



Junior Physics Handbook 2012

Semester and Vacation Dates 2012

Semester 1		Semester 2	
Lectures start	5 March	Lectures start	30 July
Laboratories start	12 March	Laboratories start	6 August
Tutorials start	12 March	Tutorials start	6 August
Easter break	6 -13 April	Mid-semester break	24 - 28 September
Study vacation	11-15 June	Study vacation	5 - 9 November
Exams begin	18 June	Exams begin	12 November
End of semester	30 June	End of semester	24 November

sydney.edu.au/science/physics



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Introduction

Welcome to the School of Physics at the University of Sydney. We hope that your time with us will provide a rewarding introduction into the world of physics. University life offers different challenges to those you have met at school and we trust this booklet will help ease your entry into this new phase of your education.

There are a number of junior physics units of study available to students. This booklet gives descriptions of these, their timetables and assessment methods. If your particular degree program allows you to choose your physics unit of study, this booklet will also provide information to help you select the options most suited to your needs and physics background.

We hope this booklet will answer many of your questions, so please take the time to carefully read the parts that concern you.

Junior Physics Web Page and eLearning

You will find the junior physics web page at sydney.edu.au/science/physics/current/jpc.shtml. This page is primarily intended to help you select your units of study. Once you have enrolled, your main source of information about your physics course are the separate eLearning sites for your unit of study. These are available under the eLearning system by clicking on any of the eLearning links scattered across the junior physics web pages or via your *MyUni* pages. Access requires a Unikey Username and Password that is issued with your confirmation of enrolment.

On the eLearning sites there are links to many useful resources to help you with your study. Each unit has pages describing the unit as a whole and the individual lecture modules that comprise it. Other resources include past exam questions, study notes, links to useful sites etc.

Junior units of study - an overview

Students have the choice of taking mainstream junior physics at one of two different levels: advanced or normal. Both levels are equally valuable – as self contained introductions to physics for students who are intending to "major" in other disciplines, and as solid foundations for higher year physics units of study possibly leading to a "major" in physics.

Other units of study at Junior level are available. However by themselves they do not provide the background necessary for studying physics at higher levels. These units of study are also described in this booklet. They are:

PHYS1500 Astronomy

and Computational Science units:

COSC1001 Computational Science in Matlab

COSC1002 Computational Science in C

COSC1901 Computational Science in Matlab (Advanced)

COSC1902 Computational Science in C (Advanced).

The Science Faculty Handbook at sydney.edu.au/science/about_us/handbook.shtml provides detailed information on all Junior Physics units of study. The comments below and on the Physics web pages are provided to help in your choice of units, but the information in the Faculty Handbooks ultimately defines what combinations of units are possible.

Several other faculties offer units that are taught partly or entirely by Physics Staff:

The Faculty of Education offers EDUH1017 Sports Mechanics

The Faculty of Health Sciences offers MRTY1031 Medical Radiation Physics and MRTY1036 Health Physics and Radiation Biology

The Faculty of Agriculture offers AFNR1002 Climate and the Environment

These units are described in the respective Faculty Handbooks and are not described further in this booklet.

Mainstream physics units

Advanced level: PHYS1901 Advanced and PHYS1902 Advanced are intended for students who have a strong background in physics and an interest in studying more advanced topics. The units cover more material than the normal level and in greater mathematical detail.

Normal level: provides a solid foundation in the concepts of physics. In first semester most students will choose from one of two options: PHYS1001 Regular and PHYS1002 Fundamentals. Your choice of option will depend on your background in physics.

In second semester, there are again two options from which to choose: PHYS1003 Technological and PHYS1004 Environmental and Life Sciences. This time your choice will be on the basis of interest and professional relevance.

All of these units are described in detail a little later.

How to make the choice between advanced and normal levels

Your choice of level in mainstream junior physics will be governed by your background and experience at high school level. **To enrol in PHYS1901 Advanced you must have an ATAR equal or greater than 96 or an HSC Physics result in Band 6, or equivalent.** If you would like to enrol, but don't fit the above criteria, it is possible to change your enrolment after first semester. You may enrol in PHYS1902 Advanced after successfully completing PHYS1901 Advanced (or vice versa) or on consultation with the Junior Physics Coordinator if you gain a Distinction or better in the Junior Physics units at the normal level in your first semester.

How to choose your options at the normal level

The PHYS1001 Regular option in first semester is for those who studied physics at high school level and scored 65 or more in HSC Physics.

The PHYS1002 Fundamentals option is primarily for those who have not studied physics before, or who scored less than 65 in HSC Physics.

In the case of the second semester options, your choice should be determined by your own interests and the direction of your future studies. Students from any first semester option will be able to move into either normal level second semester option. Students enrolling in the Fundamentals option should not worry, as the topics covered and the depth of knowledge gained will be adequate for either second semester option.

