

2014-2015 SHORT SIGNATURE SHEET



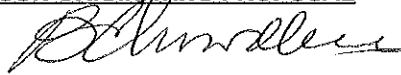
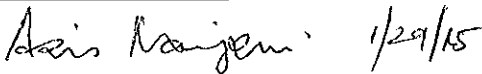


UNC CHARLOTTE

Date: 1-2-15

Subject: New course proposal for ECGR 4171

Originating Department: Electrical and Computer Engineering

TYPE OF PROPOSAL: UNDERGRADUATE _____ GRADUATE _____ UNDERGRADUATE & GRADUATE X
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE FORWARDED	COMMENTS: APPROVED, APPROVED WITH REVISIONS, ETC.	SIGNATURES
			PERSON ORIGINATING PROPOSAL  [print name here:] <u>BADRUL CHOWDHURY</u>
		Approved	DEPARTMENT CHAIR  1/29/15 [print name here:] <u>ASIS NASIPURI</u>
		Approved	COLLEGE CURRICULUM COMMITTEE CHAIR [print name here:]
	2/2/15	Approved	COLLEGE DEAN  [print name here:]
		Approved	GENERAL EDUCATION (if applicable; for General Education courses only) [print name here:]
		Approved	UNDERGRADUATE COURSE & CURRICULUM COMMITTEE CHAIR (for undergraduate courses only)  2-24-15
		Approved	GRADUATE COUNCIL CHAIR (for graduate courses only)
			FACULTY GOVERNANCE ASSISTANT (received and processed in Academic Affairs)



UNC CHARLOTTE

SHORT FORM COURSE AND CURRICULUM PROPOSAL

*To: Dr. Mehdi Miri

From: Badrul H. Chowdhury, ECE

Date: 1/2/15

Re: New course proposal for ECGR 4171

The Short Form is used for minor curriculum changes. Minor changes may include:

- Changes to course numbering (note: must follow Course Numbering Policy)
- Editorial changes to current catalog copy
- Individual new courses (undergraduate only)
- Other small changes that have limited to no impact on other departments or units

Submission of this Short Form indicates review and assessment of the proposed curriculum changes at the department and collegiate level either separately or as part of ongoing assessment efforts.

*Proposals for undergraduate courses should be sent to the Undergraduate Course and Curriculum Committee Chair. Proposals related to both undergraduate and graduate courses, (e.g., courses co-listed at both levels) must be sent to both the Undergraduate Course and Curriculum Committee and the Graduate Council.

SUMMARY: State clearly and concisely the proposed changes. Please give a brief statement as to why the change is being proposed.

The Electrical and Computer Engineering Department proposes to add a new course, ECGR 4171: Introduction to Energy Systems. In recent years, there has been a tremendous interest in all forms of energy.

Revised 11/20/13
OAA/mjw

Its past use, the conversion process, its environmental impact, and its future are all important considerations as we position ourselves for a low-carbon economy. This course counts as one of the electives for the undergraduate Power and Energy Concentration in the ECE Department. After taking this course, students can take more advanced courses in electric power and energy. This will be a 3 credit class.

FOR CONSULTATION WITH OTHER DEPARTMENTS:

1. Does the proposed change affect other departments (including additions and/or changes to degree requirements or prerequisites offered in other departments)?

_____ Yes No

2. If Yes, please list the other departments affected by the proposed change:

3. Have you consulted with each department listed in item 2 regarding the proposed change?

_____ Yes _____ No

Result(s) of Consultation(s) (please attach documentation):

For a new course or for major modification of an existing course, include Consultation on Library Holdings.

RESOURCES:

1. For a new course or revisions to an existing course, check all the statements that apply:

This course will be cross listed with another course.

There are prerequisites for this course.

_____ There are co-requisites for this course.

_____ This course is repeatable for credit.

_____ This course will affect the number of credits hours for its program.

_____ This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.

_____ This proposal will alter an agreement with a North Carolina community college.

For all items checked above, applicable statements and content must be reflected in the proposed catalog copy.

2. Indicate the additional resources required, if any, to implement and maintain the proposed change. NONE

CREDIT HOUR (Mandatory if new and/or revised course in proposal): 3

Review statement and check box once completed.

- The appropriate faculty committee has reviewed the course outline/syllabus and has determined that the assignments are sufficient to meet the University definition of a credit hour.

PROPOSED CATALOG COPY: For existing courses copy and paste the current catalog copy and use the Microsoft Word "track changes" feature (or use red text with "strikethrough" formatting for text to be deleted, and adding blue text with "underline" formatting for text to be added). For new courses, draft comprehensive catalog copy.

