



## **STUDENT COURSE PLANNING**

**FOR 2002**

### Contents

Introduction	2
Entrance Criteria for Advanced Physics Subjects	2
Physics major and entry to Physics Honours	3
Second Year Physics Subjects	4
Third Year Physics Subjects	6
Combined Courses	8

Web site: <http://optics.ph.unimelb.edu.au/courseplan2001.html>

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## SCHOOL OF PHYSICS STUDENT COURSE PLANNING FOR 2002

(MAY 2001)

### Introduction

To gain a B.Sc. degree, a student must obtain a credit of at least 300 points, with 75-125 at 100 level and at least 50 (preferably 90 or more) at 300 level. The corresponding information for Combined Course students is given in the relevant section.

### Enrolment

Enrolment for 2001 is being done by students themselves via the Internet. Further details are contained in a letter sent to students by the Faculty of Science. Students enter own course via Web, October 4 – 18: <http://www.sis.unimelb.edu.au/>  
Information from Science Faculty: <http://www.science.unimelb.edu.au/courses/planning.html>  
Handbook: <http://www.unimelb.edu.au/HB/> <http://www.science.unimelb.edu.au/hbupdates/>  
Timetable: <http://sis.unimelb.edu.au/cgi-bin/subjects.pl>  
Students need to establish an ITS e-mail account prior to entering their course for the coming year. October 18 is the closing date for Round 1 of quota selection.

### Maximum workloads

Please note the Faculty of Science rules governing overloads. Students who have successfully completed 62.5 points at 100-level can enrol in up to 56.25 points per semester. Students who have not failed any subjects in the previous semester are permitted to enrol in 62.5 points per Semester. Although strong students are encouraged to enrol in a wide range of subjects, they should not do so many subjects that their overall performance is affected.

### Guidelines for Entry to Advanced Physics Subjects

**Core** physics lecture units are given at both the **advanced and standard level** at both 200 and 300 level. Both streams can lead to a major in Physics and to Physics Honours. The pace of advanced courses is faster, the material is covered in more depth and assumes a stronger mathematical background. The grade a student receives in a course should not depend on whether it is taken at the standard or advanced level. To ensure that students undertake the appropriate level subject, the School of Physics has developed the following guidelines for entrance to advanced level physics subjects at 200 and 300 level. If a student wishes to enrol in a 220 or 320 series subject and is close to meeting, but doesn't quite satisfy, these criteria he or she should consult the year organiser.

#### *Entrance to 22x Series Subjects*

Physics 121/141 or 122/142 mark	70
Average mark in Maths. [111/121/141, 112/122/142, 113/123/143]	70

#### *Entrance to 32x Series Subjects*

Average second year Physics Theory mark (excluding 251)	70
Average second year Mathematics mark [231, 232, 221/222/252]	70

### Honours (4<sup>th</sup> year) entry

Various majors and co-majors involving physics are outlined below. Note, however, that completion of a physics major does *not necessarily* permit a student to enrol in Physics Honours (4<sup>th</sup> year). In order to enrol in Honours (which is required to pursue a higher degree in physics and is desirable for those wishing to pursue a career in industrial physics) students are required to complete:

- 640-321/341            Quantum Mechanics
- 640-322/342           Thermal Physics
- 640-323/343           Electrodynamics
- 640-353                Atomic, Molecular and Solid State Physics
- 640-299                Laboratory work
- plus
- *Either* 25 points of 300-level physics laboratory work *or* 50 points of mathematics chosen from 620-311, 620-312, 620-321, 620-322, 620-331, 620-332, 620-341, 620-342 [which in turn requires completion of additional 2<sup>nd</sup> year maths pre-requisites]

Students wishing to retain the option of enrolling in Physics Honours in future years should ensure that they complete the required 300-level subjects and their pre-requisites.

## Physics Major

### *100-level subjects*

- 640-121/141 and 640-122/142                      Physics A and B
- 620-111/121/141 and 620-112/122/142/200/211    Mathematics A and B/2
- 620-113/123/143                                      Applied Mathematics

### *200-level subjects*

- 640-223/243            Quantum Mechanics & Thermal Physics
- 640-225/245            Electromagnetism & Relativity
- 640-299                 Laboratory Work
- At least one of 640-237 Astro & Optics II, 640-234 Further Class & Quantum Mech *or* 640-251 Inst. for Scientists

### *300-level subjects*

- 640-321/341            Quantum Mechanics
- 640-364                Computational Physics *or* 12.5 points of 300-level Physics laboratory work
- 25 points or more of other 300-level Physics subjects.

The Physics Major is accredited by the Australian Institute of Physics.

