



**Course Outline**

**UNIVERSITY STUDIES**

**ENGG 130**  
**Engineering Mechanics I**  
**Fall, 2012**

**3 CREDITS**  
**5 HOURS PER WEEK**

**INSTRUCTOR: Jean-Pierre De Villiers**

**INSTRUCTOR:** Jean-Pierre De Villiers  
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**E-MAIL:** [Jean-Pierre.DeVilliers@keyano.ca](mailto:Jean-Pierre.DeVilliers@keyano.ca)  
**OFFICE NUMBER:** S211B  
**OFFICE HOURS:**

Monday	10:00 – 10:50 AM
Tuesday	03:00 – 03:50 PM
Wednesday	03:00 – 03:50 PM
Thursday	04:00 – 04:50 PM
Friday	04:00 – 04:50 PM

**HOURS OF INSTRUCTION:**

Tuesday	08:00 – 08:50 AM	Room 237
Tuesday	01:00 – 02:50 PM	Room 239 (lab)
Wednesday	04:00 – 04:50 PM	Room S216
Friday	12:00 – 12:50 PM	Room S216

**COURSE DESCRIPTION:**

The ENGG 130 course is an introduction to the fundamental principles of statics, a key field in engineering mechanics. Statics deals with the equilibrium of bodies that are either at rest or move with a constant velocity. The main topics covered in this course include: force vectors, equilibrium of a particle, equilibrium of a rigid body, structural analysis of simple trusses and frames, internal forces, friction forces, centre of gravity, and moments of inertia.

**PRE-REQUISITE(S):**

Admission into the engineering program at Keyano College or permission of the Chair.

**COURSE OUTCOMES:**

The students will be able to:

1. carry out idealization of a physical system, and know how to set up and solve the equations to solve a statics problem.
2. resolve forces in planar and three-dimensional space.
3. draw a free-body diagram of a rigid body and develop the equations of equilibrium.
4. calculate a moment about an axis in 2D and 3D and to reduce a simple distributed loading to a resultant force having a specified location
5. apply equilibrium concept/techniques to solve simple 2D structural problems
6. analyze friction forces.
7. compute the for discrete systems and continuous bodies of arbitrary shape in 2D
8. calculate the moment of inertia for a simple planar object.

**REQUIRED RESOURCES:**

- Engineering Mechanics: Statics and Dynamics; R.C. Hibbeler. Singapore – Pearson, 2012 (13<sup>th</sup> edition) with Mastering Engineering.
- Engineering notepad for lab
- Lecture Notebook and **separate bound notebook for assignments**

**TOPICS TO BE COVERED:**

**Please Note:**

This course outline may be modified to facilitate unforeseen time constraints. Date and time allotted to each topic is subject to change.

Wk	Chapter	Main Topics	Lab/Tutorial
1	1.1-1.6	<b>General Principles</b> - units, procedures for analysis	
2	2.1-2.9	<b>Force Vectors</b> - Scalars and vectors, vector operations - Force vectors along a line	Selection of problems from Chapter 2
3	3.1-3.4	<b>Equilibrium of a Particle</b> - the free-body diagram, 2D and 3D force systems	Selection of problems from Chapter 3
4	4.1-4.5	<b>Force System Resultants</b> - Moments	Selection of problems from Chapter 4
5	4.6-4.9	<b>Force System Resultants</b> - Simplification of force/couple systems	Selection of problems from Chapter 4
6		Midterm Review; Midterm	
7	5.1-5.7	<b>Equilibrium of a Rigid Body</b>	Selection of problems from Chapter 5
8	6	<b>Structural Analysis:</b> - simple trusses - space trusses	Selection of problems from Chapter 6 - popsicle stick bridge activity
9	7	<b>Internal Forces</b> - Shear and moment equations	Selection of problems from Chapter 7
10	8	<b>Friction:</b> - Dry friction; friction in various systems	Selection of problems from Chapter 8
11	9	<b>Centre of Gravity and Centroid</b> - Theorem of Pappus	Selection of problems from Chapter 9
12	10	<b>Moments of Inertia</b> - Parallel axis theorem	Selection of problems from Chapter 10
13	10	<b>Moments of Inertia</b> - Mohr’s Circle	Selection of problems from Chapter 10
14	11	<b>Virtual Work</b>	Selection of problems from Chapter 11

**Ilearn**

Go to <http://ilearn.keyano.ca>

This course is supported through Ilearn. Assignments, readings and handouts will be posted on Ilearn. Login information will be provided by your instructor.

