

# CS 490MT/5555

## Software Methods and Tools



Spring 2016, Yongjie Zheng

# About the Course

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- ▶ This is a software engineering course that aims at increasing students' skills of using practical software methods and tools as software engineers. At the end of the course, students should not only know how to use the covered methods and tools, but also understand the underlying concepts, principles, and designs.
- ▶ The course website
  - ▶ [http://y.web.umkc.edu/yzheng/classes/490\\_5555.html](http://y.web.umkc.edu/yzheng/classes/490_5555.html)

# Additional Information

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- ▶ **Prerequisite**
  - ▶ Java Programming.
- ▶ **Lectures, Labs, and Assignments**
  - ▶ Lab attendance is required.
  - ▶ Due to the capacity of the lab rooms, students will be divided into two groups doing labs at the same time.
- ▶ **Policies**
  - ▶ Late submissions will not be accepted.
  - ▶ Be honest.

# Additional Information, cont.

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## ▶ Grading and Evaluation

- ▶ Midterm: 30%.
- ▶ Final Exam: 30%.
- ▶ Labs/Assignments: 40%.
  - ▶ Each lab/assignment combination counts 5%.
  - ▶ The lab portion: 20%; the assignment portion: 80%.

## ▶ About Re-grading

- ▶ Assignments and exams can be re-graded within one week after grades are released.
- ▶ The whole assignment or exam will be regraded.

# Course Content

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Topics	Methods	Tools
Planning		Microsoft Project
Analysis and Design	UML Modeling	IBM Rational Modeler
Architecture	Architecture Patterns and Styles, Functional Design	ArchStudio
Implementation	Integrated Development Environment	Eclipse Plug-ins
Testing	Unit Testing	JUnit
Maintenance	Version Control	Subversion, GIT

# About Software Engineering

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- ▶ Software engineering is about improving **predictability**, **productivity** (e.g. cost, time-to-market), and **quality** of software production.
- ▶ Software engineering is **programming-in-the-large**.
- ▶ Software engineering usually involves **collaborations among human beings**.
- ▶ Software engineering is not successful in the sense that
  - ▶ Numerous software projects failed.
  - ▶ Software development is still manually done, and software productivity is relatively low compared to other engineering disciplines.

# Terminologies

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- ▶ **Software**

- ▶ Computer programs and associated documentation (e.g. software architecture).

- ▶ **Method**

- ▶ A systematic way (series of steps) of performing a task (e.g. software design).

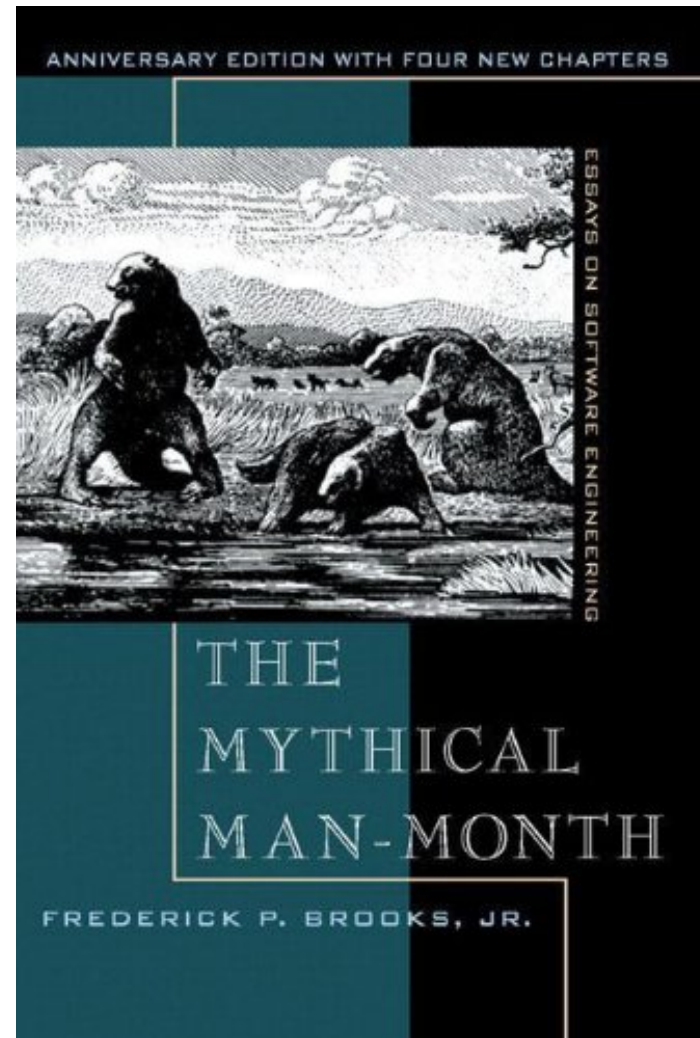
- ▶ **Tool**

- ▶ Something used to carry out a particular function (e.g. software design).
    - ▶ In software engineering, many “tools” happen to be software by themselves.

# Required Reading

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Frederick P. Brooks, Jr..  
1987. No Silver Bullet  
Essence and Accidents  
of Software Engineering.  
Computer 20, 4 (April  
1987), 10-19.





“There is no single development, in either technology or management technique, which by itself promises even one order-of-magnitude improvement within a decade in productivity, in reliability, in simplicity.”

--- Fred Brooks

# Essence of Software Systems

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- ▶ **Complexity**

- ▶ E.g. Windows NT - 1.8 million SLOC; Windows XP - 45 million SLOC.

- ▶ **Conformity**

- ▶ Software is designed by different people and needs to conform to different interfaces.

- ▶ **Changeability**

- ▶ Software is constantly subject to pressure of change.

- ▶ **Invisibility**

- ▶ Software is not inherently embedded in space.

# Promising attacks on the essence

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- ▶ **Avoid constructing what can be bought**
  - ▶ The cost of software has always been development cost, not replication.
- ▶ **Use rapid prototyping in establishing requirements**
  - ▶ The hardest single part of building a software system is deciding precisely what to build.
- ▶ **Grow software with incremental development**
  - ▶ The conceptual structures we construct today are too complicated to be accurately specified in advance ...
- ▶ **Identify and develop great designers**
  - ▶ Good design practices can be taught, but great designs can't.

# Reminder

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- ▶ Read the article “No Silver Bullet Essence and Accidents of Software Engineering”. Follow the link [NoSilverBullet] on the course website to download the article.
- ▶ There is no lab this week. Please make sure that you have a valid UMKC account to access lab computers.