The University of Texas at Tyler  
Bachelor of Science in Computer Science  

Syllabus

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>COSC 4377</th>
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<tbody>
<tr>
<td>Course Title:</td>
<td>Compiler Techniques</td>
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**Course Description:**
Characteristics of the compiling process, syntax directed compiling, symbol table construction and searching, top down and bottom up methods, formal grammars, and a formalization of syntax.

**Pre-requisites:**
COSC 2315 and COSC 2336

**Credits:**
3

**Text:**
*Introduction to Compiler Construction*
Thomas W. Parsons
Computer Science Press (W. H. Freeman and Co.)

**Languages Used:**
C, C++, Java

**OUTLINE**

<table>
<thead>
<tr>
<th>Topic</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Introduction to language translation</td>
<td>3</td>
</tr>
<tr>
<td>Lexical Analysis</td>
<td>7</td>
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<tr>
<td>Formal Grammars</td>
<td>5</td>
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<tr>
<td>Syntactic Analysis</td>
<td>6</td>
</tr>
<tr>
<td>Top down parsing</td>
<td>6</td>
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<tr>
<td>Bottom up parsing</td>
<td>5</td>
</tr>
<tr>
<td>Intermediate code generation</td>
<td>4</td>
</tr>
<tr>
<td>Code optimization</td>
<td>2</td>
</tr>
<tr>
<td>Object code generation</td>
<td>2</td>
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<td><strong>Total</strong></td>
<td><strong>40</strong></td>
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**Additional Materials:**

**Evaluation Method:** (only items in dark print apply)

1. Examination/Quiz
2. Homework
3. Paper/Report
4. Computer Program
5. Project
6. Presentation
7. Class Participation
8. Peer Review

**Course Objectives:**
By the end of this course students are expected to:

1. Compare and contrast compiled and interpreted execution models, outlining relative merits of each. [1,2,7]
2. Describe the phases of program translation from source code to executable code the files produced by these phases. [1,2,7]
3. Explain the differences between machine-dependent and machine-independent translation and where these differences are evident in the translation process. [1,2,7]
4. Describe the steps and algorithms used by language translators: lexical analysis.
   [1,2,4,7]
5. Describe the steps and algorithms used by language translators: top-down parsing.
   [1,2,4,7]
6. Describe the steps and algorithms used by language translators: bottom-up parsing.
   [1,2,4,7]
7. Describe the steps and algorithms used by language translators: intermediate code
   generation. [1,2,4,7]
8. Describe the steps and algorithms used by language translators: code optimization.
   [1,2,4,7]
9. Describe the steps and algorithms used by language translators: object code
   generation. [1,2,4,7]
10. Recognize the underlying formal models such as finite state automata and their
    connection to language definition through regular expressions and grammars.
    [1,2,4,7]
11. Discuss the effectiveness of optimization. [1,2,7]
12. Explain the impact of a separate compilation facility and the existence of program
    libraries on the compilation process. [1,7]

Relationship to Program Outcomes: (only items in dark print apply)†

This course supports the following Computer Science Program Outcomes, which
state that our students at the time of graduation are expected to:

1. Posses knowledge of the fundamentals of mathematics, science, and technology.
   [1-12]
2. Be able to use modern computational tools and techniques in the practice of
   computer science. [4,5,6,7,8,9,10]
3. Be able to develop logically sound and efficient algorithms. [4,5,6,7,8,9,10]
4. Be prepared to implement algorithms in multiple programming languages, on
   multiple hardware platforms, and in multiple operating system environments.
   [4,5,6,7,8,9,10]
5. Be able to perform analysis, design, implementation, testing, and maintenance of
   computer-based systems, stressing software engineering principles.
   [4,5,6,7,8,9,10]
6. Be prepared to seek continuing professional development, graduate studies, or
   professional certifications related to computer science. [1-12]
7. Demonstrate effective written, visual and oral communication skills.
   [1-12]
8. Posses an educational background to understand the global context in which computer
   science is practiced, including:
   a. Knowledge of contemporary issues related to computer science;
   b. The impact of computers on society;
   c. The role of ethics in the practice of computer science.
9. Be able to contribute effectively as members of a project development team.
10. Recognize the need to pursue continued learning throughout their professional
careers.

Numbers in brackets refer to course objective(s) that address the Program Outcome.

<table>
<thead>
<tr>
<th>Prepared By: Stephen B. Rainwater</th>
<th>Date: 1/02/05</th>
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<tr>
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<td>Revised:</td>
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