

Submit original with signatures + 1 copy + electronic copy to Faculty Senate (Box 7500).  
 See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/> for  
 a complete description of the rules governing curriculum & course changes.

**TRIAL COURSE OR NEW COURSE PROPOSAL**

**SUBMITTED BY:**

<b>Department</b>	Aviation Maintenance AFPM	<b>College/School</b>	UAF / Community and Technical College
<b>Prepared by</b>	Roger Weggel	<b>Phone</b>	907-455-2847
<b>Email Contact</b>	<a href="mailto:rfweggel@alaska.edu">rfweggel@alaska.edu</a>	<b>Faculty Contact</b>	Roger Weggel

1. **ACTION DESIRED**  
 (CHECK ONE):      Trial Course       New Course

2. **COURSE IDENTIFICATION:**      Dept       Course #       No. of Credits

Justify upper/lower division status & number of credits:

**Lower Division (200) Course with 100 level course prerequisites**

3. **PROPOSED COURSE TITLE:** **Advanced FCC Amateur and General Radiotelephone Operator (GROL) Licensing**

4. **To be CROSS LISTED?** YES/NO       If yes, Dept:       Course #   
 (Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. **To be STACKED?** YES/NO       If yes, Dept:       Course #

6. **FREQUENCY OF OFFERING:** **Spring or as Demand Warrants**  
 Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) - or As Demand Warrants

7. **SEMESTER & YEAR OF FIRST OFFERING** (AY2011-12 if approved by 3/1/2012; otherwise AY2012-13) **Spring 2013**

**8. COURSE FORMAT:**

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

**COURSE FORMAT:** (check all that apply)       1       2       3       4       5       6 weeks to full semester

**OTHER FORMAT** (specify)

Mode of delivery (specify lecture, field trips, labs, etc)

**Lecture, instructor demonstrations, student demonstrations, audio/video, field trip**

9. **CONTACT HOURS PER WEEK:**       LECTURE hours/weeks       LAB hours /week       PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/guidelines-for-computing-/> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title, credits, credit distribution, cross-listings and/or stacking (50 words or less if possible):

ELT F211 Advanced FCC Amateur and General Radiotelephone Operator (GROL) Licensing  
3 Credits Offered Spring or As Demand Warrants  
Advanced FCC Amateur and General Radiotelephone Operator Licensing is a course for students who wish to pursue the understanding of high frequency AC electrical theory and design, and to study the operation of HF, VHF, UHF, and Radar equipment. Also, to acquire the knowledge to successfully pass the General Radiotelephone Operator License or Amateur Extra License test. (3+0)

11. COURSE CLASSIFICATIONS: Undergraduate courses only. Consult with CLA Curriculum Council to apply S or H classification appropriately; otherwise leave fields blank.

H = Humanities  S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? If YES, attach form.

YES:  NO:

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6  W = Writing Intensive, Format 7  Natural Science, Format 8

12. COURSE REPEATABILITY:

Is this course repeatable for credit?

YES  NO

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

Completion of this class will allow the student to qualify to take either of the two licensing exams. Although the homework and final project, and study time will be spent focusing on one of the two licensing exams. The students, who took the trial course AC Electronics and FCC Licensing F293, would have liked to take the same class again to concentrate the other license.

How many times may the course be repeated for credit?

TIMES

If the course can be repeated for credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

13. GRADING SYSTEM: Specify only one. Note: Later changing the grading system for a course constitutes a Major Course Change.

LETTER:  PASS/FAIL:

**RESTRICTIONS ON ENROLLMENT (if any)**

**14. PREREQUISITES**

ELT F111 or equivalent, DEVM F 105, and one of the following, a position in a technical, electrical, or broadcast media fields; or departmental approval. AFPM students must have AFPM departmental permission.

These will be required before the student is allowed to enroll in the course.

**15. SPECIAL RESTRICTIONS, CONDITIONS**

**Must be able to physically work in areas of radio frequency and magnet field emissions.**

**16. PROPOSED COURSE FEES**

**\$70.00, the special fee assessed to all AFPM courses. This course will originally be taught through the AFPM Department, using AFPM resources. Currently listed in the catalog, " A \$70.00 fee for state-of-the-art equipment, instructional aids and supplies will be assessed for every AFPM class. This fee is in addition to fees listed".**

Has a memo been submitted through your dean to the Provost for fee approval?

Yes/No  No

**17. PREVIOUS HISTORY**

Has the course been offered as special topics or trial course previously?

