

The Human Body - what you'll learn in Life Sciences and Biochemistry

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Associate Dean
Life Sciences and Biochemistry

Professor, Department of Biomedical and Molecular Sciences
Researcher, Centre for Neuroscience Studies

Faculty of Health Sciences



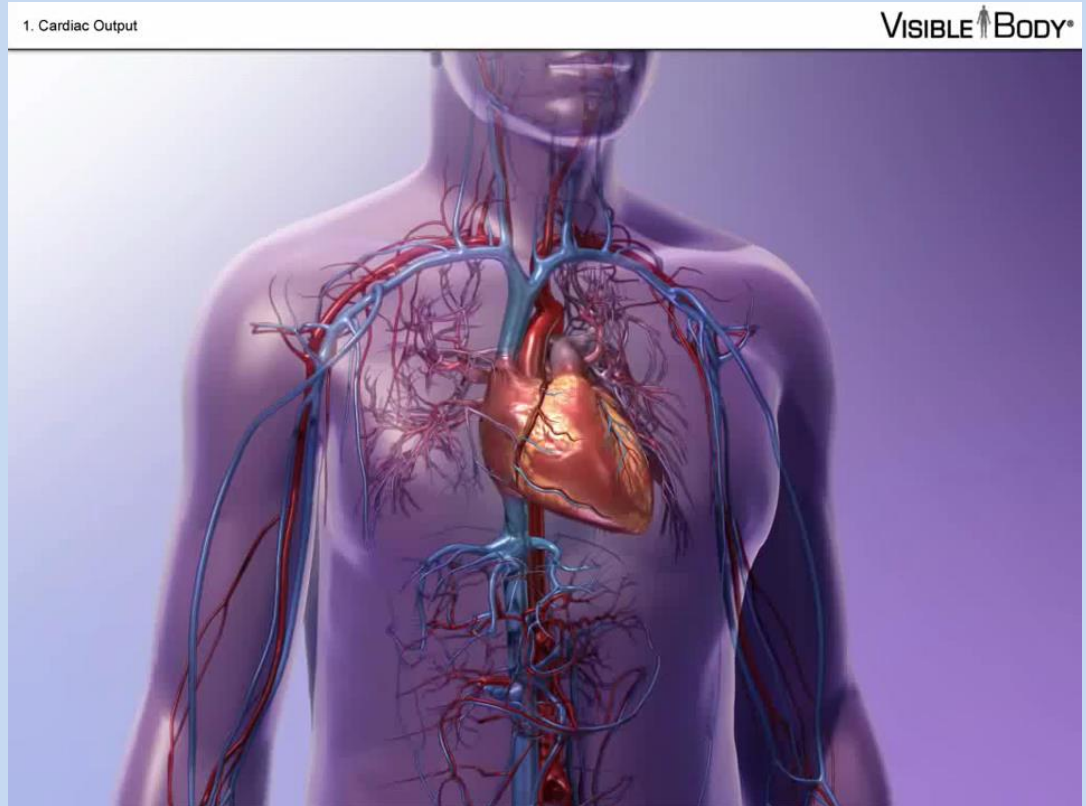
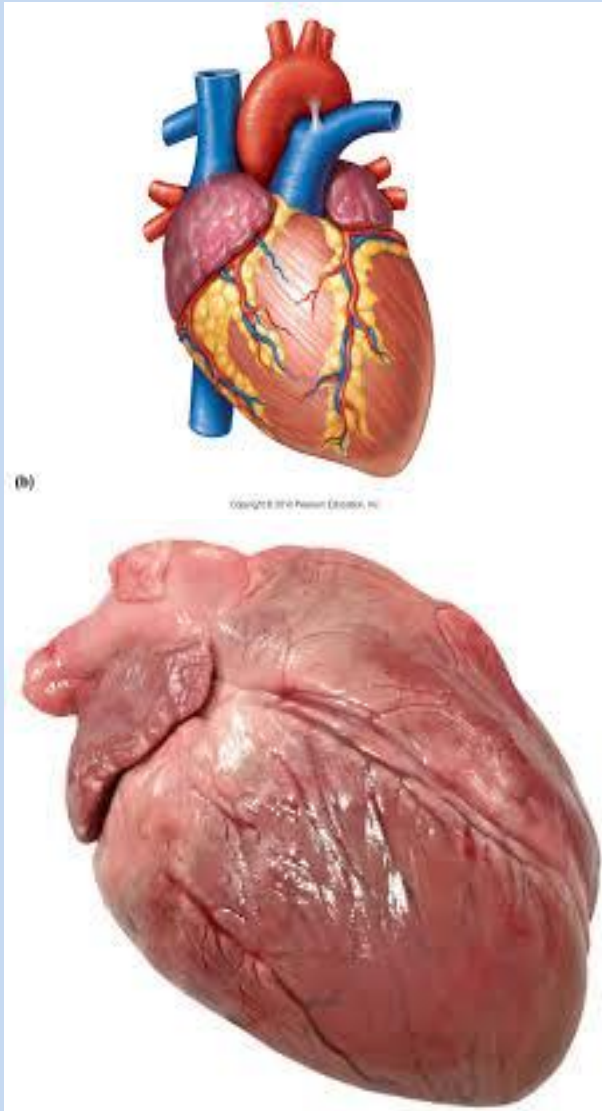
What is “Life Sciences” at Queen’s?

This is a highly sought after undergraduate program that offers students both lecture instruction and laboratory opportunities to learn about human life. With courses ranging from the anatomy and physiology of the organs in our bodies to the bacteria and viruses that compromise organ functions to the cells that give rise to carcinomas to the drugs used to cure us of infection and disease.

What is “Biochemistry” at Queen’s?

This undergraduate program offers students a unique opportunity to learn about the machinery in cells that governs their shape, movement, and functional importance, as well as how this machinery is altered in response to injury and disease.

Human Heart – anatomy and function



Cardiovascular and Blood – development, normal function, and disease

Dr. Ozolins – Cardiac defects
(Pharmacology)

Dr. Pang – Hormone
production (Cell Biology)

Dr. Cote – Contractile
proteins (Biochemistry)

Dr. Maurice – Endothelial
cell function (Pharmacology)

Dr. Boyd – Biomarkers of
Cardiac arrest
(Critical Care Medicine)

Drs. James and Lilicrap –
Congenital blood diseases
(Pathology)

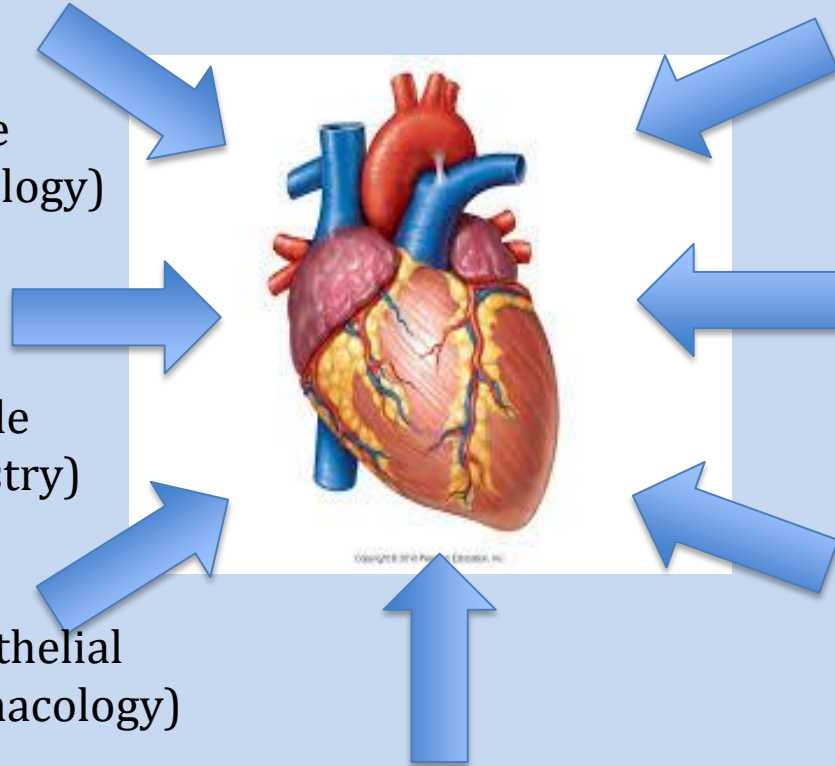
Dr. Funk – Prostaglandins
(Physiology)

