

LIFE SCIENCES – SPECIALIZATION (SCIENCE) – BACHELOR OF SCIENCE (HONOURS)

Plans of study for students who were admitted to a Life Sciences Plan after May 1, 2017

LISC-P-BSH [----]-O (where [----] is a Life Science SubPlan).

Subject: Administered by the Associate Dean, (Life Sciences and Biochemistry).

Plan: Consists of 57.0 core units and 27.0 – 42.0 units in one Sub-Plan, as described below.

Program: The Plan, with sufficient electives to total 120.0 units, will lead to a Bachelor of Science (Honours) Degree.

Code	Title	Units
1. Core		
A. Complete the following:		
BIOL 102	Fundamentals of Biology: Molecular and Cell Biology	3.00
BIOL 103	Fundamentals of Biology: Organisms to Ecosystems	3.00
B. Complete the following:		
CHEM 112	General Chemistry	6.00
C. Select 6.00 units from the following:		
MATH 120	Differential and Integral Calculus	6.00
MATH 121	Differential and Integral Calculus	
MATH 123	Differential and Integral Calculus I & MATH 124 and Differential and Integral Calculus II	
D. Select 6.00 units from the following:		
PHYS 104	Fundamental Physics	6.00
PHYS 106	General Physics	
PHYS 117	Introductory Physics	
PHYS 118	Basic Physics	
E. Select 6.00 units from the following:		
ANAT 100	Anatomy of the Human Body	6.00
ANAT 215	Principles of Human Morphology I	
ANAT 216	Principles of Human Morphology II	
ANAT 380	Clinically Relevant Human Anatomy	
F. Complete the following:		
BCHM 218	Molecular Biology	3.00
G. Complete the following:		
CHEM 281	General Organic Chemistry I (with Virtual Laboratory)	3.00
CHEM 282	General Organic Chemistry II	3.00
H. Select 3.00 units from the following:		
MICR 221	Basic Microbiology	3.00
MICR 271	Introduction to Microbiology	
I. Select 6.00 units from the following:		
6.00		

PHGY 215	Principles of Mammalian Physiology I	3.00
PHGY 216	Principles of Mammalian Physiology II	
J. Select 3.00 units from the following:		3.00
STAT 263	Introduction to Statistics	3.00
BIOL 243	Introduction to Statistics	
STAM 200	Introduction to Statistics	
K. Select 3.00 units from the following:		3.00
PHAR 340	Principles of General Pharmacology I	3.00
PHAR 370	Fundamentals of Pharmacology and Therapeutics	
L. Select 3.00 units from the following:		3.00
MICR at the 300 level		3.00
MICR 400-454		
MICR 461	Advanced Immunology	
2. Sub-Plans		
Select one of the following sub-plans:		27.00-42.00
A. Biomedical Discovery (BMDS-O) (39.0 units)		84.00-99.00
B. Biomedical Sciences (BMSS-O) (27.0 units)		
C. Cancer Research (CANC-O) (39.0 units)		
D. Cardiorespiratory Science (CRSS-O) (42.0 units)		
E. Drug Discovery and Human Toxicology (DDHT-O) (39.0 units)		
F. Neuroscience (NSCI-O) (42.0 units)		
Total Units		84.00-99.00

3. Additional Requirements

A. Students may take no more than one course from: ANAT 499 Research Project in Anatomy and Cell Biology or CANC 499 Research Project in Cancer Biology and Genetics or EPID 499 Research Project in Epidemiology or MICR 499 Research Project in Microbiology and Immunology or NSCI 499 Research Project in Neuroscience or PATH 499 Research Project in Pathology or PHGY 499 Research Project in Physiology or PHAR 499 Research Project in Pharmacology and Toxicology or REPD 499 Research Project in Reproduction and Development

4. Notes

A. PSYC 100 Principles of Psychology is a prerequisite for all higher-level psychology courses. Some psychology courses listed as approved science options have limited enrolments and may not be available to Life Sciences students.



