

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	Construction Trades Technology	College/School	CRCD/ Interior-Aleutians Campus
Prepared by	Bryan Uher	Phone	474-2613
Email Contact	bmuher@alaska.edu	Faculty Contact	Mario Gho

1. ACTION DESIRED
(CHECK ONE):

Trial Course	<input type="checkbox"/>	New Course	<input checked="" type="checkbox"/>
--------------	--------------------------	------------	-------------------------------------

2. COURSE IDENTIFICATION:

Dept	CTT	Course #	160	No. of Credits	5
------	------------	----------	------------	----------------	----------

Justify upper/lower division status & number of credits: Course presents the introductory level of information and design for alternative energy generation. Course is delivered for individuals with basic familiarity with construction and energy generation. 75 contact hours over 15 days.

3. PROPOSED COURSE TITLE Photovoltaic Systems-Part 1

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

5. STACKED? YES/NO No If yes, Dept. Course #

6. FREQUENCY OF OFFERING: As Demand Warrants
(Every or Alternate) Fall, Spring, Summer — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved) Fall 2011

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 one)	<input type="checkbox"/>	1	<input type="checkbox"/>	2	<input checked="" type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>	6 weeks to full semester
OTHER FORMAT (specify)	Intensive											
Mode of delivery (specify lecture, field trips, labs, etc)	Lecture, lab											

9. CONTACT HOURS PER WEEK:

55Hr.	LECTURE hours/weeks	20Hrs.	LAB hours/week	<input type="checkbox"/>	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/cd/credits.html> for more information on number of credits.

OTHER HOURS (specify type) 75 Hours over 15 days

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

CTT 160 – Photovoltaic Systems - Part I
5 Credits Credit distribution is (4+2); approved at the Jan. 4, '11 Curriculum Review meeting. Provost approved 1/6/2011.
 This course is a practical introduction to electric power generation through photovoltaic cells. During this course the student will build a solar panel to understand its operation, installation and maintenance.

11. COURSE CLASSIFICATIONS (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities N = Natural Science S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? 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).

How many times may the course be repeated for credit? TIMES

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:

LETTER: PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES CTT 106: Construction Mathematics or approval from instructor

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

RECOMMENDED None

Classes, etc. that student is strongly encouraged to complete prior to this course.

15. SPECIAL RESTRICTIONS, CONDITIONS None

16. PROPOSED COURSE FEES N/A

Has a memo been submitted through your dean to the Provost & VCAS for fee approval? Yes/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 2010, CTT 193

18. ESTIMATED IMPACT

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

None

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (ffklj@uaf.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 No additional supplies or resources needed

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)

CRCD Construction Trades Technology Program

21. POSITIVE AND NEGATIVE IMPACTS

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

Increase in student numbers and credit hours. May provide additional students transition into the CRCD Construction Trades Technology degree programs. Should not adversely impact other courses or programs.

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 has been requested by multiple Tribal governments and organizations to give the residents of rural Alaska an alternative to fossil fuels. The course was piloted Spring 2010 in Fort Yukon to an overwhelmingly positive response. This course is part 1 of a 2 part course offering in photovoltaic systems and is the foundation of an Occupational Endorsement in Alternative Energy (currently under development).

APPROVALS

	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, UAF Faculty Senate Curriculum Review Committee		

Found 1 OTT 160

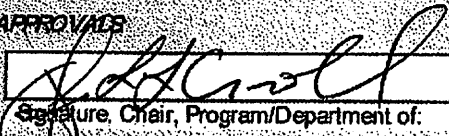
Increase in student numbers and credit hours. May provide additional students transition into the CRCO Construction Trades Technology degree programs. Should not adversely impact other courses or programs.


JUSTIFICATION FOR ACTION REQUESTED

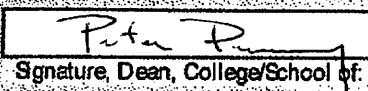
The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory.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

This course has been requested by multiple Tribal governments and organizations to give the residents of rural Alaska an alternative to fossil fuels. The course was piloted Spring 2010 in Fort Yukon to an overwhelmingly positive response. This course is part 1 of a 2 part course offering in photovoltaic systems and is the foundation of an Occupational Endorsement in Alternative Energy (currently under development).

APPROVALS



 Date 10/8/10
Signature, Chair, Program/Department of: Indigenous, Community and Tribal Programs

 Date 10/8/10
Signature, Chair, College/School Curriculum Council for: CRCO

 Date 12/9/10
Signature, Dean, College/School of: CCOS

Signature of Provost (if applicable) Date

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, UAF Faculty Senate Curriculum Review Committee

Increase in student numbers and credit hours. May provide additional students transition into the CRCD Construction Trades Technology degree programs. Should not adversely impact other courses or programs.

