



**DEPARTMENT SCIENCE**  
**COURSE OUTLINE – WINTER 2018**

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

**INSTRUCTOR:** Dr. Greg Ballentine      **PHONE:** 780-539-2008  
**OFFICE:** C414      **E-MAIL:** gballentine@gprc.ab.ca

**OFFICE HOURS:** 10:30 – 11:30 AM Monday to Friday  
(or whenever else can be arranged – come check my office at any time)

**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 5<sup>th</sup> Edition, Physics 1260 Lab Manual

**DELIVERY MODE(S):** 3 hours of lecture (TR 8:30-9:50 J228) and 3 hours of lab (W 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/onlineresearch.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 15% (or 0%\*) February 13<sup>th</sup>
- Midterm #2 15% (or 0%\*) March 20<sup>th</sup>
- Final Exam 55% (or 40%\*) Cumulative. Time and Location TBA by Registrar’s Office

\* The lowest midterm will be dropped and its weight will be added to the final exam if it improves your mark

**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 a midterm exam.

**GRADING CRITERIA: (The following criteria may be changed to suite the particular course/instructor)**

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	Sections in Walker
Jan 4 <sup>th</sup>	Introduction	
Jan 9 <sup>th</sup>	Fluid Statics	15-1, 15-2, 15-3, 15-4, 15-5
Jan 10 <sup>th</sup>	Lab – Fluid Properties	
Jan 11 <sup>th</sup>	Fluid Dynamics	15-6, 15-7, 15-8, 15-9
Jan 16 <sup>th</sup>	Coulomb’s Law, Insulators, Conductors	19-1, 19-2, 19-3
Jan 17 <sup>th</sup>	Lab – Terminal Velocity	
Jan 18 <sup>th</sup>	Electric Field	19-4, 19-5, 19-6, 19-7
Jan 23 <sup>rd</sup>	Voltage, Potential Difference	20-1, 20-2, 20-3
Jan 24 <sup>th</sup>	Lab – Coulomb’s Law	
Jan 25 <sup>th</sup>	Capacitance	20-4, 20-5
Jan 30 <sup>th</sup>	Capacitor Circuits, Dielectrics	20-6
Jan 31 <sup>st</sup>	Lab – Inverse Square Law	
Feb 1 <sup>st</sup>	Electric Current, Ohm’s Law, Power	21-1, 21-2, 21-3
Feb 6 <sup>th</sup>	Kirchhoff’s Laws	21-4, 21-5
Feb 7 <sup>th</sup>	Problem Lab #1	
Feb 8 <sup>th</sup>	Complex Circuits	21-8
Feb 13 <sup>th</sup>	Midterm #1	
Feb 14 <sup>th</sup>	Lab – Mapping of Electric Fields	
Feb 15 <sup>th</sup>	RC Circuits	21-6, 21-7
Feb 27 <sup>th</sup>	Magnets, Magnetic Fields and Forces	22-1, 22-2, 22-3, 22-8
Feb 28 <sup>th</sup>	Lab – Capacitance	
Mar 1 <sup>st</sup>	Ampere’s Law, Magnetic Fields in Wires	22-4, 22-5, 22-6, 22-7
Mar 6 <sup>th</sup>	Induced EMF, Magnetic Flux	23-1, 23-2
Mar 7 <sup>th</sup>	Lab – Simple Electrical Circuits	
Mar 8 <sup>th</sup>	Lenz and Faraday’s Laws	23-3, 23-4, 23-5, 23-9
Mar 13 <sup>th</sup>	Generators, Transformers	23-6, 23-10
Mar 14 <sup>th</sup>	Lab – Problem Lab #2	
Mar 15 <sup>th</sup>	AC Circuits	24-1, 24-2
Mar 20 <sup>th</sup>	Midterm #2	
Mar 21 <sup>st</sup>	Lab- E/M for Electrons	
Mar 22 <sup>nd</sup>	Inductors	23-7, 23-8
Mar 27 <sup>th</sup>	RC RL RLC Circuits	24-3, 24-4, 24-5

Mar 28 <sup>th</sup>	Lab- Magnetic Fields	
Mar 29 <sup>th</sup>	Resonance, Phasors	24-6
Apr 3 <sup>rd</sup>	Nuclei and Radioactivity	32-1, 32-2
Apr 4 <sup>th</sup>	Lab – Balmer Series	
Apr 5 <sup>th</sup>	Half-Lives, Nuclear Binding Energy	32-3, 32-4, 32-5, 32-6
Apr 10 <sup>th</sup>	Applications, Fundamental Particles + Forces	32-7, 32-8, 32-9
Apr 11 <sup>th</sup>	Lab – Problem Lab #3	
Apr 12 <sup>th</sup>	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.