## 200-level physics subjects

Sem	Code	Subject	Pts	Pre- and co-requisites	Pre-requisite for
1	640-223	Quantum Mechanics and Thermal Physics (Advanced)	12.5	Physics 121/141+122/142 Maths 111/121/141 + 112/122/142/211 + 113/123/143/ +231*	321/341 Quantum Mechanics 322/342 Thermal Physics
1	640-243	Quantum Mechanics and Thermal Physics	12.5	Physics 121/141+122/142 Maths 111/121/141 + 113/123/143* + 112/122/142/211*	321/341 Quantum Mechanics 322/342 Thermal Physics
1	640-237	Astrophysics and Optics II	12.5	Physics 121/141+122/142 Maths 111/121/141	351 Astrophysics and Optics
1	640-251	Instrumentation for Scientists	12.5	Physics 121/141/151/161 +122/142/152/162 Maths 111/121/141/151/(161+162)	
1	640-261	Energy and the Environment	12.5		
2	640-225	Electromagnetism and Relativity (Advanced)	12.5	Physics 121/141+122/142 Maths 231 + 113/123/143	323/343 Electrodynamics
2	640-245	Electromagnetism and Relativity	12.5	Physics 121/141+122/142 Maths 231* + 113/123/143	323/343 Electrodynamics
2	640-234	Further classical and quantum mechanics	12.5	Physics 223/243 Maths 231*	
2	640-299	Laboratory work	12.5	Physics 121/141+122/142	391,392,393,394 Laboratory

### Notes

- Subjects marked \* are pre-requisites or co-requisites; others are pre-requisites.
- Students who have completed Maths A (620-111/121/141) and Applied Maths (620-113/123/143) may also enrol in Quantum Mechanics and Thermal Physics with Maths B (620-142) as a co-requisite.
- In addition to meeting formal prerequisite requirements, students should note the following:
  - A knowledge of the material covered in Instrumentation for Scientists and/or the optics covered in the 237 lecture course will be advantageous when undertaking the Laboratory unit 640-299.
  - It will be assumed that students are taking Maths 232 concurrently with 225/245 Electromagnetism.
  - Students intending to take Honours Physics (4<sup>th</sup> Year) must take the Laboratory subject 640-299 or equivalent.
- Students who have taken half of a 2000 12.5 point subject in previous years and need to complete the other half to satisfy prerequisites will need to take special 6.25 unit subjects. These students should consult the Course Planning co-ordinator.
- Note that students who completed 100-level maths units prior to 1999, should ensure that they have completed the equivalent mathematics units.

### Core units

The core units are:

- 640-223/243 Quantum Mechanics and Thermal Physics (Semester 1)
- 640-225/245 Electromagnetism and Special Relativity (Semester 2)
- 299 Laboratory Work.

### Course plans

Suggested course plans for B.Sc. students are given on the following page.

### Mathematics

Careful attention must also be paid to the sequence of Mathematics subjects required in second year; this will depend on what Mathematics subjects a student completes in first year, as indicated in the table. Mathematics 231 and 232 are prerequisite for many 300 level Physics subjects and Mathematics 231 is a pre- or co-requisite for the 200 level Physics subjects: 223 and 225/245. Students wishing to pursue a major in 300 level Physics must, by the end of second year, have passed the following Mathematics subjects: 111 or 121 or 142[98] or 141[99+], 112 or 122 or 142[99+] or 211 or 200[98-], 113 or 123 or 143 or 130[98-] or 132[98-], 231 and 232. Students undertaking engineering mathematics subjects should consult the section on Combined Courses at the end of this document.

**Course Plans for 200-level students intending to pursue a major in physics  
Suggested plans listed for different 100-level maths background**

Semester	Code	Subject Name	First Year Maths Options Taken:			Maths 111/121/141+112/122/142#		Maths 111/121/141+112/122/142+113/123/143#	
			Points	Option 1	Option 2	Min phys/maths	Option 1	Min. phys/maths	Overload†
1	<b>640-223/243*</b>	<b>Quantum Mechanics and Thermal Physics</b>	12.5	12.5	12.5	12.5	12.5	12.5	12.5
1	640-237	Astrophysics and Optics II	12.5	12.5	12.5		12.5	12.5	12.5
1	640-251	Electronics and Instrumentation	12.5	12.5	12.5		12.5	12.5	12.5
1	620-143/123/113	Applied Mathematics**	12.5	12.5	12.5	12.5			
1	620-231/3	Vector Analysis	12.5	12.5	12.5		12.5	12.5	12.5
1	620-221	Real and Complex Analysis	12.5						12.5
1		Other subjects				25			25
2	<b>640-225/245*</b>	<b>Electromagnetism and Relativity</b>	12.5	12.5	12.5	12.5	12.5	12.5	12.5
2	640-234	Further classical and quantum mechanics	12.5	12.5	12.5		12.5	12.5	12.5
2	<b>640-299*</b>	<b>Laboratory</b>	12.5	12.5	12.5	12.5	12.5	12.5	12.5
2	620-231/3	Vector Analysis	12.5	12.5	12.5		12.5	12.5	12.5
2	620-232/4	Mathematical methods	12.5	12.5	12.5		12.5	12.5	12.5
2	620-222	Linear and Abstract Algebra	12.5						12.5
2		Other subjects							12.5
<b>Total points for year</b>				<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>125</b>

