

## NUS LIFE SCIENCES UNDERGRADUATE PROGRAMME

### BSC (HONS)/BSC DEGREE IN LIFE SCIENCES

(For Cohorts AY2019/20 and AY2020/21)

| REQUIREMENTS                                       | MODULES INVOLVED<br>(FOR COHORTS AY2019/20 AND 2020/21)   | MODULAR CREDITS<br>[BSc(Hons)] | MODULAR CREDITS<br>[BSc]     |
|--|---|--------------------------------|------------------------------|
| General Education                                  | Pass <b>one</b> module for each of the five Pillars:<br>GER1000 – Quantitative Reasoning<br>GEH1XXX – Human Cultures<br>GES1XXX – Singapore Studies<br>GET1XXX – Thinking and Expression<br>GEQ1000 – Asking Questions  | 20                             | 20                           |
| Computational Thinking                             | Pass either <b>CS1010 (or a variant of CS1010) or COS2000</b> . [See Page 2 on reading CS50 DYOM edX.]  | 4                              | 4                            |
| Science Communication                              | Pass <b>SP1541</b> Exploring Science Communication through Popular Science [If pursuing BSc (Hons) and precluded from taking SP1541, please read one module from any Science subject group except LSM-prefixed modules.]  | 4                              | 4                            |
| Life Sciences Major Level 1000                     | Pass <b>LSM1102, LSM1105, LSM1106, CM1401</b> and <b>ST1232</b> . [If a precluding module to CM1401 (i.e. CM1121 or CM1402 or CM1501) is passed, the precluding module is accepted to be fulfilling the Major in Life Sciences in lieu of CM1401.]  | 20                             | 20                           |
| Life Sciences Major Level 2000                     | Pass <b>LSM2191</b> and <b>three</b> LSM22xx elective modules (except LSM2288 and LSM2289). (Refer to Page 3.)  | 16                             | 16                           |
| Life Sciences Major Level 3000                     | Pass <b>two</b> LSM32xx (except LSM3289); and Pass <b>two</b> LSM32xx/LSM42xx/LSM-recognised elective modules (except LSM3289 and LSM4299) (Refer to Page 3.)   | 16                             | 16                           |
| Life Sciences Major Level 4000<br>[For BSc (Hons)] | Pass <b>32MC of LSM4xxx</b> (refer to Page 3.), of which to include either LSM4199 or LSM4299 but not both:<br><br><u><b>Honours Research Project Option</b></u><br>Pass LSM4199 Honours Project in Life Sciences, AND pass another <b>four</b> LSM42xx elective modules.<br><br><b>Optional: To fulfil a Specialisation</b><br>Complete <b>20MC</b> including LSM4199 Honours Project in Life Sciences AND one LSM42xx elective modules from the corresponding list for the chosen specialisation.<br>(Refer to Page 3.)<br><br><u><b>Applied Internship Project Option</b></u><br>Pass LSM4299 Applied Project in Life Sciences, AND pass another <b>four</b> LSM42xx elective modules. | 32                             | -                            |
| Unrestricted Elective Modules                      | Pass sufficient modules to meet the degree requirements. [These modules can be those for requirements of Minor, Second Major or other enrichment programmes.]   | 48<br>[typically 12 modules]   | 40<br>[typically 10 modules] |
|  | <b>Total</b>  | <b>160</b>                     | <b>120</b>                   |

- Refer to Page 3 for the list of LSM-prefixed elective modules and LSM-recognised elective modules.
- Refer to Page 4 for typical schedule of completion (i.e., study plan) of BSc (Hons) degree in Life Sciences.
- For details on LSM modules, refer to <https://www.dbs.nus.edu.sg/education/lifesciences/#lsmmodules>.

**To qualify for Honours year**, students must fulfil the Life Sciences Major Requirements at BSc standard (i.e. Levels 1000, 2000 and 3000 Major Requirements), and obtained a minimum overall CAP of 3.20 on completion of 100MC (Modular Credits) or more.

**The number of MC earned from Level 1000 modules for graduation requirements is capped at 60.** Excluding CFG1010 Roots and Wings (2MC), CFG1002 Career Catalyst (2MC), ES1103 English for Academic Purposes (4MC) and DYOM.