ECGR 4171. Introduction to Energy Systems. (3) Prerequisite: PHYS 2101. Overview of energy systems: energy types, generation, conversion, storage, transportation/transmission, and utilization. Principles, physical structure, processes, and utilization of fossil fuel, nuclear, and renewables for transportation, thermal, and electrical energy generation are discussed along with associated performance metrics. The course also provides an introduction to environmental impacts of energy production, life-cycle analysis, energy efficiency concepts and metrics, transmission systems, grid reliability, and the impact of smart grid technologies. All topics are presented in the context of industry standards as well as federal and state regulations.

ACADEMIC PLAN OF STUDY (UNDERGRADUATE ONLY): Does the proposed change impact an existing Academic Plan of Study?

- Yes. If yes, please provide updated Academic Plan of Study in template format.
 No.

STUDENT LEARNING OUTCOMES (UNDERGRADUATE & GRADUATE): Does this course or curricular change require a change in SLOs or assessment for the degree program?

- Yes. If yes, please provide updated SLOs in template format.
 No.

TEXTBOOK COSTS: It is the policy of the Board of Governors to reduce textbook costs for students whenever possible. Have electronic textbooks, textbook rentals, or the buyback program been considered and adopted?

- Yes. Briefly explain below.
 No. Briefly explain below.

The textbook currently in use, or being considered for adoption in the near future are all much lower cost options than the average college textbook. If an electronic version of an adopted text is available at the library, it will be given as an option to students.

IMPORTANT NOTE: A Microsoft Word version of the final course and curriculum proposal should be sent to facultygovernance@uncc.edu upon approval by the Undergraduate Course and Curriculum Committee and/or Graduate Council chair.

The University of North Carolina at Charlotte
The William States Lee College of Engineering

ECGR 4090/ECGR 5090/SEGR 4961/EMGT 5961 Introduction to Energy Systems

Course Description:

Overview of energy systems: energy types, generation, conversion, storage, transportation/transmission, and utilization. Principles, physical structure, processes, and utilization of fossil fuel, nuclear, and renewables for transportation, thermal, and electrical energy generation are discussed along with associated performance metrics. The course also provides an introduction to environmental impacts of energy production, life-cycle analysis, energy efficiency concepts and metrics, transmission systems, grid reliability, and the impact of smart grid technologies. All topics are presented in the context of industry standards as well as federal and state regulations.

Instructor: Prof. Badrul H Chowdhury

Phone: (704) 687-1960

Fax: (704) 687-5588

E-mail: b.chowdhury@uncc.edu

Office: EPIC 1162 **Office Hours:** M and Tu: 11 am – noon

Prerequisite: Physics I, or consent of the instructor.

Required Textbook

Energy Systems Engineering: Evaluation and Implementation, 2nd Edition, by Francis Vanek, Louis, D. Albright, Largus Angenent, McGraw-Hill, 2012.

Reference Textbooks

1. Energy and the Environment, 2nd Edition, by Robert A. Ristinen, Jack P. Kraushaar, December 2005, Wiley & Sons.
2. Alternative Energy Resources: The Quest for Sustainable Energy, by Paul Kruger, March 2006, Wiley & Sons.
3. Sustainable Energy: Choosing Among Options, by J. W. Tester, E. M. Drake, M. W. Golay, M. J. Driscoll, and W. A. Peters, 2005, MIT Press, Cambridge, MA.

Supplementary Materials: Lecture notes will be provided through Moodle.

Learning Objectives:

After completing the course, the students will be able to

1. Have a working knowledge of the various forms of energy usage and their impact
2. Understand energy systems design from an engineering perspective
3. Understand life cycle economics of energy systems
4. Understand how systems design is changing the way we generate, convert, deliver and use energy.
5. Understand how policies can impact the use of energy.
6. Make a presentation of a technical report on a current issue related to energy systems.

Course Contents & Tentative Schedule

	Topic	Lectures
1	Introduction to Energy Systems; sustainability; power vs. energy; units of energy; performance metrics;	1.5
2	Historical development of energy sources; energy resources summary	0.5

3	Energy utilization (electricity, transportation, heat, etc.); statistics	0.5
4	Physics refresher: thermal cycles; electrical equations, basic circuits, AC & DC power, generators and loads	1.5
5	Conventional/fossil-based energy sources and turbines – principles, structures, processes, and emissions/waste	1
6	Alternative energy sources (fuel cell technologies, advanced engines, dish/Stirling engines, etc.) – principles, structures, processes, and emissions/waste	2
7	Renewable energy sources (solar photovoltaics, solar thermal, CSP, wind, biomass, geothermal, ocean, tide, etc.) – principles, structures, and processes	2
8	Electrical transmission systems and how they work: power flows, balancing, reliability and quality, ancillary services	2
9	Energy storage technologies: principles, performance, applications, and hurdles	1
10	Energy use in transportation; propulsion systems; well-to-wheel analysis	1
11	Nuclear energy and its future	0.5
13	Environmental impact of energy production, transportation, and utilization; climate change; solutions for decarbonization	1

Course Policies, Requirements and Assessment:

