

Ⓟ

PROPOSAL SCC # ~~99/00~~ 402

SENATE

CURRICULUM PROPOSAL FORM 1999-2000

OCT 87

NON-GENERAL EDUCATION PROCESS A

0906-477

RECEIVED

*DEADLINES: Deadline dates for 1999/2000 submissions: Regular proposals: October 22, 1999 to be implemented in Fall 2000; Short-Term proposals: December 10, 1999 to be implemented in Fall 2000; Regular proposals February 18, 2000 to be implemented in Spring 2001; March 24, 2000 for short-term courses to be implemented in Spring 2001

PROPOSAL TITLE: Fundamentals of Engineering Process Analysis and Experimental Design (0906.477)

SPONSOR(S): Dr. Zenaida Otero Keil and the Chemical Engineering Curriculum Committee

DEPARTMENT: Chemical Engineering

COLLEGE: Engineering

IF LAS CHECK ONE: History/Humanities Math/Science Social/Behavioral Sciences

Check one: 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) to:

- existing non-gen-ed course
- non-gen-ed degree requirements
- major
- minor, specialization, concentration, track certificate program

DEPARTMENT (Signature indicates approval)

+ Dept. Curriculum Chair/Date Ravi Mohan Ramchandran 10/25/99

+ Dept. Chair/Person/Date [Signature]

ACADEMIC DEAN

Approved Not Approved Comments:

Dean's Signature/Date [Signature]

COLLEGE CURRICULUM COMMITTEE

Date of open hearing (if necessary) 12/8/99 Approved Not Approved

Comments:

Signature of College Chair/Date: Ravi Prith Ramachandran

UNIVERSITY CURRICULUM COMMITTEE

Date Received/Processed _____

Comments:

Curriculum Chair Signature: _____ Date Announced At Senate _____

EXECUTIVE VICE PRESIDENT/PROVOST

Approved Not Approved If no, reasons are as follows:

Student Credit Hours: _____ Faculty Load Hours: _____ Equalized Credit Hours _____

Official Copy & Approval Sheet Filed (Date): _____ Executive VP/Provost Signature/Date: _____

OFFICE OF THE PROVOST

OCT 17 2001

Helen Ingle 11/30/01

REGISTRAR

Date Approved Course Description Required _____

Hegis Taxonomy & Course Number Assigned C906-477

Registrar Signature/Date EC Egan 12/5/01

NOTIFICATION FORWARD

Senate Curriculum Committee Chairperson Academic Dean(s) *mailed Transm. 12/18/01*

Department Chairpersons Senate Pres. Registrar _____ Sponsor(s) _____

Course Proposal

1. Details:

- a) Course Title:** Fundamentals of Engineering Process Analysis and Experimental Design(0906. 477)
- b) Sponsor:** Dr. Zenaida Otero Keil and
Chemical Engineering Curriculum Committee
- c) Credit Hours:** 3 credit hours
- d) Course Level:** Senior
- e) Curricular Effect:** Technical elective for engineering courses
- f) Prerequisites:** senior standing and approval of advisor
- g) Suggested Time/
Scale of Implementation:** Spring 1999
1 section
- h) Resources:** Faculty will be hired consistent with the College of Engineering multi-year budget. Computer software required is available or will be acquired with approval of the College of Engineering Computer Committee. Laboratory equipment purchases will be consistent with the College of Engineering capital budget. Required library acquisitions will be consistent with current acquisition plan.

2. Rationale:

The proposed course is a new offering consistent with other courses in the Engineering Curriculum Proposal approved by the College Senate in December 1994. The proposed course is consistent with the establishment of the College of Engineering approved by the Board of Trustees in February 1995.

The proposed course is a technical elective for all engineering majors and satisfies the Engineering topics credit requirements of the Education and Accreditation Committee (EAC) of the American Institute of Chemical Engineers for accreditation of the Chemical Engineering Program by the Accreditation Board of Engineering and Technology (ABET).

