SICET Course Syllabus

Academic Term 1241

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Course Information

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| Course Name | Embedded Systems Fundamentals |
| Course Code | CMPE1250 |
| Course Dates | September 3rd to December 17th 2024 |
| Meeting Day, Time, and Location | [Mon 10:00 - 11:50] (WC204)  [Wed 14:00 - 14:50] (WC202) |
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***Note: Course description and grading details are found on the course outline.***

Instructor Details

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| Name | Carlos Estay |
| Office Location | W111 |
| Phone Number | 780.378.7170 (7170 on internal phones) |
| Email | [carlose@nait.ca](mailto:carlose@nait.ca) |
| Office Hours | Tutorial, and when online (and not busy) |
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Other Details

* Lab, assignment, and exam scheduling will be provided in the Moodle Calendar.
* Source code for Labs is to be submitted for grading according to your instructor’s instructions.
* An electronic version of the Course Notes will be available in Moodle, along with a number of other resources you will need. It is recommended that you download copies of these for ready reference, as you will not have access to the Internet during formal practical assessments. Paper copies can also prove valuable, but printing will be the responsibility of individual students.
* Grades will be entered in the Brightspace Gradebook.
* Food and drinks are allowed at the classroom tables but not at the lab work benches.
* Safety glasses are to be worn by everyone in the room when one or more students engage in a potentially hazardous activity, such as cutting wire or soldering.
* Promptness and attendance are known to contribute to success in this course. Attendance will be monitored.

Note: The schedule for this class is best-fit. The schedule may be adjusted (with prior warning) to accommodate challenges and issues encountered during the term.

Course Schedule, subject to change:

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| Week | Topics (Concepts, Skills, Issues) | Activities / Assessments / Notes |
| 1 (4) | Introduction to embedded systems and the 9S12XDP512.  Get your micro kit (board + BDM), and AD2. | P1-P11 “old” Course Pack.  ICA #01 – Programming Workflow. |
| 2 (4) | Toolchain setup.  BDM pod install at home.  Template files.  Project workflow.  C# to C transition. | ICA #02 – Migrate to C. |
| 3 (4) | It’s all about bits. Common expressions in GPIO ops.  The story of Big Pink and the derivative file. | ICA #03 – Expressions, Sizes, Bitwise Operations.  Look at derivative file. |
| 4 (4) | GPIO at last: blinking LEDs and blocking delays.  Measurements with the AD2.  Frequency and Period.  Building and managing libraries (compilation units).  Reading a momentary-contact switch state.  Switch and LED library. | ICA #04 – Measurement, GPIO, LEDs  ICA #05 – Switch and LED library. |
| 5 (4) | Clocks and PLL – It’s all about clocks. | ICA #06 - Work-along with PLL library. With and without PLL start-up.  Practical Assessment #01 |
| 6 (4) | Real Time Interrupt (RTI)  Completing the SWL library - switch transition detection  Serial Communication Interface (SCI) | ICA #07 – RTI  ICA #08 – SCI Basics |
| 7 (4) | Serial Communication Interface (SCI) | [SCI Discussion + Library Building]  Lab #01 – SCI and Timing |
| 8 (4) | Intro to 7-Segs  Basic Number Theory  Building a 7-Seg Library, with #define support code | ICA #09 – Basic Segs Functions |
| 9 (4) | BCD, 16-Bit display functions  Isolation of DEC/HEX digits from a number  Nibbles: getting them where you want them | Lab #02 – 16-Bit Segs functions Practical |
| 10 (4) | Intro to PWM Module | Lab #03 – Decimal Entry and Conversion  Assessment #02 |
| 11 (4) | PWM Module | ICA #10 PWM 8-bit |
| 12 (4) | PWM 16-bit  Intro to LCD | ICA #11 PWM 16-bit  ICA #12 – LCD Checkouts |
| 13 (4) | Building an LCD library, with support functions  Basic LCD library functions | ICA #13 – Fixed Output, LCD String Functions  Lab #04 – Secondary LCD Functions |
| 14 (4) | Using character buffers  Using sprint to format data for display | Lab #05 – Dynamic LCD Output |
| 15 (4) | Practical Assessment #3 | Capstone presentations on Friday. |

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