Dr. Adams – Hypertension
(Pharmacology)

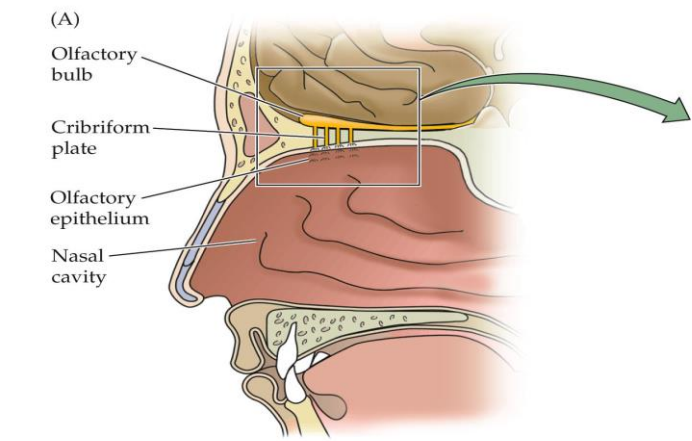
Dr. Zhang – Arrhythmias
(Physiology)

Dr. Ferguson – CNS control
of hypertension
(Physiology)

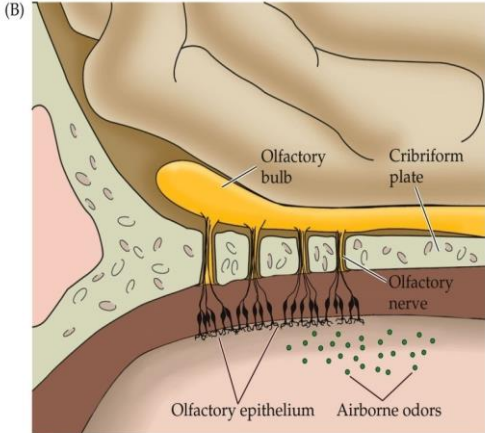
Dr. Jin – Stroke
(Neurology)



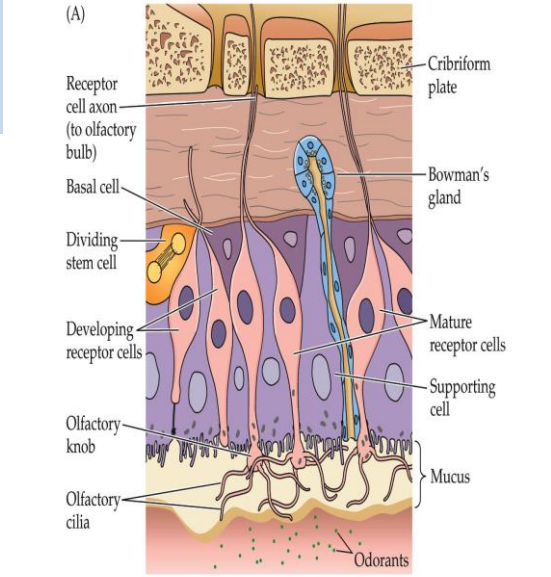
Olfactory Nervous System



NEUROSCIENCE, Fourth Edition, Figure 15.1 (Part 1)



