Software Engineering: A Practitioner's Approach

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课程简介

课程编号： B1801241S　　**学　分：** 3.0

开课学院： 物联网学院　　**学　时：** 24+24

课程类别： 专业基础课　　**课程性质：**必修

目的

The Software Engineering is the basis course of computer and related sciences. It is an engineering discipline where software engineers use methods and theory from computer science and apply it cost-effectively to solve difficult problems. This course presents a broad perspective on software engineering, such as software lifecycle, qualities of software, design, specification and verification of software, programming environments and tools, structural oriented programming and object oriented programming. Furthermore, the quality management, process improvement, software change, configuration management are also discussed.

课程教学内容及基本要求

- This is an introductory course of software development process and methods which tells systematically the related development processes and technology. Content includes the concepts of products, software engineering and software process, software requirements engineering, analytical modeling, design engineering, software architecture design, user interface design, component-level design and software testing technology etc.

课程学时分配

教学环节 时数 课程内容	讲课	上机	实验	习题及讨论	小计
1、Software and Software Engineering					
2、Process Models					
3、Agile Development					
4、Understanding Requirements					
5、Requirements Modeling: Scenarios, Information, and Analysis Classes					
6、Design Concepts					
7、Architectural Design					
8、Component-Level Design					
9、Software Testing Strategies					
10、Testing Conventional Applications					
11、Quality Mangement					
总　　计	24		24		48

课程考核

The course use close examination pattern. The academic performance mainly results from the final examination and the usual performance, which accounted for 70% and 30% each. Usual performance is mainly decided by working projects of the courses, supplemented by after-school work and attendance.

教材及主要参考书

教材：

[1] Roger S. Pressman.*Software Engineering: A Practitioner's Approach, 8/e.*

主要参考书：

[1]《软件工程：实践者的研究方法》Roger S. Pressman，机械工业出版社，2009.

[2]《Software Engineering (8th Edition)》，Ian Sommerville，机械工业出版社，2006.

[3]《软件工程（第8版）》，程成，陈霞，机械工业出版社，2007.

[4]《人月神话》，布鲁克斯(FrederickP.Brooks.Jr.)

Chapter 1

- **Software & Software Engineering**

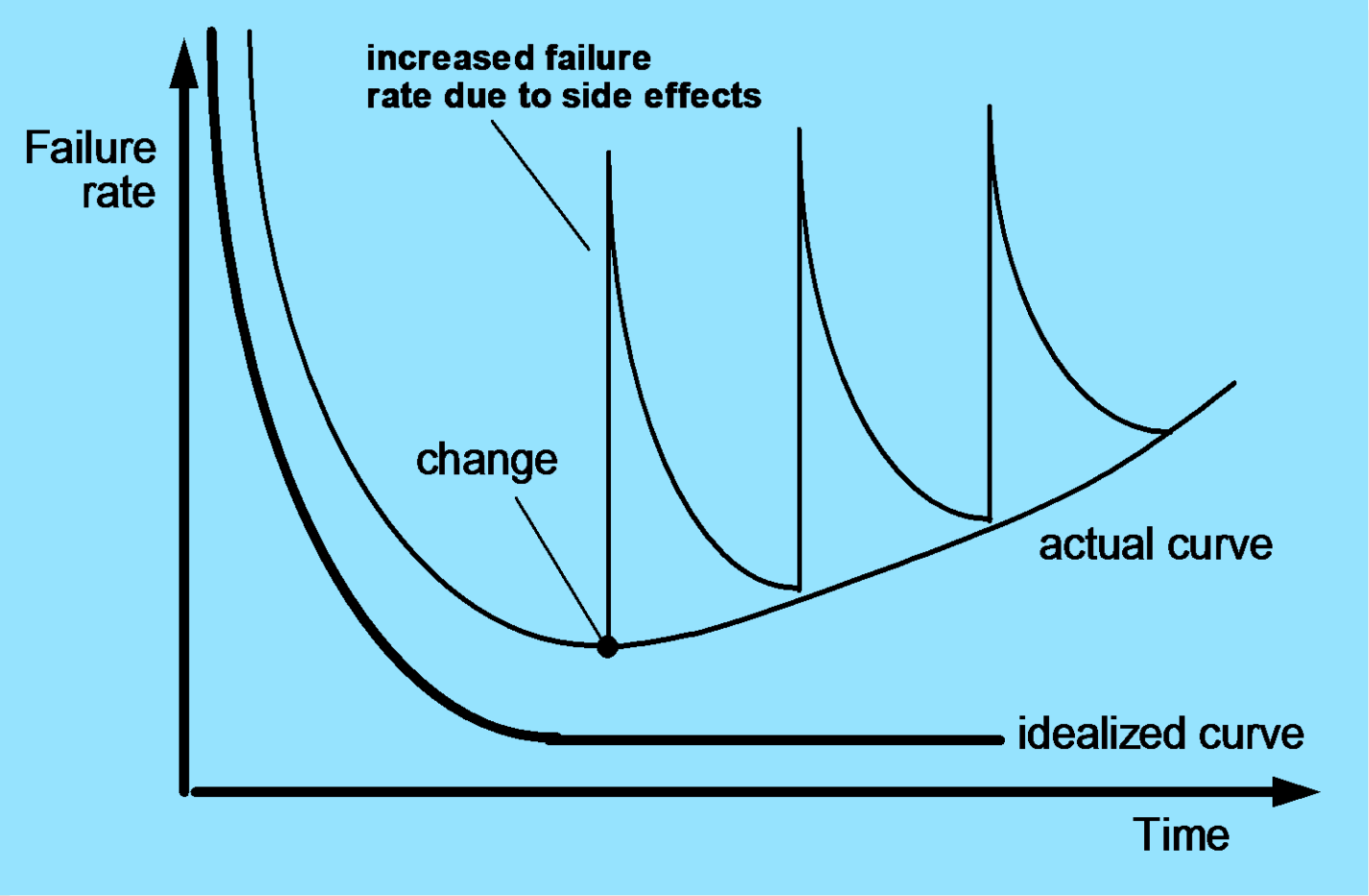
What is Software?

