

# APPLICATION FOR NEW COURSE

## 1. General Information.

- a. Submitted by the College of: Engineering Today's Date: 2-2-11
- b. Department/Division: Civil Engineering
- c. Contact person name: Tim Taylor Email: taylor@engr.uky.edu Phone: 859-323-3680
- d. Requested Effective Date:  Semester following approval OR  Specific Term/Year<sup>1</sup>: Fall 2011

## 2. Designation and Description of Proposed Course.

- a. Prefix and Number: CE-508
- b. Full Title: Design and Optimization of Construction Operations
- c. Transcript Title (if full title is more than 40 characters): Design and Optimization of Construction
- d. To be Cross-Listed<sup>2</sup> with (Prefix and Number): N/A
- e. Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours<sup>3</sup> for each meeting pattern type.

3 Lecture \_\_\_\_\_ Laboratory<sup>1</sup> \_\_\_\_\_ Recitation \_\_\_\_\_ Discussion \_\_\_\_\_ Indep. Study  
\_\_\_\_\_ Clinical \_\_\_\_\_ Colloquium \_\_\_\_\_ Practicum \_\_\_\_\_ Research \_\_\_\_\_ Residency  
\_\_\_\_\_ Seminar \_\_\_\_\_ Studio \_\_\_\_\_ Other – Please explain: \_\_\_\_\_

- f. Identify a grading system:  Letter (A, B, C, etc.)  Pass/Fail
- g. Number of credits: 3
- h. Is this course repeatable for additional credit? YES  NO   
If YES: Maximum number of credit hours: \_\_\_\_\_  
If YES: Will this course allow multiple registrations during the same semester? YES  NO
- i. Course Description for Bulletin: The course critically examines repetitive operations that occur from project to project and the deterministic approaches used to design and optimize their effectiveness. Scientific techniques used to field measure the efficiency of construction operations are also examined. The primary metrics used to optimization include cost, schedule, and sustainability.
- j. Prerequisites, if any: CE 303, CE 381, and engineering standing or graduate standing
- k. Will this course also be offered through Distance Learning? YES<sup>4</sup>  NO
- l. Supplementary teaching component, if any:  Community-Based Experience  Service Learning  Both
3. Will this course be taught off campus? YES  NO

## 4. Frequency of Course Offering.

<sup>1</sup> Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

<sup>2</sup> The chair of the cross-listing department must sign off on the Signature Routing Log.

<sup>3</sup> In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from SR 5.2.1)

<sup>4</sup> You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

## APPLICATION FOR NEW COURSE

- a. Course will be offered (check all that apply):       Fall       Spring       Summer
- b. Will the course be offered every year?      YES       NO   
If NO, explain: \_\_\_\_\_
5. Are facilities and personnel necessary for the proposed new course available?      YES       NO   
If NO, explain: \_\_\_\_\_
6. What enrollment (per section per semester) may reasonably be expected?      30-40
7. Anticipated Student Demand.
- a. Will this course serve students primarily within the degree program?      YES       NO
- b. Will it be of interest to a significant number of students outside the degree pgm?      YES       NO   
If YES, explain: \_\_\_\_\_
8. Check the category most applicable to this course:
- Traditional – Offered in Corresponding Departments at Universities Elsewhere
- Relatively New – Now Being Widely Established
- Not Yet Found in Many (or Any) Other Universities
9. Course Relationship to Program(s).
- a. Is this course part of a proposed new program?      YES       NO   
If YES, name the proposed new program: \_\_\_\_\_
- b. Will this course be a new requirement<sup>5</sup> for ANY program?      YES       NO   
If YES<sup>5</sup>, list affected programs: \_\_\_\_\_
10. Information to be Placed on Syllabus.
- a. Is the course 400G or 500?      YES       NO   
If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in **10.b**. You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR 3.1.4.)
- 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.

<sup>5</sup> In order to change a program, a program change form must also be submitted.

# APPLICATION FOR NEW COURSE

## Signature Routing Log

**General Information:**


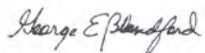
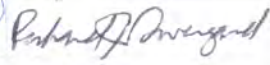
Course Prefix and Number: CE-508

Proposal Contact Person Name: Timothy R.B. Taylor, Ph.D., P.E. Phone: 323-3680 Email: taylor@engr.uky.edu

**INSTRUCTIONS:**

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

**Internal College Approvals and Course Cross-listing Approvals:**

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
CE Education team	2/9/11	Nick Stamatiadis / 7-8102 / nstamat@engr.uky.edu	
CE Faculty	2/25/11	George Blandford / 7-1855 / gebland@engr.uky.edu	
Engineering faculty	4/11/11	Richard Swergard / 7887 / rswergar@engr.uky.edu	
		/ /	
		/ /	

**External-to-College Approvals:**

Council	Date Approved	Signature	Approval of Revision <sup>6</sup>
Undergraduate Council	10/11/2011	Sharon Gill	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

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<sup>6</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

# **CE 508 Design and Optimization of Construction Operations**

## **Course Syllabus**

**Paul M. Goodrum, P.E., Ph.D.**

Department of Civil Engineering  
University of Kentucky  
Lexington, Kentucky 40506-0281

# CE508 Design and Optimization of Construction Operations

## How to Contact the Instructor

Instructor: Paul M. Goodrum, P.E., Ph.D.  
151C Oliver H. Raymond Building  
859 257-5416 Office Voice, 859 257-4404 Office Fax  
Email Address: pgoodrum@engr.uky.edu  
Office Hours: 1-2 PM T & Th, or by Appointment.