<http://www.nus.edu.sg/registrar/academic-information-policies/undergraduate-students/degree-requirements>

**Computational Thinking Requirements for Life Sciences Major:**

CS50 Introduction to Computer Science from edX can fulfil the Computational Thinking Requirements but cannot be used to satisfy the Faculty Requirements (i.e., this DYOM serves only as Unrestricted Elective Module). Please refer to the following for details and subject groupings:

<https://www.science.nus.edu.sg/undergraduates/general-academic-requirements-and-policies/>

**Faculty Requirements for Life Sciences Major:**

Please refer to the following for details and subject groupings:

<https://www.science.nus.edu.sg/undergraduates/general-academic-requirements-and-policies/>

**CM1401 and ST1232** satisfy 8MC of the Faculty Requirements. **DO NOT read ST1131 or ST2334.**

**Modules to fulfil Faculty Requirements:**

- Module 1: **CM1401** [4MC; recognised as Major Requirements]
- Module 2: **ST1232** [4MC; recognised as Major Requirements]
- Module 3: **Either CS1010 (or a variant of CS1010) or COS2000 for Computational Thinking** [4MC]
- Module 4 [*For BSc (Hons)*]: **SP1541 Exploring Science Communication through Popular Science** (if precluded from taking SP1541, please read 1 module from any Science subject group except LSM-prefixed module) [4MC]

**List of LSM Elective Modules. All are 4MC each except otherwise if indicated.**

|   |   |   |  |
|---|---|---|--|
| <p>LSM2211 Metabolism and Regulation<br/>                     LSM2212 Human Anatomy<br/>                     LSM2231 General Physiology<br/>                     LSM2232 Genes, Genomes and Biomedical Implications<br/>                     LSM2233 Cell Biology<br/>                     LSM2234 Physical Concepts in Biology<br/>                     LSM2241 Introductory Bioinformatics<br/>                     LSM2251 Ecology and Environment<br/>                     LSM2252 Biodiversity<br/>                     LSM2254 Fundamentals of Plant Biology<br/>                     LSM2291 Fundamental Techniques in Microbiology</p>  | <p><b><u>LSM22xx Elective Modules</u></b></p> | <p>LSM4199 Honours Project in Life Sciences (16MC)<br/>                     LSM4210 Topics in Biomedical Science<br/>                     LSM4211 Toxicology<br/>                     LSM4213 Systems Neurobiology<br/>                     LSM4214 Cancer Pharmacology<br/>                     LSM4215 Extreme Physiology<br/>                     LSM4216 Molecular Nutrition and Metabolic Biology<br/>                     LSM4217 Functional Ageing<br/>                     LSM4218 Biotechnology and Biotherapeutics<br/>                     LSM4221 Drug Discovery and Clinical Trials<br/>                     LSM4222 Advanced Immunology<br/>                     LSM4223 Advances in Antimicrobial Strategies<br/>                     LSM4225 Genetic Medicine in the Post-Genomic Era<br/>                     LSM4226 Infection and Immunity<br/>                     LSM4227 Stem Cell Biology<br/>                     LSM4228 Experimental Models for Human Disease and Therapy<br/>                     LSM4229 Therapeutic and diagnostic agents from animal toxins<br/>                     LSM4252 Reproductive Biology</p> | <p><b><u>LSM4xxx Elective Modules (Biomedical Science)</u></b></p>         |
| <p>LSM3201 Research and Communication in Life Sciences<br/>                     LSM3210 Metabolism and Regulation<br/>                     LSM3211 Fundamental Pharmacology<br/>                     LSM3212 Human Physiology: Cardiopulmonary System<br/>                     LSM3214 Human Physiology – Hormones and Health<br/>                     LSM3215 Neuronal Signaling and Memory Mechanisms<br/>                     LSM3216 Neuronal Development and Diseases<br/>                     LSM3217 Human Ageing<br/>                     LSM3218 Cardiopulmonary Pharmacology<br/>                     LSM3219 Neuropharmacology<br/>                     LSM3220 Genes, Genomes and Biomedical Implications<br/>                     LSM3222 Human Neuroanatomy<br/>                     LSM3223 Immunology<br/>                     LSM3224 Molecular Basis of Human Diseases<br/>                     LSM3225 Molecular Microbiology in Human Diseases<br/>                     LSM3226 Medical Mycology and Drug Discovery<br/>                     LSM3227 General Virology<br/>                     LSM3228 Microbiomes and Biofilms<br/>                     LSM3231 Protein Structure and Function<br/>                     LSM3232 Microbiology<br/>                     LSM3233 Developmental Biology<br/>                     LSM3234 Biological Imaging of Growth and Form<br/>                     LSM3235 Epigenetics in Human Health and Diseases<br/>                     LSM3236 Pattern Formation and Self-organisation in Biology<br/>                     LSM3241 Genomic Data Analysis<br/>                     LSM3242 Translational Microbiology<br/>                     LSM3243 Molecular Biophysics<br/>                     LSM3244 Molecular Biotechnology<br/>                     LSM3245 RNA Biology and Technology<br/>                     LSM3246 Synthetic Biology<br/>                     LSM3247 Practical Synthetic Biology<br/>                     LSM3252 Evolution and Comparative Genomics<br/>                     LSM3254 Ecology of Aquatic Environments<br/>                     LSM3255 Ecology of Terrestrial Environments<br/>                     LSM3256 Tropical Horticulture<br/>                     LSM3257 Applied Data Analysis in Ecology and Evolution<br/>                     LSM3258 Comparative Botany<br/>                     LSM3259 Fungal Biology<br/>                     LSM3262 Environmental Animal Physiology<br/>                     LSM3265 Entomology<br/>                     LSM3266 Avian Biology and Evolution<br/>                     LSM3267 Behavioural Biology<br/>                     LSM3272 Global Change Biology<br/>                     LSM3288 Advanced UROPS in Life Sciences I</p> | <p><b><u>LSM32xx Elective Modules</u></b></p> | <p>LSM4199 Honours Project in Life Sciences (16MC)<br/>                     LSM4231 Structural Biology<br/>                     LSM4232 Advanced Cell Biology<br/>                     LSM4234 Mechanobiology<br/>                     LSM4241 Functional Genomics<br/>                     LSM4242 Protein Engineering<br/>                     LSM4243 Tumour Biology<br/>                     LSM4245 Advanced Epigenetics and Chromatin Biology<br/>                     LSM4251 Plant Growth and Development</p>   | <p><b><u>LSM4xxx Elective Modules (Molecular and Cell Biology)</u></b></p> |
|   |   | <p>LSM4199 Honours Project in Life Sciences (16MC)<br/>                     LSM4254 Principles of Taxonomy and Systematics<br/>                     LSM4255 Methods in Mathematical Biology<br/>                     LSM4256 Evolution of Development<br/>                     LSM4257 Aquatic Vertebrate Diversity<br/>                     LSM4259 Evolutionary Genetics of Reproduction<br/>                     LSM4260 Plankton Ecology<br/>                     LSM4261 Marine Biology<br/>                     LSM4262 Tropical Conservation Biology<br/>                     LSM4263 Field Studies in Biodiversity<br/>                     LSM4264 Freshwater Biology<br/>                     LSM4265 Urban Ecology<br/>                     LSM4266 Aquatic Invertebrate Diversity<br/>                     LSM4267 Light &amp; Vision in Animal Communication<br/>                     LSM4268 Environmental Bioacoustics</p>   | <p><b><u>LSM4xxx Elective Modules (Environmental Biology)</u></b></p>      |
|   |   | <p>LSM4299 Applied Project in Life Sciences (16MC)</p>  | <p><b><u>LSM4xxx Elective Modules (Not for any specialisation)</u></b></p> |

