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COURSE: SYSTEM FOR ADVANCED PROGRAMMING (includes the “Client-Server Programming” and the “Advanced Programming Techniques” module)

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ACADEMIC YEAR: 2016/2017

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TYPE OF EDUCATIONAL ACTIVITY: Basic

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TEACHER: GIANVITO SUMMA

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e-mail: gianvito.summa@gmail.com

website: <http://informatica.unibas.it/moodle/>

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phone:

mobile (optional):

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Language: ITALIAN

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ECTS: 12

n. of hours: 100 (includes  
12 hours of lab)

Campus: Potenza  
Dept./School: Engineer  
Program: Master Degree in  
Engineering in Computer Science

Semester:  
Annual

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#### EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

This course puts together two modules: web development and advanced programming techniques in object-oriented programming language (Java).

The educational goals mainly consist in providing skills and abilities to students for designing and building systems in medium/high complexity in a client-server web architecture.

By the end of the course, students will know:

- How to deal with requirements analysis and designing of a system in medium-high complexity;
- How to use the main programming techniques of both the client-server paradigm and web development process.

Main topics are listed below:

- Design Patterns;
  - Inversion of Control;
  - Thread e concurrent programming;
  - Clonation and serialization;
  - Refactoring techniques;
  - Agile development process and AUP;
  - Protocols and standards of Web;
  - Web programming;
  - J2EE platform and frameworks;
  - Db programming and frameworks..
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#### PRE-REQUIREMENTS

It is required that students know the following concepts provided by “Object Oriented Programming II” and “Networks” courses:

- Inheritance and polymorphism;
  - Internet and communication protocols.
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#### SYLLABUS

Design Patterns:

- Introduction; History; Patterns and Framework; Patterns and Java API; Data and algorithms: Conclusions.

Inversion of Control:

- Introduction; Dependency Injectio; How to...; AOP; Conclusions.

Refactoring:

- Introduction; Techniques; Examples.

Development process:

- Introduction; RUP; XP; AUP.

Clonation and serialization.

Threading e synch.

Db programming:

- Introduction; Technologies; JDBC; How to...; Conclusions.
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Framework for the persistence layer:

- Introduction; Transactions; Programming techniques; Torque; Hibernate; JPA.

Web programming:

- Introduction; Technological issues; Architectures; Conclusions.

Platforms for Web applications:

- Introduction; Web app structure in JEEE; Servlet; JSP; Programming techniques; EL-JSTL; Filters and events.

Web programming frameworks:

- Introduction; Modello2; Struts; Programming techniques; JSF; JSF 2; Functional tests.
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#### TEACHING METHODS

Theoretical lessons, Laboratory tutorials.

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#### EVALUATION METHODS

Written examination, Practical test, Oral examination.

The examination's goal consists in verifying the skills and knowledges acquired by students, as depicted before.

The examination is composed by three parts that take place in three different days. In the order:

- A **written examination** (a quiz test about the "Client-Server Programming" module). Students that do not pass this test (the minimum score is 18/30 points) cannot access to the following test parts. The quiz contains 30 questions and students have 40 minutes of time available. Students cannot use anything else during the test (no PC, no smartphone, no calculators....);
- A **practical test** to be done in the lab, consisting in building a web application in medium-high complexity. This test aims at evaluate if students have acquired skills in requirements analysis and designing. To pass this test students have to reach at least 18/30 points and have 5 hours of time available. Students may consult the user guides, Java documentation and slides of the course (all this stuff is available on the lab PCs). The test is composed by two exercises: the first one (24 points) is related to the requirements analysis and designing skills and the second one (6 points) is related to building a web application;
- An **oral examination**. To pass this test students have to reach at least 18/30 points.

Students that pass both the **intermediate tests** (minimum score of 18/30 points) will have an extra bonus of 2 points upon the practical test. Please note that this bonus may be used only within the third (III) examination session. The intermediate tests consists in quizzes and designing exercises.

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#### TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

The slides of the course are available online at <http://informatica.unibas.it/moodle/> (click "*Programmazione di Sistemi Avanzati*", authentication required).

Books:

- Cooper -- The Design Patterns Java Companion;
- Eckel -- Thinking in Patterns;
- Martin Fowler -- Refactoring -- Improving the Design of Existing Code -- 1999 – Addison-Wesley

For further details please consult the link provided before and go to the "Riferimenti Utili" section that contains interesting resources (books and web sites) for each topic of the course.

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#### INTERACTION WITH STUDENTS

In the first lesson, the teacher will explain all useful information about the course and how to consult the online stuff (at the Moodle Learning platform). Office hours: On Monday/Wednesday, from 6pm to 7.30pm, at "Docenti a contratto" office room (DiMIE Department, III floor).

Students may also contact teacher by email.

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#### EXAMINATION SESSIONS (FORECAST)<sup>1</sup>

First intermediate test: 22th Feb 2017

Second intermediate test: 28th Jun 2017

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<sup>1</sup> Subject to possible changes: check the web site of the Teacher or the Department/School for updates.



Università degli Studi della Basilicata  
**Scuola di Ingegneria**

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Sessions:

I: 3/5th Jul 2017

II: 17/19th Jul 2017

III: 11/13th Sep 2017

IV: 11/13th Dec 2017

V: Feb 2018

VI: May 2018

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SEMINARS BY EXTERNAL EXPERTS    YES     NO

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FURTHER INFORMATION

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