



Radio Frequency (RF) Transmission Lines and Antennas – AUST 203 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 investigates Radio Frequency (RF) signal propagation in cables and through free space. Concepts related to transmission of the RF signal within cables and causes of transmission impairment are explored. Free space propagation of an RF signal as an Electromagnetic (E/M) field is examined. The properties of RF signals radiated by an antenna system will be explored. RF filtering systems are introduced, including cavity filters. The practical component of this course will include forward and reflected power measurements, Voltage Standing Wave Ratio (VSWR) minimization and Time Domain Reflectometry (TDR) fault location techniques for transmission line systems. Antenna operational parameters will be measured, and cavity filter alignment will be performed.

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: 3

Hours for this course: 90 hours

Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	45
Seminars / Tutorials	
Laboratory / Studio Hours	45
Practicum / Field Experience	
Other Contact Hours	
Total	90

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: AUST 202 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

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

- describe the various types of transmission lines and their applications;
 - explain the concept of characteristic impedance and how it may affect RF transmissions;
 - fabricate and test an RF transmission cable;
 - explain the principles of TDR and VSWR and their applications for cable and antenna testing;
 - perform TDR and VSWR testing on an RF transmission line, including fault location;
 - explain the basics of e/m propagation and radiation patterns;
 - describe the various antenna families and specific applications;
 - build and test a quarter wave antenna for a given frequency; and
 - tune and test a cavity filter system.
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COURSE TOPICS:

- Radio Frequency (RF) signal propagation
- RF Transmission
- Voltage Standing Wave Ratio (VSWR) minimization
- Time Domain Reflectometry (TDR)
- Antenna Operation
- Cavity Filter Systems

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 (x2)	65%
Labs	20%
Assignments	<u>15%</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.