# These course plans assume the given mathematics subjects or equivalent have been completed

\*These are core subjects and must be completed to continue to a physics major

\*\*Note that 620-143 is offered during the summer

†Possible 2nd year courses for advanced mathematical route to physics honours

### 300-level physics subjects

Sem.	Code	Subject	Pts	Pre- or co-requisites
1	640-321/341	Quantum Mechanics	12.5	Physics 223/243 Maths 231+232
1	640-322/342	Thermal Physics	12.5	Physics 226/246[98-] or 223/243[99+]
1	640-351	Astrophysics and Optics	12.5	Physics 227/247[98-] or 237[99+] Maths 231+232
1	640-356	Theoretical Methods for Physics	12.5	37.5 pts of 200-level physics including 223/243 and 225/245 Physics 321/341*+322/342* Maths 231+232
1	640-393	Laboratory work	12.5	Physics 299
2	640-323/343	Electrodynamics	12.5	Physics 225/245 Maths 231+232
2	640-353	Atomic, Molecular and Solid State Physics	12.5	Physics 321/341
2	640-354	Nuclear and Particle Physics	12.5	Physics 321/341, 221/241[98-] or 225/245 [99+]
2	640-364	Computational physics	12.5	Physics 321/341 Maths 231/232
2	640-394	Laboratory work	12.5	Physics 299

\* Those pre-requisites marked with an asterisk may be taken as either a pre- or co-requisite

*Seminar:* Students enrolled in 50 pts of 300 Physics must enrol in 310 Seminar. Others may enrol.

*Laboratory work:* The standard combination of laboratory work is 393 in Semester 1 followed by 394 in Semester 2.

#### *Physics IV (Honours Year)*

- Prerequisites for entry to 4th year are given earlier.
- To enter 4th year, students normally require at least an average of 65% in their best 87.5 points of 300-level Science units. Combined course students have their Faculty score based on a weighted average mark. This score counts 1/3 and the honours year mark 2/3 of the score for award of postgraduate research scholarships. Students, therefore, should not undertake a workload that will cause 300-level results to suffer.
- The choice of 3rd year subjects in no way influences or prejudices a student's admission to a particular research group unless they are doing the bare minimum Mathematical Physics major or, the co-major with Environmental Science.

#### *Mathematics Combinations*

- Note that the Mathematical Physics major (no longer offered) does not necessarily permit entry to Physics Honours. It may, however, be obtained in conjunction with a Physics major or permit entry to Physics Honours by completing the required extra Physics subjects.
- Some students may be interested in a major in both Physics and Mathematics. This is different from a Mathematical Physics major. They should see the description of a Physics major above and consult the Mathematics and Statistics department about requirements for a Mathematics major. Note that this combination also does not necessarily permit entry to Physics Honours.
- Students who satisfy the requirements to both Physics and Mathematics Honours may also be admitted to a combined Mathematics and Physics Honours course.

<p><b>Suggested course plans are given on the next page</b></p>
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## Suggested 300-level course plans for Physics major and Honours entry

640-3xx Semester	Code	Subject Name	Points	Honours entry				Physics major †		Mathematical Physics †	
				Overlap 1	Overlap 2	Option 1	Option 2	Option 1	Option 2		
1	640-321/341*	Quantum Mechanics	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
1	640-322/342*	Thermal Physics	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
1	640-351	Astrophysics and Optics III	12.5	12.5	12.5						
1	640-356	Theoretical Methods for Physics	12.5	12.5	12.5						
1	640-393*	Laboratory Work	12.5	12.5	12.5	12.5	12.5	12.5	12.5		
1		Approved mathematics units						25#		12.5	
1		Other physics or other subjects							25	12.5	
2	640-323/343*	Electrodynamics	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
2	640-353*	Atomic, molecular and solid state physics	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
2	640-354	Nuclear and particle physics	12.5	12.5	12.5						
2	640-364	Computational physics	12.5	12.5	12.5						
2	640-394*	Laboratory Work	12.5	12.5	12.5	12.5	12.5	12.5	12.5		
2		Approved mathematics units						25§		12.5	
2		Other physics or other subjects							25	37.5	
Y	640-310	Seminar**	0	0	0	0	0	0	0	0	
		<b>Total points for year</b>		125	112.5	100	100	100	100	100	100

Honours entry and Physics Major Courses are accredited by the Australian Institute of physics

Note: various combinations of non-core units can be taken

† These course plans do not permit entry to Physics Honours

Note that other combinations are possible and more physics can be included.