Yes/No  Yes

If yes, give semester, year, course #, etc.:

Spring 2009 under ELT F293 AC  
Electronics and FCC Licensing

**18. ESTIMATED IMPACT**

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

Will be using existing classroom space and reference material. As enrollment increases the program will be required to purchase additional classroom demonstration equipment.

**19. LIBRARY COLLECTIONS**

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No  Yes

**The aviation maintenance library has the required material.**

**20. IMPACTS ON PROGRAMS/DEPTS**

What programs/departments will be affected by this proposed action? Include information on the Programs/Departments contacted (e.g., email, memo)

**AFPM Aviation Maintenance Technology and ELT Electronics Technology.**

**The special topics course ELT F293 and ELT F111 are taught in the Aviation Department, primarily for the aviation students. Although students in other fields are more than welcome and do attend. The course has an ELT course number instead of an AFPM number primarily because the Federal Aviation Administration**

**21. POSITIVE AND NEGATIVE IMPACTS**

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

**This course will extend the career training options of students who have completed the certificate in**

Aviation Maintenance, allowing for expanded career opportunities in the avionics and flight control systems field, and extend the course options who are interested in electronics technology. The FCC licenses increase the employability of the students.

**JUSTIFICATION FOR ACTION REQUESTED**

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

**This course was initiated by the Aviation Maintenance facility and contract employees from the Eielson Air Force Base.  
No similar course is offered in the UAF system.**

**APPROVALS: Add additional signature lines as needed.**

*(As per attached.)*

	Date	
Signature, Chair, Program/Department of:		

	Date	
Signature, Chair, College/School Curriculum Council for:		

	Date	
Signature, Dean, College/School of:		

	Date	
Signature of Provost (if applicable)		

**Offerings above the level of approved programs must be approved in advance by the Provost.**

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

	Date	
Signature, Chair Faculty Senate Review Committee:		
___ Curriculum Review		___ GAAC
___ Core Review		___ SADAC

APPROVALS: Add additional signature lines as needed.

<i>Roger Wegel</i>	Date	1 Feb. 2012
Signature, Chair, Program/Department of:	Aviation and Trade Technologies	

<i>[Signature]</i>	Date	4-12-12
Signature, Chair, College/School Curriculum Council for:	CTC	

<i>[Signature]</i>	Date	4/12/12
Signature, Dean, College/School of:	CTC-RCO	

	Date	
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Signature of Provost (if applicable)

Offerings above the level of approved programs must be approved in advance by the Provost.

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

	Date	
--	------	--

Signature, Chair

Faculty Senate Review Committee:  Curriculum Review  GAAC

Core Review  SADAC

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

	Date	
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Signature, Chair,  
Program/Department of:

	Date	
--	------	--

Signature, Chair, College/School Curriculum  
Council for:

	Date	
--	------	--

Signature, Dean, College/School  
of:

ATTACH COMPLETE SYLLABUS (as part of this application). Note: The guidelines are online:  
<http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/uaf-syllabus-requirements/>

The Faculty Senate curriculum committees will review the syllabus to ensure that each of the i listed below are included. If items are missing or unclear, the proposed course (or changes to may be denied.

#### SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

##### 1. Course information:

Title,  number,  credits,  prerequisites,  location,  meeting time (make sure that contact hours are in line with credits).

##### 2. Instructor (and if applicable, Teaching Assistant) information:

Name,  office location,  office hours,  telephone,  email address.

##### 3. Course readings/materials:

Course textbook title,  author,  edition/publisher.

Supplementary readings (indicate whether  required or  recommended) and

any supplies required.

##### 4. Course description:

Content of the course and how it fits into the broader curriculum;

Expected proficiencies required to undertake the course, if applicable.

Inclusion of catalog description is strongly recommended, and

Description in syllabus must be consistent with catalog course description.

##### 5. Course Goals (general), and (see #6)

##### 6. Student Learning Outcomes (more specific)

##### 7. Instructional methods:

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

##### 8. Course calendar:

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

##### 9. Course policies:

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

##### 10. Evaluation:

Specify how students will be evaluated,  what factors will be included,  their relative value, and  how they will be tabulated into grades (on a curve, absolute scores, etc.)

Publicize UAF regulations with regard to the grades of "C" and below as applicable to this course. (Not required in the syllabus, but may be a convenient way to publicize this.) Faculty Senate Meeting #171:

<http://www.uaf.edu/uafgov/faculty-senate/meetings/2010-2011-meetings/#171>

##### 11. Support Services:

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

##### 12. Disabilities Services:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials.

State that you will work with the Office of Disabilities Services (208 WHITAKER BLDG, 474-5655) to provide reasonable accommodation to students with disabilities.