## Course Information

Lecture: 8:00 –9:15AM T&TH RGAN 202

## Course Description ~ Credits (3) Spring

The course critically examines repetitive operations that occur from project to project and the deterministic approaches used to design and optimize their effectiveness. Scientific techniques used to field measure the efficiency of construction operations are also examined. The primary metrics used to optimization include cost, schedule, and sustainability.

Prerequisites: Undergraduate - CE 303, CE 381, and engineering standing;

## Learning Outcomes

Students will learn to use scientific techniques used to measure the effectiveness of construction operations at the work face.

Students will learn the design and optimization procedures of heavy construction operations

Students will learn the methods of construction involving engineered components within the civil area.

Students will learn the design and optimization of temporary structures used to support construction

Students will survey sustainable construction practices in heavy and building construction operations

## Text

Peurifoy, R. and Schexnayder, C. Construction Planning, Equipment, and Methods, 6th Ed., McGraw-Hill, 2002.

Additional Material & References will also be used.

## Class Meetings

Lecture classes start at promptly at the assigned start time, and continue for the 50-minute lecture period. The instructor will lecture for the entire time and will dismiss the class when finished.

There is much more course material than can be covered in the lecture class periods. The instructor will present class lectures and cover the majority of the Lecture Topic Materials. It is the responsibility of the student to cover any additional materials assigned from the text and other class materials.

## Class Meeting Organization

T&Th ~ 1 hour and 15 minute Formal Lecture Format w/ Class Participation

## Attendance Policy

Class attendance is required as part of the learning experience. If you are unable to attend class due to illness or other excusable reasons, contact the instructor prior to, or immediately after the absence to make

up the material to be missed. If your absence is for other unexcused reasons, it is still more important to contact the instructor. An unexcused absence will result in a deduction of your class participation grade. Excused absences are defined by the University in Section 5.2.4.2 of the *University Senate Rules*.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

### Assignment Policy

Home assignments are to be completed prior to the start of the class period due. Assignments are due at the beginning of the class period on the corresponding due date. No credit can be given for late assignments. Undergraduate students will be provided with a Midterm Evaluation (by the midterm date) of course performance based on the grades earned and the criteria in syllabus.

### Undergraduate Grading Policy

A = 100 - 90%  
 B = 89 - 80%  
 C = 79 - 70%  
 D = 69 - 65%  
 E = 64 - 0%

### Graduate Grading Policy

A = 100-90%  
 B = 89-80%  
 C = 79-70%  
 E = 69 -0%

**Please Note:** A grade is an assessment of your effort and your abilities; therefore, simply fulfilling the course requirements does not constitute an A. Exceptional work will warrant an A; good work will warrant a B; adequate work will warrant a C; below adequate work warrants a D; a final grade of E means that your work has been unsatisfactory. Please be aware that I am a tough, but fair grader. Graduate students are not eligible to receive a grade of D in the course

### Undergraduate Final Grade Weighting

60% - Exams (2 @ 30%)  
 10% - Homework  
 25% - Class Project  
 5% - Class Participation

### Graduate Final Grade Weighting

50% - Exams (2 @ 25%)  
 5% - Homework  
 25% - Class Project  
 20% - Independent Research on Sustainable Construction

The Instructor shall use his discretion to adjust any grade, individual or class grade as a whole, or curve final grade totals, as he feels necessary to be reflective of the actual learning that has occurred by the students in class.

### Introduction to Course Web Page

- Home Page
- What's New
- Policies
- Syllabus

- Grade Book

### My Expectations

The Instructor accepts the responsibility for creating an environment for learning by lectures, laboratories, take-home assignments, projects, quizzes and examinations.

The instructor expects the student to accept their responsibility for their learning.

- Come prepared for class discussion
- Complete all reading & homework Assignments
- Come with your questions
- There are no dumb questions
- Take plenty of good notes with sketches & examples

### Team Presentations of Site Visits: Analysis of Supply Chain and Field Operations (AKA Class Project) (Undergraduate and Graduate Students)

The intent of this team assignment is to increase students' awareness of the supply chain on construction operations. Four person teams should be formed and each team should visit a **minimum of two** construction job sites (**not to include single family residential construction**) and material/fabrication facilities to analyze and map the processes and tasks occurring in each venue. Students are urged to consider jobsites outside of the Lexington area. This knowledge should then be shared with fellow students via a highly visual slide presentation. Thus, each team is expected to take more than one independent field trip, to acquire relevant information, to document the visits and findings with use photographs and other graphical means to present the findings to the class in an informative presentation to last approximately 25 minutes. Dress for presentation is to be business casual. Each team is to also submit a maximum 10-page well-written report summarizing their findings as well.