\* These are core subjects

\*\* Students enrolled in 50 points or more of 300 level physics must take this unit.

† App.Maths or Pure Maths co-major

‡ In order to satisfy the entry requirements for physics Honours, students must complete the core lecture units and either 25 points of 300-level

physics laboratory work or 50 points of the mathematics subjects listed at below.

# Two of 620-311, 620-321, 620-331, 620-34

§ Two of 620-312, 620-322, 620-332, 620-34

**Suggested course plan for students enrolled in BSc/LLB combined course  
leading to a Physics and entry to Physics Honours**

Year 1	BSc/LLB [200 science points]	1st year of course		BSc/LLB¶
Semester	Code	Subject Name	Points	
1	640-121/141**	<b>Physics A</b>	12.5	12.5
1	620-111/121/141	Mathematics A [for 141, Sem 1 or 2]	12.5	12.5
1		Law subjects		25
2	640-122/142**	<b>Physics B</b>	12.5	12.5
2	620-112/122/142	Mathematics B [for 142,122, Sem 1 or 2]	12.5	12.5
2		Law subjects		25
<b>Total Science points for year</b>				<b>50</b>

Year 2		2nd year of course		
Semester	Code	Subject Name	Points	
1	640-223/243**	<b>Quantum Mechanics and Thermal Physics</b>	12.5	12.5
1	620-113/123/143	Applied Maths [for 143, Sem 1 or 2 or Summer]	12.5	12.5
1		Law subjects		25
2	620-231/233	Vector analysis	12.5	12.5
2	620-232/234	Mathematical methods	12.5	12.5
2		Law subjects		25
<b>Total Science points for year</b>				<b>50</b>

Year 3		3rd year of course		Points	
1	640-321/341**	<b>Quantum Mechanics</b>	12.5	12.5	
1	640-322/342*	<b>Thermal Physics</b>	12.5	12.5	
1		Law subjects		25	
2	640-225/245**	<b>Electromagnetism and Relativity</b>	12.5	12.5	
2	640-299**	<b>Laboratory work</b>	12.5	12.5	
2		Law subjects		25	
Y	640-310***	<b>Seminar</b>	0	0	
<b>Total Science points for year</b>				<b>50</b>	

Year 4		4th year of course		Points	
1	640-393*	<b>Physics laboratory work</b>	12.5	12.5	
1		Physics 200-level option[237/251; or 234=Sem	12.5	12.5	
1		Law subjects		25	
2	640-323/343*	<b>Electrodynamics</b>	12.5	12.5	
2	640-353	<b>Atomic, molecular and solid state physics</b>	12.5	12.5	
2	640-394*	<b>Physics laboratory work</b>	12.5	12.5	
2		Law subjects		25	
<b>Total Science points for year</b>				<b>62.5</b>	

Year 5		5th year of course		
		Law subjects		
<b>Total Science points for year</b>				<b>0</b>

\* Completion of these subjects and those marked \*\* is essential in order to proceed to Physics Honours

\*\* Completion of these subjects is essential to proceed to a major in Physics. See other requirements.

\*\*\* Students intending to take 50 points or more of 300-level physics must take this subject

**NB: Students not wishing to enter Physics Honours have a greater choice of 300-level physics subjects.**

**For more details consult the Physics course planning document**

¶ This scheme (for the first four years) is broadly applicable to BSc/LLB, BAsC and other combined courses where the science points are expected to be evenly distributed for 50 points over each of four years.



**Suggested course plan for students enrolled in the B.Sc./B.E. combined course leading to a Physics major and entry to Physics Honours**

Year 1 Semester	B.Sc./B.E.[237.5pnts]	1st year of course	Points	B.Sc./B.E.	B.Sc./B.E.
	Code	Subject Name		Electrical stream	Computer Stream
1	<b>640-121/141</b>	<b>Physics</b>	<b>12.5</b>	<b>12.5</b>	<b>12.5</b>
1	620-121/141	Mathematics 1A	12.5	12.5	12.5
1	433-141	Computing Fundamentals A	12.5	12.5	12.5
1	431-102	Engineering [Digital Electronics & Microprocessors]	12.5	12.5	12.5
2	<b>640-122/142</b>	<b>Physics</b>	<b>12.5</b>	<b>12.5</b>	<b>12.5</b>
2	620-113/123/143	Applied Mathematics	12.5	12.5	12.5
2	620-112/122/142	Mathematics 1B	12.5	12.5	12.5
2	431-103	Engineering [Electrical Circuits]	12.5	12.5	12.5
<b>Total Science points for year*</b>				<b>75</b>	<b>75</b>