**List of LSM-Recognised Elective Modules**

|  |  |  |  |
|--|--|--|--|
| <p>LSM3991 Exchange Enrichment Module</p>  | <p><b><u>Other LSM-Prefixed Modules</u></b></p>          | <p>CN4247R Enzyme Technology<br/>                     CN4249 Engineering Design in Molecular Biotechnology<br/>                     CN5172 Biochemical Engineering<br/>                     MT4002 Technology Management Strategy</p>  | <p><b><u>Faculty of Engineering</u></b></p>                |
| <p>CM3221 Organic Synthesis: The Disconnection Approach<br/>                     CM3222 Organic Reaction Mechanisms<br/>                     CM3225 Biomolecules<br/>                     CM3251 Nanochemistry<br/>                     CM3261 Environmental Chemistry<br/>                     CM4227 Chemical Biology<br/>                     PR3116 Concepts in Pharmacokinetics and Biopharmaceutics<br/>                     PR4205 Bioorganic Principles of Medicinal Chemistry<br/>                     ZB4171 Advanced Topics in Bioinformatics</p> | <p><b><u>Faculty of Science</u></b></p>                  | <p>SPH3101 Biostatistics for Public Health<br/>                     SPH3102 Public Health Communication<br/>                     SPH3104/ Infectious disease epidemiology and public health<br/>                     SPH3202 Public Health Practice<br/>                     SPH3001/ Public Health Practice<br/>                     SPH3201 Introduction to Public Health Communication<br/>                     SPH3501</p> | <p><b><u>Saw Swee Hock School of Public Health</u></b></p> |
| <p>PL3232 Biological Psychology<br/>                     PL3233 Cognitive Psychology</p>   | <p><b><u>Faculty of Arts and Social Sciences</u></b></p> | <p>BSN3701 Technological Innovation (also coded as TR3008/A)<br/>                     BSN3712 Innovation and Intellectual Property</p>   | <p><b><u>School of Business</u></b></p>                    |

