



## DEPARTMENT OF SCIENCE

### COURSE OUTLINE – Winter 2024

#### PC1310 (A3): Mechanics – 4 (3-1-1.5) UT 82.5 Hours for 15 Weeks

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

**INSTRUCTOR:** Braden Kelly  
**OFFICE:** J218  
**OFFICE HOURS:** TBA

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#### 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.

#### PREREQUISITE(S)/COREQUISITE:

Pre-requisites: MA1000, PC1300, and EG1300

Co-requisites: MA1010

#### REQUIRED TEXT/RESOURCE MATERIALS:

Engineering Mechanics: Dynamics, 15<sup>th</sup> Ed., R.C. Hibbeler, Publisher: Prentice Hall (Required)

PC1310 Laboratory Manual (Required)

Fundamentals of Physics, 11<sup>th</sup> Ed. Authors: Halliday, Resnick & Walker, Publisher: Wiley(Reference)

#### DELIVERY MODE(S):

- Lectures Tuesday & Thursday 8:30-9:50 AM, room J201
- Laboratories Tuesday 2:30-5:30 PM, room J103
- Seminar Friday 10-10:50 AM, room J202.

## 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

## TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page <http://www.transferalberta.alberta.ca>.

\*\* 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:

Evaluations are subject to change. Final syllabus will be uploaded to D2L by the end of the second week.

Assignments	5%	Due at start of Seminar each week
Seminars	10%	Engineering Paper required
Labs	15%	Must pass the lab with a minimum of 50% to pass the course
Midterm Exam	30%	TBD
Final Exam (Comprehensive)	40%	TBD

Formula Sheets will be provided by the instructor for the Midterm and Final examinations. There will be no makeup midterm. Students who miss the midterm due to a valid reason, such as illness, will have the weight shifted to the final exam. A doctor note is required for illness related issues. The final examination will be comprehensive and cover all of the material of the course. Only calculators acceptable at the University of Alberta are allowed in the midterm or final examinations. See section further down for information on the seminars.

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	95-100	C+	2.3	67-69
A	4.0	85-94	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

#### COURSE SCHEDULE/TENTATIVE TIMELINE:

Topic	Sections in Hibbeler	Equivalent Sections in HRW
Introductory material	1.1-1.5 (Hibbeler Dynamics)	1.1-1.7
Kinematics of Rectilinear Motion	12.1-12,3	2.1-2.10
Kinematic 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	11.7-11.1
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

The schedule is subject to change. Updates will be made to the online course outline found on D2L.

Experiment Number	Title
6	Acceleration Due to Gravity
7	Non-Uniform Motion
8	Conservation of Energy
9	Collision: Ramp
10	Moment of Inertia

Labs are subject to change as the University of Alberta has made several changes to their lab offerings in the past 2 years. Labs take place Tuesdays from 2:30 – 5:20PM and lab reports must be submitted for marking by 5:20 PM of the following Thursday. Students must achieve a score of at least 50% on the laboratory component of the course in order to pass the course. Late lab reports will accrue a penalty of 25% per day.

#### **SEMINARS:**

These are 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 submission will not be accepted and will receive a grade of zero. Limited help in solving these problems will be available from the seminar instructor. Students are allowed to bring their notes and textbooks. Electronic devices (cell phones, laptops, tablets etc) are only permitted for accessing local copies of the textbook. No internet access is allowed during the seminars.

#### **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 spare calculator to exams and seminars.

**CALCULATOR POLICY:** Only non-programmable or programmable calculators approved by the Faculty of Engineering are allowed in tests and exams. Using an improper calculator or other devices/software in an exam/test is considered cheating. The TI-36X-Pro is recommended.

#### **STATEMENT ON ACADEMIC MISCONDUCT:**

Academic Misconduct will not be tolerated. For a more precise definition of academic misconduct and its consequences, refer to the Student Rights and Responsibilities policy available at <https://www.nwpolytech.ca/about/administration/policies/index.html>.

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

**Additional Information (Not Optional):**

Engineers Rule The World (ERTW).