

BSc (Physics)

Advice regarding subject choices

2017

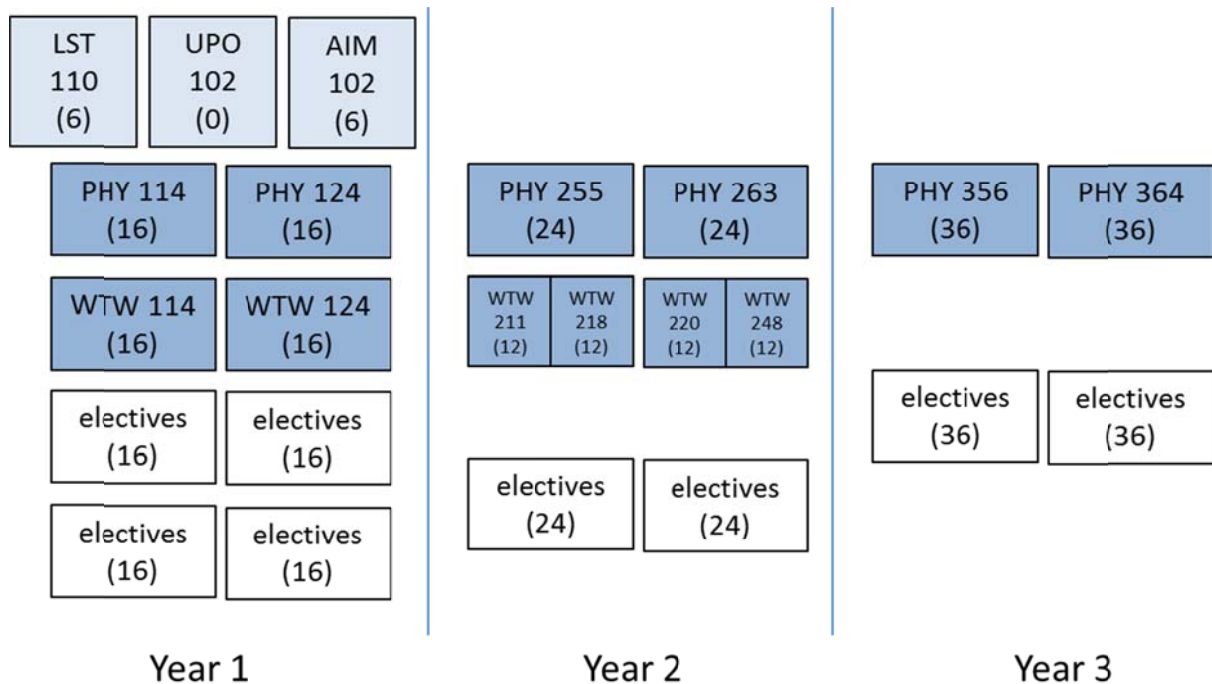
Natural Sciences Building 1

Room 5-35

This document will also be available on www.up.ac.za/physics

General guidelines and rules

- Your aim is to choose elective subjects in the first year, that will allow you to register for the appropriate electives in the 2nd and 3rd year.
- You must keep in mind that in order to register for most 2nd and 3rd year modules that you must have passed modules that are prerequisites for these year courses. Check the requirements for each module on the UP website at <http://www.up.ac.za/yearbooks/home>
- Aim to have half your first year credits (about 70) in the first semester and the other half in the second semester.
- A student may, with permission from the Dean, follow modules not indicated in BSc programmes (i.e. from other faculties) to the equivalent of a maximum of 36 module credits.
- Students should ensure that their elective courses do not result in any timetable or examination clashes.
- Astronomy: an introductory astronomy course (SCI154) Exploring the universe, might be an interesting option for many students. Further astronomy electives are available in the 2nd and 3rd year (PHY 210, PHY 300 and PHY 310)



Please note: You must complete the fundamental modules UPO 102 and either (AIM 111 and AIM 121) or AIM 102 and LST.

