Honours in Physics 2022

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A. General information

Honours students, please take note of the following points:

- The main assessments for the honours course are scheduled to occur in lecture-free weeks. The assessments occur at the respective end of each term.
- Honours degrees are very challenging in the amount of work and time required of students. **Communication** is key for all of us to understand how you are coping or whether there are things about the course that are not working well, or, for that matter, that you find are going optimally. You can certainly entrust these to your lecturers, but we shall also be organising regular meetings with you, in which you can discuss concerns that you have on an individual basis. The earlier we all pick up something, the easier it will be that we can do something about it, and the better it is for your academic success in the programme.
- During the first week, we shall be having individual discussions with you about your specialization, and, as applicable, options you might have in module choice. Please be prepared to tell us about your undergraduate modules' contents (unless, of course, you were an undergraduate at Stellenbosch).

B. Overview of the academic year (Physics Honours 2022)

	Weeks	**Special dates / Note**
Honours in Physics commences	7 February 2022: Preparatory work, mathematica as a tool, consultation on module selections, etc.	
Lectures for Term 1	14 February 2022 – 25 March 2022 (6 weeks)	Public holiday 21 March; Monday time table on 25 March
Mid-Semester Break	28 March 2022 – 1 April 2022	
Test week	4 April 2022 – 8 April 2022 (1 week)	Final tests and mid-semester tests
Lectures for Term 2	11 April 2022 – 27 May 2022 (7 weeks)	Public holidays 15 April, 18 April, 27 April, 2 May; Friday time table on 14 April, Monday time table on 19 April
Test period	30 May 2022 – 10 June 2021	
Break		
Lectures for Term 3	18 July 2022 – 2 September 2022 (7 weeks)	Public holiday 9 August
Mid-Semester Break	5 September 2022 – 9 September 2022	
Test week	12 September 2022 – 16 September 2022(1 week)	
Lectures for Term 4	19 September 2022 – 28 October 2021 (6 weeks)	
Test weeks, project presentations	31 October 2022 – 12 November 2022 (2 weeks)	

C. Course overview

Below is a listing of the component modules for each specialization.

In some special cases a very specific deviation may be recommended to you by the course coordinator. Registration occurs during the first week of the honours course, after consultation with us. Some of the specialisations allow for electives: please consult with the environment on your choice of electives.

Details on when each module is scheduled and the lecturers are provided on the next page.

All honours modules follow a continuous assessment approach, which means that assignments, presentations, tests, etc. all contribute to the final mark. Consistent work is crucial for success and good grades.

Theoretical Physics in 2022
Core modules: Physics 711(8), 712 (8), 713 (8), 714 (16), 719 (8), 721 (16), 741 (32)
+ Further modules: Physics 755 (16), 756(8), 757 (8).

Possible elective (although credits above already suffice for the degree): 746(8)

Queries: Prof. H. Weigel weigel@sun.ac.za

Laser Physics in 2022
Core modules: Physics 711(8), 712 (8), 714 (16), 721 (16), 741 (32)
+ Further modules: Physics 744 (8), 745 (8), 746 (8), 772 (8), 773 (8)
+ Choice (8 credits from): Physics 713 (8), 756 (8), 757 (8)

Queries: Dr. P.H. Neethling pietern@sun.ac.za

Nuclear Physics in 2022
Core modules: Physics 711(8), 712 (8), 713 (8), 714 (16), 718 (8), 721 (16), 741 (32), 748 (8), 753 (8)
+ Further modules: Physics 719 (8)
+ Choice (at least 8 credits from) 755 (16), 756 (8), 757 (8), 746 (8)

Queries: Prof. S.M. Wyngaardt shaunmw@sun.ac.za

Health and Radiation Physics in 2022
Modules: Physics 711(8), 712 (8), 713 (8), 714 (16), 718 (8), 741 (32), 748 (8), 750 (8), 751 (8), 752 (8), 753 (8), 772 (8)

Queries: Prof. R.T. Newman rtnewman@sun.ac.za

NB: Coordinators may recommend that certain students choose specific alternatives or deviations from these lists.

Modules are listed below.

