ENGR 141 – Engineering Mechanics

Instructor:
- Dr. Flavio Firmani
- Office: EOW 531 | Tel: 7890
- Email: ffirmani@uvic.ca
- Section A02

Dr. Saeedeh Saghlatoun will teach section A01.
Mr. Luke Friedl will develop assignments lfriedl@uvic.ca

Lectures:
- Mon 3:30 – 4:50 and Thurs 3:30 – 4:50

Office Hours:
- Wednesday 10-11am. If you wish to meet on a different time, please e-mail instructor for an appointment.

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Tutorials:

T01	COR A129	M	6:00 pm - 6:50 pm
T02	COR A225	M	6:00 pm - 6:50 pm
T03	COR A125	M	6:00 pm - 6:50 pm
T04	COR A120	M	6:00 pm - 6:50 pm
T05	COR A121	M	6:00 pm - 6:50 pm
T06	COR A229	R	5:30 pm - 6:20 pm
T07	COR A221	R	5:30 pm - 6:20 pm
T08	COR A125	R	5:30 pm - 6:20 pm
T09	COR A121	R	5:30 pm - 6:20 pm
T10	COR B129	R	5:30 pm - 6:20 pm

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Tutorials:

The weekly ENGR 141 tutorials are a <u>mandatory course component</u>. Tutorials will start during Week 2 of classes (week of Mon, Jan 16th).

During the tutorial, students will complete assigned problems in teams. Each team will submit:

- **Initial Draft**. A hard copy solution to the TA at the end of the tutorial,

- **Final Draft**. a complete solution of the tutorial problem through Brightspace prior to the following tutorial (week).

Each tutorial is worth 1.5% of the final grade: 0.5% for the solution submitted during the tutorial and 1% for the final draft.

Tutorials:

Students who are away during the tutorial period will not receive any credit for the in-class submission. However, students are allowed to participate remotely, e.g. zoom. Note that students are responsible for arranging the remote participation. Attendance will be taken.

Students are responsible for ensuring that identification (including tutorial section, names and student numbers) are provided for those individuals who contributed to the submission. All the student names that are written in the final draft submission will receive credit.

Teams will be changed as follows **3-4-3**, $i.e.$ first three tutorials, next four, and final three tutorials.

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Teaching Assistants:

T03 & T10	AJ Messner	messner.aj@gmail.com
T08	Victor da Silva	victorallisson@uvic.ca
Assign	Hrishitha Kishan	hrishithakishan@uvic.ca
T04/T09	Zahra Motamedi	zmotamedi@uvic.ca
T02 & T07	Oluwaseyi Ogunfowora	ogunfool@uvic.ca
T04/T09	Sara Hatami Gazani	sarahatami@uvic.ca
T07/Assign	Payton Bray	paytonbray@uvic.ca
T05	Kaveh Yazdani	kavehym@uvic.ca
T01 & T06	Arian Yeganegi	arianyeganegi@uvic.ca

Lecture Notes

ENGR 141 – Engineering Mechanics, Lecture Notes, Brightspace

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Textbook:

Hibbeler R.C., 2016, "Engineering Mechanics - Statics & Dynamics 14th Ed.", Pearson Canada.

Any previous version of Hibbeler's textbook going back to a 6th edition will contain the material covered in this course. However, the section numbers/headings referred to in the Course Schedule section and assignments are referred to the 14th edition.

Exams:

Midterm - March 13th, 2023 at 7:00pm

Final Exam - TBA

In case the dates are changed, students will be informed in advance by email or with an announcement on Brightspace.

Assignments:

Two submissions of Assignments are required

- **WeBWork**. Students will submit final solutions through WeBWork (75% of the mark). https://webwork-math.uvic.ca

- **Brightspace**. Students must also submit a PDF file of the complete assignment. Diagrams, presentation, and completion of the assignments will be assessed (25% of the mark).

	Assigned	Due Date
Assignment 1	Jan 16	Jan 30
Assignment 2	Jan 30	Feb 13
Assignment 3	Feb 16	Mar 6
Assignment 4	Mar 9	Mar 23
Assignment 5	Mar 23	Apr 6

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Evaluation:

Evaluation Component	Overall mark
Five Assignment (3% each)	15%
Ten Tutorials (1.5% each)	15%
Midterm	30%
Final Exam	40%

Your marks will be posted on Brightspace. Ensure that the grades have been entered correctly. Keep all your returned graded exams, assignments, and tutorials in case of discrepancy.

Failure to pass the final exam will result in a failing grade for the course.

Supplemental Exams:

A student who has written the final exam and achieved a failing course grade may be offered an opportunity to write a supplemental exam. The percentage grade at which the instructor recommends supplemental exams varies, depending on the methods of evaluation for the course.

Supplemental exam recommendations are decided by the department and the faculty based on a review of each student's overall academic record.

Grading Scale:

90 – 100	A+
85 – 89	A
80 – 84	A-
77 – 79	B+
73 – 76	B
70 – 72	B-
65 – 69	C+
60 – 64	C
50 – 59	D
0 – 49	F

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Course Objectives:

At the conclusion of this course students should be able to:

- Sketch three-dimensional Cartesian reference frames, force vectors and moment vectors.

