

**Department of Civil and Environmental Engineering  
Colorado State University  
CIVE 561 - Advanced Steel Behavior and Design  
Spring 2018**

**Instructor:** Prof. Hussam Mahmoud  
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**Office Hours:** Tue, 1:00 p.m. – 3:00 p.m. @ A205A

**Class Hours:** Tue & Thu, 8:00 – 9:15 a.m.  
**Room:** Engineering, B2  
**Required Textbook:**

AISC, Manual of Steel Construction: Load and Resistance Factor Design, 15<sup>th</sup> Edition, 2011.

**Prerequisites:** CIVE 466 and CIVE 367. It is recommended that students be finished with or take concurrently: CIVE 302.

Because of the nature of the topics that we will be covering in this course, your understanding of indeterminate analysis and design of steel tension and compression members, beams, beam-columns, and rudimentary connections should be complete. You will need to use this information at several points throughout the course, including for the written and oral examinations. *In addition, knowledge of SAP2000 is important for the final project. Two or three class periods will be used for SAP2000 lab sessions. It is vital that you attend these sessions.*

**Ref. Text:** Segui, W.T. *Steel Design*, 6th Edition. Cengage Learning, 2018.

Salmon, C.G., Johnson, J.E., and Malhas, F.A. *Steel Structures, Design and Behavior*, 5th Ed. Upper Saddle River, NJ: Pearson, 2009.

Galambos, T. V., Lin, E., and Johnston, B. G., *Basic Steel Design*, Prentice Hall, Englewood Cliffs, New Jersey, 1996.

Gaylord, E. H., Gaylord, C. N., and Stallmeyer, J. E., *Design of Steel Structures*, Third Edition, McGraw-Hill, New York, 1992.

McGuire, W., *Steel Structures*, Prentice Hall, New York, 1968.

**Additional Refs.:** Selected papers and handouts.

You should familiarize yourself with the trade magazines and journals, including at a minimum:  
*Modern Steel Construction* American Institute of Steel Construction.  
*Engineering Journal*, American Institute of Steel Construction.  
*Journal of Structural Engineering*, American Society of Civil Engineers.

**Homework:** There will be approximately six projects, with the last one being a major design project and a formal oral presentation. Most projects will be done as a group. Some projects will be done in groups while others will be individual projects. No late assignments will be accepted. Points will be deducted for sloppy work. Solutions are to be developed using a pencil and a ruler and presented on an engineering papers (points will be deducted if this is not followed).

**Mid Term Exams:** There will be one take home and open book/references exam. You will have a week to do the test. The exam will be due at the beginning of class.

**To be Announced:** Date of the written Midterm Examination. The exam will likely be during last four weeks of classes and mostly towards the end (i.e. April sometime)

Date of the Oral Presentation (it will be during the final week of class.)

**Grading:** Final Grade is A-F only (i.e. not pass/fail). Please let me know now if you will need special accommodations for the presentations or exams.

Group Projects (not including final design project):	30%
Individual assignments:	15%
Final Design Project (not including oral presentation):	15%
Oral presentation/examination:	10%
Midterm Examination (open book):	30%
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Total	100%

You must take the written examination, turn in the final design project, and do the oral presentation/examination to pass the course, regardless of your cumulative average in the course.

**Final Exam (oral presentation) is May 10 (6:20 p.m. – 8:20 p.m.)**

**Scholastic Conduct:** The course will adhere to the academic integrity Policy of Colorado State University General Catalog (Page 7) and the student Conduct Code. CSU and college of engineering polices on academic integrity can be found on the web at:

<http://catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf>

These policies will be strictly enforced. Any violation to the policies will result in dismissal from the course with grade “F” and possible dismissal from the university.

The following Honor Pledge should be hand written and signed on all of your academic work in this class including HW, Exams, and Term Project: ***I pledge on my honor that I have not received or given any unauthorized assistance in this exam [assignment] [academic work].***

**Class Conduct:**

Reading the AISC manual is required. LRFD Specification Chapters also require reading of the corresponding Appendix and Commentary. Students are expected to read Salmon and Johnson and other books and journals (in the library) to complete their understanding of each subject.

Most projects will be done in groups of approximately four people. All members of the same group will receive the same grade for each project (except those portions of a project that each person must submit individually).

A major design project and group oral presentation of the project will be due at the end of the quarter. It must be completed to pass the course. Each member of each group must participate in the preparation of the group's oral presentation, and each person must present a portion of it (approximately 5 to 8 minutes per person). The grades for the oral presentation will be for each individual. Students are expected to practice the presentation sufficiently before presenting it and assure that it can be presented within the time limits. Oral questions, in the form of a brief examination, will follow the presentation.

Every student is expected to understand all aspects of every project, regardless of whether they actually did the majority of work for a particular portion of the project.

The examination is two hours and is open book (there will be no final written examination).

**Tentative Schedule:** The course will include the following topics:

Topic	Readings	
	Salmon and Johnson	AISC (Numbers: Manual; Letters: Specification)
Introduction (no lecture)	Chs. 1, 2	1, A
Connections (2.5 wks)	Chs. 4, 5, 13	B, J, K
Columns (2 weeks)	Ch. 6	E

Plate Girders (2 weeks)	Chs. 6, 11	4, A, B, F, G, K
Composite Members (2.5 wks)	Ch. 16	3, 4, 5, B, E, F, H, I
Torsion (1 wk)	Ch. 8	F, H
Multi-story frames (3 wks)	Chs. 12, 14, 15	All, but especially C

As time permits, other topics may be covered, with reading assigned at that time.

**Class Objectives:** Enable students to:

1. Understand the mechanical behavior of steel as a construction material
2. Evaluate the physical behavior and response of various structural components
3. Comprehend the relationship between experimental tests and code equations
4. Apply the design procedure for the structural components using the design specifications
5. Check the adequacy of a given member, connection, or structural system.
6. Design a full structural system