

ENPHY 131A – Mechanics

3 Credits (4.3 Engineering Units), 14 weeks, 5.5 hours per week

Kinematics and dynamics of particles, gravitation, work and energy, linear momentum, angular momentum, systems of particles, introduction to dynamics of rigid bodies, accompanied by related laboratory work. The course will also promote the development of a well-disciplined approach to problem solving. This approach will emphasize the rigorous application of the applicable principles, the drawing of accurate free-body diagrams, and the presentation of the results in a clear, logical, and concise manner.

Prerequisites and/or co-requisites: Minimum grade of C- in MATH 100, PHYS 1130, ENGG 130.

Instructor

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Office Hours

Monday	13:00-14:50
Tuesday	15:00-15:50
Thursday	09:00-09:50
Friday	12:00-12:50

Hours of Instruction

Monday	09:00-09:50	Room 239
Tuesday	13:00-13:50	Room 239
Wednesday	11:00-11:50	Room 239
Thursday	14:00-16:50	Room 239 (Lab, every other week)
Friday	08:00-08:50	Room 239 (Tutorial)

Required Resources

- **Engineering Mechanics: Statics and Dynamics with Mastering Engineering**, R.C. Hibbeler; 13th edition, ISBN 978-0-13-291548-9
- **University Physics**: Young and Freedman. Addison Wesley, 2009 (13th edition) with Mastering Physics. ISBN 978-0-321-69686-2
- Physics Laboratory Notebook
- Engineering notepad for tutorials
- Lecture Notebook and separate bound notebook for assignments

Course Outcomes

- To understand basic phenomena of the physical world: motion of bodies in response to forces (dynamics)
- To develop problem solving skills ranging from order-of-magnitude estimates to full algebraic/numeric solutions of multi-part problems, often with calculus
- To develop basic laboratory skills: how to measure, quantify, and analyze physical phenomena; how to discuss and defend experimental results; how to communicate experimental results.

Evaluation

The following components of course work will form the basis for computing your term grade:

Assignments	2.5% (Weekly, on Mastering Engineering)
Tutorials	7.5% (Weekly, in-class exercises)
Labs	20% (Alternate weeks; information on iLearn course page)
Midterm Exam	25% (Week of February 16, 2015)
Final Exam	45% (Date TBA, in April)
Total	100%

A grade of C- is required for progression or transfer.

Instructions for each lab are posted on the iLearn course page. All lab assignments are due at the end of the lab period, without exception. Submission of lab exercises is to be done electronically, via iLearn. All lab work must be your own work. Any attempt to present another student's work as your own, or to present material obtained from Internet resources will result in an automatic failing grade for the course.

Grading System

Descriptor	Alpha Grade	4.0 Scale	Percent	Rubric for Letter Grades
Excellent	A+	4.0	> 92.9	Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format.
	A	4.0	85 – 92.9	
	A-	3.7	80 – 84.9	
Good	B+	3.3	77 – 79.9	Work is generally of high quality, well developed, well written, has clarity, and uses proper format.
	B	3.0	74 – 76.9	
	B-	2.7	70 – 73.9	
Satisfactory	C+	2.3	67 – 69.9	Work has some developed ideas but needs more attention to clarity, style and formatting.
	C	2.0	64 – 66.9	
	Progression	C-	1.7	
Poor	D+	1.3	55 – 59.9	Work is completed in a general way with minimal support, or is poorly written or did not use proper format.
Minimum Pass	D	1.0	50 – 54.9	
Failure	F	0.0	< 50	Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.

Proposed Schedule of Topics

The following table lists the course readings and laboratory exercises.

