

ENGR 141

Engineering Mechanics

Introduction and Basic Concepts, and Definitions

Instructor: **Mohsen Akbari**, *Ph.D.*, Assistant Professor



Structure of the Lions gates
(Vancouver BC)



University
of Victoria



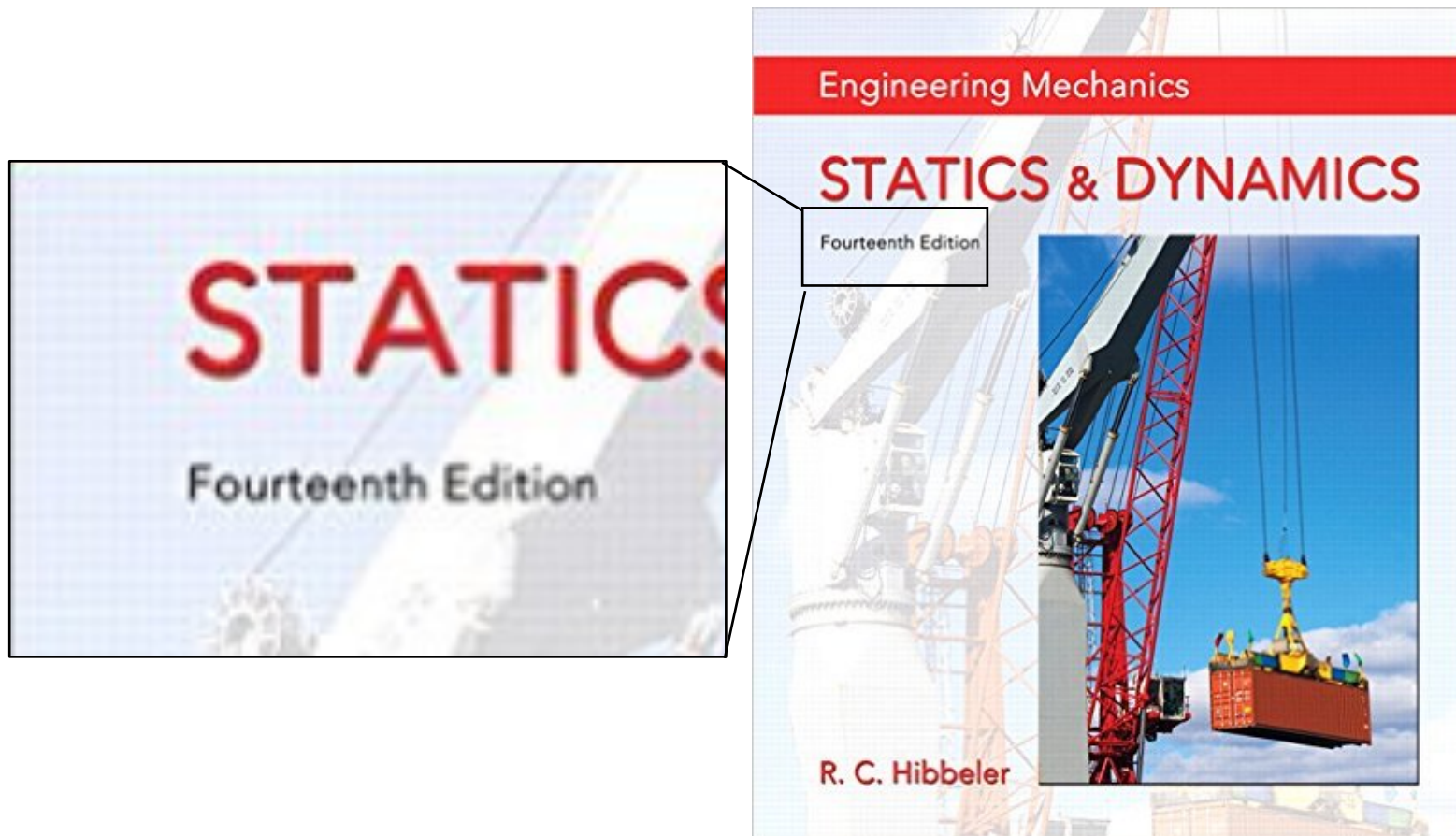
Space frame
system

Course Objectives

- This course deals with the concept of equilibrium as applied to rigid bodies- the case in which the forces and moments acting on a body do not result in an acceleration of the body.
- The course will define a methodology, the method of statics, used to determine certain forces and moments acting on and within rigid bodies, and structures and machines composed of rigid components, that are in equilibrium.

Recommended Texts and References

Required: RC Hibbeler, Engineering Mechanics – Statics & Dynamics, 14th Edition, Pearson, 2016.



What Will be Covered?

