

PHARMACY FAQs

NUS e-OPEN HOUSE 2020

1. Who are pharmacists?

Pharmacists are registered healthcare professionals (registered with the Singapore Pharmacy Council) who are committed to ensuring the best outcomes from medication therapy through patient-centred care. Pharmacists do this by:

- Educating and advising patients, caregivers, and health professionals on the responsible use of medicines and medicine-related devices,
- Informing patients, caregivers and health professionals on both the benefits and risks associated with the use of any medicine,
- Helping patients adhere to their medication regimens,
- Supporting adverse-event and medication-error reporting programs in the interest of promoting the safer use of medicines,
- Raising public awareness that more positive health outcomes and important cost savings can result when patients, physicians and pharmacists collaborate in selecting, monitoring, and adjusting medication therapy,
- Leading on the use of informatics within our healthcare system.

Pharmacists are employed across every aspect of our healthcare system including our hospitals (acute and community), medical centres, intermediate and long-term care facilities, polyclinics and retail pharmacies. Pharmacists are also increasingly working beyond the healthcare institutions delivering pharmaceutical care services directly in the community (e.g. visiting Singaporeans in their homes to review if they are using their medicine optimally).

Pharmacists by virtue of their training are also experts in the development and distribution of medicines and therefore discharge important leadership roles across pharmaceutical industry (manufacturing and commercial) and government agencies whose remit includes access to and the quality of medicines (e.g. ALPS, IHiS, HSA).

Reference: CENTENNIAL DECLARATION, Improving Global Health by Closing Gaps in the Development, Distribution, and Responsible Use of Medicines (FIP, 2012).

2. What will I learn in NUS in order to become a pharmacist?

Knowledge

- To develop understanding of pharmacy practice (professionalism, ethics, physical assessment, therapeutics and prescribing sciences) and the underpinning pharmaceutical sciences (see Questions 3 and 4), skills, attitudes and values that will guide you for your lifelong career as a registered pharmacist.

Ethics

- To encourage you as a student and as a pharmacist to adhere to the highest standards of professional conduct, always giving top priority to serving the best interests of your patients and wider Singaporean society,
- To support the confidentiality of patient information through diligent application of privacy standards and compliance with the law including the Personal Data Protection Act.

Innovation

- To foster innovative solutions in how to develop new services that promote the responsible use of medicines,
- To lead on the use of healthcare informatics across our health care system in order to improve the quality and ensure the sustainability of our healthcare system.

Leadership

- To influence the wider society by partaking in policy making to ensure safe and sustainable systems for the development, control and responsible use of medicines in Singapore, the ASEAN region and globally.

3. What is the difference between pharmacy and pharmacology?

- Pharmacology is the branch of biomedical sciences that is concerned with the study of drug action, which exerts a biochemical and/or physiological effect, on the cell, tissue, organ, or organism. More specifically, it is the study of the interactions that occur between a living organism and chemicals that affect normal or abnormal biochemical functions.
- Pharmacy is a health profession where pharmacists are responsible to ensure people and patients get the best outcomes from their medicines.
- Pharmacology is an essential subject within the scope of the Pharmacy programme.

4. What are pharmaceutical sciences?

Pharmaceutical sciences are fundamental to your practice as a pharmacist and are integrated with the clinical and systems sciences throughout your degree programme (see Question 11). Pharmacists are unique as healthcare professionals in having such strong pharmaceutical sciences foundations. So what then are pharmaceutical sciences?

- Pharmaceutical sciences belong to a branch of science that comprises a range of scientific subjects dealing with various aspects of discovery, development, formulation, manufacturing as well as the quality assurance of pharmaceutical substances.
- Some examples of subjects that are classified under pharmaceutical sciences include biopharmaceutics, biotechnology, medicinal chemistry, pharmaceuticals, pharmaceutical technology, pharmacogenetics and pharmacokinetics.