6/30/2011

# Course Syllabus

## University of Alaska Fairbanks Campus

**Term:** Spring 2013

**Course Title:** Advanced FCC Amateur and General Radiotelephone Operator (GROL) Licensing

**Department and Number:** ELT 211

**Credits:** 3.0 credits

**Prerequisites:** ELT F111 or equivalent, 100 Level Math, and one of the following, 30 credits of technology classes, full time job in a technical, electrical or broadcast media field; or departmental approval. AFPM students must possess an A&P certificate or have departmental permission.

**Dates/ Times:** TBA Spring 13 Week Semester

Thursday 6:15 PM to 9:15 PM and one four hour Saturday class TBA

For a total of 40 hours

**Instructor:** Eric Nichols

**Office Hours:** 5:30 PM – 6:00 PM Rm. 202 Hutchison

**Location:** UAF/CTC Fairbanks, Hutchison Rm. 202

**Text Books:** “The ARRL Handbook for Radio Amateurs”, current edition

Publisher: The American Radio Relay League, Inc.

“General Radio Telephone Operator License Plus”, by Gordon West, current edition

Publisher: Master Publishing, Inc.

“ARRL Extra License Manual”, current edition

Publisher “The American Radio Relay League, Inc.

“Avionics: Systems and Troubleshooting, A Practical Guide of Non-Traditional Avionics”

by T.K. Eismín Publisher: AVOTEK ISBN 0-9708109-1-1

**Supplies:** OSHA approved safety glasses

### Course Description:

**ELT F211 Advanced FCC Amateur and General Radiotelephone Operator (GROL) Licensing**

**3 Credits Offered Spring or As Demand Warrants**

Advanced FCC Amateur and General Radiotelephone Operator Licensing is a course for advanced students who wish to pursue the understanding of high frequency AC electrical theory and design, to study the operation of HF, VHF, UHF, and Radar equipment. Also, to acquire the knowledge to successfully pass the General Radiotelephone Operator License or Amateur Extra License test. Students interested in the course are required to have a good understanding of math and be involved in the electrical field. Radio frequency transmitting, receiving, and test equipment are used in this class. Students must be able to work in the area of operating electro-magnetic equipment. (3+0)

**Course Goals:**

1. Upon successful completion of the course the student should have the theoretical knowledge to pass the FCC General Radiotelephone Operator Test with the Radar Endorsement or an Amateur Extra Class License
2. Understand and follow RF safety procedures and regulations
3. Design RF filtering systems
4. Design transmission lines
5. Design antennas for specific frequencies, and directions
6. Understand and describe the basic sections of transmitters and receivers
7. Design and calculate AC circuits
8. Operate test equipment designed for radio work.
9. Install, operate, and trouble shoot radio systems.
10. Operate within the Federal Regulations, both FAA and FCC

**Student Learning Outcomes:**

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

1. Describe the history of governmental radio regulation
2. Explain global maritime distress and safety systems
3. Explain the procedures for grounding radio systems
4. Explain the requirements and methods of lightning protection
5. Explain the FCC RF exposure regulations and methods of compliance
6. Explain and calculate DC Ohms Law, in series and parallel circuits
7. Explain and calculate AC Ohms Law, reactance circuits, capacitance circuits, and inductance circuits
8. Explain Q Factor
9. Design and calculate resonant circuits
10. Describe inductive circuits and transformers
11. Calculate exponential functions
12. Design directional antennas, with required gain effects and null areas
13. Understand the Doppler effect
14. Describe the operation of ground, ship, and air born radar
15. Use advanced measuring and calibrating equipment
16. Describe the FCC regulations required for safe and legal transmitter operation
17. Research FAA regulations for aircraft communications equipment

**Instructional Methods:** Lecture, Demonstration, and Audio-Video Conferencing



## **Course Calendar:**

- Week 1:**                    **FCC Commercial and Amateur License Overview**
1. Grading policy for obtaining licenses
  2. Introduction to ARRL Handbook, GROL Plus textbook, and other study materials.
  3. Overview of Student / Class project
  4. Radio Frequency safety and regulations
  5. FAA and FCC Regulations
- Week 2:**                    **Review of Electronics**
1. Ohm's Law DC and AC
  2. Inverse Functions Conductance, Susceptance, Admittance
  3. Basic and advanced test equipment
  4. Schematics
- Week 3:**                    **AC and RF Electronics**
1. RC Time Constant
  2. Transformers
  3. RF Safety and Interference Issues
- Week 4:**                    **Advanced Electrical Math**
1. Pythagorean Theorem
  2. The Imaginary Number and Complex Systems
  3. Trigonometry and Advanced Programmable Calculating
  4. Frequency and Period
  5. The Decibel
- Week 5:**                    **ELI the ICE Man**
1. Reactance
  2. Impedance
  3. Resonance
  4. Transformers
  5. Smith Chart
- Week 6:**                    **Active Devices**
1. Diodes
  2. Transistors
  3. Amplification
  4. Power and Decibel Measurement

