EFD 12-10

Office of the Registrar
FORM 40 REV. 11/09

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

Fall

DEPARTMENT: Division of Construction Engineering and Management

EFFECTIVE SESSION: Spring 2010 (201020) 201170

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

- [x] 1. New course with supporting documents
- [ ] 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 (department head signature only)
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:		EXISTING:	
Subject Abbreviation	CEM	Subject Abbreviation	
Course Number	45000	Course Number	
Long Title	Building Systems in Construction		
Short Title	Bldg Systems in Construction		

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

TERMS OFFERED (Check All That Apply:)
- [ ] Summer
- [ ] Fall
- [x] Spring

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

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 3.0
2. Variable Credit Range: Minimum Cr. Hrs ____ (Check One) To [ ] Or [ ] Maximum Cr. Hrs ____
3. Equivalent 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. Special Fees [ ]
6. Registration Approval Type: Department [x] Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
9. Full Time Privilege [ ]
10. Off Campus Experience [ ]

Schedule Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	75	2	16	100
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Prerequisites: CEM 29100 Construction Internship II; CEM 30100 Project Control & Life Cycle Execution of Constructed Facilities

The primary objective of this course is to familiarize students with the terminology, planning and execution of constructed Mechanical, Electrical and Plumbing (MEP) systems.

*COURSE LEARNING OUTCOMES

The student will develop proficiency in implementing MEP design concepts including reading and interpreting drawings and construction documents; developing sourcing and equipment plans; and managing construction execution and completion through the turnover phase.

Calumet Department Head	Date	Calumet School Dean	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date
North Central School Dean	Date	North Central Vice Chancellor for Academic Affairs	Date
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date

12/29/09 4/5/10 5/20/10 West Lafayette Registrar Date

OFFICE OF THE REGISTRAR

5/19/10

EFD 12-10

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   Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
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Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Prerequisites: CEM 29100 Construction Internship II; CEM 30100 Project Control & Life Cycle Execution of Constructed Facilities

The primary objective of this course is to familiarize students with the terminology, planning and execution of constructed Mechanical, Electrical and Plumbing (MEP) systems.

*COURSE LEARNING OUTCOMES

The student will develop proficiency in implementing MEP design concepts including reading and interpreting drawings and construction documents; developing sourcing and equipment plans; and managing construction execution and completion through the turnover phase.

Calumet Department Head	Date	Calumet School Dean	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date
North Central School Dean	Date	North Central Vice Chancellor for Academic Affairs	Date
West Lafayette Department Head	12/29/09 Date	West Lafayette College/School Dean	4/5/10 Date
		West Lafayette Registrar	Date

OFFICE OF THE REGISTRAR

TO: The Faculty of the College of Engineering

FROM: Division of Construction Engineering and Management

RE: New Undergraduate Course CEM 45000
Building Systems in Construction

The Faculty of the Division of Construction Engineering and Management (CEM) has approved the following new course listed below. This action is now submitted to the Engineering Faculty with recommendation for approval.

CEM 45000 Building Systems in Construction
Sem. 2, Lecture 3, Cr.3.
Prerequisite: CEM 29100 - Construction Internship II and
CEM 30100 - Project Control & Life Cycle Execution of Constructed Facilities
or Department Permission

Description: The primary objective of this course is to familiarize students with the terminology, planning and execution strategies associated with constructed Mechanical, Electrical and Plumbing (MEP) systems. The student will develop proficiency in implementing MEP design concepts including reading and interpreting drawings and construction documents; developing sourcing and equipment plans; and managing construction execution and completion through the turnover phase.

Reason: This course is being taught as CEM 497 and will continue to be offered in the Spring semester. The syllabus for the proposed course is attached. This course will serve as a key course at the 400 level for CEM majors, as part of the Construction Engineering undergraduate curriculum.

Makarand Hastak, Professor and Head
Division of Construction Engineering and Management

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #21

Date 3/30/10

Chairman ECC R. Cipra

CONSTRUCTION BUILDING SYSTEMS
CEM 497-001 SYLLABUS SPRING 2009

Professor: Deanna McMillan, Ph.D. CIVL 1219 Phone: (765) 494-2242
Email: dimcmill@purdue.edu
Office hours: Wed. 3:00 – 5:00 pm or by appointment

TA: Nader Naderpajouh CIVL 1255 Phone: (765) 496-2046
Email: nnp@purdue.edu
Office Hours: Mon. 3:00 – 5:00 pm

Time: Tuesday/Thursday 3:00 – 4:15 pm (Lectures) PHYS 331

A. COURSE CONCEPT:

This course is considered a *proficiency* in your BSCNE program. You will have the opportunity to integrate and apply a wide range of subjects that have already been addressed both in the classroom and during your internships. The framework for the course is realistic, and the course material is based on actual construction projects. The project and work in this course is very similar to the work that will be expected of you in your early career after graduation.

