<table>
<tr><th colspan="2">COURSE DESCRIPTION FORM</th></tr>
<tr><td>Course Code and Name</td><td>CENG458 COMPILER AND CODE GENERATION (TECH. ELECT.)</td></tr>
<tr><td>Course Semester</td><td>8</td></tr>
<tr><td>Catalogue Data of the Course (Course Content)</td><td>The fundamentals of compiler theory and practice.</td></tr>
<tr><td>Course Textbooks</td><td>1.Compilers: Principles, Techniques, and Tools (2nd Edition) by Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Addison-Wesley, 2006.</td></tr>
<tr><td>Supplementary Textbooks</td><td>1.Compiler Design: Analysis and Transformation, Seidl, Helmut, Wilhelm, Reinhard, Hack, Sebastian, Springer, 2012.<br>2.Engineering a Compiler 2nd Edition, Keith Cooper Linda Torczon, 2011</td></tr>
<tr><td>Credit (ECTS)</td><td>6</td></tr>
<tr><td>Prerequisites for the Course (Attendance Requirements)</td><td>Attendance mandatory</td></tr>
<tr><td>Course Type</td><td>Technical Elective</td></tr>
<tr><td>Language of Instruction</td><td>English</td></tr>
<tr><td>Course Objectives</td><td>To teach the fundamentals of programming languages, compiler functions, and stages, and to explain the interaction between compilers and programming languages and programs.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1.Examines the evolution of the logical design of the compiler.<br>2.Explains programming languages, compilers, grammar classification, language design, and finite state automata.<br>3.Designs for code generation.<br>4.Performs code optimization.</td></tr>
<tr><td>Instruction Method<br>(Face-to-face, Distance education etc.)</td><td>Face-to-face</td></tr>
<tr><td>Weekly Schedule of the Course</td><td>1.Week: Logical development of compiler design<br>2. Week: Programming languages<br>3. Week: Programming languages<br>4. Week: Converters<br>5. Week: Converters<br>6. Week: Grammatical classification<br>7. Week: Language design<br>8. Week: Finite state automata<br>9. Week: Lexical parsers<br>10. Week: Bottom-up parsing<br>11. Week: Top-down parsing<br>12. Week: Symbol table processing<br>13. Week: Code generation, processing and optimization<br>14. Week: Code generation, processing and optimization</td></tr>
<tr><td>Teaching Activities<br>(The time spent for the activities listed here will determine the amount of credit required)</td><td>Weekly theoretical course hours: 3<br>Reading activities<br>Internet search and library work<br>Making a report<br>Midterm and revision for midterm<br>Final exam and revision for final exam</td></tr>
<tr><td>Assessment Criteria</td><td>
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<tr><th></th><th>Number(s)</th><th>Weight (%)</th></tr>
<tr><td>Midterm exam</td><td>1</td><td>30</td></tr>
<tr><td>Assignment</td><td>1</td><td>10</td></tr>
<tr><td>Application</td><td></td><td></td></tr>
<tr><td>Project</td><td>1</td><td>20</td></tr>
<tr><td>Practice</td><td></td><td></td></tr>
<tr><td>Quiz</td><td></td><td></td></tr>
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| Final exam | | 40 | |
| Total | 3 | 100 | |

**Workload of the Course**

| Activity | Number of Weeks | Duration (Weekly Hour) | End of Semester Total Workload |
|---|---|---|---|
| Weekly theoretical course hours | 14 | 3 | 42 |
| Weekly practical course hours | | | |
| Reading activities | 10 | 3 | 30 |
| Internet search and library work | 10 | 3 | 30 |
| Designing and implementing materials | | | |
| Making a report | 3 | 6 | 18 |
| Preparing and making presentations | | | |
| Midterm and revision for midterm | 1 | 12 | 12 |
| Final exam and revision for final exam | 1 | 18 | 18 |
| Total workload | | | 150 |
| Total workload/ 25 | | | 6 |
| Course Credit (ECTS) | | | 6 |

**Contribution Level between Course Outcomes and Program Outcomes**

| No | Program Outcomes | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1 | Knowledge of mathematics, science, basic engineering, computing, and computer engineering; ability to use this knowledge in solving complex engineering problems. | | | | | X |
| 2 | Ability to define, formulate and analyze complex engineering problems using basic science, mathematics and engineering knowledge and considering the UN Sustainable Development Goals relevant to the problems addressed. | | | | X | |
| 3 | Ability to design creative solutions to complex engineering problems; ability to design complex systems, processes, devices, software, algorithms or products to meet current and future requirements, considering realistic constraints and conditions. | | | | X | |
| 4 | Ability to select, use and develop appropriate techniques, resources and modern engineering and informatics tools, including estimation and modeling, for the analysis and solution of complex engineering problems while being aware of their limitations. | | | | | X |
| 5 | Ability to use research methods to examine complex engineering problems or research topics in computer engineering, including reviewing the literature, designing experiments, conducting experiments, collecting data, analyzing and interpreting results. | | | X | | |
| 6 | Knowledge of the effects of engineering practices and the standards used in these practices on society, health and safety, economy, sustainability and environment within the scope of the UN Sustainable Development Goals; awareness of the consequences of engineering solutions in the fields of information security and law. | | | | | |
| 7 | Acting in accordance with engineering professional principles and knowledge on | | X | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | ethical responsibility; awareness of acting impartially, without discrimination on any issue, and being inclusive of diversity. | | | | | |
| | 8 | Ability to work effectively individually and as a team member or leader in intradisciplinary and multidisciplinary teams (face-to-face, remote, or hybrid). | | | | X | |
| | 9 | Ability to conduct effective verbal and written communication on technical issues in Turkish or English, prepare reports, make effective presentations and prepare software documentation, considering the various differences of the target audience (such as education, language, profession). | | | X | | |
| | 10 | Knowledge of business practices such as project, risk and change management and economic feasibility analysis; awareness of entrepreneurship and innovation. | | | | | |
| | 11 | Lifelong learning skill that includes the ability to learn independently and continuously, to adapt to new and developing scientific practices and technologies, and to think inquisitively about technological changes. | | | X | | |
| **Lecturer(s) and Contact Information** | Assist. Prof. Dr. Çağrı Şahin<br>cagrisahin@gazi.edu.tr | | | | | | |