The course will address multidisciplinary topics in process analysis and experimental design that are relevant to many areas of engineering and science. The course will include fundamental principles of process and data analysis and experimental design. It will focus on application of these fundamental principles with examples from a wide range of industries.

3. Essence of the Course:

a) Objectives:

Upon completion of the course, students will be able to:

1. Understand the fundamental principles that govern process analysis and experimental design
2. Apply process and data analysis and experimental design techniques to a wide range of engineering problems
3. Design and engineering process including proposed experimentation using principles of process analysis and experimental design
4. Use varied process and data analysis and experimental design computer software
5. Work in teams to solve open-ended design problems.

b) Topical Outline:

The topics to be covered are listed below. The instructor will supply the students with a syllabus during the first week of classes. The instructor will assess any technology advances in the subject matter prior to the course and make topic changes as deemed appropriate to maintain the level and currency of instruction.

- I. Introduction and Basic Principles
 1. Statistical Concepts in Process Analysis and Experimental Design
 2. Typical Applications of Process and Data Analysis
 3. Typical Applications of Experimental Design
 4. Historical Overview of Process Analysis and Experimental Design in Engineering
 5. Evolution of Quality in Process Analysis and Experimental Design
- II. Process Data Characterization Methods
 1. Purpose and Nature of Sampling
 2. Characterization and Representation of Data
 3. Probability Analysis for Processes
- III. Process Data Analysis Methods
 1. Simple Comparative Analysis
 2. Process Precision Analysis
 3. Process Variable Analysis
 4. Process Applications of Analysis of Variance
 5. Regression Models
- IV. Experimental Design
 1. Statistical Framework for Design
 2. Randomized Blocks, Latin Squares and Related Designs
 3. Factorial Designs
 4. Nested and Split-Plot Designs
 5. Response Surface Models for Process Optimization

- V. Process Charting for Optimization
 - 1. Statistical Basis for Charting
 - 2. Construction and Interpretation of Charts
 - 3. Process Capability Assessment

c) Evaluation and Grading Procedure of Students:

Student grades will be based on examinations, homework and a required semester project. A course syllabus with a stated method of arriving to the final grade, e.g., number of exams, projects, homework, percentage of grade, will be distributed to students the first week of classes.

d) Course Evaluation:

The proposed course will be evaluated on the basis of student evaluations and curriculum review by appropriate faculty.

4. *Results of Consultations:*

The proposed course is part of the Engineering Curriculum Proposal approved by the Faculty Senate in December 1994 with consultations. Copies of this proposal have been submitted to the Department of Mathematics for consultation.

Catalog Description

Fundamentals of Process Analysis and Experimental Design (0906.477)

Prerequisite: Mathematics for Engineering Analysis I (1701.131), Mathematics for Engineering Analysis II (1701.241) or instructor approval

This course exposes students to the fundamentals of engineering process analysis and experimental design. Students will use statistical techniques for process analysis and optimization and experimental design and process monitoring techniques that are presently used in industry. The analysis and experimental design techniques presented in this course serve to optimize any process and make engineering design and calculations more effective. Applications from a wide range of industries will be presented, including pharmaceutical, food, bulk and specialty chemicals, and petroleum.

My documents/courses/edesgugpro.doc



Mathematics Department

DATE: March 27, 2000

TO: Zenaida Otero Keil and Chemical Engineering Curriculum Committee
Steven Chin and the College of Engineering Curriculum Committee

FROM: Dex Whittinghill, Department of Mathematics

RE: Consultation for *Fundamentals of Engineering Process Analysis and Experimental Design* (0906.477)

On February 29, 2000, via e-mail, Dr. Keil requested a formal 'letter of consultation' for the undergraduate course *Fundamentals of Engineering Process Analysis and Experimental Design* (0906.477). This memo is being written to explain the consultation process. I take full responsibility for the delay of this letter (since February 29th, 2000).