Your assignments are considered practical experience. Some will be performed individually and some as a member of a student team. This "learning by doing" approach is a valuable part of your Purdue education. You should be prepared to participate and fully utilize your abilities and knowledge, to complete your tasks to the highest standards attainable.

B. OBJECTIVES OF THE COURSE:

The two primary objectives of this course are as follows:

- To familiarize students with the terminology, planning and execution of constructed MEP (Mechanical-Electrical-Plumbing) systems.
- To develop proficiency in implementing MEP design concepts including reading and interpreting drawings and construction documents; developing sourcing and equipment plans; and managing construction completion through turnover.

C. EXPERIENTIAL LEARNING MEANS...

1. Submittals. On an individual basis, you will perform realistic and practical tasks, developing and presenting written submittals based on construction documents distributed in class. You may be assigned in teams throughout the semester. You will develop open-ended approaches and solutions which will require planning, research, analysis, and decision-making just as in "real-world" construction engineering and management project. You may be required to make oral presentations.

2. Case Studies. Problem identification, analysis, and recommendations about complex, real-world issues in construction will be required in the case-study problems utilized in this class. Each group is expected identify resources in developing construction management approaches to resolving issues presented in the course materials.

D. TEXT: None required. Periodic homework assignments (submittals) with handouts provided. You may incur some costs for printing and production of your submittals and case studies. This cost is expected to be minimal. Handouts for assignments will also be posted on Blackboard.

E. CONSTRUCTED BUILDING SYSTEMS

May include but are not limited to:

1) HVAC Systems
2) Facilities – Structural, Support & Access ways incl. Flooring Systems
3) Utilities – Supply & Distribution
4) Controls (Electrical)
5) Conveyance
6) Environment
7) Integrated – Security & Hazard Detection
8) Air Monitoring, Ozone Destruction, Micro Water Systems
9) Fire Protection
10) Sanitary & Process Sewer

F. TOPICS COVERED IN THE COURSE

1. Terminology
2. Delivery Systems
3. Contractor Prequalification
4. Legal Issues and Clauses
5. Construction Methods
6. Project Controls
7. Workforce Leveling and Work Sequencing and Resource Leveling
8. Equipment Sourcing and Procurement Planning
9. Quality Control & Inspection
10. IQ/OQ (Installation Qualification/Operations Qualification)
11. Performance Testing & Process Reliability
12. Commissioning

g. Student Submittals & case studies: Grade Scale

You are expected to develop and submit professionally prepared, thorough assignments. (See attached Project Deliverables). Written, advance assignments for each submittal will provide you specific requirements and expectations.

Course Grading Criteria are as follows:

- Submittals 25%
- Case Studies[1] 40%
- Final Project 25%
- Attendance 10%

100%

Team Grading Policy: When team projects are assigned, each student on a team will receive the same grade (the team grade) on Case Studies and the Final Project. At semester end, you will submit a Peer Evaluation Form for the final Project, with which you can record any significantly better or lesser efforts by your teammates. This evaluation can result in an adjustment to your grade by a letter grade or more. An example of the form is attached at the end of this syllabus.

Final (Letter) Grades:

A = 90.0 and above
80.0 <= B < 90
70.0 <= C < 80
F < 70

Since this course covers an advanced construction engineering topic here at Purdue University, a high level of proficiency is required in order to pass, therefore anything below a grade of "C" will be failing. The point totals above are initial estimates and may change throughout the semester. Individual grades will be based on the grade points earned by the team, individual points, and the results of the peer evaluation.

Campus Emergency:

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in this course. **Blackboard Vista web page**, my **email address**: dimcmill@purdue.edu, and my **office phone**: 764.494.2242. I n case of emergency, you can also contact the CEM Division office at 765.494.2244.