In the event of any discrepancy between information in this document and in the UP yearbooks, you may assume that we have made a mistake and that the yearbooks are correct. Please inform us of the error at chris.theron@up.ac.za

Elective courses

Popular first year elective courses can be chosen from the following subjects. (You are free to choose other options that do not result in timetable clashes)

Course	Name	Term	Credits
General			
SCI 154	Exploring the universe (English)	S1	16
FIL 155	Science and world views	S1	6
Applied Mathematics			
WTW 115	Discrete structures	S1	8
WTW 152	Mathematical modelling	S1	8
WTW 123	Numerical analysis	S2	8
WTW 162	Dynamical processes	S2	8
Chemistry			
CMY 117	General chemistry	S1	16
CMY 127	General chemistry	S2	16
Computer Science (IT department in Engineering Faculty)			
COS 130	Introduction to programming	S1	16
COS 132	Imperative programming	S1	16
COS 151	Introduction to computer science	S1	8
COS 110	Program design introduction [COS 130 or COS 132]	S2	16
COS 121	Software modelling	S2	16
ERA 284	Computer architecture	S2	16
Geology			
GLY 151	Introduction to geology	S1	16
GLY 162	Environmental and hazard geology	Q3	8
GLY 161	Historical geology	Q4	8
Geography and Geoinformatics			
GMC 110	Cartography	S1	12
ENV 101	Introduction to environmental sciences	Q1	8
GGY 156	Introduction to human geography	Q2	6
GGY 158	Geographical skills	S1	4
GGY 166	Southern African geomorphology	Q3	8
GMC 110	Cartography	S1	12
GIS 120	Geoinformatics	S2	12
Meteorology			
WKD 151	Atmospheric processes	Q1	8
WKD 152	Atmospheric circulation and climate	Q2	8
WKD 162	Dynamic and numerical meteorology	Q3	8
WKD 164	Climate and weather of Southern Africa	Q4	8
Informatics			
INF 112	Informatics	S1	10
INF 153	Informatics	S1	5

INF 154	Informatics	S1	5
INF 163	Informatics	S2	5
INF 164	Informatics	S2	5
INF 181	Informatics	S2	3
Mathematical statistics			
WST 111	Mathematical statistics	S1	16
WST 121	Mathematical statistics	S2	16
Actuarial & Financial Mathematics			
COS 132	Imperative programming	S1	16
EKN 113	Economics	S1	15
FBS 110	Financial management	S1	10
OBS 114	Business management	S1	10
WST 111	Mathematical statistics	S1	16
EKN 123	Economics	S2	15
FBS 120	Financial management	S2	10
WST 121	Mathematical statistics	S2	16
WTW 123	Numerical Analysis	S2	8
Biological Sciences (Biochemistry, Genetics, physiology, microbiology, plant pathology, plant sciences, veterinary biology, zoology, animal sciences)			
CMY 117	General chemistry	S1	16
MLB 111	Molecular and cell biology	S1	16
CMY 127	General chemistry	S2	16
BME 120	Biometry	S2	16
BOT 161	Plant biology	S2	8
GTS 161	Introductory genetics	S2	8
MBY 161	Introduction to microbiology	S2	8
ZEN 161	Animal diversity	S2	8

Note: some modules have been duplicated for convenient grouping. Remember, these are just suggestions and you may choose other combinations as long as the timetables work out.

WTW 286 (Differential equations) is an extremely useful elective and requires that you take WTW 162 in the first year.

If in doubt, please contact Prof Chris Theron

Email: chris.theron@up.ac.za or office hours 012 420 2455.

BSc majoring in physics & mathematics

Here is an example of a course outline for a BSc degree with physics and mathematics as main subjects in 3rd year. The fundamental modules (AIM, LST and UP0) are not shown. The core modules are in bold.

