

## **Syllabus for Computer Science 375**

### **Digital Systems**

**Instructor:** Dr. Randy L. Ribler

**Office:** 103 Hobbs, **Phone:** 544-8529

**Class Web Page:** [http://ribler\\_r.web.lynchburg.edu/cs375](http://ribler_r.web.lynchburg.edu/cs375)

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**Class Meetings:** MWF 2:00-2:50 (Hobbs 116)

M 3:00-5:00 (Hobbs 118)

**Office Hours:**, or by appointment.

**Objective:** The principal concepts of digital systems and their applications to computer science are studied. Topics include number representations, codes, switching theory, sequential circuits, comparators, arithmetic circuits, counters, memory implementation, and integrated circuit logic families.

**Text:** Fundamentals of Digital Logic with VHDL Design, by Stephen Brown and Zvonko Vransec (Third Edition)

#### **Principal Topics:**

Boolean Algebra

Basic Logic Gates

Karnaugh Maps

Number Representation and Arithmetic Circuits

Combinational Circuits

Flip-Flops

Counters

Synchronous Sequential Circuits

VHDL Design

Programmable Logic Devices

Testing/Debugging Logic Circuits

#### **Grading:**

Labs and Homework Assignments (7-14) (40%)

Pop Quizzes (5%) (drop the lowest grade) (no makeups)

Exam 1 (15%)

Exam 2 (20%)

Final Exam (20%)

**Computation of Final Grade:**

A letter grade will be given for each assignment. The final grade will be the weighted average of the grades from all assignments. However, no student who fails the final exam or completes less than 1/2 of the labs will receive a grade higher than D.

**Late Policy:** Assignments should be submitted by 11:59pm on the day that they are due. Late assignments will be penalized 5 points per weekday up to a maximum of 25 points. I will not accept assignments that are more than one week late.

**Attendance:** Classes will start promptly at the start of the hour. Students who arrive late to class will forfeit their opportunity to take the day's quiz, and will receive a failing grade for the quiz. Students are expected to attend all classes, and are responsible for the material covered.

**Class Conduct:** Students are expected to pay attention in class and respect the basic courtesies commonly found in civilized societies. You will be expected to arrive on time and to stay until the completion of the class. Computers should be used for relevant class work only. Instant messaging, emailing, web surfing, playing computer games, and other similar activities are prohibited.

**Individual Needs:** Lynchburg College is committed to providing all students equal access to learning opportunities. The Support Services office, located in Academic & Career Services (on the second floor of Hall Campus Center) is the campus office that works with eligible students to provide and/or arrange for reasonable accommodations.

Students who have or think they may have a disability (e.g. attention, learning, vision, hearing, physical, psychiatric, or other applicable disability) are invited to contact the Support Services Coordinator for a confidential discussion: [Arnold.sm@lynchburg.edu](mailto:Arnold.sm@lynchburg.edu) Additional information is available in the College catalog and on the Lynchburg College Disability Support Services website: <http://www.lynchburg.edu/disabilityservices.xml>

Students already registered with Support Services, who have been given Accommodation Letters for the semester, are strongly encouraged to contact their instructor(s) as early as possible in the semester because accommodations are not retroactive.

*Students must request a new set of Accommodation Letters each semester by emailing their request to the Support Services Coordinator and include the number of letters needed.*

**Objectives:**

Students will be able to simplify Boolean expressions the iterative application of Boolean

Students will be able to read and write schematics.

Students will be able to use Karnaugh maps to generate an optimal design for simple circuits.

Students will understand binary representations, including 2's complement and utilize this understanding through the development of arithmetic circuits.

Students will be able to differentiate the different types of flip-flops and utilize them appropriately in their designs.

Students will be able to employ synchronous sequential circuits in their designs.

Students will be able to create simple designs using VHDL

Students will be able to design a simple printed circuit board and test and debug it.

Students will:

- **Inquire:** frame questions that address issues and uncertainties across a range of disciplines. The student will
  - recognize precise and complete statements of problems,
  - recognize what information is necessary in order to solve given problems,
  - ask essential questions about given problems,
  - ask questions for further study regarding problems and reading assignments,
  - and develop an approach for investigating program requirements.
- **Explore:** investigate issues in depth and detail. The student will
  - think creatively about possible solutions to problems,
  - use data debugging techniques to understand how their programs are performing,
  - and comprehend given problems, reading assignments, and the arguments of others.
- **Conclude:** develop informed responses to issues. The student will
  - identify program defects/bugs and determine their causes and solutions,
  - and articulate the cause of the defect.
- **Persuade:** convince others of the validity and value of conclusions. The student will
  - show how one approach to a program/problem is better than another,
  - and construct effective arguments based in evidence, reason and understanding.
- **Engage:** use knowledge and abilities for the good of self and society. The student will
  - work effectively with other members of a group to solve problems and present their solutions.