



WIST-201 – Radio Frequency (RF) Principles

Technology

Effective Term & Year: Fall 2022

Course Outline Review Date: 2027-03-01

Program Area: Information Technology

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 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. Frequency synthesizers and phase locked loop (PLL) circuits are also introduced. 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.

Program Information:

This course is required for successful completion of the Wireless Systems Technician Diploma program.

Delivery Methods: Hybrid – On-campus (Face-to-Face) and Online

Credit Type: College of the Rockies Credits

Credits: 4

Instructional Activity and Hours:

Activity	Hours
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Classroom, Directed Studies or Online Instruction	90
Seminar/Tutorials	
Laboratory/Studio	90
Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	180

Course Requisites:

- Completion of the first year of the Wireless Systems Technician program.

Flexible Assessment: Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. Contact an education advisor for more information.

Course Transfer Credit:

For information about receiving transfer credit for courses taken at other BC institutions, please see <http://www.bctransferguide.ca>. All requests for course transfer credit from institutions in BC or elsewhere should go to the College of the Rockies Enrollment Services office.

Textbook 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.

Miller, Gary, Beasley, Jeffery and Hymers, Jonathan. Laboratory Manual to accompany Electronic Communications: A Systems Approach

Please see the instructor's syllabus or check COTR's online text calculator <https://textbook.cotr.bc.ca/> for a complete list of the currently required textbooks.

Learning Outcomes:

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

- working in decibels in communications;
- describe Information, bandwidth, noise and noise designation;
- identify and analyze: amplitude modulation, double-sideband AM, Suppressed carrier and single-sideband AM;
- identify and analyze: angle modulation, frequency modulation in the time domain, FM in the frequency domain, phase modulation and noise suppression;
- analyze and implement in specific cases: amplifiers, oscillators, frequency-selective circuits, mixing and multiplication circuits, phase-locked loop and frequency synthesis;
- analyze: AM transmitter systems, AM transmitter measurements, SSB transmitters, FM transmitters and stereo FM;
- analyze: receiver characteristics (sensitivity & selectivity), tuned radio-frequency receiver, superheterodyne receivers, direct conversion receivers, demodulation & detectors, stereo demodulation, receiver noise sensitivity, dynamic range relationships, automatic gain control and Squelch;
- analyze: digital communications, pulse modulation and multiplexing, sample rate and Nyquist frequency and pulse-code modulation; and
- analyze: digital modulation techniques, bandwidth considerations of modulated Signals, M-ary modulation techniques, spectral efficiency, noise performance, and filtering, complex exponential signals and wideband modulation.

Course Topics:

- Frequency Spectrum
- Noise
- RF Transmission Spectral Characteristics
- Channel Bandwidth
- Modulation/Demodulation
- Frequency Synthesizers
- Phase Locked Loop Circuits (PPL)
- Angle Modulation (FM and PM) Schemes
- Analog and Digital FM Modulation
- Commercial FM
- DSP Analog
- Spread Spectrum Techniques

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

Evaluation and Assessments

Assessment Type: On-Campus (face-to-face) and Online, or Hybrid

Assessment Type	% of Total Grade
Lab Test 1	10%
Lab Test 2	10%
Lab Test 3	10%
Assignments	10%
Exam 1	30%
Exam 2	30%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

Pass requirements: None

Evaluation Notes: A grade of “D” grants credit, but may not be sufficient as a prerequisite for sequential courses.

Evaluation Notes Comments:

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 Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a “0” on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at <https://cotr.bc.ca/about-us/college-policies/> and include the following:

- Policy 2.4.3 Students with Documented Disabilities
- Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)

- Policy 2.5.8 Academic Performance
 - Policy 2.5.3 Grade Appeal
 - Policy 2.4.9 Student Concerns Re Faculty
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Equivalent Course(s) and Course Code Changes

Prior Course Code: AUST 201

Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.