UNIVERSITY OF KENTUCKY

# New Course Report

12/9/2016 12:03:10 PM

## 1. General Information

1a. Submitted by the College of: ENGINEERING

Date Submitted: 11/23/2015

1b. Department/Division: Electrical and Computer Engineering

1c. Contact Person

Name: Lawrence Holloway

Email: holloway@uky.edu

Phone: 859-323-8523

Responsible Faculty ID (if different from Contact)

Name: Jeff Seay

Email: jeffrey.seay@uky.edu

Phone: (270) 534-3299

1d. Requested Effective Date: Semester following approval

1e. Should this course be a UK Core Course? No

## 2. Designation and Description of Proposed Course

2a. Will this course also be offered through Distance Learning?: Yes [4]

2b. Prefix and Number: EGR 549

2c. Full Title: Power and Energy Experiences

2d. Transcript Title: Power and Energy Experiences

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 1

COLLOQUIUM: 1

OTHER: 2

OTHEREXPLAIN: Technical visits to energy sites. Visits include industry presentations, listed as "Colloquium" hours.

2g. Grading System: Letter (A, B, C, etc.)

2h. Number of credit hours: 3

2i. Is this course repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester?

2j. Course Description for Bulletin: This course will provide unique experiences through visits to a variety of energy-related sites and presentations from topical experts. The course begins with preparations through readings, videos, and assignments. The course then has a week-long tour of selected energy related sites, which may include: pumped storage site, coal mine, coal- and gas-fired and nuclear power plants, power operations center, wind farm, hydroelectric generation, landfill gas site, smart grid demonstration center, solar farm, high efficiency building, etc. in the region. More than simply tours, these visits include presentations by industry technical personnel. Students prepare for these visits in advance through preliminary assignments, and students then do a written summary and reflection journal on these visits afterwards. This Course may not be used to satisfy degree requirements if credit is earned in EGR 649.

2k. Prerequisites, if any: EGR240 or EGR542 or EGR546, or consent of the instructor. Due to the nature of this class, enrollment is limited. Students pursuing either the Undergraduate Certificate or Graduate Certificate in Power and Energy may be given preference in enrollment.

2l. Supplementary Teaching Component:

3. Will this course taught off campus? Yes

If YES, enter the off campus address: This course consists of a period of distance learning followed by an immersive week-long visit to energy sites.

4. Frequency of Course Offering: Summer,

Will the course be offered every year?: Yes

If No, explain:

5. Are facilities and personnel necessary for the proposed new course available?: Yes

If No, explain:

6. What enrollment (per section per semester) may reasonably be expected?: 22

7. Anticipated Student Demand

Will this course serve students primarily within the degree program?: No

Will it be of interest to a significant number of students outside the degree pgm?: Yes

If Yes, explain: This course will primarily be of interest to students in engineering, and in particular to students pursuing the (Graduate or Undergraduate) Certificate in Power and Energy.

8. Check the category most applicable to this course: Not Yet Found in Many (or Any) Other Universities ,

If No, explain:

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program?: No

If YES, name the proposed new program:

b. Will this course be a new requirement for ANY program?: No

If YES, list affected programs:

10. Information to be Placed on Syllabus.

a. Is the course 400G or 500?: Yes

b. The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from **10.a** above) are attached: Yes

## Distance Learning Form

Instructor Name: Jeffrey Seay

Instructor Email: jeffrey.seay@uky.edu

Internet/Web-based: Yes

Interactive Video: No

Hybrid: Yes

1.How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations? Course will utilize Canvas for interaction with students. Syllabus complies will University Senate Syllabus Guidelines.

2.How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc. This is not a traditional course, and so is as well suited for online offering as for traditional classroom. The online learning portion is assignments and preparatory material prior to an experience-based learning program. These assignments and preparatory material is equally well suited to either on-line or class-room delivery.

3.How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc. The academic integrity policy based on the template provided by the Senate is clearly stated in the course syllabus. All course material is posted and submitted through the password protected Canvas website, and plagiarism checks will be utilized.

4.Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above? No.

If yes, which percentage, and which program(s)? This is an elective course. If a student chooses to take this course, it would represent less than 3% of his/her academic coursework. This course will be taken primarily by students in engineering undergraduate and graduate programs. None of these programs are heavily DL.

