

# UNIVERSITY OF GUELPH DEPARTMENT OF PHYSICS

## PHYS\*1080 W'11 Physics for Life Sciences

**IMPORTANT:** Please retain this material and consult it regularly during the semester. This information will be important to you as the course progresses.

**LECTURERS:** Mike Massa MacN328 ext.52625 email : [massam@uoguelph.ca](mailto:massam@uoguelph.ca)  
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**QUIZ ROOM SUPERVISOR:** Cindy Wells SCIE1101A Ext. 52445 email: [cwells@uoguelph.ca](mailto:cwells@uoguelph.ca)  
Please email the Quiz Room Supervisor with course related inquiries and to report any errors in your Desire2Learn (D2L) record.

**PREREQUISITES:** (1 of 4U Physics, OAC Physics, PHYS\*1020), one 4U or OAC Mathematics course

**RESTRICTIONS:** PHYS\*1000

Students in this course will need to use D2L to write required pretests, perform a simulated experiment on diffusion for Study Guide 17, and check their term marks. **As soon as possible, you should check that you can login to D2L:**

- \* Use a web browser to go to: <http://courselink.uoguelph.ca/>,
- \* Follow the D2L login instructions.

### **FINAL EXAMINATION CONFLICTS**

The University's policy regarding examination conflicts, as stated in the Undergraduate Calendar, is as follows: "Students who drop and add courses are required to consult the examination timetable in order to avoid conflicts in examination times. Written approval must be obtained from the dean or director and the instructor-in-charge of the course to register in courses that have conflicting examination times."

### **TEXT AND OTHER REQUIRED MATERIALS:**

- (i) **Text:** *Physics for the Biological Sciences: A Topical Approach to Biophysical Concepts (4<sup>th</sup> Edition)*; F.R. Hallett *et al.* Available in the University Bookstore and the Co-op Bookstore.

**Study Guide/Laboratory Manual for PHYS\*1080 (2010 printing): \$10.00 (CASH ONLY)**

Note that the last page of the Study Guide section is a copy of the formula sheet that is used in the Quiz Room and supplied as part of the final examination. This is available in the Quiz Room (SCIE1101A). For the sale of this item, the Quiz Room will be open *on* Mon, Tues, Wed Sept 10,11,12 during the following hours: 9-12noon/1-4. After Sept. 12<sup>th</sup> this item may be purchased in the Quiz Room during normal Quiz Room daytime hours as posted on D2L.

**i-Clicker Student Response Unit** – available in the University Bookstore. A Classroom Response System will be used this semester where students use Personal Response Units (commonly known as "clickers") to register their responses to questions posed in class.

- (ii) In addition to the pretests and the experiment for Study Guide 17, the following items are available via D2L:
- (a) **Solutions to Self-Tests** in the Study Guides
  - (b) Two **Sample Final Examinations**
  - (c) **Textbook Problem Solutions** for all the mechanics problems (Chapters 7-10) and for selected problems in the remaining chapters.
  - (d) **Computer Tutorials** on various topics (list on pg. 8)
  - (e) **Errata** for the textbook.
  - (f) **One sample quiz** for each Study Guide.

- (iii) **Calculator** (with trig functions, logs, etc.) – **(graphing calculators and electronic devices are not allowed in the quiz room or exam)**
- (iv) **This Course Outline:** includes important dates and deadlines, lecture schedule, evaluation information, personal record sheet, etc.

