Faculty of Science  
School of Physics  

PHYS1902: Physics 1B (Advanced)  
Semester 2, 2012 | 6 Credit Points | Coordinator: A/Prof. Joe Khachan (khachan@physics.usyd.edu.au)

1 Introduction

PHYS 1902 is the second part of the broad 3-semester overview of physics at Advanced Junior and Intermediate levels commenced in PHYS 1901. Together with either PHYS 1901 and 12 credit points of Junior Mathematics, PHYS 1902 provides the necessary background knowledge and practice of scientific skills for students who wish to enrol in Advanced Intermediate units of study in physics, in the environmental, medical and life sciences, or in engineering.

1.1 Assumed Knowledge and Prohibitions

It is assumed that students have an ATAR of at least 96 or HSC Physics result in Band 6, or PHYS 1901 or Distinction or better in PHYS 10001, 1002 or an equivalent unit. Recommended concurrent units of study are MATH1003/1903 and MATH1005/1905. PHYS1902 may not be counted with PHYS1003 or PHYS1004

2 Course Aims, Learning Objectives and Graduate Attributes

2.1 Course Aims

The focus of this unit is to introduce you to the key concepts in three foundation areas of physics: fluids, electromagnetism and quantum phenomena, using technological applications familiar to students of engineering and the physical sciences, for example, the lift on aeroplane wings and metal detectors.

The unit is designed to help you develop appropriate methods of study that will allow you to become an independent learner, capable of organising new information into a coherent conceptual framework and applying it in both familiar and unfamiliar situations. In the accompanying laboratory segment, students are introduced to basic skills in the use of electrical measuring instruments and work in teams to plan, carry out and report on an independent scientific investigation.

2.2 Learning Outcomes

After successfully completing this unit, you should be able to demonstrate:

1. an understanding of the key concepts of the behaviour of fluids, the interaction between electricity, magnetism and matter, and the fundamental concepts of quantum physics and its application to modern technology;
2. the ability to apply these concepts to develop models, and to solve qualitative and quantitative problems in scientific and engineering contexts with particular reference to applications in modern technology;
3. basic experimental skills in the use of electrical measuring instruments and the ability to devise and carry out a scientific investigation that includes measuring physical quantities, analysis and interpretation of results;
4. the ability to find and analyse information and judge its reliability and significance;
5. the ability to communicate scientific information appropriately, both orally and through written work;
6. the ability to engage in team and group work for scientific investigations and for the process of learning;
7. a sense of responsibility, ethical behaviour and independence as a learner and as a scientist.
2.3 Graduate Attributes

Graduate Attributes are generic attributes that encompass not only technical knowledge but additional qualities that will equip students to be strong contributing members of professional and social communities in their future careers. The overarching graduate attributes identified by the University relate to a graduate’s attitude or stance towards knowledge, towards the world, and towards themselves. These are understood as a combination of five overlapping skills or abilities, the foundations of which are developed as part of specific disciplinary study. For further details please refer to the Science faculty website at: http://www.itl.usyd.edu.au/graduateAttributes/facultyGA.cfm?faculty=Science