5.How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting? The syllabus provides information to contact student services including disability resources services.

6.How do course requirements ensure that students make appropriate use of learning resources? The course assignments in canvas will include appropriate learning resource articles or links to articles. For assignments where students must do independent searches for material, guidance will be provided regarding appropriate source sites, either generally available on the internet or through online UK library resources.

7.Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program. For the online portion of the course, no access to on-campus laboratories, facilities, or equipment is needed. For the concentrated experiential portion of the course, transportation will be provided to industrial sites off campus.

8.How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (http://www.uky.edu/UKIT/)? The syllabus includes information on access to Canvas and access to UKIT (email, web, and phone). In addition, the instructor will be available via email and phone to assist in resolving any technical difficulties.

9.Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology. The course will include videos and readings available through Canvas. Video recordings will be either already available recordings on the web (industrial documentaries, for example), or produced by the instructors using desktop tools such as voice-over-powerpoint. (Meeting software such as Adobe Connect may be used, if needed.) However, infrastructure from DLP and ATP such as Echo360 classrooms will not be used.

10.Does the syllabus contain all the required components? YES

11.I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name: Jeffrey R. Seay

# Syllabus
# University of Kentucky EGR 549

[Note to curriculum committees: This proposed course is a modification of the existing EGR649 course, which is only open to graduate students. This EGR549 course will be open to graduate and undergraduate students.)

## Power and Energy Experiences
## Summer I 2015

**Instructor:** *Dr. Jeffrey Seay,* (270) 534-3299, Rm. 211 Crounse Hall, Paducah Extended Campus. The best way to get in contact with me is by email – jeffrey.seay@uky.edu. I regularly check my e-mail even while traveling, so you can always get me that way.

**Course Meeting Schedule:**
This course is taught during the Summer I term. The course is a blend of distance learning and an immersive experience, and will not require any classroom facilities on the University of Kentucky campus. (A detailed course meeting schedule is listed at the end of the syllabus.)

**Pre-visit online content prior to May 18.**
During the week of May 11, students will be assigned readings, videos, and preparatory assignments. This will be done via distance learning methods (Canvas and emails). The class will not meet in person during this period.

**Immersive Class Experience: May 18 (Monday) through May 22 (Friday)** (with required orientation the afternoon of Sunday May 17).
The class will visit energy sites via a charted bus. **The class will depart campus on the morning of Monday May 18 and not return to campus until Friday May 22.** Overnight stays are covered as a part of the program during this period. More details on the schedule of the immersive experience schedule and the covered expenses are given later in this document.

**Post-visit assignment:**
Students will be required to journal regarding the industry visits. The journal will be due to be submitted during the week after the intensive week.

**Prerequisites:** EGR240 or EGR542 or EGR546, or consent of the instructor. Due to the nature of this class, enrollment is limited. Students pursuing either the Undergraduate Certificate or Graduate Certificate in Power and Energy may be given preference in enrollment.

This course is open to both graduate students and undergraduate students. However, it is encouraged for graduate students to take EGR649 instead.

**Expected Outcomes:** A student who has successfully completed this course should be able to:
1) Describe conventional and renewable electrical generation sources
2) Describe electrical distribution systems
3) Describe methods of controlling electrical power generation, distribution and storage
4) Describe the policies and techniques of how and when electricity is generated, distributed, used and sold.

**Course Description:** This course will provide unique experiences through visits to a variety of energy-related sites and presentations from topical experts. The course begins with preparations through readings, videos, and assignments. The course then has a week-long tour of selected energy related sites, which may include: pumped storage site, coal mine, coal- and gas-fired and nuclear power plants, power operations center, wind farm, hydroelectric generation, landfill gas site, smart grid demonstration center, solar farm, high efficiency building, etc. in the region. More than simply tours, these visits include presentations by industry technical personnel. Students prepare for these visits in advance through preliminary assignments, and students then do a written summary and reflection journal on these visits afterwards. This Course may not be used to satisfy degree requirements if credit is earned in EGR 649.

