Section 1: Instructional Support

Section 1.1: Course Instructor

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Office Location</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Josh Mogyoros</td>
<td>MacNaughton 453</td>
<td><a href="mailto:jmogyoro@uoguelph.ca">jmogyoro@uoguelph.ca</a></td>
</tr>
</tbody>
</table>

Section 1.2: Graduate Teaching Assistants

<table>
<thead>
<tr>
<th>Teaching Assistant</th>
<th>Email</th>
<th>Lab/Tutorial Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eamonn Corrigan</td>
<td><a href="mailto:eamonn@uoguelph.ca">eamonn@uoguelph.ca</a></td>
<td>(10) Monday: 19:00-21:50 (09) Thursday: 11:30-14:20</td>
</tr>
<tr>
<td>Shane Holden</td>
<td><a href="mailto:mholde01@uoguelph.ca">mholde01@uoguelph.ca</a></td>
<td>(04) Tuesday: 19:00-21:50 (03) Wednesday: 14:30-17:20</td>
</tr>
<tr>
<td>Bryn Knight</td>
<td><a href="mailto:knightb@uoguelph.ca">knightb@uoguelph.ca</a></td>
<td>(02) Tuesday: 8:30-11:20 (08) Wednesday: 19:00-21:50</td>
</tr>
<tr>
<td>Andrew MacLean</td>
<td><a href="mailto:amacle02@uoguelph.ca">amacle02@uoguelph.ca</a></td>
<td>(01) Monday: 14:30-17:20 (05) Thursday: 14:30-17:20</td>
</tr>
<tr>
<td>Joshua Sampson</td>
<td><a href="mailto:sampsonj@uoguelph.ca">sampsonj@uoguelph.ca</a></td>
<td>(06) Tuesday: 11:30-14:20 (07) Thursday: 8:30-11:20</td>
</tr>
</tbody>
</table>

Section 2: Learning Resources

Section 2.1: Course Website

Course material, news, announcements, and grades will be regularly posted to the PHYS*1010 Courselink site (http://courselink.uoguelph.ca). You are responsible for checking the site regularly. Please ensure that your grades are recorded correctly and notify the course instructor of any discrepancies.

Section 2.2: Required Resources

Textbook (Required)

Courselink Website
Pre-lecture readings and quizzes will be assigned for almost all lectures. Quizzes are accessed from within the PHYS*1010 Courselink site. Assigned readings will also be posted within Courselink. The quizzes count towards your overall grade as expressed in Section 3.1 below.
Section 2.3: Additional Resources

Equation sheet
The equation sheet for the final exam will be posted on Courselink and students are encouraged to use this as they work through the problems throughout the semester.

Section 2.4: Communication and E-Mail Policy

Lectures and tutorial sessions are your primary opportunity to ask questions about the course. The Course Instructor will be available to provide help in his office (MacN 328) – regular office hours will be announced during the first week of class. If you wish to obtain help from your instructor at another time, please email to make an appointment or see him before or after lectures to arrange a mutually convenient time. Short questions can often be handled in the lecture room just before or after lectures.

Section 3: Assessment

Section 3.1: Grade Breakdown

<table>
<thead>
<tr>
<th>Assessment Tool</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Quizzes</td>
<td>5%</td>
</tr>
<tr>
<td>Assignments (5)</td>
<td>15%</td>
</tr>
<tr>
<td>Laboratory experiments (5)</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm tests (2)</td>
<td>25%</td>
</tr>
<tr>
<td>Final exam (closed book, covers entire course)</td>
<td>35%</td>
</tr>
</tbody>
</table>

Midterm Exam Details:
The midterm examinations will be held on the evenings of Wednesday, February 7, and Wednesday, March 21, with location TBA. Please notify the instructor of any scheduling conflicts well in advance. There will be no makeup midterm exams. If you miss a midterm exam due to illness or compassionate reasons, you need to provide the instructor with documentation (see your Program Counselor if you require assistance). In the (unusual) case of an excused absence, your other course grades will be used to compute your final grade.

Final Exam Details:
The final examination Wednesday April 11 (11:30 – 13:30, location TBA) will cover the entire course material. If you miss the final examination, see your Program Counselor. Refer to “General Information for Academic Consideration and Appeals” in your Undergraduate Calendar.
Section 3.2: Course Grading Policies

Missed Assessments:
If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor or TA. If you miss a quiz or a lab, you must provide your TA with a written explanation for possible academic consideration. For missed midterm contact the instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration.

Accommodation of Religious Obligations:
If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations.

Mark Adjustments:
If you have questions about any grade, please inquire promptly after the material has been returned to you.

Passing Grade:
In order to pass the course, you must obtain a final grade of 50% or higher. There is no mandatory requirement that students pass specific elements of the course, such as the midterm and final exams.

