1. You are advised to read the instructions to courses registration posted in STARS. Please refer to STARS for the schedule of registration.

2. Students in Physics with 2nd Major in Mathematical Sciences should also refer to the instructions for programme in Mathematical Sciences. The **normal load is 22 AU (U16 and before), 19 AU (U17 and after)** and the **maximum load is 25 AU (U16 and before), 22AU (U17 and after)**. When you are registering a course that will exceed your normal load, you can only do so after 5pm on your course registration day. If you wish to read a course that will exceed your maximum load, you can apply online through this link: http://spms-appserver5.staff.main.ntu.edu.sg/overload/apply/default.aspx.Please note that approval is granted to a specific course that you wish to overload and it may depend on your past satisfactory academic performance. You are advised to plan ahead as approval takes several days.

3. The following courses are to be read during Semester 2 AY 2020/2021 (subject to pre-requisites).

PHMA – AMAS/PMAS/STAT Year 1			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH1106	Electricity and Magnetism	Core	3
PH1107	Relativity and Quantum Physics	Core	3
PH1199	Physics Laboratory Ib	Core	2
MH1803	Calculus for Physics **(AY17 batch onwards)**	Core	4
MH1201	Linear Algebra II	UE (2nd Major)	4
HW0128	Scientific Communication I	GER-Core	2
GC0001	Sustainability: Seeing Through the Haze	GER-Core	1

PHMA – AMAS/PMAS/STAT Year 2			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH2101	Quantum Mechanics I	Core	3
PH2102	Electromagnetism	Core	4
PH2199	Physics Lab IIb	Core	2
MH3100	Real Analysis I	UE (2nd Major)	4
MH3200	Abstract Algebra (PMAS) **(AY17 - AY19 batch only)**	UE (2nd Major)	3
MH3700	Numerical Analysis I (AMAS) **(AY17 - AY19 batch only)**	UE (2nd Major)	3
MH3500	Statistics (STAT) **(AY17 - AY19 batch only)**	UE (2nd Major)	4
HY0001	Ethics & Moral Reasoning	GER-Core	1
*PS0002	Introduction to Data Science and Artificial Intelligence **(AY19 batch only)**	GER-Core	3

PHMA – Applied Mathematics Year 3			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH3199	Physics Laboratory IIIa	Core	2
PH3201	Statistical Mechanics I	Core	4
ET0001	Enterprise & Innovation	GER-Core	1
HW0228	Scientific Communication II	GER-Core	2
ML0002	Career Power Up **(AY14 – AY17 batch only)**	GER-Core	1
MH3701	Basic Optimization	UE (2nd Major)	4

PHMA – Pure Mathematics Year 3			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH3199	Physics Laboratory IIIa	Core	2
PH3201	Statistical Mechanics I	Core	4
ET0001	Enterprise & Innovation	GER-Core	1
HW0228	Scientific Communication II	GER-Core	2
ML0002	Career Power Up **(AY14 – AY17 batch only)**	GER-Core	1

PHMA – Statistic Year 3			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH3199	Physics Laboratory IIIa	Core	2
PH3201	Statistical Mechanics I	Core	4
ET0001	Enterprise & Innovation	GER-Core	1
HW0228	Scientific Communication II	GER-Core	2
ML0002	Career Power Up **(AY14 – AY17 batch only)**	GER-Core	1

PHMA – Applied Mathematics Major PE			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH3401	Atomic Physics	Major PE	4
PH4401	Quantum Mechanics III	Major PE	4
PH4404	Nanoscale Physics	Major PE	3
PH4414	Introduction to Spintronics	Major PE	3
PH4418	Physics in the Industry	Major PE	4
PH4419	Computational Physics	Major PE	4
PH4508	Introduction to General Relativity	Major PE	3

PH4509	Quantum Field Theory with applications in Condensed Matter Physics	Major PE	4
PH4405	Final Year Project **(AY15 batch and earlier)**	Major PE	10
PH4405	Final Year Project **(AY15 batch and earlier)**	Major PE	10
PH4415	Final Year Project **(AY16 - AY18 batch only)**	Major PE	11
PH4413	Professional Internship **(AY15 batch only)**	Major PE	10
MH3400	Algorithms for the Real World	Major PE/ UE (2nd Major)#	4
MH4110	Partial Differential Equations	Major PE/ UE (2nd Major)#	4
MH4310	Coding Theory	Major PE/ UE (2nd Major)#	4
MH4514	Financial Mathematics	Major PE/ UE (2nd Major)#	4
MH4517	Data Applications in Natural Sciences	Major PE/ UE (2nd Major)#	4
MH4920	Supervised Independent Study I	Major PE/ UE (2nd Major)#	4
MH4921	Supervised Independent Study II	Major PE/ UE (2nd Major)#	4
CZ2001	Algorithms	Major PE/ UE (2nd Major)#	3

#AY17 batch onwards will read these courses as Unrestricted Elective (UE)

PHMA – Pure Mathematics Major PE			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH3401	Atomic Physics	Major PE	4
PH4401	Quantum Mechanics III	Major PE	4
PH4404	Nanoscale Physics	Major PE	3
PH4414	Introduction to Spintronics	Major PE	3
PH4418	Physics in the Industry	Major PE	4
PH4419	Computational Physics	Major PE	4
PH4508	Introduction to General Relativity	Major PE	3
PH4509	Quantum Field Theory with applications in Condensed Matter Physics	Major PE	4
PH4405	Final Year Project	Major PE	10

