



INSTRUCTOR'S COURSE REQUIREMENTS

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COURSE: ELN 133 Digital Electronics

SEMESTER & YEAR: 2017 Spring

INSTRUCTOR'S NAME	SECTION #	CLASS MEETING TIME	OFFICE HOURS AND OTHER CONTACT INFORMATION
Billie Adeimy	01	M,W 12:25 – 2:45 F 12:25 – 1:15	Office Hours: M,W 12:10 – 12:25, 2:45 -3:00 T,TH 12:10 – 12:25, 2:45 -3:15 F 12:10 – 12:25, 1:15 -1:25 Office Location: Forte 327 Phone: 410-1901 Email: bladeimy@richmondcc.edu

METHODS OF INSTRUCTION AND EVALUATION:

STUDENT LEARNING OUTCOMES	METHODS OF INSTRUCTION	SUCCESSFUL PERFORMANCE/BEHAVIORAL INDICATORS	METHODS OF EVALUATION
1. Solve problems relating to the decimal, binary, octal, hexadecimal, conversion and counting methods	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> ▪ Convert any number in decimal, binary, octal, and hexadecimal systems to its equivalent value in any of the remaining numbering systems. ▪ Describe the format and use of BCD and ASCII code numbers. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances
2. Describe the operation and use of digital gates.	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> • Describe the operation and use of AND, OR, Inverter, NAND, NOR, XOR, and XNOR. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances
3. Use Boolean algebra and reduction techniques to implement a combinational logic circuit.	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> ▪ Write Boolean equations for combinational Logic circuits. ▪ Utilize Boolean algebra laws and rules for simplifying combinational logic circuits. ▪ Utilize the Karnaugh mapping procedure to systematically reduce complex Boolean equations to their simplest form. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances

STUDENT LEARNING OUTCOMES	METHODS OF INSTRUCTION	SUCCESSFUL PERFORMANCE/BEHAVIORAL INDICATORS	METHODS OF EVALUATION
4. Use arithmetic circuits, code converter, multiplexer, and de-multiplexer for various applications in digital circuits.	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> • Explain the design and operation of a half-adder and full adder circuit. • Describe the function and uses of encoders, decoders, multiplexers, and de-multiplexers. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances
5. Discuss the differences and proper use of the various subfamilies within both the TTL and CMOS lines of ICs.	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> ▪ Determine IC input and output voltage and current rating from the manufacturers' data manual. ▪ Explain gate loading, fan-out, noise margin, and time parameter. ▪ Discuss the difference and proper use of the various subfamilies within both TTL and CMOS lines of ICs. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances
6. Discuss the differences and proper use of various types of flip-flops.	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> ▪ Explain the internal circuit operation of S-R and Gated S_R flip flops. ▪ Describe the difference between the edge-triggered and pulse-triggered flip-flops. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances
7. Use flip-flops to design simple sequential circuits	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> ▪ Design any modulus ripple counter and frequency divider using J-K flip-flops. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances
8. Use counters, shift registers, and multivibrators for various applications in digital circuits	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> ▪ Connect seven segment LEDs, counters, and BCD decoders to form multidigit numeric display counter. ▪ Connect J-K flip-flops as serial or parallel-in to serial or parallel-out multibit shift register. 	<ul style="list-style-type: none"> ▪ Exam ▪ Lab performances
9. Implement and test digital logic circuits using CPLDs.	<ul style="list-style-type: none"> ▪ Lecture ▪ Lab 	<ul style="list-style-type: none"> ▪ Explain the PLD design flow. ▪ Explain how a graphic editor and a VHDL text editor are used to define logic to a PLD. 	<ul style="list-style-type: none"> ▪ Lab performances
10. Discuss the use and the impact of modern engineering tools, equipment, techniques and solutions in a global context.	<ul style="list-style-type: none"> ▪ Lecture 	<ul style="list-style-type: none"> ▪ Discuss the opportunities and challenges for U.S. digital electronics manufacturer in global market. 	<ul style="list-style-type: none"> ▪ Research paper

TENTATIVE CLASS SCHEDULE AND ASSIGNMENTS:

- A. Number systems and codes
- B. Digital electronic signals and switches
- C. Basic logic gates
- D. Inverting logic gates
- E. Boolean algebra and reduction techniques
- ** First test
- F. Exclusive-or and exclusive-nor gates
- G. Arithmetic circuits
- H. Code converters, multiplexers, and demultiplexers
- I. Combinational logic design and implementation
- J. Logic families and their characteristics
- ** Second test
- K. Flip-flops and registers
- L. Practical considerations for digital design
- M. Counter circuits and applications
- N. Shift registers
- O. Multivibrators and TH 555, (556) timers
- ** Third test
- ***Final exam
- **** Course project: Design, minimization, and implementation of selected topic using combinational logic.

Evaluation

The final grade will be based on the following criteria:

Three exams	37.5%
Labs	25%
Final test	25%
Quiz	<u>12.5%</u>
	100%

CLASS GUIDELINES AND OTHER REQUIREMENTS:

- 1. **Instructor:** Billie Adeimy
- 2. **Email:** bladeimy@richmondcc.edu

3. Attendance for ELN 133:

Promptness and regular class attendance are expected of all students. An absence, excused or unexcused, does not relieve the student of any course requirement. Attendance is required and punctuality is expected! A student is responsible for all the work, including tests, quizzes, lab work and any other assignments, of all class meetings. Following are the guidelines used by RCC Engineering department regarding students' attendance.