**DROP AND ADD FORMS:** Instructor's signature to drop or add this course is not required.

**LOST AND FOUND:** "Lost and Found" is in the **Quiz Room (SCIE1101A)**.

**LECTURE PERIODS:**

Tues., Thurs.	10:00-11:20am	MacN 105
Tues., Thurs.	1:00-2:20 p.m.	MacN 105
Wed.	7:00-9:50 pm	MacN105

**FINAL EXAM:** **MONDAY, APRIL 18<sup>TH</sup>, 2011 8:30-10:30AM**

**PHYS\*1080 W'11 - DEADLINES, QUIZ REQUIREMENTS & IMPORTANT NOTES**

**STUDENTS MUST SHOW THEIR U OF G PHOTO ID CARD IN ORDER TO WRITE A QUIZ**

**\*\*\*NOTE: ONLY 1 QUIZ ATTEMPT PER TIME SLOT ALLOWED ON SAME\*\*\***

**MONDAY, JAN. 10TH - QUIZ ROOM OPENS AND QUIZZES ARE AVAILABLE**

Wk. 1 **Wed. Jan. 12** Lab Room (MacN 304A) opens.

Wk. 4 **Fri. Feb. 4** **Quiz #6 – LAST DAY**

- Kinematics SG. 9
- Newton's Laws, Momentum & Energy SG. 10
- Experiment 10 – Forces and Torques: Equilibrium (MacN304a)
- **Pretest 6 (on line)**

Wk. 6 **Fri. Feb. 18** **Quiz #7 - LAST DAY**

- Rotational Motion SG. 11
- **Pretest 7 (on line)**

Wk. 8 **Fri. Mar. 11** **Quiz #8 - LAST DAY**

- Elasticity & Scaling SG. 12
- Experiment 12 – Elasticity (MacN304a)
- Pressure & Surface Tension SG. 13
- Experiment 13 – Density and Surface Tension of Liquids (MacN304a)
- **Pretest 8 (on line)**

Wk. 10 **Fri. Mar. 25** **Quiz #9 - LAST DAY**

- Fluids in Motion SG. 14
- Experiment 14 – Viscosity of Liquids (MacN304a)
- Turbulent Flow SG. 15
- **Pretest 9 (on line)**

Wk. 12 **Thur. Apr. 7** **Quiz #10 – LAST DAY**

- Boltzmann Eq'n & Sedimentation SG. 16
- Diffusion, Osmotic Pressure SG. 17
- Experiment 17 – Diffusion (computer on line lab)
- **Pretest 10 (on line)**

Wk. 12 **Thur. Apr. 7** **QUIZROOM CLOSES Thursday, April 7<sup>th</sup> At 4:00pm**

Graphing Review (ref. pg 8 of this outline)

Heat SG. 18 will be tested on the final examination (at least 2 questions)

- **Be careful not to run out of quiz room time slots when writing quizzes. Your 1<sup>st</sup> attempt should be well in advance of the deadline point to allow for a possible 2<sup>nd</sup> or 3<sup>rd</sup> attempt.**

**PRETESTS MUST BE PASSED WITH A MINIMUM OF 60% PRIOR TO MAKING YOUR 1<sup>ST</sup> QUIZ ATTEMPT. ALLOW AT LEAST 1 HR. FOR YOUR MARK TO BE PROCESSED.**

**YOU ARE ADVISED TO SIGN UP FOR AND COMPLETE YOUR REQUIRED LABS EARLY IN THE SEMESTER TO ENSURE ALL REQUIRED LABS ARE COMPLETED BY QUIZ DEADLINES. ALSO, LABS MUST BE SIGNED/STAMPED BY T/A IN LAB ROOM NO LATER THAN THE DAY PRIOR TO ATTEMPTING THE RELATED QUIZ.**

**QUIZ ROOM HOURS (SCIE1101A):** Posted on D2L

Note: times given are when the door opens and closes.

**LAB ROOM HOURS (MacN 304A):** Lab schedule sign up available on D2L

Extra opening times may be added depending on enrolment.

*The following paragraphs should be included in ALL course outlines.*

*The Department of Physics requires student assessment of all courses taught by the Department. These assessments provide essential feedback to faculty on their teaching by identifying both strengths and possible areas of improvement. In addition, annual student assessment of teaching provides part of the information used by the Department Tenure and Promotion Committee in evaluating the faculty member's contribution in the area of teaching.*

The Department's teaching evaluation questionnaire invites student response both through numerically quantifiable data, and written student comments. In conformity with University of Guelph Faculty Policy, the Department Tenure and Promotions Committee only considers comments signed by students (choosing "I agree" in question 14). Your instructor will see all signed and unsigned comments after final grades are submitted. Written student comments may also be used in support of a nomination for internal and external teaching awards.