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### BSC (HONS)/BSC DEGREE IN LIFE SCIENCES

(For Cohorts AY2019/20 and AY2020/21)

#### Schedule for Completion of BSc (Hons) in Life Sciences – Cohorts AY2019/20 and AY2020/21

Typical Study Plan for students reading Life Sciences as Primary Major. Numbers in [ ] are Modular Credits (MC).

|        | Semester  | Life Sciences Major Modules  | Other Graduation Requirements   |
|--------|---|--|---|
| YEAR 1 | 1 <sup>st</sup> Semester (Sem 1) & 2 <sup>nd</sup> Semester (Sem 2) | <input type="checkbox"/> <b>LSM1102</b> Molecular Genetics [4]<br><input type="checkbox"/> <b>LSM1106</b> Molecular Cell Biology [4]<br><input type="checkbox"/> <b>LSM1105</b> Evolutionary Biology [4]<br><input type="checkbox"/> <b>ST1232</b> Statistics for Life Sciences [4]<br><input type="checkbox"/> <b>CM1401</b> Chemistry for Life Sciences [4]<br><i>[If a precluding module to CM1401 (i.e. CM1121 or CM1402) is passed, the precluding module is accepted in lieu of CM1401.]</i> | <b>General Education:</b><br><input type="checkbox"/> <b>GER1000</b> – Quantitative Reasoning [4]<br><input type="checkbox"/> <b>GEQ1000</b> – Asking Questions [4]<br><input type="checkbox"/> <b>GEH1XXX</b> – Human Cultures [4]<br><br><input type="checkbox"/> <b>GES1XXX</b> – Singapore Studies [4]<br><br><input type="checkbox"/> <b>GET1XXX</b> – Thinking and Expression [4] |
|        | 3 <sup>rd</sup> Semester (Sem 1) & 4 <sup>th</sup> Semester (Sem 2) | <input type="checkbox"/> <b>LSM2191</b> Laboratory Techniques in Life Sciences [4]<br><input type="checkbox"/> <b>Pass 3 LSM22xx</b> (except LSM2288/9) [3x4=12]   | <b>Faculty Requirements:</b><br><input type="checkbox"/> <b>Either CS1010 (or its variant) or COS2000 for Computational Thinking Requirement</b> [4]  |
| YEAR 3 | 5 <sup>th</sup> Semester (Sem 1) & 6 <sup>th</sup> Semester (Sem 2) | <input type="checkbox"/> <b>Pass 2 LSM32xx</b> (except LSM3289) [2x4=8]<br><br><b>Pass 2 LSM32xx/LSM42xx/LSM-recognised elective modules</b> (except LSM3289 and LSM4299) [2x4=8]  | <input type="checkbox"/> <b>SP1541 Exploring Science Communication through Popular Science</b> (if precluded, please read 1 module from any Science subject group except LSM-prefixed modules) [4]  |
|        | 7 <sup>th</sup> Semester (Sem 1) & 8 <sup>th</sup> Semester (Sem 2) | <input type="checkbox"/> <b>Pass 32MC of LSM4xxx</b> , of which must include either LSM4199 or LSM4299 but not both.<br><br><b>To fulfil a specialisation, pass 20MC including LSM4199 AND one LSM42xx elective modules from the corresponding list for the chosen specialisation.</b>   | <b>Unrestricted Elective Modules (UEM):</b><br><input type="checkbox"/> - <b>48MC or typically 12 modules</b><br><br><b>Typical workload for one semester is 20 MC. Read modules on top of the Major modules secured to fulfil other graduation requirements.</b>   |

**Note:** The number of MC earned from Level 1000 modules for graduation requirements is capped at 60 (typically 15 modules). Excluding CFG1010 Roots and Wings (2MC), CFG1002 Career Catalyst (2MC), ES1103 English for Academic Purposes (4MC) and DYOM.