



PROPOSAL SCC #99/00-426

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

PROPOSAL TITLE: *Optimization of Engineering Projects*

SPONSOR(S): *Kevin Dahm*

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)

Dept. Curriculum Chair/Date: *[Signature]* *Rev. Peter Ruckler* *02/24/00*

Dept. Chairperson/Date: *[Signature]* *2/24/00*

ACADEMIC DEAN

Approved Not Approved Comments:

Dean's Signature/Date: *[Signature]* *2/24/00*

Course Proposal

1. Details:

- a) Course Title:** Optimization of Engineering Projects (0906.580)
b) Sponsor: Kevin D. Dahm and the Chemical Engineering Curriculum Committee
c) Credit Hours: 3 credit hours
d) Course Level: graduate
e) Curricular Effect: Technical Elective for engineering majors
f) Prerequisites: Graduate standing and approval of Graduate Advisor
g) Suggested Time/
Scale of Implementation: 1 section
h) Resources: Faculty have been hired consistent with the College of Engineering multi-year budget. No computer software or laboratory equipment beyond what is currently available will be necessary.

2. Rationale:

The proposed course is a graduate elective in the College of Engineering and is consistent with the establishment of the College of Engineering approved by the Board of Trustees in February 1995. The course will overview organization, direction and execution of long-term projects in engineering.

Topics will include project organization, scheduling, resource allocation, optimization and financial analysis. One major project, along with mini-projects and in-class exercises, will give students practical experience in planning and execution of engineering research and design projects. Project teams will be composed of both undergraduate and graduate students. Graduate students will take primary responsibility in leadership roles such formulation of strategy, directing work and synthesizing the contributions of team members.

This course will be a key component of the graduate curriculum, since many people pursue advanced degrees in chemical engineering specifically to gain qualifications for advancement from a strictly technical position into a managerial, decision-making position.

3. Essence of the Course:

a) Objectives:

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

1. Direct teams in the solution of open-ended research and engineering problems.
2. Compile and defend effective proposals and plans for engineering projects.

3. Assess the economic, professional and social impact of a project.
4. Select and implement optimal project organizations.
5. Utilize knowledge of advanced mathematics and principles of probability and economics to problems of resource utilization and budgeting.
6. Optimize projects using modern modeling techniques.

b) Topical Outline:

The topics to be covered are listed below. The instructor will supply students with a syllabus during the first week of classes. The instructor will assess advances in the subject matter prior to the course, with particular attention to the continuing evolution of relevant software, and implement any changes deemed appropriate to maintain the level and currency of the course.

Project Planning

- Assessing feasibility
- Economic and non-economic criteria
- Compiling and presenting effective proposals
- Professional responsibility and safety

Project Organization and Scheduling

- Selecting an optimal organizational structure
- Gantt charts
- Network analysis

Project Optimization and Execution

- Assessing human and material resource needs
- Probability and resource allocation
- Retrofitting
- Financial analysis and budgeting
- Development and use of process models

Project Assessment

- Statistical assessment of experimental results
- Environmental impact
- Advanced economic analysis and assessment of financial impact
- Scale-up considerations

c) Evaluation and Grading Procedure of Students:

Students will be graded based on one major team project, as well as quizzes, mini-projects and in-class exercises. On major and mini-projects, graduate students will fill leadership positions in teams that are composed largely of undergraduate students. A course syllabus with a stated method of arriving to the final 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.

Catalog Description

Optimization of Engineering Projects (0906.580)

Prerequisite: Graduate standing and approval of Graduate Advisor

This course will overview strategies for planning, directing and executing long-term research and engineering projects. Topics will include project organization, project scheduling, allocation of resources, project optimization and financial analyses.