**NOTE:** No information will be passed on to the instructor until after the final grades have been submitted.

**PHYS\*1080****Tentative Lecture Schedule – Winter 2011 (Sec. 01 & 02)**

**Section 03, the Wednesday evening lecture will cover all the topics from that week's Tuesday and Thursday lectures in Sections 01 & 02**

LECTURE		DATE		LECTURE TOPIC	STUDY GUIDE NUMBER
L1	Tue	<b>JAN</b>	11	Kinematics	9
L2	Thu		13	Kinematics	9
L3	Tue		18	Kinematics, Forces & Torques	9,10,11
L4	Thu		20	Forces	10
L5	Tue		25	Momentum, Work & Energy	10
L6	Thu		27	Energy, Rotational Motion	10,11
L7	Tue	<b>FEB</b>	1	Rotational Motion	11
L8	Thu		3	Rotational Motion	11
L9	Tue		8	Rotational Motion	11
L10	Thu		10	Elasticity	12
L11	Tue		15	Scaling	12
L12	Thu		17	Pressure, Barometric Eq'n	13
				<b>MONDAY FEB.21-FRIDAY FEB25 WINTER BREAK</b>	
L13	Tue	<b>MAR</b>	1	Surface Tension	13
L14	Thu		3	Non-Viscous Fluid Flow	14
L15	Tue		8	Viscous Fluid Flow	14
L16	Thu		10	Pulsatile Flow, Bolus Flow, Turbulence	15
L17	Tue		15	Turbulence, Aneurysms	15
L18	Thu		17	Perrin's Experiment	16
L19	Tue		22	Sedimentation, Diffusion	16,17
L20	Thu		24	Diffusion	17
L21	Tue		29	Osmotic Pressure	17
L22	Thu		31	Heat	18
L23	Tue	<b>APR</b>	5	Heat	18
L24	Thu		7	Review, Info re Final Exam	

## **HOW THE COURSE WORKS**

### **INTRODUCTION**

Students' study schedules at University are often based on a crisis-to-crisis approach (When's my next midterm exam?) rather than on organized learning. To reduce this problem, Introductory Physics For Life Sciences is offered using a "Personalized Instruction" method which gives the student some flexibility in scheduling study time.

The central idea of this teaching method is the accommodation of both the student who needs or likes formal lecture teaching and the student who prefers guided self-instruction. Indeed, in this course, any combination of these two extremes may be mixed to the student's own taste.

Many thousands of students have taken this course and almost every semester has seen some modification, usually minor, in the operation of the course. The present version of the study materials incorporates a large number of constructive suggestions made by students. We hope you will continue to point out errors, omissions and weaknesses so that the course and its teaching materials can be regularly upgraded. We are confident that this thoroughly tested learning concept will continue to be met with enthusiastic approval from the majority of our students.

### **LECTURES**

Formal lectures will be given and you will find a detailed timetable of dates and topics in this course handout. Students may attend all of the lectures or select only those topics in which they feel they need lecture support. You are strongly advised to attend lectures until you are sure that the self-study method works for you. In any case, the entire course content will be covered in these lectures. Whether you attend lectures or not, it is your responsibility to check D2L and the door to the quiz room for important weekly notices regarding the course.

### **MODULES**

The Study Guide (SG) contains the ten modules (SG 9 to 18) for this course, which are summarized on pg. 6 of this outline. These ten modules cover the entire course and are designed so that you need never actually attend a lecture if you follow their advice scrupulously. (You must, however, do laboratory work.) Each module provides you with:

- 1) a brief introductory discussion of what the module is about,
- 2) the educational objectives of the module,
- 3) a detailed study guide (reading and problem lists, etc.)
- 4) self tests,
- 5) answers to self tests, and sometimes
- 6) extra problems.

