
> 2. The study of approaches as in 1.

You must be both disciplined and agile.

The overarching goal is

> To produce a quality product, on time, within budget, and of value to the customers and users.

## Software Engineering Rationale

For any software project, a set of Software Engineering (SE) *objectives* should be specified.

Acheivement of those objectives is governed by the adoption of SE *principles* in the *process*.

Use of such SE principles will induce desirable *attributes* in the *product*.

## Four P's of Software Engineering

1. People
2. Process
3. Project
4. Product

## A Generic Software Engineering Process

1. Communication
2. Planning
3. Modeling
4. Construction
5. Deployment

## Umbrella Activities

- Project tracking and control
- Risk management
- Software Quality Assurance (QA)
- Technical reviews
- Measurement
- Software Configuration Management (SCM)
- Documentation and other artifacts

## The Essence of Software Engineering Practice

- Understand the problem (communication and analysis)
- Plan a solution (modeling and software design)
- Carry out the plan (code generation)
- Examine the result for accuracy (testing and QA)

## Principles of Software Engineering Practice

According to David Hooker:

1. Deliver value
2. Keep it simple
3. Maintain the vision
4. Remember that others will consume what you produce
5. Be open the future
6. Plan ahead for reuse
7. Think

## Characteristics of Software

- Software is engineered
  - It is *not* manufactured
- Software does not wear out
  - It *rots*
- Software is complex

## Some Myths about Software

- If we fall behind schedule, we can add more programmers
- A general statement of objectives is sufficient to begin writing programs – we can fill in the details later
- Software requirements continually change, but can be easily accommodated because software is flexible
- The sooner we get to coding, the sooner we will get done

Remember: focus on reality as you navigate your way through software engineering decisions.