- Assign reference points and calculate the moment of a force relative to those points.

- Combine several forces and moments to form simpler equivalent force-couple systems.

- Identify the forces and moments acting on a rigid body and draw the corresponding free body diagram (FBD).

- Apply the method of statics to FBDs to solve for reaction forces and moments, including:

  - Divide a structure into sub-assemblies that can be analyzed using equations of static equilibrium.

Course Objectives (cont'd):

- Manipulate algebraic equations of equilibrium to solve for unknown forces and moments.
- Judge whether the static equilibrium assumption is possible based on solutions to equilibrium equations.

- Calculate internal forces and moments in truss and beam structures.
- Recognize statically determinant and indeterminant mechanics problems by observation of FBDs.
- Interpret parametric solutions to equilibrium equations to measure the ability of a structure or a machine to sustain loads.
- Organize multiple FBDs in the solution of impeding motion problems.
- Locate the centroids of lines, areas and volumes using single variable calculus and first moments of area.

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Syllabus:

Hours

Introduction to Mechanics
Course Overview, SI units, analysis procedure

3

Force Vectors
Forces and positions, vector algebra, inner (dot) product

3

Statics of Particles
Particle Equilibrium, Equilibrium equations

3

Equivalent Force Systems
Force System resultants: moment of a force, cross product, principle of moments, reduction to equivalent loads

3

Equilibrium of Rigid Bodies
Equilibrium equations, Free-Body Diagrams, Interconnections (constraints)

3

Syllabus (cont'd):

Hours

Analysis of Structures
Truss analysis: methods of joints and sections. Frames and Machines

6

Internal Forces
Distributed loads, shear and bending moment diagrams, method of sections. Shear and bending moment diagrams: differential relations

6

Friction
Dry friction, screw forces, wedges

3

Centroids
Center of gravity, composite bodies, integral methods

3

Class Policies:

Late Submission Policy:

Late submission will be subject to a penalty of 20% reduction per day (including weekends) of the total assignment mark. Under extreme situations with convincing proofs, the penalty might be waived.

- Tutorial First Submission is due at the end of the tutorial

- Tutorial Final Draft is due one week later, before the next tutorial.

- Assignments are due by midnight on the due date.

Teamwork

Only the names written on the tutorial final draft will be entered. Any missing names will be considered as if the student had not participated.

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Absenteeism:

If the midterm has been missed due to illness, or for other compassionate reasons, email the instructor immediately. Failing to contact the instructor will result in a zero mark for that component. The contribution to the final grading will be transferred to a final examination.

Keep your record: Your marks will be posted on Brightspace. Ensure that the grades have been entered correctly. Keep all your returned graded exams, assignments, and tutorials in case of discrepancy.

University policies: Students are responsible to know the university policies on course withdrawal, academic integrity, equality, and other regulations, which are documented on the Calendar of the University of Victoria.

Academic Integrity

Academic integrity is intellectual honesty and responsibility for academic work that you submit individual or group work. It involves commitment to the values of honesty, trust, and responsibility. It is expected that students will respect these ethical values in all activities related to learning, teaching, research, and service. Therefore, plagiarism and other acts against academic integrity are serious academic offences.

The responsibility of the institution. Instructors and academic units have the responsibility to ensure that standards of academic honesty are met.

The responsibility of the student. Plagiarism sometimes occurs due to a misunderstanding regarding the rules of academic integrity, but it is the responsibility of the student to know them.

It is your responsibility to understand the University's policy on academic integrity: http://web.uvic.ca/calendar/undergrad/info/regulations/academic-integrity.html

Fair Use of Course Content

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructors, who therefore own their Intellectual Property, and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites such as Course Hero, Discord, Chegg, Scribd, Study, Bartleby, Brainly, OneClass or equivalent sharing platforms, or to others not enrolled in this course.

Uploading course materials, including PowerPoint lecture notes, video lectures, tutorials, assignment descriptions, and quizzes, onto online sharing platforms is considered to be a copyright violation, regardless of whether an individual did so intentionally or unintentionally. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar, and can lead to penalties.

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Course Experience Survey

You will have the opportunity at the end of the semester to evaluate the course and provide feedback to instructors on your learning experience and on the course overall. The feedback is vitally important in helping us to continually improve the course. The instructors also value feedback throughout the term.

General Information and Policies

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair/Director of the Department/Unit by email or the Chair/Director's assistant to set up an appointment.

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For various university polices, see the following links:

- General University Polices, including Policy on Human Rights, Equity and Fairness; Discrimination and Harassment Policy; Creating a Respectful and Productive Learning Environment; and Student Discipline.
General University Polices

- UVic Policy on Accommodation of Religious Observance
Accommodation of Religious Observance

- Faculty of Engineering Standards for Professional Behaviour
Standards for Professional Behaviour

Equality

This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Centre for Accessible Learning located in the Campus Services Building.