These self-study modules are your chief help; the Study Guide is a teacher at your side constantly and should be studied with care.

## DIAGNOSTIC QUIZZES

Note that quizzes are withdrawn on specific dates (see pg.2), so these should be attempted as appropriate. Also, note that some quizzes may require knowledge of material from previous quizzes. A non-credit PRETEST must be passed before its Quiz for credit can be written. The PRETESTS are available on D2L. See page 9 for details. There is a PRETEST available for S.G. 18 even though there is no Quiz. This is strongly recommended for study purposes for the final exam.

- Regardless of the combination of formal lectures and/or self-study you use to acquire knowledge in the course, the question is "how do you demonstrate this knowledge and receive credit for it?" When you think you have mastered the contents of the required modules, and have passed (60%) the associated PRETEST, you should go to the Quiz Room where you may request a Diagnostic Quiz. This quiz is designed to test your mastery of the material. Note however a very important point. There are far more study guide topics than there are quizzes that you are expected to write. Consequently, most quizzes have been combined to include questions from two study guides as shown above on this page. For example, quiz #6 contains questions from Kinematics, Newton's Laws, Momentum & Energy and Experiment 10. It is therefore very **important that you come prepared for both** study guides and have passed the pretest. *You will need your University of Guelph photo ID card in order to write a quiz.* This quiz is designed to test your mastery of the material. The time allotted for each quiz is **20 minutes**. When you have completed the quiz, it is marked immediately by a tutor in your presence<sup>1</sup>. In this way, no time is wasted teaching you things you already know, but the quiz will isolate those things (if any) you don't know. The tutor will give you help on the spot. It is important to emphasize the diagnostic aspect of this quiz; diagnosis is its prime purpose. It is of no value to write one if you are not prepared; you are wasting everyone's time. The level at which you are considered to have "mastered" the material is 80%, i.e., the "pass mark" is 8.0 out of 10.0. Please see "Evaluation of Quiz Marks" section on pg. 7.

Each quiz that is passed contributes 10% toward your course mark. If you do not get 8 out of 10 on your first attempt (and you may not), it doesn't matter. There is no stigma attached to failing this quiz; that is not its purpose. You may go away, study, and try again. The quiz will have served to show you what you must study. Obviously there must be a limit to the number of times you may write quizzes on a single group, and this has been set at three. **Also, you may not attempt more than one quiz on any given group in a single quiz period.**

During quizzes (and the final examination), you may use a pocket calculator (**graphing calculators and/or electronic devices are not allowed at your quiz station**). In the quiz room, each desk is provided with a sheet of formulae. A copy of this sheet will be included in the final exam, and is also included on the last page of the Study Guide before the Lab Manual. **No material in the form of quizzes or papers may be taken from the Quiz Room and all paper used when writing a quiz must be turned in.** You should visit the quiz room during the first week of the semester to see how the system operates.

As shown on pg. 2, there are 5 quizzes to be completed. There is no quiz on SG 18, although there will be at least 2 questions on SG 18 on the final examination. A sample quiz for each Study Guide is available on D2L.

Self-paced study is a new experience for most students. At best, it permits you to work ahead in physics early in the semester, freeing study time for other courses during heavy weeks. At worst, there is a temptation to leave things too late. To help pace students, deadlines are placed on quizzes. (Refer to pg. 2)

## GRAPHING REVIEW

Some quizzes will require you to sketch graphs of simple functions, or to plot graphs of data. To prepare for this graphing, you should work through the computer tutorial - Graphing Simple Functions (available via D2L) and also read the "Graphing Hints" at the beginning of the lab experiments section in the Study Guide and Lab Manual.