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.

You may choose to begin your study of Physics in either first or second semester, but be aware that a Physics unit from both semesters is required in order to qualify for intermediate physics. We recommend completing one of PHYS1001/1002/1901 before PHYS1003/1004/1902 if possible.

If you need more advice or wish to discuss your situation, go to the Physics Student Services Office (Room 210) in the Physics Building and the staff will arrange for you to see an academic staff member. It is also a good idea to consult with the academic staff member at the Physics Desk during enrolment.

Advice for students entering physics with no prior knowledge

The PHYS1002 Fundamentals unit has been designed especially for students who have no background in physics. If you are in this category, this unit is for you. It is extremely difficult to make a success of the PHYS1001 Regular unit with no prior knowledge; you are better off gaining a secure grounding of the subject starting with the basics.

There will be weekly tutorials to help you understand the lecture material and its applications. You should also consider the bridging course run by the School of Physics in February each year, which is designed to help intending students make the transition to a university standard in Physics. Enrolment details are available from the Faculty web page at sydney.edu.au/science/fstudent/undergrad/entry/bridging.shtml.

Maths units to do alongside physics

Science students are required to do Maths units, usually alongside mainstream junior physics units in their first year. In the first semester the recommended concurrent Maths units are MATH1001 + MATH1002 (or MATH1901 and MATH1902 at the advanced level). In the second semester the recommended concurrent Maths units are MATH1003 and MATH1005 (or MATH1903 and MATH1905 at the advanced level), although MATH1004 is also acceptable.

Other physics units

Astronomy

The PHYS1500 Astronomy unit is available in second semester and is open to all students. It has no assumed knowledge and no pre-requisites. As a stand-alone unit it does not count towards the 12 credit points of Junior Physics required for enrolment into Intermediate Physics.

Astronomy is one of the most popular areas of science and the School of Physics is very active in this area, with several research activities within the School linked together to form the Sydney Institute for Astronomy. Beyond PHYS1500, further study in Astronomy is possible in the mainstream physics units - see sydney.edu.au/science/physics/about/astrometry.shtml

Computational Science

Computational Science is the study of scientific problem solving using computers. It covers the formulation and analysis of problems, the use of software packages and programs to solve these problems computationally, simulations and modeling, mathematical and numerical analysis, graphics, visualisation, and programming.

You will learn how to solve problems arising in various areas of the natural sciences and mathematics using core features of the problem solving environment Matlab (COSC1001) and the language C (COSC1002). Advanced versions of each unit (COSC1901 and 1902) feature more challenging problems and some additional programming and visualisation techniques. These are not simply programming units and no previous knowledge of programming is assumed. HSC Mathematics is assumed.

Together with a selection of other units from across the Faculty, the COSC units can be used to construct a "major" in Computational Science. For more information see sydney.edu.au/science/physics/current/cosc.shtml

Nanoscience

The field of Nanoscience is concerned with the study of matter on the nanoscale, a scale where the fundamental quantum mechanical interactions that determine the properties of materials take place. Our growing ability to manipulate matter and fabricate materials on the nanoscale is the basis of the Australian Institute of Nanoscience (AIN) to be housed in a new building being constructed behind the School of Physics.

Although there are no units of study labelled as Nanoscience in first year, there are many units that will allow you to build a major in Nanoscience. This requires core Physics and Chemistry units in the first two years and then specialising in third year. For more information see sydney.edu.au/science/physics/current/nano.shtml

Useful information for students

Talented students program

The School of Physics has a special program for talented students. It is offered to a limited number of students on the basis of ATAR scores (for Junior Physics students) and performance in physics and weighted average marks (in later years). It offers enrichment of physics courses by way of special project work and lecture material and by a mentor arrangement, whereby each talented student is linked with a staff member in the School.

Entry into the Talented Student Program is by invitation from the Faculty of Science. In special circumstances, Physics may allow a small additional number of highly achieving students to participate in Physics TSP activities.

Registration for Physics units

The Timetable Unit prepares your personalised timetable, which is available from *MyUni* the week before first semester starts. It includes your scheduled laboratory sessions. In most units you must register with the School of Physics at your first laboratory session in the **second** week of semester. All students, even those repeating the unit, must register in this way.

Staff-Student Liaison Committee

Each year, students in each unit run by the School of Physics nominate representatives to the Staff-Student Liaison Committee. The Committee meets once per semester and is a forum at which student concerns about our units can be aired. Discussions are informal, over lunch, but items brought forward by representatives are treated seriously and the staff try to solve problems raised.

First year physics prizes and scholarships

The following are some of the prizes and scholarships offered in the School of Physics for Junior Physics performance.

