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	1. Introduction, Concepts, Course Scope, Compilation Pipeline 2. C++ Recap 3. Definion 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
References	- Compilateurs : principes, techniques et outils – A. Aho, R Sethi, J Ullman – InterEditions - Compilateurs – 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	Definion 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

Week	Weekly Contents
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