

# Course Outline: PHYS1A03—Introductory Physics, Fall 2015

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## Instructors:

- Section 1:** Kari Dalnoki-Veress, ABB 432, x22658, dalnoki@mcmaster.ca  
Mo & Th, 9:30am — 10:20am, JHE 376
- Section 2:** Maikel Rheinstädter, ABB-237A, x23134, rheinstadter@mcmaster.ca  
Tu & Fr, 8:30am — 9:30am, JHE 376
- Section 3:** Mike Massa, ABB 326A, massamv@mcmaster.ca  
Mo, 7:00 m — 9:00pm, HSC 1A1

**Laboratory:** Alex Vorobyov, BSB B117, x24251, voroby@mcmaster.ca

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## Course web page:

<http://avenue.mcmaster.ca>

Log in with your McMaster ID (i.e. your email prefix) and password and select this course. There you will find important communications and all the on-line modules. This course will make extensive use of Avenue to Learn, it is your responsibility to check this frequently. The Avenue to Learn site will have a variety of resources and will be used throughout the term for posting schedules, information, links to other websites, etc.

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## Outline:

PHYS 1A03 is a first course in university physics, taught using examples and applications from many areas of science. The topics we will cover include the concepts of force and energy, mechanics, waves and fluids. This course is taught in a *blended learning* format which consists of both in-class lectures and an on-line web component. For PHYS 1A03 there are two hours of lectures per week with an accompanying web module. In addition there is also a laboratory component roughly every other week (5 labs in the term).

The course is hands-on, requires active participation through discussion with your peers, and laboratory investigations are carried out in the laboratory as well as at home. The format in which the course is taught, with its on-line modules, adapts itself to individual learning styles because the pace can be chosen by you. The regular lecture component of the course will focus on review of the modules, adding further depth, and applying the physics learned to real-world examples. You will see that the physics learned in class is not stagnant, rather it is relevant to current research topics — even to current research carried out at McMaster!

As the lecturers of PHYS 1A03 we strive to share our enthusiasm for physics and how widely applicable physics is in areas that range from muscles and body mechanics, to diffusion in a cell, to space exploration and our climate. Physics is not just about sliding boxes on an inclined plane or the tension in a rope. The goal of physics is to understand the way the world works from the tiniest speck of matter to the entire cosmos. Physics is at the intersection of many

disciplines (biophysics, medical physics, geophysics, etc.), ties these disciplines together, and bridges them to mathematics. More than anything we hope that by the end of the course you will share our enthusiasm for the topic.

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## Course requirements and resources:

**Textbook (Recommended):** There is *no* required textbook, however, *Physics for the Life, 2nd Ed.* by Zinke-Allmang and co-authors is an ideal companion to the material presented.

**i>clickers (Required):** i>clickers will be used in every class and are an integral part of the course. Please register your i>clicker at [www.iclicker.com/registration](http://www.iclicker.com/registration) using your McMaster ID (i.e. your email prefix, not your student number).

**Lab manual (Required):** PHYS 1A03 Laboratory course manual available from the bookstore.

**Lab notebook (Required):** Black hard cover bound Physics Laboratory Notebooks available from the bookstore.

**Calculator (Required):** only the McMaster Standard Calculator will be permitted during tests and examinations

**Course notes:** Notes will be posted prior to class

**On-line modules:** The on-line modules are a major component of the course. Roughly one module per week will be assigned and available from the course avenue webpage.

