FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS AND ASTRONOMY
COURSE OUTLINE

1. **Course:** Physics 223, Thermodynamics, Electricity & Magnetism Summer 2017

Instructor: Dr. Jared Stang | SB130 | 403.220.3041 | jared.stang@ucalgary.ca | Office hours: MWF 9:00-9:50 AM

Lecture Sections: L01: MWF | 10:00-11:50 AM | SB 148
B01: TR | 9:00-11:50 AM | ST 030
B02: TR | 9:00-11:50 AM | ST 032

Course website: d2l.ucalgary.ca

Departmental Office: SB 605, 403-220-5385, phasugrd@ucalgary.ca
MasteringPhysics Course ID – MPSTANG87240

2. **Prerequisites:** Physics 211 or 221 or 227.
Note: The Faculty of Science policy on pre- and co-requisite checking is outlined in the UofC Calendar. A student may not register in a course unless a grade at least" C-" has been obtained in each pre-requisite course; it is the responsibility of students to ensure that their registrations are in order. See http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html for details.

3. **Grading**: The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

4%	In-class activities (TopHat questions)
6%	Pre-reading checks
10%	Mastering Physics assignments
14%	Labatorials
16%	In-class quizzes (Four total, each worth 4%: 3.4% for individual phase and 0.6% for group phase)
20%	Midterm exam (17% for individual phase and 3% for group phase)
30%	Final exam

A student's final letter grade will be determined using the percentage to letter grade conversion scale below unless that student falls within the following exception: if the student's overall course grade is greater than 50%, but the student receives less than 50% weighted average on the quizzes, midterm and final examination, the student will receive a D in the course.
Percentage to letter grade conversion scale:

> = 95 %	A +	> = 80 %	B +	> = 65 %	C +	> = 50 %	D +
> = 90 %	A	> = 75 %	B	> = 60 %	C	> = 45%	D
> = 85%	A -	> = 70 %	B -	> = 55 %	C -	< 45 %	F

As your term work items (labs, assignments and exams) accumulate, the marks for students in Phys223 will be posted on D2L. The marks that appear on this website are the marks that will be used to determine each student's overall course grade. Check your marks frequently. **Missing or incorrectly posted term work marks should be reported to your Instructor as soon as they are noticed.** You should be prepared to produce the original work to verify the requested correction.

4. **Missed Components of Term Work**: The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in Section 3.6. It is the student's responsibility to familiarize himself/herself with these regulations. See also Section E.6 of the University Calendar at; http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html

Missed Labatorials

Students are NOT allowed to attend a different Labatorial section than the one in which they are registered. You can make-up one Labatorial. Priority for scheduling a make-up lab will be given to students who missed a lab for a legitimate reason. A note from a physician/counsellor should be provided. Please fill in the form Make-up lab request (Excel file, should be saved as an Excel file) posted on D2L (Folder: Missed term work) and email it to Jared at **jared.stang@ucalgary.ca** in order to arrange for a make-up Labatorial as soon as you know that you might need one. Requests submitted more than 4 days after the date of the missed lab will not be considered. A make-up lab session will be scheduled in the last week of classes.

Missed assignments:

Please contact Jared at jared.stang@ucalgary.ca if you have a legitimate reason for missing a deadline for an assignment. Sleeping in, forgetting about the deadline etc. is not considered a legitimate reason.

Missed quiz:

Please contact Jared at jared.stang@ucalgary.ca if you have a legitimate reason for being absent on the day of a quiz. Sleeping in, forgetting about the day etc. is not considered a legitimate reason.

Missed midterm:

Students who miss the midterm because of ill health, or for other valid reasons, will most often be granted an excused absence provided that alleged problems are supported in writing by a person in a position of authority (physician, counselor, etc.). In the case of a missed exam due to illness, students must fill in the form Missed Midterm (Excel file, should be saved as an Excel file) posted on D2L (Folder: Missed term work) and email it to Jared along with the note preferably the day of the exam, but no later than 11:59 pm the day after the exam. Once the claim of illness is substantiated, **the weight of the midterm will be shifted to the final exam.**

5. **Course Materials:** *R.D. Knight, Physics for Scientists and Engineers: A Strategic Approach, 3rd Edition, Addison-Wesley.*

6. **Examination Policy**: Closed book exam, mid-term, and quizzes with formula sheet provided. Rules pertaining to the use of calculators, and other devices, during exams will be discussed in lecture. Students should also read the Calendar, Section G, on Examinations: http://www.ucalgary.ca/pubs/calendar/current/g.html.

7. **Approved Mandatory and Optional Course Supplemental Fees**: None

8. OTHER IMPORTANT INFORMATION FOR STUDENTS:

(a) **Academic Misconduct:** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties

(b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.

(c) **Academic Accommodation Policy:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Physics and Astronomy, Dr. David Feder, by email (dfeder@ucalgary.ca) or by phone (403. 220.3638).

(d) **Safewalk:** Campus Security will escort individuals day or night (http://www.ucalgary.ca/security/safewalk/). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on

all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also http://www.ucalgary.ca/secretariat/privacy.