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<sup>1</sup>If you absolutely cannot stay to have your quiz marked, you may leave it. It will be marked at the end of the quiz period and the mark posted. It will be available for you to look at for two further quiz periods.

## EXPERIMENTS

There are 5 experiments to be done, associated with S.G. units 10-11, 12, 13, 14 and 17 (see pg. 2 of the outline). Four of these experiments are done in the lab room (MacN 304A) and they may be performed in any order (see D2L for hours of operation). You must reserve a space (sign up on D2L). It is mandatory to sign-up for all required labs and create your own lab schedule at the start of the semester. Print this schedule and staple it inside your lab manual as proof of your reservation. Each station can be reserved for **1.5 hours** which is sufficient time to complete data and calculations provided you have read over the lab material prior to your scheduled lab session. There is also one computer simulation (Experiment 17) which can be done on D2L.

Once your lab is **COMPLETE** (data and calculations) you must have the laboratory instructor sign and stamp your Lab. You will tear off the signed/sealed portion and take it to the quiz room when making your first attempt at related quiz. Notice that the lab instructor does not assign a mark to your lab work, although he/she may refuse to accept it if he/she judges the work to be inadequate. Your understanding of the material is tested in the quiz on the associated Study Guide.

You are encouraged to visit the lab early in the semester in order to see how it operates.

**Remember that, for Study Guides with an associated experiment, you cannot write the quiz until the experiment is stamped as complete.**

## EVALUATION OF QUIZ MARKS

**Quizzes are marked out of 10**

**Quiz marks** 8/10 or higher receives 10% (highest possible mark)  
between 4.0/10 and 7.5/10 (inclusive) receives 2%<sup>†</sup>  
less than 4/10 receives zero

<sup>†</sup> This 2% mark does not add to a mark of 10. It is awarded on the condition you do not receive a "pass" on any attempt on a unit quiz. **Four examples below:**

- (i) A student earns 4.0/10 on the first quiz attempt, 6.0/10 on the second quiz attempt, and 8.0/10 on the third quiz attempt. Mark received: 10 out of 10.
- (ii) A student earns 4.0/10 on the first quiz attempt, 5.5/10 on the second quiz attempt, and 7.5/10 on the third quiz attempt. Mark received: 6 out of 10.
- (iii) A student earns 2.5/10 on the first quiz attempt, 4.0/10 on the second, and 7.5/10 on the third. Mark received: 4 out of 10.
- (iv) A student earns 7.5/10 on the first quiz attempt and tries no further quizzes. Mark received: 2 out of 10.

**SUMMARY OF MARKS: quiz marks 50% (5 x 10.0) + 50% (final exam) = 100%**

**ACCURACY OF RECORDS: It is your responsibility to use D2L to check that your marks are recorded correctly. Please check your record often and report any discrepancies immediately to the Quiz Room Supervisor** (email address on pg. 1). As an aid, a 'Personal Record Form' is attached to this handout. You should use this form to record your quiz attempts, etc., and from time to time check the computer record against your personal record.

**ILLNESS:** If you are away for brief periods of time due to illness or for compassionate reasons, see the quiz room supervisor re: consideration of extension of deadlines, etc. For an extended illness, etc. (> 1 week), you should obtain a medical certificate or similar documentation and consult the quiz room supervisor. If you miss the final examination because of illness or for other reasons, consult the Academic Consideration regulations in the current Undergraduate Calendar and see your Program Counselor.

**COURSE NOTICES:** From time to time, notices pertaining to the course will be given in lectures and/or posted on D2L and by the Quiz Room door or inside the quiz room. You should check weekly for notices and reminders, etc. **It is your responsibility** to keep yourself informed regarding these special announcements.