Levey Scholarship No 1 \$825	Awarded for proficiency in Junior Physics to a student in the Faculty of Arts, Science or Engineering who is proceeding to 12 credit points of Intermediate Physics.
School of Physics - Julius Summer Miller Scholarships for Academic Excellence No 1 \$700	Up to two scholarships to be awarded annually on the recommendation of the Head of School of Physics to the most proficient students in Junior Physics provided that their work is of sufficient merit and they enrol in 12 credit points of Intermediate Physics.
Science Foundation for Physics Scholarships No 1 \$700	Up to five scholarships to be awarded annually, on the recommendation of the head of the School of Physics for proficiency in Junior Physics, provided that the student's work is of sufficient merit and that the student enrolls in 12 credit points of Intermediate Physics.
Smith Prize \$200	Awarded to the best undergraduate in Junior Experimental Physics.
Australian Sky & Telescope Prize for Astronomy	Awarded to the best undergraduate in PHYS1500 Astronomy.

Web Resources

The "Current Students" link on the School of Physics web page sydney.edu.au/science/physics provides basic information on your Unit of Study. Further resources are provided under the University's eLearning environment, which can be accessed from links on the Junior Physics webpages sydney.edu.au/science/physics/current/jpc.shtml or your *MyUni* pages sydney.edu.au/myuni. Access to *MyUni* requires a Unikey username and password that is issued with your confirmation of enrolment. The University provides computer facilities in the Access Labs sydney.edu.au/ict/student/locations/.

Email

The University provides you with email access based on your username. We will 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 email account you do read (eg. a hotmail account).** See the IT Assist information sydney.edu.au/ict/student for information on how to forward your University email.

University study techniques

Many aspects of university life are very different to those you experienced at school. The most important difference is that you are expected to accept responsibility for your own study. The academic staff at the university will not chase you to ensure that you maintain your studies. The conduct of your university career and its success or failure rests with you.

Having said this, we want you to know that we are, at all times, more than happy to discuss any difficulties and to help and advise you. You are not alone. If you need help, go to the Physics Student Services Office (Physics Building A28, Ground Floor, Room 210) and talk to the administrative staff or phone on 9351 3037.

The methods of instruction in university courses are also different to those used in school, partly because of the large numbers of students involved. In mainstream physics units we use the following regime:

Lectures: basic course content and demonstration of associated principles are delivered in three lectures per week. They are held in the School of Physics lecture theatres which hold up to 150 people.

Laboratories: to gain experience in experimental methods, you will spend three hours per week in the Junior Physics Laboratories, which are located in the Carslaw Building on Level 4. You work in groups and keep a single laboratory logbook for the group.

Tutorials: these are smaller classes, in which the previous week's lecture material is consolidated and expanded. They are designed specifically to give you an opportunity to discuss physics problems with other physics students and staff.

Do not plan on just sitting and listening. Research has shown that students who actively participate in tutorials improve their performance in exams significantly compared with students who don't.

Assignments: to help you understand the lecture material in greater depth, we set regular assignments due every few weeks. In most units the assignments are entirely on-line using the *MasteringPhysics* system associated with your text book. Your assignment marks will give you a good indication of your proficiency as the course progresses.

Independent Study: One aspect of university study that will hopefully be familiar from school is the need to devote time to Independent Study, outside of assigned class times. In a 6 credit point unit of study you are expected to spend up to 6 hours per week to read through and understand the textbook, work through assigned examples and complete assignments, and to study for laboratory skills tests and the final examination.

For any Physics unit, if you attend classes regularly and involve yourself in all of the learning experiences provided, you will gain a far better understanding of the course work. This will have a considerable impact on your exam preparation and performance.

Content of Junior Physics units

The following pages give a very brief outline of the contents and timetable of junior physics units. More detail is available from the junior physics web page or individual unit eLearning sites.

Semester 1 (March 2012)

PHYS1001 Physics 1 (Regular)

The unit is divided into three lecture modules:

Mechanics 17 lectures	Brief review of kinetics and dynamics. Rotational mechanics.
Thermal Physics 10 lectures	Temperature, thermal properties of matter, the first and second laws of thermodynamics.
Oscillations and Waves 10 lectures	Basic oscillations and wave concepts developed for mechanical, acoustic and water waves.

You will be timetabled into one lecture stream, with three one-hour lectures per week most in the Slade Lecture Theatre, ground floor, Physics Building.

Stream 1	Stream 2	Stream 3
Monday 10am	Tuesday 9am	Monday 2pm
Wednesday 10am	Wednesday 12noon	Wednesday 2pm
Friday 10am	Thursday 9am	Thursday 2pm
Monday 2pm (LT5)	Wednesday 2pm (LT5)	Thursday 2pm (LT5)

You will be timetabled into a single one-hour tutorial per week. Tutorials start in the *second* week of semester. You will also be timetabled into one, three-hour laboratory session per week in the Carslaw Building on Level 4. Your first laboratory session is during the *second* week of semester. Registration will take place during this session.

