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2-06

Print Form

Office of the Registrar
FORM 40G REV. 9/06

PURDUE UNIVERSITY

REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(500-600 LEVEL)

Graduate Council Document No. 07-2b

DEPARTMENT Civil Engineering

EFFECTIVE SESSION ~~Spring 2007~~ Fall 2007

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

- [X] 1. New course with supporting documents (complete proposal form)
- [ ] 2. Add existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [ ] 6. Change in course credit/type
- [ ] 7. Change in course attributes
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered
- [ ] 12. Transfer from one department to another

PROPOSED:	EXISTING:
Subject Abbreviation: CE	Subject Abbreviation:
Course Number: 685	Course Number:
Long Title: Rock Mechanics	
Short Title: Rock Mechanics	

Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
[ ] Summer [X] Fall [ ] Spring

CAMPUS(ES) INVOLVED
[ ] Calumet [ ] N. Central
[ ] Cont Ed [ ] Tech Statewide
[ ] Ft. Wayne [X] W. Lafayette
[ ] Indianapolis

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 3
2. Variable Credit Range: Minimum Cr. Hrs
(Check One) To [ ] Or [ ]
Maximum Cr. Hrs.
3. Equivalent Credit: Yes [ ] No [X]
4. Thesis Credit: Yes [ ] No [X]

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only		7. Registration Approval Type	
2. Satisfactory/Unsatisfactory Only		Department	
3. Repeatable		Instructor	
Maximum Repeatable Credit:		8. Variable Title	
4. Credit by Examination		9. Remedial	
5. Designator Required		10. Honors	
6. Special Fees		11. Full Time Privilege	
		12. Off Campus Experience	

Instructional Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated	Delivery Method (Asyn. Or Syn.)	Delivery Medium (Audio, Internet, Live, Text-Based, Video)
ture	50	3	16	100	syn	Live
citation						
Presentation						
Laboratory						
Lab Prep						
Studio						
Distance						
Clinic						
Experiential						
Research						
Ind. Study						
Pract/Observ						

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES):

Prerequisites: CE 580 or instructor consent.
Mechanical properties governing rock behavior, from intact rock to fractured rock masses. Laboratory experiments and field tests. Failure criteria. Linear Elastic Fracture Mechanics. Rock mass deformability. Analytical and empirical approaches for the design and construction of civil engineering structures in rock masses. Slope stability. Bearing capacity of shallow and deep foundations.
Professor Bobet.

Calumet Department Head / Date		Calumet School Dean / Date		Calumet Undergrad Curriculum Committee / Date	
Fort Wayne Department Head / Date		Fort Wayne School Dean / Date		Fort Wayne Chancellor / Date	
Indianapolis Department Head / Date		Indianapolis School Dean / Date		Undergrad Curriculum Committee / Date	Rachel Doltsinis 12/1/06
North Central Department Head / Date		North Central Chancellor / Date		Date Approved by Graduate Council	APPROVED 2/15/07
West Lafayette Department Head / Date	11/21/06	West Lafayette College/School Dean / Date	12/1/06	Graduate Council Secretary / Date	Marilyn D. Heist 4/18/07
Juate Area Committee Convener / Date	2/15/07	Graduate Dean / Date		West Lafayette Registrar / Date	6/18/07

OFFICE OF THE REGISTRAR

2/15/07

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PURDUE UNIVERSITY

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OR REVISION OF A GRADUATE COURSE
(500-600 LEVEL)

DEPARTMENT Civil Engineering

EFFECTIVE SESSION Spring 2007

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

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- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered
- [ ] 12. Transfer from one department to another

PROPOSED:		EXISTING:	
Subject Abbreviation	CE	Subject Abbreviation	
Course Number	685	Course Number	
Long Title	Rock Mechanics		
Short Title	Rock Mechanics		

Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
[ ] Summer [X] Fall [ ] Spring

CAMPUS(ES) INVOLVED
[ ] Calumet [ ] N. Central
[ ] Cont Ed [ ] Tech Statewide
[ ] Ft. Wayne [X] W. Lafayette
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CREDIT TYPE
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(Check One) To [ ] Or [ ]
Maximum Cr. Hrs.
3. Equivalent Credit: Yes [ ] No [X]
4. Thesis Credit: Yes [ ] No [X]

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only [ ]
2. Satisfactory/Unsatisfactory Only [ ]
3. Repeatable [ ]
Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
5. Designator Required [ ]
6. Special Fees [ ]
7. Registration Approval Type
Department [ ] Instructor [ ]
8. Variable Title [ ]
9. Remedial [ ]
10. Honors [ ]
11. Full Time Privilege [ ]
12. Off Campus Experience [ ]

Instructional Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated	Delivery Method (Asyn. Or Syn.)	Delivery Medium (Audio, Internet, Live, Text-Based, Video)
Lecture	50	3	16	100	syn	Live
Recitation						
Presentation						
Laboratory						
Lab Prep						
Studio						
Distance						
Clinic						
Experiential						
Research						
Ind. Study						
Pract/Observ						

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES):

Prerequisites: CE 580 or instructor consent.
Mechanical properties governing rock behavior, from intact rock to fractured rock masses. Laboratory experiments and field tests. Failure criteria. Linear Elastic Fracture Mechanics. Rock mass deformability. Analytical and empirical approaches for the design and construction of civil engineering structures in rock masses. Slope stability. Bearing capacity of shallow and deep foundations.

