COLLEGE OF THE ROCKIES

Radio Frequency (RF) Principles 2 – AUST 202
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 introduces the student to the theoretical and operational analysis of Angle Modulation (FM & PM) schemes as applied to radio transmission and reception. Common FM transmitter and receiver configurations, technical specifications, and schematics are investigated. Students will receive hands-on experience with basic analog and digital FM modulation technology. Commercial FM radio transmissions are examined and students are introduced to advanced digital modulation techniques. The basic theory of spread spectrum radio systems and DSP analog is introduced. Laboratory exercises include programming and performance testing of commercial LMR radios. Basic concepts of LMR dispatching are 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: 3

Hours for this course: 120 hours

Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	60
Seminars / Tutorials	
Laboratory / Studio Hours	60
Practicum / Field Experience	
Other Contact Hours	
Total	120

Practicum Hours (if applicable):

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

Course Outline Author or Contact:
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Signature

APPROVAL SIGNATURES:

Department Head
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Department Head Signature

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Dean Signature

EDCO

Valid from: September 2020 – March 2025

Education Council Approval Date

COURSE PREREQUISITES AND TRANSFER CREDIT:

Prerequisites: AUST 201 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

- draw the block diagram of a generic FM radio transmitter and receiver;
- explain the fundamental operation of an FM transmitter and receiver;
- perform testing on an FM transceiver to verify manufacturer's operational specifications;
- perform testing on a digital FM transceiver to verify manufacturer's operational specifications;
- differentiate between wideband and narrow band FM transmission;
- discuss the advantages in noise suppression and sensitivity improvements using FM technology;
- describe the theory of operations of a commercial wideband FM radio station from a baseband perspective;
- discuss the theory of operation behind advanced digital modulation techniques;
- explain fundamentals of analog PCM and DSP/Vocoder operations;
- explain fundamentals of FHSS and DSSS spread spectrum techniques;
- demonstrate the use of a spread spectrum FHSS radio system;
- program a variety of analog and digital FM 2-way radios using manufacturer's software; and
- demonstrate a basic FM dispatch system with multiple users on two radio channels.

COURSE TOPICS:

- Angle Modulation (FM and PM) Schemes
- Analog and Digital FM modulation
- Commercial FM
- DSP analog
- Spread Spectrum techniques
- LMR dispatching

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 (x2)	10%
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.