\* Also incorporates compulsory CS units

Year 2	2nd year of course	Points	Electrical stream	Computer Stream
1	<b>640-223/243*</b>	<b>Quantum Mechanics and Thermal Physics</b>	<b>12.5</b>	<b>12.5</b>
1	431-204	Programmable Logic & Microcon	12.5	12.5
1	431-210	Circuit Analysis	12.5	12.5
1	433-142	Computer Fundamentals B	12.5	12.5
2	620-231/3	Vector Analysis	12.5	12.5
2	620-232/4	Mathematical Methods	12.5	12.5
2	431-221	Fundamental Signals & Systems	12.5	12.5
2	431-222	Electronic Devices & Circuits	12.5	12.5
<b>Total Science points for year*</b>			<b>50</b>	<b>50</b>

\* Also incorporates compulsory CS units

Students who completed Computing Fundamentals B in first year instead of Applied Maths will need to modify their course plan accord Electrical stream students could take Engineering Maths instead of Maths 231 and 232, but must ensure they have sufficient Science p

Year 3	3rd year of course	Points	Electrical stream	Computer Stream
1	640-237	Astrophysics and Optics II*	12.5	12.5
1	620-201 or 431-325	Engineering & CS options	<b>12.5</b>	<b>12.5</b>
1	431-326 or 431-324		<b>12.5</b>	<b>12.5</b>
1	431-330	[Design laboratory]	<b>12.5</b>	<b>12.5</b>
2	<b>640-225/245*</b>	<b>Electromagnetism and Relativity</b>	<b>12.5</b>	<b>12.5</b>
2	640-234	Further classical and quantum mechanics*	12.5	12.5
2	<b>640-381 or 431-328</b>	<b>Sensors or Eng. Option</b>	12.5	12.5
2	431-328 or 431-329	Engineering and CS subjects	12.5	12.5
2	<b>640-299**</b>	<b>Laboratory</b>	<b>42.5</b>	<b>12.5</b>
<b>Total Science points for year</b>			<b>25</b>	<b>25</b>

\* Choose one to avoid overload

\*\* Electrical and computer engineering streams are exempted from 299 Laboratory work

Note: the Eng. Handbook Entry should be checked by contacting both Physics & Eng course advisors.

Year 4	4th year of course	Enrol in standard 300-level Science subjects.	Total Science points for year
		See relevant section of course advice document.	<b>100</b>

Year 5	5th year of course	Enrol in 4th year of Engineering course	Total Science points for year
			<b>100</b>

**Suggested course plan for students enrolled in the B.Sc./B.E. combined course leading to a Physics major and entry to Physics Honours**

Year 1	B.Sc./B.E.[237.5pts]	1st. year of course	B.Sc./B.E.
Semester	Code	Subject Name	Points
1	640-121/141	Physics	12.5
1	620-121/141	Mathematics 1A	12.5
1	433-141	Computing Fundamentals A	12.5
1	431-102	Engineering [Digital Electronics & Microprocessors]	12.5
2	640-122/142	Physics	12.5
2	620-113/123/143	Applied Mathematics	12.5
2	620-112/122/142	Mathematics 1B	12.5
2	431-142	Computing Fundamentals B	12.5
<b>Total Science points for year*</b>			<b>87.5</b>

\* Also incorporates compulsory CS units

Year 2	2nd year of course	Points	Software stream
1	640-223/243*	12.5	12.5
1	620-231/3	12.5	12.5
1	433-252	12.5	12.5
1	433-253	12.5	12.5
2	640-225/245*	12.5	12.5
2	620-232/4	12.5	12.5
2	433-254	12.5	12.5
2	433-103	12.5	12.5
<b>Total Science points for year*</b>			<b>87.5</b>

\* Also incorporates compulsory CS units

Students who completed Computing Fundamentals B in first year instead of Applied Maths will need to modify their course plan accordingly. Electrical stream students could take Engineering Maths instead of Maths 231 and 232, but must ensure they have sufficient Science points

Year 3	3rd year of course	Points	Software stream
1	433-340/341/343	37.5	12.5
1	431-204	12.5	12.5
2	433-340	12.5	12.5
2	433-255	12.5	12.5
2	640-299**	12.5	12.5
2	433-3xx/640-381/431-328	37.5	37.5
<b>Total Science points for year</b>			<b>25</b>

\*\* Software engineering students must do 299 Laboratory work

Note: the Eng. Handbook Entry should be checked by contacting both Physics & Eng course advisors.