	(AY15 batch and earlier)		
PH4415	Final Year Project **(AY16 - AY18 batch only)**	Major PE	11
PH4413	Professional Internship **(AY15 batch only)**	Major PE	10
PH4417	Professional Internship **(AY16 - AY18 batch only)**	Major PE	11
MH3400	Algorithms for the Real World	Major PE/ UE (2nd Major)#	4
MH4100	Real Analysis II	Major PE/ UE (2nd Major)#	4
MH4310	Coding Theory	Major PE/ UE (2nd Major)#	4
MH4600	Algebraic Topology	Major PE/ UE (2nd Major)#	4
MH4920	Supervised Independent Study I	Major PE/ UE (2nd Major)#	4
MH4921	Supervised Independent Study II	Major PE/ UE (2nd Major)#	4

#AY17 batch onwards will read these courses as Unrestricted Elective (UE)

PHMA - Statistics Major PE			
Course Code	**Course Title**	**Course Type**	**Course AU**
PH3401	Atomic Physics	Major PE	4
PH4401	Quantum Mechanics III	Major PE	4
PH4404	Nanoscale Physics	Major PE	3
PH4414	Introduction to Spintronics	Major PE	3
PH4418	Physics in the Industry	Major PE	4
PH4419	Computational Physics	Major PE	4
PH4508	Introduction to General Relativity	Major PE	3
PH4509	Quantum Field Theory with applications in Condensed Matter Physics	Major PE	4
PH4405	Final Year Project **(AY15 batch and earlier)**	Major PE	10
PH4415	Final Year Project **(AY16 - AY18 batch only)**	Major PE	11
PH4413	Professional Internship **(AY15 batch only)**	Major PE	10
PH4417	Professional Internship **(AY16 - AY18 batch only)**	Major PE	11
MH3400	Algorithms for the Real World	Major PE/	4

		UE (2nd Major)#	
MH3701	Basic Optimization	Major PE/ UE (2nd Major)#	4
MH4500	Time Series Analysis	Major PE/ UE (2nd Major)#	4
MH4501	Multivariate Analysis	Major PE/ UE (2nd Major)#	4
MH4514	Financial Mathematics	Major PE/ UE (2nd Major)#	4
MH4920	Supervised Independent Study I	Major PE/ UE (2nd Major)#	4
MH4921	Supervised Independent Study II	Major PE/ UE (2nd Major)#	4

#AY17 batch onwards will read these courses as Unrestricted Elective (UE)

4. You are allowed to read higher level courses provided that you have met the pre-requisites and there are vacancies available. Pre-requisites may also be met through exemptions.

5. The location of the Mathematics Labs is as follow.

Mathematics Lab	Location
COMP LAB 1	SPMS-MAS-03-02
COMP LAB 2	SPMS-MAS-03-03
COMP LAB 3	SPMS-MAS-03-04

6. Students who are interested may take graduate courses as prescribed electives or unrestricted electives. A minimum CGPA of 4.00 is required for the application. Students will be required to fulfill at least 10 AU of level 4 [excluding PH4405/PH4415 Final Year project (10 AU/11 AU) or PH4407/PH4413/PH4417 Professional Internship (10 AU/11AU)] and above courses as part of their graduation requirement under Major PE. Graduate course information may be found from http://spms.ntu.edu.sg/PhysicsandAppliedPhysics/Graduate-Students/Pages/Course-Schedule.aspx . Students may write in to spmsundgrad@ntu.edu.sg for more details on the application process.
These are the graduate courses offered in AY2020/2021 Semester 2:
   - PAP777 - Graduate Quantum Mechanics
   - PAP732 - Nonlinear Optics
   - PAP747 - Spintronics for Information Technology
   - PAP723 - Advanced Numerical Methods for Physicists

   Please note that PAP777 is mutually exclusive with PH4401; PAP732 is mutually exclusive with PH4409; PAP747 is mutually exclusive with PH4414; PAP723 is mutually exclusive with PH4419. This application is subject to approval.

7. Students who have taken courses as pre-requisites during exchange programme in the current Semester, please submit your waiver request via the Online Waiver Application using this link: https://walnut.spms.ntu.edu.sg/waiver/student/default.aspx. Please upload a copy of the course matching details and a copy of your exchange transcript (if any) in pdf format in your application.

8. Enquiries on curriculum may be directed to :
   - Assoc Prof Cheong Siew Ann (cheongsa@ntu.edu.sg)
   - Ms Tan Soo Pei, Juliet (JulietTanSP@ntu.edu.sg)
   - Mr Chris Kee (kbkee@ntu.edu.sg) – Math Curriculum

9. Enquiries on courses registration may be directed to SPMSundgrad@ntu.edu.sg. Your matriculation number must always be included in your e-mail. Please refrain from sending multiple similar e-mails as this will not expedite the response but rather it will cause undue delay. All enquiries will be attended to and will be replied as soon as possible, depending on the nature of the request. Appeals for GER-PE and UE vacancies are to be submitted through the online appeal system and will not be responded to if submitted otherwise.

10. Enquiries on network performance, Studentlink password or STARS PIN may be directed to NSS Service Desk using the IT Service Desk Form below: https://www.ntu.edu.sg/AboutNTU/contactntu/Pages/servicedesk.aspx.