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| **1. Course title/number, number of credit hours** |
| Introduction to Microprocessor Systems – CDA3331C |  3 credit hours |
| **2. Course prerequisites, corequisites, and where the course fits in the program of study** |
| *Prerequisites*: CDA3201C and COP2220, both with minimum grade of C |
| **3. Course logistics** |
| *Term*: Spring 2017This is a classroom lecture course with 5 laboratory experiments*Class location and time*: EE 207; T/R 4:00-5:20 am (Lecture)*Lab location and time*: EE-203; Mon-Sat almost 9:00-9:00 pm open lab,  see lab timetable for exact TA hoursThis course has several design content. |
| **4. Instructor contact information** |
| *Instructor’s name**Office address**Office Hours* *Contact telephone number**Email address* | **Dr. Bassem Alhalabi**, Associate ProfessorEngineering East (EE) Bldg., Room 512T/r: 2:00-4:00 PM561-297-3182alhalabi@fau.edu  |
| **5. TA contact information** |
| *TA’s name**Office address**Office Hours* *Contact telephone number**Email address* | Five TA’s; names TBDLab Room EE203, Logic Design and Microprocessor Laboratory65 hours a week, see details on BlackboardFor now: alhalabi@fau.edu |
| **6. Course description** |
| Architecture of a 16-bit microcontroller; addressing modes, instruction set, assembly language programming, embedded C, program design, hardware model, exception handling and interface to memory and peripherals. Training kits will be used in the lab to run assembly programs for the first half of the semester and C programs for the second half. The course includes lab experiments, which are mixed assembly language and C programs. You will use the software in the lab to edit, assemble, and load your programs to the TI MSP430 boards to run them. These experiments are designed to put learned concepts into actions. The labs cover data arrays (sorting), math functions (factorial), bit manipulation (image processing), and interface with real-world controls (sensors and actuators). |
| **7. Course objectives/student learning outcomes/program outcomes** |
| *Course objectives* | 1. To learn the fundamental hardware and software structures of microprocessors and microcontrollers.
2. To learn the basic concept of microprocessor-based control systems.
3. To develop basic to moderate skills in assembly language and embedded C programming.
4. To learn basic interface between computing systems and real-world devices.
5. To demonstrate knowledge by performing 5 simple to moderate lab exercises using a TI MSP430 Microcontroller training board connected to real-world I/O controls such as sensors and actuators.
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| *Student learning outcomes**& relationship to ABET a-k objectives* | (c)    An ability to apply mathematical foundations, engineering or computer science theory in the modeling and design of a system, component, or program to meet desired needs with realistic constraints and tradeoffs.(e)    An ability to identify, formulate, and solve engineering problems. |
| **8. Course evaluation method** |
| 5 Homework and/or quizzes - 25%5 Laboratory Experiments - 25%Term Project 15%Final Comprehensive Examination - 35% | *Note*: The minimum grade required to pass the course is C. |
| **9. Course grading scale** |
| Grading Scale: 90-100 for “A” and “A-“; 80-89 for “B+”, “B”, or “B-“;70-79 for “C+”, “C”, or “C-“;60-69 for “D+”, “D” ,or “D-“;50 and below: “F” |
| **10. Policy on makeup tests, late work, and incompletes** |
| *It is for your advantage to read ahead and promptly solve all assigned homework problems. On the due date, you will be asked to either submit parts of your homework assignment or take a quiz. No make-up quizzes are allowed unless official excuses are provided. Missed assignments and quizzes will receive a zero grade. Depending on the overall performance of the class, additional quizzes may be given and then the lowest one or two will be dropped.* |
| **11. Special course requirements** |
| This is a fundamental course in engineering, and students are truly encouraged to pay their best attention. This course is designed to build a good foundation for the other more advanced courses. |
| **12. Classroom etiquette policy** |
| University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.­ High level well behavior and class discipline are expected. |
| **13. Disability policy statement** |
| In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU’s campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. |
| **14. Honor code policy** |
| Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at [www.fau.edu/regulations/chapter4/4.001\_Code\_of\_Academic\_Integrity.pdf](http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf) |
| **15. Required texts/reading** |
| 1-Programmable Microcontrollers with Applications: MSP430 LaunchPad with CCS and GraceBy Cem Unsalan, 1st Edition[http://smile.amazon.com/dp/0071830030/ref=rdr\_ext\_tmb](http://smile.amazon.com/dp/0071830030/ref%3Drdr_ext_tmb)Please read Chapters 1 and 2ahead |
| **16. Supplementary/recommended readings** |
| 2-Read about this kit:<http://www.ti.com/tool/msp-exp430g2>Kits will be provided to you in during the third week of the semester.Please get acquainted with it.This kit may use a microcontroller with different version from the one we are studying in the book, but still very much the same MSP430 family, meaning same basic architecture with different functions.Here is the TI original data sheets on the micro of the kit NSP430G2553.<http://www.ti.com/lit/ds/symlink/msp430g2553.pdf>Please keep the two pages (3, 5) I gave you with you all the times.3-Please read ahead about the compiler:<http://www.ti.com/tool/ccstudio?DCMP=PPC_Google_TI&k_clickid=7948fe70-5539-a2a8-dbbf-00002b86f10f>And download it from:<http://processors.wiki.ti.com/index.php/Download_CCS#Code_Composer_Studio_Version_6_Downloads>onto your laptop, which you should bring with you all the time when we start the labs.If you do not have a laptop, you will need to use the one in the lab room EE203.4-Also below is the link for a cd you can download which has programming examples.<http://www.ti.com/general/docs/lit/getliterature.tsp?baseLiteratureNumber=SSQC028&fileType=zip>5-Please bring with you to the lab your own small tools kit, basically a small pliers, wire cutter, and small screw drivers set. You can find small kits at Lowes, Home Depot, Radio Shack, etc. |
| **17. Course topical outline, including dates for exams/quizzes, papers, completion of reading** |
| 1. Preliminaries
2. Introduction to the MSP430
3. Addressing modes
4. Instruction set
5. Interrupt and exception processing
6. Embedded C Programming
7. Memory and I/O systems
8. Ports and Interface
9. Analog to Digital Conversion
10. Advanced programing topics with: Timers, Low Power etc.
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