

## **CVET-431-01 Structural Design - Steel** *Fall 2018-2019*

Instructor: **Dr. Amanda Bao, P.E.**

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Lecture: **T, R: 9:30-10:45am, Room GLE-2129**

Office Hours: **Mon: 9:30-10:30am; Tue: 3:00-4:00pm; Thu: 12:00pm-1:00pm**

### **Texts:**

1. Structural Steel Design, 6<sup>th</sup> Edition, by McCormac J.C., Pearson, 2017
2. Steel Construction Manual, American Institute of Steel Construction, 15<sup>th</sup> Edition

### **References:**

1. ASCE 7, Minimum Design Loads for Buildings and Other Structures, ASCE Standard, 2010
2. International Building Code, ICC

### **Prerequisites:**

CVET-332 Structural Analysis with STAAD

### **Intended Learning Outcomes:**

After completing this course, you will be able to:

1. Calculate dead, live, snow, wind and seismic loads acting on building structures and components using ASCE 7 Code.
2. Identify vertical and lateral load paths in building structures.
3. Select appropriate structural systems for resisting lateral loads in building structures.
4. Design basic structural elements in steel such as beams, columns, hangers, lateral braces and floor systems using AISC Steel Construction Manual and International Building Code.
5. Present design information in the form of design calculations, structural plans, sections and details.

6. Perform more effectively in teams with enhanced oral/written communication skills and improved leadership and interpersonal skills through design project.

**Course Outline:**

1. Introduction to steel structures (2 lectures)
2. Structural loads and systems, steel framing (4 lectures)
3. Tension members (2 lectures)
4. Compression members (2 lectures)
5. Non-composite beam design (4 lectures)
6. Composite beam design (3 lectures)
7. Combined axial load and bending (4 lectures)
8. Bolted connection (2 lectures)
9. Welded connection (2 lectures)
10. Tests & Presentations (3 lectures)

**Homework Assignments:**

Homework assignment will be posted on the course website at <http://mycourses.rit.edu>.

- **Homework problems are due by 4pm on the assigned due date. No late homework will be accepted or graded.**
- Calculations should be neat and organized. Sketches, assumptions, units, and references must be included, where appropriate. Show all works in details. Use Engineering paper only, write on one side and box your solutions. All numerical values shall include the appropriate units. Points will be deducted from the assignment grade if this format is not followed.
- No point will be given for work that has been copied from other students or resources.
- Assignments will be graded and handed back within one week.
- Solutions to the homework assignments will be posted in the display case outside CETEMS office.

**Homework Assignments Schedule:**

Homework #	Handout Date	Due date	Topic
1	Thu. 8/30	Thu. 9/6	Steel Structure Introduction
2	Thu. 9/6	Thu. 9/13	Gravity Loads & Framing
3	Thu. 9/13	Thu. 9/27	Lateral Loads & Systems
4	Thu. 9/27	Thu. 10/4	Tension Member
5	Thu. 10/4	Tue. 10/16	Compression Member
6	Tue. 10/16	Thu. 10/25	Non-Composite Beam
7	Thu. 10/25	Tue. 11/6	Composite Beam
8	Tue. 11/6	Tue. 11/20	Combined Axial & Bending
9	Tue. 11/20	Thu. 11/29	Combined Axial & Bending
10	Thu. 11/29	Mon. 12/10	Connections

## Design Project

- A group design project will be assigned in this course and a formal design project report (including detailed design calculations) with CAD drawings is required.
- The design project will be carried out in a group of **4** students. Students are encouraged to form their own teams, and the names of the company and team members should be submitted to the instructor by **Friday, August 31, 2018**.
- MS Excel spreadsheets/ Hand calculations are encouraged to use in the steel member design and strength check.
- Each team member is expected to put in equal amount of effort and must identify his/her portion of the design project report.
- Each team member will be required to make an oral presentation of their design project.
- To evaluate individual contributions to the team's effort, the members in each team will be required to submit peer reviews and evaluations within their group together with their design project report.
- The design project will be assigned group grades.

## Conduct in Lectures:

Please be on time and conduct yourself in a respectful and professional manner in class. Students will refrain from wearing headphones, earpieces, or other audio devices during class. Laptops can only be used during class for note-taking purposes. Cell phones, pagers, texting devices, I-pods, etc. should be set to silent mode.

## Computer Usage:

STAAD or computer-aided Structural Analysis Software will be used for structural analysis in the design project. AutoCAD or Revit should be used for plan production in the design project.

## Access to DDL Lab:

Access to the lab will be by card swipe. **YOU must request access through the following link:** [https://apps.rit.edu/cast/labs/lab\\_access/index.php](https://apps.rit.edu/cast/labs/lab_access/index.php)  
Chris Brown ([cjbsps@rit.edu](mailto:cjbsps@rit.edu)) will be the point of contact for any issues with accessing the lab.

## Course Web Site, Online Discussions, and E-mail:

The course web site at <http://mycourses.rit.edu> will mainly be used to post handouts, homework and test information. Structural Analysis and STAAD screencasts are available on the web site: <http://baoteachingcet.com>. (Screencasts Access: **Username: test, Password: 1234**). Some announcements relating to this course may be sent to you via e-mail.

**Exams:**

There will be two 1-hour tests and a 2.5-hour final exam in this course, and all exams are open book and notes.

**Exams Schedule:** (Exams are open book and open notes, AISC Steel Construction Manual is required)

Exam #	Date	Covers HW #
1	Thu. 10/11/18 (1 hour)	1, 2, 3, 4
2	Thu. 11/15/18 (1 hour)	5, 6, 7
3	Final Exam	All

**Note:** No make-up tests will be given except in **very extenuating** circumstances and only if the instructor is given prior notice. **The final exam will not be returned** but you may look through your graded final exam booklet in my office.

**Grade Distribution:**

Homework	= 20%
Two Mid-Term Tests@ 12.5% each	= 25%
2-hour Final Exam	= 25%
Design Project Report/Presentation	= 30%

**Letter Grades:**

The letter grades in this course will be assigned as follows:

<b>A</b>	=	93-100
<b>A-</b>	=	90-92
<b>B+</b>	=	87-89
<b>B</b>	=	83-86
<b>B-</b>	=	80-82
<b>C+</b>	=	77-79
<b>C</b>	=	73-76
<b>C-</b>	=	70-72
<b>D</b>	=	60-69
<b>F</b>	=	Below 60