

301AA - Advanced Programming [AP-21]

Lecturer: **Andrea Corradini**

andrea@di.unipi.it

<http://pages.di.unipi.it/corradini/>

Assistant: **Laura Bussi**

laurabussi@live.it

Course pages: <http://pages.di.unipi.it/corradini/Didattica/AP-21/>

Virtual room: on [Teams](#)

Department of Computer Science, Pisa
Academic Year 2021/22

AP-01: Overview and Admins

Goals of the course

- To provide the students with a deep understanding of how ***high level programming concepts*** and ***metaphors*** map into ***executable systems*** and which are ***their costs and limitations***
- To gain familiarity with modern principles, techniques, and best practices of software construction
- To introduce the students to techniques of programming at higher abstraction levels, in particular ***component programming*** and ***functional programming***
- To present ***state-of-the-art frameworks*** incorporating these techniques.

Prerequisites

- Undergraduate level knowledge of
 - at least one object-oriented programming language (like Java, C++, C# or others)
 - at least one functional programming language (like Haskell, OCaml, Scheme or others)
- ➔ If you don't have this background, please inform me at the beginning of the course
- ➔ Suggestions to fill possible gaps will be given

Programme

- Run Time Support and Execution Environments
- Component Based Programming
- Software and Application Frameworks
- Polymorphism & Generic Programming
- Functional aspects of programming languages
- Scripting languages
- Advanced concepts in programming languages

Organization of the course

- **Frontal lessons** in presence (room L1) and in streaming, using slides
- ***Lessons will be recorded and left accessible on Teams (unless...)***
- **Hands-on activities** will be organized (with the help of Laura Bussi), to experiment with concepts, tools and languages presented in the lessons.
- Interaction with the lecturer: **during lessons**, by e-mails, in meetings during office hours (day/time to be fixed).
- On the **web page of the course**, the slides presented in each lesson are published progressively, with references to corresponding topics in the reading material.
- → <http://pages.di.unipi.it/corradini/Didattica/AP-21/>
- → see also <http://pages.di.unipi.it/corradini/Didattica/AP-20/>

Evaluation and other things...

Evaluation

- Some programming assignments during the course
- Final oral exam

Attendance to the course is strongly encouraged

- *The recorded lessons are available for exceptional situations*
- If you miss a lesson, you can find on the course web page the list of topics presented, with slides and references to teaching material

Examination methods for **non-attending students** are identical to those for attending students

Reading material

- Will be suggested progressively along the course
- Mostly material accessible on-line

Credits

- Slides of the course freely taken and elaborated from a number of sources:
 - **Giuseppe Attardi** (DIP), Advanced Programming
 - **Gianluigi Ferrari** (DIP), Advanced Programming
 - **Antonio Cisternino** (DIP)
 - and others that will be indicated along the course

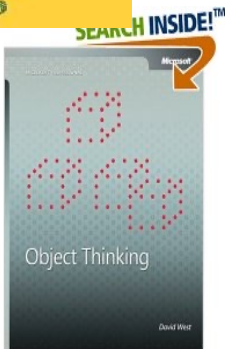
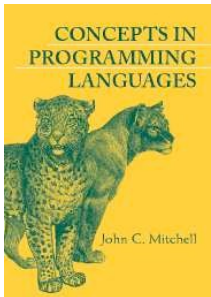
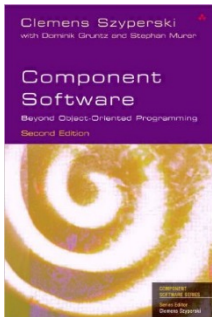
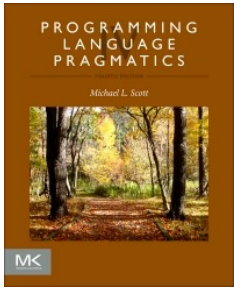
Some Suggested Readings

Programming Language Pragmatics, 4th ed.
Michael L. Scott, Morgan-Kaufmann, 2015.

Component Software: Beyond Object-Oriented
Programming. C. Szyperski, D. Gruntz, S.
Murer, Addison-Wesley, 2002.

Concepts in Programming Languages. John C.
Mitchell, Cambridge University Press, 2002.

Object Thinking. D. West, Microsoft Press, 2004.



Admins...

- Web page of the course:

<http://pages.di.unipi.it/corradini/Didattica/AP-21/>

- Office Hours: ???

- Also: by appointment, sending an email to

andrea@di.unipi.it

Other infos

- Erasmus+ -- next call: **17/09/2021** deadline: **30/09/2021**
 - <https://erasmusmobility.unipi.it/>
- Double Degree with "Master Degree in Computer Engineering" of University of Malaga (only for students of WIF)
 - https://www.uma.es/master-en-ingenieria-informatica?set_language=en
- → for info send an email to erasmus@di.unipi.it