

Engineering Faculty Document 05-23
April 8, 2022

To: The Engineering Faculty
From: Construction Engineering & Management
Re: CEM 45100

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

- 1) Integrative Building Design
- 2) CEM 45100
- 3) 3 credit hours, lecture, Spring/Fall, non-repeatable
- 4) This course introduces the architectural and constructive challenges of comprehensive, integrated building design. In lectures, the range of constituent systems (active and passive) that combine to produce contemporary buildings will be presented with particular attention to the specific parameters and metrics that drive their functionality and performance. The central project is an extended exercise in design modeling: applying iterative refinements to introduce additional layers of systemic complexity and to respond to specific analytical measures of building performance. Success in this course will support the ability to productively contribute to building and construction projects from a variety of specific roles.
- 5) This course represents one of several technical electives available to Construction Engineering and Management students. There are two (6 credit hours) technical electives required for graduation with a BSCNE.

Reason: This course provides exposure to the iterative design process followed as more information is gathered and developed to prepare for the construction of buildings that have multiple systems frequently designed by other professionals.



Dr. Makarand Hastak
Professor and Derrnan Family Head of Construction Engineering and Management
Division of Construction Engineering and Management

CEM 49700

Integrative Building Design

CRN: 23971

Meeting time: 3:30 – 4:20 MWF HAMP 1113

3 credit hours

Course Brightspace page: <https://purdue.brightspace.com>

Restricted to Junior standing and above in the College of Engineering

Instructor

Geoff Graff RA, NCARB, LEED AP BD+C

Office: HAMP 1227

Email: ggraff@purdue.edu

Office hours: TBD

(<https://purdue.webex.com/meet/ggraff>)

Course Description

This course introduces the architectural and constructive challenges of comprehensive, integrated building design. In lectures, the range of constituent systems (active and passive) that combine to produce contemporary buildings will be presented with particular attention to the specific parameters and metrics that drive their functionality and performance. The central project is an extended exercise in design modeling: applying iterative refinements to introduce additional layers of systemic complexity and to respond to specific analytical measures of building performance. Success in this course will support the ability to productively contribute to building and construction projects from a variety of specific roles.

Learning Outcomes

- 1) Understand building systems fundamentals.
Methods of Evaluation: quizzes, exams, process participation
- 2) Apply knowledge of building systems to a model case.
Methods of Evaluation: project progress reports, project final report, process participation
- 3) Compare the outcomes of different design/system application choices.
Methods of Evaluation: project progress reports, project final report, process participation
- 4) Develop a design solution based on a range of input parameters.
Methods of Evaluation: project progress reports, project final report, process participation
- 5) Communicate project outcomes clearly and effectively.
Methods of Evaluation: project final report, project physical model (3D Print), process participation

ABET Student Outcomes

- 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- 2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- 3: An ability to communicate effectively with a range of audiences
- 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions

How to Succeed in this Course

If you want to be a successful in this course:

- Be self-motivated and self-disciplined.
- Be willing to “speak up” if problems arise.
- Be willing and able to commit to developing multiple solutions to given problems.
- Take advantage of class time, when provided, to work on the ongoing project.
- Always have new project progress to discuss at the next class.
- Be able to meet the minimum requirements for the course.
- Accept critical thinking and decision making as part of the learning process.

In contrast, here are some common behaviors that make this course more challenging:

- Assuming that there is a single answer to the problems presented.
- Waiting until the last day to begin assignments.
- Forgetting about deadlines.
- Ignoring emails from the instructor and/or your peers regarding course activities.
- Not getting familiar with the syllabus, assignments, and policies.

Learning Resources, Technology, & Texts

Required Textbook:

Building Construction Illustrated, 6th Ed., Francis D.K. Ching, Wiley
hardcopy or e-text

This will serve as a reference and study guide for reinforcing lecture content and working on the semester long modeling project.

Additional Readings:

Further required or supplemental readings may be added. These resources, or links to them, will be clearly posted on Brightspace.

Laptop Computer:

This will be an essential tool for the project work in this course.

Cont.

Software:
 SketchUp w/ Sefaira (academic), Trimble
 This will serve as the primary modeling, analysis, and presentation package for the course project.