1. **Exams:** There will be two exams during the semester. There will be no final exam. In lieu of the exam, you will have to turn in a term paper and present your findings in front of the class. Exams will most likely be take home exams unless otherwise announced. You may bring a calculator to tests.
2. **Absences:** Regular, on-time attendance is a requirement for on-campus students. Students are allowed one absence without penalty. All other absences, including missed absences for work and minor illnesses, will result in a lower attendance score. A student whose religion requires that (s)he miss class for a religious observance must fill out a "Request for Religious Observances" form and submit it prior to the census date for that semester to receive an excused absence for that event. The University's inclement weather number is 704-786-2877.
3. **Excused absence:** A medical certificate will be required to make up a test because of absence from a test due to illness. For absences from tests or quizzes because of plant trips, you will need to provide some documentation or proof, 24 hours in advance, that you will be going on a plant trip. Usually a travel itinerary from the company or a copy of the ticket is sufficient.
4. **Homework** is due in class on the second class period after the assigned date unless otherwise announced. For some assignments, students will be working in groups, but Individual Assignments should be completed independently. Students who plagiarize from other sources or hand in assignments identical to or copied from others (except for assignments submitted as a group) will be violating scholastic honesty regulations and will not receive credit and will be subject to university's procedures and policies! You must submit all work in class before class begins on the date the homework is due. If you wish to submit your work early, you may certainly do so in person. On occasion, you will be allowed to upload your homework to Moodle. In those cases, you must name you file '**HW#_Lastname_Firstname**' where # is replaced by the assignment number, Lastname and Firstname are your last and first names. You must also scan into a pdf document before uploading the assignment.
5. **Term project:** Students will work individually, or in teams on an applied or theoretical project topic related to energy systems. Each team will write a proposal and a final report and present their work. Specific interests of students related to their job or research work will also be taken into account.
6. Graduate and undergraduate sections will be taught jointly, but obtaining graduate credit will require additional assignments on the homework, project, and exams.
7. I will try my best to return all graded homework/quizzes/tests in a timely manner.
8. If you wish to discuss the grade received on homework/tests, you will have 4 weeks from the date of the homework submission or the date of the test to do so. After that, no change will be made on the grade. You will have a full semester after the date of the final exam to ask to see the final. However, the review must be done in person.
9. You are encouraged to visit with me during office hours. If you have a conflict with my posted hours, please call for an appointment. Email exchanges are always encouraged.

Moodle Environment

This course includes a significant and required use of the Moodle on-line environment. You must be able to access course materials and announcements on-line. You can login to Moodle here: <https://moodle2.uncc.edu/login/index.php>

Email

You *must* be reachable via your UNC Charlotte email account. All course communication will be directed to you at your UNC Charlotte email address. If you primarily use a different email account, then you should forward your email to your primary account.

Diversity

The William Lee States College of Engineering strive to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

Academic Honesty

You are required to complete 100% of your own work in this class (including making a full contribution to the team project). Cheating violates the UNC Charlotte Code of Academic Integrity and may result in course failure, suspension, and/or expulsion. For more information see the following: <http://integrity.uncc.edu/>

Disability and Impairment Accommodation

If you require course adaptations or accommodations because of a disability, or if you have emergency medical information about which we should be informed, please speak with us as soon as possible. Students who require such accommodations must work with the Office of Disability Services (704-687-4355).

Special Instructions for On-line Students

- (1) This class is offered as both an on-campus face-to-face delivery and an online version. Online students don't have to be present in class to take this course if they sign up for the online section. Each lecture will be recorded using Panopto software. The software is maintained by Classroom Support. All students (both on-campus and on-line) will be able to watch the recording on Moodle shortly after the lecture ends.
- (2) For *online students*, it is expected that they will watch the lecture on the day the lecture is recorded. However, if that's not possible, they should finish watching the lecture by the specific deadline provided on the Moodle course link. They are expected to answer short quiz-type questions based on each lecture every week. The link for these questions will remain active only for a limited time. This activity will count as attendance.
- (3) Online students will not be required to do a presentation; however, a project report will be required.
- (4) For on-line students, the exams and homework submission are handled via Moodle. The exams are emailed to all distance students at a pre-set of the exam day. Moodle will not accept submissions past a specific time. Homework submissions work in a similar fashion - students have to upload their scanned homework to Moodle by the submission deadline. You must name your file as '**HW#_Lastname_Firstname**' or '**Exam#_Lastname_Firstname**' where # is replaced by the assignment number, Lastname and Firstname are your last and first names. You must also scan into a pdf document before uploading the assignment.
- (5) Graduate and undergraduate sections will be taught jointly, but obtaining graduate credit will require additional assignments on the homework, project, and exams.

Grading Policy:

Exam I	20%
Exam II	20%
Term Project and Presentation	25%
Homework	20%
Attendance and Participation	15%