Presentations and Reports should explicitly include each of the following ten items of analysis:

1. Operation model of the supply chain facility that serves the observed construction operation on each construction jobsite;
2. An Activity Analyses of the construction operation on both construction jobsites.;
3. Operation model of the construction operation on both jobsites;
4. Analyses of resource constraints unique to the construction operation on both jobsites.; and
5. Report on the observations of construction safety practices occurring within the construction operation on both jobsites

Each team should meet with the instructor 2 to 4 weeks prior to presentations to review progress of preparation for presentation. A copy of the slides should be turned in to the instructor on or before each group's presentation to the class.

Each team's project will be evaluated according to the following criteria:

Completeness of technical content in presentation and report (10 items)	50%
Quality of visuals, figures, etc.	25
Sequence of technical content (logical)	10
Presented on schedule	10
	5
Team meeting with instructor prior to presentation	100%

Each individual will receive a grade based on their team's project **and** evaluation of their peers. Work effort should be equitably distributed among each team member and the instructor should be notified if/when this is not the case.

### Independent Research on Sustainable Construction (Graduate Students Only)

The ability to perform critical analyses of emerging technology is an expectation of modern construction site managers. Sustainability is an evolving approach towards using construction technologies that provide a simultaneous environmental, economic, and societal benefits to project stakeholders.

The independent research is to provide graduate students to explore sustainable techniques that are being in construction operations. Each student will be designed a specific type of construction and tasked with identifying and critically analyzing the costs and benefits of associated sustainable practices. The results of the research will be presented to the class to coincide with the associated topics sequence in the course syllabus. The presentation is to be accompanied by a 10-page white paper to be introduced to the class' overall body of knowledge.

### Sample Class Schedule

Week(s)	Topic	Graduate Student Presentations
1	Course Introduction	
2	Activity Analysis	
3	Operation Modeling and Planning	
4	Soil Mechanics and Construction/ Heavy Construction Quantity Surveys	Public Policy and Sustainability Corporate Approaches to Sustainability
5-8	Design and Optimization of Heavy Construction Operations	Earthmoving and Sustainability
9	Exam/Exam Review	
10-11	Below Grade Construction Operations	Sustainability in the Concrete Trades
12	Design and Optimization of Critical Lifts/Vertical Construction Operations	
13-14	Vertical Construction Operations	Sustainability in the Steel Trades
15	Design of Temporary Structures	Sustainability and Timber Construction
16	Class Presentations	

### Policy on academic accommodations due to disability

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address [jkarnes@email.uky.edu](mailto:jkarnes@email.uky.edu)) for coordination of campus disability services available to students with disabilities.

### Academic Honesty

Academic dishonesty, in the form of plagiarism and cheating, is a large problem at many U.S. universities and it is an issue I take very seriously. No form of scholastic dishonesty will be tolerated in this course. This is consistent with Section 6.3.0 of the University Senate Rules which states that "students shall not plagiarize [or] cheat."

Section 6.3.1 of the University Senate Rules states the following in regards to plagiarism.

*"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 anything else from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.*

*Plagiarism includes reproducing someone else's work, whether it be published article, chapter of a book, a paper from a friend or some file, or whatever. 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."*

As commonly defined, plagiarism consists of passing off as one's own the ideas, word, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have permission of that person. This includes copying material from books, reports, journals, pamphlets, handouts, other publications, web sites, etc., without giving appropriate credit for those ideas or without identifying material as quotations when taken directly from another source. If you have any doubt, uncertainty, or questions regarding plagiarism while working on an assignment for this (or any other course) please come see me **before** you turn in the assignment. Additional information on plagiarism is available on the UK Ombud website at: <http://www.uky.edu/Ombud/Plagiarism.pdf>

Section 6.3.2 of the University Senate Rules states the following in regards to cheating.

*"Cheating is defined by its general usage. It includes, but is not limited to, the wrongfully giving, taking, or presenting any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade. The fact that a student could not have benefited from an action is not by itself proof that the action does not constitute cheating. Any question of definition shall be referred to the University Appeals Board."*

Unless specifically allowed in advance by the instructor, all assignments, homework, and exams in this class are expected to be completed based on individual effort. While working within a study group is an acceptable learning method, copying the work and ideas of others is cheating.

The handouts used in this course are copyrighted. By "handouts," is meant all materials generated for this class, which include but are not limited to syllabi, notes, quizzes, exams, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts for any purpose other than your personal use during this course unless you are expressly granted permission *in writing*.

Incidents of academic dishonesty in this course will be handled according to policies and procedures outlined in, but not limited to, the University Senate Rules, the Department of Civil Engineering Undergraduate Handbook, the Department of Civil Engineering Graduate Handbook, and the Office of Academic Ombud Services. Please note that the Department of Civil Engineering Undergraduate Handbook states that "The **minimum** penalty for an academic offense is for the instructor to award a grade of zero for the assignment on which the offense occurred, if there are no prior offenses or letters of warning in the student's record." [emphasis added].