

## 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 (FOR MATRICULATION COHORT AY17/18 AND ONWARDS)	CUMULATIVE MAJOR MC
<b>Level 1000</b> (20 MC)	Pass LSM1102, LSM1105, LSM1106, CM1401* and ST1232*. (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.)	<b>20</b>
<b>Level 2000</b> (16 MC)	Pass LSM2191 and <b>three</b> LSM22xx elective modules (except LSM2288 and LSM2289).	<b>36</b>
<b>Level 3000</b> (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> (32 MC) [For BSc (Hons)]	<b>Pass 32 MC of LSM4xxx</b> , of which may include either LSM4199 or LSM4299 but not both:  <b><u>Honours Research Project Option</u></b> Pass LSM4199 Honours Project in Life Sciences, AND pass another <b>four</b> LSM42xx elective modules.  <b><u>Applied Internship Project Option</u></b> Pass LSM4299 Applied Project in Life Sciences, AND pass another <b>four</b> LSM42xx elective modules.  <b><u>Coursework Taught Modules Option</u></b> 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 Life Sciences Major (LSM) Modules

All LSM modules are 4MC each except otherwise if indicated.

LSM2211	<b><u>LSM22xx Elective Modules</u></b> Metabolism and Regulation	LSM4199	<b><u>LSM4xxx Elective Modules (Biomedical Science)</u></b> Honours Project in Life Sciences (16MC)
LSM2212	Human Anatomy	LSM4210	Topics in Biomedical Science
LSM2231	General Physiology	LSM4211	Toxicology
LSM2232	Genes, Genomes and Biomedical Implications	LSM4213	Systems Neurobiology
LSM2233	Cell Biology	LSM4214	Cancer Pharmacology
LSM2234	Physical Concepts in Biology	LSM4215	Extreme Physiology
LSM2241	Introductory Bioinformatics	LSM4217	Functional Ageing
LSM2251	Ecology and Environment	LSM4221	Drug Discovery and Clinical Trials
LSM2252	Biodiversity	LSM4222	Advanced Immunology
LSM2253	Applied Data Analysis in Ecology and Evolution	LSM4223	Advances in Antimicrobial Strategies
LSM2291	Fundamental Techniques in Microbiology	LSM4225	Genetic Medicine in the Post-Genomic Era
		LSM4226	Infection and Immunity
		LSM4227	Stem Cell Biology
		LSM4228	Experimental Models for Human Disease and Therapy
		LSM4229	Therapeutic and diagnostic agents from animal toxins
			<b><u>LSM4xxx Elective Modules (Molecular and Cell Biology)</u></b>
LSM3201	<b><u>LSM32xx Elective Modules</u></b> Research and Communication in Life Sciences	LSM4199	Honours Project in Life Sciences (16MC)
LSM3211	Fundamental Pharmacology	LSM4231	Structural Biology
LSM3212	Human Physiology: Cardiopulmonary System	LSM4232	Advanced Cell Biology
LSM3214	Human Physiology – Hormones and Health	LSM4234	Mechanobiology
LSM3215	Neuronal Signaling and Memory Mechanisms	LSM4235	Nuclear Mechanics and Genome Regulation
LSM3216	Neuronal Development and Diseases	LSM4241	Functional Genomics
LSM3217	Human Ageing	LSM4242	Protein Engineering
LSM3218	Cardiopulmonary Pharmacology	LSM4243	Tumour Biology
LSM3219	Neuropharmacology	LSM4244	Oncogenes and Signal Transduction
LSM3222	Human Neuroanatomy	LSM4245	Advanced Epigenetics and Chromatin Biology
LSM3223	Immunology	LSM4251	Plant Growth and Development
LSM3224	Molecular Basis of Human Diseases	LSM4252	Animal Reproduction
LSM3225	Molecular Microbiology in Human Diseases		<b><u>LSM4xxx Elective Modules (Environmental Biology)</u></b>
LSM3226	Medical Mycology and Drug Discovery	LSM4199	Honours Project in Life Sciences (16MC)
LSM3231	Protein Structure and Function	LSM4254	Principles of Taxonomy and Systematics
LSM3232	Microbiology	LSM4255	Methods in Mathematical Biology
LSM3233	Developmental Biology	LSM4256	Evolution of Development
LSM3234	Biological Imaging of Growth and Form	LSM4257	Aquatic Vertebrate Diversity
LSM3235	Epigenetics in Human Health and Diseases	LSM4261	Marine Biology
LSM3241	Genomic Data Analysis	LSM4262	Tropical Conservation Biology
LSM3242	Translational Microbiology	LSM4263	Field Studies in Biodiversity
LSM3243	Molecular Biophysics	LSM4264	Freshwater Biology
LSM3245	RNA Biology and Technology	LSM4265	Urban Ecology
LSM3246	Synthetic Biology	LSM4267	Animal Communications & Sensory Ecology
LSM3247	Practical Synthetic Biology		<b><u>LSM4xxx Elective Modules (Not for any specialisation)</u></b>
LSM3252	Evolution and Comparative Genomics	LSM4299	Applied Project in Life Sciences (16MC)
LSM3254	Ecology of Aquatic Environments		
LSM3255	Ecology of Terrestrial Environments		
LSM3256	Tropical Horticulture		
LSM3258	Comparative Botany		
LSM3259	Fungal Biology		
LSM3262	Environmental Animal Physiology		
LSM3264	Environmental Biochemistry		
LSM3265	Entomology		
LSM3266	Avian Biology and Evolution		
LSM3267	Behavioural Biology		
LSM3272	Global Change Biology		
LSM3273	Ecology, Conservation and Management of Sri Lankan Ecosystems		
LSM3288	Advanced UROPS in Life Sciences I		

