**CPET 252 Microcontrollers Lab** Syllabus Spring 2195

# Credit Hours: 1

**Course Time and Location: Section 01 -** Tues 11:00-12:50pm GOL 1360

**Section 02 -** Thur 11:00-12:50pm GOL 1360

**Section 03 -** Tues 02:00-03:50pm GOL 1360

**Section 04 -** Tues 08:00-09:50am GOL 1360

**Section 05 -** Thur 02:00-03:50pm GOL 1360

**Section 06 -** Thur 08:00-09:50am GOL 1360

# Instructors: Dr. Jeanne Christman

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# Holly Dickens

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# Ken Garland

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**Office Hours:** Schedules posted on mycourses

**Lab Kit:** Purchase from the ECTET lab managers – Ken Garland or Chris Brown ENT-3128

# Content of the Course

In this lab, you will learn to write code that utilizes a microcontroller’s resources to perform a variety of tasks.

# Philosophy of this Lab Course

In your career, you will certainly work with microcontrollers at some level, as part of a product that you design or a system that you interface with. Microcontrollers are widely used in products and systems ranging from tiny hearing aids to large scale factory automation systems.

As your instructors at RIT, we believe it is essential that you personally develop hands-on skills in interpreting datasheets, reading schematics, and writing code that efficiently utilizes a microcontroller’s resources.

# \*\* Competency Exams \*\*

To this end, this course requires you to individually demonstrate that you have basic proficiency in using a microcontroller. You will demonstrate this by taking two pass/fail competency exams during the course. \*\* **If you fail either of the competency exams, you fail the course.** The competency exams are not pass/fail for a grade, they are pass/fail for the course. If you pass the competency exams, then your grade will be determined by your performance on other graded items. Regardless of your grade on the other graded items, if you do not pass the competency exams, you fail the class. If you fail a competency exam, you will be given one chance to retake the exam, the next week, at the instructor’s office hours. It is your responsibility to contact the instructor to schedule the exam retake. The exam retake must be completed within 7 calendar days of the initial examination.

# What is the Format for the Competency Exams?

Competency exams will be given in lab, typically take less than 1 hour to complete, and will be individually administered. The competency exams will ask you to program the microcontroller to perform a set of tasks and then show the instructor that it works. What does this mean for you? It means you must personally understand the material and be able to apply it to new situations. If you rely on your lab partner to understand the material and complete the labs, you will most certainly fail the competency exams and the course. Therefore, get engaged, ask questions, participate, program for yourself, and understand what is going on.

**Lab Schedule**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Wk | Tues/Thurs | Topic | Homework | Comp Exams |
| 1 | 14/16-Jan | Lab #1 intro to Hardware and IDE |  |  |
| 2 | 21/23-Jan | Lab #2 State Machines | postlab ultrasonic |  |
| 3 | 28/30-Jan | Lab #3 Shift registers/ RGB LED | prelab RGB |  |
| 4 | 4/6-Feb | Competency Exam #1 |  | 1 |
| 5 | 11/13-Feb | Lab #4 Timers | prelab timers |  |
| 6 | 18/20-Feb | Lab #5 Interrupts |  |  |
| 7 | 25/27-Feb | Lab #6 I2C communication, gyroscope | prelab gyro |  |
| 8 | 3/5-Mar | Lab #7 Robot platform | prelab robot platform |  |
| NA | 10/12-Mar | Spring Break |  |  |
| 9 | 17/19-Mar | Competency Exam #2 |  | 2 |
| 10 | 24/26-Mar | Lab #8 Using gyro for motor calibration |  |  |
| 11 | 31/2-Apr | Lab #9 IR remote control |  |  |
| 12 | 7/9-Apr | Lab #10 Ultrasonic distance sensor |  |  |
| 13 | 14/16-Apr | Project day #1 |  |  |
| 14 | 21/23-Apr | Project day #2 |  |  |
| 15 | 28/30-Apr | Finals Week |  |  |

**Text book:** none

# Labs:

* All labs must be completed in order to receive credit for this course.
* All Lab must be completed by the next lab session or will receive penalties as listed below:
  + - 10 point deduction for 1 week late
    - 25 point deduction for 2 weeks late

# Attendance and Course Participation:

* Students are responsible for all material covered in the readings, lecture, lab, and on the course web pages. This includes unforeseen changes to the quiz/exam schedules.
* Students are fully expected to attend class and participate in the team-based activities by working with their peers and the instructor.