Section 4: Aims and Course Objectives

Section 4.1: Calendar Description
This is a course for physical science students on the phenomena of electromagnetism, waves and introductory quantum physics. Topics include electric charges and fields, electric potential, capacitance, magnetic fields, electric circuits, waves, electromagnetic waves, quantization of light and other aspects of introductory quantum physics.

Section 4.2: Course Aims
Due to the ubiquitous nature of electric charge in nature and technological applications, the theoretical framework describing electromagnetic interactions is necessary in fields as diverse as engineering, physics, biology, and chemistry. This course serves as a survey of classical electromagnetic theory, starting with Coulomb’s law governing interactions of charged systems and culminating with the experimental evidence that led to the development of modern quantum theory. The main goals of this course are (1) to teach students the fundamental concepts in electricity, magnetism and elementary circuit theory, (2) to teach students how to collect and analyze experimental data including rigorous error analysis and (3) to prepare students for intermediate and advanced science courses that build on electricity and magnetism.
Section 4.3: Learning Objectives

At the successful completion of this course, the student will be able to:

• demonstrate knowledge of technical problem solving and critical thinking skills.
• obtain high quality experimental data and assign appropriate experimental uncertainty to measured values.
• analyze experimental data using rigorous error analysis and correct accuracy, precision, digits and dimensional homogeneity to verify physical theories.
• clearly articulate and differentiate the vector (electric fields, Coulomb’s law) and scalar (electric potential, electric potential energy) formalisms of electrostatics.
• use the superposition principle to derive the electric field and electric potential arising from collections of point charges using summation or integration.
• articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.
• use Ohm’s law and Kirchhoff’s rules to analyze direct current (DC) circuits consisting of parallel and/or series combinations of voltage sources and resistors.
• describe the magnetic field produced by magnetic dipoles and electric currents.
• use Faraday-Lenz and Faraday-Maxwell laws to articulate the relationship between electric and magnetic fields and how magnetic fields can be exploited to generate electricity.
• describe light as electromagnetic waves and use physical concepts of waves to describe experimental phenomena such as diffraction and interference.

Section 4.4: Instructor’s Role and Responsibility to Students

The instructor’s role is to develop and deliver course material in ways that facilitate learning for students with differing learning aptitudes. Lecture notes will be provided on Courselink after lectures for students who struggle to get everything copied in lecture, but these notes are not intended to replace the lecture experience. Discussions resulting from student questions, for example, are of particular importance for students.

During lectures, the instructor will expand and explain the content of the assigned course reading, and example problems will be discussed. Due to time constraints, these problems cannot simulate the difficulty of problems students can expect on the exams or quizzes, but are instead intended to reinforce concepts discussed in lecture. Lecture demonstrations will be provided where appropriate, and clickers and classroom discussions will be extensively used to help students achieve their learning goals.

Section 4.5: Students’ Learning Responsibility

Students are expected to take advantage of the learning opportunities provided during lectures, tutorials and laboratory periods. Students having difficulty with the course content are advised to consult with the course instructor when they encounter concepts: do not wait until the week before an exam or (worse) after an exam to approach the instructor…this is too late!

Students who do (or may) fall behind due to illness, work, or extra-curricular activities (including varsity sports, student leadership activities, etc.) are advised to keep the instructor informed such that extra resources or accommodation can be provided if appropriate.

Students are expected to attend lectures and tutorials and are expected to complete the assigned homework in a timely fashion. Do not leave homework until the week before the midterm and/or final exams as this historically puts students at a much higher risk of failing the course.
Section 4.6: Relationship with Other Courses & Labs

Prerequisite Courses:
Students must have completed one of IPS*1500, MATH*1080, or MATH*1200. Students must also have completed one of 4U Physics, Grade 12 Physics, or PHYS*1020.

Restrictions:
Students that have already completed IPS*1510 cannot receive credit for PHYS*1010.

Section 5: Teaching and Learning Activities

Section 5.1: Timetable

Lectures:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, Wednesday, Friday</td>
<td>12:30 – 13:20</td>
<td>MACN 105</td>
</tr>
</tbody>
</table>

Tutorials / Labs (see also weekly schedule):