### List of LSM-Recognised Elective Modules

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

## 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: <input type="checkbox"/> LSM1102 Molecular Genetics [4] <input type="checkbox"/> LSM1106 Molecular Cell Biology [4] OR Group 2: <input type="checkbox"/> LSM1105 Evolutionary Biology [4] <input type="checkbox"/> ST1232 Statistics for Life Sciences [4]  To be pre-allocated in Semester 2: <input type="checkbox"/> CM1401 Chemistry for Life Sciences [4]	<input type="checkbox"/> GER1000 – Quantitative Reasoning [4] (pre-allocated)  <input type="checkbox"/> GEH1XXX – Human Cultures [4] (to bid) _____  <input type="checkbox"/> GES1XXX – Singapore Studies [4] (to bid) _____
	3 <sup>rd</sup> Semester (Sem 1) & 4 <sup>th</sup> Semester (Sem 2)	To be pre-allocated in either semester: <input type="checkbox"/> LSM2191 Laboratory Techniques in Life Sciences [4]  <b>Pass 3 LSM22xx</b> (except LSM2288/9) [3x4=12] <input type="checkbox"/> _____ <input type="checkbox"/> _____  <input type="checkbox"/> _____	<input type="checkbox"/> GET1XXX – Thinking and Expression [4] (to bid) _____  <input type="checkbox"/> GEQ1000 – Asking Questions [4] (pre-allocated)  <b>Faculty Requirements:</b> <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] <input type="checkbox"/> _____ <input type="checkbox"/> _____  <b>Pass 2 LSM32xx/LSM42xx/LSM-recognised elective modules</b> (except LSM3289 and LSM4299) [2x4=8] <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] _____  <b>Unrestricted Elective Modules (UEM):</b> - 48 MC or typically 12 modules
	7 <sup>th</sup> Semester (Sem 1) & 8 <sup>th</sup> Semester (Sem 2)	<input type="checkbox"/> Pass 32 MC of LSM4xxx, of which may include either LSM4199 or LSM4299 but not both.  _____ _____ _____ _____ _____ _____  <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"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____  <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).