

# ECEN 625 Syllabus

## Compilation Strategies for High-Performance Systems

(Synthesis and Optimization of Digital Circuits)

Fall 2007

<http://www.et.byu.edu/groups/ece625web/>

### Instructor:

Prof. Mike Wirthlin  
448 CB  
422-7601

### Course Location & Meeting Times:

10:00 am MWF  
393 CB

### Course Content

This course will investigate compilation strategies for digital circuits. This course will focus on the theoretical foundations of behavioral synthesis as well as applied practice of high-level synthesis with modern tools. The course will also include the opportunity for application of synthesis techniques through relevant programming assignments. The major topics addressed in this course include:

- Basic Graph Theory
- Fundamental Graph Algorithms and Analysis
- Scheduling Algorithms and Techniques
- Resource Allocation Algorithms
- Retiming
- Technology Mapping and Module Selection Techniques

### Prerequisites

ECEN 320 (or RTL design experience) and strong programming skills. Graduate standing in ECEN or CS. We will do most of our programming in the Java programming language. While you are not expected to program in Java to enter this class, you should be familiar with object-oriented programming principles and be prepared to learn the Java programming language.

### Textbook

[Synthesis and Optimization of Digital Circuits](#), Giovanni DeMicheli, McGraw Hill, 1994  
(optional) *Introduction to Algorithms*, Cormen, Leiserson, Rivest, McGraw Hill

## Course Grading

Class Participation	10%
Programming Assignments	25%
Technical Paper & Presentation	15%
Mid-Term Exams (2)	25%
Final Exam	25%

*Homework:* There will be no assigned homework for this course. However, you are encouraged to practice homework problems listed at the back of each chapter to prepare for examinations. Questions

*Class Participation:* Class participation is an important component of learning in this class. Class participation includes attending class, preparing for class (usually by reading), participating in the class discussion, and providing additional insight or help to the instructor or fellow students. Students that attend regularly and participate meaningfully in class will receive a base class participation score of 90%. Failure to attend class, prepare for class, or participate in class lectures will result in a lower class participation score. Students that go the extra mile by providing unusual insight, help, or participation will receive a higher class participation score.

You are expected to read *and* understand the material assigned for the class lecture. Your understanding of the material during the class lecture and your participation in the lecture will be used to determine your class participation score. You will be expected to discuss and explain difficult concepts found in the reading for each class period. Failure to read, understand the reading, or participate in class lectures will result in a lower class participation score.

*Programming Assignments:* You will be expected to implement the concepts and algorithms presented in this course as programming assignments. You will be assigned several programming assignments throughout the semester and will be graded on the quality, readability, performance, and completeness of your assignments. Students in the class will assist in grading your assignment.

*Technical Paper and Presentation:* You will be required to write a short technical paper on current research related to the topics presented in this course. You will be graded on the quality of both the writing and research. You will prepare a presentation for the class on this research topic and will be graded on the quality and completeness of your class presentation.

*Mid-Term Exams:* Two midterm examinations will be given to test your understanding of the course material. These examinations will be closed book and taken during class. Make sure you schedule and attend the mid term exams - ***No makeup examinations will be given.***

*Final Exam:* A comprehensive final exam will be given on the scheduled final exam date in the classroom. No other time will be made available for the final examination.

Mid-Term 1 Friday, October 12	Classroom
Mid-Term 2 Friday, November 16	Classroom
Final Exam Monday, December 17, 11:00 am	Classroom

### **Course Schedule**

The course schedule for the semester will be updated on a week by week basis. However, the reading assignment and lecture discussion topics will be announce at least one week before each lecture. The course schedule will be posted on the class web page.

### **Honor Code Standards**

*In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university.*

*Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.*

### **Preventing Sexual Harassment**

*Sexual discrimination or harassment (including student-to-student harassment) is prohibited both by the law and by Brigham Young University policy. If you feel you are being subjected to sexual discrimination or harassment, please bring your concerns to the professor. Alternatively, you may lodge a complaint with the Equal Employment Office (D-240C ASB) or with the Honor Code Office (x2-4440).*

### **Students With Disabilities**

*If you have a disability that may affect your performance in this course, you should get in touch with the office of Services for Students with Disabilities (1520 WSC). This office can evaluate your disability and assist the professor in arranging for reasonable accommodations.*