

# NUS MEDICINE MSC (BY RESEARCH) / PHD PROGRAMME

## HANDBOOK FOR ASPIRING CLINICIAN- SCIENTISTS

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## 1. Purpose

The purpose of this handbook is to provide concise and relevant information on the Graduate Programme offered by the Division of Graduate Studies, NUS Medicine, for aspiring Clinician-Scientists in Singapore.

The NUS Medicine Graduate Programme is a research-oriented programme aimed at training competent biomedical scientists and clinician-scientists who will spearhead and drive the medical biotechnology efforts in the industry. Students will enroll for the MSc or PhD programme at admission and fulfill requirements to graduate either with a generic MSc or PhD degree. There is no specialization of the degrees awarded.

This handbook gives an overview of the programme including the coursework and graduation requirements. It also includes information on coursework waivers for clinicians, who have completed a Master of Medicine (MMed) or equivalent / Master of Clinical Investigation (MCI) prior to enrolling into the PhD / MSc programme. A list of potential Thesis Advisors and their research interests is also attached at the end of this handbook.

## 2. Admission Requirements

### MSc Programme

- A relevant Bachelor's degree with at least a second honours class or its equivalent or
- The degree of Bachelor of Medicine and Bachelor of Surgery (MBBS) or
- The degree of Bachelor of Dental Surgery and
- The ability to pursue research in the candidate's proposed field of advanced study.

### PhD Programme

- A good Master's degree in a relevant discipline or
- A relevant Bachelor's degree with at least a second upper honours class or its equivalent
- The degrees of Bachelor of Medicine and Bachelor of Surgery (MBBS) or
- The degree of Bachelor of Dental Surgery and
- The ability to pursue research in the candidate's proposed field of advanced study.

## 3. Candidature Period and Residency Requirements

| Programme | Maximum Candidature Period | Residency Period            |
|-----------|----------------------------|-----------------------------|
| MSc       | 3 years                    | 6 months (one semester)     |
| PhD       | 5 years                    | 18 months (three semesters) |

MSc students are expected to submit thesis by the end of their second year and conferred the degree within 3 years.

PhD students are expected to submit thesis by the end of their fourth year and conferred the degree within 5 years.

Periods of study leave and overseas fieldwork do not count towards residency. In addition, MSc and PhD candidates must be resident during the semester in which they submit their thesis for examination.

There is no minimum candidature period – students can submit thesis after the minimum residency period (subject to approval of their Thesis advisor), if they have fulfilled all the coursework and graduation requirements.

#### 4. Programme Overview and Coursework Requirements

Students will undertake research under the supervision of staff members from NUS Medicine for their period of candidature, at the end of which, they submit a thesis that is examined by a Board of Examiners.

##### Coursework Requirements

| Programme | Coursework Requirement   |
|-----------|--|
| MSc       | A total of 16 Units comprising of two core courses + elective courses (at Level-5000 / 6000) |
| PhD       | A total of 24 Units comprising of two core courses + elective courses (at Level-5000 / 6000) |

In addition, all students are required to complete a mandatory online Responsible Conduct in Research (RCR) course within 4 months of their enrolment.

To be confirmed a PhD candidate, a student is required to pass a PhD Qualifying Examination (PQE) within two years from the date of admission. PQE applications must be submitted by the end of the third semester. With effect from the August 2024 intake, all PhD candidates are required to pass NG5002 Research Ethics for Graduate Researchers before their PQE. MSc candidates who wish to upgrade to PhD are required to pass their PQE to be confirmed as a PhD candidate. After passing the PQE, they will need to pass the compulsory course NG5002.