SECTION	TOPICS COVERED
1.1 – 1.6	Introduction: Course Overview, SI units, analysis procedure
2.1 - 2.9	Vectors: forces and positions, vector algebra, inner (dot) product
3.1 – 3.4	Particle equilibrium, equilibrium equations
4.1 – 4.3	Force system resultants: moment of a force
4.3-4.8	Cross product, principle of moments, reduction to equivalent loads
5.1 – 5.7	Equilibrium of rigid bodies: Equilibrium equations, FREE-BODY DIAGRAMS, Interconnections (constraints)
6.1 – 6.4	Truss analysis: methods of joints and sections
6.6	Frames and Machines.
4.9	Internal forces: distributed loads, shear and bending moment diagrams, method of sections.
7.1 – 7.2	Internal forces: distributed loads, shear and bending moment diagrams, method of sections.
7.3	Shear and bending moment diagrams: differential relations.
8.1, 8.2, 8.3,8.4	Friction: dry friction s crew forces, wedges
9.1 – 9.2	Centroids: center of gravity, composite bodies, integral methods.

Office Hours

Days: Open door. Best way to find me is to send me an email.
Please include “ENGR141-Name-Request” in your subject line.

E-mail: makbari@uvic.ca

Location: EOW 553

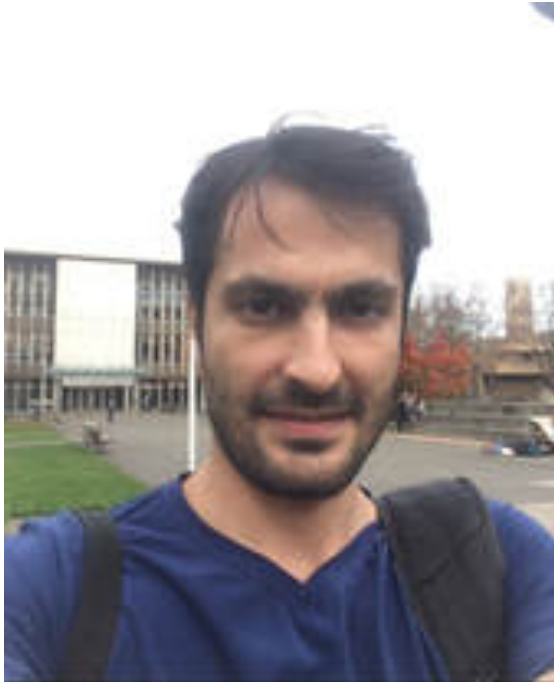
Lecture notes

- Pre-recorded lectures will be available to you on CourseSpaces.
- Please go over the videos before coming to lectures. I will briefly go over the material in the lectures and spend most of the time solving examples.
- Problems that will be solved in lectures will be available before each lecture. Please go over them and come to the class prepared.

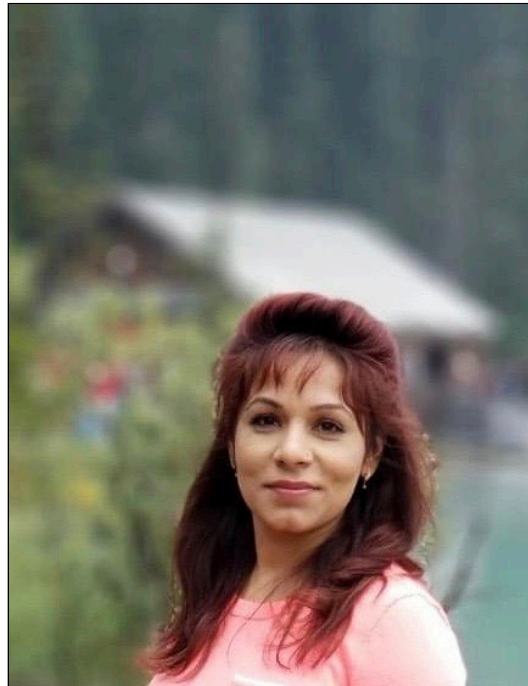
Lectures

- Days: Mondays and Thursdays from 10:00 am-11:30 am
- We use Zoom for the lectures. Please make yourselves familiar with this tool.
- Join Zoom Meeting <https://uvic.zoom.us/j/8599153914>
- Meeting ID: 859 915 3914