The Department of Pharmacy also has a four-year degree programme B.Sc. and B.Sc. (Hons) majoring in Pharmaceutical Science. This degree provides deeper training on pharmaceutical sciences, but does not lead to the acquisition of a professional license to practise as a pharmacist in Singapore. Students who are keen in the science of medicines and aspire to seek future employment in the pharmaceutical industry may consider this option. More information can be found in separate brochures and also on the Department of Pharmacy website (<https://pharmacy.nus.edu.sg/>).

5. Why is Pharmacy regarded as a professional degree?

- You are only able to practise as a pharmacist in Singapore if you have successfully completed the professional integrated degree in pharmacy and are registered with the Singapore Pharmacy Council (<https://www.healthprofessionals.gov.sg/spc>). Therefore, the degree is a pre-requisite for entry into the profession.
- The registration of pharmacists is governed by the Pharmacist Registration Act.
- Registered pharmacists are obligated to abide by the laws that govern pharmacy practice, demonstrate good ethical and professional responsibilities (by adhering to the Code of Ethics) towards the care of patients.

6. What are the pre-requisites for admission into Pharmacy?

- Very good passes in Chemistry (H2) and in either Biology (H2) or Physics (H2) or Mathematics (H2) or Further Mathematics (H2) at 'A' Level (or equivalent) examinations.
- For information on the Indicative Grade Profile and Course Places for the Pharmacy Programme (Direct Admission) in Academic Year 2019/2020, please go to <http://www.nus.edu.sg/oam/gradeprofile/sprogramme-igp.html>.
- For information on application, please go to the NUS website and read the relevant application procedures (<http://www.nus.edu.sg/oam/apply-to-nus/application>) for the respective group of applicants.

7. Is it possible to enter the Pharmacy programme without 'A' Level biology?

'A' Level biology (H2) (or the equivalent) is not a compulsory subject prerequisite for application to the Pharmacy programme in NUS. Therefore, prospective students may apply to read Pharmacy without 'A' Level biology. However, 'A' Level chemistry (H2) (or the equivalent) remains as the only compulsory prerequisite subject for entry to the Pharmacy programme.

8. Are there additional requirements for one to be Fit To Practise as a student pharmacist?

A pharmacist is a registered healthcare professionals who are committed to ensuring the best outcomes from medication therapy through patient-centred care. The behaviour, therefore, of all pharmacy students at all times must justify the trust that the public places in the pharmacy profession, including when you are on supervised clinical training during the professional degree programme. This Fitness to Practise, or sometimes referred to as Fitness for Clinical Training, is demonstrable through the acquisition of competency, the exhibition of good character and behaviour as well as the possession of good physical and mental health. Such requirements can go beyond the standard criteria for tertiary education, and they also take into consideration the ability to handle different aspects of the course including laboratory training, industrial and clinical internships. We provide such guidelines for fitness to practise on our website (<http://pharmacy.nus.edu.sg/bachelor-of-science-pharmacy/>), with coverage similar to those released for other pharmacy programmes elsewhere in the world.

9. Is there any health screening requirement for Pharmacy students?

In accordance with the Singapore Ministry of Health requirements, students enrolled in a healthcare professional programme must undergo health screening and vaccination requirements. Knowing their health status will enable them to protect themselves and patients during their course of study, in particular when they embark on clinical training which can be referred to as pre-employment clinical training (PECT).

10. What is the course duration?

The Pharmacy course is a four-year professional programme. Some details of each year to note are:

- Students are admitted directly into the Pharmacy programme in the first year of study,
- At the end of the four years, graduates are conferred with a professional degree in Pharmacy, while those who have demonstrated good academic performance over the four years will be awarded an honours professional degree in pharmacy,
- Students enrolled into the programme will, in addition to work-place based training during Years 1-3 of the programme, undertake six months of pre-employment clinical training (PECT) in Year 4 of the programme,
- Graduates with a Pharmacy degree from NUS may then be registered with the Singapore Pharmacy Council upon the satisfactory completion of a further six months of pre-registration training. The in-course PECT and post-course work-place training will constitute the mandatory 12-month pre-registration training required for registration.