The Experiences class is a signature course for the Graduate Certificate in Power and Energy, and is an optional course for the Undergraduate Certificate in Power and Energy. It is intended to provide students with unique exposure to industry personnel and facilities. The course is intended to be multipurpose: in addition to providing a special perspective on power and energy learning content covered over the preliminary material of this class and pre-requisite courses, the visits will also provide another communication channel between students, industry and teaching faculty.

**Course Structure:** This course learning experience consists of two closely related parts: preliminary content, and site visits.

- The preliminary content part consists readings and videos intended to give the students background content to prepare them for effective site visits. This content is assessed through papers and quizzes. (See grading information below.)
- The site visit part consists of the technical tours of the power and energy sites, including presentations from site engineers and operators. This content is assessed through a journal. (See grading information below.) These dates of site visits will be known prior to the start of the course. Students should ensure that they do not have any schedule conflicts with these scheduled dates prior to enrolling in the course.

**Grading Scale:**

- Graduate Students: 40% Class attendance, 10% class participation/questions, 35% Papers and Quizzes, 15% Journal
- Undergraduate Students: 50% Class attendance and participation, 40% Papers and Quizzes, 10% Journal.

The class participation grade will be evaluated based upon interaction of the student with the presenters – asking questions, talking with them about the technologies they are using, what they are looking for in students, issues they are facing, future trends, etc. This is to be done during the pre-tour briefing sessions and the post tour Q&A sessions. "Good" participation (equivalent to participation grade of "A") for a student is approximately one or more appropriate questions or interactions per tour. "Satisfactory" participation (equivalent to participation grade of "B") for a student is approximately an appropriate question or interaction by that student in two thirds of the tours.

Grading scale for undergraduates:
90 – 100% = A
80-89% = B
70-79% = C
60-69% = D
<60 = E

Grading scale for graduate students (no D for Grad Students):
90-100% = A
80 – 89% = B
70-79% = C
<70 = E

Differentiation of Graduate Student grading and Undergraduate Student grading is outlined in specific sections below.

**Excused absences:**
S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor. Each of these types of excused absences will be excused for the "preliminary content" section of the course, since that content is done individually by the student through readings and videos. Students may be asked to verify their absences in order for them to be considered excused.

However, for the site visit portion of the course, absences are more difficult. It is not possible to makeup or reschedule a facility visit for which a student was absent, so absences will be considered excused only for extraordinary circumstances. Unscheduled absences, such as due to student illness or illness or death of a family member will be excused on a case by case basis. A special assignment which is based upon the facility tour which was missed will be assigned for approved absences.

Students should not enroll in the course if they expect any absences during the site visit portion of the course. The dates of the site visit portion of the course will be known prior to the start of the course. Given that the site visits are done in a condensed week-long period using chartered transportation away from the Lexington area, students should not participate if there are planned absences due to University-related trips or major religious holidays. Absences that were or could have been known prior to the start of the course will not be excused, as the student should not have enrolled in the course under that circumstance.

Students may be asked to verify their unexpected absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness, or death in the family.

**Safety Equipment:**
Personal safety is of utmost importance. Each student will be given a set of personal protection equipment ("PPE", consisting of hard hat, safety glasses, and hearing protection) and it shall be worn on all visits. A student may not participate in a visit if they do not bring their PPE and this will be counted as an unexcused absence. You are responsible for keeping and maintaining this equipment that is assigned to you. If it gets lost it is your responsibility to replace. The hard hat is to be returned upon completion of the course.
Long pants and closed-toe shoes with leather or rubber soles will be required to be worn on each visit. Many sites require considerable walking and climbing of stairs. Therefore comfortable clothing and footwear are required. If there are any health issues which might affect the student's performance this should be relayed to the instructor at the start of the class.
Specific safety announcements or training may be required before participating in certain tours. If a student feels unsafe or is uncomfortable for their security at any time they should relay this to the instructor or tour leader. There shall be no penalty for identifying these situations nor for not participating due to such things as concern for their safety, health mobility issues, or claustrophobia.