##### Core Courses

| Course Code | Course Description  |
|-------------|---|
| MDG5108     | Biostatistics for Basic Research – 4 Units  |
| MDG5771     | Graduate Research Seminar – 4 Units<br>(prior to AY2022/2023 intake)                      |
| NG5001      | Academic Communication for Graduate Researchers – 4 Units<br>(AY2022/2023 intake onwards) |

### MDG5108 - Biostatistics for Basic Research

This course is offered as a concept-based introduction to biostatistics, or to the use of numerical techniques to extract information from data and facts. It is aimed at students, researchers in life and health sciences, and health professionals who wish to learn modern research methods. The main learning objectives are to communicate scientific results, to develop tools to investigate the inherent variability introduced by sampling, to quantify uncertainty before progressing to the process of making inference about the population. Using computer software such as SPSS, the concepts and the statistical methods will be illustrated based on real life data arising from selected scientific and medical studies.

### MDG5771 – Graduate Research Seminar

Spread over 2 Semesters

(prior to AY2022/2023 intake)

This course aims to cultivate a strong research culture among graduate students by exposing students to diversified area of current research topics and to improve their communication skills through presentations and interactions with other researchers. Students are required to attend at least 7 out of the 10 seminars held each semester for 2 consecutive semesters. In addition, they are required to present at least once during the 2 semesters.

### NG5001– Academic Communication for Graduate Researchers

(AY2022/2023 intake onwards)

Designed for all PhD students of the NUS Graduate School (NUSGS), this course facilitates further development of students' academic literacies in critical reading, writing and oral presentation. For critical reading, students will be guided to deconstruct and evaluate arguments – competences which students will then deploy by writing a proposal. In writing the proposal, students will need to demonstrate the ability to use suitable academic conventions. This proposal will subsequently be delivered as an oral presentation to a cross-disciplinary audience. This course utilizes a blended learning approach, where students' learning experiences will comprise in-class and online synchronous and asynchronous lessons and activities.

More information on the core courses may be obtained from [here](#)

**Practising clinicians are exempted from NG5001.**

### Compulsory Courses

| Course Code | Course Description  |
|-------------|---|
| NG5002      | Research Ethics for Graduate Researchers – 2 Units<br>(For PhD students admitted from AY2024/2025 intake onwards) |

## NG5002 - Research Ethics for Graduate Researchers

This course, compulsory for all PhD students in NUS, introduces the learner to ethical issues in research. It provides an in-depth analysis of core topics, namely data management, publication practices, authorship criteria and responsibilities, research integrity, misconduct, questionable research practices, and conflict of interest. Learners will be allowed to choose two elective topics based on their research needs. A case-study approach will serve as the basis for in-depth analysis. Each topic emphasizes the importance of promoting ethical conduct in research. A blended learning 2.0 pedagogical approach involving synchronous and asynchronous learning activities will be adopted.

More information on the compulsory course may be obtained from [here](#)

**MCI graduates enrolling in the NUSMed PhD (admitted from AY2024/2025 intake onwards) are exempted from NG5002.**

## Elective Courses

NUSMed Division of Graduate Studies offers more than 35 elective courses to suit individual student's learning needs.

Elective Courses offered by the School have been classified into 5 focal areas. Students can select courses that are best aligned with their research, expertise, and understanding to enhance their overall learning experience with us.

- Underpinning Biology of Diseases
- Techniques & Technology
- Innovation & Entrepreneurship
- Bioethics
- Pharmaceuticals & Drug Development

More information on the elective courses offered by the School can be obtained from [here](#)

Clinician students doing epidemiological research may also choose their elective courses offered by the Saw Swee Hock School of Public Health, subject to availability and approval.

## **5. Academic Proficiency Badges**

The Division of Graduate Studies will award Academic Proficiency Badges for high-performing NUSMed MSc and PhD students admitted with effect from the August 2021 intake.

The Academic Proficiency (AP) badges are digital badges awarded to students who have completed the relevant courses, as an indicator of their accomplishment. A badge is attained after successful completion of elective courses from a variety of baskets with a minimum **B+** grade in addition to passing the core courses.

These badges are fully verifiable online through Accredible and can be displayed on resumes. Upon degree conferment, achieved AP badges and accompanying e-certificates will be awarded. Credentials issued on Accredible are available for life.