<table>
<thead>
<tr>
<th>Graduate Attributes</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A Research and Inquiry</strong></td>
<td></td>
</tr>
<tr>
<td>A1.</td>
<td>Apply scientific knowledge and critical thinking to identify, define and analyse problems, create solutions, evaluate opinions, innovate and improve current practices.</td>
</tr>
<tr>
<td>A2.</td>
<td>Gather, evaluate and deploy information relevant to a scientific problem.</td>
</tr>
<tr>
<td>A3.</td>
<td>Design and conduct investigations, or the equivalent, and analyse and interpret the resulting data.</td>
</tr>
<tr>
<td>A4.</td>
<td>Critically examine the truth and validity in scientific argument and discourse, and evaluate the relative importance of ideas.</td>
</tr>
<tr>
<td>A5.</td>
<td>Disseminate new knowledge and engage in debate around scientific issues.</td>
</tr>
<tr>
<td>A6.</td>
<td>Value the importance of continual growth in knowledge and skills, and recognise the rapid, and sometimes major, changes in scientific knowledge and technology.</td>
</tr>
<tr>
<td><strong>B Information Literacy</strong></td>
<td></td>
</tr>
<tr>
<td>B1.</td>
<td>Use a range of searching tools (such as catalogues and databases) effectively and efficiently to find information.</td>
</tr>
<tr>
<td>B2.</td>
<td>Access a range of information sources in the science disciplines, for example books, reports, research articles, patents and company standards.</td>
</tr>
<tr>
<td>B3.</td>
<td>Critically evaluate the reliability and relevance of information in a scientific context.</td>
</tr>
<tr>
<td>B4.</td>
<td>Consider the economic, legal, social, ethical and cultural issues in the gathering and use of information.</td>
</tr>
<tr>
<td>B5.</td>
<td>Use information technology to gather, process, and disseminate scientific information.</td>
</tr>
<tr>
<td><strong>C Communication</strong></td>
<td></td>
</tr>
<tr>
<td>C1.</td>
<td>Explain and present ideas to different groups of people in plain English.</td>
</tr>
<tr>
<td>C2.</td>
<td>Write and speak effectively in a range of contexts and for a variety of different audiences and purposes.</td>
</tr>
<tr>
<td>C3.</td>
<td>Use symbolic and non-verbal communication, such as pictures, icons and symbols as well as body language and facial expressions, effectively.</td>
</tr>
<tr>
<td>C4.</td>
<td>Present and interpret data or other scientific information using graphs, tables, figures and symbols.</td>
</tr>
<tr>
<td>C5.</td>
<td>Work as a member of a team, and take individual responsibility within the group for developing and achieving group goals.</td>
</tr>
<tr>
<td>C6.</td>
<td>Take a leadership role in successfully influencing the activities of a group towards a common goal.</td>
</tr>
<tr>
<td>C7.</td>
<td>Actively seek, identify, and collaborate with others in a professional and social context.</td>
</tr>
</tbody>
</table>

**D Ethical, Social and Professional Understanding**

| D1. | Demonstrate an understanding of the significance and scope of ethical principles, both as a professional scientist and in the broader social context, and a commitment to apply these principles when making decisions. | 7 |
| D2. | Appreciate the importance of sustainability and the impact of science within the broader economic, environmental and socio-cultural context. | 7 |
| D3. | Demonstrate empathy with, and sensitivity towards, another's situation, feelings and motivation. | 6, 7 |

**E Personal and Intellectual Autonomy**

| E1. | Evaluate personal performance and development, recognise gaps in knowledge and acquire new knowledge independently. | 3, 4, 7 |
| E2. | Demonstrate flexibility in adapting to new situations and dealing with uncertainty. | 3, 7 |
| E3. | Reflect on personal experiences, and consider their effect on personal actions and professional practice. | 7 |
| E4. | Set achievable and realistic goals and monitor and evaluate progress towards these goals. | 7 |
| E5. | Demonstrate openness and curiosity when applying scientific understanding in a wider context. | 7 |

For further details on course learning outcomes see the Specific Objectives listed in the Lecture Module Outlines available on the unit eLearning site.

### 3 Study Commitment

Students enrolled in any 6-credit point unit of study offered by the Faculty of Science should consider spending up to 12 hours per week on that unit during the 13 teaching weeks and the study vacation. In PHYS 1902 this involves:

**Lectures**

You will have 38 one-hour lectures divided into 3 lecture modules:

- **Electricity and Magnetism** (20 lectures) - electrostatics, electric charge, electric fields, Gauss's Law, electric potential, capacitance, electromagnetism. This module will be taught from the
viewpoint of the operation of devices commonly used in the technical world.
- **Fluids** (6 lectures) - density, pressure, buoyancy, surface tension, flow, turbulence, viscosity.
- **Quantum Physics** (12 lectures) - atomic spectra, photons, wave nature of particles, potential wells and barriers, the hydrogen atom.

The lectures are intended to guide you in your study of the textbook.

**Tutorials/Workshops**

You will have 12 one-hour **Workshop tutorials** based on and supporting the lecture modules. You will work in groups of four on a selection of qualitative and quantitative questions and problems, and investigate physical phenomena with demonstration apparatus. Tutors are present to assist you.