I was first asked to review the course proposal for *Fundamentals of Engineering Process Analysis and Experimental Design* (0906.477) on October 20, 1999, in a letter from Dr. Keil (campus mail). The undergraduate proposal was accompanied by a proposal for the graduate course *Engineering Process Analysis and Experimental Design* (0906.577). The cover letter did not state any urgency.

After a few days, I believe Dr. Keil called me to ask for a quick response. Within a day or so I looked at the two course proposals, and called her back with my preliminary observations. Because she did not answer the phone, I left a message in which I said that in principle each course was fine, but that I thought the two proposals were too much alike. Although the courses had different numbers (477 and 577), the proposals were virtually identical. In my message I invited Dr. Keil to call me back if she needed more details. [My notes from October indicate that I might have also suggested that the graduate course be called "*Advanced Engineering Process Analysis and Experimental Design*," and that differences in the level of the two courses be amplified. However, because Dr. Keil did not call me back, what I have related is based on memory, and the details of that phone message have been lost over time.]

I was next contacted, by Dr. Keil via phone, on February 24, 2000, when she asked me to again review the graduate proposal for *Engineering Process Analysis and Experimental Design* (0906.577). At that time she informed me that the undergraduate course had already 'gone through.'

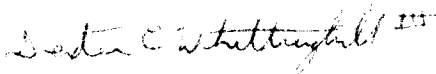
It should be noted that the Department of Mathematics has a course on the books called *Statistical Design of Experiments* (1702.371), as part of its Concentration in Statistics. In two tries, with fairly extensive advertising (flyers to advisors in several appropriate departments, and then flyers to nearly all advisors on campus), the course did not run. Maybe '477' will have more success.



Mathematics Department

DATE: April 12, 2000

TO: Zenaida Otero Keil and Chemical Engineering Curriculum Committee
Steven Chin and the College of Engineering Curriculum Committee
'To whom it may concern'

FROM: Dex Whittinghill, Department of Mathematics 

RE: The Consultation for *Engineering Process Analysis and Experimental Design* (0906.577)

This memo describes the consultation process for the graduate course *Engineering Process Analysis and Experimental Design* (0906.577), and my position on the proposed course. On February 29, 2000, Dr. Keil had requested a formal 'letter of consultation' for the course. I take full responsibility for the delay since the 29th.

I was first asked to review the course proposal for the graduate *Engineering Process Analysis and Experimental Design* (0906.577) on October 20, 1999, when it, and the proposal for the undergraduate *Fundamentals of Engineering Process Analysis and Experimental Design* (0906.477), were sent to me by Dr. Keil. Within a few days I looked at the two course proposals, and called her back with my preliminary observations. She did not answer the phone, so I left a message in which I said that in principle each course was fine, but that I thought the two proposals were too much alike. Although the courses had different numbers (477 and 577), the proposals were virtually identical. In my message I also invited Dr. Keil to call me back if she needed more details. (What I have related here is based on memory, and any specific suggestions for the graduate proposal that I may have made have been lost over time.)

I was next contacted by Dr. Keil on February 24, 2000, by phone, and asked to again review the graduate proposal for *Engineering Process Analysis and Experimental Design* (0906.577). I looked at the proposal early the next morning, comparing it to the since-accepted undergraduate 477, and sent the 'attached' e-mail with my comments. [The first two lines in the e-mail refer to the facts that I had less than 24 hours to look at the new proposal, and that I had temporarily misplaced my notes from last October.]

In principle *Engineering Process Analysis and Experimental Design* (0906.577) is fine, and although the syllabus has been changed since last October, I still feel that the two syllabi need to be differentiated more. I look forward to seeing the textbooks chosen for 577 and 477.

> > Dexter C. Whittinghill 02/25/00 08:32AM > >
Zenaida,

Please note that I consider this part of a _continuing_ consultation. This is too short of a turn-around-time for me to consider this a completed consultation.