**Release of Personal Information:**
It is expected that a security clearance will have to be obtained in order to visit some of the facilities such as military bases or federal facilities. On previous visits this required releasing to the security personnel at the facility the student's social security number and/or passport information prior to the visit and the presentation of a government issued ID and/or passport during the visit. While all attempts will be made to keep this personal information secure, it should be recognized that this is beyond the university's control. If a student does not wish to release this information, they cannot go on the visit and it will be treated as an unexcused absence.

**Pre-visit Assignments:** Reading assignments or videos will be provided prior to the visits. A short paper (3 pages minimum for graduate students and 2 pages minimum for undergraduates) or a quiz on the readings or video content will be required before the start of each tour. These assignments and the background material will be made available at least 1 week prior to the start of the site visits.

**Post-visit Journal Assignment:** A journal entry for each tour must be completed and submitted on Canvas. The journal is to include a description of what was seen and how it works. It should include drawings, sketches and/or pictures. Submittal of any pictures in a visit journal indicates the ownership of, and approval and transfer of further publication rights to the University of Kentucky. At times Powerpoint presentations may be made at a site and those will be made available to the students if possible; however it should not be expected that these presentations will be available and therefore sufficient notes should be taken for preparation of the journal. The journal shall be single space text, 11pt Arial or equivalent font, with 1" margins on all sides. Undergraduate student journal entries should be 2 pages per site visit at a minimum. Graduate student journal entries should be 3 pages per site visit at a minimum. Appropriate use of references is required. Figures, pictures and drawings should be included at the end and not embedded in the text. These do not count as part of the required page length.

The use of any material not specifically developed by the author must be referenced according to the style manual of your professional organization (e.g. IEEE, ASME, etc). Quotation marks must be used for material quoted. Plagiarism will not be accepted and can cause the paper to be given zero credit. References including URLs must be complete and be specific enough that the material be able to be found by using only the URL given. The reference for any figures should be included with the figure title.

It is expected that the journal be free of grammatical errors. These will not be corrected and may lead to a zero credit for the journal in which case it may not be submitted for re-grading. It is strongly suggested that the eStudio or other campus service be used as a resource if assistance is needed in the suitable writing of the journal.

**Text:**
There is no required textbook for this course. All required and suggested reading material will be posted on Canvas.

**Final Exam:**
There will be no final exam. The completed journal must be uploaded to Canvas at the start of the scheduled final exam time or before.

**Mid-term Grade (for undergraduates in EGR549 course)**
Mid-term grades will be posted in myUK as per the requirements shown in the Academic Calendar (http://www.uky.edu/registrar/content/academic-calendar)

**Cell Phone Use:**
Cell phones must be turned off and stowed during the on-site part of the tours. They may not be used for any reason, including texting during this time. Phone usage is permitted during travel time.

**Academic Integrity, Cheating and Plagiarism:**
Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Senate Rules 6.3.1 (see http://www.uky.edu/Faculty/Senate/ for the current set of Senate Rules) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work, which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone.

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content, and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas, which are so generally and freely circulated as to be a part of the public domain.

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

**Student Interaction:**
Communication: Communication between instructor and student during the online portion of this course will be via email or virtual office meetings (link to be provided). The most suitable time for regular meetings via Adobe Connect will be established at the beginning of the term.

E-mail: UK email addresses will be used. Students must activate e-mail forwarding if they prefer another primary e-mail address.

Canvas Access: Canvas will be used to communicate course content, announcements, exam grades, etc. To access UK's Canvas go to https://uk.instructure.com/.

Technical Support: Students experiencing difficulty with delivery of the course material should contact the instructor or the UK help desk (http://www.uky.edu/ukat/help, 859-218-4357, or 218help@uky.edu). .

Audio-conferencing:
There are several options for the audio connection – use the one indicated by the instructor

a. Direct phone line (recommended if only person-to-person conversation)
b. Web-audio within Adobe connect. After logging in, push "TALK" when you wish to speak.