1	Missing a test or a quiz (Unexcused absence)	Student will receive a grade of zero
2	Missing more than 10% of classes (Unexcused absence)	Student's grade will be dropped by 5 points
3	Missing more than 3 labs	Student will receive an incomplete
4	Tardy	Equals 10 minutes of missed class or lab time
5	Three tardy accounts	Equals one absence

4. **Grading Scale:** The RCC grading scale: **93-100 (A), 85-92 (B), 78-84 (C), 70-77 (D), below 70 (F)**. Students in health related curricula must obtain a minimum grade of C in each major course in order to progress to the next semester. All students must obtain a grade of C in core curriculum courses in order to graduate.

5. **Withdrawal:** If you are going to drop one or more classes, you should follow the school's procedure. See a counselor or your instructor and obtain a drop form. This form should be signed by your instructor and returned to Student Development. You may also withdraw over the telephone by calling Student Development.

6. **Responsibility for Work:** The student is responsible for all material, assignments, and announcements in class. If you miss class, you should get class notes and assignments from another student or contact the instructor.

7. **Discipline Policy:** The school has a discipline policy which will be enforced. Under it, the college has the right to decline admission, to reprimand, to place on probation, to suspend, to expel, or to require the withdrawal of a student for just cause when it is deemed in the best interest of the college. A list of offenses is found in the College Catalog.

8. **Grievance Procedure:** If you have a complaint, try to work it out with the instructor. If this is not possible, talk to the department chair. If you can't work out the problem with the department chair, talk to the division chair for the department. If the issue still cannot be resolved, then talk to the Vice-President for Instruction.

Department Chair Contact Information:

Amir Niczad

Email Address: asniczad@richmondcc.edu

Office: Forte 315

Office Phone: 910-410-1872

9. **Other Notes:** It is against school policy for children to accompany adults to class. It is against school policy to have food or drinks in classrooms.

10. **Final Exam:** The final exam for this course is scheduled for **Last Day of Class.**

Note: If the college is closed during any of the exam days, the exam schedule will resume on the next day the college is open, completing the remaining exams.

11. **Academic Freedom:** Students' rights to express dissenting opinions from that held by the instructor are upheld. No student will be penalized for disagreeing with the instructor's opinion. However, students should know the difference between opinion and fact, as factual information is not subject to debate.

12. Internet Use in the Classroom: Connecting classrooms to the Internet and college computing resources opens immense possibilities for learning—but it also opens the risk of losing student attention to e-mail, instant messaging, web surfing, MP3 downloads, and even network hacking. Due to the increasing demands in technology and education, the internet is deemed necessary but should not be abused or accessed while in the classroom for these purposes. While in the classroom, Internet access is prohibited while the instructor is lecturing or when the class is involved in classroom exercises that do not include the internet. Internet activity will only be permitted when authorized by the instructor. There are **NO** exceptions to this classroom Policy.

13. Late Work: Assignments submitted late will be assessed a penalty of **-5 points** per school day late. Monday-Friday is counted 1 day each (weekends are counted as one day). The late penalty policy does **NOT** apply to the final term project, simply because late final projects will **NOT** be accepted due to end-of-the-semester grading constraints.

14. Makeup Tests:

When students have missed a test, the student may be allowed to make up the test **ONLY** if the instructor permits. Otherwise **ALL** test should be taken at the appropriated times.

15. Cell Phones and Electronic Devices: Classroom disruption by cell phones or other electronic devices is prohibited. All cell phones and similar electronic devices must remain turned off and out of sight for the duration of class. This includes headphones and Bluetooth devices. Personal Laptops, Net-books, I-pads, etc. are also prohibited without prior permission from your instructor. **If a student violates this policy, they will be asked to leave the classroom and be counted absent for the remainder of the class period or surrender their cell phone to the instructor for the remainder of the class. If a cell phone or an electronic device is used for cheating during a test, a student will be given a zero and given a failing grade for the class.** Cheating at RCC is not tolerated and may result in further disciplinary action. Exceptions to this policy, needs prior approval from the instructor before the class starts.

16. Classroom and Campus Security requirements: Student IDs: It is required that Student IDs be worn at **ALL** times while on Campus. All IDs must be clearly displayed on the front of an individual. Failure to display your Student ID on an on going basis will be Reported to the VP of Student Development and may result in disciplinary action.
Classroom Doors: The door will remain locked at all times while class is in session. (This is according to college policy.)

17. RCC's Dress Code

Appearance: You are expected to dress appropriately for the classroom environment. Sagging pants, clothing/jewelry with drug related signs, low cut tops, see through garments, too-short shorts, short skirts, leggings worn alone, halter tops, short midriff tops are not acceptable. No hats or head gear are allowed in the classroom. No gang affiliation is to be displayed. The instructor will notify any student if he/she is inappropriately dressed. If a student is found in violation of the above dress code, the garment error will be immediately corrected and the student can remain in class; or the student will be sent home to correct the garment error; or failure to comply with garment error will result in the student being referred to the Discipline Committee.