I looked at the proposals early this morning. Unfortunately I did not find my notes on the previous versions (I wanted to ~~refer~~ consult them). I think it is because I had given them to Ron.

The graduate course now looks 'more different' than the undergraduate course. I will still make the following suggestions/comments.

1. Call the graduate one "Advanced Engineering ..."
2. Is the implementation 1 section every other spring, or every spring?
3. Fiddle with the topical outline so that it is not just a copy-paste of the undergraduate course. Add words like 'advanced.'

I noticed that 3a, 3c and the catalog description have been modified to emphasize the differences.

I would very much like to see the book(s) that you plan to use, or the set of notes.

Dex

*Letter
attached to
encl.*



Rowan University Senate

Date: February 8, 2000

To: Dr. Zenaida Otero Keil
Chemical Engineering Dept.

From: Dr. Martin Itzkowitz, Chr. Senate Curriculum Committee

RE: Proposal – Fundamentals of Engineering Process Analysis and
Experimental Design, SCC#00-402

Your proposal, Fundamentals of Engineering Process Analysis and
Experimental Design must include letters of consultation.

Please attach the letters of consultation to the original proposal. The
original proposal is in the Senate office file. If you have any questions, feel
free to contact me at extension 3418.

MI/r

*2/22/00
College level
on 12/8/99*

Dear Dr. Giles-Gee:

My apologies for this late response to your query, and it took me a while to get back to you.

My decision to approve Embedded Systems as a new Engineering Process Analysis & Design course is final.

The letter from Dex Whittinghill making sure the graduate version is approved and the undergraduate version is approved by the faculty.

The Embedded Systems Program Science majors (rather than a mix of Engineering and Science) will grant them final say in the content of the course.

As experts in Computer Science (and Electrical Engineering), we must know what is best for their education. I thus was more willing to give the final say to the Computer Science & Electrical Engineering departments.

I am happy to talk to you further. I will be in my office late morning & early afternoon Monday through Friday.

Sincerely,
Lauretta

Note:

Consultation provided for changes that I cannot document have been made.

- Is this curricular recommendation still current?
OK per memo

Consultation raises issues which are not addressed in attached materials

OK
(HJM)

Please
~~do not~~
include in my file only

the 2

med with
lem with
made).
uter
ing to
hat more
ineering.
ensors
er turf
titulated.

the mid-
in my

CURRICULUM PROPOSAL FORM 1999-2000

NON-GENERAL EDUCATION PROCESS A

*DEADLINES: Deadline dates for 1999/2000 submissions: Regular proposals: October 22, 1999 to be implemented in fall 2000; Short-Term proposals: December 10, 1999 to be implemented in fall 2000; Regular proposals February 18, 2000 to be implemented in Spring 2001; March 24, 2000 for short-term courses to be implemented in Spring 2001

0906.482

PROPOSAL TITLE: PRINCIPLES OF FOOD ENGINEERING (0906.482)

SPONSOR(S): STEPHANIE FARRELL

DEPARTMENT: CHEMICAL ENGINEERING

COLLGE: ENGINEERING

IF LAS CHECK ONE: History/Humanities Math/Science Social/Behavioral Sciences

Check one: 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) to:

existing non-gen-ed course

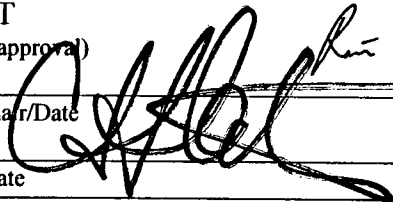
non-gen-ed degree requirements

major

minor, specialization, concentration, track certificate program

DEPARTMENT

(Signature indicates approval)

 *Stephanie Farrell* 10/25/99

Dept. Curriculum Chair/Date

10.22.99

Dept. Chairperson/Date

ACADEMIC DEAN

Approved Not Approved Comments:

Dean's Signature/Date 