**Assignments**

You will be given 6 web-based **MasteringPhysics** sets of Assignment questions. **MasteringPhysics** provides questions that use a 'Socratic dialogue' - when you get stuck in answering a problem it offers a simpler problem and provides feedback tailored to your answers. It also offers the opportunity to develop your understanding of concepts and your problem solving ability through compulsory assignment questions and optional extra questions.

**Laboratory Work**

You will have 9 three-hour laboratory sessions. You will work in groups of three on a range of experiments, with tutors to assist. You will work in groups of six on a project, with tutors to assist. Your understanding of Circuits concepts introduced in the laboratory will be tested using the **MasteringPhysics** system.

**Independent Study**

You are expected to do up to 6 hours (per week) of independent study. Use this time to:

- read through and understand relevant sections of the textbook
- work through the assigned examples in the text
- attempt the **MasteringPhysics** questions
- study for the practice exam, circuits test and the final examination

**On-line exercise**

All students must complete an on-line exercise describing Scholarly versus non-scholarly resources before the Laboratory session in Week 9 of semester. This exercise is located at [http://library.usyd.edu.au/elearning/schvsnonsch/index.php](http://library.usyd.edu.au/elearning/schvsnonsch/index.php). A digital certificate of completion must be saved and printed after completing the exercise and taken to the Lab session. This digital certificate can also be used for other units that have this requirement.

<table>
<thead>
<tr>
<th>In class activities</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures (38 @ 1 hr each)</td>
<td>38</td>
</tr>
<tr>
<td>Workshop Tutorials (12 @ 1 hr each)</td>
<td>12</td>
</tr>
<tr>
<td>Laboratory sessions (9 @ 3 hrs each)</td>
<td>27</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>77</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Study</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 web-based MasteringPhysics sets (3 hr each)</td>
<td>18</td>
</tr>
<tr>
<td>Reading of text for lectures (38 @ 0.5 hr each)</td>
<td>19</td>
</tr>
<tr>
<td>Reading of lecture notes after lectures (38 @ 0.25 hr each)</td>
<td>10</td>
</tr>
<tr>
<td>Revision and self-assessment (13 @ 1 hr each week)</td>
<td>13</td>
</tr>
<tr>
<td>Preparation for Laboratory sessions (10 @ 0.5 hr each)</td>
<td>10</td>
</tr>
</tbody>
</table>
Study Tips

You are now in control of your own study strategy, and as an adult learner it is up to you to devise a study plan that best suits you. If you attend classes regularly and involve yourself in all of these learning experiences, you will gain a good understanding of the course work. This will have a considerable impact on your exam preparation and performance.

Good study habits are also very important - we offer some suggestions on our Learning Physics web page (http://sydney.edu.au/science/physics/current/learningphysics.shtml).

As preparation, you should read How to Succeed in Physics by Really Trying on pages vii - viii of the textbook, preferably before the start of semester. You should also read and understand Section 1.5, Uncertainty and Significant Figures, and Section 1.6, Estimates and Orders of Magnitude.

4 Learning and Teaching Activities

WEEKLY SCHEDULE

Lectures

You will attend three one-hour lectures per week in the lecture theatre indicated. All lectures are held in the Physics Building.

Lectures commence Tues 31 July and end Thur 1 November

- Slade Lecture Theatre - Tues 2pm, Wed 2pm, Thurs 2pm

Please consult your personal timetable on myUni for more details.

NB: There will be no lecture or tutorial classes during the mid-semester break and Labour Day Holiday (Monday 24 September to Monday 1 October inclusive).

Tutorials/Workshops

You should attend a single one-hour workshop tutorial per week. Times and venues will be displayed on the unit Blackboard pages. Workshop tutorials start in the second week of semester commencing Monday, 6 August. The final tutorial will be in the week commencing Monday, 29 October.

Note that participation in Workshop Tutorials will be recorded. A mark of 2% of your final grade is allocated to Workshop participation. To obtain full marks you must take part in at least 9 out of 12 workshops.

Laboratory Work

The laboratory component is divided into several sections:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation for Laboratory sessions</td>
<td>5</td>
</tr>
<tr>
<td>Preparation for circuits test</td>
<td>3</td>
</tr>
<tr>
<td>Outside work on Lab Project</td>
<td>10</td>
</tr>
<tr>
<td>Library on-line exercise</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>79</strong></td>
</tr>
</tbody>
</table>
5 weeks - electrical circuits
4 weeks - projects and student presentations

You will be scheduled into one, three-hour laboratory session per week in the Carslaw Building on Level 4 - Rooms 401, 402, 407 and 408.