Year 4	4th year of course	Points	Software stream
1	640-237	12.5	12.5
1	433-440/443	25	12.5
1	433-3xx/620-201/431-325	12.5	12.5
2	433-440	12.5	12.5
2	640-234	12.5	12.5
2	433-3xx	37.5	37.5
<b>Total Science points for year</b>			<b>25</b>

\* Choose one to avoid overload

\*\* Software engineering students must do 299 Laboratory work

Note: the Eng. Handbook Entry should be checked by contacting both Physics & Eng course advisors.

Year 5	5th year of course	Points	Software stream
Enrol in standard 300-level Science subjects. See relevant section of course advice document.			
<b>Total Science points for year</b>			<b>100</b>

**2000 (old/outdated) plan for students in the B.Sc./B.E. combined course leading to a Physics Major and Honours**

Year 1 Semester	BSc/BE[237.5pnts] Code	1st year of course Subject Name	Points	Electrical stream	Computer Stream	Software stream
1	640-121/141	<b>Physics</b>	12.5	12.5	12.5	12.5
1	620-121/141	Mathematics 1A	12.5	12.5	12.5	12.5
1	433-141	Computing Fundamentals A	12.5	12.5	12.5	12.5
1	433-102	Engineering [Digital Electronics & Microprocessors]	12.5	12.5	12.5	12.5
2	640-122/142	<b>Physics</b>	12.5	12.5	12.5	12.5
2	620-113/123/143	Applied Mathematics	12.5	12.5	12.5	12.5
2	620-112/122/142	Mathematics 1B	12.5	12.5	12.5	12.5
2	431-103	Engineering [Electrical Circuits]	12.5	12.5	12.5	12.5
<b>Total Science points for year*</b>			<b>75</b>	<b>75</b>	<b>75</b>	<b>75</b>

\* Also incorporates compulsory CS units

Year 2	Code	2nd year of course Subject Name	Points	Electrical stream	Computer Stream	Software stream
1	640-223/243*	<b>Quantum Mechanics and Thermal Physics</b>	12.5	12.5	12.5	12.5
1	620-231/3	Vector Analysis	12.5	12.5	12.5	12.5
1	431-201/204	Engineering Analysis A	12.5	25	25	25
1		Engineering and CS subjects [2 of HB listed 3rd year]				
2	640-225/245*	<b>Electromagnetism and Relativity</b>	12.5	12.5	12.5	12.5
2	620-231/3	Vector Analysis	12.5	12.5	12.5	12.5
2	620-232/4	Mathematical Methods	12.5	12.5	12.5	12.5
2	431-202/205	Engineering Analysis B	12.5	12.5	12.5	12.5
2		Engineering and CS subjects [1 of HB listed 3rd year]				
2	433-142	Computing Fundamentals B	12.5	12.5	12.5	12.5
<b>Total Science points for year*</b>			<b>62.5</b>	<b>62.5</b>	<b>62.5</b>	<b>62.5</b>

\* Also incorporates compulsory CS units

Students who completed Computing Fundamentals B in first year instead of Applied Maths will need to modify their course plan accordingly  
Electrical stream students could take Engineering Maths instead of Maths 231 and 232, but must ensure they have sufficient Science points

Year 3	Code	3rd year of course Subject Name	Points	Electrical stream	Computer Stream	Software stream
1	640-237	<b>Astrophysics and Optics II*</b>	12.5	12.5	12.5	12.5
1		Engineering and CS subjects		37.5	37.5	37.5
2	640-234	Further classical and quantum mechanics*	12.5	12.5	12.5	12.5
2	640-299**	<b>Laboratory</b>	12.5	12.5	12.5	12.5
2		Engineering and CS subjects		37.5	37.5	37.5
<b>Total Science points for year</b>			<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>

\* Choose one to avoid overload

\*\* Electrical and computer engineering streams are exempted from 299 Laboratory work

\*\* Software engineering students must do 299 Laboratory work

Note: the Eng. Handbook Entry for this is wrong. Contact both Physics & Eng course advisors.