The 10 Academic Proficiency Badges are:

1. Cancer Science
2. Cardiovascular & Metabolic Science
3. Neuroscience
4. Immunology
5. Infectious Diseases
6. Biomedical Informatics
7. Bioethics
8. Pharmaceutical & Drug Development
9. Innovation & Entrepreneurship
10. Biostatistics, Bioinformatics & Epidemiology

Below is an illustration of what an Academic Proficiency badge would look like:



The details of the elective course requirements and listing of courses for the AP badges may be obtained from [here](#)

## 6. Coursework Waivers for Clinicians with MMed / MCI

| Degree | Coursework Waiver (Automatic)   |
|--------|---|
| MMed   | 8 Units waiver of elective courses  |
| MCI *  | 24 Units credits transfer (no coursework required except the mandatory online RCR course) |

\* MCI courses should not have been completed more than 10 years prior to start of the MSc / PhD programme

**8 Units waiver of elective courses will also be extended to clinicians with a MRCP / MRCS, similar to MMed graduates (double-counting will not be allowed).**

Clinicians who fall into the above category will be able to cut down time spent on completing coursework requirements towards their MSc / PhD programme requirements thereby being able to dedicate more time for research and potentially completing their MSc / PhD in a shorter timeframe.

## 7. PhD Qualifying Examination

Students who are admitted into the PhD programme and those who wish to upgrade from their MSc to PhD programme should take and pass a PhD Qualifying Examination (PQE) within 2 years of their candidature start date. PQE applications should be submitted by the end of the third semester.

PQE comprises of a written component and an oral component. Students are required to submit a written research proposal in a prescribed template. This proposal is then graded by 2 examiners. An oral component will be arranged once the student has passed the written component.

Detailed information on the PhD Qualifying Examination may be obtained from [here](#)

## 8. Thesis Advisory Committee

A Thesis Advisory Committee (TAC) should be formed within 2 months of their enrolment for PhD students or within 2 months of passing the PhD Qualifying Examination for MSc students.

The Thesis Advisor will nominate members of this Committee. TAC members need not be restricted only to staff members of NUS Medicine. Staff members and investigators from National Research Institutes/Centres and other faculties within NUS may be included. The TAC is responsible for monitoring the student's research progress and gauge their readiness for PQE and PhD thesis submission.

More information on the Thesis Advisory Committee (TAC) may be obtained from [here](#)

## 9. Thesis Examination

| Programme | Number of Examiners             | Oral Defense Requirement |
|-----------|---------------------------------|--------------------------|
| MSc       | 2 internal examiners            | No                       |
| PhD       | Minimum of 2 internal examiners | Yes                      |

More information on thesis examination may be obtained from [here](#)

## 10. Tuition Fees

As the tuition fee changes on an annual basis, prospective students are advised to get the most updated figures [here](#)



## 11. Tuition Fee Concession / Allowance for NUHS Residents and Clinicians

NUS and NUSMed provides tuition fee allowances for NUHS Residents (employed by MOHH) and NUHS Clinicians (employed by NUHS / NUS) who enrol for a part time MSc / PhD with NUSMed. The details of the concession is indicated in the table below:

| Nationality       | Concession for NUHS Residents employed under MOHH | Concession for NUHS Clinicians employed by NUHS/NUS   |
|-------------------|---|---|
| Singapore Citizen | Full tuition fee coverage by NUSMed*              | Full tuition fee coverage upon approval of staff concession application (to be submitted to NUS OHR)  |
| Singapore PR      | Full tuition fee coverage by NUSMed*              | Full tuition fee coverage upon approval of staff concession application (to be submitted to NUS OHR)**  |
| Foreigner         | NIL   | Full tuition fee coverage upon approval of staff concession application by NUS OHR** <u>and approval of MOE Service Obligation (SO) Scheme***</u> |

\* Students should apply for NUSMed Dean's Office Tuition Fee Allowance after admission

\*\* Students should apply for NUSMed Dean's Office Tuition Fee Allowance to cover the difference in amount after staff concession

\*\*\* Detailed information of the SO scheme can be found [here](#) Prospective students who are foreigners are strongly encouraged to go through the details of the SO scheme carefully before taking an informed decision on the matter.