B. Students wishing to take 300- and 400- level BIOL courses as options should review the prerequisites for these courses.

Some upper year BIOL courses require BIOL 205 Mendelian and Molecular Genetics as a prerequisite which is an option under 2.C.

C. Students who have not previously taken any other courses from outside the Faculty of Arts and Science are able to take up to 9.0 units of approved BMED Options towards their LISC-P-BSH degree.

Sub-Plans

A. Biomedical Discovery (BMDS-O) (39.00 units) (p. 2)

Code	Title	Units
i. Core		
a. Complete the following:		
BCHM 310	General Biochemistry	9.00
b. Select 3.00 units from the following:		
PHAR 450	Principles of General Pharmacology II	
PHAR 380	Drug and Environmental Toxicology	
c. Select 12.00 units from the following:		
ANAT 499	Research Project in Anatomy and Cell Biology	12.00
EPID 499	Research Project in Epidemiology	
MICR 499	Research Project in Microbiology and Immunology	
NSCI 499	Research Project in Neuroscience	
PATH 499	Research Project in Pathology	
PHGY 499	Research Project in Physiology	
PHAR 499	Research Project in Pharmacology and Toxicology	
REPD 499	Research Project in Reproduction and Development	
ii. Option		
a. LISC_List_C at the 300 level or above		
		9.00
b. LISC_List_C at the 200 level or above		
		6.00
Total Units		39.00

B. Biomedical Sciences (BMSS-O) (27.00 units) (p. 2)

Code	Title	Units
i. Core		
a. Select 6.00 units from the following:		
BCHM 315	Proteins and Enzymes & BCHM 316 and Metabolism	6.00
or		
BCHM 310	General Biochemistry	

ii. Option	
a. Select 12.00 units from the following	12.00
LISC_List_D at the 400 level or above	
LISC_Labs_E at the 400 level or above	
b. Select 9.00 units from the following:	9.00
LISC_List_D	
LISC_Labs_E	
iii. Additional Requirements	
a. 6.00 units must be from LISC_Labs_E	
Total Units	27.00

C. Cancer Research (CANC-O) (39.00 units) (p. 2)

Code	Title	Units
i. Core		
a. Complete the following:		
BCHM 310	General Biochemistry	9.00
b. Complete the following:		
CANC 440	Cancer Biology and Therapeutics	3.00
c. Select 3.00 units from the following:		
PHAR 450	Principles of General Pharmacology II	
PHAR 380	Drug and Environmental Toxicology	
d. Complete the following:		
CANC 499	Research Project in Cancer Biology and Genetics	12.00
ii. Option		
a. Select 6.00 units from the following:		
LISC_List_F at the 400 level		6.00
b. Select 6.00 units from the following:		
LISC_List_F		6.00
Total Units		39.00

D. Cardiorespiratory Science (CRSS-O) (42.00 units) (p. 2)

Code	Title	Units
i. Core		
a. Complete the following:		
BCHM 310	General Biochemistry	9.00
b. Complete the following:		
PHGY 355	Biomedical Respiratory Physiology	3.00
c. Select 6.00 units from the following:		
CRSS 453	Principles in Cardiorespiratory Science I	
CRSS 454	Cardiovascular Sciences	

CRSS 456	Molecular and Cellular Basis of Cardiovascular Disease	
CRSS 498	Cardiorespiratory Rounds	
d. Select 3.00 units from the following:		3.00
PHAR 450	Principles of General Pharmacology II	
PHAR 380	Drug and Environmental Toxicology	
e. Select 12.00 units from the following:		12.00
ANAT 499	Research Project in Anatomy and Cell Biology	
PATH 499	Research Project in Pathology	
PHAR 499	Research Project in Pharmacology and Toxicology	
PHGY 499	Research Project in Physiology	

