



Fall 2011

Dr. J.W. Bruce

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Class times:

Simrall 203
TR: 11:00AM–12:15 PM
lab: Simrall 329 TBD

Office hours:

Simrall 335 (325-1530)
Office visits can be scheduled at
<http://jwbruce.youcanbook.me>
Visitation outside of office hours without
a prior appointment will *NOT* be
accepted.

Office hours:

Email Andrew for an
appointment outside of lab
times.
Additional office hours may be
announced at a later date.

The class home page is at <http://www.ece.msstate.edu/courses/ece4723>

1 Course Description

1.1 MSU's catalog description:

Embedded Systems (3 hours): Two hours lecture. Three hours laboratory. Advanced topics in embedded systems design using contemporary practice. Interrupt-driven, reactive, real-time, object-oriented, and distributed client/server embedded systems. **Prerequisite:** Grade of C or better in ECE 3243 or CSE 4153 and CSE 3324 and ECE 3724.

1.2 Required Texts

- Reese, Bruce, and Jones, *Microcontrollers: From Assembly Language to C Using the PIC24 Family*, Charles River/Cengage Learning, 2008. ISBN13: 978-1584505839
- ECE 3724 parts kit (you should have this already...)
- any information at <http://www.ece.msstate.edu/courses/ece4723>

1.3 (Highly) Recommended Texts

- J. Ganssle, *The Art of Designing Embedded Systems 2/e*, Newnes, 2008. ISBN: 0750686448
- M. Lutz, *Programming Python 3/e*, O'Reilly Media, 2006. ISBN: 0596009259

2 Attendance and Grading

You are expected to attend *all* classes and *all* labs in their entirety.

2.1 Drops/Withdrawals

If you decide to discontinue the course for *any* reason, please make an *official* drop or withdrawal. If you fail to officially drop or withdraw from a class which you are no longer attending, you will receive an *F* on your permanent transcript. Also, please let me and your teammates know of your decision to drop or withdraw. In a team-based course like ECE4723/6723, your decision to draw or withdraw has implications to others. Please be professional and courteous.

2.2 Assessments and grades

2.2.1 Grading

Your final course grade will be computed as follows:

Progress Exams (two @ 13%)	26%	<i>A</i>	=	90–100%
Lab	25%	<i>B</i>	=	80–90%
Dissection	16%	<i>C</i>	=	70–80%
Class/team participation	8%	<i>D</i>	=	60–70%
Competency Exam	25%	<i>F</i>	=	0–60%

Grades are *not* curved in this course! It is theoretically possible for everyone in the class to get an *A* (or *F*). Your performance depends on how well *you* do, not on how everyone else does. *Did I remember to say that the competency exam is mandatory?*

While the exams scores are based on your individual effort, much of the other work in this course will be team-based. However, your team can influence your exam score. When everyone on your team understands the course material well, your team experience will be more productive and every team member will earn better grades. Therefore, it is in *your best interest* to help your classmates in every possible legal manner. To further enforce the statement above, there is a standing rule:

Whenever every member on a team earns a score of 85% or better on a progress exam, each team member will receive an additional 5% points on their score.

2.2.2 Exams and other non-lab activities

There will be two progress exams and a comprehensive competency exam. Your competency exam grade can replace your lowest progress exam grade, if it helps you. Unless stated otherwise, all exams will be closed book, closed notes, and no calculators. Use of prohibited materials during an exam will be consider a violation of the MSU Honor Code. See Section 2.2.6 in this syllabus.

2.2.3 Missed Exams

If you miss a progress exam with a *certified* medical excuse or *prior* instructor approval, the grade computation will be adjusted so that the remaining two (2) progress exams are worth a total of 18% and the Competency Exam is worth 33%. If you miss a progress exam *without* a valid excuse, you will earn a zero (0) grade on the progress exam. The competency exam grade cannot replace a zero earned by unexcused absence. The Competency Exam may not be missed except for the most extreme circumstances.

2.2.4 Labs

The ECE4723/6723 lab is where a majority of the learning occurs, therefore it is imperative that you come to lab prepared.

The laboratory TA will provide additional details about the lab organization during your first lab meeting. Labs will start meeting the week of August 29th. If you fail to hand in two or more labs you will be assigned an *F* in the course regardless of your class average. All labs will meet in Simrall 329.¹ All labs will involve approximately 30 minutes of lecture before starting, so *BE ON TIME!* Unless otherwise noted, labs will be due at the beginning of your assigned lab period one week after the lab was performed.

2.2.5 Dissections

Each person must perform a dissection and prepare a dissection report as specified in the Dissection assignment. Your selected dissection device must be proposed to the instructor and approval granted before beginning the dissection. Each student's device must be unique, and a device that has not been dissected in previous semesters. See the class website for dissections from previous classes.

¹Your MSU ID card will provide access to the lab. Feel free to use the lab anytime. However, this room is also used by ECE 3724 Microprocessor lab sections. If an ECE 3724 lab section is scheduled, the ECE 3724 students have priority.

2.2.6 Mississippi State University Honor Code

I have no tolerance for academic dishonesty in any form, and neither does Mississippi State University. I will refer all academic dishonesty incidents to the MSU Honor Council as violations of the MSU Honor Code:

“As a Mississippi State University student I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.”

The MSU Honor Code specifies a first offense penalty of an “XF” grade for the course and academic probation. The MSU Honor Council also has the right to suspend a student for first offense. (Suspension is the minimum sanction for second offenses.) Failing grades earned due to violation of the MSU Honor Code *cannot* be forgiven via the Academic Forgiveness Policy. For more information on your obligations under the MSU Honor code, please visit <http://students.msstate.edu/honorcode>

3 Teaming

Engineers rarely work alone. Your teaming skills (along with your communication skills) are often the most important skill a future employer wants from you. This class will require that you work in an engineering design team.