The laboratory component is divided into two sections:

4 weeks	Mechanics, fluid flow; including concepts, problem solving, use of computers in physics.
4 weeks	Wave motion; planning and problem solving skills, including use of computers in physics, data analysis & uncertainties.

Textbook: *University Physics* (13th edition, with Modern Physics) by Young and Freedman, including *MasteringPhysics* access key. This may be purchased from the University Co-Op Bookshop at the University Sports & Aquatic Centre.

The *Experimental Physics Handbook* is also available from the University Co-Op Bookshop in the first week of semester, or on the eLearning site.

Semester 1 (March 2012)

PHYS1002 Physics 1 (Fundamentals)

The unit is divided into three lecture modules:

Language of Physics 12 lectures	"Thinking like a physicist", methods in the context of simple motion in one and two dimensions, forces (vectors), contact forces, equilibrium, elasticity, strength, etc.
Mechanics 13 lectures	Builds on previous module by extending physical concepts into dynamics, momentum, work, energy. Examples will be based on everyday experience.
Oscillations & Waves 12 lectures	Basic oscillations and wave concepts, in an acoustic context. Energy propagation, intensity.

You will be timetabled into one lecture stream, with three one-hour lectures per week in Physics Lecture Theatre 1, second floor, Physics Building.

Stream 1	Stream 2
Monday 10am	Monday 2pm
Wednesday 10am	Wednesday 2pm
Friday 10am	Thursday 2pm

You will be timetabled into a single one-hour tutorial per week. Tutorials start in the *second* week of semester. You will also be timetabled into one, three-hour laboratory session per week in the Carslaw Building on Level 4. Your first laboratory session is during the *second* week of semester. Registration will take place during this session.

The laboratory component is as follows:

8 weeks	Measurement, data acquisition, analysis skills, statistics and computer use in the context of mechanics and waves.
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Textbook: *College Physics: A Strategic Approach* by Knight, Jones and Field, Edition 2 including *Mastering Physics* access key. This may be purchased from the University Co-Op Bookshop at the University Sports & Aquatic Centre.

The *Experimental Physics Handbook* is also available from the University Co-Op Bookshop in the first week of semester, or on the eLearning site.

Semester 1 (March 2012)

PHYS 1901 Physics 1A (Advanced)

The unit is divided into three lecture modules:

Mechanics 15 lectures	Brief review of kinematics and dynamics. Rotational mechanics, gravitation.
Thermal Physics 10 lectures	Temperature, thermal properties of matter, the first and second laws of thermodynamics.
Oscillations, Waves and Chaos 13 lectures	Oscillations and wave concepts, developed for mechanical, acoustic and water waves. Chaos, accompanying computational laboratory work on chaos.

There are three one-hour lectures per week in Physics Lecture Theatre 2, second floor, Physics Building.

Monday 2pm
Wednesday 2pm
Thursday 2pm

You will be timetabled into a single one-hour tutorial per week. Tutorials start in the *second* week of semester. You will also be timetabled into one, three-hour laboratory session per week in the Carslaw Building on Level 4. Your first laboratory session is during the *second* week of semester. Registration will take place during this session.

The laboratory component is divided into two sections:

4 weeks	Wave motion; planning and problem solving skills, including use of computers in physics, data analysis and uncertainties.
4 weeks	Computational Physics based on the study of Chaos.

Textbook: *University Physics* (13th edition, with Modern Physics) by Young and Freedman, including *MasteringPhysics* access key. This may be purchased from the University Co-Op Bookshop at the University Sports & Aquatic Centre.

The *Experimental Physics Handbook* is also available from the University Co-Op Bookshop in the first week of semester, or on the eLearning site.

Semester 2 (July 2012)

PHYS1003 Physics 1 (Technological)

The unit is divided into three lecture modules:

Electricity and Magnetism 20 lectures	Electrostatics, electric fields, Gauss' Law, electric potential, capacitance, magnetic fields and forces, Ampere's Law, Faraday's Law, Lenz's Law, Inductance.
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.

You will be timetabled into one lecture stream, with three one-hour lectures per week in Physics Lecture Theatre 1, second floor, Physics Building.

Stream 1	Stream 2
Monday 10am	Tuesday 2pm
Wednesday 10am	Wednesday 2pm
Friday 10am	Thursday 2pm

You will be timetabled into a single one-hour tutorial per week. Tutorials start in the *second* week of semester. You will be timetabled into one, three-hour laboratory session per week in the Carslaw Building on Level 4. Your first laboratory session is during the *second* week of semester. Registration will take place during this session.

The laboratory component is divided into two sections:

5 weeks	Electrical Circuits.
4 weeks	Projects and student presentations.

