

CSC 221 – Introduction to Software Engineering

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www.hcibook.com/alan/teaching/CSC221/

course text

Ian Sommerville
Software Engineering, 6th Edition
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www.software-engin.com

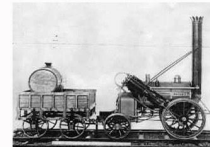
overview

Alan Dix	introduction and rationale (ch1-ish) software engineering processes (ch 3), system engineering (ch 2), debugging!
John Mariani	verification and validation (part 5: ch 19,20,21) project management (ch4) management (part 6: ch 22–25) professional, ethical and legal issues (ch 1)

engineering?



- craft
 - personal skill
 - experience
 - flexible materials
- engineering
 - tables and tools
 - recorded knowledge
 - controlled materials



size matters design and construction in the small

- garden path
- tree house
- program to add up numbers

craft

- garden path, tree house
- program to add up numbers
 - ◆ complete view of problem
 - ◆ one person in control
 - ◆ focus on final goal
 - ◆ personal skills

design and construction in the large

- garden path Ⓜ motorway
 civil engineer
- tree house Ⓜ skyscraper
 architect
 structural engineer

engineering

- motorway, skyscraper
 - ◆ complex problem
 - ◆ decomposed goal
 - ◆ many people involved
 - ◆ logistics, management, costs
 - ◆ quality control, safety

... and software?

- garden path Ⓜ motorway
 civil engineer
- tree house Ⓜ skyscraper
 architect, structural engineer
- add up numbers Ⓜ
 hospital record system
 airbus control system

software engineer!

physical things

- directness of effect
 - push and it moves
- locality of effect
 - here and now
- visibility of state
 - small number of relevant parameters

what's special about software?

- complexity of effect
 - computation
- non locality of effect
 - in space – networks
 - in time – memory
- hidden state
 - large number of invisible variables

other complex systems

- chemical plants
- economic systems
- large organisations
- hydraulics
 - ◆ non-locality
 - ◆ complex interactions

... increasing complexity

- chemical plants
- economic systems
- large organisations
- hydraulics

replaced or supported by
software



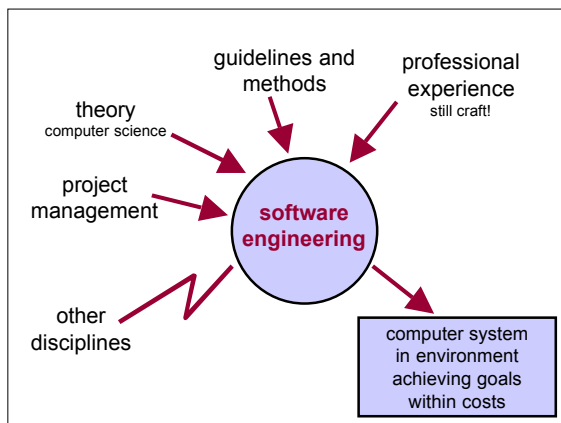
kinds of software

specialisation

- **generic**
 - word-processor
 - database
- **bespoke**
 - control system
 - business process
- + domain specific
 - SAP (customisable)

interaction

- **stand-alone**
 - word-processor
 - payroll
- **embedded**
 - washing machine
 - guided missile
- **networked**
 - ATM, web browser



when it goes wrong ...

- Ariane 5 ... 📺