Year 4	Code	4th year of course Subject Name	Points	Electrical stream	Computer Stream	Software stream
		<b>Enrol in standard 300-level Science subjects.</b>				
		See relevant section of course advice document.				
<b>Total Science points for year</b>			<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Year 5	Code	5th year of course Subject Name	Points	Electrical stream	Computer Stream	Software stream
		<b>Enrol in 4th year of Engineering course</b>				

**Suggested course plan for B.E.(Mechanical and Manufacturing)/B.Sc.  
students leading to a Physics major and entry to Physics Honours**

**NB: Variations may be required to minimise timetable clashes**

Year 1		1st year of course		B.E./B.Sc.
Semester	Code	Subject Name	Points	
1	<b>640-121/141**</b>	<b>Physics A</b>	<b>12.5</b>	<b>12.5</b>
1	620-121/141	Mathematics A	12.5	12.5
1		Engineering subjects		
2	<b>640-122/142**</b>	<b>Physics B</b>	<b>12.5</b>	<b>12.5</b>
2	620-122/142	Mathematics B#	12.5	12.5
2	620-130/132/143/123	Applied Mathematics	12.5	12.5
2		Engineering subjects		
<b>Total Science points for year</b>				<b>62.5</b>

Year 2		2nd year of course		B.E./B.Sc.
Semester	Code	Subject Name	Points	
1	<b>640-223/243**</b>	<b>Quantum Mechanics and Thermal Physics</b>	<b>12.5</b>	<b>12.5</b>
1	<b>640-251***</b>	<b>Instrumentation for Scientists</b>	<b>12.5</b>	<b>12.5</b>
1	620-231	Vector Analysis	12.5	12.5
1		Engineering subjects[2]†		
2	<b>640-225/245**</b>	<b>Electromagnetism and Relativity</b>	<b>12.5</b>	<b>12.5</b>
2	620-232	Mathematical methods	12.5	12.5
2		Engineering subjects[2]		
<b>Total Science points for year</b>				<b>62.5</b>

Year 3		3rd year of course		Points	
1	<b>640-321/341**</b>	<b>Quantum Mechanics</b>	<b>12.5</b>	<b>12.5</b>	
1	<b>640-322/342*</b>	<b>Thermal Physics</b>	<b>12.5</b>	<b>12.5</b>	
1		Engineering subjects[2]			
2	<b>640-299**</b>	<b>Laboratory work</b>	<b>12.5</b>	<b>12.5</b>	
2	<b>640-353*</b>	<b>Atomic, molecular and solid state physics</b>	<b>12.5</b>	<b>12.5</b>	
2	640-234¶	Further classical and quantum mechanics	12.5	12.5	
2		Engineering subjects[1]			
<b>Total Science points for year</b>				<b>62.5</b>	

n.b. 620-331, 620-160 variations

Year 4		4th year of course		
		Primarily engineering subjects		
		Possibly room for one Science subject[2]		
<b>Total Science points for year</b>				<b>0</b>

Year 5		5th year of course		Points	
1	<b>640-393*</b>	<b>Physics laboratory work</b>	<b>12.5</b>	<b>12.5</b>	
1		Physics option		12.5	
1		Engineering subjects			
2	<b>640-323/343*</b>	<b>Electrodynamics</b>	<b>12.5</b>	<b>12.5</b>	
2	<b>640-394*</b>	<b>Physics laboratory work</b>	<b>12.5</b>	<b>12.5</b>	
2		Engineering subjects			
Y	<b>640-310§</b>	<b>Physics seminar</b>	<b>0</b>	<b>0</b>	
<b>Total Science points for year</b>				<b>50</b>	

† one engineering subject may be deferred to avoid overload

\* Completion of these subjects and those marked \*\* is essential in order to proceed to Physics Honours

\*\* Completion of these subjects is essential to proceed to a major in Physics. See other requirements.

\*\*\* This subject is required if 431-101 Fund. of Elect. Eng. (or equivalent) has not been completed.

¶ Another Science or Eng subject could replace this unit

§ Students taking 50 points or more 300-level physics should take this unit

# This subject can be deferred until 2nd year if Science maths units are being taken

**Suggested course plan for students enrolled in B.Sc leading to a double major in Physics and Computer Science, allowing entry to Honours of both majors**

Year 1 Semester	B.Sc. / double major Code	Subject Name	1st year of course	Points	Physics/Comp.Sci.
1	640-121/141	Physics		12.5	12.5
1	620-121/141	Mathematics 1A		12.5	12.5
1	433-141	Computing Fundamentals A		12.5	12.5
1		elective e.g. Chemistry, Biology, ...		12.5	12.5
2	640-122/142	Physics		12.5	12.5
2	620-113/123/143	Applied Mathematics		12.5	12.5
2	620-112/122/142	Mathematics 1B		12.5	12.5
2	431-142	Computing Fundamentals B		12.5	12.5
<b>Total Science points for year*</b>					<b>100</b>