Textbook: *University Physics* (13th edition, with Modern Physics) by Young and Freedman, including *MasteringPhysics* access key. This may be purchased from the University Co-Op Bookshop at the University Sports & Aquatic Centre.

The *Experimental Physics Handbook* is also available from the University Co-Op Bookshop in the first week of semester, or on the eLearning site.

Semester 2 (July 2012)

PHYS1004 Physics 1 (Environmental and Life Sciences)

This unit is divided into three lecture modules:

Electricity and Magnetism 12 lectures	Concepts of electric and magnetic fields and their interaction with charged particles. Application of these concepts in biological systems, for example in nerve conduction, and in the environment..
Properties of Matter 12 lectures	Elasticity, pressure in fluids, surface tension, ideal fluids, viscous fluids
Radiation and its Interactions with Matter 14 lectures	Fundamental particle physics with an emphasis on the interaction between radiation and matter. Examples from biology, medicine & dosimetry.

You will be scheduled into one lecture stream, with three one-hour lectures per week in the Slade Lecture Theatre, ground floor, Physics Building.

Stream 1	Stream 2
Monday 10am	Tuesday 12pm
Wednesday 10am	Wednesday 12pm
Friday 10am	Friday 12pm

You will be timetabled into a single one-hour tutorial per week. Tutorials start in the *second* week of semester. You will also be timetabled into one, three-hour laboratory session per week in the Carslaw Building on Level 4. Your first laboratory session is during the *second* week of semester. Registration will take place during this session.

The laboratory component is divided into two sections:

5 weeks	Introductory Electrical Circuits.
4 weeks	Projects and student presentations.

Textbook: *College Physics: A Strategic Approach* by Knight, Jones and Field, Edition 2 with *Mastering Physics* access key. This may be purchased from the University Co-Op Bookshop at the University Sports & Aquatic Centre.

The *Experimental Physics Handbook* is also available from the University Co-Op Bookshop in the first week of semester, or on the eLearning site.

Semester 2 (July 2012)

PHYS1500 Astronomy

This unit is divided into four lecture modules:

Introduction and Solar System 8 lectures	Formation and evolution, terrestrial planets, gas giants, rings and moons, small bodies.
Stars 8 lectures	Analysis of starlight, spectra of stars, properties of stars, structure of stars, evolution of stars, stellar deaths.
The Milky Way 4 lectures	Multiwavelength astronomy, star formation, galactic structure, galactic evolution, galactic centre, galaxies.
Extra-galactic Astronomy 6 lectures	Galaxy Clustering, distance scale, active galactic nuclei, gamma-ray bursts, cosmology, dark matter, dark energy.

There are two one-hour lectures and a one-hour special lecture per week in the Slade Lecture Theatre, ground floor, Physics Building. Special Lectures are used to present material outside the flow of the normal lectures. Many will be given by guest lecturers.

Lecture	Monday 2pm
Lecture	Thursday 3pm
Special Lecture	Tuesday 1pm

You will be timetabled into a single one-hour tutorial per week. Tutorials start in the *second* week of semester.

The laboratory component of this unit uses computer-based exercises. You will be timetabled into one, two-hour laboratory session per week. Your first laboratory session is during the *second* week of semester. Registration will take place during this session.

There are also night observing sessions scheduled on the basis of moon and weather conditions.

Textbook: *The Cosmic Perspective* 6th edition by Bennett, Donahue, et al, with *MasteringAstronomy* access key. This text may be purchased from the University Co-Op Bookshop at the University Sports & Aquatic Centre.

Astronomy Computer Exercises is available from the University Copy Centre, or on the eLearning site.

Semester 2 (July 2012)

PHYS1902 Physics 1B (Advanced)

This unit is divided into three lecture modules:

Electricity and Magnetism 20 lectures	Electrostatics, electric fields, Gauss' Law, electric potential, capacitance, magnetic fields and forces, Ampere's Law, Faraday's Law, Lenz's Law, Inductance.
Fluids 6 lectures	Density, pressure, buoyancy, surface tension.
Quantum Physics 12 lectures	Atomic spectra, photons, wave nature of particles, potential wells and barriers, the hydrogen atom.

There are three one-hour lectures per week in the Slade Lecture Theatre, ground floor, Physics Building.

Tuesday 2pm
Wednesday 2pm
Thursday 2pm

You will be timetabled into a single one-hour tutorial per week. Tutorials start in the *second* week of semester. You will also be timetabled into one, three-hour laboratory session per week in the Carslaw Building on Level 4. Your first laboratory session is during the *second* week of semester. Registration will take place during this session.

The laboratory component is divided into two sections:

5 weeks	Electrical Circuits.
4 weeks	Projects and student presentations.

Textbook: *University Physics* (13th edition, with Modern Physics) by Young and Freedman, including *MasteringPhysics* access key. This may be purchased from the University Co-Op Bookshop at the University Sports & Aquatic Centre.