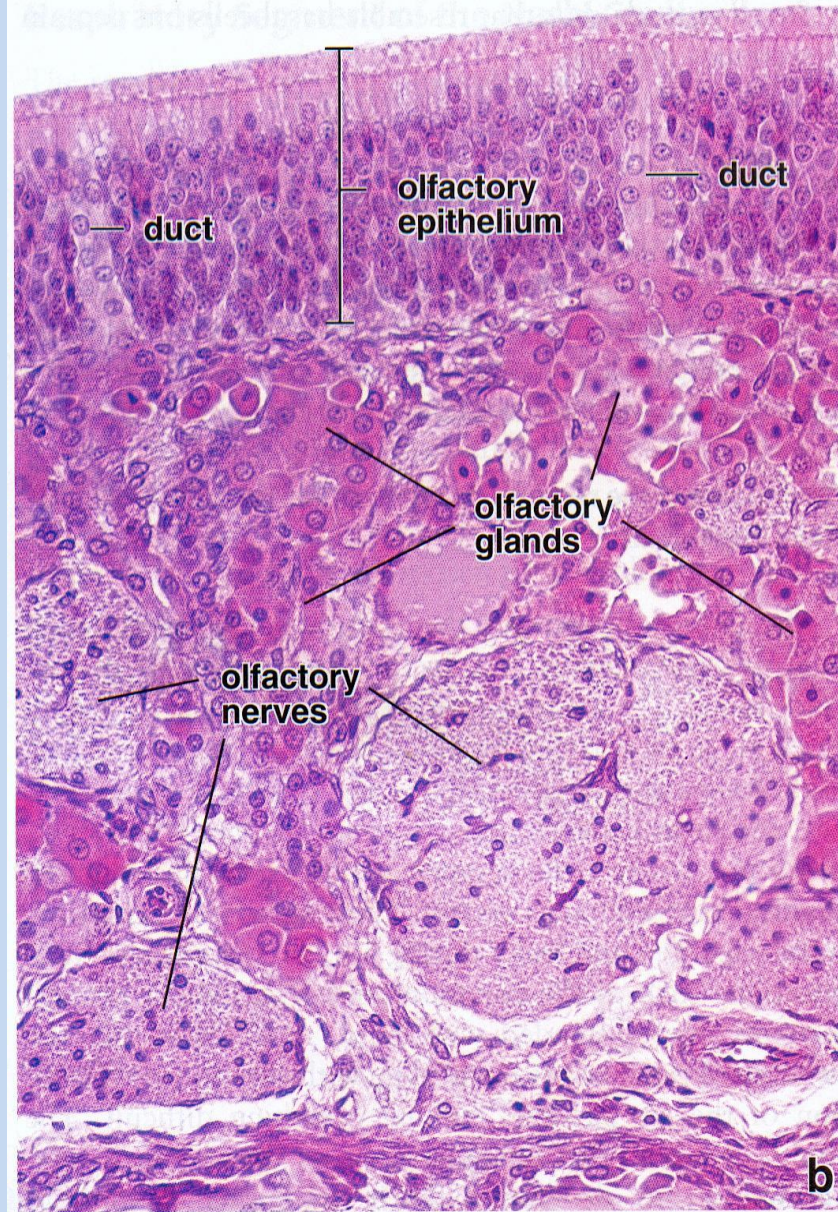
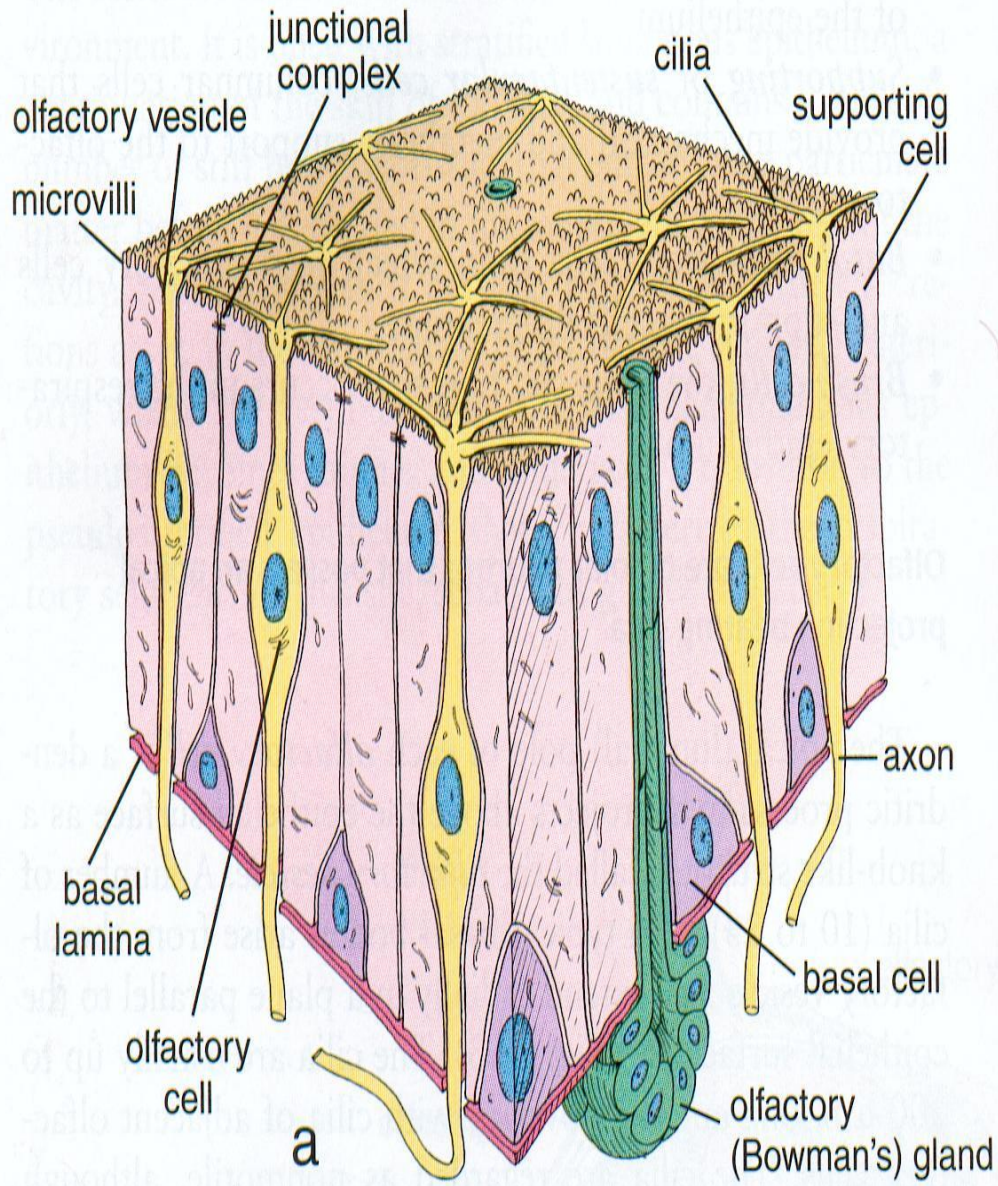
© 2008 Sinauer Associates, Inc. NEUROSCIENCE, Fourth Edition, Figure 15.1 (Part 2)



NEUROSCIENCE, Fourth Edition, Figure 15.6 (Part 1)

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Nobel Prize in Physiology or Medicine 2004

☀ Protein must be able to detect a large number of odorants

■ One gene, multiple combinations (like immunity)

■ A large family of genes each encoding a different receptor

☀ Discovered the Odorant Receptor Gene family (in 1991)



RICHARD AXEL



LINDA BUCK

Introductory Neurobiology 2012

... For their discovery of odorant receptors and the organization of the olfactory nervous system

**Faculty of Arts
and Science**

**Faculty of Health
Sciences**

**Biology
Chemistry
Geology
SKHS
Math
Physics
Psychology**

**LISC
&
BCHM**

**Medicine
Nursing
Rehabilitation
Therapy**

Faculty of Arts And Science

**1st year declared ...
Direct Entry**

- Music
- Kinesiology
- Fine art
- Physical and Health Education

**1st year undeclared
....
Not Direct Entry**

- Social Sciences
- Life & Physical Sciences (e.g., LISC and BCHM)
- Humanities
- Languages
- Creative Arts
- Interdisciplinary Programs

LIFE SCIENCES (LISC)

Anatomy and Cell Biology
Cancer Biology
Biochemistry
Epidemiology and Community Health
Microbiology and Immunology
Neurosciences
Pathology and Molecular Medicine
Pharmacology and Toxicology
Physiology
Etc!

BIOCHEMISTRY (BCHM)

Biochemistry
Chemistry
+
Cell Biology
Microbiology and Immunology
Pathology and Molecular Medicine
Pharmacology and Toxicology
Physiology
Etc!

Faculty who teach in LISC and BCHM are in ...

Department of Biomedical and Molecular Sciences
Department of Pathology and Molecular Medicine
Department of Public Health Sciences

+

Departments of Biology, Chemistry, Mathematics, Physics, etc

Entry into 2nd year LISC requires:

GPA greater than 2.5

(automatic acceptance GPA \geq 3.2)

Pass in 1st year Chemistry

No less than 27-unit load

Entry into 2nd year BCHM requires:

GPA greater than 2.5

(automatic acceptance GPA \geq 2.9)

Pass in 1st year Chemistry

No less than 27-unit load

Maximum enrolment in Sept 2016 ...

