San José State University
College of Engineering/Computer Engineering Department
CMPE 102 – Fundamentals of Embedded Software

Instructor:	Dr. Ahmet Bindal
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Office Hours:	Monday 1:30 – 3:00 PM
Class Days/Time:	Monday 3:00 – 5:45 PM
Lab Days/Time:	NA
Classroom:	E337
Prerequisites:	CMPE 50 or CS 46 (with grade of "C-" or better) Students who do not provide documentation of having satisfied the class prerequisite requirements <u>by the second class meeting will be dropped from the class</u>.

Course Web Page and Messaging

Copies of the course materials such as the syllabus, major assignment handouts, etc. may be found at: http://www.engr.sjsu.edu/abindal. You are responsible for regularly checking with the messaging system through MySJSU and the webpage at the link above.

Course Catalog Description

Assembly programming; assembly-C interface; CPU and memory organization; addressing modes; arithmetic, logic and branch instructions; arrays, pointers, subroutines, stack and procedure calls; multiplication, division and floating point arithmetic.

Program Outcomes

a. Ability to apply knowledge of mathematics, science, and engineering
b. Ability to design and conduct experiments, as well as to analyze and interpret data
c. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. Ability to function on multi-disciplinary teams

e. Ability to identify, formulate, and solve engineering problems
f. Understanding of professional and ethical responsibility
g. Ability to communicate effectively
h. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. Recognition of the need for, and an ability to engage in life-long learning
j. Knowledge of contemporary issues
k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Goals and Student Learning Objectives

Course goals

CMPE 102 is a programming course that introduces a basic instruction set that runs on RISC data-path. The course also teaches Assembly programming concepts on a popular PIC24 instruction set, analyze the interaction between Assembly and a higher-level language such as C, and uses PIC integrated design platform to do Assembly programming.
Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of forty-five hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus.

Student Learning Objectives

- Produce RISC CPU hardware from an Assembly instruction set.
- Analyze the interactions between C language and Assembly.
- Use Assembly instruction set to build flow charts and execute programs.

Required Texts/Readings

Textbooks

"Microcontrollers From Assembly Language to C Using the PIC24 Family", R. Reese, J. W. Bruce, B. A. Jones, ISBN: 1-58450-583-4.

Other Material (available from the class web site):
http://www.engr.sjsu.edu/abindal/cmpe102.htm

Software Requirements

You will use the PIC software design and development platform on your personal laptop to design embedded code.

Classroom Protocol

You are expected to arrive in time for class. No cell phones and no open laptops (unless instructed by the instructor) are allowed in the lecture. Please be considerate of your fellow students.

Assignments and Grading Policy

Student Assessment

Midterm 1	30%
Midterm 2	30%
Final Examination	40%

0 to 49	F
50 to 59	D
60 to 69	C
70 to 79	B
80 to 84	B+
85 to 89	A-
90 to 100	A

Descriptions of Assignments/Exams

Exams: Exams will be conducted closed book, comprehensive and will be based on the course material.
Once decided in the class, all exam dates are final. Students may retake a missed exam because of a health emergency or sickness accompanied by an official and signed doctor's report. Each case will be individually verified by calling the doctor's office. The retake exams may have more difficult set of questions than the ones asked in the original exam.

Policy on Respect and Insubordination

Students who disturb the peace and harmony in class, behave disrespectfully to the instructor or his/her fellow students will be immediately dismissed from the class and reported to student's affairs for disciplinary action.

Policy on Cheating

A student or students involved in a cheating incident in a test, homework, report, or lab project will receive an F in the course and will be reported to the judicial affairs office and subjected to disciplinary action.

I will personally notify you of any such findings or actions. All such reports will also be brought to the attention of the Chair of the Computer Engineering department. You have

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certain rights of appeal, which may serve to exonerate you.

Dropping and Adding

Students who do not provide documentation of having satisfied the class prerequisite and co-requisite requirements (if any) by the second class meeting will be dropped from the class.

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic calendar web page located at http://www.sjsu.edu/academic_programs/calendars/academic_calendar/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/**.** Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

University Policies

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University's Academic Integrity policy, located at http://www.sjsu.edu/senate/S07-2.htm, requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

Department Policies

- Students who do not provide documentation of having satisfied the class prerequisite or co-requisite requirements (if any) by the second class meeting will be dropped from the class.
- All non-proctored report (or similarly sized) assignments in courses where some of the final grade depends on prose writing will be submitted to Turnitin.com.

Engineering Student Success Center

The Engineering Student Success Center (ESSC) will help you move successfully from freshman to senior year, supporting and enhancing your learning and overall academic experience. ESSC is an inclusive environment that fosters collaboration, builds community and supports your smooth transition into college. It is located in Room 344 in the Engineering Building. The ESSC web site is located at http://www.engr.sjsu.edu/students/essc.

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CMPE 102 Course Schedule

The schedule is tentative and subject to change.

Week	Topics
0	Introduction to class
1	A simple Assembly instruction set and the CPU hardware requirements
2	Continue Assembly instruction set and the CPU hardware requirements
3	Continue Assembly instruction set and the CPU hardware requirements, Midterm 1
4	Introduction to PIC memory organization, move instructions, direct, immediate and indirect addressing modes
5	Basic 2 and 3-operand arithmetic instructions
6	Increment/Decrement instructions Bitwise logical instructions The status register
7	Shift and rotate instructions
8	Conditional statements
9	Continue conditional instructions
10	Comparison and branch instructions, loop instructions, Midterm 2
11	Indirect addressing modes – pointers and arrays
12	Continue indirect addressing modes, pointers and arrays, strings
13	Strings, subroutines, stack and procedure calls
14	Continue to subroutines, stack and procedure calls, and software interrupts
15	Complex Assembly arithmetic - multiplication, division and floating point arithmetic
16	Final (comprehensive)