

## LIFE SCIENCES UNDERGRADUATE PROGRAMME: MAJOR IN LIFE SCIENCES

### BSc (Hons) / BSc in Life Sciences (For Matriculation Cohorts AY2017/2018 and onwards)

Along with General Education, Faculty Requirements and Unrestricted Elective Modules, to be awarded a BSc (Hons) or BSc in Life Sciences, candidates must satisfy the following:

| MODULE LEVEL                                     | PRIMARY MAJOR IN LIFE SCIENCES REQUIREMENTS<br>(FOR MATRICULATION COHORT AY17/18 AND ONWARDS)  | CUMULATIVE MAJOR MC |
|--|--|---------------------|
| <b>Level 1000</b><br>(20 MC)                     | Pass LSM1102, LSM1105, LSM1106, CM1401* and ST1232*.<br><i>(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.)</i>  | <b>20</b>           |
| <b>Level 2000</b><br>(16 MC)                     | Pass LSM2191 and <b>three</b> LSM22xx elective modules (except LSM2288 and LSM2289).   | <b>36</b>           |
| <b>Level 3000</b><br>(16 MC)                     | Pass <b>four</b> LSM32xx elective modules (except LSM3289), of which up to two (up to 8 MC) may be LSM42xx (except LSM4299) and/or LSM-recognised elective modules.  | <b>52</b>           |
| <b>Level 4000</b><br>(32 MC)<br>[For BSc (Hons)] | <b>Pass 32 MC of LSM4xxx</b> , of which may include either LSM4199 or LSM4299 but not both:<br><br><b><u>Honours Research Project Option</u></b><br>Pass LSM4199 Honours Project in Life Sciences, AND pass another <b>four</b> LSM42xx elective modules.<br><br><b><u>Applied Internship Project Option</u></b><br>Pass LSM4299 Applied Project in Life Sciences, AND pass another <b>four</b> LSM42xx elective modules.<br><br><b><u>Coursework Taught Modules Option</u></b><br>Pass <b>eight</b> LSM42xx elective modules. | <b>84</b>           |
| <b>To fulfil a specialisation</b>                | <b>Pass 24 MC of LSM4xxx</b> from the corresponding list for the chosen specialisation (refer to pg. 3)  |                     |

|                                      | <b>BSc</b>    | <b>BSc (Hons)</b> |
|--------------------------------------|---------------|-------------------|
| <b>General Education</b>             | 20 MC         | 20 MC             |
| <b>Faculty Requirements</b>          | 8 MC          | 8 MC              |
| <b>Major Requirements</b>            | 52 MC         | 84 MC             |
| <b>Unrestricted Elective Modules</b> | 40 MC         | 48 MC             |
| <b>Total</b>                         | <b>120 MC</b> | <b>160 MC</b>     |

Refer to pg. 3 for the list of LSM-prefixed elective modules and LSM-recognised elective modules.  
 Refer to pg. 4 for typical schedule of completion (i.e. study plan) of BSc (Hons) degree in Life Sciences.  
 For details on Life Sciences Major modules, please refer [http://lifesciences.nus.edu.sg/modules/lsm/lsm\\_modules.pdf](http://lifesciences.nus.edu.sg/modules/lsm/lsm_modules.pdf).

To qualify for Honours year/project, 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 100 MC (Modular Credits) or more.

The number of MC earned from Level 1000 modules for graduation requirements is capped at 60.

### **Faculty Requirements for Life Sciences Major:**

Please refer to the following for details and subject groupings:

<http://www.science.nus.edu.sg/undergraduate-studies/ugreq/curriculum-structure?id=212>

\* Faculty Requirements are at 16 MC. Major modules CM1401 and ST1232 satisfy 8 MC of the Faculty Requirements. **DO NOT read ST1131 or ST2334.**