The *Experimental Physics Handbook* is also available from the University Co-Op Bookshop in the first week of semester, or on the eLearning site.

Semester 2 (July 2012)

COSC 1001 Computational Science in MATLAB and COSC 1901 Computational Science in MATLAB (Advanced)

These units provide an introduction to scientific problem solving using MATLAB. The scientific problems addressed will be drawn from a wide variety of disciplines, and no previous programming experience in MATLAB (or any other language) is expected of you. The emphasis is on problem solving rather than programming, with the aim of providing an introduction to the use of computers in science for students with diverse backgrounds and interests.

MATLAB is an interactive environment including a programming language and graphics commands for two and three dimensional display of data and functions. You will learn to use MATLAB to solve a variety of problems commonly encountered in the real world, and be able to present visualisations of your solutions to facilitate understanding of the results. Examples of the kinds of problems you will be able to solve include solution of simultaneous linear equations, data fitting and visualisation. You will be able to recognise situations when the use of MATLAB will lead to a simpler and quicker solution to a problem than an analytical approach. Whilst the unit of study is not a complete, formal course in MATLAB, nevertheless you will develop basic programming skills, and an understanding of how to expand your repertoire to include more complex MATLAB features.

COSC 1901 students will share the same lecture and practical sessions as COSC 1001 students. However, COSC 1901 students will be given additional problems in the practical sessions and introduced to more advanced MATLAB features and more advanced problem solving techniques.

There is a single one-hour lecture per week in Physics Lecture Theatre 2, second floor, Physics Building. You are also required to attend a two-hour practical session.

Lecture	Friday 12noon Physics Lecture Theatre 2
Practical	Tuesday 9am or Tuesday 3pm Room TBA

Textbook: Essential MATLAB for Scientists and Engineers (4th Edition) by Brian D. Hahn and Daniel Valentine. This book is recommended but not required.

Semester 2 (July 2012)

COSC 1002 Computational Science in C and COSC 1902 Computational Science in C (Advanced)

These units provide an introduction to scientific problem solving using the programming language C. The scientific problems addressed will be drawn from a wide variety of disciplines, and no previous programming experience in C (or any other language) is expected of you. The emphasis is on problem solving rather than programming, with the aim of providing an introduction to the use of computers in science for students with diverse backgrounds and interests.

In the natural sciences the most commonly used programming languages are Fortran and C/C++. C has been chosen for this unit. You will not be expected to master advanced aspects of the language, but you will be expected to learn to use C to solve simple but realistic problems arising in the natural sciences. Examples of the kind of techniques that you will learn to use include: evaluating integrals numerically, solving differential equations, and finding the roots of real functions. You will be able to use libraries of mathematical routines, and be able to recognise when a numerical approach is required in a problem. Whilst the unit of study is not a complete, formal course in the C language, you will develop basic programming skills, including an understanding of structured programming and the importance of documentation.

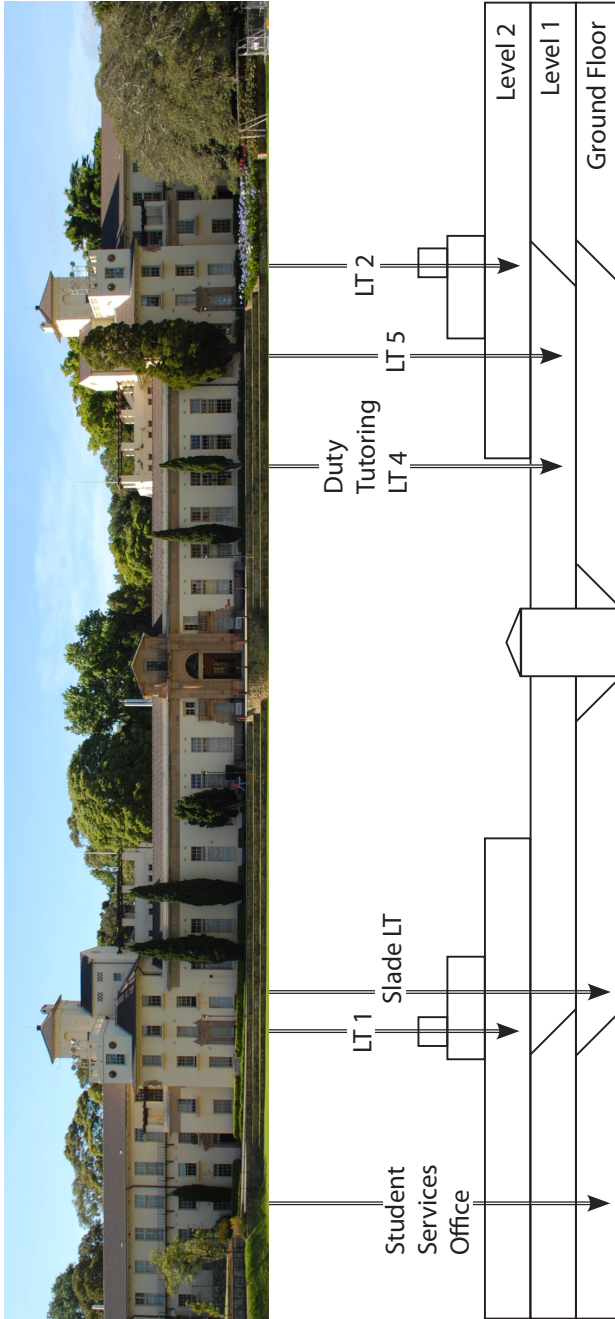
COSC 1902 students will share the same lecture and practical sessions as COSC 1002 students. However, COSC 1902 students will be given additional problems in the practical sessions and introduced to more advanced programming techniques.