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## Marking scheme:

	Option 1*	Option 2*	Option 3*
Midterm test 1	15%	20%	20%
Midterm test 2	20%	15%	20%
Final examination	35%	35%	30%
Laboratory investigations	20%	20%	20%
Class activities (i>clicker questions)	5%	5%	5%
On-line assignments	5%	5%	5%

\* Each of the three options will be evaluated and the student will receive the highest grade

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## Mid-term tests and final examination:

**Test 1:** Friday, October 9, 2015, 7-9 pm

**Test 2:** Tuesday, November 10, 2015, 7-9 pm

**Final Examination:** see McMaster Examination Timetable

The midterm exams and final exam will be multiple-choice questions. You will be tested on the material covered in class, on-line modules and the labs. The tests and final will be 2 hours long. If you miss a midterm you will need to fill out a McMaster Student Absence Form (MSAF, see “Missed work” below) or contact the associate dean’s office. There will be no make-up midterm. If you miss a midterm (through MSAF or as approved by the associate dean’s office) then 15% will be transferred to your final exam and the other midterm will be worth 20%. If you miss two midterms your final exam will be worth 70%.

Only the McMaster standard calculator will be allowed during these exams.

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## **Laboratory investigations:**

During your practical sessions, you will work in a group of, typically, 3 students on the exercises outlined in this laboratory manual. Some of these are "pencil-and-paper" exercises, in which you will make a prediction or verify some theoretical result. Others will involve making observations of some system which is set up in the laboratory, and still others will ask you to design an experiment to test a prediction. In all cases, these tasks are guided by questions posed in the manual, but the details for the steps required to come to a solution may not be spelled out in detail. The process of applying your physical knowledge to predicting, testing and verifying without direct instructions from the manual or your demonstrators is the most important aspect of the practical sessions. There will be 5 labs during the semester, 4 of those will be conducted during your lab period. The fifth will be a ‘home experiment’ where you will be asked to conduct a practical investigation on your own.

Please consult your laboratory manual for further details. Active participation in the scheduled laboratory practicals is a required part of the coursework.

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## **Class activities:**

We will frequently use i>clickers during class to address concept questions. Marks are assigned for attempting the question as well as for getting the correct answer (for questions with a correct answer!). All students are responsible for having an i>clicker before the second class of term. Failure to have and use an i>clicker will result in the loss of marks. Entering answers on another student’s i>clicker is strictly forbidden.

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## **Missed work:**

If you are absent from the university for a minor medical reason, lasting fewer than 5 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form (MSAF). Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to your course instructor (Dalnoki-Veress, Massa, or Rheinstädter) not your TA. Please note that the MSAF may not be used for the final examination.

For any other absence reported using the MSAF you must contact your course instructor (normally within 2 working days) at the email address provided above, to learn what relief may

be granted for the work you have missed. You must contact the instructor and not your TA about any absences.

For labs, contact the Lab Instructor (Dr. Vorobyov, [voroby@mcmaster.ca](mailto:voroby@mcmaster.ca)) to reschedule. A lab should normally be made up within two weeks.

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## **Learning outcomes:**

PHYS 1A03 will give you a thorough preparation for applying physics concepts to the world around you. The course will prepare you for higher level courses in most areas of Science. Along with other first year science courses, PHYS 1A03 will enhance your ability to think critically and develop problem solving skills. This course is an excellent preparation for medical school and other professional schools. The topics presented in this class, together with those presented in Physics 1AA3, cover most of the material required for the MCAT. Together, these two courses (Physics 1A03 and Physics 1AA3) fulfill the requirements of many Canadian and American medical schools for 2 physics courses with labs.

Students interested in pursuing a degree or a minor in physics might consider taking PHYS 1CC3 (Modern Physics for the Chemical and Physical Sciences), since it is a more math-intensive course that can provide a more in-depth preparation for a full physics degree.

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## **Course planner:**

Please refer to the online calendar posted on Avenue to Learn for day-by-day schedule of class activities.

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

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## **Academic Ethics and Collaboration:**

Physics is not to be done in solitary confinement. Seeking help when you have difficulties and discussing physics with your colleagues is encouraged but what you submit must be your work. Consult the instructor if there is any doubt about what is acceptable.

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at <http://www.mcmaster.ca/academicintegrity/>

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.
4. Using an other student's i>clicker to answer questions.