

PROCESS A NON-GENERAL EDUCATION - CURRICULUM PROPOSAL

SCC #02-03-

403 (R)

Deadlines:

Regular proposals: October 18, 2002 to be implemented Fall 2003; Short-Term proposals: December 6, 2002 to be implemented Fall 2003
Regular proposals: February 14, 2003 to be implemented Spring 2004; March 21, 2003 short-term courses to be implemented Spring 2004

PROPOSAL TITLE: Power System Engineering (0909.408)

Sponsor(s): Peter Mark Jansson E-Mail: jansson@rowan.edu Ext: 5373
E-Mail: _____ Ext: _____
E-Mail: _____ Ext: _____
E-Mail: _____ Ext: _____

DEPARTMENT: Electrical Eng.

COLLEGE: _____

If Liberal Arts & Sciences CHECK : History/Humanities Math/Sciences Social/Behavioral Sciences

UNDERGRADUATE GRADUATE

THE ATTACHED NON-GEN-ED PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED.

- New non-gen-ed course
- Short-term non-gen-ed course
- Minor curricular changes (fewer than three)
- Existing non-gen-ed course
- Non-gen-ed degree requirements
- Major
- Minor, specialization, concentration, track, certificate program

The following signatures REPRESENT APPROVAL

Department Chair: [Signature] Date: 14 FEB 2003

Department Curriculum Chair: [Signature] Date: 14 FEBRUARY 2003

Academic Dean: [Signature] Date: 2/14/03

College Curriculum Chair: [Signature] Date: 5/5/03

College Curriculum Committee OPEN HEARING Date: 4/10/03 Approved Not Approved

UNIVERSITY CURRICULUM COMMITTEE

Senate Curriculum Chair Signature: [Signature] Date: 6/10/2003

Comments: _____
EXECUTIVE VICE PRESIDENT/PROVOST Signature: [Signature] Date: 7/25/03

Approved - Not Approved due to the following: _____ Student Cr Hrs _____ Faculty Load Hrs _____ Equalized Cr Hrs

7/30/03

OFFICE OF THE PROVOST

Registrar Signature: [Signature]

JUL 28 2003

ROWAN UNIVERSITY

REGISTRAR

Date Received & Approved ~ Hegis Taxonomy & Course #: 0909408

7/30/03

NO INFORMATION FORWARD

Academic Dean _____ Department Chair _____ Registrar _____ Sponsor(s) _____

SCC#02-03-403

Course Proposal

1. Details:

- | | |
|---|--|
| a) Course Title: | Power System Engineering |
| b) Sponsor: | Suggested Hegis Number - 0909.408
Peter Mark Jansson and Electrical
Engineering Curriculum Committee |
| c) Credit Hours: | 3 credit hours |
| d) Course Level: | Upper Level |
| e) Curricular Effect: | Elective course for electrical engineering
majors |
| f) Prerequisites: | 0909.202 and 0909.302 |
| g) Suggested Time/
Scale of Implementation | Offered Every Other Year Beginning Spring
2004 - One section |
| h) Resources | No new faculty will be required, laboratory
equipment will be obtained consistent with
Engineering School multi-year budget.
Library acquisitions will be required. |

2. Rationale:

The proposed course is a revision to part of the Engineering Curriculum Proposal approved by the College Senate in December, 1994. The proposed course is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February, 1995.

The electric power system is one of the most pervasive technologies of modern society. It forms the backbone infrastructure of industrialized civilizations and represents one of the major technological achievements of our age. The efficient and effective operation of this dynamic and complex system requires the ongoing attention of many engineers and technicians. Recent migration away from teaching the fundamentals of power system engineering in many modern ECE curricula has led to a reduction in the number of modern engineers that are adept to design, maintain and operate this critical infrastructure. This course will introduce engineering students to electrical system components, methods of system operation and management and provide hands-on experience in the field of electric power generation, transmission, transformation and distribution. New technologies, cogeneration systems and back-up power systems will all be presented and the theory of operation and necessary mathematical analysis will be understood.

3. Essence of the Course:

a) Objectives:

The proposed course has a number of objectives, by the end of this course, the student should –

- have a firm understanding of how the electric power system is designed, constructed and operated
- have experienced first hand (via tours, visits, models and lab work) what it would be like to work in, design, maintain and operate an actual power system
- understand the technology options for providing electricity to society and the features of energy use
- know the theoretical basis for the design and operation of the electric power grid

b) Topical Outline:

This foundational course in the engineering, design, construction, operation and key theoretical principles of modern electric power systems (generation, transmission, substations, distribution and end-use) will include such topics as:

History and Key Inventions in the Development of the Electric Power Industry

Mechanical and Electromagnetic Fundamentals

Three Phase Circuits and Transformers

AC Machinery Fundamentals

Synchronous Machines and Induction Motors

DC Machines

Transmission Lines

Introduction to Power Flow

System Reliability - Relay and Control Engineering

Power Generation Fuels (Fossil, Nuclear, Solar, Geothermal and Tidal)

Advanced Generation Technologies

Utility Industry Organization and Deregulation

End-Use Devices, Systems and Efficiency

Sustainable Designs for Electric Power

c) Evaluation and Grading Procedures:

Student grades will be based on projects, examinations, homework, field trips and analyses, reports and written and oral technical communication.

d) Course Evaluation:

The proposed course will be evaluated based on student evaluations and critical review by engineering faculty.

