



Radio Frequency (RF) Principles 1 – AUST 201 Autonomous Systems Technician Program

Course Outline

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

GENERAL COURSE DESCRIPTION:

This course is designed to introduce students to the concepts of electronics that are related to the transmission and reception of radio frequency (RF) signals. The course commences with a review of relevant basic electronic circuits including filters, amplifiers and oscillators, reinforced with selected laboratory experiments. Wireless communication fundamentals such as the frequency spectrum, noise, RF transmission spectral characteristics, channel bandwidth, and modulation/demodulation technologies will be covered. Information transmission in analog and digital forms is discussed. Frequency synthesizers and phase locked loop (PLL) circuits are also introduced.

Program Information: This course is required for successful completion of the Autonomous Systems Technician Diploma program.

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	
Total	150

Practicum Hours (if applicable):

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

Course Outline Author or Contact:

Joy Brown, BEd

Signature

APPROVAL SIGNATURES:

Department Head
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Dean of Trades and Technology
Dr. Jack Moes
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Department Head Signature

Dean Signature

EDCO

Valid from: September 2020 – March 2025

Education Council Approval Date

COURSE PREREQUISITES AND TRANSFER CREDIT:

Prerequisites: Completion of the first year of the Autonomous Systems Technician program.

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

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:

Miller, Gary, Beasley, Jeffery and Hymers, Jonathan. *Electronic Communications: A Systems Approach*.

Autonomous Systems Technician Level 2 Lab Manual

Autonomous Systems Technician Level 2 Handout 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.

LEARNING OUTCOMES:

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

- explain the RF spectrum and the phenomenon of external and internal noise;
 - perform power measurements and decibel calculations;
 - explain the transferring of information in both analog and digital modes;
 - build, analyze, and troubleshoot amplifier and oscillator circuits;
 - explain the different configurations and classifications of amplifiers and their operating parameters;
 - explain the use of filters in RF communications;
 - build, analyze, and troubleshoot basic active and passive filters;
 - build and analyze a parallel resonant circuit;
 - create a technical report on a parallel resonant circuit;
 - explain the basic concepts underlying Amplitude Modulation and Single Sideband modulation/demodulation;
 - demonstrate how to use a radio manual for AM and SSB testing, and repair tasks;
 - demonstrate the correct usage of bench radio test equipment with AM and SSB radios;
 - explain PLL frequency synthesizer operation; and
 - build and analyze PLL synthesizers.
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COURSE TOPICS:

- Frequency Spectrum
- Noise
- RF Transmission Spectral Characteristics
- Channel Bandwidth
- Modulation/Demodulation
- Frequency Synthesizers
- Phase Locked Loop Circuits (PPL)

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

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

Assignments	% of Total Grade
Exams (x3)	65%
Labs	20%
Lab Tests	5%
Assignments	<u>10%</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.

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.

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.

ACADEMIC POLICIES:

See www.cotr.bc.ca/policies for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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.