11. What is the overall course structure like?

The curriculum of our four-year professional Pharmacy programme is integrated across the basis, clinical and systems sciences. We chose to structure our curriculum in this way because such integration explicitly makes the connections for you on why you are learning what you are learning and by doing so it will not only make your learning journey more enjoyable but also prepare you to be a great pharmacist. Some features of our integrated curriculum are:

- All modules are integrated around specific themes rather than specific disciplines. This means that there is no module, for instance, on chemistry but rather chemistry is integrated into modules in the programme so that the relevance of chemistry to your future practice as a pharmacist is always clear to you.
- Themes of Year 1 include professionalism, practice skills, foundational knowledge and finally how to optimally manage medicines that are used for simple conditions of the skin and eyes. In Years 2 and 3, the themes of professionalism and skills are further developed while at the same time you learn about how medicines maintain health, prevent, treat and cure illnesses in all the other major physiological systems of the body (from the head to the heart). In your final year (Year 4), we bring all this learning together so that you can rise to the challenge of managing the medicines for the complex patient. At same time, we also empower you to *Create the Future of Pharmacy* by developing your leadership skills and equipping you with a toolkit to go about health care reform on graduation. Finally, we build on your Year 3 computational thinking competencies, by concluding with a module integrated around the theme of healthcare informatics, so that rather than being afraid of the impending fourth industrial revolution you can embrace it and bring value not only to the practice of pharmacy but to our wider healthcare system.
- In every year of the programme we integrate work-based learning (otherwise referred to as experiential learning) with your on-campus studies. This purposeful integration means your academic studies are always contextualized to real world practice which not only gives your learning greater meaning but also prepare you from Day 1 in NUS for Day 1 as an independent practitioner. Your experiential learning journey begins in Year 1 when as part of a team of medical, nursing and social worker students you will visit the home of an elderly Singaporean citizen. This supervised visit, debriefing and structured reflections will give your life-long invaluable insights into what it means to be a patient, the reality of living with illness, and the immeasurable privilege of being the healthcare professional in whom such trust is placed. This activity also allows you to interact with students from the other healthcare programmes, preparing you to be interprofessional collaborative practice ready in the future. Such interprofessional education forms an essential part of the programme as well.
- In Years 3 and 4 of the programme you get the opportunity to generate new knowledge through the Discovery Project. This Discovery Project is integrated into the world of the practice of pharmacy as the research questions you will be answering will be a real-world problem set by a clinical practitioner who is affiliated with our Department. You will, as part of a team, have the opportunity to apply your research skills in finding solutions to the problem and then presenting and defending that solutions back to the clinical practitioner. In addition, those who are more inclined to working on a Discovery Project related to pharmaceutical sciences may work on a research question set by faculties who are pharmaceutical scientists or clinician scientists.
- During the four-year integrated programme, students may expand their horizons by participating in other academic programmes offered by the University or Faculty e.g. University Scholar Programme, University Town College Programme, NUS Overseas College Programme, Summer Student Exchange Programme, Undergraduate Research Opportunity Programme in Science (UROPS).

12. How will I learn at NUS?

- We have embraced active as opposed to passive learning in our integrated professional programme. Active learning is different from passive learning in that you are much more participatory in the learning process - by way of, example, a lecture in which you sit, listen and learn is generally regarded as a passive learning whereas in an Interactive Class (IC) you are expected to listen, respond to questions, share your experience and opinion. There are various types of active learning activities throughout our programme in order to suit a variety of learning styles.
For example in advance of an IC you are directed to read preparatory material so that your lecturer can engage you in the class where higher forms of learning such as analysis, synthesis, application and critical thinking will take place.
- E-learning – in advance of an IC you can prepare at home or wherever is convenient by being directed to short, engaging e-learning units that your lecturer will have posted on our learning management system (LumiNUS).
- Collaborative Learning Workshops (CLW) – you as part of an assigned team will engage in an enquiry around a case study that is presented to you by a multidisciplinary team.
- Practicals – you have the hands-on opportunity to conduct your own experiments which will give you a deeper understanding of the concepts you will have been introduced to in ICs & CLWs.
- Skills workshops – the only way to develop skills is by practice and so in our series skills workshops you can to try out your new skills, refine them and practice them so that you are ready for work-place based learning.