ii. Option

a. Select 9.00 units from the following:		9.00
LISC_List_G		

Total Units **42.00**

E. Drug Discovery and Human Toxicology (DDHT-O) (39.00 units) (p. 3)

Code	Title	Units
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i. Core

a. Complete the following:		
BCHM 310	General Biochemistry	9.00
b. Select 6.00 units from the following:		6.00
DDHT 459	Principles of Drug Discovery	
DDHT 460	Principles of Drug Development	
PHAR 416	Xenobiotic Disposition and Toxicity	
PHAR 480	Drug Discovery and Development	
c. Select 3.00 units from the following:		3.00
PHAR 450	Principles of General Pharmacology II	
PHAR 380	Drug and Environmental Toxicology	

d. Select 12.00 units from the following:		12.00
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ANAT 499	Research Project in Anatomy and Cell Biology	
EPID 499	Research Project in Epidemiology	
MICR 499	Research Project in Microbiology and Immunology	
NSCI 499	Research Project in Neuroscience	
PATH 499	Research Project in Pathology	
PHGY 499	Research Project in Physiology	
PHAR 499	Research Project in Pharmacology and Toxicology	
REPD 499	Research Project in Reproduction and Development	

ii. Option

a. LISC_List_J	3.00
b. LISC_List_K at the 200 level or above	6.00

Total Units **39.00**

F. Neuroscience (NSCI-O) (42.00 units) (p. 3)

Code	Title	Units
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i. Core

a. Complete the following:		
BCHM 310	General Biochemistry	9.00
b. Select 3.00 units from the following:		3.00
NSCI 323	Cellular Neuroscience	
NSCI 324	Systems Neuroscience	
c. Select 3.00 units from the following:		3.00
PHAR 450	Principles of General Pharmacology II	
PHAR 380	Drug and Environmental Toxicology	
d. Complete the following:		
NSCI 499	Research Project in Neuroscience	12.00

ii. Option

a. LISC_List_L at the 400 level	6.00
b. LISC_List_L	9.00

Total Units **42.00**

Life Sciences Course Lists

The following lists contain courses offered through other Departments. In accordance with Academic Regulation 2.5 (Access to Classes), students do not have enrolment priority in all of these courses. Access to these courses may only be made available during the Open Enrolment period, and then only if space permits.

LISC_List_C

Code	Title	Units
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Options in the Biomedical Discovery Sub-plan

ANAT
BCHM
CANC
CHEM at the 200 level
CRSS
DDHT
EPID
LISC
MATH at the 200 level
MICR
NSCI
PATH



PHAR		
PHGY		
REPD		
PHYS at the 200 level		
STAT at the 200 level		
BIOL 205	Mendelian and Molecular Genetics	3.00
BIOL 321	Animal Behaviour	3.00
BIOL 322	Environmental Physiology of Animals	3.00
BIOL 330	Cell Biology	3.00
BIOL 331	Analytical Genomics	3.00
BIOL 334	Comparative Biochemistry	3.00
BIOL 339	Animal Physiology	3.00
BIOL 350	Evolution and Human Affairs	3.00
BIOL 369	Sex and Evolution	3.00
BIOL 401	Experimental Approaches to Animal Physiology	3.00
BIOL 403	Experimental Techniques in Biology	3.00
BIOL 404	Techniques in Molecular Biology	3.00
BIOL 430	Molecular Genetics of Development	3.00
BIOL 441	Molecular Genetics	3.00
BIOM 300	Modeling Techniques in Biology	3.00
BMED 270		3.00
BMED 370		3.00
BMED 380		3.00
BMED 381	Clinical Biochemistry	3.00
BMED 383		3.00
BMED 384	Integrative Laboratory Course	3.00
BMED 480	Clinical Applications of Human Anatomy	3.00
BMED 482		3.00
BMED 483	Advanced Topics In Infectious Diseases	3.00
HLTH 323	Epidemiology	3.00
PSYC 271	Brain and Behaviour I	3.00
PSYC 305	Introduction to Comparative Cognition	3.00
PSYC 323	Laboratory in Attention	3.00
PSYC 360	The Neurobiology and Psychology of Sleep	3.00
PSYC 370	Brain and Behaviour II	3.00
PSYC 470	Advanced Topics in Behavioural Neuroscience	3.00
PSYC 471	Behavioural Pharmacology	3.00
PSYC 501	Honours Thesis	9.00
Excluding the following courses:		3.00
ANAT 270	Human Anatomy and Morphology	3.00
BCHM 270	Biochemical Basis of Health and Disease	3.00
MICR 270	Infection, Immunity and Inflammation	3.00

