

Module title Languages and Their Compilers				
Module code Tba	Level Bachelor (B.Sc.)	Hours per week 4	ECTS credits 5	Duration 2 weeks block course + virtual lectures
Module instructor Dr. Lenka Kosková, Technical University Liberec		Lecture type Lectures + Guided Lab Sessions	Prerequisite(s) Intermediate Programming Ability	Grading Coursework compiler writing exercise
Description The course discusses internal mechanisms of compilers and interpreters of programming languages. Basic principles of compilation are explained as well as the structure of a compiler and steps of compilation, including Lexical analysis, parsing techniques, syntactical and semantic analysis. The course covers deterministic languages, LL a LR languages. It focuses also to compilation of program constructs, code generation and optimization. Toolchains and build automation software are demonstrated in labs.				
Content Lectures: <ol style="list-style-type: none"> 1. Languages and compilers, internal compiler structure. 2. Build automation tools and toolchains. 3. How the grammar theory meets real language specifications (Java, Python) 4. The lexical analysis 5. The syntactic analysis 6. The semantic analysis 7. Intermediate code 8. The optimization 9. Code generation 10. JIT compilers and interpreters Labs: <ol style="list-style-type: none"> 1. - 2. The compilation process, compiler directives, macros, and pre-processors (GCC) 3. - 4. The build automation tools (make, Maven, Ant) 5. - 6. Lexical analyzer construction (Flex, ANTLR, JavaCC) 7. - 8. Syntactic analyzer construction (Yacc, ANTLR, JavaCC) 9. - 10. Optimization levels and final product 				
Textbook/teaching material Wirth N., Compiler Construction, updated book from Addison-Wesley in 1996, Zurich 2006, ISBN 0-201-40353-6, online: http://www.ethoberon.ethz.ch/WirthPubl/CBEAll.pdf				

Note: this is not the official course descriptor according to the "Studien- und Prüfungsordnung" (SPO)