There is a single one-hour lecture per week in Physics Lecture Theatre 5, first floor, Physics Building. You are also required to attend a two-hour practical session.

Lecture	Mon 9am Physics Lecture Theatre 5
Practical	Wed 3pm or Fri 9am Room TBA

Textbook: There is no recommended textbook for these units. However, the following are recommended references. The required knowledge of the C programming language is described in the book *Schaum's Outlines – Programming with C* by B. Gottfried (McGraw-Hill 1996).

For background on numerical methods *Numerical Recipes in C, The Art of Scientific Computing* by Press, Teukolsky, Vetterling and Flannery (Cambridge University Press 1992).



PHYSICS BUILDING A28
LOCATION OF LECTURE THEATRES

Location of Laboratories

Experimental Physics takes place on Level 4 of the Carlsaw Building.

Computer laboratory classes for PHYS1500 Astronomy are held in Room 301 of the Madsen Building.

Location of Tutorials

Tutorials for all units are held in Room 331 of the Madsen Building.

Assessment

Your marks are based upon a combination of assessment tasks. Satisfactory performance in all components is necessary for a pass in your physics unit of study. Different units of study are assessed in slightly different ways. Further details are available in the documents describing individual units and lecture modules, but the mark allocation (to be confirmed) within each unit is given in the table below:

Unit of Study	Assessment breakdown for each semester
PHYS1001 Regular PHYS1901 Advanced	Laboratory 20% Laboratory Skills Test 5% Assignments 10% Tutorials 2% Practice Exam 3% Examination 60%
PHYS1002 Fundamentals	Laboratory 20% Assignments 7% Laboratory Skills Test 5% Tutorials 2% Interactive Lecture Demonstrations 3% Examination 63%
PHYS1003 Technological PHYS1004 Environmental and Life Sciences PHYS1902 Advanced	Laboratory - Circuits 10% Laboratory - Circuits Test 2% Lab Projects 14% Assignments 10% Tutorials 2% Practice Exam 2% Examination 60%
PHYS1500 Astronomy	Laboratory Exercises 15% Laboratory Exam 10% Assignments 10% Night Viewing 5% Tutorials 2% Examination 58%

We are concerned that students in physics are able to express themselves accurately by clear, efficient use of the English language in their written work. The correct use of language is taken into account when assessing written reports and examination work. We require clarity of expression with a reasonable standard of spelling, grammar and punctuation.

If you need assistance with English, contact the Learning Centre in the Education Building, Level 7 or phone them on 9351 3853.

Academic Honesty

We encourage cooperation between students in completing assignments, projects and essays. We will NOT accept assignments that are simply copied - either from other students or other sources such as the web. Copying the work of another person without acknowledgment is plagiarism and contrary to University policies on Academic Honesty in Coursework see sydney.edu.au/learning/education_policy/academic_dishonesty_in_coursework_policy_2012.pdf

Examinations

Physics examinations covering the material included in lectures are held at the end of each semester. The modules taken in each semester are examined at that semester's examination.

Proof of identification is required at all examinations.

A preliminary examination timetable is posted on the University web site, accessed through *MyUni*, late in each semester. You should consult this as soon as possible and report any clashes to the Student Centre. The final timetable appears about two weeks before the examinations. It can differ markedly from the draft timetable, so check your examination times carefully.

Rooms and seat numbers are available on *MyUni*. Check all information relevant to you as it is University policy that no special consideration be given to students who misread the timetable, rooms or seat numbers.

You will be notified by mail of your results by the university. Results are also accessible via *MyUni*. The grade obtained will be indicated by: HD (High Distinction), D (Distinction), C (Credit), P (Pass), F (Fail) or INC (Incomplete).

Scaling of Marks

In Junior Physics, our aim is to give everyone an even chance of a high grade, irrespective of their unit of study. To achieve this, we compare the units by having part 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. This results in some upward scaling, affecting students in the Advanced unit most.

