Special Programme in Mathematics (SPM) Briefing

November 2024

Definition

Special **P**rogramme in **M**athematics consists of:

    Four Core S-courses
    Two Advanced courses (MA42xx)
    Two Graduate courses (MA52xx except …)

A student completes the SPM by obtaining a pass in each of the above courses.

Optional: student-led seminar on advanced topics

Four Core S-courses

❑ MA2101S   Linear Algebra II
[Sem 1] – Dr Arghya SADHUKHAN

❑ MA2202S   Algebra I
[Sem 2] – Prof ZHU Chengbo

❑ MA2108S   Mathematical Analysis I
[Sem 2] – Dr YANG Lei

❑ MA3211S   Complex Analysis I
[Sem 2] – A/P CHIN Chee Whye

Two Advance courses (MA42xx)

- MA4203   Galois Theory
- MA4207   Mathematical Logic
- MA4221   Partial Differential Equations
- MA4229   Fourier Analysis and Approximation
- MA4230   Matrix Computation
- MA4233   Dynamical Systems
- MA4235   Topics in Graph Theory
- MA4251   Stochastic Processes II
- MA4252   Advanced Ordinary Differential Equations
- MA4254   Discrete Optimization
- MA4255   Numerical Methods in Differential Equations
- MA4260   Stochastic Operations Research
- MA4261   Coding and Cryptography
- MA4262   Measure and Integration
- MA4263   Analytic Number Theory
- MA4264   Game Theory
- MA4268   Mathematics for Visual Data Processing
- MA4270   Data Modelling and Computation
- MA4271   Differential Geometry of Curves and Surfaces
- MA4273   Algebraic Geometry of Curves and Surfaces

Two Graduate courses (MA52xx)

Almost all MA5xxx courses can be taken to fulfill this requirement. The exceptions are:

1. MA5232 Modeling and Numerical Simulations
2. MA5248 Stochastic Analysis in Math Finance
3. MA5259 Introductory Probability
4. MA5266 Optimization
5. MA5270 Game Theory and applications
6. MA5271 Introduction to Computational Mathematics

These courses are not opened for undergraduate students to enroll.

Student-led seminar

- Organized and led by SPM students
  (but opened to all)

- Work through landmark papers on topics of current research

- Department facilitates by providing funding for refreshments

- 2023/2024 Sem1 : Morse theory, K-theory
- 2023/2024 Sem2 : Optimal transport
- 2024/2025 Sem1 : Riemann-Hilbert correspondence

Sample Study Plan

Year 1		Year 2		Year 3	
Sem 1	Sem 2	Sem 1	Sem 2	Sem 1	Sem 2
• **MA1100T** Basic Discrete Mathematics (T) • **MA2002** Calculus	• **MA2001** Linear Algebra I • **MA2104** Multivariable Calculus • **MA2108S** Mathematical Analysis I (S)	• **MA2101S** Linear Algebra II (S) • **MA2116/ST2131** Probability • Other MA courses (**MA22xx/MA32xx / MA42xx**)	• **MA2202S** Algebra I (S) • **MA3211S** Complex Analysis (S) • At least one **MA42xx** course	• At least one **MA42xx** course • At least one **MA52xx** course	• At least one **MA52xx** course

Comparison between
S-course vs non-S version

- Same time slots for classes, same exam dates (usually)

- Separate lectures, lecturers, tests, tutorials and exams.

- 1 additional tutorial hour per week.

- 1 additional course unit.

- Enhanced syllabus:
  - more depth
  - more theory
  - more proofs

SPM Students

- Intake: 15-25 per year.

- Students with strong passion and aptitude for mathematics.

- Primarily target Mathematics majors.

- Also welcome students from QF, Stats, DSA, DSE, Computer Science, Physics, Engineering.

Benefits

- ❑ Small classes.
- ❑ Strong support from the math department.
- ❑ SPM completion statement in NUS transcript.
- ❑ SPM prize $500 every year. Past recipients:

- 2009 : GAO Fan
- 2010 : TEO Wei Hao
- 2011 : GOH Jun Le
- 2012 : SHI Xiaojie
- 2013 : LUO Yusheng
- 2014 : Johan GUNARDI
- 2015 : Stefanus LIE
- 2016 : KHOR Shi-Jie
- 2017 : GAO Yuan, LEE Si Ying
- 2018 : QUEK Ming Hao

- 2019 : ANG Yan Sheng
- 2020 : YAP Jit Wu
- 2021 : LE Nhat Hoang
- 2022 : YUNG Cheuk Wai Clement
- 2023 : PAN Jingbin
- 2024 : FANG Xinyu

More Benefits

Less tangible but more important benefits:

- ❑ Greater depth and sophistication.
- ❑ Better understanding of mathematics as a whole.
- ❑ Learning together with other keen students.
- ❑ Closer attention from S-course lecturer.
- ❑ Recommendation letters.

Reading S-courses

- We do not enforce SPM students to read the S-courses.

- Students manage and decide when to take an S-course, as long as they can complete the SPM requirements before their graduation.

- SPM students going for overseas exchange programme can also map up to one S-course with a comparable course at the overseas university.

- Students can take one or more S-courses without enrolling in the SPM.

What if I find an S-course too tough?

You can drop it, or switch to the non-S version:

- Weeks 1,2 : no penalty (NUS policy)
- Weeks 3,4 : no penalty (SPM special accommodation)

- Weeks 5,6,recess : W grade for S-course (NUS policy)
- Weeks 7 onwards : F grade for S-course (NUS policy)

What if I cannot complete the requirements for SPM?

There is no penalty for not completing or dropping out of the SPM.

How to enroll?

1. Do well in MA1100T
   -- or : do well in MA1100, MA2001 and MA2002 (official exemption = done well).

2. Apply online at the SPM webpage

3. Indicate the S-courses you want to take in the coming semester. Also indicate whether you want to enroll into the SPM (if you aren't already in it)

4. Bid for the non-S version through CourseReg.

   - This is to secure your enrolment in the non-S version in case you don't get into the S-version
   - You will automatically be removed from the non-S version once you get into the S-version.

General guidelines for approval

- Grade conversion: (illustration only)
  - A+ for CS1231/S → A for MA1100 → A− for MA1100T
  - A+ for MA1522 → A for MA2001
  - A+ for MA1521 → A for MA2002

- A student has to show the potential to get at least A− grades for the S-courses.

- This includes a willingness to commit time and effort to the S-courses.

- Roughly speaking: if your MA course grades are
  - all A+ / A / A- : most likely approved
  - mostly As but some Bs : probably approved but possibly not
  - mostly Bs or worse: possibly approved but probably not

Contact us

- SPM Coordinator :
  A/P CHIN Chee Whye S17-07-14

- SPM Website :

  https://www.math.nus.edu.sg/ug/spm/