Aspiring Clinician-Scientists may also explore funding schemes provided by the National Medical Research Council (NMRC) like the NMRC Research Training Fellowship (RTF)

More information on RTF may be obtained from [here](#)

## 12. Overseas Research Attachments

Clinicians enrolling in the NUSMed MSc / PhD programmes are allowed to undertake part of their research in overseas universities or institutions, subject to approval from their Thesis Advisor and Vice-Dean (Graduate Studies). The duration of such attachments can be worked out between the student and Thesis Advisor, bearing in mind the residency requirements of the programme.

### 13. Graduation Requirements

#### MSc

- Pass all prescribed core and elective courses
- Pass the Master's Thesis
- A minimum grade of C+ for all levels of English course(s), where applicable\*

#### PhD

For students admitted with effect from August 2020 intake to January 2024 intake

- Pass all prescribed core and elective courses
- Pass the Qualifying Examination
- Pass the PhD Thesis and Oral Examination
- A minimum grade of C+ for all levels of English course(s), where applicable\*

For students admitted with effect from August 2024 intake

- Pass all prescribed core and elective courses
- Pass the compulsory course NG5002 Research Ethics for Graduate Researchers
- Pass the Qualifying Examination
- Pass the PhD Thesis and Oral Examination
- A minimum grade of C+ for all levels of English course(s), where applicable

\* applicable for students whose medium of instruction was not in English

**PhD students are expected to publish as a first/co-first author in at least 1 peer reviewed publication at the point of their thesis submission.**

NUS Medicine requires all MSc and PhD students to write a proper thesis based on their research project. Students are allowed to include their own published work into their thesis. However, it should be rephrased (where necessary) to add up to a coherent whole story for the thesis. Compiling of published papers into a thesis is not allowed.

Further information on the NUSMed MSc and PhD programme may be obtained from [here](#)

## **Appendix A**

### List of Thesis Advisors and Research Projects Available

Clinicians enrolling in the NUSMed MSc / PhD programme are expected to pursue translational research projects with a NUSMed Clinician-Scientist as their Thesis Advisor. Co-Thesis Advisors may be from Basic Sciences and other institutions or hospitals.

If the Thesis Advisor is from Basic Sciences, there should be a Co-Thesis Advisor who is a NUSMed Clinician-Scientist.

The research project chosen for PhD should be novel, deep and publishable.

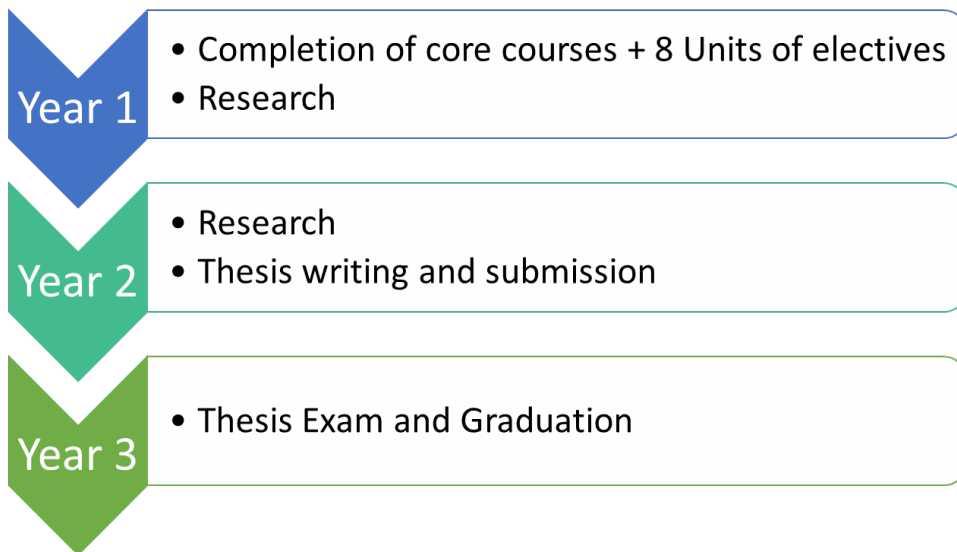
A compiled list of potential Clinician-Scientist Thesis Advisors and their research interests may be obtained from [here](#). Prospective students who are keen to pursue research in any of these areas are advised to contact them directly before applying for the MSc / PhD programme.

