DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2016

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

INSTRUCTOR: Robert (Bert) Hunt P.Eng., FEC, FGC (Hons.) **PHONE:** 780.539.2008

OFFICE: C414 **E-MAIL:** Bhunt@gprc.ab.ca

OFFICE HOURS: M 1-3 pm TR 2-3 pm WF 3 pm PC Lab in J103

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

REQUIRED TEXT/RESOURCE MATERIALS:

Engineering Mechanics, Statics and Dynamics*,* 13th Ed.*,* R. C. Hibbeler, Prentice Hall

Physics 130/ EN PH 131 Laboratory Manual*,* Dept. of Physics, University of Alberta

Fundamentals of Physics, 9th Ed., Authors: Halliday, Resnick & Walker, Wiley

CALENDAR DESCRIPTION: Kinematics and dynamics of particles; gravitation; work and energy; linear momentum; angular momentum; systems of particles; 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):

LECTURES:	W F	1300 – 1420	J228
SEMINAR:	R (S1)	1300 – 1350	J229
	T (S2)	1300 – 1350	J229
LAB:	F	1430 – 1720	J101/J103

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	5%	
Seminars	5%	
Lab	15%	(Must pass the lab to pass the course)
Midterm Exam	25%	(Feb 26th 2016 or possibly an evening exam)
Final Exam (Comprehensive)	50%	(Date and Location TBA)

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.

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

* Note: Corresponding sections from "Fundamentals of Physics", 9th Ed. by Halliday, Resnick and Walker (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
8	Atwood's Pulley
9	Collision: Ramp
10	Moment of Inertia *(Lab instructions to be provided)*

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: 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 19:00 on the due date. There will be 10 assignments each consisting of 5 problems. Only 9 of the 10 assignments will be used in the calculation of the total assignment mark.

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.

Midterm Exam: The midterm will be 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 exam 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 the Registrar's office or on myGPRC portal.* Grades or marks cannot be disclosed by email or phone and all such requests will be disregarded.

GRADING CRITERIA:

GRADING CONVERSION CHART – THIS IS A GENERAL GUIDELINE ONLY			
Alpha Grade	**4-point Equivalent**	**Percentage Guidelines**	**Designation**
A^+	4.0	90 – 100	EXCELLENT
A	4.0	85 – 89	
A^-	3.7	80 – 84	FIRST CLASS STANDING
B^+	3.3	77 – 79	
B	3.0	73 – 76	GOOD
B^-	2.7	70 – 72	
C^+	2.3	67 – 69	SATISFACTORY
C	2.0	63 – 66	
C^-	1.7	60 – 62	
D^+	1.3	55 – 59	MINIMAL PASS
D	1.0	50 – 54	
F	0.0	0 – 49	FAIL
WF	0.0	0	FAIL, withdrawal after the deadline

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.

STUDENTS WITH DISABILITIES: Students who require accommodation in this course due to a disability are advised to discuss their needs with student services. Please ensure that the required forms for exams are submitted to the instructor at least four business days before the date of the midterm or by the last lecture class for the final exam.

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.