Your first laboratory session is during the second week of semester commencing Monday 6 August. The final laboratory session for Monday classes will be on Monday 29 October; for all other classes it will be in the week commencing Monday, 22 October. Some weeks there are no laboratory classes - consult the timetable on the back cover of your Lab Manual for details.

Mastering Physics

All assignments are done using the MasteringPhysics system. MasteringPhysics may be accessed through the eLearning page or at masteringphysics.com. Instructions for registering can be found on the "Mastering Physics" webpage under the "support" tab.

You will need an access code to use the system. This can be obtained in several ways as follows:

- Purchase a new copy of the textbook and the access code is shrink-wrapped with the book. (cost approximately $190 to Coop members)
- Use a free code which can be obtained from the Physics Student Services Office, Room 210, in the 1st and 2nd week of semester.

The first two methods allow you to do assignments but also provide access to an electronic version of the textbook through MasteringPhysics. This is very valuable in that it allows easy access to the textbook when doing assignments (and saves you carrying around a heavy book). The third method allows you to do the assignments but does not provide access to the textbook. If you buy the textbook or the standalone code then that is better to register using its code rather than the more limited code which we supply.

The first time you login you need to choose a username and password. You also need

- the course ID SUPHYS1902Y2012,
- your full 9 digit Student ID number (SID) (e.g. 307759311 or 200459311 – please enter this number correctly!)
- your preferred email address.

Subsequent logins require only your chosen username and password (so make sure you keep a record of them).

Questions in MasteringPhysics are presented in groups (called 'assignments' by the system) with a title such as Mechanics - Assignment 1 and Tutorial Questions. There are six 'assignments' for this unit of study. ‘Introduction to MasteringPhysics’ is an extra, short assignment illustrating the features of the system with a mark value (for completion) approximately half that of a regular assignment.

Assignment questions must be completed by 7pm (local time) on the due date. MasteringPhysics will not accept late assignments. Available marks ramp down to zero in the five hours after the assignment deadline. It is therefore essential that you seek permission if you need to submit the assignment late. Assignment questions remain accessible to you for review (but no more marks!) until the end of the semester.

Help in using MasteringPhysics can be obtained from:

- Extensive on-line help
A discussion group on eLearning for this unit is monitored by Physics staff.
email the MasteringPhysics coordinator, Dr Chris Dey, mastering_physics@physics.usyd.edu.au

If for any reason you cannot complete the assignment on-line, you may request a paper copy of the assignment and permission to submit a paper copy of the solution. Paper-based assignments will not be accepted unless permission is obtained beforehand, since the objective is for you to use the tutoring ability of MasteringPhysics to improve your ability to solve problems and your understanding of concepts.

5 Teaching Staff and Contact Details

<table>
<thead>
<tr>
<th>Unit Coordinator</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/Prof. Joe Khachan</td>
<td><a href="mailto:khachan@physics.usyd.edu.au">khachan@physics.usyd.edu.au</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching Staff</th>
<th>Email</th>
<th>Room</th>
<th>Phone</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Geraint Lewis</td>
<td><a href="mailto:geraint.lewis@sydney.edu.au">geraint.lewis@sydney.edu.au</a></td>
<td>Rosehill St Building, Room 213</td>
<td>9351 5184</td>
<td>EM</td>
</tr>
<tr>
<td>Dr Helen Johnston</td>
<td><a href="mailto:h.johnston@physics.usyd.edu.au">h.johnston@physics.usyd.edu.au</a></td>
<td>Physics, Room 213</td>
<td>9036 9259</td>
<td>Fluids</td>
</tr>
<tr>
<td>A/Prof. Mike Wheatland</td>
<td><a href="mailto:michael.wheatland@sydney.edu.au">michael.wheatland@sydney.edu.au</a></td>
<td>Rosehill St Building, Room 223</td>
<td>9351 5965</td>
<td>Quantum Physics</td>
</tr>
</tbody>
</table>

6 Learning Resources

Textbook

The lecture modules are based on the textbook:


Textbooks can be purchased at the Co-op Bookshop for ~$190 (to Co-op members).

