



## **CE 432/532 - ADVANCED STRUCTURAL DESIGN IN STEEL**

**C E Chavez Bldg, Rm 109, Tu Th 2:00PM - 3:15PM**

### **Description of Course**

Advanced Structural Design in Steel (3) I Advanced problems in the analysis and design of steel structures including beam-columns, plate girders, composite construction, multi-story buildings; static and dynamic vertical and lateral loads; connections; computer applications. May be convened with 532.

### **Course Prerequisites or Co-requisites**

CE 334 or consent of the instructor.

### **Instructor and Contact Information**

Instructor: Achintya Haldar

Office: 220E, CE Bldg.

Phone: 621-2142

Email: [haldar@u.arizona.edu](mailto:haldar@u.arizona.edu)

Office Hours/"Open Door Policy"

Instructor home page – [haldar.faculty.arizona.edu](http://haldar.faculty.arizona.edu)

### **Course Format and Teaching Methods**

Lecture only, in-class discussions with handouts.

### **Course Objectives and Expected Learning Outcomes**

#### **Part 1 - Design of a multi-story building**

Conceptual design

Load analysis

Design of all structural elements

Detail of all connections

Estimate of weight of steel

Discussion

A detailed project report

#### **Exam #1**

#### **Part 2 - Beam-Column design**

Braced frames

Unbraced frames

## **Exam #2**

### **Part 3 - Design of plate girders**

Modes of failure

Elastic buckling

Bending in the plane of web

Local buckling

Buckling in the plane of web

Vertical buckling of the compression flange

Shear buckling

Inelastic buckling under pure shear

Tension field action

Design of stiffeners

Bearing stiffeners

Intermediate stiffeners

Preliminary design of a plate girder

A detailed design project

### **Part 4 - Composite steel-concrete construction**

An ABET Course Classification Form is attached. For further information see

[http://assessment.arizona.edu/academic\\_degree\\_programs](http://assessment.arizona.edu/academic_degree_programs))

## **Absence and Class Participation Policy**

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

## **Course Communications**

Students will be communicated by emails in most cases.

## **Required Texts or Readings**

- (1) Steel Construction Manual, AISC, 15<sup>th</sup> Ed. If you do not have the manual, please talk to me after class to buy it at a discounted price. (required)
- (2) Class handouts (I will email to you) (required)
- (3) Steel Structures Design and Behavior by Salmon and Johnson, 4th Ed. (**not required**)

### **Required or Special Materials**

Must bring the handouts every day in the first phase of the class.

### **Required Extracurricular Activities (if any)**

None.

### **Assignments and Examinations: Schedule/Due Dates**

Weekly homework	10%
2- One Hour Exams	40%
1- Final Exam	30%
Project	20%
	<hr/>
	100%

### **Final Examination or Project**

The date and time of the final exam or project, along with links to the Final Exam Regulations, <https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information>, and Final Exam Schedule, <http://www.registrar.arizona.edu/schedules/finals.htm>

**May 6, 2019 (Monday); 3:30 to 5:30 pm**

## Grading Scale and Policies

University policy regarding grades and grading systems is available at <http://catalog.arizona.edu/policy/grades-and-grading-system>

Late HWs without proper justification will not be accepted.

Composite grades will be calculated using the weight factors mentioned earlier. Students will then be grouped in to several sub-groups for the overall grading purpose.

**Since it is a 400/500 course:** Undergraduate and graduate students will be graded separately. Levels of sophistication used in the solution strategy of a problem will be used as one of the parameters in grading undergraduate and graduate students. Graduate students will be expected to do more work on the required project than the undergraduate students. Bonus questions, if assigned, will also be graded differently for undergraduate and graduate students.

**Requests for incomplete (I) or withdrawal (W)** must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

**Dispute of Grade Policy:** Contact me immediately if you have any question or comment on the grade you receive following an exam.

## Scheduled Topics/Activities

HWs will be due in one week period. Two Hour Exam dates will be announced at least 2 weeks in advanced.

## Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Some learning styles are best served by using personal electronics, such as laptops and iPads. These devices can be distracting to other learners. Therefore, students who prefer to use electronic devices for note-taking during lecture should use one side of the classroom.

## Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

## Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

## **Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at

<http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

*Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent.* Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions.

Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

## **UA Nondiscrimination and Anti-harassment Policy**

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

## **Additional Resources for Students**

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

Student Assistance and Advocacy information is available at

<http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

## **Confidentiality of Student Records**

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

## **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.