### **Modules to fulfil Faculty Requirements:**

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

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

|   |  |  |   |
|---|--|--|---|
| LSM2211<br>LSM2212<br>LSM2231<br>LSM2232<br>LSM2233<br>LSM2234<br>LSM2241<br>LSM2251<br>LSM2252<br>LSM2253<br>LSM2254<br>LSM2291  | <b><u>LSM22xx Elective Modules</u></b><br>Metabolism and Regulation<br>Human Anatomy<br>General Physiology<br>Genes, Genomes and Biomedical Implications<br>Cell Biology<br>Physical Concepts in Biology<br>Introductory Bioinformatics<br>Ecology and Environment<br>Biodiversity<br>Applied Data Analysis in Ecology and Evolution<br>Fundamentals of Plant Biology<br>Fundamental Techniques in Microbiology  | LSM4199<br>LSM4210<br>LSM4211<br>LSM4213<br>LSM4214<br>LSM4215<br>LSM4217<br>LSM4221<br>LSM4222<br>LSM4223<br>LSM4225<br>LSM4226<br>LSM4227<br>LSM4228<br>LSM4229<br>LSM4252 | <b><u>LSM4xxx Elective Modules (Biomedical Science)</u></b><br>Honours Project in Life Sciences (16MC)<br>Topics in Biomedical Science<br>Toxicology<br>Systems Neurobiology<br>Cancer Pharmacology<br>Extreme Physiology<br>Functional Ageing<br>Drug Discovery and Clinical Trials<br>Advanced Immunology<br>Advances in Antimicrobial Strategies<br>Genetic Medicine in the Post-Genomic Era<br>Infection and Immunity<br>Stem Cell Biology<br>Experimental Models for Human Disease and Therapy<br>Therapeutic and diagnostic agents from animal toxins<br>Reproductive Biology |
| LSM3201<br>LSM3211<br>LSM3212<br>LSM3214<br>LSM3215<br>LSM3216<br>LSM3217<br>LSM3218<br>LSM3219<br>LSM3222<br>LSM3223<br>LSM3224<br>LSM3225<br>LSM3226<br>LSM3231<br>LSM3232<br>LSM3233<br>LSM3234<br>LSM3235<br>LSM3241<br>LSM3242<br>LSM3243<br>LSM3244<br>LSM3245<br>LSM3246<br>LSM3247<br>LSM3252<br>LSM3254<br>LSM3255<br>LSM3256<br>LSM3258<br>LSM3259<br>LSM3262<br>LSM3265<br>LSM3266<br>LSM3267<br>LSM3272<br>LSM3273<br>LSM3288 | <b><u>LSM32xx Elective Modules</u></b><br>Research and Communication in Life Sciences<br>Fundamental Pharmacology<br>Human Physiology: Cardiopulmonary System<br>Human Physiology – Hormones and Health<br>Neuronal Signaling and Memory Mechanisms<br>Neuronal Development and Diseases<br>Human Ageing<br>Cardiopulmonary Pharmacology<br>Neuropharmacology<br>Human Neuroanatomy<br>Immunology<br>Molecular Basis of Human Diseases<br>Molecular Microbiology in Human Diseases<br>Medical Mycology and Drug Discovery<br>Protein Structure and Function<br>Microbiology<br>Developmental Biology<br>Biological Imaging of Growth and Form<br>Epigenetics in Human Health and Diseases<br>Genomic Data Analysis<br>Translational Microbiology<br>Molecular Biophysics<br>Molecular Biotechnology<br>RNA Biology and Technology<br>Synthetic Biology<br>Practical Synthetic Biology<br>Evolution and Comparative Genomics<br>Ecology of Aquatic Environments<br>Ecology of Terrestrial Environments<br>Tropical Horticulture<br>Comparative Botany<br>Fungal Biology<br>Environmental Animal Physiology<br>Entomology<br>Avian Biology and Evolution<br>Behavioural Biology<br>Global Change Biology<br>Ecology, Conservation and Management of Sri Lankan Ecosystems<br>Advanced UROPS in Life Sciences I | LSM4199<br>LSM4231<br>LSM4232<br>LSM4234<br>LSM4235<br>LSM4241<br>LSM4242<br>LSM4243<br>LSM4244<br>LSM4245<br>LSM4251  | <b><u>LSM4xxx Elective Modules (Molecular and Cell Biology)</u></b><br>Honours Project in Life Sciences (16MC)<br>Structural Biology<br>Advanced Cell Biology<br>Mechanobiology<br>Nuclear Mechanics and Genome Regulation<br>Functional Genomics<br>Protein Engineering<br>Tumour Biology<br>Oncogenes and Signal Transduction<br>Advanced Epigenetics and Chromatin Biology<br>Plant Growth and Development   |
|   |  | LSM4199<br>LSM4254<br>LSM4255<br>LSM4256<br>LSM4257<br>LSM4261<br>LSM4262<br>LSM4263<br>LSM4264<br>LSM4265<br>LSM4267  | <b><u>LSM4xxx Elective Modules (Environmental Biology)</u></b><br>Honours Project in Life Sciences (16MC)<br>Principles of Taxonomy and Systematics<br>Methods in Mathematical Biology<br>Evolution of Development<br>Aquatic Vertebrate Diversity<br>Marine Biology<br>Tropical Conservation Biology<br>Field Studies in Biodiversity<br>Freshwater Biology<br>Urban Ecology<br>Animal Communications & Sensory Ecology  |
|   |  | LSM4299  | <b><u>LSM4xxx Elective Modules (Not for any specialisation)</u></b><br>Applied Project in Life Sciences (16MC)  |