Depending on your choice of units, the textbook you need may be different in first and second semesters. We will facilitate exchange of textbooks between students to ensure you only need to buy one textbook for the year. See the Physics Student Services Office for more information.

Laboratory Manual

The laboratory segment of the unit is covered by:

PHYS 1902 Physics 1 (Advanced) Semester 2, Circuits - Advanced & Projects Laboratory Manual,
Laboratory Manuals can be purchased at the Co-op Bookshop for ~$10 (to Co-op members) and are also on the eLearning pages for this unit.

Lecture Module Outlines

There is a module outline for each of the three lecture modules, available on the eLearning pages for this unit. These list specific objectives that define what you should learn and understand about the detailed content of each chapter of the textbook. Understanding a term or concept means that you should be able to:

- explain its meaning in writing and give examples;
- interpret it correctly when you read or hear it;
- use it correctly in your own writing; and
- apply it correctly to examples and problems.

The module outline also lists what sections of the textbook are relevant and recommended questions.

Web Resources

The University eLearning system elearning.sydney.edu.au provides resources to help you with your studies, please spend time getting acquainted with this site. MyUni sydney.edu.au/myuni is the student portal providing University information and services. Access to MyUni and eLearning requires a Unikey username and password that is issued with your confirmation of enrolment. The University provides computer facilities described on the Student IT pages at http://sydney.edu.au/ict/student/. The 'Current Student' link on the School of Physics web page sydney.edu.au/science/physics also provides resources to help you with your studies.

Email

The University provides you with email access based on your username. We may use this email address to provide you with important information regarding this unit of study. We expect you to periodically read your email account or to forward mail from it to an account you do read (e.g. a gmail account).

Where to go for help

If you need help, you can:

- as a first step, always check your unit eLearning pages for information, documents and links
- ask other students using the Discussion Board on the unit eLearning page.
- go to the Physics Student Services Office, Room 210 in the Physics building, or phone 9351 3037
- ask your lecturer or tutor
- ask a Duty Tutor - a staff member who is available Monday, Tuesday, Thursday and Friday, 1-2 pm, in Physics LT4 to help you with problems with physics course material - available from Week 3 of semester.
- consult one of the many services provided by the University, such as the Maths Learning Centre. These can be found by choosing Junior Physics Resources and Links from the unit eLearning page or your MyUni pages sydney.edu.au/myuni.
- for Lab issues contact Dr Chris Stewart, Lab Coordinator, c.stewart@physics.usyd.edu.au
- for MasteringPhysics issues contact Dr Chris Dey, mastering_physics@physics.usyd.edu.au

Providing us with feedback

We welcome comments on all aspects of this unit. You should feel free to contact your lecturers, tutors or the First Year Coordinator by email using the People@Physics list on the Physics web pages. There is also a formal opportunity for feedback at the Staff-Student Liaison meeting, held one lunch time towards the end of semester with staff and student representatives from the various units of study, including this one.
Changes this year

As a result of student feedback and other initiatives there will be a number of changes this year:

- A full review of the Physics syllabus is underway, so your feedback is especially timely.
- Assessment policies are changing progressively, so there will be changes in the way your assessment marks are used to produce your final grade.
- We have a new building project underway - see http://www.physics.usyd.edu.au/about/building.shtml

7 Assessment Tasks

Assessment

Assessment tasks are intended to allow you to demonstrate what you have learned related to the goals of this unit. They also serve to encourage you to work with the material, but should not dominate your approach to learning. See them as another learning activity, accompanying and complementing those listed earlier.

Assessment of this unit of study is based on achievement of specific learning objectives (listed in the module outlines) demonstrated in a combination of assignments, tests examination and laboratory work. Satisfactory performance in all aspects of assessment is necessary to ensure a pass in this unit.

In addition, students in physics must be able to express themselves accurately by clear, efficient use of the English language in their written work. Spelling, grammar, punctuation and correct use of language will be taken into account when written reports and examination work are assessed. Students should refer to the University’s WriteSite (http://writesite.elearn.usyd.edu.au/) if they are looking for guidance on grammar and other aspects of academic and professional writing.