3.1 Team roles

On the team assignments, the team will have a designated *coordinator* to keep everyone on task and makes sure everyone is involved, a *recorder* to prepare the final solution or report to turn in, and one or two *checkers* to verify the solution for correctness and make sure that everyone understands the solution and the strategies used to obtain it.

3.2 Teamwork

All students will be asked to submit evaluations of how well they and their teammates perform as team members. These evaluations are used in assigning your individual scores. Malfunctioning teams must attempt to work out any problems themselves before approaching the instructor. If repeated attempts to improve team function (including instructor intervention) fail, a nonparticipant may be fired by unanimous consent of the rest of the team. Furthermore, a team member doing essentially all of the work may quit a team. Individuals who quit or are fired must notify the instructor of their intent and find a team of three unanimously willing to accept them; otherwise, the individual will receive zeros for the remainder of the team assignments.

4 Help for the needy

I am primarily interested in helping you to understand and learn a subject which is both complicated and important for people heading into electrical and computer engineering. Don't be surprised to hear me egging you on to be prepared for classes, to study harder for exams, and to learn how to study. I do not bite and my bark is pretty minimal, so I hope dearly that you all ask questions and attend some office hours. Please come by if you need help! You are strongly encouraged to discuss any academic (or personal) questions with me during scheduled office hours or by e-mail.

Additionally, MSU does have tutoring services as well as a series of study-skills classes *every* semester. I STRONGLY recommend that every student go to the classes, and seek out a tutor if needed. Don't let pride or anxiety keep you out of these classes. Problems you may have *now* will only get worse as the semester goes on if you don't get the help when it's available. I cannot overemphasize how helpful these skills classes can be for everyone!

Any students who believes they may need accommodations in this class are encouraged to contact Student Support Services in Montgomery Hall at (662) 325-3335, as soon as possible to better ensure such accommodations are implemented in a timely fashion. If Student Support Services has a prescribed course of action for you with regard to to this class, please visit me during office hours so we can make the proper arrangements.

5 Miscellaneous

5.1 Tools

The lab will involve prototyping, PCB stuffing, and testing. You will need a set of electronics tools. There *may* be an opportunity to buy tools in bulk during the class. As tools tend to disappear in the lab environment, the laboratory will not provide basic electronics hand tools. You may wish to obtain a locking plastic “fishing tackle” box in which to store your tools and parts. Students often ask me what I have in my electronics toolbox, so here is a basic inventory: (*You do not need to purchase every item on this list; it is provided strictly for instructional purposes.*)

- *basic digital multimeter*
- *electronics 20-40 W soldering iron* (with good temperature control) with several replacement fine tips (Weller irons are a little more expensive, but will last much longer than the cheaper brands. Beware of the inexpensive Weller irons, they are simply rebadged inferior soldering irons.)
- solder, small gage, between 0.38-0.56 mm (“Multicore 5-core” is one of the best.)
- *desoldering braid* in various widths between 0.6-3.3 mm (“EasyBraid One-Step” is one of the best.)
- anti-static wrist strap
- *rosin flux cleaner* in paste or liquid form (be sure to get the electronics formulation, not the one for plumbers)
- nut drivers (3/16” and 1/4”)
- spare parts tube or small tackle box
- breadboard wires
- electrical tape, heat shrink tubing, zip ties
- *needle nose pliers*
- IC extractor
- *tweezers* (nylon are best, metal “medical” version is OK) and/or three-prong parts “grabber”
- 2 standard screwdrivers (1/8 and 3/8 inch blades)
- 3 Phillips screwdrivers (#0, #1, #2)
- jeweler’s screwdriver set
- *side cutters*
- *wire strippers* (designed for small electrical wires, AWG 20 and smaller)

To create the “deluxe” electronics toolkit, consider getting

- quality handheld full-function multimeter (Fluke is the “gold standard” here.)
- Torx drivers (T10 and T15 recommended most)
- brass filings and holder for cleaning soldering iron tip
- bent needle nose, long nose, and flat nose pliers

- diagonal cutters
- desoldering vacuum hand pump
- small wrench/socket set
- IDC cable/socket crimper
- basic wirewrap tool

5.2 Personal communication devices

Turn off all cell phones and pagers before coming to class. It is very unprofessional for your mobile phone to ring during our learning time together. If your phone rings, buzzes, vibrates, etc during lecture, you will forfeit all “professionalism” points on your final grade. Remove any Bluetooth headsets before coming to class.

6 Important University Dates

The following schedule is tentative; this schedule is subject to change as circumstances dictate. Please keep yourself updated by visiting the class web site and noting the assignments for each week!

Date	Time	Lecture
August 18	1100	First class meeting
August 23	2359	Last day for dropping a course without a grade
August 24	2359	Last day for registration/add course
September 5		University holiday (Labor day)
September 6	2359	dissection proposals due
September 15		University holiday (football day)
September 29		Last day to drop a class with a “W” grade
October 25 - Nov. 2		Advising for pre-registration
November 3-11		Pre-registration for summer and fall semesters
November 14		Last day to withdraw from University
November 17	1100	Dissection journals due
November 21-25		Thanksgiving Break
December 1	1215	ECE 4723/6723 class ends
Monday, Dec. 5, 2011	1200-1500	FINAL EXAM PERIOD

Did I remember to say that the competency exam is mandatory?

History

18 Aug 2011 Initial version