Texts:

Electric Machinery and Power System Fundamentals - Stephen J. Chapman,
McGraw Hill 2002

4. Results of Consultations: Letters of Support and Library Resources form
are attached

a) Consulted Departments: Chemistry & Physics and Mechanical Engineering

b) Consultants and Consultant Statements:

Physics Consultant: Dr. Jeff Hettinger - Professor
and Dr. Eduardo V. Flores, Chair of Department

Mechanical Engineering Consultant:
Dr. H. Clay Gabler - Associate Professor

c) Written Consultations: see attachments

5. Additional Supporting Information: N/A

Rowan University
LIBRARY RESOURCES
 to

SUPPORT A NEW COURSE or NEW PROGRAM PROPOSAL

The purpose of this form is to provide a channel of communication between the library and faculty designing new courses/programs. The information will be used to assess the resources available in the library, and to identify resources the library should acquire to support the course/program. The information will also provide rationale for institutional support for library acquisitions

This form should be completed in a coordinated effort between the course sponsor(s) and the academic department liaison librarian.

- The sponsor(s) complete parts A & D
 If assistance is required to complete parts A & D, please notify the liaison librarian.
- Forward this form to the librarian who will complete parts B, C, & E

This form must be completed and attached to the original curriculum proposal before being approved by the Senate Curriculum Committee

A. College Engineering Department Electrical and Computer Engineering
 Proposed by: Peter Mark Jansson Date: 14 April 2003
 Course Title: Power System Engineering
 Anticipated Date for Course/Program Offering: Spring 2004

- B. Describe the resources available in the library to support this course/program, including reference, monographic, electronic databases, audio-visual materials, etc.

Campbell Library acquires monographs in all aspects of electrical and computer engineering through an approval plan that automatically supplies new titles from the major publishers in these fields. Numerous reference volumes will support this course to include: Dictionaries, handbooks, standards, and encyclopedias published by IEEE, McGraw Hill, Wiley, and CRC. Electronic databases that will support the course are: *Science Direct* which includes electrical and computer journal titles published by Elsevier; the IEEE database; Engineering Village which includes Compendex.; the ACM Digital Library; MathSci +, and the Applied Science and Technology Index. Audio-visual materials have not been systematically acquired in this area, but can be purchased as needed.

- C. List key periodicals available in the library to support this course/program.

IEEE Transactions on Power Systems
 International Journal of Electrical Power and Energy Systems
 Electric Power Systems Research

- D. List specific resources that should be acquired to support this course.

Electric Machinery and Power System Fundamentals, Stephen J Chapman, McGraw Hill, 2002
 Power System Analysis, 2nd Edition, Bergen and Vittal, Prentice Hall 2000
 Power System Analysis, 2nd Edition, Hadi Saadat, McGraw Hill, 2002
 Electric Machines and Electromagnetics, 2nd Edition, Syed Nasar, Shaum's Outlines, McGraw Hill, 1998

- E. Librarian comments and recommendations:

The titles requested in D above will be acquired. Monographs, reference works, and journals holdings are adequate to support this course. If other materials should be needed, they will be purchased or acquired through document delivery services.



Department of Chemistry & Physics

To: Peter Jansson, Electrical Engineering
From: Eduardo V. Flores, Chair *Eduardo V. Flores*
Department of Physics and Astronomy
Re: Power System Engineering course proposal
Date: April 2, 2003

The course, *Power System Engineering*, does not overlap with any course currently offered or planned by the Physics Section therefore it would be a unique course not requiring the duplication of resources. Given the two prerequisite courses listed, the course is only available to Engineering students. It is clearly useful to someone in applied science or engineering and is part of the planned further development of the Electrical Engineering program.



Department of Mechanical Engineering

Per email dated: 14 February 2003

Hi Peter,

Per your request, I have reviewed the course proposal entitled "Power System Engineering (0909.408)". I am in agreement that the electric power system is one of the most important technological infrastructures of modern society. I see the need for training some of our electrical engineers in this discipline at the undergraduate and graduate level to assure we maintain the expertise critical to the efficient and effective engineering, operation, design and construction of this system in the future.

Having reviewed the syllabus I can see that this course is complementary to Mechanical Engineering's course "Introduction to Energy Conversion Systems (0910.414)" in that it reviews the methods of generating electric power. Its emphasis, however, is clearly on the electric power system in its entirety (generation, transmission, transformation and distribution) and it therefore is focused appropriately to be a valuable addition to the Rowan University and Electrical and Computer Engineering curricula. I can offer the support of Mechanical Engineering to this course proposal.

Clay Gabler

H. Clay Gabler
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6. Catalog Description:

Power System Engineering

Suggested Hegis Number: 0909.408

This is an upper level elective course that covers the fundamentals of power system engineering with an emphasis on the modern electricity grid and new energy technologies. Topics include: History and key inventions in the development of the electric power industry, mechanical and electromagnetic fundamentals, three-phase circuits and transformers, AC machinery, synchronous machines and induction motors, DC machines, transmission lines, power flow, system reliability, advanced generation technologies, utility industry deregulation, and options for a sustainable electric power system in the future.

Prerequisites: 0909.202 (Networks II) and
 0909.302 (Engineering Electromagnetics II)