LISC_List_D

Code	Title	Units
Options in the Biomedical Sciences Sub-plan		
ANAT		
BCHM		
CANC		
CRSS		
DDHT		
EPID		
LISC		
MICR		
NSCI		
PATH		
PHAR		
PHGY		
REPD		
BIOL 205	Mendelian and Molecular Genetics	3.00
BIOL 321	Animal Behaviour	3.00
BIOL 330	Cell Biology	3.00
BIOL 331	Analytical Genomics	3.00
BIOL 334	Comparative Biochemistry	3.00
BIOL 339	Animal Physiology	3.00
BIOL 350	Evolution and Human Affairs	3.00
BIOL 401	Experimental Approaches to Animal Physiology	3.00
BIOL 403	Experimental Techniques in Biology	3.00
BIOL 404	Techniques in Molecular Biology	3.00
BIOL 430	Molecular Genetics of Development	3.00
BIOL 431	Cellular Basis of Adaptation	3.00
BIOL 433	History and Philosophy of Biology	3.00
BIOL 441	Molecular Genetics	3.00
BIOL 445	Neuroethology	3.00
BIOM 300		
BMED 270		3.00
BMED 370		3.00
BMED 380		3.00
BMED 381	Clinical Biochemistry	3.00
BMED 383		3.00
BMED 384	Integrative Laboratory Course	3.00
BMED 480	Clinical Applications of Human Anatomy	3.00
BMED 482		3.00
BMED 483	Advanced Topics In Infectious Diseases	3.00
PSYC 470	Advanced Topics in Behavioural Neuroscience	3.00
PSYC 471	Behavioural Pharmacology	3.00

PSYC 473	Neurobiology of Psychiatric Disorders	3.00
STAT 361	Applied Methods in Statistics I	3.00
Excluding the following courses:		
ANAT 270	Human Anatomy and Morphology	3.00
BCHM 270	Biochemical Basis of Health and Disease	3.00
MICR 270	Infection, Immunity and Inflammation	3.00

LISC_Labs_E

Code	Title	Units
Laboratory Options in the Biomedical Sciences Sub-plan		
ANAT 309	Functional Histology	3.00
ANAT 312	Functional Neuroanatomy	3.00
ANAT 315	The Human Musculoskeletal System	3.00
ANAT 316	The Human Visceral Systems	3.00
ANAT 409	Selected Topics in Histology	3.00
BCHM 310	General Biochemistry	9.00
BCHM 421	Advanced Biochemistry Laboratory I	6.00
BCHM 422	Advanced Biochem Lab II	6.00
BCHM 442	Seminars in Biochemistry	3.00
BIOL 205	Mendelian and Molecular Genetics ((if taken before 2018-19))	3.00
BIOL 212	Scientific Methods in Biology	3.00
BIOL 321	Animal Behaviour	3.00
BIOL 322	Environmental Physiology of Animals	3.00
BIOL 330	Cell Biology	3.00
BIOL 331	Analytical Genomics	3.00
BIOL 334	Comparative Biochemistry	3.00
BIOL 401	Experimental Approaches to Animal Physiology	3.00
BIOL 403	Experimental Techniques in Biology	3.00
BIOL 404	Techniques in Molecular Biology	3.00
BIOL 441	Molecular Genetics	3.00
BMED 384	Integrative Laboratory Course	3.00
EPID 401	Biostatistical Data Analysis for Life Science Students	3.00
LISC 390	Integrated Life Science Laboratory I	3.00
LISC 391	Integrated Life Sciences Laboratory	3.00
MICR 435	Advanced Prokaryotic Structure and Function	3.00
MICR 436	Microbial Genetics	3.00
NSCI 433	Cellular Elements of the Nervous System: Responses to Injury and Disease	3.00
PSYC 305	Introduction to Comparative Cognition	3.00
PSYC 323	Laboratory in Attention	3.00
PSYC 360	The Neurobiology and Psychology of Sleep	3.00

