

Engineering Faculty Document 109-23  
February 6, 2023  
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To: The Engineering Faculty  
From: Construction Engineering & Management  
Re: New Undergraduate course CEM 43100 – Introduction to Facility Engineering & Mgmt

The Faculty of Construction Engineering and Management department has approved the following new undergraduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval

New course

To:  
CEM 43100 – Introduction to Facility Engineering & Management  
Fall  
3 total credits; Lecture  
No prerequisites

**Reason:** This course introduces students to the field of facility engineering and management, the operation of constructed facilities to ensure efficient operation, meet stakeholder needs, and preserve the facility for its intended life. The course is a technical elective for Construction Engineering and Management students who are familiar with the delivery of capital construction projects and provides an owner/operator perspective of capital construction and ongoing operations. The course focuses on the different capital construction types (buildings, roads, bridges, tunnels, water treatment facilities, and industrial facilities). Guest speakers will be used to present the challenges specific to individual facility types. Methods and tools to develop the needed management and annual operational plans for facilities will be used. Case studies will be used to demonstrate the application of methods and tools.

This course is offered at the graduate level as CEM 53100

**Enrollment History of CEM 53100:**

Fall 2021 (23 graduate, 1 undergraduate), Fall 2022 (30 graduate, 1 undergraduate)

*Makarand Hastak*

Head of CEM

# CEM 43100

## Introduction to FACILITY ENGINEERING and MANAGEMENT

### Fall Semester 2023

**Professor:** Theodore J. Weidner, Ph.D., PE, RA, CEFM, DBIA  
**Office:** HAMP 1245  
**Telephone:** 765-494-2250  
**Email:** tjweidne@purdue.edu  
**Office Hours:** TBD

TIME	PLACE	CREDITS
		3 Credits

#### ABSTRACT

This course introduces students to the field of facility engineering and management, the operation of constructed facilities to ensure efficient operation, meet stakeholder needs, and preserve the facility for its intended life. The course is a technical elective for Construction Engineering and Management students who are familiar with the delivery of capital construction projects and provides an owner/operator perspective of capital construction and ongoing operations. The course focuses on the different capital construction types (buildings, roads, bridges, tunnels, water treatment facilities, and industrial facilities). Guest speakers will be used to present the challenges specific to individual facility types. Methods and tools to develop the needed management and annual operational plans for facilities will be used. Case studies will be used to demonstrate the application of methods and tools.

#### TEXTS

Facilities Management: Theory and Practice, Alexander, Keith ed. 1996

Other materials as identified

#### DESCRIPTION

The course includes a combination of lectures, assigned readings, individual assignments, 2 exams, and a final exam. Students will explore and gain an understanding of the analytical methods associated with operating a physical infrastructure. The students will learn:

- Introduction to maintenance workforce: hours, productivity, and staffing
- Data required to maintain facilities
- External factors related to owning and/or operating facilities
- Measuring stakeholder satisfaction
- Planning capital improvements and/or expansion

## OBJECTIVES

Students will learn how to apply the overall goals of operating and maintaining constructed infrastructure, analyze and evaluate the annual operating needs, predominately labor and materials, for the infrastructure. Students will also be able to make capital replacement recommendations based on cost-benefit analysis of existing operating costs of a facility. Students must complete a comprehensive project that will require them to identify data needs, analyze the data, and report conclusions. Professional writing and presentation skills are required.

### *Course Schedule*

Weeks #	Topic
1	Course overview – definitions and organization
2	Maintenance workforce – identify the differences between on-call staff and permanent workers including the implications on productivity
3 & 4	Facility Planning & Design – Before construction – how do owners define what is required
5 & 6	How Much/How Big? – Applying productivity measures to the entire facility
7 & 8	Budgets & Costs – The financial plan – Evaluating prior performance and designing future plans
9 & 10	Maintenance of the Physical Infrastructure – Care of the engineered product
11 & 12	Operations – Care of the users – Responding to subjective measures
13 & 14	Monitoring & Measuring – Metrics and knowledge needed
15 & 16	Renewal of the Physical Infrastructure – Preservation and modernization through evaluation results

### *Class Participation*

All students are expected to participate in class discussions through relation of personal experiences or observations regarding the subject of the day. Learning from discussion of course theory and observations of practical applications is an essential component of learning; discussion and questions will be encouraged. The use of communication devices during class is prohibited.

### *Learning validation*

There are 8 (eight) assignments in the course. The assignments will cover reading material and class discussions; they are intended to keep the student on pace and ensure concepts are understood. The assignments represent 40% of the student’s final grade for the semester.

There are **2 exams** in the course; each exam is worth 20% of the total grade. The exams will cover material discussed in the readings and classroom discussion. Final exam represents 20% of the course.

## Purdue Honors Pledge

*“As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – we are Purdue.”*

## GRADING

The breakdown of the total grade is:

• Homework/Assignments	40 %
• Exams (2)	40 %
• Final Exam	<u>20 %</u>
<b>Total:</b>	100 %

## OTHER RESOURCES

CAPS – Counseling and Psychological Services, 765-494-6995, <http://purdue.edu/caps/> . Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. Counselors are located in the Purdue University Student Health Center (PUSH) during business hours.

DRC – Disability Resource Center, 765-494-1247, <http://purdue.edu/drc/> , students may present a “Letter of Accommodation” identifying any required accommodations. The professor requests this be done as early in the semester as is practical.

## Course Material Use Statement

All course materials represent derivative works of the instructor and they are subject to the instructor’s copyright in such presentations and materials. As such, they cannot be sold or bartered without the express written permission of the instructor nor may they be posted to the world wide web, uploaded/posted to other sites outside the Blackboard course, or otherwise shared/used/distributed for purposes outside of their intended use for individuals currently registered in this course. *Sharing materials for purposes outside of course registration needs is explicitly prohibited.*

## Emergency Preparedness

The Purdue Emergency Preparedness website [http://www.purdue.edu/ehps/emergency\\_preparedness/](http://www.purdue.edu/ehps/emergency_preparedness/) has detailed information. A summary appears below.

**All Hazards Sirens** – Shelter-In-Place or shelter in designated location (e.g. tornado)

**Fire Alarm** – Evacuate the building. Emergency Assembly Area is the east side of RHPH (building opposite HAMP, to the west, across the mall). In bad weather we will assemble in the ARMS atrium (building to the north).

**All emergencies** – call 911 via campus phone or cell phone.

## NOTES

1. The course description and course schedule handouts provide the general framework for the course. However, the instructor reserves the right to make any modifications or changes to the course, depending on the class progress, or on any special circumstance that may arise during the semester.
2. **All submissions can be turned in typed or emailed in .pdf format.** Assignments that deviate from these instructions (e.g., torn from spiral binder, etc.) will not be accepted.
3. Problems and questions should be re-stated or paraphrased. Neat sketches (use of computerized drafting is encouraged) should be used whenever appropriate.
4. References should be footnoted or listed in a separate section of the final report.
5. Assignments should be turned in with name, course number, assignment number, and page number on each sheet (either in a header or footer). Neatness and presentation are important and will be considered when grading assignments.
6. All verbal presentations (written and oral) should be organized in a logical manner representative of good technical writing; see The Purdue OWL (Online Writing Lab) for assistance.
7. There will be no curve for the final grade, only straight averages. The grading policy for this course is as follows:

$X$  = Cumulative student score for the semester

<u>Student Score</u>	<u>Grade</u>
$X \geq 90$	A
$90 > X \geq 80$	B
$80 > X \geq 70$	C
$70 > X \geq 60$	D
$60 > X$	F