You should be familiar with the new University Assessment policy, which can be found at http://sydney.edu.au/ab/policies/Assessment_Policy_2011.pdf

7.1 Summative Assessments

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Percentage Mark</th>
<th>Due Date</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Mastering Physics</td>
<td>1</td>
<td>Week 2 Friday, 10 August 2012</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Electricity and Magnetism - Assignment 1 and Tutorial Questions</td>
<td>1.5</td>
<td>Week 3 Friday, 17 August 2012</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Electricity and Magnetism - Assignment 2 and Tutorial Questions</td>
<td>1.5</td>
<td>Week 5 Friday, 31 August 2012</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Electricity and Magnetism - Assignment 3 and Tutorial Questions</td>
<td>1.5</td>
<td>Week 7 Friday, 14 September 2012</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Fluids - Assignment 4 and Tutorial Questions</td>
<td>1.5</td>
<td>Week 9 Friday, 05 October 2012</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Assignment</td>
<td>Week/Locus</td>
<td>Date</td>
<td>Pages</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
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</tr>
<tr>
<td>Quantum Physics - Assignment 5 and Tutorial Questions</td>
<td>Week 11</td>
<td>Friday, 19 October 2012</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Quantum Physics - Assignment 6 and Tutorial Questions</td>
<td>Week 13</td>
<td>Friday, 02 November 2012</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>Workshop Tutorials</td>
<td>Weekly (weeks: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13)</td>
<td>3, 4, 5, 6, 7</td>
<td></td>
</tr>
<tr>
<td>Laboratory Work - Circuits</td>
<td>Weekly (weeks: 2, 3, 4, 5 and 6)</td>
<td>1, 3, 4, 5, 6, 7</td>
<td></td>
</tr>
<tr>
<td>Laboratory Circuits Test</td>
<td>Week 8</td>
<td>Friday, 21 September 2012</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
</tr>
<tr>
<td>Laboratory Project</td>
<td>Week 13</td>
<td>(week starting Sunday, 28 October 2012)</td>
<td>1, 2, 5, 6, 7</td>
</tr>
<tr>
<td>Practice Examination</td>
<td>Week 8</td>
<td>(week starting Sunday, 16 September 2012)</td>
<td>1, 2, 4, 5</td>
</tr>
<tr>
<td>Final Examination</td>
<td>Exam Period</td>
<td>1, 2, 4, 5</td>
<td></td>
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</table>

**Descriptions of Summative Assessments**

**Introduction to Mastering Physics**

Each assignment (apart from the Introduction to Mastering Physics) is divided into two components. Tutorial Questions. These all feature the full Mastering Physics Socratic dialogue - when you get stuck in answering a problem it offers a simpler problem and provides feedback tailored to your answers. These have been selected by your lecturers to help your understanding and problem solving ability. They are not assessed but we strongly recommend you look at some of these questions, which will remain available after the assignment deadline until the end of the semester. Assignment Questions are compulsory questions and represent the minimum use you should make of the system. 8 questions are offered, each worth 5 marks even though some are a little longer than others. Each assignment is worth about 2% towards your total assessment. The questions are a mix: tutorial-style questions teaching you concepts and problem solving techniques; and end-of-chapter problems from the textbook. The tutorial-style questions have full hints and feedback, while the end-of-chapter questions do not. The marking scheme gives a small reward when answers are achieved without using the hints, but no penalty if you do use them. See the Mastering Physics FAQ at sydney.edu.au/science/physics/pdfs/current/jphys/MP_faq.pdf for more details. Read each problem, then work on it before trying to enter your answer. We don’t want you to sit down and type in the answers without working on and thinking about them first. Try the problem without a hint first, then, if you get stuck, try the hint. For assignment questions, we give you eight chances to get the correct answer (although there is a small penalty for wrong answers). The objective is to get the right answer using as much help as it takes. Your answers need to be formatted correctly so be smart and use the help the system provides; Values of constants can be found using the ‘constants’ button near the top of the page. See the Help linked from ‘?’ at the right end of relevant boxes for more help with formatting. Move your mouse over symbols in the question to see how to type then in the correctly. We encourage students to cooperate in understanding all the questions since the objective is to understand concepts and develop your problem solving ability. However all Assignment Questions using Mastering Physics must be completed individually. Simply copying the work of another person without acknowledgment is plagiarism and contrary to University policies on Academic Dishonesty and Plagiarism in Coursework see http://sydney.edu.au/learning/education_policy/academic_dishonesty_in_coursework_policy_2012.pdf. Mastering Physics marks the assignments automatically and you immediately know your result. Worked solutions to all Assignment Questions will be posted on the web, although you should have the answer once you complete each Mastering Physics question. Note that some assignment questions use randomised values - i.e. different students see the question with different values.