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 has been requested by multiple Tribal governments and organizations to give the residents of rural Alaska an alternative to fossil fuels. The course was piloted Spring 2010 in Fort Yukon to an overwhelmingly positive response. This course is part 1 of a 2 part course offering in photovoltaic systems and is the foundation of an Occupational Endorsement in Alternative Energy (currently under development).

APPROVALS

Signature, Chair, Program/Department of: _____ Date _____

Andre R. Scuse Date 10/8/10
Signature, Chair, College/School Curriculum Council for: CRCD

Signature, Dean, College/School of: _____ Date _____

Signature of Provost (if applicable) _____ Date _____

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

Signature, Chair, UAF Faculty Senate Curriculum Review Committee _____ Date _____

ATTACH COMPLETE SYLLABUS (as part of this application).

Note: syllabus must follow the guidelines discussed in the Faculty Senate Guide <http://www.uaf.edu/uafgov/faculty/cd/syllabus.html>. The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will 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 Student Learning Outcomes (more specific)

6. 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.).

7. 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.

8. Course policies:

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

9. 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.)

10. Support Services:

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

11. 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 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities."

UNIVERSITY OF ALASKA FAIRBANKS

College of Rural and Community Development

Construction Trades Technology

Spring 2010

Interior – Aleutians Campus

Harper Building, P.O. Box 756720 Fairbanks, Alaska 99775-6720

COURSE SYLLABUS

Course Title:	Photovoltaic Systems – Part 1
Course No:	CTT 160
Credits:	5
Prerequisites:	CTT 106 or permission from instructor
Instructor:	Mario Gho Assistant Professor Construction Trades Technology
Phone:	(907) 322-8049
Address:	PO Box 756720 Fairbanks, AK 99775-6720
Email:	mgho1@alaska.edu
Office Hours:	Instructor will post office hours for students during the first class session.
Location:	TBD
Dates:	20XX
Times:	10 am to 4 pm Monday through Friday
Course Textbook:	<i>Photovoltaic Systems</i> , American Technical Publishers and National Joint Apprenticeship and Training Committee for the Electrical Industry, 2007 (ISBN 978-0-8269-1287-9)
Supplemental Readings:	Recommended course handouts related to topic, including Electrical Safety Student Manual by US Department of Health and Human Services..
Supplies:	Photovoltaic cells, tabbing wire, cell batteries, resistors, multi-meters, encapsulating material, electric wire, wire connectors, batteries and controllers.

Course Description:

This course is a practical introduction to electric power generation through photovoltaic cells. During this course the student will build a solar panel to understand its operation, installation and maintenance.

Course Goals:

To familiarize students with the operation and maintenance of simple photovoltaic power systems. The students will also be able to design and operate a simple stand-alone PV system.

Instructional Methods:

Instructional method will be a combination of face-to-face instruction/lecture, small group discussions, and construction and assembly of photovoltaic panels. Classroom environment consists of work tables/desks; overhead projector/LCD projector; wipe boards; TV/VCR; standard instructional equipment dealing with power tools and testing instruments.

Student Learning Outcomes:

Upon completion of the course students should be able to:

Students should be able to:	Evaluated by:
1. Compare advantages and disadvantages of installing PV systems. Describe different types of solar energy technologies that utilize solar radiation.	Written tests and group discussions
2. Determine the factors that affect solar radiation.	Readings, group discussions, and written tests.
3. Evaluate site feasibility for photovoltaic system and planning for its installation.	Readings and relevant group activities
4. Describe the components forming stand-alone and grid-tied photovoltaic systems and their functions.	Readings, group discussions, and group presentations.
5. Describe the operation of photovoltaic cells; determine configuration of modules and arrays	Written tests, class discussions and class demonstrations.
6. Describe battery principles and differentiate between battery types and systems.	Readings, class discussions and practical applications.
7. Explain the function of charge controllers	Written tests and class discussions
8. Assemble a simple photovoltaic system	Practical application.

Course Evaluation:

A letter grade will be issued for participants who successfully complete the course.

% of Total	Grade
91 to 100%	A letter grade
81 to 90%	B letter grade
71 to 80%	C letter grade
60 to 70%	D letter grade
59% and below	F letter grade

Total points for the course will be assigned and weighted based on the following:

Attendance/ Participation	10%
Homework.....	20%
Demonstration of Skill Mastery.....	30%
Exams/Test.....	40%

Attendance/Participation (10%) means the student is in class, has read the required material, and is actively participating in the classroom session.