List of LSM-Recognised Elective Modules

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

## LIFE SCIENCES UNDERGRADUATE PROGRAMME: MAJOR IN LIFE SCIENCES

### Schedule for Completion of BSc (Hons) in Life Sciences – Matriculation Cohort AY2017/2018

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) | To be pre-allocated in either semester Group 1:<br><input type="checkbox"/> LSM1102 Molecular Genetics [4]<br><input type="checkbox"/> LSM1106 Molecular Cell Biology [4]<br>OR Group 2:<br><input type="checkbox"/> LSM1105 Evolutionary Biology [4]<br><input type="checkbox"/> ST1232 Statistics for Life Sciences [4]<br><br>To be pre-allocated in Semester 2:<br><input type="checkbox"/> CM1401 Chemistry for Life Sciences [4] | <input type="checkbox"/> GER1000 – Quantitative Reasoning [4] (pre-allocated)<br><br><input type="checkbox"/> GEH1XXX – Human Cultures [4] (to bid)<br>_____<br><br><input type="checkbox"/> GES1XXX – Singapore Studies [4] (to bid)<br>_____   |
|        | 3 <sup>rd</sup> Semester (Sem 1) & 4 <sup>th</sup> Semester (Sem 2) | To be pre-allocated in either semester:<br><input type="checkbox"/> LSM2191 Laboratory Techniques in Life Sciences [4]<br><br><b>Pass 3 LSM22xx</b> (except LSM2288/9) [3x4=12]<br><input type="checkbox"/> _____ <input type="checkbox"/> _____<br><br><input type="checkbox"/> _____   | <input type="checkbox"/> GET1XXX – Thinking and Expression [4] (to bid)<br>_____<br><br><input type="checkbox"/> GEQ1000 – Asking Questions [4] (pre-allocated)<br><br><b>Faculty Requirements:</b><br><input type="checkbox"/> Either CS1010 (or a variant) or COS2000 for Computational Thinking [4]   |
| YEAR 3 | 5 <sup>th</sup> Semester (Sem 1) & 6 <sup>th</sup> Semester (Sem 2) | <b>Pass 2 LSM32xx</b> (except LSM3289) [2x4=8]<br><input type="checkbox"/> _____ <input type="checkbox"/> _____<br><br><b>Pass 2 LSM32xx/LSM42xx/LSM-recognised elective modules</b> (except LSM3289 and LSM4299) [2x4=8]<br><input type="checkbox"/> _____ <input type="checkbox"/> _____   | <input type="checkbox"/> SP1541 Exploring Science Communication through Popular Science (if precluded, please read 1 module from any Science subject group except LSM-prefixed modules) [4]<br>_____<br><br><b>Unrestricted Elective Modules (UEM):</b><br>- 48 MC or typically 12 modules   |
|        | 7 <sup>th</sup> Semester (Sem 1) & 8 <sup>th</sup> Semester (Sem 2) | <input type="checkbox"/> <b>Pass 32 MC of LSM4xxx</b> , of which may include either LSM4199 or LSM4299 but not both.<br><br>_____<br>_____<br>_____<br>_____<br>_____<br>_____<br><br><b>To fulfil a specialisation, pass 24 MC of LSM4xxx from the corresponding list for the chosen specialisation.</b>  | <input type="checkbox"/> _____ <input type="checkbox"/> _____<br><input type="checkbox"/> _____ <input type="checkbox"/> _____<br><input type="checkbox"/> _____ <input type="checkbox"/> _____<br><input type="checkbox"/> _____ <input type="checkbox"/> _____<br><input type="checkbox"/> _____ <input type="checkbox"/> _____<br><input type="checkbox"/> _____ <input type="checkbox"/> _____<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).