The final mark for each unit is calculated by adding all the individual assessment marks with the appropriate weightings and then scaling to match University guidelines. This final scaling isn't normally very great, but it does mean that you can't simply add all your individual marks and get your

final mark. The result of all this is a higher percentage of HDs and Ds in the Advanced unit (as you might expect), however the scaling also ensures there are appropriate numbers of HDs and Ds awarded in the other units of study.

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 Office (Level 2, 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 Office (Level 2, 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 (Room 210, A28 Physics Building) 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.

Longer term health or emotional issues are better dealt with via the University's Disabilities Services unit rather than through the Special Consideration process.

If for example, you missed 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.

For more information, see your Unit Outlines or sydney.edu.au/science/physics/local/consideration.shtml. See also information on the University Student Support Services at sydney.edu.au/current_students/student_services/index.shtml

Where to go for help

If you need help go to the Physics Student Services Office, Room 210, Ground Floor, Physics Building A28. If you need to phone us, the phone number is 9351 3037.

Staff involved in Junior Physics are all located in the School of Physics. Some staff members closely involved with Junior Physics are:

- Physics Student Services staff (Room 210)
- Associate Professor Joe Khachan – Junior Physics Coordinator (Room 363)
- Dr Chris Stewart – Junior Physics Laboratory Coordinator (Room 213A)

Duty Tutoring

There is a roster of Postgraduate Teaching Fellows who are available to help you with problems with physics course material. Normally, they are available four days per week from 1pm – 2pm starting from **Week 3** of each semester. The details of the roster are posted on eLearning and on the Physics website sydney.edu.au/science/physics/current/jpc.shtml.

Help with administrative enquiries

Type of Enquiry	Where to go	Type of Assistance
Address, name, unit changes	Faculty Office, <i>MyUni</i>	Relevant Forms
Illness and other difficulties affecting your performance	Faculty Office	Special Arrangement or Special Considerations form
General physics course matters	Physics Student Service Office	Notification of course, lab and tutorial changes; other physics details
Laboratory Work	The tutor in charge of your lab or Dr Chris Stewart	Assessment; change of laboratory time

Help with Physics

Type of Enquiry	Where to go	Type of Assistance
Lecture material	The duty tutor or your lecturer	Help with the material in lecturers or suggested problems
Assignments	The duty tutor	Problems with assignments or solutions

Tutorial Sheets	A tutor during the tutorial	Assistance with tutorial material or general course material if time permits. Tutorial sheets can only be collected by attending a tutorial
Laboratory work	A tutor during your lab session	Assistance with lab work

Changing your units of study

If you wish to change your enrolment you should first try to do so on-line via your MyUni account. If the system does not allow you to make changes, you may need special permission to enrol in the unit of study. If you are unable to vary your enrolment online you will need to visit your Faculty Office.

In first semester, the last day to *add* a unit of study is Friday 16 March and the last day to *withdraw* from a unit of study is Friday 30 March. Corresponding dates in second semester are Friday 10 August and Friday 31 August.

WARNING: See information on HECS-HELP and your faculty handbook for consequences of your change in enrolment or consequences of failing to lodge a signed form.

If you do vary your enrolment, be sure that you are not limiting your program of study in succeeding years.

Student Support Services

The University provides a wide range of services for students, some of which include:

Counselling and Psychology Services (CAPS)

CAPS aim to help students develop the skills to build strengths, improve well-being and achieve academic success. The services are free and confidential, and available to all enrolled students.

Level 5, Jane Foss Russell Building G02, City Road

Phone: 8627 8433 or 8627 8437

email: caps.admin@sydney.edu.au

sydney.edu.au/currentstudents/counselling/

Disability Services

Disability Services is the principal point of contact and support for students with disabilities and works closely with others in the administration and academic departments of the University. This is to ensure that appropriate arrangements relating to teaching and assessment are made, whilst maintaining the academic integrity and core requirements of the individual courses.

Level 5, Jane Foss Russell Building G02, City Road

Enquiries: 8627 8422 Appointments: 8627 8433

email: disability.services@sydney.edu.au

sydney.edu.au/stuserv/disability/

Learning Centre

The Learning Centre provides resources for students to build and extend the skills they need for study and research at university.

Level 7, Education Building A35 Phone: 9351 3853 Fax: 9351 4865
email: learning_centre@sydney.edu.au
sydney.edu.au/stuserv/learning_centre

Mathematics Learning Centre

The Mathematics Learning Centre assists students to develop the mathematical knowledge, skills and confidence that are needed for studying mathematics or statistics at university.

Level 4, Carslaw Building F07 Phone: 9351 4061 Fax: 9351 5797
email: mlc.enquiries@sydney.edu.au
sydney.edu.au/stuserv/mathematics_learning_centre/index.shtml