**Week 7. Receiver and Transmitter Sections**

1. Tuners
2. RF Amplifier
3. Mixers
4. Oscillators
5. IF Filter
6. IF Amplifier
7. Demodulator

**Week 8.**

8. AF Amplifier
9. Amplitude Modulator
10. RF Oscillator
11. RF Output Amplifier
12. Coupling transformers

**Week 9. Transmission Systems**

1. Transmission line types
2. Transmission line losses
3. Transmission line design
4. Transmission line connections and testing

**Week 10. Antenna Systems**

1. Antenna types
2. Antenna gain and loss
3. Antenna modeling
4. Antenna trouble shooting
5. Antenna radiation patterns

**Week 11. Radar Theory and Practices**

1. Pulse, Continuous – Wave, and Doppler Radar operation
2. Radar safety and installation requirements
3. Radar frequency transmission lines and design

**Week 12. Technical Writing**

1. Writing for amateur publications
2. Writing for professional publications
3. Legal and quality control reports

**Week 13. Student Project Presentations**

**Field Day. Field Operation**

1. Transmitting and Receiving equipment installation 2 hrs.
2. Antenna Installation 1 hr.
3. Remote transmitters and receivers 1 hr.

Note: Travel not included in class time, students are responsible for their own travel.

Aviation student's independent homework: Review maintenance, repair, alteration, and record keeping requirements for aircraft of the current Title 14 Code of Federal Regulations.

**Course Policies:**

1. Students are required to follow the University's Code of Conduct and Student Behavior Standards in accordance with the board of regent's policies. See the UAF 20011-2012 Catalog page 50 and 51, or current UAF Course Catalog.
2. The instructor has the right to exclude a student from the class who does not follow or appears to be incapable of following class rules, school policies, and safety rules.
3. Attendance is mandatory for obtaining the goals and learning outcomes.
4. Arriving late for class without permission from the instructor will constitute an absence from class.
5. Late assignments and missed class time are not acceptable, and can not be made up.
6. Computers, recording, receiving, and transmission devices are not allowed to be used in class, without the instructor's permission.
7. Eating will not be allowed in the classroom, drinks must be in sealable containers.
8. Back packs and cases are to be stored in a common area during class.
9. The instructor has the right to amend the class content as they feel needed.
10. You must provide you own transportation to the Field Day activities.

**Evaluation:**

1. Class, Lecture and Demonstration 70% of Final Grade  
Includes an evaluation of homework, class work sheets, and participation in discussion and other class activities  
Exams and Quizzes 10% of Final Grade  
Project (Final Exam) 20% of Final Grade
2. 3 percentage points will be deducted from the final class grade for each unexcused absence and each violation of a course policy. The instructor will set the rules for absences on the first day of class.
3. 10 points will be added to the final grade, of Evaluation #1, if any class of Amateur Radio or Commercial FCC License is obtained during class, provided the earned grade from class activities and attendance is within the passing range.

**Grading Scale:**

90% to 100%	A
80% to 90%	B
70% to 80%	C
60% to 70%	D
Below 60%	F

UAF regulations have specific policies regarding a "C" grade. Refer to Faculty Senate Meeting # 171 at <http://www.uaf.edu/uafgov/faculty-senate/meeting/2010-2011-meetings/#171> for information.

### **UAF Disability Services for Distance Students**

- a. UAF has a Disability Services office that operates in conjunction with the College of Rural and Community Development campuses and UAF's Center for Distance Education (CDE). Disability Services, a part of UAF's Center for Health and Counseling, provides academic accommodations to enrolled students who are identified as being eligible for these services.
- b. If you believe you are eligible, please visit <http://www.uaf.edu/chc/disability.html> on the web or contact a student affairs staff person at your nearest local campus. You can also contact Disability Services on the Fairbanks Campus at (907) 474-7043, [fydso@uaf.edu](mailto:fydso@uaf.edu)