## Syllabus for Computer Science 375

***Digital Systems***

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

**Class Web Page:** http://ribler\_r.web.lynchburg.edu/cs375

**Email:** [ribler@lynchburg.edu](mailto:ribler@lynchburg.edu)

**Class Meetings:** TuTh 10:00-11:15 (online)

**Office Hours:** I will be available for office hours by appointment. Just send me an email and we will find a time when we can meet online. I encourage all students to make use of office hours.

**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 Vranesec (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) (50%)

Exam 1 (10%)

Exam 2 (20%)

Final Exam (20%)

**Computation of Final Grade:**

A z-score will be computed for each assignment. The final grade will be determined from the weighted average of the grades from all assignments. (see Virginia Tech Testing [Memos #6](http://ribler_r.web.lynchburg.edu/VirginiaTechTestingMemos/Memo6-averaged.docx).) However, no student who fails the final exam or leaves two or more programming assignments uncompleted will earn 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 40 points. I will not accept assignments that are more than two weeks late.

**Attendance:** Students are expected to attend all classes and are responsible for the material covered.

**Center for Accessibility and Disability Resources**

University of Lynchburg is committed to providing all students equal access to learning opportunities.  The Center for Accessibility and Disability Services (CADR) works with eligible students with disabilities (medical, physical, mental health and cognitive) to make arrangements for appropriate, reasonable accommodations.  Accommodations are available as applicable in both live and virtual classroom settings.  Students registered with CADR who receive approved accommodations are ***required to provide letters of accommodation each semester to each professor if they wish to use their accommodations.  A meeting to discuss accommodations the student wishes to implement in individual courses is strongly suggested.*** *Accommodations are not retroactive and begin when the accommodation letter is provided to faculty.*For information about requesting accommodations, please visit <https://www.lynchburg.edu/academics/disability-services/>  or use the contact information below.   (eff 4/29/20)

**Contact Information**

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| Julia Timmons, Director of the  Center for Accessibility and Disability Resources  1501 Lakeside Drive  Lynchburg, VA  24501  Email: [timmons.j@lynchburg.edu](mailto:timmons.j@lynchburg.edu)  Phone: 434-544-8339  Fax: 434-544-8808 | Meg Dillon, Assistant Director of the  Center for Accessibility and Disability Resources  1501 Lakeside Drive  Lynchburg, VA  24501  Email: [dillon\_ma@lynchburg.edu](mailto:dillon_ma@lynchburg.edu)  Phone: 434-544-8709  Fax: 434-544-8808 |

**Commitment to Diversity, Equity, Inclusion, & Respect for Others :**

The University of Lynchburg is committed to ensuring that diversity, equity, and inclusion are apparent through a campus community climate where all students, faculty, and staff feel welcomed and are treated equitably and with respect. All campus community members are expected to conduct themselves in ways that exemplify respect for people of all groups and identities adhering to personal values without unduly imposing them on others. Furthermore, campus community members should take responsibility to serve as leaders in promoting compassion for others and in challenging prejudice against all individuals and groups whether due to national origin, gender identity, gender expression, age, marital status, religion, race, socioeconomic status, parental status, political beliefs, diversity of thought, sexual orientation identity, physical/mental ability, genetic information or any other self-identifiers. Campus community members are expected to respect the rights of others and at no time should they harass, assault, or violate the privacy of other persons. Victims of human rights-related incidents or witnesses to them are encouraged to report such incidents. Reports are secure, confidential, and only certain designated University officials have access to the information reported.

To report a bias incident [click here](https://docs.google.com/forms/d/e/1FAIpQLSdCPNfX96W5GPjZA5yra0Yqc-eo8knU6wZ9XeVrY9COwZq_9g/viewform?usp=sf_link), or call the Campus Conduct Hotline toll-free at 866.943.5787, or contact Dr. Robert L. Canida, II, Diversity & Inclusion Officer, at [canida\_rl@lynchburg.edu](mailto:canida_rl@lynchburg.edu).

**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.