13. What are the career prospects for Pharmacy graduates?

Career opportunities for pharmacists are abundant and diversified and are both in clinical and non-clinical settings:

- Pharmacists are employed across every aspect of our healthcare system including our hospitals (acute and community), intermediate and long-term care facilities, polyclinics, and retail pharmacies. Pharmacists are also increasingly working outside healthcare institutions and delivering services directly in the community (e.g. visiting Singaporeans in their homes to review if they are using their medicine optimally),
- Pharmacists are also experts in the development and distribution of medicines and therefore discharge important leadership roles across pharmaceutical industry (manufacturing and commercial) and government agencies whose remit includes access to medicines and the quality of medicines (e.g. ALPS, IHIS, HSA).

14. What about student life?

There are abundant opportunities for undergraduate students to hone their talents and soft skills at NUS Pharmacy and include:

- **NUS Pharmaceutical Society (NUSPS)**, a student-led organisation, comprises several sub-committees (e.g. media resource team, international relations) that work closely together with the mission to engage and empower the student body.
- By creating internship opportunities, organising career talks/seminars and field trips, NUSPS hopes to expose NUS Pharmacy students to the diverse career tracks that are open to them upon graduation.
- NUSPS also promotes and raises public awareness of the Pharmacy profession through numerous community outreach activities. Students can contribute actively to NUSPS by serving in various committees and in the process, develop interpersonal, leadership and networking skills amongst many others.
- Apart from NUSPS, students can also participate in other **special activities/projects** e.g. Pharmacy Youth Expedition Project (YEP) or spend a year at one of the NUS Overseas Colleges (NOC), or participate in overseas exchange programmes. These experiences will broaden their horizons.
- At NUS Pharmacy, students who are interested in embarking on a research career can also participate in **Undergraduate Research Opportunities in Science (UROPS)** under the close supervision of experienced Pharmacy faculty members. These research opportunities are open to the students as early as their 2nd year in the pharmacy course.
- In Year 3, all students will undertake Discovery Project. Students will have the opportunity in Year 4 to showcase and present their research work from their Discovery Project to employers and in local and even international conferences.

15. Are pharmacy undergraduates allowed to go for exchange programmes?

The integrated Pharmacy curriculum does not offer options for semester-long exchange programmes. This is not unusual for a programme which leads to registrations as a healthcare professional as there is a significant core syllabus of knowledge, skills, attitudes and values that all students have to undertake. You are, however, encouraged in Years 1 and 2 to take part in summer exchange programmes during the university vacation period that span the months of May-July.

16. Will pharmacy graduates be able to switch to a totally different career path should they decide to do so upon graduation?

Yes, our professional pharmacy programme not only develops the competencies to be a pharmacist but it also develops transversal competencies that will give you the flexibility to pursue many careers. The specific transversal competencies which our programme develops and are valued by many different types of employers are:

- Communication skills,
- Conflict resolution management skills,
- Creativity,
- Critical thinking ability,
- Decision-making skills,
- Healthcare informatics knowledge and skills,
- Inter-personal relationship management,
- Numeracy skills,
- Self-directed learning skills,
- Attitude for life-long learning,
- Awareness in systems science,
- Awareness in legislative regulation.

17. How many students are accepted each year?

The Department of Pharmacy receives a large number of applications each year. Based on the admission exercise of the previous year, approximately 160 students are admitted into the programme.

18. May I apply again if I am denied the first time?

The Pharmacy programme is highly competitive and we receive a large number of applications each year. Please write to phabox2@nus.edu.sg for advice should you wish to apply again.