350

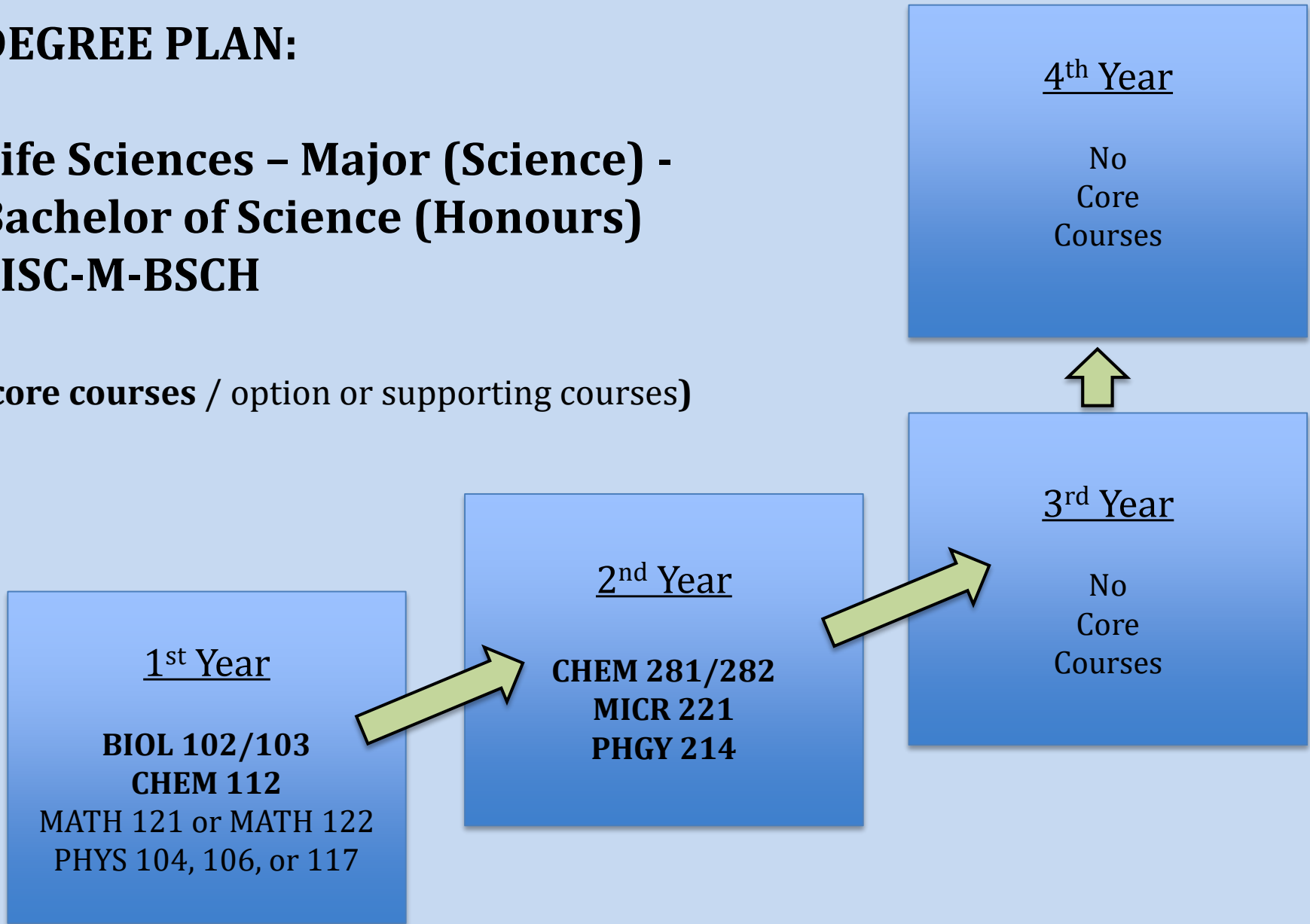
Maximum enrolment in Sept 2016...

90

DEGREE PLAN:

Life Sciences – Major (Science) - Bachelor of Science (Honours) LISC-M-BSCH

(core courses / option or supporting courses)



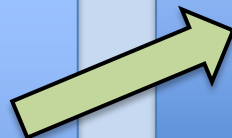
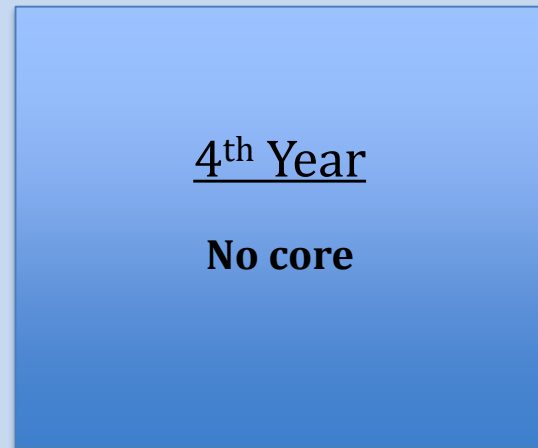
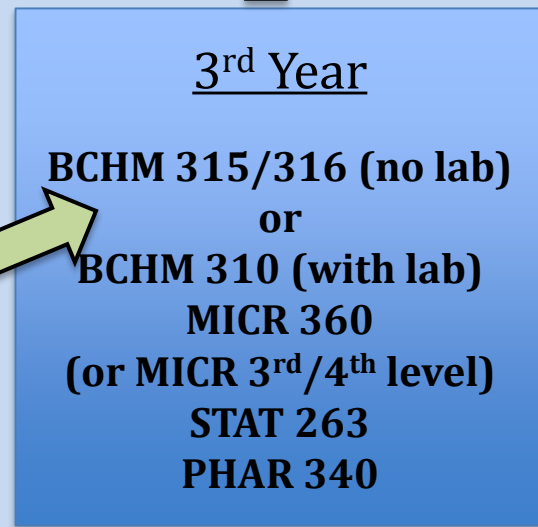
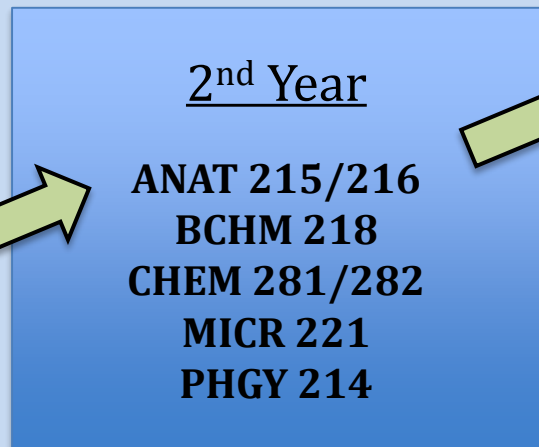
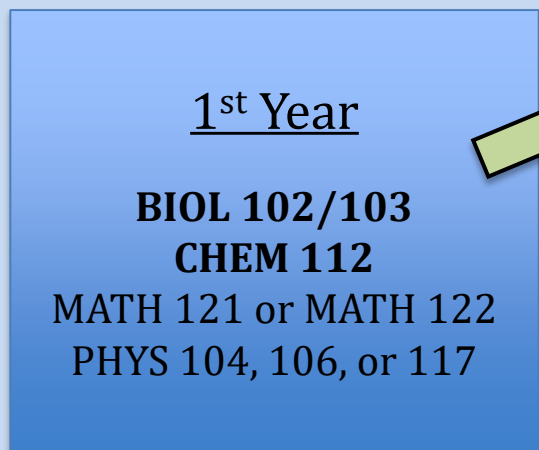
DEGREE PLAN:

Life Sciences – Specialization (Science) - Bachelor of Science (Honours)

LISC-P-BSCH

Sub plan - Biomedical Sciences

(core courses / option or supporting courses)