TAs



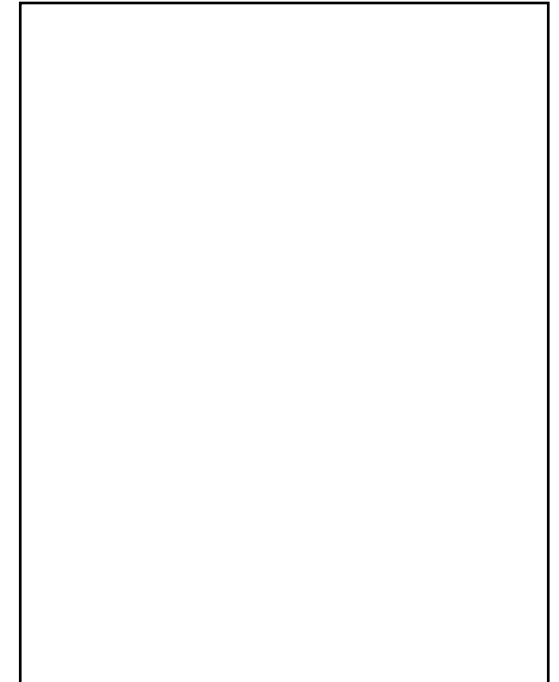
Meitham Amereh
m.amereh14@gmail.com



Anjali Anjali
anjali.anjali2045@gmail.com



Behnad Chehri
chehnad@gmail.com



Bhanu Koya
Koyabhanuprakash262@gmail.com

Tutorials

Start on May 12th via Zoom

- T01: Tuesdays, 11:30 AM – 12:20 AM (Primary TA: Meitham: m.amereh14@gmail.com)

- T02: Tuesdays, 14:30 AM – 15:20 AM (Primary TA: Behnad: chehnad@gmail.com)

- Zoom links:

T01: <https://uvic.zoom.us/j/93728763722?pwd=RmpwZ0pyRGVST0VwRnl5cXpKVfV4Zz09>

T02: <https://uvic.zoom.us/j/3934008785>

- Few problems will be solved during the tutorials by your TAs.

- Attendance will be taken and will be accounted as part of your final grade of the course (see the evaluation).

Assignments

There will be 10 assignments which will be given to you on Mondays (starting May 11th) every week.

- Assignments are worth 20% of your final grade.
- Assignments **MUST** be uploaded to CourseSpaces.
- You will have one week to solve the problems. For example, Assignment#2 will be posted online on May 18st, thus, you **MUST** submit it by **the noon** of May 25th.
- Late submissions or submissions via email will **NOT** be accepted.

Assignments

Two random problems will be selected and graded.

- Each assignment will be graded out of 100% (50% for submitting the assignment and 50% for correct solutions)
- You can solve the assignments with the help of your friends but please DO NOT copy from each other or the solution manual.

Assignments

Format

- We only accept assignments in PDF. Please ensure that you have access to a scanner. "Tiny Scanner" is a free Android App for converting images to PDFs. Genius Scan and "CamScanner" are iPhone options. Please make yourselves familiar with these apps.

- Please name your assignments as follows

"ENGR141_ASSIGNMENT#_LAST NAME_YOUR V#".

For example, for assignment #2, Akbari's file should be named as

ENGR141_ASSIGNMENT#2_Akbari_V0013xxx.

- Please make sure that the assignment file is clear and readable.

House Keeping

Suggested problems

- A few suggested problems will be posted online every week for those who want to practice more.
- Solving these problems is optional but highly recommended.

House Keeping

Quizzes

- There will be 3 quizzes, each worth 5% of the final grade.
- Tentative dates are

Quizz#1: June 16th

Quizz#2: July 7th

Quizz#3: July 21th

- Quizzes will be open-book.
- TAs will be available during the test and can be reached via Zoom.

Quizzes

- The questions will be posted in **PDF** on **CourseSpaces** and will be available to you **five minutes** before the tutorial session begins. You will have 25 minutes to solve one question and upload your solutions. **Please submit your solutions in PDF and to Course Spaces.** Late submissions or submissions via email will **NOT** be accepted.

- Please name your test files as follows

“ENGR141_QUIZ#_LAST NAME_YOUR V#”.

For example, for Test #1, Akbari’s file should be named as

ENGR141_QUIZ#1_Akbari_V0013xxx.

Tests

There will be 4 tests, each worth 15% of the final grade.

- The tests will be taken during the lecture times (10am-11:20am).

The tentative dates are:

Test #1: May 21th

Test #2: June 8th

Test #3: June 29th

Test #4: July 30th

Tests

- The tests will be open-book.
- I will be available during the test and can be reached via Zoom.
- The questions will be posted in **PDF** on **CourseSpaces** and will be available to you at 9:55 am on the test date. You will have until 11:20 am to upload the test files. **Please submit your solutions in PDF and to CourseSpaces.** Late submissions or submissions via email will **NOT** be accepted.
- Please name your test files as follows

“ENGR141_TEST#_LAST NAME_YOUR V#”.

For example, for Test #3, Akbari's file should be named as

ENGR141_TEST#3_Akbari_V0013xxx.

House Keeping

Evaluation

Tutorials attendance:	5%
Assignments:	20%
Quizzes:	15%
Test 1:	15%
Test 2:	15%
Test 3:	15%
Test 4:	15%
Total:	100%