**EVALUATION:**

Component	Percentage	Due Date
Assignments	5%	Weekly, Mastering Engineering
Tutorials/Labs	15%	Weekly
Midterm	35%	Week of October 8, 2012
Final Examination	45%	Date TBA, in December

**GRADING SYSTEM:**

Letter Grade	Description	Grade Points
A+		4
A	Excellent	4
A-		3.7
B+		3.3
B	Good	3
B-		2.7
C+		2.3
C	Satisfactory	2
C-		1.7
D+		1.3
D	Minimal Pass	1
F	Failure	0

Students intending to transfer to other institutions require a ‘C-’ as a minimum grade. Transfer information on each course is available at the [Alberta Council on Admission and Transfers](#).

Students who do not complete all the required work should not expect to pass the course. Students should consult:

[http://www.keyano.ca/current\\_students/examinations/index.htm](http://www.keyano.ca/current_students/examinations/index.htm)

**IMPORTANT DATES:**

September 18, 2012	Courses dropped after this date will be designated “W”. (A withdrawal (W) is not reflected in your GPA)
Week of October 8, 2012	Mid-term examination
October 26, 2012	Courses dropped after this date will be designated “WF”. (A withdrawal failure (WF) counts as a 0 in your GPA)
December 7, 2012	Last day of classes
December 10-19, 2012	Final Exams

**COLLEGE POLICIES**

**Equality, Equity and Respect**

The Keyano College is committed to providing an environment of equality, equity and respect for all people within the College community. All members of this community are considered partners in developing teaching and learning contexts that are welcoming to all. Faculty, staff, and students are encouraged to use inclusive language to create a classroom atmosphere in which students' experiences and views are treated with equal respect and valued in relation to their gender, ethnic and cultural background, and sexual orientation.

*Students should consult:*

[http://www.keyano.ca/Committees/IRA/Individual\\_Rights\\_Policy.asp](http://www.keyano.ca/Committees/IRA/Individual_Rights_Policy.asp)

**Plagiarism and Cheating**

Every student expects to be treated and evaluated fairly in a course. Plagiarism and cheating robs everyone of this right.

No student may submit words, ideas or data of another student or person as his or her own in any writing, project, assignment, quiz, electronic presentation, exam etc. Any work used that is not the student's own must be clearly cited as belonging to someone else. There are penalties for using other's work and not citing it. The Student's Rights & Responsibilities document clearly outlines these penalties and the appeal process.

- No learner can obtain information from another student during an exam.
- No learner can bring unauthorized information (paper or electronic) into an exam or quiz.
- No student can submit work done in another course for grading in this course without the written prior approval of the course instructor.
- No student can submit copyright protected or commercially produced materials as part or all of an assignment without proper citation & permission.

**Student Rights & Responsibilities**

Students should consult the Keyano College Credit Calendar or online at:

<http://www.keyano.ca/Media/Collections/Calendars/Keyano.Calendar1112-10-full.pdf>

## Specialized Supports and Duty to Accommodate

### *Disability Support Services: Learner Assistance Program*

If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

### *Specialized Supports and Duty to Accommodate*

Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation, and defined by a number of Keyano College policies. Keyano College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.

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## COURSE-SPECIFIC POLICIES

**Engineers are problem solvers.** If you want to succeed in engineering it is important you learn how to organize your thoughts, to analyze, set up, and solve problems and to experience the often frustrating trials that arise in doing so. The best way to learn and retain knowledge is by practicing; the more problems you attempt and complete, the more experienced and confident you will become.

Engineering is a demanding profession: you must be able to clearly articulate solutions to complex problems in a timely manner. This course will encourage you to develop the work habits and skills necessary to submit clear and concise work on deadline. To reinforce this, keep in mind that sloppy work will **not** be graded in any component of this course, and late work will also **not** be accepted.

Teamwork is pervasive in engineering, but this is an activity that takes place among competent peers. Teamwork is a privilege that comes with competence. It is not a way to get by when you lack the skills to do the work yourself. In this course, working in groups can be helpful and is not discouraged, but you must be careful not to use teamwork to coast through an assignment or project; any work that you turn in must be your own (see rules on plagiarism below).

### **iLearn and Lecture Notes**

You are responsible for keeping a complete record of classroom work (lecture notes, interactive problems, classroom exercises) in a proper notebook. **Lecture notes are posted to iLearn at the end of each week and do not constitute a complete record of lecture materials.**

### **Attendance Policy**

You are expected to attend all lectures, tutorials, and laboratories without exception. Failure to do so may jeopardize your standing in the course; please consult the Keyano College Calendar, also available on-line at <http://www.keyano.ca/calendar/>.

