4.2.2.7 Master of Science in Pharmaceutical Sciences and Technology (Part-Time)

The Master of Science in Pharmaceutical Sciences and Technology is designed to cater to special interest groups of prospective students who are already working or aspiring to enter the pharmaceutical industry. This may be in areas of manufacturing and quality assurance of active pharmaceutical ingredients (API) and/or finished pharmaceutical products, regulatory affairs, medication utilisation review and drug registration.

According to the feedback from the pharmaceutical industry, there is a lack of knowledge and skills in the area of formulation science, pharmaceutical process validation and pharmaceutical product quality assurance among the current workforce in Singapore, compared to those of India, Ireland, USA and UK. However, it remains necessary for the pharmaceutical industry to continue hiring people equipped with relevant core competencies, for example chemical engineering, organic synthetic chemistry, chemical analysis, biotechnology, biomedical sciences etc. Therefore, it will be useful for these people to have gained on-the-job skills and sufficient work experience to enable them to appreciate how their core competency is related to the general operations in pharmaceutical manufacturing and development of drug products.

This programme aims to address the gap in manpower training by introducing topics in pharmaceutical sciences and pharmaceutical technology that focus on the processing and manufacturing of the active pure drugs right through to the formulation and quality assurance of the final product.

**Learning Outcomes**
Graduates from this programme will enhance their on-the-job competency by:
- Gaining in-depth knowledge and practical skills for formulation and process manufacturing of chemical and biological drugs into a range of pharmaceutical dosage forms, ranging from tablets to injectables.
- Acquiring understanding of the regulatory and quality compliance of pharmaceuticals in the process of drug development and manufacturing.

**Admission Requirements**
To be admitted into the programme (part-time option only), candidates must be holders of one of the following degrees, or their equivalent:
- Bachelor of Science (Honours) in Chemistry
- Bachelor of Science (Honours) in Life Sciences
- Bachelor of Applied Science (Honours) in Food Science & Technology
- Bachelor of Applied Science (Honours) in Applied Chemistry (Drug Option)
- Bachelor of Science in Pharmacy (Honours)
- Bachelor of Engineering (Chemical Engineering) (Honours).

Candidates without a Bachelor degree in Pharmacy will have to read and pass PR3301 Pharmaceutical Dosage Forms as a bridging module.
**Special Criteria for Admission**
- Candidates who do not have Honours classification in the degree prerequisites as stipulated above may apply for admission with GRE results.
- Candidates who hold equivalent degrees from overseas universities may apply for admission with GRE and TOEFL results.

**Programme Structure**

Candidates admitted into the Master degree program must read and pass a total of 10 modules (40 MC), comprising 3 essential modules and 7 elective modules:

Three Essential Modules, 4 MCs each:
1. PR5211 Pharmaceutical Analysis IV
2. PR5217 Formulation Science
3. PR5218 Practical in Product Development – Lab Rotation

Seven Elective Modules, 4 MCs each – choose from the following:

**Group A Cluster: Process & Technology**
1. PR5213 Pharmaceutical Process Validation
2. PR5214 Advances in Tablet Technology
3. PR5216 Advances in Drug Delivery
4. PR5220 Bioprocess Technology
5. PR5225 Preformulation Science

**Group B Cluster: Regulatory & Management**
6. PR5224 Pharmacoepidemiology
2. PR5219 Product Quality Management
3. PR5230 Pharmacoconomics and Outcomes Research
4. PR5302 Regulation of Drug Development or GMS5011 Fundamentals of Pharmaceutical Regulation
5. PR5303 Good Regulatory Practices or GMS5012 Chemistry, Manufacturing and Controls

**Graduation Requirements**

To graduate with the degree in Master of Science (Pharmaceutical Sciences & Technology), candidates must have achieved a CAP of at least 3.00. The maximum candidature for a part-time student is four years.