(f) **Student Union Information:** VP Academic Phone: 220-3911 Email: suvpaca@ucagary.ca. SU Faculty Rep. Phone: 220-3913 Email: sciencerep@su.ucalgary.ca; Student Ombudsman

(g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

(h) **USRI:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

(i) **STUDENT ADVOCACY INFORMATION:**

Website: http://www.su.ucalgary.ca. Student Ombudsman: http://www.ucalgary.ca/provost/students/ombuds

(j) **LABATORIALS**

Labatorials begin Tuesday, July 11th, 2017. Labatorials take place in ST 030 / 032, and students will have been assigned to a particular room by the Registrar's Office when enrolling in Physics 223.

Physics 223 Labatorial Schedule – Summer 2017

Week	Dates	Labatorial
1	July 3-7	Tuesday: NO LABATORIALS Thursday: NO LABATORIALS
2	July 10-14	Tuesday: Labatorial 1 Electric Charges and Forces Thursday: Labatorial 2 Electric Fields
3	July 17-21	Tuesday: Labatorial 3 Equipotential Lines Thursday: Labatorial 4 Electric Circuits
4	July 24-28	Tuesday: Midterm review/office hours Thursday: NO LABATORIALS
5	July 31-Aug 4	Tuesday: Labatorial 5 Magnetic Field in a Slinky Thursday: Labatorial 6 Ideal Gas Law
6	Aug 7-11	Tuesday: Labatorial 7 First Law of Thermodynamics Thursday: Labatorial 8 Temperature at Microscopic Level
7	Aug 14-16	Tuesday: Make-up Labatorials/ Drop-in sessions

In general, the format of the Labatorials is as follows: Working in groups, students make their way through a carefully written workbook crafted to help students ponder, discuss, and learn concepts being covered in their lectures. TAs offer assistance and guidance, and check student understanding periodically throughout the session. Labatorials typically involve a class demonstration, computer simulations, or some apparatus, and the tasks presented to students vary accordingly.

The Labatorials workbook documents will be available on D2L. Students are to print out their own copies and take them to their Labatorial section to do their work.

It is the student's responsibility to ensure their Labatorials marks as posted on D2L are correct. A student's Labatorials mark will not be revised in the D2L gradebook if more than 15 days has passed since the student performed the Labatorial.

(k) MASTERING PHYSICS On-line ASSIGNMENTS

Mastering Physics assignments are due by 23:59 on Friday nights. The first graded assignment is due Friday, July 7th, 2017. A practice, not for credit, MP assignment will be made available for students to attempt (Assignment 0). Please see detailed schedule of the assignments below.

Physics 223 Assignment Schedule – Summer 2017

Week	Dates	Assignments	Available	Due Date
1	July 3-7	Assigment 0 - Intro to MP Assignment 1	Tuesday, July 4	Friday, July 7, 2017
2	July 10-14	Assignment 2 Assignment 3	Friday, July 7, 2017	Friday, July 14, 2017
3	July 17-21	Assignment 4 Assignment 5	Friday, July 14, 2017	Friday, July 21, 2017
Midterm exam on Wednesday, July 26th				
4	July 24-28	Assignment 6	Friday, July 21, 2017	Friday, July 28, 2017
5	July 31-Aug 4	Assignment 7 Assignment 8	Friday, July 28, 2017	Friday, August 4, 2017
6	Aug 7-11	Assignment 9 Assignment 10	Friday, August 4, 2017	Friday, August 11, 2017
7	Aug 14-16	Practice assignment 11	Friday, August 11, 2017	No due date

** As was the case in Phys211/221, all students must sign-up to access Mastering Physics **

If you have a MasteringPhysics account, **Sign In** at http://www.masteringphysics.com and enter your Username and Password. If you cannot remember your username or your password, click Forgot your username or password? and enter the email address you used to register for MasteringPhysics. Your login name and password will be sent to your email.

If you have purchased the package with MasteringPhysics in the bookstore:

- Go to www.pearsoncustom.com/can/ucphys and click Register Here under Register / Purchase Access. and click **Students** under **Register**.
- Select **Yes, I have an Access Code** Click **Next**.
- **License Agreement and Privacy Policy:** Click **I Accept** to indicate that you have read and agree to the license agreement and privacy policy.
- Select the appropriate option under "Do you have a Pearson Education account?" Continue to give the requested information until you complete the process. The **Confirmation & Summary** page confirms your registration. This information will also be emailed to you for your records. You can either click **Log In Now** or return to www.masteringphysics.com later.
    - Select the appropriate option under "Do you have a Pearson Education account?" (**Note**: if you have used a Pearson MyLab/Mastering at U of C you will have an account). If **No**, create a username/pass word. If **Yes**, Sign In with your username/password. Can't remember? Click Forgot your username or password? Enter your **Access Code**, click **Next** and complete the registration information.

If you choose to just access the MasteringPhysics assignments without purchasing access to the study material please email Pearson at ucphysics.mastering@gmail.com to get an access code and registration instructions. You will be able to access only the assignments.

Once you have registered in MasteringPhysics, **Join a Course** by entering the MasteringPhysics Course ID – **MPSTANG87240**

(l) ACTIVITIES

In order to help students to better understand and learn course material there will be additional activities:

- Pre-reading checks (due twice a week, every Monday and Wednesday, 9:00 AM), worth 6%. Pre-reading checks will be available on D2L (Assessments)
- In class TopHat personal response system questions, worth 4%.

As a vehicle to encourage class participation and student interaction as well as providing instructors with rapid, in-class feedback, the TopHat system will be employed. This is the same response system used in the Fall 2016 and Spring 2017 semesters for Physics 211/221. A demonstration of this system could happen in your lecture section in the first week of classes. TopHat questions will be graded only for participation. To account for possible technical difficulties/unavoidable absences, 15% grace will be given (i.e. answering 85% or more of the TopHat questions through the semester will give you full participation points for these).

(m) QUIZZES AND MIDTERM

Quizzes will take place in the first twenty minutes of class on the designated dates. The quizzes will use a two-phase format: they will consist of an individual and a group phase. Your total grade for the quiz will be weighted 85% on the individual phase and 15% on the group phase (unless your individual phase score is higher than your group's, in which case your grade will be 100% individual).

The midterm will also use a two-phase format, and your total grade for the midterm will be weighted 85% on the individual phase and 15% on the group phase (unless your individual phase score is higher than your group's, in which case your grade will be 100% individual).

9. Course incomes: Coming into Physics 223, students are expected to be able to: Model the movement and behavior of objects under the influence of outside forces; Apply principles of Newtonian mechanics, including Newton's laws and the work-energy theorem, to analyze physical situations; Analyze systems interacting under the influence of gravity, including using gravitational potential energy; Identify the appropriate physical concepts that describe a situation, object, or system; Diagram, describe, and calculate the relevant parameters describing a system; Solve problems in mathematics involving vector algebra, vector decomposition, and differential and integral calculus.

10. Course outcomes: In Physics 223, students will further develop their ability to build mathematical models of physical situations, to identify the appropriate physical concepts that describe a situation, object, or system, and to calculate the relevant parameters describing the system. Specifically, upon successfully completing Physics 223, students will be able to model, identify, and calculate for systems including but not limited to: Electric forces, fields, potential energy, and potential; Electric circuits, including parallel and series circuits with resistors, batteries, and capacitors; Magnetic forces, fields, and induced currents and magnetic fields; Ideal gases undergoing thermodynamic processes and phase changes; The first law of thermodynamics; The microscopic description of gases, and the connection to macroscopic thermodynamic variables; Heat transfer mechanisms.

Physics 223 Lecture Schedule – Summer 2017

Week	Dates	Topics	Textbook readings	Labatorial
1	July 4-7	Coulomb's law. Electric field E of a point charge, distributions of point charges, continuous distributions. Parallel plate capacitors. Motion of charged particles in E fields. Electric potential energy of point charges.	25.4, 25.5, 26.1 – 26.4 26.5, 26.6 28.1, 28.2	Tues: NO LABATORIALS Thurs: NO LABATORIALS
2	July 10-14 **Wed: Quiz 1**	Electric Potential V. V in a capacitor. V due to point charges. The connection between E and V. E fields of charged conductors. Capacitance and Capacitors Resistance and Ohm's law.	28.4-28.7, 29.1-29.3 29.4 - 29.6, 30.5	Tues: Electric Charges Thurs: Electric Fields
3	July 17-21 **Wed: Quiz 2**	Direct current circuits. Introduction to magnetism. Currents and magnetic fields.	31.1–31.8 32.1 - 32.5	Tues: Electric Potential Thurs: Circuits
Midterm exam on Wednesday, July 26th				
4	July 24-28 **Wed: Midterm exam**	Induced current. Motional emf. Magnetic flux. Lenz's Law. Lorenz force. Cyclotron motion. Hall Effect. Magnetic forces on straight wires and current loops.	32.7 - 32.9 33.1 - 33.4	Tues: Midterm review/office hours in Labatorial time Thurs: NO LABATORIALS
5	July 31-Aug 4 **Wed: Quiz 3**	Concepts of Pressure. Gauge Pressure. Thermodynamic state variables. Temperature. Phase changes. Ideal gases. Ideal gas processes. Pressure-Volume diagrams. Work in ideal gas processes. Heat.	15.1 – 15.3 16.5 – 16.6	Tues: Solenoid Fields Thurs: Ideal gas
6	Aug 8-11 (No class Aug 7) **Wed: Quiz 4**	First Law of thermodynamics. Thermal properties of matter. Calorimetry. Specific heats of gases. Gas particle collisions and resulting temperature and pressure.	17.1 - 17.7 18.1 – 18.3	Tues: First Law Thurs: Temperature
7	Aug 14-16 (Aug 16 is last day of semester)	Thermal energy and Specific Heat. Heat-Transfer Mechanisms.	18.4, 17.8	Tues: Make-up Labatorials

Department Approval_____Date_____