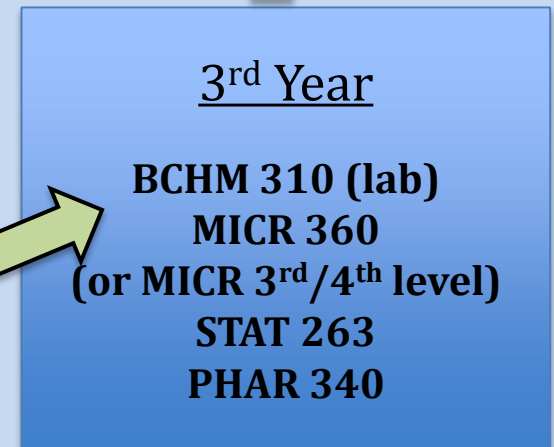
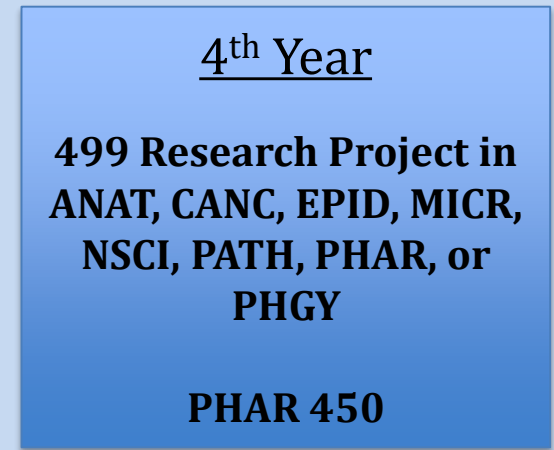
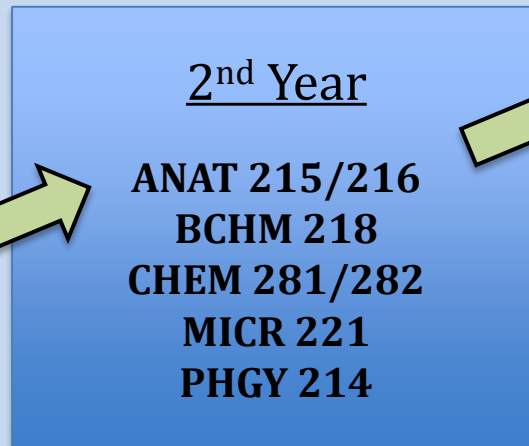
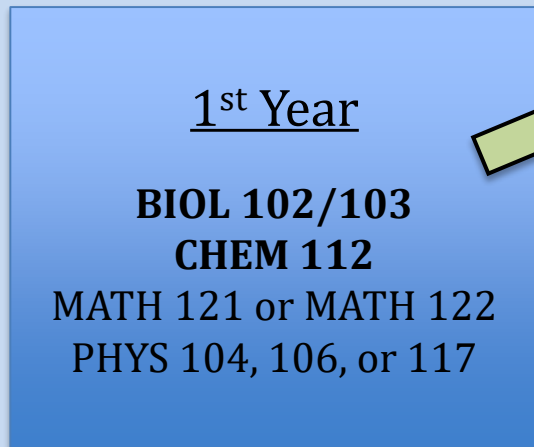
DEGREE PLAN:

Life Sciences – Specialization (Science) - Bachelor of Science (Honours)

LISC-P-BSCH

Sub plan - Biomedical Discovery

(core courses / option and supporting courses)



DEGREE PLAN:

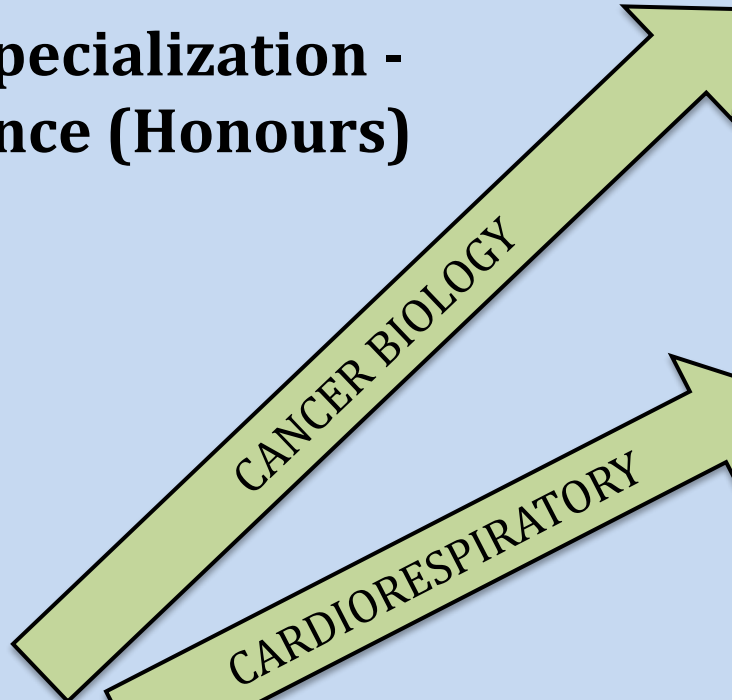
Life Sciences – Specialization - Bachelor of Science (Honours) LISC-P-BSCH

4 Sub plans

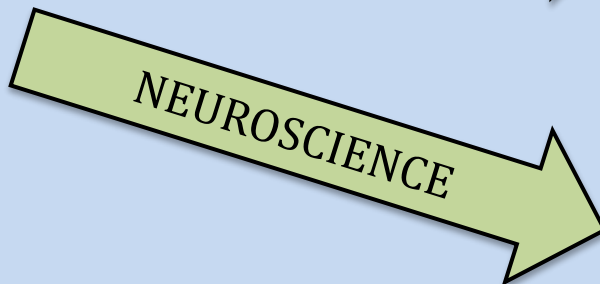
(core courses shown)

3rd Year

BCHM 310 (lab)
MICR 360
(or MICR 3rd/4th level)
STAT 263
PHAR 340



DRUG DEVEL. / HUMAN TOXI.



3rd / 4th Year

CANC 440
CANC 499 + CANC 497
PHAR 450

3rd / 4th Year

PHGY 355 & CRSS 453
LISC 454 or CRSS 456
499 in ANAT, MICR, NSCI,
PATH, PHAR, or PHGY
PHAR 450

3rd / 4th Year

DDHT 459, DDHT 460, &
PHAR 416
499 in ANAT, EPID, MICR,
NSCI, PATH, PHAR, or PHGY
PHAR 450

3rd / 4th Year

NSCI 323 or NSCI 324
NSCI 499
PHAR 450

Combined BScH/MSc Accelerated Program

Combined BScH/MSc (Biomedical & Molecular Sciences)

The Department of *Biomedical & Molecular Sciences* is very excited to launch a new initiative which offers a combined program of a BScH/MSc (*Biomedical & Molecular Sciences*). This program offers an opportunity for students in the 4th year of their Honours program (Biomedical Discovery stream of the Life Sciences or Biochemistry programs) to take up to 2 courses in *Biomedical & Molecular Sciences* at the graduate level which would then allow these students to enter the graduate program with advanced standing. Research begun in the 4th year thesis project could be carried forward as a foundation for the graduate thesis, which would create an opportunity for exceptional students to complete the graduate degree within 4 terms.

Admission to the combined program is a two-step process.

Step 1:

Students will have the option to apply for admission to the combined program (permission to take graduate level courses) in the winter term of the 3rd year, in parallel with the process for admittance to the Honours year and the thesis research project. All applications will then be reviewed by the DBMS Graduate Admissions Committee.

If accepted into the combined program, in Year 4 of the BSc (Honours) program students will be permitted to take up to two 3.0 graduate level courses for a total of 3 or 6 credits towards the 12 credits required for the MSc degree. It is the student's responsibility to gain admission to these graduate courses following acceptance into the program. These courses will be counted as electives or science options towards completion of the degree requirements in the BSc (Hons) program. Only 1 of these courses may be a combined undergraduate/graduate (400/800) level course. The second (and all subsequent) graduate courses must be graduate only (800 and/or 900 level).