# Grading Policy:

Competency Exams Pass/Fail

Labs 70%

Quizzes 10%

Project 20%

Total 100%

**Texting/Cellphone Usage - This will cost you points.** If you use your cell phone or text during class, it will be distracting. Instead, if you need to take a call, standup, leave the classroom, and handle your phone call or text.

Using your cellphone/smartphone has a negative effect on the class, not just you personally. It affects your partner and it affects the time I have for other students, as invariably, you will need to ask about material that has been just been covered because you were distracted.

**Bonus Points** - For outstanding contributions to the class discussion, or for contributions that are exceptional beneficial to the class as a whole, I may award bonus points to individuals or teams. You are encouraged to make contributions worthy of bonus points.

**Incomplete (“I”) and Withdraw (“W”) grades:** Incomplete grades “I,” will only be given after week 10 of the semester for appropriate hardship situations (unexpected business trip, illness/death in the family, etc.). An incomplete grade WILL NOT be given to students failing and/or falling behind in their work.

Withdraw grades may be assigned through the 10th week of the semester. In unusual circumstances that are beyond the control of the student, a “W” may be assigned after the 10th week with the approval of the instructor, department chair, & dean. No credit hours are earned & your GPA is not affected by a “W” grade, however a ‘W’ will show on your transcript. “Unusual circumstances" does not include poor or lacking performance and the instructor will not sign late 'W' requests unless documented circumstances warrant such action

# Project:

* You will work on a mini project during the semester.
* Additional details project will be provided during class and on myCourses. You will work with your team to complete the work. Your grade may be different than other team members if you are not participating and contributing fully to the project.

# Quizzes:

* Expect quizzes during the semester on recent course material. The quizzes will be at the start of class.

# Competency Exams

* Will be open book, open web, but not open-human—you must do the work by yourself.
* A make-up test will be considered only if the student informs the instructor of the absence prior to the test date. If prior notification is not possible, notification must take place immediately following the exam. In these cases a make-up test can be scheduled at the instructor’s discretion.

# Attendance and Course Participation:

* Students are responsible for all material covered in the readings, lecture, lab, and on the course web pages. This includes unforeseen changes to the quiz/exam schedules.
* Students are fully expected to attend class and participate in the team-based activities by working with their peers and the instructor.

**Other Course Policies:**

* Check the course conference (www pages) for additional course content, announcements or messages DAILY. If I need to contact you personally or the entire class, I will use the myCourses system so make sure that you check the conference daily and that your information

is current in the RIT directory.

* I reserve the right to modify anything on this syllabus including reading assignments, lecture topics, quiz/test dates, homework assignments, grading percentages, etc. I will do so with notice via in-class announcements and/or using myCourses.
* E-mail will almost always be responded to within 24 hours during the workweek, please do not expect a 20-minute turnaround.
* Graded assignments will generally be returned to you within 7-10 days.
* Requests for the instructor to review a graded assignment must be received within 48 hours of the return of the assignment and will be honored at the instructor’s discretion. Reviewing a

graded assignment will result in a complete re-grade and may/may not have the desired outcome.

* Although you are EXPECTED and ENCOURAGED to utilize a study-group, individual and original efforts are expected for all exams, quizzes and homework assignments except when otherwise stated; for example, team homework assignments are a team activity.
* Any student who is not actively participating in the lecture may be asked to leave.
* Cellular/PCS telephones, pagers, PDAs, etc. must be turned-off or put in vibrate mode during class. If your device disrupts the lecture, you may be asked to leave immediately. Upon a second offense, you will need to explain your actions to the ECTET Department Head before

being allowed to return. If you require an exception to this policy, please see me before creating a disturbance.

The devices mentioned above and all other electronic devices except approved calculators and watches must be placed out of your reach and sight during exams.

* You may not use a PDA, PPC, laptop, netbook or other computer, IPOD or similar device in- class or during quizzes or exams. I understand that you may enjoy listening to music and

instant-messaging while working but I have to insist that you leave the distractions out of the classroom.