Software is: (1) instructions (computer programs) that when executed provide desired features, function, and performance; (2) data structures that enable the programs to adequately manipulate information and (3) documentation that describes the operation and use of the programs.

What is Software?

- ***Software is developed or engineered, it is not manufactured in the classical sense.***
- ***Software doesn't "wear out."***
- ***Although the industry is moving toward component-based construction, most software continues to be custom-built.***

Wear vs. Deterioration



Legacy Software

Why must it change?

- software must be adapted to meet the needs of new computing environments or technology.
- software must be enhanced to implement new business requirements.
- software must be extended to make it interoperable with other more modern systems or databases.
- software must be re-architected to make it viable within a network environment.

Software crisis

Software crisis –chronic affliction

软件危机—“慢性的苦恼”

Software crisis

20世纪60年代末70年代初，西方工业发达国家经历了一场“软件危机”。这场软件危机表现在：一方面软件十分复杂，价格昂贵，供需差日益增大，另一方面软件开发时又常常受挫，质量差，指定的进度和完成日期很少能按时实现，研制过程很难管理，即软件的研制往往失去控制。

落后的软件生产方式无法满足迅速增长的计算机软件需求，从而导致软件开发与维护过程中出现一系列严重问题的现象称为软件危机。

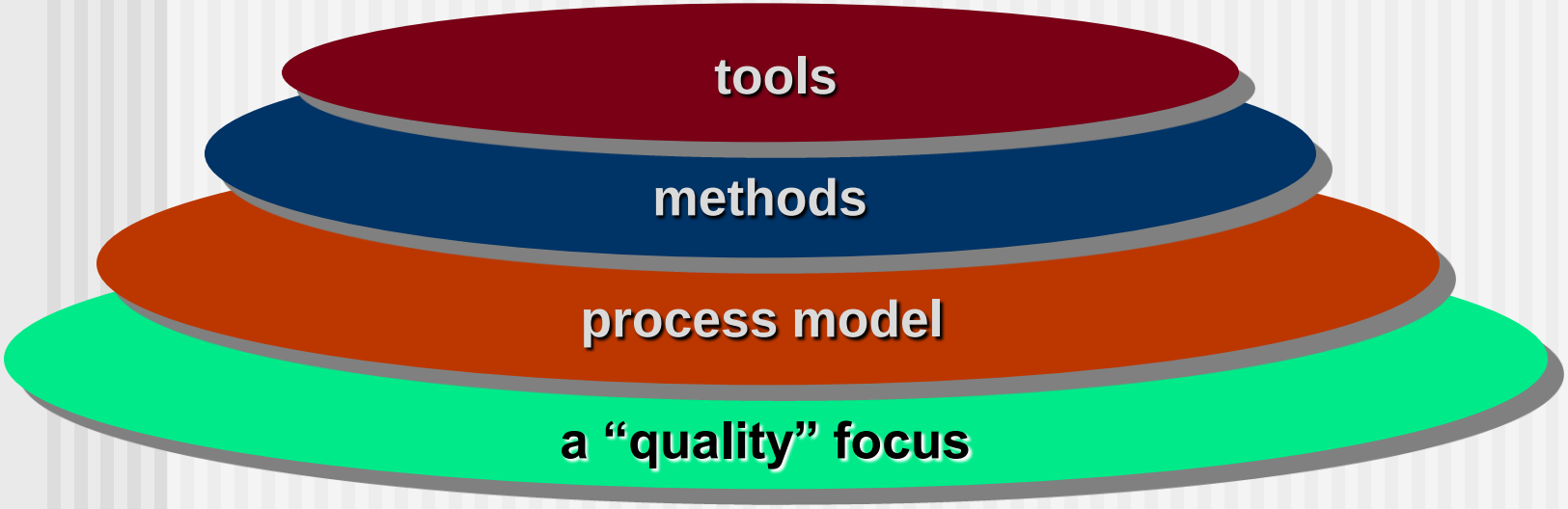
Software Engineering

- Some realities:
  - *a concerted effort should be made to understand the problem before a software solution is developed*
  - *design becomes a pivotal activity*
  - *software should exhibit high quality*
  - *software should be maintainable*
- The seminal definition:
  - *[Software engineering is] the establishment and use of sound engineering principles in order to obtain economically software that is reliable and works efficiently on real machines.*

Software Engineering

- The IEEE definition:
  - *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).*

A Layered Technology



Software Engineering

A Process Framework

Process framework

Framework activities

- work tasks
- work products
- milestones & deliverables
- QA checkpoints

Umbrella Activities

Framework Activities

- Communication
- Planning
- Modeling
  - Analysis of requirements
  - Design
- Construction
  - Code generation
  - Testing
- Deployment

Hooker's General Principles

- 1: *The Reason It All Exists*
- 2: *KISS (Keep It Simple, Stupid!)*
- 3: *Maintain the Vision*
- 4: *What You Produce, Others Will Consume*
- 5: *Be Open to the Future*
- 6: *Plan Ahead for Reuse*
- 7*: Think!*

Questions

- 1、What is software?
- 2、What is software Engineering?
- 3、What is Hooker’s General principles ?
- 4、What are the layers of software engineering?