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

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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 X 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 X 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?
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: X PASS/FAIL:
RESTRICTIONS ON ENROLLMENT (if any)
14. PREREQUISITES CTT 160: Photovoltaic Systems Part I or approval from instructor
These will be <i>required</i> 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 FIES 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 No
If yes, give semester, year, course #, etc.:
18. ESTIMATED IMPACT WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES' SPACE, FACULTY, ETC.
WHAT IIIII ACI, II AIVI, WILL IIIIGHAVE ON BODGEI, IAGIBHEAG ACE, IACCELI, EIC.
None
19. LIBRARY COLLECTIONS
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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 CRO	CD
Construction Trades Technology degree programs. Should not adversely impact other courses or	
programs.	

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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

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APPROVALS:				
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Sgnature, 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 progr	ams must be a	pproved in ad		the Provost.
ALL SIGNATURES MUST BE OBTAINED PRICE	OR TO SUBMI	SSION TO TH	HEGOVI	ENANCE OFFICE
			Date	
Signature, Chair, UAF Faculty Senate Curric	culum Review	Committee		

format 1 CTT 161

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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. Part One of the course was piloted Spring 2010 in Fort Yukon to an overwhelmingly positive response. This course is part 2 of a 2 part course offering in Alternative Energy and is the foundation of an Occupational Endorsement in Alternative Energy (currently under development).

Signature, Chair, Program/Department of: Tradicesons, Com	Date	10,1	8/10 bul Fro	549
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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 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 department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included.

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):

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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 <i>strongly</i> 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 Worl 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.)
1(O. Support Services:
	☐ Describe the student support services such as tutoring (local and/or regional) appropriate for the course.
11	1. 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 2

Course No: CTT 161

Credits: 5

Prerequisites: CTT 160 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: Photovoltaic Systems, 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. **Supplies:** Photovoltaic panels, batteries, controllers, inverters.

Course Description:

This course is a practical introduction to electric power generation through photovoltaic cells. During this course the student will learn to design and install a photovoltaic system integrated with a residential electrical system.

Course Goals:

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

Instructional Methods:

Instructional method will be a combination of face-to-face instruction/lecture, small group discussions, and assembly of photovoltaic systems. 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:

Stude	nts should be able to:	Evaluated by:
1.	Explain the basic types of inverters used	Written tests and group
	in PV systems.	discussions
2.	Determine the system energy and power	Group discussion and group
	requirements from a load analysis.	presentation.
3.	Explain the primary factors that affect PV	Written tests and group
	system sizing.	discussions.
4.	Describe the methods used to install PV	Readings, group discussions, and
	arrays on buildings or other structures.	written tests.
5.	Identify the electrical codes and practices	Written tests and class discussions.
	applicable to PV systems.	
6.	Describe how interconnected PV systems	Class discussions and
	can affect utility operations.	presentations.
7.	Identify the applicable NEC requirements	Written tests and class discussions
	for both general electrical system	
	requirements and specific PV system	
	requirements.	
8.	Troubleshoot PV systems based on a	Group discussion and
	logical process.	demonstration.

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.	

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 (CRCD) 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	 Introduction of syllabus, community needs, evaluation process, reading material, and proper handling of special tools. Class discussion on personal experiences with PV systems. Review of Ohm's Law Introduction to Chapter 8 - Inverters
Day 2	 Introduction to waveform characteristics Class discussion on AC, phase balance, power factor Discussion on stand-alone inverters, utility-interactive inverters and bimodal inverters Review inverter features and specifications; define utilization and limitations
Day 3	 Test on Chapter 8 – Inverters Discussion on system sizing methods. Work on sizing calculations for interactive systems Work on sizing calculations for stand-alone and interactive systems.
Day 4	 Resolve exercise problems on battery bank sizing. Discuss array sizing and configuration. Resolve exercise problems.
Day 5	 Test on Chapter 9 – System Sizing Discussion on various array mounting systems. Discussion on galvanic corrosion prevention methods Discussion on attachment methods and weather sealing
Day 6	 Test on Chapter 10 – Mechanical Integration Student activity – install PV panels
Day 7	Student activity – install inverter, BOS
Day 8	 Introduction to the National Electric Code Class discussion on conductors and wiring methods
Day 9	 Class discussion of NEC Article 690. Class discussion on equipment disconnects and grounding requirements.
Day 10	 Test on NEC 690 and on grounding requirements Class discussion on codes and standards for utility interconnection Student research on interconnection differences of rotating generators and inverters
Day 11	Class discussion on labeling requirements for PV systems and components

Day 12	 Test on Chapter 11 – Electrical Integration
	 Discussion and development of an inspection checklist
	 Class discussion on commissioning PV systems
Day 13	 Test on Chapter 14 – Commissioning, Maintenance and
	Troubleshooting
	 Class discussion on PV system maintenance procedures
	 Class activity – perform maintenance on PV panels
	 Class activity – perform maintenance functions on battery
Day 14	Class discussion on system monitoring
	 Class exercises on troubleshooting PV systems
	 Class discussion and development of a troubleshooting guide
Day 15	 Test on Chapter 15 – Economic Analysis
	 Class discussion on incentive options for alternative energy systems
	 Discussion on how present and future costs are calculated
	 Class discussion whether a PV system can pay back its value
	compared to alternative energy sources.