Module code	***Module***	***Lecturer(s)***	***Honours specialisation***				***Term & credits***			
			Lasers	***Nuclear***	***Health & Rad.***	***Theory***	***1***	***2***	***3***	***4***
711	Electromagnetism	Prof. F.G. Scholtz	X	X	X	X	8			
712	Lagrangian and Hamiltonian mechanics	Prof. B.I.S. van der Ventel	X	X	X	X	8			
713	Solid state physics	Prof. H. Weigel	Elective	X	X	X			8	
714	Quantum mechanics B	Prof. F.G. Scholtz	X	X	X	X	8	8		
716	Atomic physics (not offered in 2022)									
718	Radiation interaction	Prof. R.T. Newman		X	X				8	
719	Relativistic quantum mechanics	Prof. H. Weigel		X		X		8		
721	Statistical physics B	Prof. K.K. Müller-Nedebock	X	X		X	8	8		

741	**Physics project**		**X**	**X**	**X**	**X**			16	16
742 *	Special topics in applied photonics – 2022: Applied Statistical Physics	Prof. K.K. Müller-Nedebock	Only as recommended by Dept.	Only as recommended by Dept.	Only as recommended by Dept.	Only as recommended by Dept.		*8*		
743	*Selected topics in biophotonics: Soft condensed matter and biophysics of cells (not offered in 2022)*	*Prof. K.K. Müller-Nedebock & Dr. G.W. Bosman*								
744	Laser Spectroscopy	Dr P. Neethling & Prof. E.G. Rohwer	X							8
745	Laser technology	Dr. G.W. Bosman	X						4	4
746	Quantum Optics *(and Information)*	Prof. M.S. Tame	X						8	
747	*Molecular Physics (not offered in 2021)*									
748	Nuclear reactions and structures	Prof. S.M. Wyngaardt		X	X				8	
749 *	Selected topics in nuclear physics – in 2022: Applied Quantum Mechanics	TBC	Only as recommended by Dept	Only as recommended by Dept	Only as recommended by Dept	Only as recommended by Dept	*8*			
750	Physics of radiation dosimetry/radiology	@Tygerberg			X				4	4
751	Physics of nuclear medicine	@Tygerberg			X				4	4
752	Physics of radiotherapy	@Tygerberg			X				4	4
753	Radiation protection	Prof. R.T. Newman & Dr P. Beukes		X	X					8
754	*Many-body theory (Not offered in 2022)*	*Prof. F. G. Scholtz*	*Elective*							
755	Relativistic quantum field theory					X			8	8
756	Selected topics in theoretical physics – in 2021: General Relativity	Dr. A.J. John	Elective			X			8	
757	Bayesian Physics	Prof. H.C. Eggers				X		8		
772	Optics	Prof. E.G. Rohwer & Ms N. Payne	X				4	4		
773	Non-linear optics	Prof. E.G. Rohwer & Dr C.M. Steenkamp	X							8
Electives			Min 8 credits	Min 8 credits						

Notes:

- Your credits **must add up to (at least) 128** for the Honours degree.
- Please consult on your module and stream choice.

Time Tables

First term (from 14 February)

	Monday	Tuesday	Wednesday	Thursday	Friday
08:00-08:50		P772 (Opt)			
09:00-09:50	P714 (QM)	P772 (Opt)	P712 (CM)		P721 (SP)
10:00-10:50	P714 (QM)	P714 (QM)	P712 (CM)	P721 (SP)	P721 (SP)
11:00-11:50	P712 (CM)	P714 (QM)	P711 (EM)	P721 (SP)	P711 (EM)
12:00-12:50	P712 (CM)		P711 (EM)		P711 (EM)
13:00-13:50					
14:00-16:30 tutorials	P711 (EM)	P772 (Opt)	P721 (SP)	P714 (QM)	P712 (CM)

NB: times for Physics 749 and 742 to be confirmed

Second term (from 11 April)

	Monday	Tuesday	Wednesday	Thursday	Friday
08:00-08:50		P757 (Bayes)			P743 (SCM)
09:00-09:50	P714 (QM)	P757 (Bayes)	P714 (QM)	P772 (Opt)	P743 (SCM)
10:00-10:50	P714 (QM)	P719 (RQM)	P714 (QM)	P772 (Opt)	
11:00-11:50	P757 (Bayes)	P719 (RQM)	P721 (SP)	P719 (RQM)	P721 (SP)
12:00-12:50	P757 (Bayes)		P721 (SP)	P719 (RQM)	P721 (SP)
13:00-13:50					
14:00-16:30 tutorials	P719 (RQM)	P772 (Opt)	P757 (Bayes)	P721 (SP)	P714 (QM)

NB: times for Physics 749 and 742 to be confirmed

Test schedules:

Middle of semester 1 (tests commence at 09:00 unless otherwise confirmed)

4 April 2022: Physics 711 (EM) – final test

5 April 2022: Physics 712 (CM) – final test

6 April 2022: Physics 772 (Opt)
7 April 2022: Physics 714 (QM)
8 April 2022: Physics 721 (SP)
NB: times for Physics 749 and 742 to be confirmed

End of semester 1 (tests commence at 09:00 unless otherwise confirmed)
31 May 2022: Physics 757 (Bayes)
3 June 2022: Physics 714 (QM)
7 June 2022: Physics 721 (SP)
10 June 2022: Physics 719 (RQM) & Physics 772 (Opt)
NB: times for Physics 749 and 742 to be confirmed