Bachelor of Science (Pharmaceutical Science)
For Cohort AY2020/21

<table>
<tr><th>University Requirements</th><th>Faculty Requirements</th><th colspan="2">Major Requirements</th><th>Unrestricted Electives</th></tr>
<tr>
<td>General Education Modules (GEMs)

Five Pillars:
• Human Cultures (GEH)
• Asking Questions (GEQ)
• Quantitative Reasoning (GER)
• Singapore Studies (GES)
• Thinking and Expression (GET)</td>
<td>16 MCs of Faculty Requirements are needed for BSc (Hons) programmes:

For the PHS programme, 8 MCs out of the 16 MCs are fulfilled through the reading of ST1232 and a PR-coded elective module within the Major Requirements.

The remaining 8 MCs of Faculty Requirements can be fulfilled as follows:
• 4 MCs from SP1541, a compulsory Faculty writing requirement for Science students, under the ‘Multidisciplinary and Interdisciplinary Sciences’ subject group (SP1541 also fulfils Science Communication Requirement)

[<u>Note:</u>
○ Students residing in <u>Halls (RVRC, UTCP)</u> are exempted from SP1541 and will take their respective Hall Communication Modules to <u>fulfill Science Communication Requirement</u>. They will need to <u>take another 4-MC module</u> from ‘Multidisciplinary and Interdisciplinary Sciences’ or ‘Physical Sciences’ subject group to fulfill Faculty Requirement <u>if the Hall Communication Modules do not fulfill Faculty Requirement</u>.
○ Students in <u>Special Programmes (USP/SPS) may have different provisions for Faculty Requirements</u> – please refer to the link below (last two pages in the link) on USP/SPS modules satisfying Faculty Requirements.
○ All students should refer to this link for more information and the list of modules which can fulfill Faculty Requirements: https://www.science.nus.edu.sg/undergraduates/general-academic-requirements-and-policies/]

AND

• 4 MCs from EITHER
the ‘Computing Sciences’ OR the ‘Physical Sciences’ subject group

[<u>Note</u>: If a PHS student reads COS1000/COS2000 or CS1010/prefix or CS1101S, it will satisfy <u>both Faculty Requirement and Computational Thinking Requirement</u> below.]

Computational Thinking Requirement

• COS1000/COS2000* Computational Thinking for Scientists
OR
CS1010/prefix or CS1101S Programming Methodology
OR
LSM2302 Computational Thinking for Life Sciences
OR
CS50 Introduction to Computer Science (with a Verified Certificate) (from EdX)

[<u>Note:</u>
○ For PHS students, if you read <u>COS1000/COS2000 or CS1010/prefix or CS1101S</u>, it will satisfy <u>both</u> Faculty Requirement (under ‘Computing Sciences’ subject group) and Computational Thinking Requirement.
○ However, if a student reads <u>CS50</u>, it can only be used to satisfy the Computational Thinking Requirement; it <u>cannot be used to satisfy the Faculty Requirement</u>.
○ <u>Updated IMPORTANT Note</u>: As CS50 Introduction to Computer Science from EdX is not equivalent to CS1010S (or its variant), CS50 will not serve as pre-requisite for higher computing modules. Also, there is a one-way preclusion in place, where students who have read CS50 will be precluded from reading CS1010S. Students who are required to read CS1010S (or its variant) as part of their majors/second majors/minors are to take CS1010S (or its variant) instead of CS50. For students who have taken CS50 but are required to read CS1010S (or its variant) as part of their majors/minors, please write in to SOC to be allowed to take CS1010S (or its variant) and CS50 will be counted towards the UE. Please also note that the number of credits transferred for CS50 is subject to the maximum 8 MCs allowed for DYOM. For example, if a student has already completed 5 MCs worth of edX MOOCs, only 3 MCs (and not 5 MCs) can be counted for CS50.]</td>
<td>Year 1

(Major 28 MCs)</td>
<td>Essential Modules
• PHS1110 Foundation for Medicinal and Synthetic Chemistry
• PHS1111 Fundamental Biochemistry for Pharmaceutical Science
• PHS1114 Principles of Pharmaceutical Formulations I
• PHS1120 Essential Topics in Pharmaceutical Chemistry
• PHS1130 Human Physiology
• ST1232 Statistics for Life Sciences
• LSM2212 Human Anatomy (Level 2000 module to be read in Year 1)</td>
<td rowspan="4">Unrestricted Elective Modules (UEMs)</td>
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<td>Year 2

(Major 28 MCs)</td>
<td>Essential Modules
• PHS2115 Basic Principles of Drug Design and Development
• PHS2117 Principles of Pharmaceutical Formulations II
• PHS2120 Drug Product Development & Lifecycle Management
• PHS2143 Analytical Techniques and Pharmaceutical Applications
• PHS2191 Laboratory Techniques in Pharmaceutical Science I
• LSM2241 Introductory Bioinformatics
• LSM3211 Fundamental Pharmacology (Level 3000 module to be read in Year 2)</td>
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<td>Year 3

(Major 20 MCs)</td>
<td>Essential Modules
• PHS3116 Pharmacokinetics and Biopharmaceutics
• PHS3122 Pharmaceutical Quality Management
• PHS3123 Biotechnology for Pharmaceutical Science
• PHS3191 Laboratory Techniques in Pharmaceutical Science II
Elective Modules (Pass any 1)
• PR3204 Medicinal Natural Products
• PHS3220 Microbiology for Pharmaceutical Science
• LSM3223 Immunology
• LSM3224/LSM4220** Molecular Basis of Human Diseases
• LSM3231 Protein Structure and Function
• CM3242 Instrumental Analysis II
• SPH3403 Public Health Economics
• SPH3501 Introduction to Public Health Communication</td>
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<tr>
<td>Year 4

(Major 24 MCs)</td>
<td>Essential Modules
• PHS4121 Regulation of Healthcare Products
• PHS4199 Honours Project in Pharmaceutical Science (12 MCs)
Elective Modules (Pass any 2)
• PR4204 Special Drug Delivery
• PR4205 Bioorganic Principles of Medicinal Chemistry
• PR4207 Applied Pharmacokinetics and Toxicokinetics
• PHS4220 Synthetic Strategies for Drug Substances
• LSM4241 Functional Genomics
• LSM4242 Protein Engineering
• CM4227 Chemical Biology
• CM4241 Trace Analysis
• CM4242 Advanced Analytical Techniques
• SP4263/FSC4203 Forensic Toxicology and Poisons (offered in Special Term)
• CS4220 Knowledge Discovery Methods in Bioinformatics</td>
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<tr>
<td>20 MCs +</td>
<td>8 MCs +</td>
<td colspan="2">100 MCs +</td>
<td>32 MCs +</td>
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<td colspan="5">Minimum required for graduation = 160 MCs</td>
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** COS2000 is re-coded as COS1000 with effect from AY2021/22 Sem 2 onwards* *(Updated: 10 Feb 2022)*

*** LSM3224 will be re-coded to LSM4220 from AY2023/24 onwards*