

RUTGERS UNIVERSITY  
School of Engineering  
Department of Electrical & Computer Engineering

## 332:231 – Digital Logic Design – Fall 2022

T, Th, 2:00–3:20 PM, Hill-114

### Course Description:

This course is a basic introduction to the principles and applications of digital logic circuits. It covers the following topics/units:

1. Introduction to DLD, logic circuit hardware and software implementation examples.
2. Number systems and binary arithmetic.
3. Analysis and synthesis of combinational circuits, Karnaugh maps, timing hazards.
4. Encoders, decoders, multiplexers, demultiplexers.
5. Arithmetic systems, comparators, adders, multipliers.
6. Sequential circuits, latches, flip-flops.
7. Registers, shift registers, counters, LFSRs.
8. Analysis and synthesis of finite state machines.

### Text:

J. F. Wakerly, *Digital Design Principles and Practices*, 5th ed., Pearson, ISBN-13: 9780134460093.

The textbook may be ordered from:

1. RU bookstore: <https://rutgers.bncollege.com/shop/rutgers/home>.
2. Pearson: <https://www.pearson.com/us/higher-education/program/Wakerly-Digital-Design-Principles-and-Practices-5th-Edition/PGM337271.html?tab=resources>.
3. VitalSource: <https://www.vitalsource.com/products/digital-design-john-f-wakerly-v9780134460239>.
4. Amazon: <https://www.amazon.com/Digital-Design-Principles-Practices-5th/dp/013446009X>.

Please find additional references and supplementary texts listed in **unit-1** of lecture notes, with several of them available on the web, and some posted on Canvas Files.

### Prerequisites:

listed in: <https://www.ece.rutgers.edu/undergraduate-course-descriptions>

co-requisite: DLD Lab 332:233

MATLAB and Simulink are ideally suited for implementing logic circuits and are integrated into the DLD course. Some prior knowledge of MATLAB is recommended. MATLAB is freely available to Rutgers students. Several MATLAB tutorials are posted under Canvas Files, as well as a tutorial video on using Simulink specifically for DLD.

### Recitations:

The DLD class has four *recitation* sections which will meet in-person as follows:

- Section 1 - index 12966 - W 12:10 - 01:30 pm - HILL-116
- Section 2 - index 12967 - Th 08:30 - 09:50 am - SEC-118
- Section 3 - index 12968 - W 10:20 - 11:40 am - SEC-210
- Section 4 - index 12969 - M 03:50 - 05:10 pm - CCB-1209

Recitations and DLD Lab will begin in the week of Sept. 12, 2022.

**Course Requirements:**

The final course grade will be based on the final exam and two midterm exams, plus possible quizzes and additional exams, if necessary. All exams will be administered **online** through **Canvas's Quizzes** tool. Exam dates & times:

Exam-1:	Thursday, Oct. 13, 2022,	2:00–3:20 pm
Exam-2:	Thursday, Nov. 17, 2022,	2:00–3:20 pm
Final Exam:	Tuesday, Dec. 20, 2022,	12:00–3:00 pm

The nominal exam weights will be 30-30-40 percent—the actual percentages are determined after all three exams have been completed.

Additional exams and/or quizzes may be scheduled as necessary, with appropriate modification of the above weights. Any additional exams or quizzes will be announced in advance.

No make-up exams are given. The grades are not curved. The following grade thresholds are nominally used as a guide, but are subject to minor changes after all course data become available at the end of the course:

$$A \geq 90, \quad B+ \geq 85, \quad B \geq 75, \quad C+ \geq 70, \quad C \geq 60, \quad D \geq 50$$

Homework problems with solutions will be assigned regularly, but they will not be graded. It is very important to try the problems on your own without looking at solutions. Recitations will cover additional problems with solutions and discuss solution methods.

**Instructor:**

Sophocles J. Orfanidis  
Room EE-230, Tel. 848-445-5017  
email: orfanidi@rutgers.edu  
Office hours: by email

**TAs:**

Zahra Aref	zahra.aref@rutgers.edu
Lingyi Huang	lingyi.huang@rutgers.edu
Huy Phan	huy.phan@rutgers.edu
Zhongze Tang	zhongze.tang@rutgers.edu
Zichen Zhu	zichen.zhu@rutgers.edu

The recitation and lab sections will be rotating each week across the TAs. Students are encouraged to send their questions by email to any of the TAs or Prof. Orfanidis.

**Course Web Page on Canvas:**

Weekly reading and homework assignments will be posted on Canvas Announcements.

Additional problems will be solved during the recitation sessions.

Several useful references and web links are placed under Canvas Files.

Three introductory videos on using the Emona board and on using Simulink for DLD are posted under Canvas Files.

**Academic Integrity:**

It is taken for granted that students *accept and adhere* to the Rutgers academic integrity policy described in:

<http://academicintegrity.rutgers.edu/>

Please read also the IEEE code of ethics that should guide your professional life:

<https://www.ieee.org/about/corporate/governance/p7-8.html>

**Students with Disabilities:**

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability *must contact* the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you and your instructors with a Letter of Accommodations. To begin this process, please complete the Registration form on the ODS web site at:

<https://ods.rutgers.edu>

<https://ods.rutgers.edu/students/getting-registered>

<https://ods.rutgers.edu/students/documentation-guidelines>

Please note that requests for exam accommodations must be submitted, separately for *each exam*, to the ODS office at least *five working days* prior to the exam, otherwise, the ODS office will not process your request.