

Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF400	Compilation	7	3	0	0	3	5
Prerequisites	INF114						
Admission Requirements	INF114						
Language of Instruction	Turkish						
Course Type	Compulsory						
Course Level	Bachelor Degree						
Objective	This course aims to give a practical account of the programming techniques used in implementing high-level programming languages by compiling into code for stack machines (WebAssembly). As part of the course project, students design and implement a working ahead-of-time compiler in modern C++ for a custom-designed toy language called "Course PL".						
Content	<ol style="list-style-type: none">1. Introduction, Concepts, Course Scope, Compilation Pipeline2. C++ Recap3. Definition of Course PL, PL Ergonomy4. Lexing: Regexp, Finite Automata, flex5. Parsing, Abstract Syntax Trees, Context Free Grammars, Syntax-Directed Translation, Top-Down Parsing, Bottom-Up Parsing, bison6. Midterm Break7. Lexing & Parsing Recap8. Semantic Analysis I: Scopes, Types9. Semantic Analysis II: Rules of Inference, Type Checking10. Code Generation: Stack Machines, WebAssembly, Browser WASM Runtime11. Operational Semantics12. Course PL to WASM I: Resource Management, Primitive Types, Activations13. Course PL to WASM II: Implementing OOP, Method Dispatch14. Intermediate Representations, Code Optimization						
References	<ul style="list-style-type: none">- Compileurs : principes, techniques et outils – A. Aho, R Sethi, J Ullman – InterEditions- Compileurs – D. Grune, H. Bal, V. Jacobs, K. Langendoen, Dunod.						

Theory Topics

Week	Weekly Contents
1	Introduction, Concepts, Course Scope, Compilation Pipeline
2	C++ Recap
3	Definition of Course PL, PL Ergonomy
4	Lexing: Regexp, Finite Automata, flex
5	Parsing, Abstract Syntax Trees, Context Free Grammars, Syntax-Directed Translation, Top-Down Parsing, Bottom-Up Parsing, bison
6	Midterm Break
7	Lexing & Parsing Recap
8	Semantic Analysis I: Scopes, Types
9	Semantic Analysis II: Rules of Inference, Type Checking
10	Code Generation: Stack Machines, WebAssembly, Browser WASM Runtime
11	Operational Semantics
12	Course PL to WASM I: Resource Management, Primitive Types, Activations
13	Course PL to WASM II: Implementing OOP, Method Dispatch
14	Intermediate Representations, Code Optimization