- Valid reasons for absences include illness, medical appointments, and family emergencies.
- You are expected to **notify your instructor** of your absence by **email** (preferred) or by **telephone** on or before the date of the absence; failure to do so will result in your absence being recorded as unexcused.

- You may be required to provide **written proof** justifying your absence at the instructor's discretion. Such proof will be required to obtain an excused absence from a quiz, tutorial, lab or exam.

### Assignments, Quizzes, and Tutorials (Labs)

#### Assignments:

It is important to start the problems early and not put them off until the day before they are due. This course uses web-based assignments: you will need to use the **Mastering Engineering access kit** purchased with your textbook to access the assignments; instructions will be provided in the first lecture. Assignments must be completed via the Mastering Physics web site before the posted due dates; partially completed assignments receive the score achieved before the due date.

- You are expected to keep fully worked out solutions to your assignments in a bound notebook; your instructor may ask to see these solutions at anytime, and you should be prepared to produce these solutions when demanded. The best approach is to have your solution book with you during lectures, labs, and tutorials.
- You may rework assignments after the due date for practice purposes; this will have no effect on your score.
- Accurate sketches and correct **free body diagrams (FBDs)** are a must and are emphasized in all work. The **FBD** is the single most important tool for the solution of mechanics problems. The important elements of a good problem-solving technique are:
  - correct problem set-up with the assumptions and what is sought,
  - correct analysis with appropriate diagrams,
  - correct numbers and units, and
  - proper interpretation of the solution in both units and directions.
- **NOTE: missed or incomplete assignments may result in a grade of F for the course.**
- **Your mark for an assignment is not released until you have shown your written work to your instructor.**

#### Quizzes:

You are expected to keep current with lecture materials by reviewing your notes, reading your textbook, and making effective use of office hours. To encourage this, there will be **periodic quizzes** consisting of simple conceptual questions. These quizzes may be done via Mastering Engineering or on paper.

#### Labs/Tutorials: **YOU MUST BRING YOUR TEXTBOOK TO ALL TUTORIAL PERIODS**

- Two hours per week will be used for laboratory/tutorial exercises.
- Tutorials are designed to help you develop your problem solving skills by having you work out a complete, written solution to a textbook problem or selected reading from your text under the guidance of your instructor
- Assessment of this component will be based on the quality and clarity of the written solution (getting the correct answer is not a significant component of the assessment).
- Tutorial assignments are due at the end of the tutorial period, unless otherwise indicated.

- **You are expected to work on tutorial problems by yourself, though you may discuss your work with your instructor or a classmate; collaborative solutions are not allowed unless explicitly stated by your instructor.**

### **Final Exam:**

The final exam is a closed book test where you are expected to demonstrate mastery of the subject. You will be expected to solve a set of problems, some similar to work you have previously done, some more challenging. You will be supplied with a formula sheet (the front matter of your text). The assignments and labs are designed to help you prepare for this examination, so make sure you take full advantage of these exercises to prepare for the final.

### **Mentoring**

All engineering students will be assigned a mentor (a faculty member). Brief meetings between student and mentor will take place at regular intervals, usually weekly, to help students manage the demands of the engineering program. Typical topics discussed with a mentor include study strategies, guidance, monitoring academic progress, among others.

### **Plagiarism and Cheating**

**There is a zero tolerance policy in Engineering for all forms of academic dishonesty.**

Plagiarism of any kind, the use of illegal study aids, or the fabrication of experimental results will be dealt with according to Keyano College policy. Specifically for this course:

- **Cheating on assignments:** if you are suspected of having obtained assignment solutions through dishonest means, you will be required to convince your instructor that you are able to reproduce any solution on the given assignment or tutorial; failure to do so will result, at minimum, in a grade of zero for the assignment or tutorial.
- **Cheating during an examination (including quizzes)** will result, at minimum, with a failing grade in the course

Repeat offenses will be penalized with, at minimum, a failing grade in the course.

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**Course Outline**

**Arts and Science**

**ENGG 130  
Engineering Mechanics I  
Fall, 2012**

**3 CREDITS  
5 HOURS PER WEEK**

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**Jean-Pierre De Villiers, Instructor**

\_\_\_\_\_  
**Date**

**Reviewed and approved by:**

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**Louis Dingley, Chairperson**

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**Date**

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**Guy Harmer, Dean**

\_\_\_\_\_  
**Date**