Course Syllabus For ENGR 434 – VLSI Design
Walla Walla University – Seventh-day Adventist Higher Education
Spring Term 2015

Course Information
Class: 10am MWF (CSP163)
Lab: 2 – 5pm Thursday, KRH348

Instructor Information
Instructor: Dr. Curtis Nelson
Office: 263 Chan Shun Pavilion
Phone: 509-527-2076
Office Hours: 9 – 10am MWF
1 – 2pm MWF
Other times by appointment
Email: curt.nelson@wallawalla.edu
The default communication method between the instructor and students is through email via mywwu at your standard WWU email address. Please monitor this email address daily for any class updates.

Course Description
System, circuit, and physical design of Very Large Scale Integrated circuits using CAD software; project specification, documentation, and reporting. Prerequisites: ENGR 433, ENGR 356.

Learning Objectives
At the end of this class, you will have designed and validated your own chip. You will understand the impact of design choices on speed, power, reliability, and cost and be able to make appropriate trade-offs, confirming your back-of-the-envelope analysis with simulation. You will be familiar with options for designing custom cells, sub-systems, and hierarchical structures. You will be able to apply modern design methods and industry-standard tools to custom designs. You will take a nontrivial integrated circuit from specification through detailed design and verification with a team and provide oral and written reports on your work.

Course Materials
• Companion web site: http://www_cmosvlsi.com/
• Due to the cutting edge nature of this course, materials will likely be presented or referenced that are not in the textbook.

Course Schedule
A daily schedule of course topics is presented in a separate document that can be found on the course web page. The schedule may change based on the professional judgment of the instructor (with appropriate notice to the students.) http://people.wallawalla.edu/~curt.nelson/engr434/common/outlines/outline 2015.pdf

Course Grade
• Your final grade will be composed of the following four parts:
  Homework, attendance: 15%
Labs: 15%
Project: 50%
Mid-term: 20%

- It is safe for you to assume that your minimum final grade, based on raw scores, will be computed as:
  - \( \geq 90\% \) A of some sort (A, A-)
  - \( \geq 80\% \) B of some sort (B+, B, B-)
  - \( \geq 70\% \) C of some sort (C+, C, C-)
  - \( \geq 60\% \) D of some sort (D+, D, D-)
  - < 60% F
- Your current grade in the class can be found anytime in D2L.

Work in the Course
- Lectures - mostly from the text, not always in sequence;
- Homework – 4ish assignments, mostly straightforward questions from the text;
- Laboratory exercises
  - Labs 1-5: Custom IC design;
  - Labs 6-10: Project related issues;
- Mostly daily updates from current issues in VLSI;
- NOTE: This course involves a large amount of work!

Lab Design Tools
- We will use commercial Computer Aided Design (CAD) software from Mentor Graphics and other integrated tools;
- Commercial software is powerful, but very complex;
- Designers sent to long training classes;
- Students will benefit from using the software, but we don’t have the luxury of long training;
- Your instructor (and some of you) have some experience with the software;
- Never, ever miss a lab session;
- Plan designs carefully and save work frequently.

Course Requirements

Homework
The value of a solution to any problem is directly related to how well the solution is documented. To promote good problem solving technique and assist those grading the assignments, I require that the guidelines presented by the Walla Walla University School of Engineering be followed. These guidelines are posted on the course web page and may also be found here: 

Additional requirements are as follows:
- Always staple the assignment sheet to the top of your solutions prior to submission;
- Homework is due at the beginning of the class period (plus five minutes);
- Late homework will not be accepted unless prior arrangements have been made with the instructor;
- Points will likely be deducted if your homework does not adhere to these guidelines.

Tests
There will be one mid-term test. There will be no final test, although the final exam time may be used for project presentations. Tests may be open or closed book, or some of each.

Project
Each student (or team of students) will choose or be assigned a project whose purpose is to apply what you have been studying this quarter to an in-depth topic in the area of VLSI Design. More details will be
provided throughout the quarter as the instructor interacts with the class to find common areas of interest.

Returned Materials
All materials submitted by a student will be evaluated in a timely manner. In this class, materials are typically returned within one week or less. Students are guaranteed access to all work submitted prior to an exam, graded or ungraded, in order to review for that exam. All graded exams will be returned within one week barring exceptional circumstances. The scores for graded course work may be accessed in D2L.

Progress Reports
Progress reports will be submitted for students identified “at risk” by the university. As stated before, your current status in the class can be found at any time by consulting the grade book in D2L.

Class Attendance
- Class attendance is a good indication of your commitment to learning the material and as such provides the instructor with visual feedback as to your learning and comprehension;
- Attendance will be used to form a part of your grade;
- Assistance to students can only be guaranteed during class time and office hours;
- Students are responsible for all material presented and handed out in class regardless if you are present or not:
  - When absent, the student is responsible for obtaining information missed in class. Any medical related absence must be reported directly to the instructor and appropriate notes from medical care providers may be required, at the teacher’s discretion.

Academic Integrity
- See the Walla Walla University Academic Integrity Policy here: http://www.wallawalla.edu/academics/academic-administration/academic-policies/academic-integrity-policy/
- You are encouraged to consult with classmates while completing your homework. However, the work that you submit must reflect your own independent thought and effort. The guiding principle when determining whether a specific action is appropriate is as follows: Does your approach maximize your learning? For example, a verbal discussion of the general solution approach can improve learning and efficiency. In addition, comparing answers after individually completing a homework problem can improve learning, because it enables you to catch and correct mistakes and misconceptions. However, copying the methods, solutions and/or answers of your classmates does not provide you with the practice necessary to learn the material. Similarly, using the solutions manual is not an effective way to learn. If you submit an assignment or exam on which you copied from a classmate or referenced the solutions manual, you have cheated. Cheating may be rewarded. With an ‘F’, for the course.
- Remember – you are not just taking a class and earning a grade. You are training for a profession which holds the highest regard for the ethics of its members.

Accommodations for a Disability
- Official Walla Walla University statement
- If you have a physical or learning disability and need accommodations please contact Sue Huett in the Teaching Learning Center, Village Hall, or call 2366. Accommodations for documented disabilities are arranged through the Disability Support Services (DSS) office. This syllabus and course materials are available in alternate format as appropriate to the disability. Accommodations are not retroactive. If you do not declare the disability to the DSS office, you may not receive appropriate accommodations.

Emergency Procedures
An emergency procedures flip chart and evacuation routes are posted in classrooms near the door. Additionally, emergency procedures can be found at: http://www.wallawalla.edu/security
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<thead>
<tr>
<th>University Core Theme</th>
<th>Summary of How The Core Theme is Actualized in the Course</th>
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<tbody>
<tr>
<td>Excellence in Thought</td>
<td>Students learn current challenges involved in cutting-edge integrated circuit design and use their acquired knowledge to design and simulate a substantial comprehensive project.</td>
</tr>
<tr>
<td>Generosity in Service</td>
<td>This course has no service learning component or course requirements for service, other than passion about such topics expressed by the instructor.</td>
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<tr>
<td>Beauty in Expression</td>
<td>Students document their learning through oral and written presentations of their work as applied to a course capstone project.</td>
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<tr>
<td>Faith in God</td>
<td>This course asks the students to sit back from time to time and appreciate the exploration of atomic limits as evidenced every day in the fabrication and use of integrated circuit technologies.</td>
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