

ECE 2042: Fundamentals of CPE I

Class Meetings

Section 001: MWF 10:20-11:10

Section 002: MWF 11:30-12:20

Instructor

Ed Char

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610-519-5659

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Office Hours

Tuesday, Thursday 9-11:30 other times by appointment at villanova.zoom.us/j/6983276498

Course Objectives

Topics include:

Number systems (signed and unsigned), conversions, Binary arithmetic, digital logic design both combinatorial and sequential, counters and state machines as well as learning VHDL (a hardware creation language) to implement the digital logic.

ABET Outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

Grading Policy

Your final grade will be determined from the following:

Tests	20% each	Homework	10%
Quizzes*	20%	Final Examination	30%

* The 10 highest quizzes will be used to determine your final grade. However, if a quiz is missed without an excused absence, that 0 will count as one of the 10 quizzes to determine your grade.

The scale used to assign letter grades is:

Letter Grade	Numerical Grade	Letter Grade	Numerical Grade
A	93 to 100	C	73 to 76
A-	90 to 92	C-	70 to 72
B+	87 to 89	D+	67 to 69
B	83 to 86	D	63 to 66
B-	80 to 82	D-	60 to 62
C+	77 to 79	F	Less than 60

Inclusive Classroom

We consider this classroom to be a place where you will be treated with respect; and, we welcome individuals of all ages, backgrounds, beliefs, ethnicities, gender, gender identities and expressions, sexual orientation, and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class.

Attendance

Class and laboratory attendance for first-year students is mandatory. A first-year student will receive a grade of "Y" (failure) whenever the number of unexcused absences in a course exceeds twice the number of weekly class meetings for the course.

Attendance on non-quiz days is not mandatory (unless you are a freshman) but is encouraged.

Where possible, students should inform their instructors if they plan to be late or absent from class. In all cases, students should be prepared to provide documentation to petition for *excused* absences to the Associate Dean for Student and Strategic Programs, Dr. Stephen Jones. Students should use the [form for requesting an excused absence](#). Excused absences do not count toward a failure in the course for first year students. Absence from class does not release the student from work assigned. Students who miss an in-class obligation (exam, presentation, etc.) due to an excused absence will not be penalized - the instructor may offer a make-up test, arrange an alternative time for a presentation, exempt a student from the assignment, or provide another arrangement.

The University's list of excused absences for all students includes the following:

- participation in NCAA athletic competitions
- participation in special academic events (e.g., conferences, field trips, project competitions)
- participation in official university business (e.g., student representatives attending meetings related to university governance)
- attendance at significant events involving the immediate family (e.g., funerals, weddings)
- religious holidays - see the University's policy on Religious Holidays
- college-approved participation in placement activities (e.g., job interviews, graduate school interviews, attending job fairs)
- legally required absence (jury duty, court appearance, short-term military service)
- documented serious illness or disability

Course Materials

BOOK: Logic Circuits & Logic Design with VHDL, 2nd by B. LaMeris ISBN: 9893030124885

Academic Integrity

The College of Engineering is committed to creating an environment of academic integrity and ethical decision-making that we hope is reflected in the actions of our students and graduates. As Villanova students, integrity is central to the University mission. As engineers, our code of conduct requires us to place honor and integrity at the forefront of everything we do. As engineering students, it is expected that you will begin to adopt these values and instill them into your work habits. Students violating the academic integrity policy will receive a zero on that assignment or exam and the violation will be reported to the Associate Dean for Academic Affairs.

Students are encouraged to read the [University's academic integrity policy](#).

The College of Engineering has adopted the following exam guidelines:

- Students must arrive before the start of the exam. Under exceptional circumstances a student may need to arrive late, but he/she can enter the exam no later than 5 minutes after the start of the exam.
- All cell phones must be turned off and stored away until the student exits the exam room.
- The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an exam.
- Each student must write and sign the following statement, *"I have neither given nor received any unauthorized assistance in the completion of this exam."*
- In the case of virtual exams, the instructor may implement video proctoring or other measures to ensure academic integrity. For consent purposes, the instructor will announce ahead of time to students if they plan to use any form of video proctoring during an assessment and whether a recording will take place.

Adherence to the Student Code of Conduct and the CARITAS Commitment

Students are expected to act in a professional and respectful manner to their fellow students, faculty, and staff. Students should become acquainted with and understand the responsibilities set forth in the Student Handbook, especially those in the sections on Policy and Regulations. Adherence to University regulations is expected and required for successful completion of the program of studies. Enforcement within the classroom of policies regarding classroom behavior is the responsibility of the faculty member. All other discipline problems are to be referred to the Dean of Students.

Students, faculty, and staff are expected to comply with the [CARITAS Commitment](#). Students must wear masks (unless they have a medical exemption), practice social distancing and good hygiene, wipe down their work area upon arrival and departure, and request an excused absence if they are not feeling well.

Online Expectations

To foster a professional environment, please wear appropriate clothes, mute if you are not talking to cut down on background noise, refrain from eating, and select an appropriate setting when we are meeting online.

Students with Disabilities

It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability please contact me after class or during office hours to make arrangements.

If you have a non-physical disability you need to register with the Learning Support Office by contacting 610-519-5176 or at learning.support.services@villanova.edu as soon as possible. Registration is needed to receive accommodations.

The Office of Disability Services collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact and register with Gregory Hannah, advisor to students with disabilities @ 610-519-3209 or visit the office on the second floor of the Connelly Center.

