


### What is CIVL 3121?

**Course Title:** Structural Analysis I

**Course Description:**

*Analysis of statically determinate structures; reactions, shear, and moment; truss analysis; deflections; influence lines and moving loads.*




### What is CIVL 3121?

**Prerequisites:** CIVL 2131 - Statics

**Corequisites:** CIVL 3322 - Mechanics of Materials

**Course Meetings:**  
Tuesday/Thursday; 9:40 - 11:05 ES 114




### What is CIVL 3121?

**Instructor:**  
Dr. Charles Camp, Office: ES 106B  
Phone: 678-3169 (office)  
Email: cvcamp@memphis.edu

**Office hours:**  
An "open door policy" or by appointment

**Class web site:** [www.ce.memphis.edu/3121](http://www.ce.memphis.edu/3121)

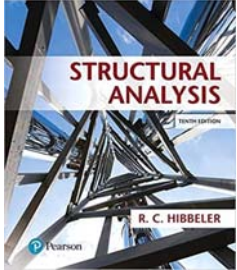



### What is CIVL 3121?

- Required Textbooks:**

**Structural Analysis**  
Russell C. Hibbeler  
Tenth Edition  
Pentice-Hall, 2018

**ISBN-13:** 978-0134610672  
**ISBN-10:** 0134610679






### What is CIVL 3121?

**Course Learning Outcomes**


Course Learning Outcomes	POs'	Assessment Tools
1. Compute the determinacy and stability of structures.	1	Homework
2. Analyze truss structures	1, 2, 3, 6	Exam and project
3. Determine the shear force and moment in beams and frames	1	Exam and project
4. Determine influence lines for beams	1	Exam
5. Compute deflections of beams using direct integration, conjugate beam and energy methods.	1, 2, 3, 6	Exam and project
6. Application of analysis concepts to truss and beam design.	1, 2, 3, 5, 6	Projects



### What is CIVL 3121?

**Course Learning Outcomes**

- An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.
- An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to communicate effectively with a range of audiences.
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.
- An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.




### What is CIVL 3121?

#### Grading

The final grades for the course will be based on the following percentages:

Components	Percentages
Homework	10%
Individual Design Project	5%
Group Design Project	15%
2 Exams (20% each)	40%
Final Exam	30%




### What is CIVL 3121?

#### Grading

Final letter grades will be based on the following scale which reflects the percentages as noted above.


Exam/Homework/Projects	Grade
90-100	A
87-89	B+
84-86	B
80-83	B-
77-79	C+
74-76	C
70-73	C-
Below 70	F



### What is CIVL 3121?

#### Grading


- ▶ Regular attendance is necessary to maintain pace with the lectures and the progress of the class.
- ▶ If you must be absent, please make sure you know the assignment for the following class meeting and turn in any work due that day.



### What is CIVL 3121?

#### Make-up Work


- ▶ Generally, if a student misses an exam, a homework assignment, or a project deadline, a score of zero will be recorded.
- ▶ However, the student may be allowed to make-up an exam or turn in their homework late if a valid reason for the absence is presented to the instructor at the next class meeting.
- ▶ If the student must miss an exam because of a conflict in their schedule the student must notify the instructor in writing at least two days prior to the absence.



### What is CIVL 3121?

#### Make-up Work


- ▶ Homework is due at the beginning of class on the due date.
- ▶ **Late homework will not be accepted for any reason.**
- ▶ To account for a missed assignment, even with an valid excuse, the lowest 10% of all the homework assignments will be dropped for consideration in computing the homework average.



### What is CIVL 3121?

#### Homework Format

- ▶ All assignments are to be submitted on engineering paper. You may use any type of engineering paper as long as it has a background grid.
- ▶ If an alternate form of paper is used, the headings at the top of the page should be modified to match the printed partitions, however, the remainder of the instructions apply equally to either form.




### What is CIVL 3121?

Homework Format

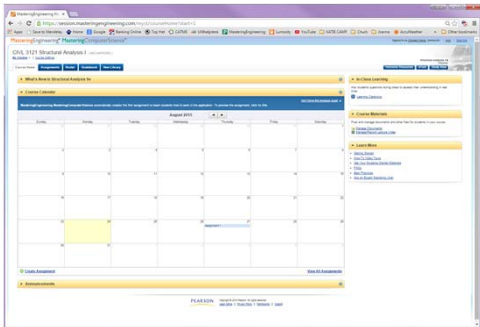

This semester we will also be using:

**Mastering Engineering** for homework

Spring 2019 ( **MECAMP87397** )




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Homework Format


- ▶ Work should be done in pencil, and a lead hardness used which produces good contrast to the paper.
- ▶ Figures should be drawn with a straight edge and if appropriate, a circle template or compass. The layout and appearance of your work should be of professional quality.
- ▶ Work no more than one problem per page.



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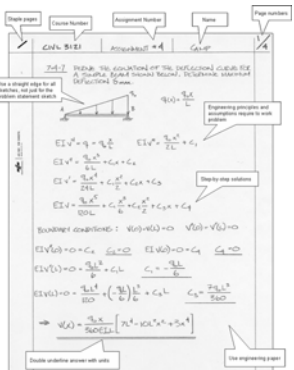
Homework Format

- ▶ Do not use the back of a page for any reason.
- ▶ All pages should be ordered by page number and stapled.
- ▶ A good guide for this standard is to prepare each assignment as if it were to be kept on file and sent to prospective employers as an example of your work at University of Memphis.




### What is CIVL 3121?

Homework Format

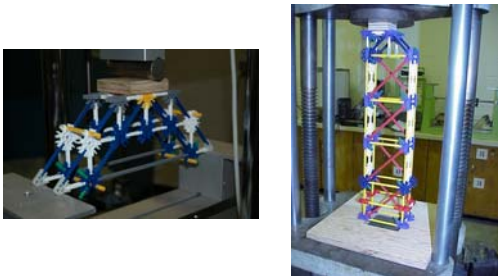



The handwritten solution shows the derivation of the deflection curve  $w(x)$  for a beam. It starts with the differential equation  $EI w'''' = q$  and integrates it four times to find the deflection curve. The final result is  $w(x) = \frac{q x^4}{24EI} + C_1 x^3 + C_2 x^2 + C_3 x + C_4$ . The constants  $C_1, C_2, C_3, C_4$  are determined by applying boundary conditions at  $x=0$  and  $x=L$ .



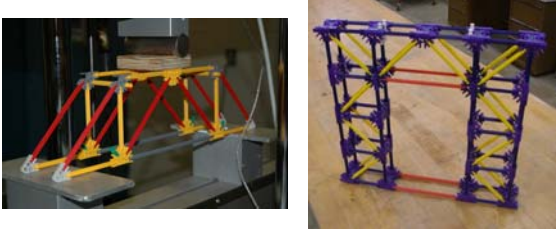
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Individual Design Project – K'NEX structures



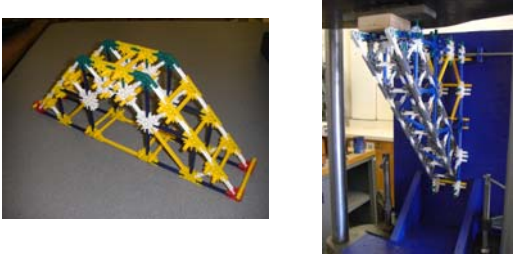
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Individual Design Project – K'NEX structures



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Individual Design Project – K'NEX structures



 What is CIVL 3121?


Group Design Project – Chipboard Beam



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Group Design Project



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Any questions?

