



DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2020

PC 1310 A3 – MECHANICS – 4.3 (3-1-3/2) UT 82.5 HOURS 15 Weeks

INSTRUCTOR: Tanvir Sadiq, Ph.D., P.Eng.

PHONE: 780.539.2865

OFFICE: J 209

E-MAIL: Tsadiq at gprc dot ab dot ca

OFFICE HOURS: TR 1000 – 1100 or by Appointment

PREREQUISITE(S)/COREQUISITE: MA 1000, EG 1300 / PC 1300, MA 1010

REQUIRED TEXT/RESOURCE MATERIALS: *Engineering Mechanics, Statics and Dynamics*, 14th Ed., R. C. Hibbeler, Publisher: Prentice Hall (Required), *PC1310 Laboratory Manual* (Required), *Fundamentals of Physics*, 11th Ed., Authors: Halliday, Resnick & Walker, Publisher: Wiley (Reference).

CALENDAR DESCRIPTION: 'This course includes kinematics and dynamics of particles; gravitation; work and energy; linear momentum; angular momentum; systems of particles and introduction to dynamics of rigid bodies.'

CREDIT/CONTACT HOURS: PC1310 is a 4.3 credit University Transfer course. There will be two lectures and a seminar every week. Each lab will be approximately three-hour long.

DELIVERY MODE(S): Lecture, Seminar, Lab

TRANSFERABILITY:

University of Alberta, University of Calgary, University of Lethbridge, Athabasca University, Augustana University, Canadian University College, King's University College. Other (transfers in combination with other courses or to other institutions)

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability

EVALUATIONS:

Assignments	7.5% (Pearson Mastering Engineering, Course ID: sadiq25878)
Seminars	7.5% (Engineering Paper Required)
Lab	15% (Must pass the lab with min 50% marks to pass the course)
Midterm Exam	30% (Wednesday Feb 26, 2020)
Final Exam (Comprehensive)	40% (Cumulative, Date and Location TBA by Student Services)

Midterm Exam: The midterm may be approximately 1½ - 2 hours long, and is a closed-book, closed-notes exam with a formulae sheet provided by the instructor. **There will be NO make-up midterm exam.** Students who miss the midterm exam due to a valid reason, such as illness, will have the weight transferred to the final exam. A supporting document such as doctor's note and a phone message or email will be required in such case.

Final Exam: The final will be approximately 3 hours long, cumulative, closed-book, closed-notes exam with the formulae sheet provided by the instructor. If the final is missed due to illness it will be deferred (see calendar for information). A doctor's note and a phone message or email will be required in such cases. *Your final grade will be available through Student Services or on myGPRC portal.* Grades or marks cannot be disclosed by email or phone and all such requests will be disregarded.

STUDENT RESPONSIBILITIES: Students are responsible for all lecture, seminar and lab material, and readings. Students are expected to practice the material by doing textbook examples as well as problems at the end of every section covered. Bring your own supplies including a stapler and calculator batteries.

LEARNING OBJECTIVES:

The Instructor will provide a calculus-based understanding of the Basic Kinematics and the Basic Dynamics as applied to the 1-D and 2-D behavior of rigid body particles in motion. The students will be shown how to use a Free Body Diagram to calculate the behavior of particles or a system of particles and the associated translational and rotational momentum, work and energy. Laboratory Experiments will be conducted to verify the principles presented in class.

LEARNING OUTCOMES:

Students will have the knowledge to be able to analyze the rectilinear and curvilinear motion of rigid particles in 1-D and 2-D under the influence of forces. They will be able to calculate such a particle's linear and angular momentum, work and energy. Students will know and be able to explain the underlying basis for general planar kinetics.

COURSE SCHEDULE:**Lecture Topics**

Topic	Sections in Hibbeler	Equivalent Sections in HRW*
Introductory Material	1.1 – 1.5	1.1 – 1.7
Kinematics of Rectilinear Motion	12.1 – 12.3	2.1 – 2.10
Kinematics of Planar Motion	12.4 – 12.7, 12.9, 12.10	4.1 – 4.9
Dynamics of a Particle	13.1 - 13.5	5.1 – 5.9, 6.1 – 6.5
Work and Energy	14.1 – 14.6	7.1 – 7.9, 8.1 – 8.8
Linear Momentum and Impulse	15.1 – 15.4	9.1 – 9.12
Angular Impulse and Momentum	15.5 – 15.7	11.7 – 11.11
Introduction to Kinematics and Dynamics of a Rigid Body	16.1 – 16.3, 17.1 – 17.5, 18.1	10.1 – 10.6, 11.1 – 11.6

This schedule is subject to change without notice at the discretion of the instructor.

* Note: Corresponding sections from “Fundamentals of Physics”, by HRW are listed only as an additional reference since most students have this text from PC 1300.

Laboratory Work

Experiment No.	Title
6	Acceleration Due to Gravity
7	Non-Uniform Motion (w)
8	Conservation of Energy
9	Collision: Ramp (w)
10	Moment of Inertia

Note: Lab reports are due at the end of the lab period, unless announced otherwise. Late reports will not be accepted and will receive zero marks. There will be no exception to this rule. Graded reports will not be returned before all the lab sections have submitted their reports.

Prerequisites, Seminars, Assignments and Lab Reports:

Prerequisite (Additional): A good background in Calculus (including Integral and Vector Calculus) is required for this course. Students are also expected to have a fairly good knowledge of trigonometry.

Seminars: These are approximately one-hour sessions held weekly in which students will be required to solve several problems. The problems will be handed in at the end of the seminar period for marking. **Late submissions will not be accepted and will receive zero mark.** Limited help in solving these problems will be available from the seminar instructor.

Assignments: Assignments will be done online using Mastering Engineering. Details on how to access Mastering Engineering will be provided. Assignments must be completed by the due date and time to receive credit. All assignments will be due by 1900 on the due date. There will be approximately 10 assignments. One assignment with lowest marks will be dropped.

Laboratory: There are five lab sessions which introduce the student to the experimental process and report writing. Students must achieve a score of at least 50% in the lab component of the course in order to obtain an overall passing grade in PC1310.

GRADING CRITERIA: (This is a general guideline only)

Alpha Grade	4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	95-100		C+	2.3	67-69.99
A	4.0	85-94.99		C	2.0	63-66.99
A-	3.7	80-84.99		C-	1.7	60-62.99
B+	3.3	77-79.99		D+	1.3	55-59.99
B	3.0	73-76.99		D	1.0	50-54.99
B-	2.7	70-72.99		F	0.0	00-49.99

STATEMENT ON PLAGIARISM AND CHEATING:

Refer to the Student Conduct section of the College Admission Guide at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at www.gprc.ab.ca/about/administration/policies/**

**Note: all Academic and Administrative policies are available on the same page.