



DEPARTMENT SCIENCE

COURSE OUTLINE – WINTER 2020

PC1260 (A3): FLUIDS, FIELDS and RADIATION – 3 (3-0-3) UT (3) 90 Hours

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OFFICE HOURS: Monday & Friday 9 - 12 am, Tuesday & Thursday 10 - 11 am

CALENDAR DESCRIPTION: This course is a continuation of PC1240 for students in the life and medical sciences. It includes fluid statics and dynamics, gases, kinetic interpretation; electrostatics, current and circuits; magnetic fields; electromagnetic induction; nuclear radiation, its interaction with matter and applications.

PREREQUISITE(S)/COREQUISITE: Physics 1240

REQUIRED TEXT/RESOURCE MATERIALS: PHYSICS Walker 5th Edition, Physics 1260 Lab Manual

DELIVERY MODE(S): 3 hours of lecture (TR 8:30-9:50 L229) and 3 hours of lab (F 14:30-17:20 J103)

COURSE OBJECTIVES: This course will provide a simple algebraic understanding of basic fluid statics and dynamics. The students will be shown how to draw and evaluate the basic constituents associated with simple electrical circuits. Applications will be presented for charges at rest and charges in motion. The relationship between electricity and magnetism will be presented and laboratory experiments will be conducted to verify the principles presented in class. Nuclear radiation and its behavior will be discussed with applications for the modern world.

LEARNING OUTCOMES: Students will have the knowledge to be able to analyze (with algebra) the general behavior of fluids. Students will know and be able to explain the underlying principles associated with charge at rest plus the moving charges of basic electricity and magnetism and why simple circuits, electrical motors and generators behave as they do. The basics of radioactivity and the general products of fission and fusion will be understood.

TRANSFERABILITY:

UA, UC, UL, AU, Augustana UA, CUC, GMU, KUC

***Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferalberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlineSearch.html?SearchMode=S&step=2>

**** 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	10%
Labs	20% (Must pass Lab to pass course)
*Midterm #1	10% February
*Midterm #2	20% March
Final Exam	40% Cumulative. Time and Location TBA by Registrar's Office

* The higher midterm will be weighted 20% and the other midterm 10%.

Midterm Exams: Students are allowed a formula sheet (handwritten 8.5 x 11 inch both sides), a calculator (any calculator WITHOUT communication features) and pens or pencils and eraser. **Final Exam:** This exam is cumulative. Students are allowed the same items as for the midterm exam.

GRADING CRITERIA:

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	90-100		C+	2.3	67-69
A	4.0	85-89		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:

NOTE: The course schedule is on Moodle and may be updated there if necessary. This schedule is preliminary but gives a good idea of which sections in the textbooks you should read to be caught up with the class lectures.

Date	Topic	Section in Walker
Jan 7	Introduction	
Jan 9	Fluid Statics	15-1, 15-2, 15-3, 15-4
Jan 10	Lab 1– Fluid Properties	
Jan 14	Fluid Dynamics	15-5, 15-6, 15-7, 15-8, 15-9
Jan 16	Coulomb’s Law, Insulators, Conductors,	19-1, 19-2, 19-3,
Jan 17	Lab 2– Terminal velocity	
Jan 21	Electric Fields	19-4, 19-5, 19-6, 19-7
Jan 23	Voltage , Potential difference,	20-1, 20-2, 20-3,
Jan 24	Lab 3-Coulomb’s Law	
Jan 28	Capacitance, Capacitor circuits, Dielectrics	20-4, 20-5, 20-6
Jan 30	Electric Current, Ohm’s Law , Power	21-1, 21-2, 21-3
Jan 31	Lab 4- Inverse square Law	
Feb 4	Kirchhoff’s Laws, Complex Circuits	21-4, 21-5, 21-8
Feb 6	RC Ciruits	21-6, 21-7
Feb 11	Problem Set#1	
Feb 13	Midterm #1 Exam	
Feb 14	Lab 5- Mapping of Electric Fields	
Feb 25	Magnets, Magnetic field forces	22-1, 22-2, 22-3, 22-8
Feb 27	Ampere’s Law, Magnetic Field in Wires	22-4, 22-5, 22-6, 22-7
Feb 28	Lab 6- Capacitance	
Mar 3	Induced EMF, Magnetic Flux	23-1, 23-2
Mar 5	Lenz and Faraday’s Laws	23-3, 23-4, 23-5, 23-9
Mar 6	Lab 7- Resistance	
Mar 10	Generators and Transformers	23-6, 23-10
Mar 12	Inductors	23-7, 23-8
Mar 17	Problem Set #2	
Mar 19	Midterm #2 Exam	
Mar 20	Lab 8- e/m for Electrons	
Mar 24	AC Circuits	24-1, 24-2
Mar 26	RC, RL and RLC Circuits	24-3, 24-4, 24-5
Mar 27	Lab 9- Magnetic Fields	
Mar 31	Resonance, Phasors	24-6
Apr 2	Nuclei, Radioactivity, Half- Life, Nuclear Binding Energy	32-1, 32-2, 32-3, 32-4, 32-5, 32-6
Apr 3	Lab 10- Balmer Series	
Apr 7	Applications, Fundamental Particles+ Forces	32-7, 32-8, 32-9
Apr 9	Problem Set #3, Conclusion	

STUDENT RESPONSIBILITIES:

Refer to the College Policy on Student Rights and Responsibilities at <https://www.gprc.ab.ca/about/administration/policies/fetch.php?ID=69>

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Calendar at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <https://www.gprc.ab.ca/about/administration/policies>

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