Homework (20%) means getting prepared for future classes by reading ahead in text and filling out handouts/worksheets. This can be done individually or as a group.

Return Demonstration (30%) means under the observation of the instructor, the students will demonstrate safety methods of handling electrical systems and circuits.

Exam (40%) is the evaluation tool the instructor will use to determine final mastery of a skill. A test will be issued after completion of each unit; an average of these tests forms the weighted test points.

Course Policies:

1. Students are expected to arrive ready to actively participate in class discussion and activities.
2. Attendance is mandatory; students must be on time and prepared for the course material.
3. Late assignments are not accepted without prior approval of instructor.
4. The instructor reserves the right to amend this course outline as needed.

Support Services:

The instructor is available by appointment for additional assistance outside normal session/class hours. Time and place will be announced at the beginning of class.

UAF Disabilities Services for Distance Students:

UAF has a Disability Services office that operates in conjunction with the College of Rural and Community Development (CRCDD) 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.

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.

Tentative Course Calendar:

Day of Activity	Activity
Day 1	<ul style="list-style-type: none">• Introduction of students, instructor, syllabus, community needs, evaluation process, reading material, and proper handling of special tools.• Class discussion on alternative energy systems• Introduction of hand-out reading - Safety• Discussion of OSHA function and requirements
Day 2	<ul style="list-style-type: none">• Test on Safety section• Class discussion on electrical characteristics, conductors, insulators.• Class discussion on voltage, current and resistance and their relation to Ohm's law.• Class demonstration on use of multimeters.
Day 3	<ul style="list-style-type: none">• Test on Ohm's Law• Student exercises on voltage, current and resistance.• Introduction of power concepts and relation with current, voltage and resistance.• Discussion on reading electric bills.
Day 4	<ul style="list-style-type: none">• Test on Ohm's Law• Discussion on parallel and series circuits.• Class assignment – Chapter 1 of PV textbook
Day 5	<ul style="list-style-type: none">• Test on parallel and series circuits• Class discussion – PV applications• Class discussion – advantages and disadvantages of PV systems
Day 6	<ul style="list-style-type: none">• Test on chapter 1 – Introduction to Photovoltaic Systems• View video on construction of solar cells and solar panels• Student activity – Design of a PV panel• Student activity – Assemble PV cells into panel, assemble diode.
Day 7	<ul style="list-style-type: none">• Student Activity – Perform continuity test on panel. Calibrate voltage and current output under existing solar conditions.• Student Activity – student encapsulates PV cells

Day 8	<ul style="list-style-type: none"> • Class discussion – Chapter 2, solar radiation, sun-earth relationship • Class discussion – solar radiation data sets • Class assignment – read chapter 3 of textbook
Day 9	<ul style="list-style-type: none"> • Test on Chapter 2 – Solar Radiation • Class discussion – Chapter 3, site surveying, shading assessment, sun path calculations • Class discussion – PV array location
Day 10	<ul style="list-style-type: none"> • Test on Chapter 3 – Site Surveys and Preplanning • Class discussion – Chapter 4, PV system components and configurations • Class discussion – Modules and arrays, energy storage, power conditioning systems, balance-of-system components • Class discussion – on-grid and off-grid systems • Field trip to existing PV installation
Day 11	<ul style="list-style-type: none"> • Test on Chapter 4 – System Components and Configurations • Discussion on Chapter 5, photovoltaic cell characteristics and operation. • Discussion on PV panels, cells and diodes • Class discussion - maintenance requirements of solar panels.
Day 12	<ul style="list-style-type: none"> • Test on Chapter 5 – Cells, Modules and Arrays • Discussion of Chapter 6, battery types, properties and limitation • Discussion of battery operation and maintenance. • Student Activity – assemble batteries in parallel and in series.
Day 13	<ul style="list-style-type: none"> • Test on Chapter 6 – Batteries • Student Activity – Calculate voltage, current and power of battery assemblies. Measure actual results. • Demonstration of proper battery grounding. • Student Activity – perform an energy survey in their own residence practice array sizing and battery bank sizing
Day 14	<ul style="list-style-type: none"> • Discussion of Chapter 7, battery controllers. • Student Activity – assemble photovoltaic panel, control and battery. • Student Activity – Calculate voltage, current and power of battery assemblies. Measure actual results. • Student activity - Assemble light and PV system.
Day 15	<ul style="list-style-type: none"> • Test on Chapter 7 – Charge Controllers • Student reports on PV system components and operation.