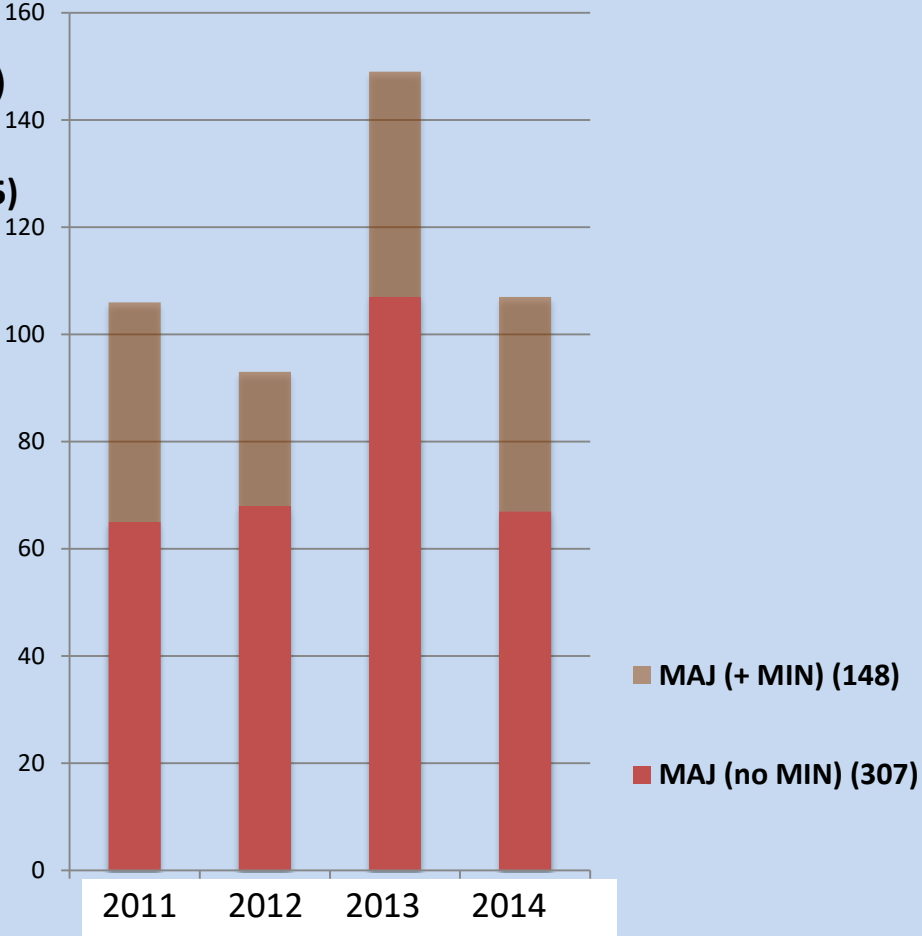
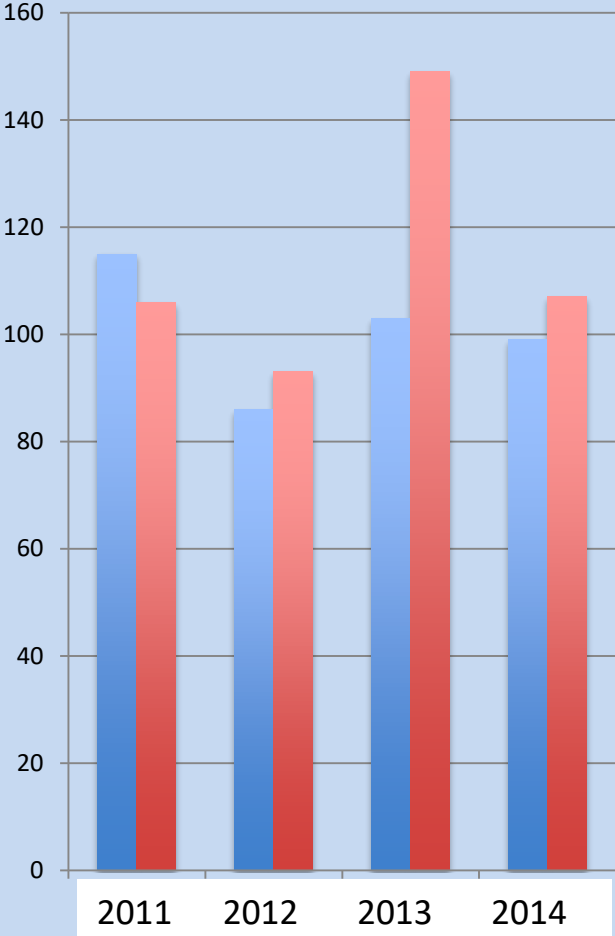
Step 2:

For admission to the MSc program in *Biomedical & Molecular Sciences with advanced standing*, students will be expected to complete the standard SGS application process, have an overall A- average in the previous 2 years of their undergraduate program, and have demonstrated significant research productivity in the 4th year thesis project. In order for the student to be granted advanced standing in the M.Sc. degree program, they must have received a final grade of at least B+ (B plus) in the graduate course(s) taken during the 4th year and meet all other requirements for admission to the MSc program in *Biomedical & Molecular Sciences*.

Applications:

Students should apply in writing via email to (Dr Louise Winn: winnl@queensu.ca) with a copy to the Graduate Assistant Diane Sommerfeld (diane.sommerfeld@queensu.ca) and at that time should provide a copy of their transcript, a brief description (1 Paragraph) of their research project, the name of their Project Supervisor, and identify the graduate level courses they hope to enroll in during their 4th year.

2011 – 2014 Graduation Lists (n=858, 4-year LISC Honours students)

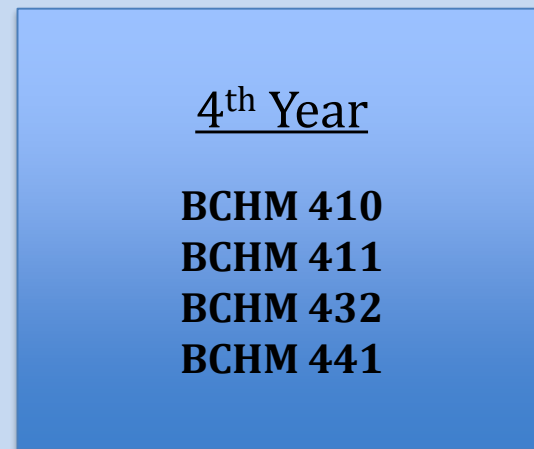
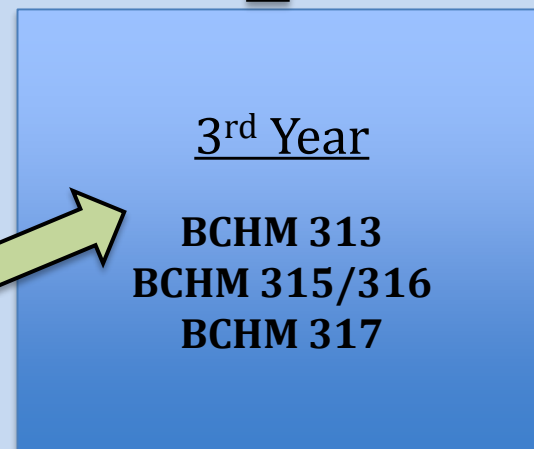
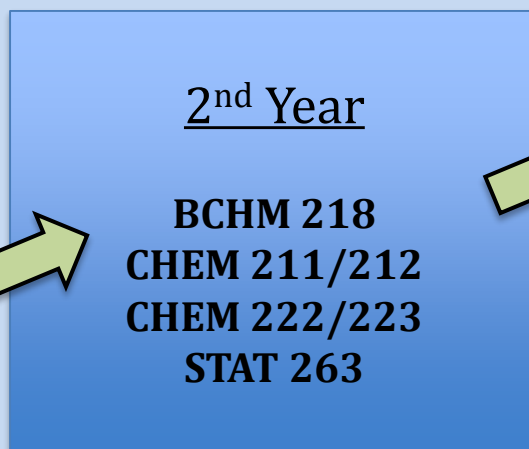
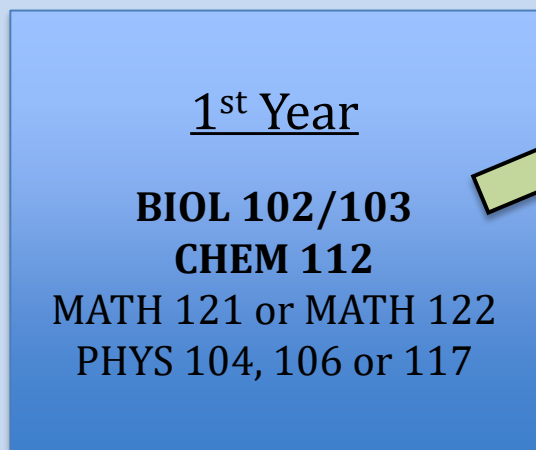