Information on Distance Learning Library Services (http://www.uky.edu/Libraries/DLLS)

- Carla Cantagallo, DL Librarian
- Local phone number: 859 257-0500, ext. 2171; long-distance phone number: (800) 828-0439 (option #6)
- Email: dllservice@email.uky.edu
- DL Interlibrary Loan Service: http://www.uky.edu/Libraries/libpage.php?lweb_id=253&llib_id=16

**Accommodations due to disability**
If you have a documented disability that requires academic accommodations, please contact the instructor prior to the course. In order to receive accommodations in this course, you must provide a Letter of Accommodation from the Disability Resource Center (DRC). The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754 and via email at drc@uky.edu. Their web address is http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/.
Note that this course visits industrial sites which may not be easily accessible for people with some disabilities. Early notice of your disability is important in order for us to determine what may be possible for the sites visited.

**Prior to going on the tour:**
Prior to the start of the first tour, submit a page which gives information about yourself. This should be uploaded to Canvas. This should include a picture of yourself, your name, a description of your background (where you are from, education, major, etc), why you want to take this course, and what you want to learn in it.

**Tours:**
In Summer 2016, the course visits are scheduled during a very concentrated single week, with a departure early on Monday morning and a return very late on Friday evening. Transportation is provided via a chartered bus, and hotel accommodations are provided for Monday through Thursday night.

[Note to curriculum committees: in past years the visits were planned for regular Fridays over a semester, but this meant that students were not able to enroll in other classes that met on Friday. In Summer 2015, the course was planned for all visits to occur during a single week. In past years and in Summer 2015, the cost of the chartered bus and the student hotel expenses was covered through grant funding. In future offerings, the cost may be covered through program fees, much like international programs cover housing and transportation.]

We will be visiting the following types of sites during the week-long travel portion of the course:

Energy Generation Facilities:

- Coal Fired Steam Generation:
- Supercritical Coal Fired Boiler
- Open Cycle Dual-fuel Turbine (gas/oil turbine)
- Nuclear plant (steam generation) (Under construction)
- Landfill Gas Turbine
- Low-Head Hydroelectric Plant
- Large-Scale Pumped Water Storage□
- Large-Scale Wind Farm
- Photovoltaic Site: a campus facility with rooftop solar power.
- Shale-gas fracking

Pollution Prevention and/or Control Facilities

- Coal gas scrubber
- Ash pond

Electrical Control, Distribution and Use

- Smart-Grid demonstration
- Electrical system control and dispatch center
- Large military complex energy management and control center
- Geothermal district heating and cooling system
- Net-zero-energy house

Electrical Equipment Manufacturing

- Distribution transformer manufacturing

## Details on the Pre-Visit Assignments

1 week before the start of the site visits, background material on each site will be made available on Canvas. This background material includes videos and reading material describing the technology to be observed at each site. Students must write a paper describing the background for the technology and their expectations for the site visit. The assignments must be completed prior to the site visit.

## Detailed schedule of the immersive site-visit portion of the course

The class will visit energy sites via a charted bus. **The class will depart campus on the morning of Monday May 18 and not return to campus until Friday May 22.** Overnight stays are covered as a part of the program during this period.

***Sunday May 17:***

Kickoff meeting to be held at the Lexington hotel site. This will include safety training, establishment of expectations, and overview of the week.

***Monday May 18:***

• Start at UK campus, and also pickup at student hotel.
• Bluegrass Energy (Nicholasville KY): Power substation and distribution site
• Ft. Knox (Elizabethtown, KY): Solar, net-zero facility, CHP, geothermal district heating/cooling
• Overnight in Louisville, KY

***Tuesday May 19:***

• Falls of the Ohio (Louisville, KY): Hydroelectric
• Trimble Power Plant (Trimble County, KY)
• Overnight in Indiana

***Wednesday May 20:***

• Wind Farm in Chalmers, Indiana
• [Overnight near Cincinnati]

***Thursday May 21:***

- Duke Envision Center (Erlanger Kentucky)
- EKPC Bavarian Landfill Gas Power (Walton, Kentucky)
- [Overnight near Knoxville, Tennessee]

***Friday May 22:***

- TVA: Raccoon Mountain Pumped Storage facility (near Chattanooga)
- TVA: Bellefonte Nuclear plant (near Chattanooga):
- [Return to Lexington]

## Details on the Post-Visit Journal Assignments

Each student is required to submit a journal based on the site visit. These journal assignments, as previously described should focus on the student's impressions of the visit and how the visit met with their expectations. These journal assignments must be turned in via canvas within 1 week of the completion of the site visits.