Brightspace Page:
 You can access the course at <https://mycourses.purdue.edu/>. It is strongly suggested that you explore and become familiar not only with the site navigation, but with content and resources available for this course

Instructor’s Email Availability and Policies

I will typically be available via email daily, exceptions will be announced, and try to respond as soon as possible (generally within 24-48) hours. When emailing me, please place the course number and the topic in the subject line of the email (e.g., CEM 497 – Quiz 3 Question). This will help in locating and responding to your emails quickly.

Assignments and Points

Your learning will be assessed through a combination of participation, quizzes, a midterm, a project, and a final exam spread throughout the semester. Details on these assignments and exams, including rubrics to guide evaluation, and guidelines on participation and evaluation will be posted on the course site.

Assignment	Due	Points
Participation	Throughout the semester	100
Lecture:		
Quizzes	Throughout the semester	100
Midterm Exam	Week 7	150
Final Exam	Finals Week	200
Project:		
Progress Report 1	Week 5	100
Progress Report 2	Week 10	100
Final Report	Week 15	200
Model	Week 16	50
Total		1000

Specific assignment due dates will be announced in class and on the course Brightspace page.

Missed or Late Work

Missed assignments may only be made up with advance notification to the instructor including an explanation and plan for completion. These requests will be accepted at the instructor’s discretion and may include a point penalty of 5% per day late. Asking for an extension does not guarantee it will be granted.

Grading Scale

In this class grades reflect the sum of your achievement throughout the semester. You will accumulate points as described in the assignments portion above, with each assignment graded according to a rubric. At the end of the semester, final grades will be calculated by adding the total points earned and translating those numbers (out of 1000) into the following letters (there will be no partial points or rounding).

A:	930 - 1000
A-:	900 - 929
B+:	870 - 899
B:	830 - 869
B-:	800 - 829
C+:	770 - 799
C:	730 - 769
C-:	700 - 729
D+:	670 - 699
D:	630 - 669
D-:	600 - 629
F:	0 - 599

Attendance Policy

This course follows Purdue's academic regulations regarding attendance, which states that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by email or phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases falling under excused absence regulations, the student or the student's representative should contact or go to the [Office of the Dean of Students website](#) to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted for cases of grief/bereavement, military service, jury duty, and parenting leave. For details, see the [Academic Regulations & Student Conduct section](#) of the University Catalog website.

Guidance on class attendance related to COVID-19 are outlined in the [Protect Purdue Pledge for Fall 2021](#) on the Protect Purdue website.

Academic Integrity

Academic integrity is central to a meaningful and productive educational experience. Beyond supporting equity in the assessment of course work, it is essential to getting the best quality and highest value out of an investment in higher education. Violations relating to this course will not be tolerated and will be managed through established university policy:

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

Remember the Purdue Honor Pledge (<https://www.purdue.edu/odos/osrr/honor-pledge/about.html>):

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

Further policies can be found at the following:

<https://www.purdue.edu/odos/osrr/academic-integrity/index.html>.

<http://catalog.purdue.edu/content.php?catoid=8&navoid=8208#miscellaneous-conduct-regulations>.

<https://www.purdue.edu/policies/academic-research-affairs/ia3.html>,

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Purdue's nondiscrimination policy can be found at http://www.purdue.edu/purdue/ea_eou_statement.html.

Students with Disabilities

The course follows and fully supports the university policy with respect to students with disabilities as described below:

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Emergency Preparation

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 beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

Mental Health Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack: <https://purdue.welltrack.com/>. Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please see the Office of the Dean of Students, <http://www.purdue.edu/odos>, for drop-in hours (M-F, 8 am- 5 pm).

If you're struggling and need mental health services: 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 mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services: <https://www.purdue.edu/caps/>(CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.

Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the [Critical Needs Fund](#)

Violent Behavior Policy

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity.

Course Evaluation

Purdue uses an online course evaluation system to give you an opportunity to evaluate this course and your instructor. During the last two weeks of the course, you will receive an official email from evaluation administrators with a link to the online evaluation site. Your participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

Disclaimer

This syllabus is subject to change. Any changes will be announced in class and on the course Brightspace page.