

## CIVE 303: Structural Analysis 1 Winter 2021

### Instructor and T.A. Information

Instructor: Cory Zurell  
Office: my living room  
Office Hours: to be held virtually through Microsoft Teams; TBD or email to arrange another time  
Email: czurell@uwaterloo.ca

T.A.	Philip Lochan	Maxime Cleroux
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### Course Description

Analysis of statically indeterminate structures using force and displacement methods. Influence lines for determinate and indeterminate structures. Approximate methods. Introduction to the matrix stiffness method.

### Learning in an online world, Class Hours

Live-streamed lectures through Microsoft Teams will be held on Wednesdays and Fridays at 10:00am (Eastern time). These will also be recorded and posted to a Microsoft Stream channel for posterity. In addition, some content, including examples, will be posted as pre-recorded videos to watch at your leisure.

Lectures:	Wednesday	10:00-11:20
	Friday	10:00-11:20
Tutorial:	Monday	10:30-11:20

### Course Goals and Learning Outcomes

Upon completion of this course, students should be able to:

- Sketch the deflected shapes of determinate and indeterminate structures and calculate deflections due to various loads.
- Determine where to place a moveable load to produce the maximum effect at a point in a structure.
- Determine the degree of static and kinematic indeterminacy of structures.
- Estimate forces/bending moments using approximate methods
- Perform structural analysis using the Stiffness Matrix Method.
- Analyze structures using a commercial structural analysis program (time permitting).

### Required Text

***Fundamentals of Structural Analysis***, Sixth Edition (International Student Edition)  
Kenneth M. Leet, Chia-Ming Uang, Joel T. Lanning  
McGraw Hill Education, 2021

PDF (180 day or lifetime options):

<https://uwaterloo-store.vitalsource.com/products/ise-ebook-online-access-for-fundamentals-of-leet-v9781260579574?term=9781260570441>

Hard copy, available at the WStore and through:

<https://wstore.uwaterloo.ca/leet-et-al-fundamentals-of-structural-analysis-6th-ed.html>

***A First Course in Finite Elements* (DO NOT BUY THIS ONE – E-Book available through the UW Library)**

J. Fish & T. Belytschko

Wiley, 2007

### Course Requirements and Assessment

Assessment	Weighting
Assignments (6 total)	20%
Test 1 (10 February)	25%
Test 2 (17 March)	25%
Test 3 (during exam period)	30%
Total	100%

\*A passing mark on Test 3 is required to receive a passing mark for the course.

### Course Outline (topics by week - tentative)

Week	Date (week of)	Topic
1	January 11	Introduction, Assumptions, Conventions, SFD, BMD, Deflections
2	January 18	Deflections, Principal of Virtual Work review
3	January 25	Stability/Determinacy, Force Method for indeterminate structures
4	February 1	Force Method
5	February 8	Force Method, deflection analysis, Test 1
6	February 15	READING WEEK
7	February 22	Influence Lines
8	March 1	Approximate Analysis
9	March 8	Displacement Method
10	March 15	Test 2, Displacement Method
11	March 22	Displacement Method, Matrix Analysis
12	March 29	Matrix Analysis
13	April 5	Matrix Analysis
14	April 12	Review

### Late Work

Assignments submitted after the due date will receive half marks if submitted within two days of the due date. Assignments submitted after this point will be corrected but will receive a mark of zero (0).

### Online Academic Integrity

All students are expected to work individually and submit their own original work. Under Policy 71, the instructor may have follow-up conversations with individual students to ensure that the work submitted was completed on their own. Any follow up will be conducted remotely (e.g., MS Teams, Skype, phone), as the University of Waterloo has suspended all in-person meetings until further notice.

## Graduate Attributes (GAs)

1. Knowledge Base	D	7. Communication	
2. Problem Analysis	D	8. Professionalism	
3. Investigation	D	9. Impact on Society	
4. Design		10. Ethics/Equity	
5. Use of Engineering Tools	I	11. Economics	
6. Individual/team Work		12. Life-long Learning	

## Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. See the [UWaterloo Academic Integrity webpage](#) and the [Arts Academic Integrity webpage](#) for more information.

## Discipline

A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to [Policy 71 - Student Discipline](#). For typical penalties check [Guidelines for the Assessment of Penalties \(https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/guidelines/guidelines-assessment-penalties\)](#).

## Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](#), Section 4 ([https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70](#)). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

## Appeals

A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72, Student Appeals \(https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72\)](#).

## Note for Students with Disabilities

The [AccessAbility Services](#) office, located on the first floor of the Needles Hall extension (NH 1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

## Fair Contingencies for Emergency Remote Teaching

We are facing unusual and challenging times. To provide contingency for unforeseen circumstances, the instructor reserves the right to modify course topics and/or assessments and/or weight and/or deadlines with due notice to students. In the event of further challenges, the instructor will work with the Department/Faculty to find reasonable and fair solutions that respect rights and workloads of students, staff, and faculty.