*Not possible to do LISC (MAJ) / BCHM (MIN) and vice versa
 *Not possible to do BIOL (MAJ) / LISC (MIN)

DEGREE PLAN:

Biochemistry – Major (Science) - Bachelor of Science (Honours) BCHM-M-BSCH

(core courses / option and supporting courses)

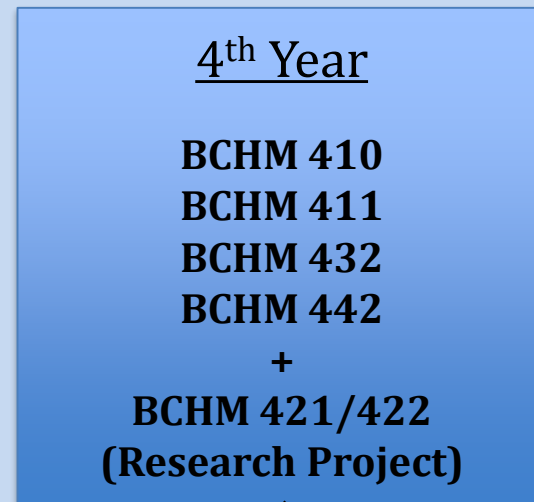
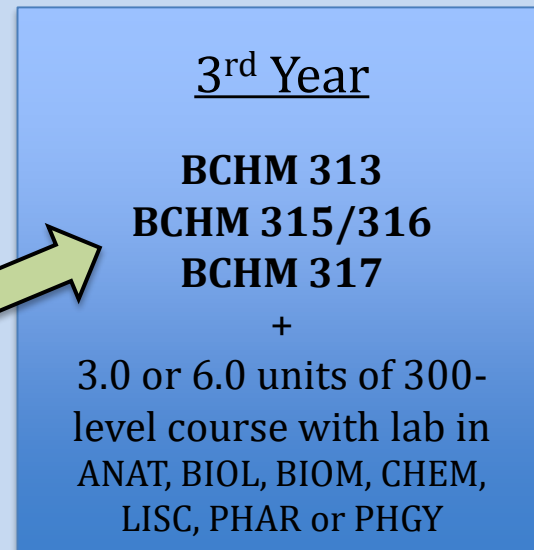
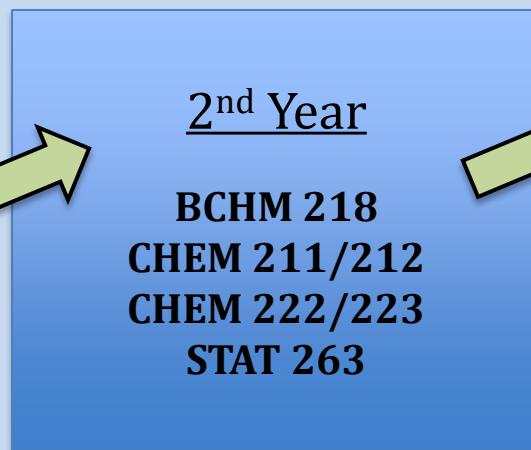
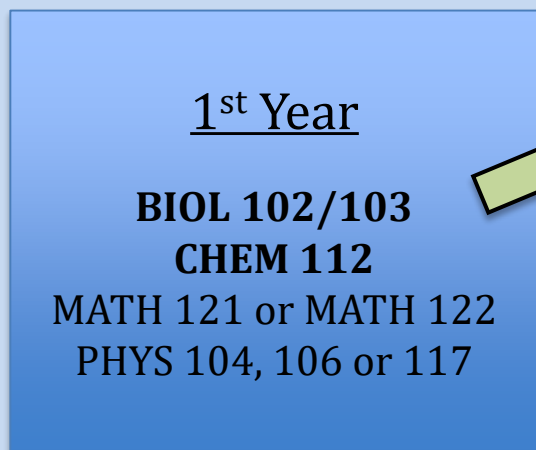


DEGREE PLAN:

Biochemistry – Specialization (Science) - Bachelor of Science (Honours)

BCHM-P-BSCH

(core courses option and supporting courses)



STUDENTS

- ▶ Looking for a Job?
- ▶ Wondering about Career Options?
- ▶ Thinking about Grad School?
- ▶ Want to Build Experience?
- ▶ Tipsheets & Career Resources
- ▼ Services for Students
 - Graduate and Professional Students
 - ▼ Employment Programs
 - M.Eng. Industrial Internship Program
 - **QUIP**
 - SWEP
 - Work Study Program
 - Drop-in Career Advising
 - Events, Fairs, & Information Sessions
 - Career Advising & Resource Area
 - ▶ Workshops
 - ▶ Appointments
 - It All Adds Up
 - LinkedIn at Queen's

Queen's Undergraduate Internship Program (QUIP)

The Queen's Undergraduate Internship Program (QUIP) provides students with a 12-16 month work experience. QUIP internships are paid, professionally supervised, career-related positions designed to offer second or third year students the opportunity to learn about current advances, practices and technologies in business and industry. The program is open to students in the Faculty of Engineering and Applied Science (domestic and international), Faculty of Arts and Science (domestic and international), School of Computing (domestic and international) and the School of Business (domestic only; not for credit). Due to the longer work term (compared to a 4-month co-op), employers are highly motivated to maximize their time and investment. This means that Internship students are offered the opportunity to manage more extensive and significant projects.

[Search QUIP job postings](#)

[Contact QUIP coordinator](#)



Got Questions? Come and see the QUIP Coordinator during QUIP Drop-in Advising Hour – no appointment necessary!

QUIP Drop-in Advising: Every Tuesday and Thursday from 11-12 in the [Career Advising and Resources Area](#) (Sept-April)

– Eligibility

The program is open to students in the Faculty of Engineering and Applied Science (domestic and international), Faculty of Arts and Science (domestic and international), School of Computing (domestic and international) and the School of Business (domestic only - please see an academic advisor in the School of Business before registering).

- Queen's students can participate in QUIP after their 2nd or 3rd year of studies and must be returning to complete their final academic term after the internship.
- Students must have a minimum GPA of 1.9 and the permission of your undergraduate chair to register in QUIP.