Week	Chapter	Lecture Topic	Lab
1	12.1-12.4	Kinematics of a particle: - rectilinear, erratic, curvilinear motion	
2	12.5-12.7	Kinematics of a particle: - curvilinear coordinates; projectiles - curvilinear motion: normal/tangential comp.	M2-Non-uniform Motion
3	12.8-12.10	Kinematics of a particle: - cylindrical components, motion of two particles	
4	13.1-13.4	Force & Acceleration: - Newton's Laws of Motion - Equations of motion, systems of particles	F3 - Terminal velocity
5	13.5-13.6	Force & Acceleration: - Newton's Laws of Motion, coordinate systems	
6	14.1-14.4	Work & Energy: - work done by a force, energy, power, efficiency	M3 - Friction
7	Rev 1	Family Day; Midterm Review; Midterm	
8	14.5-14.6	Work & Energy: - conservative forces and potential energy - conservation of energy	M4 - Pulleys
9	15.1-15.3	Impulse & Momentum: - Linear impulse and momentum defined - Cons. of momentum: systems of particles	
10	15.4	Impulse & Momentum: - Collisions	M5 - Collisions
11	16.1-16.3	Rigid Body Kinematics: - rotational motion - moment of inertia, torque, rotational energy	
12	17	Rigid Body Dynamics: - rolling motion, Newton's 2nd law, work and power	M7 - Yo-yo Dynamics
13	18.1-18.3	Rigid Body Dynamics: - energy	
14	15.5-15.7 19.1-19.3	Rigid Body Dynamics: - angular momentum, precession	

Please Note:

Date and time allotted to each topic is subject to change. It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College Credit Calendar.

Performance Requirements

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

Labs: Laboratory attendance is compulsory and no unexcused absences will be tolerated. An unexcused absence will result in a grade of zero for the missed lab and may result in course failure.

- Students must keep a proper record of experimental results in a hardcover physics laboratory manual (available at bookstore). **IF YOU DO NOT BRING YOUR LOGBOOK TO A LAB, YOU WILL BE EXCUSED FROM THE LAB.**
- A properly formatted, laboratory report produced using Microsoft Word and Excel is due at the end of the lab session.
- **Pre-lab:** you are expected to arrive at a lab having read all advance material (posted on iLearn). A pre-lab exercise is due before the start of the lab period. If this exercise is not completed by the deadline, it must be completed during the lab period; the remaining time in the lab period will then be available for the experiment.
- A passing grade must be obtained in the lab portion of the course in order to pass the course. Specifically, students must achieve a 50% or greater aggregate score on lab reports in order to avoid an automatic grade of F. If a passing grade is obtained in the lab component, then a grade is assigned a grade based on term work using the weighting given above.

Assignments: 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 Engineering 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 any time, 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.
- **NOTE:** missed or incomplete assignments may result in a grade of F for the course.

Tutorials: YOU MUST BRING YOUR TEXTBOOK TO ALL TUTORIAL PERIODS. One hour per week will be used for tutorials.

- 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.
- 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.

Laboratory Safety

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience.

Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- Collusion or the unauthorized collaboration with others in preparing work
- The deliberate misrepresentation of qualifications
- The willful distortion of results or data
- Substitution in an examination by another person
- Handing in the same unchanged work as submitted for another assignment

Penalties for academic offences range from a verbal reprimand to dismissal from the College, and in certain circumstances may involve legal action.

Specialized Supports**Counselling and Disability Services**

Counselling Services provides a wide range of specialized counselling services to prospective and registered students, including personal, career and academic counselling.

SKILL Centre

The SKILL Centre is a learning space in the Clearwater Campus at Keyano College where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff.

The SKILL Centre, through a variety of delivery methods, provides assistance in skill development to Keyano students. Assistance is provided by instructors, staff and student tutors. Individuals wishing to improve their mathematics, writing, grammar, study, or other skills, can take advantage of this unique service.

Authorization

This course outline has been reviewed and approved by the Program Chair.

Jean-Pierre De Villiers, Instructor

Louis Dingley, Chair

Date Authorized

Guy Harmer, Dean

Date Authorized

Signed copies to be delivered to:

Instructor

Registrar's Office