<table>
<thead>
<tr>
<th>Day</th>
<th>Section</th>
<th>Time</th>
<th>Classroom</th>
<th>TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>101</td>
<td>14:30 – 17:20</td>
<td>MacNaughton 415/301</td>
<td>Andrew MacLean</td>
</tr>
<tr>
<td>Monday</td>
<td>110</td>
<td>19:00 – 21:50</td>
<td>MacNaughton 415/301</td>
<td>Eamonn Corrigan</td>
</tr>
<tr>
<td>Tuesday</td>
<td>102</td>
<td>8:30 – 11:20</td>
<td>MacNaughton 415/301</td>
<td>Bryn Knight</td>
</tr>
<tr>
<td>Tuesday</td>
<td>106</td>
<td>11:30 – 14:20</td>
<td>MacNaughton 415/301</td>
<td>Josh Sampson</td>
</tr>
<tr>
<td>Tuesday</td>
<td>104</td>
<td>19:00 – 21:20</td>
<td>MacNaughton 415/301</td>
<td>Shane Holden</td>
</tr>
<tr>
<td>Wednesday</td>
<td>103</td>
<td>14:30 – 17:20</td>
<td>MacNaughton 415/301</td>
<td>Shane Holden</td>
</tr>
<tr>
<td>Wednesday</td>
<td>108</td>
<td>19:00 – 21:50</td>
<td>MacNaughton 415/301</td>
<td>Bryn Knight</td>
</tr>
<tr>
<td>Thursday</td>
<td>107</td>
<td>8:30 – 11:20</td>
<td>MacNaughton 415/301</td>
<td>Josh Sampson</td>
</tr>
<tr>
<td>Thursday</td>
<td>109</td>
<td>11:30 – 14:20</td>
<td>MacNaughton 415/301</td>
<td>Eamonn Corrigan</td>
</tr>
<tr>
<td>Thursday</td>
<td>105</td>
<td>14:30 – 17:20</td>
<td>MacNaughton 415/301</td>
<td>Andrew MacLean</td>
</tr>
</tbody>
</table>

Students are responsible for all information presented in lectures, tutorials and labs. Active participation by students in the tutorials and lectures is highly encouraged! Unless alternative arrangements have been made in advance, students must attend their scheduled tutorial/lab period, as all sections are full.

Every student has the right to participate and contribute in lectures, tutorials and labs. If a student feels that there is something preventing their full contribution, they must notify the course instructor or lab/tutorial instructor as soon as possible. We cannot fix problems that we are not aware of! The learning environment must be free from harassment and offensive or inappropriate (homophobic, racist, sexist, etc.) comments are strictly prohibited.

Drop-in Help Sessions:
The final hour of every tutorial is reserved as a drop-in session for students to seek extra help from the teaching assistants. Students are encouraged to visit any tutorial that fits into their schedule. This is an excellent opportunity to get concepts explained by different people, as the different take on the same concept is often all that is needed to enhance understanding.
### Section 5.2: Other Important Dates

Friday March 10th is the fortieth class day, the last day to drop one semester courses.

### Section 5.3: Tentative Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Material Covered in Lecture</th>
<th>Tutorial/Laboratory</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Jan 8</td>
<td>Electric charges, materials Coulomb’s law Electric fields Principle of Superposition</td>
<td>No lab or tutorial</td>
<td></td>
</tr>
<tr>
<td>02 - Jan 15</td>
<td>Continuous charge distributions Motion of charges in fields Work done by an electric field</td>
<td>Tutorial</td>
<td>MacN 301</td>
</tr>
<tr>
<td>03 - Jan 22</td>
<td>Electric potential energy Electric potential Field lines and equipotential surfaces</td>
<td>Tutorial</td>
<td>MacN 415</td>
</tr>
<tr>
<td>04 - Jan 29</td>
<td>Electric Flux &amp; Gauss’ Law The electric dipole Capacitance</td>
<td>Lab 1: Electrostatic field mapping</td>
<td>MacN 301</td>
</tr>
<tr>
<td>05 - Feb 5</td>
<td>Capacitors and dielectrics The flow of charges, resistance and electromotive force Ohm’s Law</td>
<td>Tutorial</td>
<td>MacN 415</td>
</tr>
<tr>
<td>06 - Feb 12</td>
<td>Kirchhoff’s laws Power RC circuits</td>
<td>Lab 2: Ohm’s law</td>
<td>MacN 301</td>
</tr>
<tr>
<td></td>
<td>Winter Break – No classes, laboratories or tutorials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 - Feb 26</td>
<td>Magnetism Force due to magnetic field Motion of charges in magnetic field Magnetic dipoles</td>
<td>Tutorial</td>
<td>MacN 415</td>
</tr>
<tr>
<td>08 - Mar 5</td>
<td>Sources of magnetic field Ampere’s Law Motional emf</td>
<td>Lab 3: Kirchhoff’s laws</td>
<td>MacN 301</td>
</tr>
<tr>
<td>09 - Mar 12</td>
<td>Magnetic flux Faraday-Lenz Law Inductance</td>
<td>Tutorial</td>
<td>MacN 415</td>
</tr>
<tr>
<td>10 - Mar 19</td>
<td>Inductors Review: properties of waves</td>
<td>Lab 4: e/m</td>
<td>MacN 301</td>
</tr>
<tr>
<td>11 - Mar 26</td>
<td>Electromagnetic waves Diffraction The photoelectric effect</td>
<td>Tutorial</td>
<td>MacN 415</td>
</tr>
<tr>
<td>12 - Apr 2</td>
<td>Elements of Quantum Mechanics</td>
<td>Lab 5: Photoelectric effect</td>
<td>MacN 301</td>
</tr>
</tbody>
</table>