**Workshop Tutorials**

Contributing to Workshop Tutorials is an important part of success in this Unit of Study. We measure your
contribution by collecting group answer sheets and assigning an overall mark for your work during the semester, up to 2% of your final grade. To obtain full marks you must participate in at least 9 out of 12 workshops.

Laboratory Work - Circuits
Assessment in the laboratory is based on successful completion of laboratory work. For each laboratory session, you are awarded a mark for successfully completing each checkpoint. Satisfactory performance in Laboratory work is necessary for a pass in the unit, but if you work well in the laboratory you will learn a lot and be well on the way to passing this unit.

Final Examination
In the examination at the end of the semester you will be asked to write descriptive answers to questions, to explain physical principles and to answer quantitative questions, all aimed at demonstrating your progress in achieving the goals of the unit. Ability to memorise formulas and manipulate them without understanding the associated physics will not be rewarded. Note that you must bring your own calculator to any Junior Physics examination. See the University policy on calculators at http://sydney.edu.au/current_students/student_administration/examinations/students.shtml#calculators

7.2 Assessment Grading
Final grades in this unit are awarded at levels of HD (High Distinction), D (Distinction), CR (Credit), P (Pass) and F (Fail) as defined by the Academic Board Assessment Policy. These achievement levels are described below. Details of the policy are available on the University’s ‘Policy Online’ website at http://sydney.edu.au/ab/policies/Assessment_Policy_2011.pdf.

The assessments for this unit are described in this unit of study outline. This description includes the purpose, timing and weighting of each assessment item and an explanation of how task relate to the learning outcomes of the unit. Students are responsible for actively engaging with these assessments, including carefully reading the guidance provided, spending sufficient time on the task, ensuring their work is authentic and their own (whether individual or group work), completing work on time and acting on feedback provided.

Assessment tasks are moderated to ensure their appropriateness, their consistency with the achievement level descriptors below and equity of grade distributions across the units offered by the Faculty of Science.

In Junior Physics, our aim is to give everyone a chance of a high grade, irrespective of their unit of study. To achieve this, we compare the units by having parts of the assessment in common. In the final examination for example, some questions are common on the various papers. We look at average marks for common and non-common questions to prevent one class being disadvantaged by, say, a difficult question that isn't on other papers. The result of this moderation process is a higher percentage of HDs and Ds in the Advanced unit (as you might expect), however the process also ensures there are HDs and Ds awarded in the other units of study to students who excel.

Grades:

High Distinction (HD)
At HD level, a student demonstrates a flair for the subject and comprehensive knowledge and understanding of the unit material. A ‘High Distinction’ reflects exceptional achievement and is awarded to a student who demonstrates the ability to apply subject knowledge to novel situations.

Distinction (D)
At D level, a student demonstrates an aptitude for the subject and a solid knowledge and understanding of the unit material. A ‘Distinction’ reflects excellent achievement and is awarded to a student who demonstrates an ability to apply the key ideas of the subject.

Credit (CR)
At CR level, a student demonstrates a good command and knowledge of the unit material. A ‘Credit’ reflects solid achievement and is awarded to a student who has a broad understanding of the unit material but has not fully developed the ability to apply the key ideas of the subject.

Pass (P)

At P level, a student demonstrates proficiency in the unit material. A ‘Pass’ reflects satisfactory achievement and is awarded to a student who has threshold knowledge of the subject.