Calumet Department Head	Date	Calumet School Dean	Date	Calumet Undergrad Curriculum Committee	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date	Fort Wayne Chancellor	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date	Undergrad Curriculum Committee	12/1/06 Date
North Central Department Head	11/21/06 Date	North Central Chancellor	12/1/06 Date	Date Approved by Graduate Council	
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date	Graduate Council Secretary	Date
Graduate Area Committee Convener	Date	Graduate Dean	Date	West Lafayette Registrar	Date

OFFICE OF THE REGISTRAR

APPENDIX B

Supporting Document for a New Graduate Course
(See Section I-I-3.)

To: Purdue University Graduate Council

From: Faculty Member: Antonio Bobet
Department: Civil Engineering
Campus: West Lafayette

For Reviewer's comments only
Reviewer:
Comments:

Date: November 20, 2006

Subject: Supporting Document for a New Graduate Course to Accompany the Office of the Registrar's Form 40

Contact for information if questions arise:
Name: Becky Hull
Phone Number: 62379
E-mail: bhull@purdue.edu
Campus Address: CIVL 1147

Proposed Course Number: CE 685

Proposed Course Title: Rock Mechanics

A. Justification for the Course:

Traditionally the geotechnical specialty in Civil Engineering has focused on the behavior of soils; however, this is only a small set of the geo-materials that a geotechnical engineer will encounter in his or her professional career. About 15% of the continental surface area is occupied by transported soils (i.e. alluvial, glacial, wind deposits). The other 85% is occupied by rocks. The course exposes students to the behavior and problems associated with rock materials and rock masses.

This course is intended primarily for students:

☐ **from within this department** or ☐ **from other departments**

B. Level of the Course:
Justify request for graduate course level by indicating anticipated enrollments of undergraduate and graduate students.

Anticipated Percentage of Undergraduate Student Enrollment: 0
Anticipated Percentage of Graduate Student Enrollment: 100

C. Prerequisites: CE 580 or instructor consent

D. Course Instructor(s): Antonio Bobet

E1. Course Outline:

Lectures	Topics
3	Introduction to intact rock and rock classification systems
6	Strength and deformation of intact rock
3	Failure criteria: Tresca, Coulomb, Hoek-Brown
5	Linear Elastic Fracture Mechanisms: Principles and applications
4	Discontinuities within a rock mass. Analytical and empirical failure criteria
9	Slope stability: planar, wedge and toppling failure
9	Foundations on rock: shallow and deep foundations
3	Monitoring
2	In-class exams
Total 44	

E2. Method of Evaluation or Assessment:

Two exams, homework, and term project.

F. Reading List:

Class notes and other materials distributed in class

Engineering Faculty Document 2-06
May 9, 2006

MEMORANDUM

TO: The Faculty of the Schools of Engineering

FROM: The Faculty of the School of Civil Engineering

RE: New Graduate Level Course CE 685

The faculty of the School of Civil Engineering has approved the following new course. This action is now submitted to the Engineering Faculty for a recommendation for approval.

CE 685 Rock Mechanics

Sem. 1, Class 3, Lab 0, Cr. 3

Prerequisite: CE 580 or instructor consent

Mechanical properties governing rock behavior, from intact rock to fractured rock masses. Laboratory experiments and field tests. Failure criteria. Linear Elastic Fracture Mechanics. Rock mass deformability. Analytical and empirical approaches for the design and construction of civil engineering structures in rock masses. Slope stability. Bearing capacity of shallow and deep foundations.

Reason: To provide students with the fundamental knowledge and skills to design and build civil structures on intact rock and on fractured rock masses. The course builds on the geotechnical fundamentals of CE 580 or similar courses.

M. Katherine Banks, Head
School of Civil Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE COMMITTEE ON
FACULTY RELATIONS

CFR Minutes 5

Date 9/29/06

Chairman CFR Michael J. Plotkowski

Supporting documentation

1. **Justification:** Traditionally the geotechnical specialty in Civil Engineering has focused on the behavior of soils; however, this is only a small set of the geomaterials that a geotechnical engineer will encounter in his or her professional career. About 15% of the continental surface area is occupied by transported soils (i.e. alluvial, glacial, wind deposits). The other 85% is occupied by rocks. The course exposes students to the behavior and problems associated with rock materials and rock masses.

2. **Level:** Graduate Level

3. **Prerequisites:** CE 580 or instructor consent

4. **Instructor:** Antonio Bobet

5. **Course objectives:** Students who complete the course should be able to:

   - Understand and predict the behavior of intact rock under complex loading
   - Predict failure mechanisms and critical stress of intact rock and rock masses
   - Design laboratory and field tests to investigate mechanical properties of rock masses
   - Understand fundamental concepts of Linear Elastic Fracture Mechanics
   - Design excavations in rock mass
   - Design shallow and deep foundations in rock masses

6. **Course Outline:**

Lectures	Topics
3	Introduction to intact rock and rock classification systems
6	Strength and deformation of intact rock
3	Failure criteria: Tresca, Coulomb, Hoek-Brown
5	Linear Elastic Fracture Mechanisms: Principles and applications
4	Discontinuities within a rock mass. Analytical and empirical failure criteria
9	Slope stability: planar, wedge and toppling failure
9	Foundations on rock: shallow and deep foundations
3	Monitoring
2	In-class exams
Total 44	

7. **Text:** Class notes and other materials distributed in class