

Software and Service Engineering

a Complex Adaptive Systems Perspective

Introduction to the Course

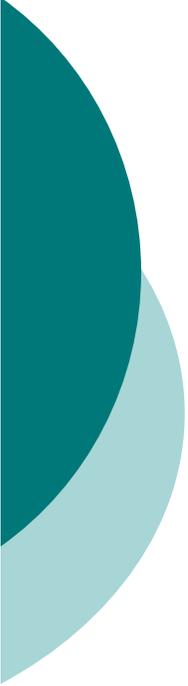
Class of 2015

Prof. Franco Zambonelli



What is it About?

- Modern software and software services systems are intrinsically “complex”
 - Large-scale, dynamic, situated
 - Complexity also due to its “intangibility”
- And are the fact “socio-technical”
 - Dived into societies and organization
 - Bringing them together
 - Society and organizations are affected by ICT (Information and Communication Technologies) and viceversa
- How to tackle such complexity
 - Manage complex and dynamic production processes
 - Understand complexity of real-world social systems and of natural systems
 - Attack the complexity and dominate it



Software vs. Services Engineering

- Software *per se* is a service
 - But this is not the key point
- Software can be organized and built around “services” as basic components
 - Service-oriented software development
 - The dominant engineering paradigm
- Software systems include non-software services
 - Human services accessed via the mediation of an ICT system
 - Other non human and non software services existis Sensing and actuating services, mobility services, robotic services, all of which mediated by ICT systems
- So, whether or not you adopt the service-oriented paradigm
 - Engineering modern software implies engineering services



...and it is a Management Problem

- Managing software development is managing a complex production process
 - With very peculiar characteristics, distinguishing it from traditional product development
 - Independent of technological considerations (programming languages or operating systems)
- Managing complex service systems implies
 - Engineering complex business processes involving software components and human components
 - Handling with dynamic situations
 - Handling with complex phenomena of collective behavior
- So all of this course is relevant for Management Engineers
 - Wherever you will be in the future, you will have to deal with the management of complex service organizations interacting with ICT systems and having to deal with the engineering of socio-technical systems

Textbooks and Readings

- Key textbooks
 - Ian Sommerville, Software Engineering, 8th Edition, Paerson Education, 2007
 - Martin Fowler, UML Distilled, Paerson Education, 2004.
- Slides
 - All available on the web sites
- Further readings
 - Technical and scientific articles make available in a properly organized way on the Web site





Course Key Themes

Part 1: Software Engineering

- Introduction to basic concepts of software engineering
- Managing the software development process

Part 2: Service Engineering

- Service-oriented software development
- Complex adaptive social and natural systems

See the web site for detailed list of topics



The Course Web Site

<http://mars.ing.unimo.it/didattica/ingss/Home.html>

- Contains everything
- Detailed program, slides, suggested textbooks, further readings, exams information, contacts, access to software tools, etc.
- Regularly updated

Can also be reached from my personal home page:

<http://www.agentgroup.unimo.it/Zambonelli>



Exams - Regular

- Written exam
 - Solving a software engineering problems – 3 hours)
- Oral exam (typically one week later)
 - Question on all the topics of the course
- Mini-thesis (discussed during the oral exam)
 - Study a specific topic on technical/scientific articles and make a presentation about it
- Dates:
 - At least two written exams in the summer session



Exams – Project Based

- Thinking about future smart cities scenarios
 - Identifying some innovative ways to manage mobility
- 2-3 persons focus on a specific case study
 - Develop the requirements, the architecture of the system, its design
 - Make some simulation and/or small prototyping
 - All of which using the concepts from the course
- **Dates:**
 - At the end of the lessons

The Staff

- Prof. Franco Zambonelli



- Also seminar by other researchers and professors...