For any clarifications on the MSc / PhD programme, please contact the Division of Graduate Studies at [dgrs@nus.edu.sg](mailto:dgrs@nus.edu.sg)

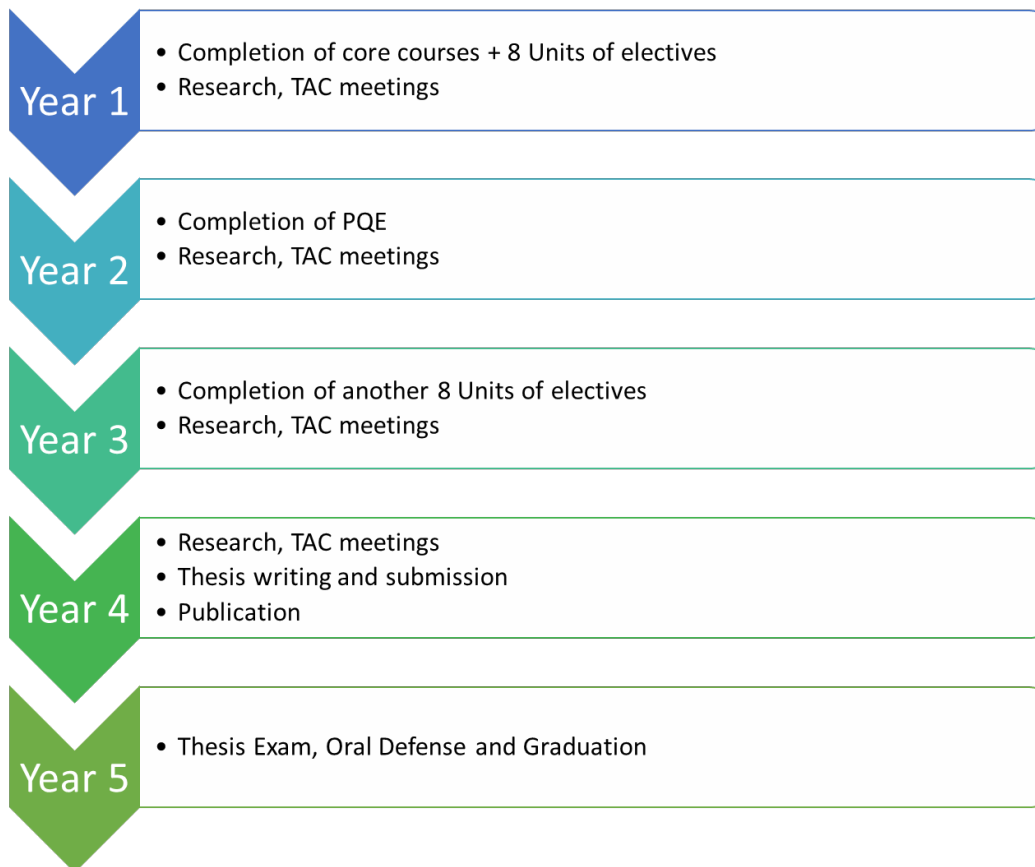
## Appendix B

### Timelines\*

#### MSc



#### PhD



\*Clinicians who qualify for credit transfers or exemption / waivers for coursework may be able to shorten the timeline