Course	Name	Term	Credits
1st Year			
PHY 114	First course in physics	S1	16
WTW 114	Calculus 114	S1	16
CMY 117	General chemistry	S1	16
WTW 115	Discrete structures	S1	8
WTW 152	Mathematical modelling	S1	8
PHY 124	First course in physics	S2	16
WTW 124	Mathematics 124	S2	16
CMY 127	General chemistry	S2	16
WTW 123	Numerical analysis	S2	8
WTW 162	Dynamical processes	S2	8
2nd Year			
PHY 255	Waves, thermodynamics & modern physics	S1	24
WTW 211	Linear Algebra 211	S1	12
WTW 218	Calculus 218	S1	12
WTW 286	Differential equations 286	S1	12
PHY 263	General physics	S2	24
WTW 220	Analysis 220	S2	12
WTW 221	Linear algebra 221	S2	12
WTW 248	Vector analysis 248	S2	12
WTW 285	Discrete structures 285	S2	12
3rd Year			
PHY 356	Electronics, electromagnetism and quantum mechanics	S1	36
WTW 382	Dynamical systems 382	S1	18
WTW 386	Partial differential equations 386	S1	18
PHY 364	General physics	S2	36
WTW 383	Numerical analysis 283	S2	18
PHY 310	Particle and astroparticle physics	S2	18
WTW 387	Continuum mechanics 387	S2	18

Note that the 1st semester of the 2nd year is 12 credits short. This is made up in the 3rd year by taking PHY 310 which is 18 credits (these extra 18 credits are used to cover the 12 credit shortfall in year 2).

BSc majoring in physics & chemistry

Example of course outline for BSc degree with physics and chemistry as main subjects in 3rd year: The fundamental modules (AIM, LST and UP0) are not shown. The core modules are in bold.

Course	Name	Term	Credits
1st Year			
PHY 114	First course in physics	S1	16
CMY 117	General chemistry	S1	16
WTW 114	Calculus 114	S1	16
MLB 111	Molecular and cell biology	S1	16
PHY 124	First course in physics	S2	16
CMY 127	General chemistry	S2	16
WTW 124	Mathematics 124	S2	16
BOT 161	Plant biology	S2	8
GTS 161	Introductory genetics	S2	8
2nd Year			
PHY 255	Waves, thermodynamics & modern physics	S1	24
WTW 211	Linear Algebra 211	S1	12
WTW 218	Calculus 218	S1	12
CMY 282	Physical chemistry 282	Q1	12
CMY 284	Organic chemistry 282	Q2	12
PHY 263	General physics	S2	24
WTW 220	Analysis 220	S2	12
WTW 248	Vector analysis 248	S2	12
CMY 283	Analytical chemistry 283	Q3	12
CMY 285	Inorganic chemistry 285	Q4	12
3rd Year			
PHY 356	Electronics, electromagnetism and quantum mechanics	S1	36
CMY 383	Analytical chemistry 383	Q1	18
CMY 385	Inorganic chemistry 385	Q2	18
PHY 364	General physics	S2	36
CMY 384	Organic chemistry 384	Q3	18
CMY 382	Physical chemistry 382	Q4	18

BSc majoring in physics & astronomy with mathematics

Here is an examples of a course outline for a BSc degree with physics, astronomy and mathematics as main subjects in 3rd year. The fundamental modules (AIM, LST and UP0) are not shown. The core modules are in bold.

Course	Name	Term	Credits
1st Year			
PHY 114	First course in physics	S1	16
CMY 117	General chemistry	S1	16
WTW 114	Calculus 114	S1	16
WTW 115	Discrete structures	S1	8
WTW 152	Mathematical modelling	S1	8
SCI 154	Exploring the universe	S1	16
PHY 124	First course in physics	S2	16
CMY 127	General chemistry	S2	16
WTW 124	Mathematics 124	S2	16
WTW 123	Numerical analysis	S2	8
WTW 162	Dynamical processes	S2	8
2nd Year			
PHY 255	Waves, thermodynamics & modern physics	S1	24
WTW 211	Linear Algebra 211	S1	12
WTW 218	Calculus 218	S1	12
WTW 286	Differential equations 286	S1	12
PHY 263	General physics	S2	24
WTW 220	Analysis 220	S2	12
WTW 248	Vector analysis 248	S2	12
WTW 221	Linear algebra 221	S2	12
PHY 210	Astronomy for physicists	S2	24
3rd Year			
PHY 356	Electronics, electromagnetism and quantum mechanics	S1	36
PHY 300	Observational astronomy	S1	36
PHY 364	General physics	S2	36
WTW 383	Numerical analysis 283	S2	18
PHY 310	Particle and Astroparticle physics	S2	18