\* Also incorporates compulsory CS units

Year 2		Subject Name	2nd year of course	Points	Physics/Comp.Sci.
1	640-223/243*	Quantum Mechanics and Thermal Physics		12.5	12.5
1	620-231/3	Vector Analysis		12.5	12.5
1	433-252	Software Engineering Principles & Tools		12.5	12.5
1	433-253	Algorithms and Data Structures		12.5	12.5
2	640-225/245*	Electromagnetism and Relativity		12.5	12.5
2	620-232/4	Mathematical Methods		12.5	12.5
2	433-254	Software Design		12.5	12.5
2	433-255	Logic and Computation		12.5	12.5
<b>Total Science points for year*</b>					<b>100</b>

\* Incorporates compulsory CS units

Year 3		Subject Name	3rd year of course	Points	Physics/Comp.Sci.
1	433-303/330/332/341/351	Engineering and CS subjects (2 of)			25
1	640-237	Astrophysics and Optics II*			12.5
1		elective e.g. 620-201			12.5
2	433-313/353/361/371/380	Engineering and CS subjects (2 of)			25
2	640-299**	Laboratory		12.5	12.5
2		elective e.g. 640-234 or 640-381			12.5
<b>Total Science points for year</b>					<b>25</b>

\*\* Software engineering students must do 299 Laboratory work

Note: the Eng. Handbook Entry should be checked by contacting both Physics & Eng course advisors.

Year 4		Subject Name	4th year of course	Points	Physics
		Enrol in standard 300-level Physics subjects.			
		See relevant section of course advice document.			
<b>Total Science points for year</b>					<b>100</b>

## Combined Courses

Students in **B.Sc./B.E.**, **B.E./B.Sc.** and **B.A./B.Sc.** must acquire credits of at least 237.5 Science points (i.e. points for subjects listed in the Science section of the Undergraduate Studies Handbook), including at least 75 points at 100 level subjects and at least 50 points at 300 level.

Students in **B.Sc./LL.B.** must acquire credits of at least 200 Science points including at least 50 points of 100 level subjects and at least 50 points at 300 level.

The attention of students is drawn to the requirements for a Physics major for all courses commencing 1999 or later, and to the requirements for admission to Physics Honours, listed above.

In combined courses, so many different choices of subjects are possible that it can become very difficult to avoid timetable clashes. For B.Sc./B.E.(Electrical stream), there are few if any timetable problems, thanks to co-operation between Science and Engineering departments in Year 2 and Year 3 subjects; Years 4 and 5 present no problems because they are either pure Science or pure Engineering. The timetabling situation for other combined courses, however, still raises problems, and is under review, the aim being to avoid serious clashes at least between named subjects in the following suggested courses.

Combined Science/Engineering students should note that the School of Physics & the Faculty of Engineering prefer that they take the B.Sc. Mathematics units, in particular 620-231 and 232. Students, however, may take the appropriate Engineering Maths units and still satisfy the pre-requisites for 200- and 300-level Physics. The subjects

- 431-201/204 Engineering Analysis A [98+]
- 431-205 Engineering Analysis B [98+]

satisfy the mathematical pre- and co-requisites for all 640-200 and 300-level subjects. Students who have completed Engineering Mathematics units in prior to 1998 should note that the sequence

- 431-203 or 431-204 Mathematics for Engineers 2.1A or 2.1B
- 431-205 Mathematics for Engineers 2.2
- 431-303 Mathematics for Engineers 3.1

satisfies the mathematical pre-requisites 200- and 300-level Physics.

Students who take Engineering Maths should note that these subjects *do not* contribute toward Science points and they may need to take additional Science subjects in order to acquire enough Science points to graduate.

**Separate course plans are available for students enrolled in the following courses:**

- **B.Sc./B.E. (Electrical, Computer and Software streams)**
- **B.E./B.Sc. (Mechanical and Manufacturing)**
- **B.Sc./B.LLB.**

**Students enrolled in B.A./B.Sc. and BCom/BSc have sufficient flexibility in their course to follow the BSc 2xx and 3xx plans and to determine their own plan in consultation with an advisor.**

**Students enrolled in BbioMedSc should see a BbioMedSc advisor or stream coordinator for one of the eight possible streams: typical streams can include Physics 151/152 or 121/122; Maths 151/152 or A and B; Applied Maths or Stats; and selected second year physics courses.**

**Students doing other courses [e.g. BForSc/BSc, BSc/BIS, BGeomE/BSc, and other streams (Civil, Chemical) of Engineering B.E./B.Sc.] and wishing to major in Physics should consult the Physics Higher Year Course Planning Co-ordinator, details below.**

## Further information

- The University Handbook: <http://www.unimelb.edu.au/HB>
- The Physics Higher Year Course Planning Co-ordinator, Dr Chris. Chantler, Room 505, Level 5, Physics Building, E-mail: [chantler@ph.unimelb.edu.au](mailto:chantler@ph.unimelb.edu.au)