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| **Study programmes**: Bachelor studies - Informatics | |
| **Course name**: R240 - Translation of programming languages | |
| **Lecturers**: Filip Marić and other teachers from Department of Computer Science | |
| **Status**: Compulsory | |
| **ECTS**: 6 | |
| **Attendance prerequisites**: P100, P101 | |

**Course aims**: Acquiring theoretical and practical knowledge  about lexical, syntax and semantic analysis of  programming languages, as well as about aspects of implementation of a back processor.  Introducing  students to the theory and practice of translation  of programming languages.

**Course outcome**: After the course is finished, a student should  know the basic concepts related to application of  the theory of formal languages in the analysis and  synthesis of programming languages. Student should  be capable to implement an interpreter for a simple programming language, using the C  programming language and appropriate existing  tools (eg. Lex/Yacc).

**Course content**:
 - Phases of translation and the structure of a program translator
 - Regular expressions and their applications.
 - Finite automata and transductors.
 - Lexical analysis. Lex/Flex tool.
 - Context-free grammars.
 - Push-down automata.
 - Top-down parsing. LL grammars. Recursive descent parsers.
 - Bottom-up parsing. LR grammars. Yacc/Bison tool.
 - Attribute grammars. Syntax-directed translation.
 - Semantic analysis. Code optimization and generation.

**Literature**:

 1. D. Vitas: Prevodioci i interpretatori, Matematički fakultet, Beograd. 2006.
2. A. Aho; R. Sethi; J. Ullman: Compilers - Principles Techniques and Tools, Addison-Wesley, 2006.
3. J. R. Levine et al: lex and yacc, O'Reilly Associates, 1992.
(a teacher may also choose other contemporary literature)

| Number of hours: **5** | Lectures: **2** | Tutorials: **3** | Laboratory: **–** | Research: **–** |
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**Teaching and learning methods**: Frontal, Group, Individual, Exercises.

| Assessment (maximal 100 points) | | | |
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| **Course assignments** | **points** | **Final exam** | **points** |
| Lectures | 20 | Written exam | - |
| Exercises / Tutorials | 20 | Oral exam | - |
| Colloquia | - | Written-oral exam | 60 |
| Essay / Project | - | | |