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[1] Includes Peer Evaluation

G. Student REQUIREMENTS -- Attendance and Conduct

Attendance: As per Purdue University Regulations: "Students are expected to be present for every meeting of classes in which they are enrolled." In CEM 497-001 attendance is recorded and you are expected to have NO MORE THAN TWO UNEXCUSED ABSENCES IN THE LECTURE. Three unexpected absences will result in a course grade reduction of one letter grade. Four unexcused absences will result in a grade of "F" or "I" in the course.

If you anticipate being absent, you must request advance approval to be granted an excused absence, prior to the class missed (except in cases of a bona fide, urgent emergency), in a written memorandum to Dr. McMillan. State in the memo the day of and the reason for the absence, and that a teammate will pick up the class handouts on the day of absence. You are expected to schedule outside activities, including interview trips, so that you will NOT BE ABSENT to the maximum extent possible.

Quizzes, team assignments and other graded work that is missed due to an unexcused absence cannot be made up. Homework turned in advance of or on the day of an absence will receive full credit.

Conduct: Students are required and expected to abide by the laws of the United States and of the State of Indiana, by the rules and regulations of Purdue University, and by the code of ethics, which applies to the practice of engineering. Part 5 of University Regulations prescribes expected conduct and disciplinary procedures regarding academic honesty.

CEM 497-001 Building Systems
Schedule & Topics
Deanna McMillan
Spring 2010

CEM-497 Course Tentative Schedule	MEP Topic:	Construction Topic:	Assignment :	Guest Lecturer
Tuesday, January 12,2010:	HVAC systems		Chapter 2	
Thursday, January 14,2010:		Delivery Systems	Chapter 3	Ali Mostafavi
Tuesday, January 19,2010:	Plumbing, Piping and Mechanical Process	Micro-water systems	Chapter 4	
Thursday, January 21,2010:	Mechanical Components		Submittal #1	
Tuesday, January 26,2010:	Mechanical Components		Chapter 5	
Thursday, January 28,2010:		Construction Methods and Constructability		
Tuesday, February 2,2010:		Service Generation & Distribution		
Thursday, February 4,2010:	Facilities Utilities		Chapter 6	
Tuesday, February 9,2010:	Basic Electrical Systems		Chapter 10 & 11	
Thursday, February 11,2010:		Light Rail System (Mass Electric Construction Corporation)		John Locke
Tuesday, February 16,2010:		Korean Relo Project -(Army Corps of Engineers)	Case Study	Col. Gordon Trounson -
Thursday, February 18,2010:	Electrical Components	In Class-Campus Project		
Tuesday, February 23,2010:		Building System Processes		
Thursday, February 25,2010:		Project Controls Work sequence and resource leveling	Submittal #2	Chris Skiba, Mike Jones, Mike Carson
Tuesday, March 2,2010:	Electrical Components	Contractor Pre-qualification		
Thursday, March 4,2010:		Equipment sourcing &Procurement planning		
Tuesday, March 9,2010:			Case Study Presentations	

CEM-497 Course Tentative Schedule	MEP Topic:	Construction Topic:	Assignment :	Guest Lecturer
Thursday, March 11,2010:			Case Study Presentation s	
Tuesday, March 16,2010: Thursday, March 19, 2010:	SPRING BREAK			
Tuesday, March 23,2010:	Fire protection systems	In Class – Campus Project	Chapter 9	
Thursday, March 25,2010:		Safety	Submittal #3	
Tuesday, March 30,2010:	Safety Components & Monitoring	Confined Space	Chapter 12	Local Fire Dept
Thursday, April 1,2010:		Legal issues and Clauses		
Tuesday, April 6,2010:	Process Components	In Class-Campus Project	Chapter 7	
Thursday, April 8,2010:	Sanitary & Process Waste	Quality control and inspection	Chapter 8	
Tuesday, April 13,2010:	Air monitoring, Ozone detection,	Integrated Controls (Electrical)		
Thursday, April 15,2010:	Conveyance Systems			
Tuesday, April 20,2010:		IQ/OQ(Installation Qualification/Operations Qualification)		
Thursday, April 22,2010:		Performance Testing, Process Reliability, and Commissioning		
Tuesday, April 27,2010:	Lighting	Equipment Design & Testing	Chapter 14 & 15	
Thursday, April 29,2010:		In Class – Campus Project	Student Choice	
Week of May 6			Final Exam	