**Note:**
The information in the table column title “Material Covered in Lecture” is provided as a *rough guide* for the term. Future announcements about changes to the table or of any kind will be made in class and posted on Courselink; *these announcements take precedence over the original course outline!* You are responsible for what is said in class, whether or not you are in attendance.
Assignments:
The assignments will typically be based on material that is covered in the two previous weeks of class. Due dates will typically occur on the Monday morning following tutorial weeks; however, specific deadlines will be announced in class at the time that assignments are released. Drop boxes for assignments can be found in the hallway of the 4th floor of the MacNaughton building; details will be provided in the first week of class.

For exceptional circumstances you may be granted consideration to write your quiz in one of the other tutorials. Make sure that you notify both your regular teaching assistant and the teaching assistant in the alternate section so that we can make sure your grade is not misplaced.

Laboratory Experiments:
The laboratory experiments (schedule on next page) are described in detail on the course website as PDF files. Experiments are to be completed and reports handed in during the laboratory period. The laboratory experiments will be done in MacN 301.

If you know that you cannot make your assigned lab in a particular week (exceptional circumstances), arrange with your teaching assistant to do the experiment in one of the other sections if possible. Make sure that you notify both your regular teaching assistant and the teaching assistant in the alternate section so that we can make sure your grade is not misplaced.

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Section 6: Lab Safety

Section 6.1: Department of Physics Laboratory Safety Policy

The Department of Physics is committed to ensuring a safe working and learning environment for all students, staff and faculty. As a student in a laboratory course, you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, students are responsible for reporting all safety issues to the graduate teaching assistant or course instructor as soon as possible. Students are not required to work in an environment that they deem to be unsafe. If you have any concerns whatsoever, please consult your lab instructor or course instructor!

In this course, students will be exposed to voltages and currents that can be harmful if proper protocols are not followed. Students MUST read the lab outlines before proceeding, and in some labs the students are prohibited from powering up the apparatus until it has been inspected by the lab instructor. Students must follow all instructions given in the lab outlines, and must at all times obey the directions given by the laboratory instructor or lab technician.

Section 6.2: Food and Drink in the Laboratory

As with all laboratories on the University of Guelph campus, ALL food and drink is strictly prohibited in the laboratory. This applies to all faculty, staff, instructors and students.
Section 7: Medical and Compassionate Consideration

Section 7.1: Medical Consideration

Attendance at the tutorial/lab periods is, of course, very important. If you miss a laboratory experiment because of illness or for compassionate reasons, please see your laboratory/tutorial instructor for possible academic consideration. In general, you will not be required to submit a medical certificate if only one lab/quiz is missed in the semester.

If you miss the midterm exam, please inform your course professor as soon as possible.

If you miss the final exam, you must consult your Program Counsellor.

For more details regarding academic consideration, appeals and petitions, refer to your Undergraduate Calendar.

Section 8: Academic Misconduct and Collaboration

Section 8.1: Collaboration

Collaboration and communication are essential for progress and advancement; much of modern society is built upon them. However, mastering the problem-solving skills, including the development of the necessary mathematical techniques, involves independent study that is irreplaceable. Collaborative teamwork is useful after you have thoroughly studied the material and attempted the problems on your own. While students are encouraged to share ideas and help each other, all material submitted for grading must be each student's own work. Plagiarism is a form of academic misconduct, and will not be tolerated.

A good guideline when it comes to crossing the line from collaboration to academic misconduct (see next section) is that a student must never look at another student’s solution. For the vast majority of students, they will be incapable at arriving at their own form of a solution after they have seen a complete solution. For students seeking help from their peers, ask conceptual questions as opposed to “How do you do Question 2?”. For student helping their peers, never give the answer explicitly, but explain your reasoning.

Section 8.2: Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar.
Section 9: Accessibility

Section 9.1: Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 52073 or email sasnotes@uoguelph.ca or see the website: https://www.uoguelph.ca/csd/.

Section 9.2: Electronic Recording of Classes

The electronic recording of classes is expressly forbidden without the prior consent of the instructor. This prohibition extends to all components of the course, including, but not limited to, lectures, tutorials, and lab instruction, whether conducted by the instructor or teaching assistant, or other designated person. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

Section 10: Course Evaluation

Section 10.1: Course Evaluation

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’s 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’s 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.