# Reasonable Accommodations:

RIT is committed to providing reasonable accommodations to students with disabilities. If you would like to request accommodations such as special seating or testing modifications due to a disability, please contact the Disability Services Office. It is located in the Student Alumni Union, Room 1150; the Web site is [www.rit.edu/dso.](http://www.rit.edu/dso)

After you receive accommodation approval, it is imperative that you see me during office hours so that we can work out whatever arrangement is necessary.

# Special Needs:

Students that have special needs above the usual student, other than the student who is already classified as deaf or hearing impaired and listed on the class roster, must present documentation to the instructor to certify the nature of his or her needs at the beginning of the quarter. This will allow me to plan ahead to best serve you.

# Academic Honesty:

***Rochester Institute of Technology does not condone any form of academic dishonesty.***

**Any act of improperly representing another person’s work as one’s own is construed as an act of academic dishonesty. These acts include, but are not limited to:**

* **Plagiarism in any form (including the use of all or parts of computer programs created by others**

**without clearly indicating that you are not the author)**

* **The use of information and materials not authorized by the instructor during an examination**

If a faculty member judges a student to be guilty of some form of academic dishonesty, the student may be given a

failing grade for that piece of work, or for the entire course, depending upon the severity of the misconduct.

If the student believes that the action taken by the instructor is incorrect, or that the penalty is too severe, the student may appeal to the Academic Conduct Committee of the college in which the course is offered.

# Academic Integrity Statement:

As an institution of higher learning, RIT expects students to behave honestly and ethically at all times, especially when submitting work for evaluation in conjunction with any course or degree requirement. The Department of Electrical, Computer, and Telecommunications Engineering Technology encourages all students to become familiar with the RIT Honor Code and with RIT’s Academic Honesty Policy.

* RIT Honor Code URL: <http://www.rit.edu/studentaffairs/studentconduct/RITHonorCode1.htm>
* RIT Academic Honesty Policy URL: <http://www.rit.edu/studentaffairs/studentconduct/rr_academicdishonesty.php>

# Gender-based discrimination and/or harassment:

RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT’s policies require faculty to share information about incidents of gender based discrimination and harassment with RIT’s Title IX coordinator or deputy coordinators, regardless whether the incidents are stated to them in person or shared by students as part of their coursework. If you have a concern related to gender-based

discrimination and/or harassment and prefer to have a confidential discussion, assistance is available from one of RIT’s confidential resources on campus (listed below).

* 1. The Center for Women & Gender: Campus Center Room 1760; 585-475-7464; CARES (available 24 hours/7 days a week) Call or text 585-295-3533.
  2. RIT Student Health Center – August Health Center/1st floor; 585-475-2255.
  3. RIT Counseling Center - August Health Center /2nd floor - 2100; 585-475-2261.
  4. The Ombuds Office – Student Auxiliary Union/Room 1114; 585-475-7200 or 585- 475-2876.
  5. The Center for Religious Life – Schmitt Interfaith Center/Rm1400; 585-475-2137.
  6. NTID Counseling & Academic Advising Services – 2nd Floor Lynden B. Johnson; 585-475-6468 (v), 585-286-4070 (vp).

# Student work on the Internet and in publications:

During this course, you may create assignments such as lab reports, final reports, etc. which may be published, in whole or in part, on publicly-accessible websites or in scholarly publications for purposes such as improving education and training. Your work will remain on these sites or in these publications after the end of the course.

Photos of the class, including individuals, may also be published, in whole or in part, on publicly-accessible websites or in scholarly publications. If you do not wish to make your photo or work public in this way, please contact me in writing during the first week of class to make other arrangements.

# Emergencies:

In the event of a University-wide emergency course requirements, classes, deadlines and grading schemes are subject to changes that may include alternative delivery methods, alternative methods of interaction with the instructor, class materials, and/or classmates, a revised attendance policy, and a revised semester calendar and/or grading scheme.

# Calendar Changes:

The class will meet according to the RIT calendar, which may include a Monday schedule on a Tuesday weekday. There may be times during the semester when I will have to travel for RIT related work. If this conflicts with a class period, I will provide as much advanced notice as possible. The lecture may have a guest speaker or on-line lecture materials, the specifics of which will be communicated via email and mycourses.