DEPARTMENT SCIENCE

COURSE OUTLINE – WINTER 2019

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

INSTRUCTOR: Dr. Sunil Kunjachan **PHONE:** 780-539-2952
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OFFICE HOURS: Monday and Friday 9 - 11 am. Tuesday 3 - 4 pm (by appointment also– feel free to 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 5th Edition, Physics 1260 Lab Manual

DELIVERY MODE(S): 3 hours of lecture (TR 8:30-9:50 J203) 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	15% February 14th
Midterm #2	15% March 22th
Final Exam	35% Cumulative. Time and Location TBA by Registrar's Office
Presentation	5%

* 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**	**Section in Walker**
Jan 3	Introduction	
Jan 4	***No Lab***	
Jan 8	Fluid Statics	15-1, 15-2, 15-3, 15-4
Jan 10	Fluid Dynamics	15-5, 15-6, 15-7, 15-8, 15-9
Jan 11	***Lab 1****– Fluid Properties*	
Jan 15	Coulomb's Law, Insulators, Conductors	19-1, 19-2, 19-3
Jan 17	Electric Field	19-4, 19-5, 19-6, 19-7
Jan 18	***Lab 2****– Terminal velocity*	
Jan 22	Voltage , Potential difference	20-1, 20-2, 20-3
Jan 24	Capacitance	20-4, 20-5
Jan 25	***Lab 3****-Coulomb's Law*	
Jan 29	Capacitor circuits, Dielectrics	20-6
Jan 31	Electric Current, Ohm's Law , Power	21-1, 21-2, 21-3
Feb 1	***Lab 4****- Inverse square Law*	
Feb 5	Kirchhoff's Laws	21-4, 21-5
Feb 7	Complex Circuits	21-8
Feb 8	***Lab 5****- Mapping of Electric Fields*	
Feb 12	Review for Midterm #1	
Feb 14	**Midterm #1 Exam**	
Feb 15	***No Lab***	
Feb 26	RC Circuits	21-6, 21-7
Feb 28	Magnets, Magnetic field forces	22-1, 22-2, 22-3, 22-8
Mar 1	***Lab 6****- Capacitance*	
Mar 5	Ampere's Law, Magnetic Field in Wires	22-4, 22-5, 22-6, 22-7
Mar 7	Induced EMF, Magnetic Flux	23-1, 23-2
Mar 8	***Lab 7****- Resistance*	
Mar 12	Lenz and Faraday's Laws	23-3, 23-4, 23-5, 23-9
Mar 14	Generators and Transformers	23-6, 23-10
Mar 15	***Lab 8****- e/m for Electrons*	
Mar 19	AC Circuits	24-1, 24-2
Mar 21	Review for Midterm #2	
Mar 22	**Midterm #2 Exam**	
Mar 26	Inductors	23-7, 23-8
Mar 28	RC, RL and RLC Circuits	24-3, 24-4, 24-5
Mar 29	***Lab 9****- Magnetic Fields*	
Apr 2	Resonance, Phasors	24-6
Apr 4	Nuclei and Radioactivity	32-1, 32-2

Apr 5	***Lab 10-*** *Balmer Series*	
Apr 9	Half- Life and Nuclear Binding Energy	32-3, 32-4, 32-5, 32-6
Apr 11	Applications, Fundamental Particles+ Forces	32-7, 32-8, 32-9
Apr 12	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.