

CS 2230 — Computer Organization & Assembly Language  
Department of Computer Science  
Western Michigan University  
Syllabus — Fall 2018

**Instructor Information:**

Colin MacCreery

**Email:** colin.c.macreery@wmich.edu

**Phone:** (269) 276-3106

**Office:** B-257 CEAS      **Hours:** Wednesday 1:00 - 2:15PM  
Thursday 2:30 - 3:45PM  
(and by appointment)

**Catalog Description:**

This course introduces concepts of computer architecture and assembly language. CISC and RISC instruction sets, along with associated hardware issues (e.g., data representation and instruction formats, instruction pipelining, register windows, context switching, and memory management) will be discussed. The student will program in both assembly language and the C programming language as well as interfacing the two languages.

**Prerequisite:** CS 1110

**Notes:**

Enrollment is restricted to undergraduates and those graduate students admitted under the PCS (Permission to take Computer Science) classification. Enrollments in all 5000-level computer science classes will be restricted to undergraduates and graduate students in the Computer Science master's program (CMP). Students in other graduate programs who need one of these courses either for subject matter or a research tool can gain admission by permission from the department.

**Credits:** 3 hours

**Textbook:**

*The Manga Guide to Microcontrollers* by Michio Shibuya (**yes, this is required**)

**Optional**, but helpful texts:

*MSP430 Microcontroller Basics* by John H. Davies

*Introduction to Microcontrollers* by Günther Gridling, Bettina Weiss available at <https://ti.tuwien.ac.at/ecs/teaching/courses/mclu/theory-material/Microcontroller.pdf>

I do not follow it nor do I encourage you to own this. You may look at a copy by asking me, because I like to keep it around for occasional reference. You will be required to purchase an MSP430 kit, for approximately \$50. These will be assembled, supported, and sold through the Computer Club, who will come to class one time. After that, you will need to get them at the Computer Club office (2225 Kahrman).

### Course Topics:

- Overview of Computer Organization
- Introductory Systems Skills (Terminal, Makefiles)
- MSP430 Architecture
- Git VCS
- Programming in C and Assembly Language

### Course Learning Outcomes:

Students will:

- *show* mastery of conversion, addition and recognition of numbers in base systems such as 2, 8 and 16.
- *define* terminology relevant to computing architecture such as “register file”, “interrupt”, “fetch-execute cycle”.
- *experiment* with the different components of the MSP430 microcontroller.
- *create* a design document suitable for a final project.
- *use* a remote debugger to *analyze* a running program.

### Grading:

The allocation of a mark ('A', 'BA' etc.) for the work in the course is done once – when the grade sheets are filled out at the end of the course. Until that time there is only data, generated from exams, programs etc. That data is processed into a single number by weighting (exam points are weighted most heavily). Those numbers are used to create a histogram. That histogram is then organized into groups ('clusters') which are then labeled with the traditional labels 'A', 'BA', etc.).

My goal will be to get a wide distribution of performance so that the clusters are well defined. I will exercise subjective judgment to label the data points that are not clearly in a group and to determine the label for a given group.

Please keep any exam or program that has been given a grade in case there is any question about grades.

### Academic Integrity:

The following text is recommended by the Faculty Senate for all course syllabi, and it includes links to relevant information. Please make sure you are familiar with the university guidelines for academic integrity.

Students are responsible for making themselves aware of and understanding the University policies and procedures that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. The academic policies addressing Student Rights and Responsibilities can be found in the Undergraduate Catalog at <http://catalog.wmich.edu/content.php?catoid=24&navoid=974>

and the Graduate Catalog at <http://catalog.wmich.edu/content.php?catoid=25&navoid=1030>

If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s) and if you believe you are not responsible, you will have the opportunity for a hearing. You should consult with your instructor if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test. In addition, students are encouraged to access the Code of Honor, as well as resources and general academic policies on such issues as diversity, religious observance, and student disabilities:

- Office of Student Conduct <http://www.wmich.edu/conduct>
- Division of Student Affairs <http://www.wmich.edu/students/diversity>
- Registrar's Office <http://www.wmich.edu/registrar/policies/interfaith>
- Disability Services for Students <http://www.wmich.edu/disabilityservices>

Students who take this class must be prepared to submit electronic copies of some or all assignments. The University expects that all students will be evaluated and graded on their own work. If you use language, data or ideas from other sources, published or unpublished, you must take care to acknowledge and properly cite those sources. Failure to do so constitutes plagiarism.

Throughout the term you will be required to solve problems. Solutions are to consist of ***your own work!*** Learning can certainly take place through discussions regarding assignments, and you may ask for hints or ideas; however, when discussion is occurring, ***the writing of assignment solutions should not take place during that discussion.*** You are to write your own solutions. Here are additional rules to follow, when writing your solutions that are to be submitted for a grade:

- Do not look at or copy material that someone else has written for the same or similar solution.
- Do not give your solution in part or whole, either in hardcopy or electronic form, to anyone else.
- Do not put yourself in a position of having access to another's files or work. Do not give another person access to your files or work.

### **Course Etiquette (Non-academic Requirements):**

Please respect the learning opportunity for you classmates. Do not disrupt learning by arriving late, leaving early, or by being inattentive or disruptive in class. **Don't make or receive cell phone calls, text messages, and email;** turn off reminder alarms and your cell phone ringer. If you need to work for other classes or personal business, **don't do it in this class.** Take the time off if you need to do something more important than attending class.

*If you think you may have difficulty meeting these or other academic requirements, please contact your instructor using e-mail, as soon as possible before or immediately after the problem occurs. Contact your instructor if you will miss or be late for a class meeting, if you have material submission problems, miss or anticipate missing course deadlines, or have personal problems that affect your work in this class.*

### **Additional University Policies:**

Each of these federal statutes, policies and statements affirms that we aspire to be a community of academics and professionals who value the diverse perspectives and experiences each individual brings to WMU. These differences contribute to our rich and vibrant environment, where we strive to broaden our understanding of complex issues and gain new insights of the world. Although our perspectives, ideas and opinions may vary, each person is valued and treated respectfully.

Please refer to the University's policy statement regarding Sexual and Gender-Based Harassment and Violence, Intimate Partner Violence, and Stalking Policy available from the following website:

<https://www.wmich.edu/sexualmisconduct>

### **The Faculty Senate Religious Observances Policy**

The complete policy statement is available from the following website:

[https://www.wmich.edu/facultysenate/downloads/MOA0702\\_religious\\_observances\\_final.pdf](https://www.wmich.edu/facultysenate/downloads/MOA0702_religious_observances_final.pdf)

**WARNING – The University is a dangerous place where your ideas will be challenged and offensive statements will be heard. It is an equal opportunity forum for all. Mutual respect is the guiding principle. Please see:**

[https://wmich.edu/sites/default/files/attachments/u370/2016/Civility%20Stmt.7-27-16\\_0.pdf](https://wmich.edu/sites/default/files/attachments/u370/2016/Civility%20Stmt.7-27-16_0.pdf)

The Civility statement affirms the value of each individual as a member of the university community. It further reminds us that ad hominem attacks directed towards the individual, rather than the position or idea, do not contribute to an environment allowing individuals to flourish. The (new) University President Montgomery has indicated his concern with the atmosphere of discourse that can be poisoned as at Charlottesville (home of the University of Virginia) this summer. We should all work to keep our University the unique enterprise that defines its sense of community.