ANAT 499	Research Project in Anatomy and Cell Biology	12.00
EPID 499	Research Project in Epidemiology	12.00
MICR 499	Research Project in Microbiology and Immunology	12.00
NSCI 499	Research Project in Neuroscience	12.00
PATH 499	Research Project in Pathology	12.00
PHAR 499	Research Project in Pharmacology and Toxicology	12.00
PHGY 499	Research Project in Physiology	12.00
REPD 499	Research Project in Reproduction and Development	12.00

LISC_List_F

Code	Title	Units
Options in the Cancer Research Sub-plan		
BCHM 410	Protein Structure and Function	3.00
BCHM 411	Advanced Molecular Biology	3.00
BCHM 432	The Molecular Basis of Cellular Function	3.00
BIOL 205	Mendelian and Molecular Genetics	3.00
BIOL 330	Cell Biology	3.00
BIOL 331	Analytical Genomics	3.00
BIOL 430	Molecular Genetics of Development	3.00
BIOL 441	Molecular Genetics	3.00
BMED 270		
CANC 380	Evolutionary Biology of Cancer	3.00
CHEM 311	Mechanistic Organic Chemistry	3.00
EPID 301	Principles of Epidemiology	3.00
LISC 270	Fundamentals of Health Research Methodology	3.00
MICR 360	Immunology	3.00
MICR 386	Fundamentals of Immunology in Health and Disease	3.00
MICR 436	Microbial Genetics	3.00
MICR 450	Principles of Molecular Virology	3.00
MICR 451	Selected Topics in Viral Pathogen	3.00
MICR 461	Advanced Immunology	3.00
PATH 310	Introduction to Pathology and Molecular Medicine	3.00
PATH 411	Applied Data Science in Molecular Medicine	3.00
PATH 425	Current Topics in Human Genetics	3.00
PHAR 416	Xenobiotic Disposition and Toxicity	3.00
PHGY 350	Pathophysiology	3.00
PSYC 332	Health Psychology	3.00



LISC_List_G

Code	Title	Units
Options in the Cardiorespiratory Sub-plan		
BMED 270		3.00
CRSS 453	Principles in Cardiorespiratory Science I	3.00
CRSS 454	Cardiovascular Sciences	3.00
EPID 301	Principles of Epidemiology	3.00
HLTH 323	Epidemiology	3.00
LISC 270	Fundamentals of Health Research Methodology	3.00
PHGY 350	Pathophysiology	3.00

LISC_List_J

Some of these courses may also appear on LISC_List_K. They may only be used to fulfill requirements from one list.

Code	Title	Units
Options in the Neuroscience Sub-plan		
CANC 440	Cancer Biology and Therapeutics	3.00
CHEM 213	Introduction to Chemical Analysis	3.00
CHEM 222	Methods of Structure Determination	3.00
CRSS 454	Cardiovascular Sciences	3.00
CRSS 456	Molecular and Cellular Basis of Cardiovascular Disease	3.00
EPID 301	Principles of Epidemiology	3.00
LISC 270	Fundamentals of Health Research Methodology	3.00
LISC 383	Advanced Research Methodologies	3.00
NSCI 414	Progress in Neuroanatomy and Neuropharmacology	3.00
PATH 310	Introduction to Pathology and Molecular Medicine	3.00
PATH 430	The Molecular Basis of Disease	3.00

LISC_List_K

Some of these courses may also appear on LISC_List_J. They may only be used to fulfill requirements from one list.

