Universidad Zaragoza

Academic Year/course: 2023/24

39530 - Language Processors

Syllabus Information

Academic year: 2023/24
Subject: 39530 - Language Processors
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 607 -
ECTS: 6.0
Year: 3
Semester: Second semester
Subject type:
Module:

1. General information

The subject will focus on the study of the inner workings of language processors. The knowledge acquired in previous subjects related to languages and grammars will be used to develop a compiler for a basic imperative language. The student will end up building a translator that includes lexical, syntactic and semantic analysis of the language, as well as the generation of the corresponding code for its subsequent execution. The techniques and tools studied are applicable to other application domains, such as the transformation of data specified by means of a formal language, the visualization of web pages (html) or virtual reality models (vrml), or natural language processing , for example.

The development of the subject is aligned with some of the Sustainable Development Goals (SDGs) of the 2030 Agenda (SDGs), mainly with Goal 8 and Target 8.4.

2. Learning results

Upon completion of the subject, the student will be able to:

- Understand the inner workings of compilers and be able to use them effectively.
- Be able to apply the acquired knowledge of languages, grammars and automata to the specification and implementation of the lexical and syntactic analysis aspects of a translator.
- Learn the methods and techniques related to code generation and optimization.
- Master the use of specific tools for the construction of translators.

3. Syllabus

Classroom face-to-face learning activities will focus on the study of the following topics:

- Topic 1: Introduction. Translation and language processing.
- Topic 2: Lexical analysis. Automata and regular expressions. Implementation of a lexical analyzer.
- Topic 3: Syntactic analysis. Context-free grammars. Implementation of a syntactic parser.
- Topic 4: Semantic analysis. Table of symbols. Implementation of a semantic analyzer.
- Topic 5: Execution environments.
- Topic 6: Code generation and optimization.

Laboratory sessions will be conducted with the final objective of developing a basic but complete compiler for an imperative language.

4. Academic activities

The calendar of the subject will be defined by the center in the academic calendar of the corresponding year. The academic

activities are organized according to the following distribution of activities:

- Lectures: 30 hours
- Practice classes: 24 hours
- Theoretical/practical evaluation activity: 3 hours
- Practical evaluation activity: 3 hours
- Student work: 90 hours (approx.)

The detailed calendar of activities will be established on the basis of the calendar approved by the University for the

5. Assessment system

The following assessment activities will be the following:

- **Continuous assessment (first call):** It will be based on the delivery of the practices and the development of a theoretical-practical test . It is mandatory to present each practice on the established dates. In the theoretical-practical test it will be necessary to solve a set of problems posed on the compiler developed in the laboratory sessions.
- **Global assessment (first and second call):** It will be based on the delivery of a compiler developed according to the guidelines of the script that will be provided to the student and a defense of the work before the teachers, as well as a theoretical-practical test, this one of analogous characteristics to the one proposed for the continuous assessment.

In the final grade the weight of the part corresponding to the laboratory practices will be 60%, while the corresponding to the theoretical-practical test will be 40%. In order to pass the subject it is necessary to obtain a minimum score of 5 points out of 10 in each of the practices. In case of not reaching the minimum established in any of the parts, the final grade will be the minimum between 4 and the weighted average of the two parts considered.