8 Learning and Teaching Policies

Academic Dishonesty/Plagiarism

We will NOT accept assessments that are simply copied. Copying the work of another person without acknowledgment is plagiarism and contrary to University policies on Academic Dishonesty and Plagiarism http://sydney.edu.au/policies/showdoc.aspx?recnum=PDOC2012/254&RendNum=0

Academic Dishonesty means seeking to obtain or obtaining academic advantage (for example, in assessments) by dishonest or unfair means or knowingly assisting another student to do so. Academic Dishonesty includes, but is not limited to:

(a) recycling – that is, the resubmission for assessment of work that is the same, or substantially the same, as Work previously submitted for assessment in the same or in a different unit of study (except in the case of legitimate resubmission with the approval of the examiner for purposes of improvement);

(b) fabrication of data;

(c) the engagement of another person to complete or contribute to an assessment or examination in place of the student, whether for payment or otherwise or accepting such an engagement from another student;

(d) communication, whether by speaking or some other means, to other candidates during an examination;

(e) bringing into an examination forbidden material such as textbooks, notes, calculators or computers;

(f) attempting to read other student’s work during an examination;

(g) writing an examination or test paper, or consulting with another person about the examination or test, outside the confines of the examination room without permission;

(h) copying from other students during examinations;

(i) Inappropriate use of electronic devices to access information during examinations.

Plagiarism means presenting another person’s work as one’s own work by presenting, copying or reproducing it without acknowledgement of the source. Plagiarism is a form of Academic Dishonesty, but is treated separately. Plagiarism includes presenting work for assessment, publication, or otherwise, that includes:

(a) phrases, clauses, sentences, paragraphs or longer extracts from published or unpublished work (including from the Internet) without acknowledgement of the source; or

(b) the work of another person, without acknowledgement of the source and presented in a way that exceeds the boundaries of legitimate cooperation.
Consideration of factors affecting your study

If your academic performance in a Science Faculty unit of study is adversely affected by illness or some other serious event, such as an accident, you should notify the Faculty of Science Student Office (level 2 of the Carslaw building) within 7 days after the period for which consideration is sought, by completing an Application for Special Consideration with accompanying documentation. This is especially important if you miss an examination.

If you have another reason for the Science Faculty to take account of your circumstances - religious commitments, legal commitments (e.g. Jury duty), elite sporting or cultural commitments (representing the University, state or country), or Australian Defence Force commitments (e.g. Army Reserve) - you should notify the Faculty of Science Student Information Office (level 2 of the Carslaw building) at least 7 days BEFORE the period for which consideration is sought, by completing an Application for Special Arrangements with accompanying documentation.

These two forms of Consideration should cover most allowable circumstances. However, if you have another reason for requiring the School of Physics to take account of your circumstances, you should notify the School of Physics Student Services Office immediately.

You should not submit an application of any type if:

- there is no assessment associated with a missed class, or
- you have a reasonable opportunity to make up any work you missed.

If, for example, you miss an assignment, an application for appropriate Consideration is required to allow late submission, but we do expect the assignment to be submitted. Sometimes catching up may be impossible, in which case we will consider a pro-rata adjustment of your marks on the basis of an application for Consideration.

Special Consideration or Special Arrangements

To submit an application for Special Consideration or Special Arrangements you should:

1. Obtain the appropriate Application pack from the Student Information Office of the Faculty of Science, the Faculty website at http://sydney.edu.au/cstudent/ug/forms.shtml, or the Physics Student Services Office.

2. Complete the forms and obtain whatever original documentary evidence is appropriate. Note especially that the Professional Practitioner's Certificate is essential for Special Consideration on grounds of serious illness - Medical Certificates will NOT be accepted.

3. Take the original copy of all forms and documents, plus sufficient copies for each unit of study affected and yourself, to the Faculty of Science Student Information Office (NOT any other Faculty Office if you are seeking Consideration in a unit taught by Physics). They will sign/stamp both the original application form and the copies. In the case of Physics units, one copy of the documentation must then be submitted to the Physics Student Services Office. Keep one copy yourself. A formal decision on your application will be sent to your university email address within 14 days.

Students unsure what type of Consideration is appropriate, or unhappy with a Consideration decision, should consult the Physics Student Services Office.

Further details on University policy regarding Considerations can be found in the Academic Board Assessment Policy at http://sydney.edu.au/ab/policies/Assessment_Policy_2011.pdf. This document also contains details on other aspects such as Student Appeals against academic decisions.

For full details of applicable university policies and procedures, see the Policy web site at sydney.edu.au/policy.

Relevant forms are available on the Faculty Forms and Procedures web site at sydney.edu.au/science/cstudent/ug/forms.shtml