Code	Title	Units
Options in the Drug Discovery and Human Toxicology Sub-plan		
ANAT		
BCHM		
EPID		
MICR		
PATH		
PHAR		
PHGY		

BIOL 205	Mendelian and Molecular Genetics	3.00
BIOL 321	Animal Behaviour	3.00
BIOL 322	Environmental Physiology of Animals	3.00
BIOL 330	Cell Biology	3.00
BIOL 331	Analytical Genomics	3.00
BIOL 334	Comparative Biochemistry	3.00
BIOL 339	Animal Physiology	3.00
BIOL 350	Evolution and Human Affairs	3.00
BIOL 401	Experimental Approaches to Animal Physiology	3.00
BIOL 403	Experimental Techniques in Biology	3.00
BIOL 404	Techniques in Molecular Biology	3.00
BIOL 430	Molecular Genetics of Development	3.00
BIOL 441	Molecular Genetics	3.00
BIOM 300	Modeling Techniques in Biology	3.00
CHEM 213	Introduction to Chemical Analysis	3.00
CHEM 221	Material, Solutions, Interfaces	3.00
CHEM 222	Methods of Structure Determination	3.00
LISC 270	Fundamentals of Health Research Methodology	3.00
LISC 383	Advanced Research Methodologies	3.00
MATH 221	Vector Calculus	3.00
MATH 225	Ordinary Differential Equations	3.00
MATH 228	Complex Analysis	3.00
STAT 268	Statistics and Probability I	3.00
NSCI 323	Cellular Neuroscience	3.00
NSCI 324	Systems Neuroscience	3.00
NSCI 422	Cellular and Molecular Neuroscience	3.00
PHYS 206	Dynamics	3.00
PHYS 216	Introduction to Astrophysics	3.00
PHYS 242	Relativity and Quanta	3.00
PSYC 271	Brain and Behaviour I	3.00
PSYC 370	Brain and Behaviour II	3.00
PSYC 375	Comparative Cognition: Animal Learning Laboratory	3.00
PSYC 470	Advanced Topics in Behavioural Neuroscience	3.00
PSYC 471	Behavioural Pharmacology	3.00
PSYC 501	Honours Thesis	9.00
Excluding the following courses:		
ANAT 270	Human Anatomy and Morphology	3.00
BCHM 270	Biochemical Basis of Health and Disease	3.00
MICR 270	Infection, Immunity and Inflammation	3.00

PHAR 370	Fundamentals of Pharmacology and Therapeutics	3.00
PHGY 170	Human Cell Physiology	3.00

LISC_List_L

Code	Title	Units
ANAT 312	Functional Neuroanatomy	3.00
BIOL 445	Neuroethology	3.00
LISC 300	The Process of Discovery in the Biomedical Sciences	3.00
LISC 426	Current Concepts in Sensorimotor Neuroscience	3.00
NSCI 323 or NSCI 324	Cellular Neuroscience Systems Neuroscience	3.00
NSCI 401	Introduction to Theoretical Neuroscience	3.00
NSCI 403	Introduction to Neuroimaging	3.00
NSCI 414	Progress in Neuroanatomy and Neuropharmacology	3.00
NSCI 422	Cellular and Molecular Neuroscience	3.00
NSCI 429	Disorders of the Nervous System	3.00
NSCI 433	Cellular Elements of the Nervous System: Responses to Injury and Disease	3.00
NSCI 444	Controversies in Neuroscience	3.00
NSCI 483	Neurobiology of Learning and Memory	3.00
NSCI 491	Directed Special Laboratory	3.00
PHGY 424	Ion Channels of Excitable Cells	3.00
PHGY 494	Neuroendocrinology	3.00
PSYC 271	Brain and Behaviour I	3.00
PSYC 370	Brain and Behaviour II	3.00
PSYC 398	Selected Topics in Psychology I	3.00
PSYC 399	Selected Topics in Psychology II	3.00
PSYC 470	Advanced Topics in Behavioural Neuroscience	3.00
PSYC 471	Behavioural Pharmacology	3.00
PSYC 473	Neurobiology of Psychiatric Disorders	3.00