## OBTAINING HELP IN THE COURSE

- (a) **Room MacN 318 – Help Room.** The hours will be posted on D2L. The help room will open in week three. Help will be provided in the quiz room during weeks 1 and 2 as required.  
**NOTE:** This Help Room is for help in physics courses PHYS\*1070, 1080 and 1130.
- (b) Help may be obtained from the lecturer. **Short questions** can often be handled in the lecture room just before or after lectures. For other times, the lecturer's office hours will be announced in lecture.
- (c) Help may be obtained in rooms MacN 304A or 304. These are the lab rooms for this course and PHYS\*1070. When these rooms are open you may obtain help with course-related problems from the instructors, but remember that their first priority is to help students who are doing experiments and to check lab reports, etc.
- (d) The following items are available via D2L:
- Several computerized tutorials are available. The useful tutorials for this course are:

Vectors	Exponential growth and decay	Logarithms
Trigonometry	Free body diagrams	Graphing log paper
Graphing simple functions	Dimensional analysis	Torque and rotational motion
  - A set of 2 final examinations from previous semesters.
  - Complete solutions to all Study Guide Self Tests.
  - Complete solutions for all the textbook problems on mechanics (Chapters 7-10) and for selected problems in the remaining chapters.
  - Errata for the textbook.



## THE PRETESTS

**Before** any Quiz can be written for credit, a **Pretest** must be taken and passed at the level of 60%. These **Pretests** are designed to permit a self-examination of the basic concepts and objectives of the modules in question. Each **Pretest** consists of a variety of simple questions in one of 4 formats:

1. multiple choice
2. true or false
3. pairwise matching
4. enter a number or symbol

The **Pretests** are delivered using D2L and so can be taken from any location which has computers connected to the internet (MacN 315, Library, home, etc.). Login instructions for D2L on pg. 1.

Follow the login instructions and the instructions which follow enabling you to take the **Pretest**. Upon completion it will be marked and an explanation provided for every question for which you selected the wrong answer. These should be studied carefully.

When you obtain at least 60% on the **Pretest** (allow 1 hour for your mark to process), you may then proceed to the Quiz Room (SCIE1101A) to write a **Quiz** for credit.

If you failed to get 60%, you must repeat the **Pretest** until 60% is obtained. Pretests are unlimited. The Pretest must be recorded as a pass before a Quiz for credit may be written.

Of course, you get the maximum advantage from these Pretests if you do them without help and, as much as possible, without aids (textbook, etc.).

Also available on the D2L is a **SAMPLE QUIZ** for each Study Guide, similar to quizzes that you will write in the Quiz Room.

**It is a serious academic offence to copy, print or otherwise store this material or to attempt to alter it in any way.**

## PERSONAL RECORD

### PHYS\*1080 Physics For Life Sciences

**Student Name:** \_\_\_\_\_

**Semester:** \_\_\_\_\_

It is **strongly recommended** that you use this sheet to keep a personal record of your term work in this course. For each quiz attempt, record the date, session (AM, afternoon, evening, version (A, B, etc.), and result. Also record the date when each laboratory experiment is completed (i.e., your lab book is signed/stamped as complete).

This record will be **useful** when you check your record on D2L. On rare occasions, errors or omissions can be made in recording passed quizzes, etc. Therefore, from time to time, you should **check your record** on the computer, particularly **at or near the end of the semester**. **Remember, it is YOUR responsibility to ensure that your computer record is correct.**

You should also retain this record until you receive your final grade in the course. The record can be extremely useful to you and to the course instructor if you wish to have your final grade checked.

Quiz	Attempt #1 Date, version, mark received (0, 2 or 10)	Attempt #2 Date, version, mark received (0, 2 or 10)	Attempt #3 Date, version, mark received (0, 2 or 10)	Final mark received for unit (0,2,4,6 or 10)
Quiz #6				
Quiz #7				
Quiz #8				
Quiz #9				
Quiz #10				

**TOTAL QUIZ MARKS** \_\_\_\_\_

### LAB COMPLETION RECORD

Experiment #10	Experiment #12	Experiment #13	Experiment #14	Experiment #17 (computer lab)
Date:	Date:	Date:	Date:	Date: