

Physics 115.3: Physics And the Universe

University of Saskatchewan

2010 Spring and Summer Session Q1

1 Instructors

Paul Bazylewski

Office Rm 43
Phone 966-6454
Email paul.bazylewski@usask.ca

Jason Sadowski

Office Rm 254
Phone 966-1240
Email jason.sadowski@usask.ca

2 Course Objectives

- Study of the basic principles of physics through a survey of various fields of the subject
- Study of the applications of physical principles to technology, health sciences, and other scientific fields
- Development of analytical, mathematical, and problem-solving skills
- Practical application of the scientific method through laboratory experimentation

3 Prerequisites

Physics 30 and Mathematics B30 and C30. *Students must have previously obtained credit for all three prerequisites. See your instructor as soon as possible if you are missing any prerequisite.*

4 Academic Honesty

Students are expected to understand and abide by the principles of academic honesty and to realize that there are potentially serious consequences for dishonest behavior.

5 Composition of Grade

In-Class Responses	5%
Homework Assignments	13%
Laboratories	15%
Midterm (Friday May 21st)	22%
Final Exam (June 4th 9:00 AM)	45%
<hr/> TOTAL	<hr/> 100%

6 Required Calculator

Students are **required** to use a Texas Instruments TI-30X series calculator or a Hewlett-Packard HP 30S calculator for all Physics 115 exams. No other calculator may be used. Students are strongly encouraged to read the user manual and use the calculator on a regular basis.

7 Required Response Device (“Clicker”)

Students are **required** to have a TurningPoint Audience Response device (a clicker) for use during all Physics 115 lectures. Clickers are available for purchase from the Campus Computer Store. You must register your clicker’s unique serial number in PAWS to identify yourself as the user. Do not lend your clicker to other students. If you do not register the clicker, we will not know that you are responding in class!

8 Required Textbooks

- *College Physics* 3rd Edition, by Giambattista and Richardson (McGraw Hill Higher Education) \$180.00
- *A Laboratory Manual for Physics 115 (Revised 2008)* \$4.60

9 Supplementary Materials

- *Student Solutions Manual* to accompany *College Physics* 2nd Edition. \$52.25

10 Internet Access Is Required

All aspects of the course will be coordinated through the online Blackboard Learning System. Students can access the course website either through their University account or through another provider.

11 Lectures

All students **must** be registered in the course to attend the lectures.

Proposed Lecture Schedule:

Lecture	Date	Section	Description (Paul Bazylewski)
1	W May 12		Introduction to course
		1.1	Why Study Physics?
		1.2	Talking Physics
		1.3	The use of Mathematics
		1.4	Scientific Notation and Significant Figures
		1.5	Units
		1.6	Dimensional Analysis
2	Th May 13	1.7	Problem Solving Techniques
		1.8	Approximation
		1.9	Graphs The Scientific Method
			Mechanics
3	Fr May 14	2.1	Force
		2.2	Net Force
		2.3	Newton's First Law of Motion
		2.4	Vector Addition Using Components
		2.5	Newton's Third Law of Motion
		2.6	Gravitational Forces
		2.7	Contact Forces
		2.8	Tension
		2.9	Fundamental Forces
4	M May 17	3.1	Position and Displacement
		3.2	Velocity
		3.3	Newton's Second Law of Motion
		3.4	Applying Newton's Second Law
		3.5	Velocity is Relative (Reference Frames)
5	T May 18	4.1	Motion along a line due to a constant net force
		4.2	Motion along a line with constant acceleration
		4.3	Free Fall
		4.4	Motion of Projectiles
		4.6	Air Resistance
		5.1	Description of uniform circular motion
6	W May 19	5.2	Radial acceleration
		5.4	Circular orbits of satellites (omit Kepler's Laws)
		5.5	Non-uniform circular motion
		6.1	The Law of Conservation of Energy
		6.2	Work Done by a Constant Force
7	Th May 20	6.3	Kinetic Energy
		6.4	Gravitational Potential Energy (1)
		6.5	Gravitational Potential Energy (2)
		6.6	Work done by Variable Forces: Hooke's Law
		6.7	Elastic Potential Energy
		6.8	Power
		7.1	A Vector Conservation Law
		7.2	Momentum
8	Fr May 21	7.3	The Impulse-Momentum Theorem
		7.4	Conservation of Momentum
		7.7	Collisions in One Dimension
		7.8	Collisions in Two Dimensions
			MIDTERM EXAM

Lecture	Date	Section	Description (Jason Sadowski)
Electromagnetism			
9	T May 25	16.3	Coulomb's Law
		16.4	The Electric Field
		17.1	Electric Potential Energy
		17.2	Electric Potential
		17.3	The Relationship between Electric Field and Potential
10	W May 26	17.4	Conservation of Energy for Moving Charges
		18.1	Electric Current
		18.2	Emf and Circuits
		18.4	Resistance and Resistivity
11	Th May 27	18.5	Kirchhoff's Rules
		18.6	Series and Parallel Circuits
		18.8	Power and Energy in Circuits
		18.11	Electrical Safety
12	Fr May 28	19.1	Magnetic Fields
		19.2	Magnetic Force on a Point Charge
		19.3	Charged Particle Moving Perpendicular to a Uniform B-Field
		19.8	Magnetic Field Due to an Electric Current
		19.10	Magnetic Materials
Quantum and Particle Physics			
13	M May 31	27.1	Quantization
		27.2	Blackbody Radiation
		27.3	The Photoelectric Effect
		27.4	X-Ray Production
14	T June 1	27.5	Compton Scattering
		27.6	Spectroscopy and Early Models of the Atom
		27.7	The Bohr Model of the Hydrogen Atom
		27.8	Pair Annihilation and Pair Production
15	W June 2	30.1	Fundamental Particles
		30.2	Fundamental Interactions
		30.3	Unification
		30.4	Particle Accelerators
		30.5	Twenty-First-Century Particle Physics

12 Tutorials

Tutorials are an integral part of this course and students are expected to attend. The tutorials will be held in Room 107 Physics (the lecture theater).

13 Homework Assignments

- There will be daily online homework assignments (accessed through the [Assessments](#) link in Blackboard)
- You should keep a separate notebook for your homework. Solve each problem with a complete written solution, following the methods outlined in the lectures and in the Survival guide.
- Compare your answers with the choices given in the question. If you do not get a match, you have made a mistake in your solution, and you should go back and check your work.
- The assignments are due at 0800 the following day (Mondays for Friday assignments). Late assignments will not be accepted. Assignments not submitted will receive a mark of zero.
- The assignment solutions will be posted to the Physics 115 web site and will remain posted for the duration of the course.

14 Etiquette

14.1 Classroom Etiquette

- Turn off all cell phones and other communication devices whilst in class
- Do not distract other students by talking while class is in progress.

14.2 Email Etiquette

All emails to Professors, lab instructors, department administrators, etc. are **official communication** with the University. Good rules to follow are:

- Course name in subject header, e.g. "Physics 115 - Test Question"
- Always address recipient courteously, e.g. "Dear Prof. Smith"
- Always include your name, student number and course name & section in your email.
- Use full sentences and describe your question or situation completely and clearly. Be concise.
- Re-read your complete message before sending

14.3 Exam Etiquette/Rules

- Turn off cell phones before entering the examination room.
- Only Texas Instruments TI-30X series calculator or a Hewlett-Packard HP 30S calculators may be used. No other electronic devices are allowed at your desk. (e.g cell phone, pager, PDA, iPod, MP3 Player, electronic dictionary)
- No written material is allowed at your desk other than the test paper, formula sheet and OpScan sheet
- Bring your student card, a pen, two soft-lead (HB) pencils, eraser, and straightedge.

15 Physics 115 Laboratory Policy

Students **MUST** go to the laboratory introduction on Thursday May 13th if you are to be permitted to attend the labs.

1. Laboratory work is an integral part of the course. A student will not receive a passing grade for the course unless **all** of the experiments have been completed. Failure to complete the laboratory work will result in failure from the course.
2. Withdrawing from Physics 115 implies withdrawing from the laboratory work in the course as well. You may not continue the laboratory work after withdrawing from the course, even if you decide to continue to attend the lectures.
3. If you complete Physics 115 with a final grade of 40% or higher and complete the laboratory work with an average laboratory mark of at least 70%, and you repeat the course in a later session within three years, you may request exemption from all of the labs. Your laboratory mark for the year will be the average mark you received for the experiments already performed.
4. If you complete Physics 115 with a final grade of less than 40%, or if you are excluded from the final examination, or if you withdraw after the deadline for withdrawal without academic penalty, **no** laboratory exemption will be granted.
5. Laboratory exemptions are not automatic. Students who have completed at least the first term of Phys 111 labs within the last three years **may** qualify for a **partial** lab exemption for Phys 115 on a lab by lab basis. To request an exemption from the laboratory work, you must contact Laverne Sander in Room 112 Physics (email laverne.sander@usask.ca)

PHYSICS 115.3 – 2010 SPRING & SUMMER SESSION – Q1

TENTATIVE LAB SCHEDULE

ALL GROUPS BEGIN LAB AT 1:30 p.m. (except as indicated)

Date	Group A			Group B			Group C			Group D		
	Expt	Room		Expt	Room		Expt	Room		Expt	Room	
May 12 W	-	-	-	-	-	-	-	-	-	-	-	
13 Th	LS	Intro	107	LS	Intro	107	LS	Intro	107	LS	Intro	107
14 F	LS/JF	M3	112	TB/YD	M3	125	-	-	-	-	-	
17 M							LS/JF	M3	112	TB/R G	M3	125
18 Tu	TB/YD	M14	117	LS/JF	M36	112						
19 W		-	-		-	-	TB/R G	M14	117	LS/JF	M36	112
20 Th	LS/JF	M36	112	TB/YD	M14	117						
21 F		TEST	107		TEST	107	-	TEST	107	-	TEST	107
24 M		Holiday			Holiday			Holiday			Holiday	
25 Tu	-	-	-	-	-	-	LS/JF	M36	112	TB/R G	M14	117
26 W	JF/RG	E7	112	LS/YD	B43	117	-	-	-	-	-	
27 Th	LS/RG	B43	117	JF/YD	E7	112	-	-	-	-	-	
28 F	-	-	-	-	-	-	JF/RG	E7	112	LS/YD	B43	117
31 M		-	-		-	-	LS/RG	B43	117	TB/JF	E7	112
June 1 Tu	-	-	-	-	-	-						
2 W	-	-	-	-	-	-						

LS: Laverne Sander
JF: Jay Forrest

TB: Teak Boyko
YD: Yue Ding

RG: Robert Green