Schedule

See attached at the end

The Learner's Studio

Villanova's Learners' Studio provides free 1:1 and small group (max of 10 students) content tutoring for over 100 courses on campus (excludes writing, math, and entry level VSB courses). From quick homework clarification questions to prep for final exams, we can help! Our peer tutors are each endorsed by two faculty members and are trained according to CRLA national standards. Pop in as-needed or book a regular weekly session to supercharge your academic success. Sessions can be 30 or 60 minutes in length. We are located in Old Falvey 301.

Walk-ins welcome, or book in advance online:

1. Visit Villanova.mywconline.com
2. Register for an account and select "The Learners' Studio" from the drop-down menu on the sign-in page
3. Use the "limit to" menu to locate your course by code (For example, PHY 2400). This feature will sort the schedule and show you all tutors approved to cover your class
4. White boxes represent available sessions. Click any white box to book

Don't see your class listed? Request a tutor for a missing subject with this link: tutorrequest.villanova.edu

For more information, contact juliana.studer@villanova.edu 610-519-5862.

The Center for Speaking and Presentation

Villanova's Center for Speaking and Presentation provides expert guidance on topics including organizing presentation material, performing as a cohesive group, voice modulation, vocal interruptions, speaking

anxiety and more! Pop in as-needed or book a regular weekly session to supercharge your academic success. Walk-ins welcome, or book in advance online:

Visit Villanova.mywconline.com, register for an account and select "Center for Speaking and Presentation". White boxes represent available sessions. Click any white box to book! Or stop by Old Falvey 301 during our hours, no appointment necessary.

For more information, contact juliana.studer@villanova.edu 610-519-5862.

Electronics Policy

Online portions of this class may be recorded so that students that are absent may view the content later.

The use of electronic devices, such as phones, laptops, tablets, etc., during class is...

Students are prohibited from making any audio or visual recordings (including taking photographs) of lectures, discussions, or other classroom activities, unless a student (1) has written permission in advance from the instructor, or (2) is permitted to record under terms and conditions as approved by the University's Office of Disability Services or Learning Support Services. Students who have received approval to record classes as an academic accommodation must provide supporting documentation from the Office of Disability Services or Learning Support Services in advance of any recording. Students may use authorized recordings only for the purposes of individual study in the course and may not disseminate or share them with a wider audience without explicit permission.

Copyright Policy

The materials used in Villanova University courses ("Course Materials") generally represent the intellectual property of course instructors, third parties and/or the University which may not be disseminated or reproduced in any form for public distribution (e.g., sale, exchange, etc.) without the written permission of the course instructor. Course Materials include all written or electronic documents and materials, including syllabi, current and past examination questions/answers, and presentations such as lectures, videos, PowerPoints, etc., provided by a course instructor. Course Materials may only be used by students enrolled in the course for academic (course-related) purposes.

Published course readings (book chapters, articles, reports, etc.) available in Blackboard are copyrighted material. These works are made available to students through licensed databases or fair use. They are protected by copyright law, and may not be further disseminated or reproduced in any form for distribution (e.g., uploading to websites, sale, exchange, etc.) without permission of the copyright owner.

Follow these links for more information about [intellectual property](#), [copyright](#), and [computer acceptable use](#).

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Homework

Homework is to be handed in individually, in the students handwriting. However, you are allowed to work in groups to solve it.

Professorial Duties

It is important to note that teaching is one of the many duties that professors perform as part of their job responsibilities. In addition to teaching, professors perform research, advise graduate students, edit journals and review journal articles, serve on committees for the university and professional societies, travel to conferences to remain abreast of current developments and to present their results... to name just a few. As a result, assigned dates for lecture might need to change, as well as office hours.

Class Number and day	Topic	Textbook
1 8/17	Intro; analog vs digital	Chapt. 1
2 8/19	Number systems and conversions	2.1-2
3 8/21	Binary arithmetic	2.3
4 8/24	Signed& unsigned numbers	2.4
5 8/26	Basic gates	3.1
6 8/28	Digital circuit operation	3.2
7&8 8/31,9/2	Boolean algebra	4.1
9&10 9/4,9/9	Combinational logic analysis & synthesis	4.2-3
11 9/11	Logic minimization	4.4
12 9/14	Digital design flow & VHDL:basics	5.1-4
13 9/16	VHDL: Concurrent Statements, Components & testbench	5.5-5.6
14 9/18	MSI logic in VHDL	Chapt. 6
15 9/21	Latch & flipflops pt. 1	7.1-2
16 9/23	TEST 1	Till 9/23
17 9/25	Latch & flipflops pt 2.	7.1-2
18&19 9/28, 9/30	sequential circuits & Timing diagrams	7.3
20&21 10/2,10/5	FSM	7.4
22&23 10/7,10/9	Counters as FSM	7.5-6
24 10/12	Sequential circuits analysis	7.7
25&26 10/14,10/16	VHDL behavior modeling: process & Sequential statements	8.1-2
27 10/19	VHDL: Signal attributes & Test bench	8.3-4
28 10/21	TEST 2	
29 10/23	VHDL: Packages (selected)	8.5
30 10/26	VHDLbehavior modeling: FFs	9.1
31&32 10/28,30		
Note 10/28 is last day to WX	VHDL behavior modeling: FSM & Counters	9.2-4
33 11/2	VHDL behavior modeling: RTL modeling	9.5
34 11/4	Memory architecture & Non-volatile memory	10.1-2
35 11/6	SRAM & DRAM	10.3

36	11/9	VHDL modeling of memory	10.4
37&38	11/11,11/13	Addition/Subtraction & Adders/Subtractors	12.1-2
39&40	11/16, 11/18	Programmable logic	Chapt. 11
40	11/20	Catch up	
41	11/23	Last day of class/review	

Final Exam: TBD