COURSE DETAILS

"INGEGNERIA DEL SOFTWARE"

SSD ING-INF/05

DEGREE PROGRAMME: BACHELOR DEGREE IN COMPUTER ENGINEERING

ACADEMIC YEAR: 2023-2024

GENERAL INFORMATION – TEACHER REFERENCES

TEACHER: STEFANO RUSSO
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SEE THE STUDY COURSE WEBSITE

GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE (IF APPLICABLE): N.A.

MODULE (IF APPLICABLE): N.A.

CHANNEL (IF APPLICABLE): N.A.

YEAR OF THE DEGREE PROGRAMME (I, II, III): III

SEMESTER (I, II): II

CFU: 10

REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE "REGOLAMENTO")
Programmazione, Basi di Dati.

PREREQUISITES (IF APPLICABLE)
None.

LEARNING GOALS
The aim of the course is to provide the methodologies and techniques fundamental for the engineering of quality software systems, concerning: modern software production processes; techniques and languages for object-oriented analysis and specification, cost estimation, design, implementation in Java, and testing   .

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding
The student must demonstrate: to know the main software life cycle models; to know the techniques of analysis and specification of requirements; to know the UML modeling language; to know the principles underlying functional and structural testing; to know the basic aspects of the Java language.

Applying knowledge and understanding
The student must demonstrate: to be able to specify the requirements and to be able to design a small-scale software system through the UML language; to be able to implement it in Java language; to be able to estimate costs with the FPA method; to be able to design test cases.

COURSE CONTENT/SYLLABUS

Introduction to Software Engineering: A Brief History of Software Engineering. Process and product. Software quality factors. Principles of software engineering.
The software lifecycle: Waterfall model; feedback model. Evolutionary models. Transformational model. 'V' model. Agile methodologies.
Cost estimation. General information on cost estimation. Function Point Analysis (FPA).
Analysis and specification of requirements. Types of requirements: user, system and domain, functional and non-functional. Comprehensiveness, consistency, verifiability and traceability of requirements. The requirements specification document (SRS). Use case modeling.
Object modeling: The UML language: diagrams of classes, interaction, state, activity, components, packages, deployment. Analysis and design in UML. Architectural and design patterns. **Software verification and validation**: Basic principles. Objectives and planning of testing. Black-box and white-box testing techniques. Unit, integration, system, acceptance, regression, α-test, β-test tests. Structural test, coverage criteria. Cyclomatic complexity. Combinatorial test. Model-based testing. Robustness test.
Software quality metrics and models. Software metrics. Software quality models; the ISO 9126 standard. Management of software configurations (outline).
From design to object-oriented programming. The Java language. Access RDBMS systems from Java programs. Exception handling in Java. From UML project to Java implementation.

READINGS/BIBLIOGRAPHY
I. Sommerville, "*Ingegneria del Software*", 10° edizione, Pearson, 2017
J. Arlow, I. Neustadt, "*UML 2 e Unified Process - Analisi e progettazione Object-Oriented*", McGraw-Hill, 2007
Lecture transparency and exercises (available on the teacher's website).

TEACHING METHODS

Teaching is provided: a) 60% with lectures; b) 40% with exercises.
The topics of the lectures and exercises are exposed with the help of detailed transparencies, made available to the student in the teaching material through the official website of the teacher.

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

Exam type	
written and oral	
only written	
only oral	X
project discussion	X
other	

The exam is divided into the drafting of a paper, pre-assigned to the student well in advance and drawn up by the student independently, and in an oral exam. The discussion of the paper is the first topic of the test oral, which for the rest consists of two questions on the principles, methodologies and techniques illustrated in the course.

b) Evaluation pattern: