



## Microcontroller Principles – AUST 109 Autonomous Systems Technician Program

### Course Outline

COURSE IMPLEMENTATION DATE: September 2020  
OUTLINE EFFECTIVE DATE: September 2020  
COURSE OUTLINE REVIEW DATE: March 2025

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#### GENERAL COURSE DESCRIPTION:

Through the use of illustrative projects the student will explore the programming and operation of the PIC series of microcontrollers. The course will include lectures on Flow code software with exercises and laboratory experiments to reinforce the lecture material. General microcomputer architecture and hardware specific to the PIC series of microcontrollers is discussed and explored. The research, design, and construction of a student led project will form a portion of the final mark.

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**Program Information:** This course is required for the first year of the Autonomous Systems Technician program.

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**Delivery:** This course is delivered face to face.

**COTR Credits:** 4

**Hours for this course:** 150 hours

**Typical Structure of Instructional Hours:**

Instructional Activity	Duration
Lecture Hours	75
Seminars / Tutorials	
Laboratory / Studio Hours	75
Practicum / Field Experience	
Other Contact Hours	
<b>Total</b>	150

**Practicum Hours (if applicable):**

Type of Practicum	Duration
On-the-Job Experience	
Formal Work Experience	
Other	
<b>Total</b>	N/A

**Course Outline Author or Contact:**

Joy Brown, BEd

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Signature

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**APPROVAL SIGNATURES:**

Department Head  
Joy Brown  
E-mail: [jbrown3@cotr.bc.ca](mailto:jbrown3@cotr.bc.ca)

Dean of Trades and Technology  
Dr. Jack Moes  
E-mail: [jmoes@cotr.bc.ca](mailto:jmoes@cotr.bc.ca)

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Department Head Signature

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Dean Signature

EDCO

Valid from: September 2020 – March 2025

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Education Council Approval Date

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**COURSE PREREQUISITES AND TRANSFER CREDIT:**

**Prerequisites:** AUST 108 with a minimum grade of C- (55%) or higher.

**Corequisites:** N/A

**Flexible Assessment (FA):**

Credit can be awarded for this course through FA

Yes  No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

**Transfer Credit:** For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Student should also contact an academic advisor at the institution where they want transfer credit.

**Prior Course Number:** N/A

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## **Textbooks and Required Resources:**

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Autonomous Systems Technician Level 1 Package

*Please see the instructor's syllabus or check COTR's online text calculator*

*<http://go.cotr.bc.ca/tuition/tCalc.asp> for a complete list of the currently required textbooks.*

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## **LEARNING OUTCOMES:**

Upon the successful completion of this course, students will be able to

- discuss the difference between a microprocessor and a microcontroller-based system;
  - program a microcontroller using Flow code;
  - identify the hardware features of the PIC16F877;
  - identify the components and structure of a microcomputer;
  - use the microcontroller to control various relays;
  - use the microcontroller to control a DC motor;
  - use the microcontroller to control a stepper motor;
  - interface the microcontroller with various displays;
  - describe polling and interrupts in general and specific to the PIC16F877; and
  - design and develop a project demonstrating knowledge of both the hardware and software of the microcontroller.
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## **COURSE TOPICS:**

- Microcontrollers
- Flowcode
- Microcomputer architecture
- PIC series

*See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.*

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## EVALUATION AND ASSESSMENT (Face-to-Face Delivery):

Assignments	% of Total Grade
Project	10%
Lab Tests (x4@ 10% each)	40%
Theory Test	25%
Final Exam	<u>25%</u>
Total:	100%

Please see the instructor's syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments and use of electronic aids.

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### EXAM POLICY:

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

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### COURSE GRADE:

Course grades are assigned as follows:

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Mark (Percent)	≥ 90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	< 50

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

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### ACADEMIC POLICIES:

See [www.cotr.bc.ca/policies](http://www.cotr.bc.ca/policies) for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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### COURSE CHANGES:

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment and marketing needs. The instructor endeavours to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.

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