DEGREE PLAN:

Biochemistry – Specialization (Science) - Bachelor of Science (Honours)

BCHM-P-BSCH

Cooperative program

(core courses shown)

3rd Year

BCHM 313
BCHM 315/316
BCHM 317

+

3.0 or 6.0 units of 300-
level course with lab in
ANAT, BIOL, BIOM, CHEM,
LISC, PHAR or PHGY

4th Year

BCHM 411
BCHM 442

+

BCHM 421

(8-month placement away)

+

BCHM 422

(4-month period at Queen's)

Final 4-month placement
away

(Research Project +
Cooperative)

5th Year

BCHM 410
BCHM 432

How about an “exit” strategy?

Did you get an acceptance to medical school in your 3rd year?

Life Sciences – General (Science)
Bachelor of Science

Honours routes of Major or
Specialization

Biochemistry – General (Science)
Bachelor of Science

Honours routes of Major or
Specialization



Arts and Science Online

Continuing and Distance Studies, Queen's University

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Online Bachelor of Science

A *General Bachelor of Science plan* is a concentration of 48 units in one subject area and 42 units of electives taken from other subject areas. Queen's Arts and Science Online currently offers the following online Bachelor of Science degree plan:

- Bachelor of Science (General) in Life Sciences

Visit the [Courses](#) page to see the range of options for your electives. Please note that the option courses listed below may not be offered every year, and that you are not required to take all of them to complete your degree. You simply need to take just enough to meet the elective requirement in your chosen plan.

+ Admission Requirements (Online Bachelor of Science)

+ Life Sciences Program Plan

Upcoming Key Dates

November 6, 2015

Fall and Fall/Winter Exam Centre Change Deadline

November 6, 2015

Fall Term Academic Drop Deadline

December 4, 2015

Fall Term Term End

[See More Dates](#)

Apply

The application process for our courses is entirely online. Click on this button to get started.

[Apply Now](#)

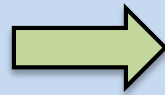
International Programs Office

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Home » Outgoing Students » Exchange

Exchange

CANADA



- Australia
- United Kingdom
- China, Taiwan, Hong Kong
- Singapore
- France
- Sweden
- Etc ...
- New Zealand
- Germany
- Netherlands



Organized by BCHM and LISC Student Executives

*Sponsored by The Office of the Associate Dean,
Life Sciences and Biochemistry*

You are invited to attend the 4th annual

“Canadians Studying Medicine Abroad”

Botterell Hall B147

Wednesday 28th of October 2015

6:30 – 7:30 PM

**This is your chance to hear from Canadian docs
who did their medical education in
Australia, the Caribbean, or Ireland,
and are now here at Queen’s as Residents.
Come with lots of questions!**

Host –

Dr. Michael Kawaja

Associate Dean Life Sciences and Biochemistry

Speakers –

Dr. Janique Dyba, PGY 2 Internal Medicine Queen’s
BPHE & BScH (Queen’s), MBBS (University of Queensland, Australia)

Dr. Jennifer Martins, PGY 3 Psychiatry Queen’s
BScH & MSc (Western),
MD (Medical University of the Americas, St. Kitts & Nevis)

Dr. Asad Naqvi, PGY 2 Diagnostic Radiology Queen’s
BScH (McMaster), MBBS (University of Limerick, Ireland)

LSO Networking Night

Tuesday, November 10, 2015



LSO / CIMTEC Networking Night sponsored by:

Ridout & Maybee LLP

CANADA'S INTELLECTUAL PROPERTY AND TECHNOLOGY LAW FIRM

Please join the LSO Board members and other Industry individuals for the November Networking Night

When: Tuesday, November 10th

Where: Marché Restaurant's **MUVBAR** - Brookfield Place Street Level



42 Yonge Street, Toronto, ON

N.B. Our event will be held at the **INDOOR Brookfield atrium patio at MUVBAR.**

Time: 5:30pm-9:00pm

Please join the LSO Board members for November's monthly Networking Night at Marche Restaurant. It will be a casual opportunity to meet and network with people from all across the Life Sciences industry.

LSO is the voice of Ontario's vibrant and diverse life sciences sector through advocacy, education and promotion of commercial success. Please drop by anytime after work and join us for drinks (cash bar) and build your own network. We hope to see you all there.

What extracurricular activities are available?

Biochemistry and Life Science students both have an active, elected student council that organizes sports, social and academic related activities for their students, including an annual banquet, BBQ's, book and clothing sales. Life Science students also have their own quarterly newspaper "Life Beat" and research publication "QSURJ".

Maclean's 2013 Canadian Universities Guidebook cited **Life Sciences** at Queen's as a Standout Program, having strength in "the integration of basic health sciences with natural and physical science".



Botterell Hall (offices and research labs)



New Medical Building (teaching labs)



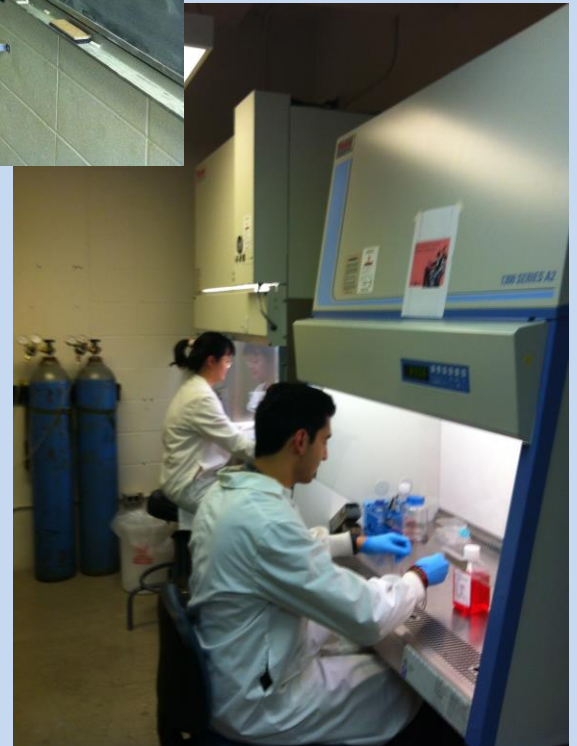
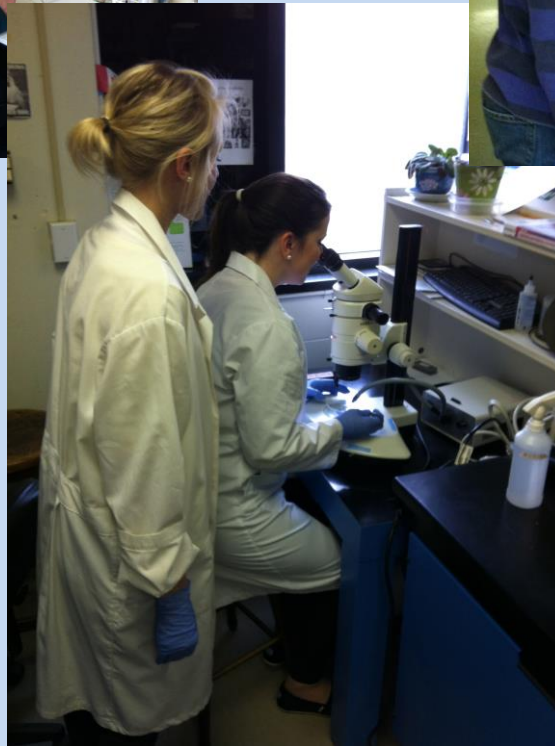
State-of-the-art Teaching Labs

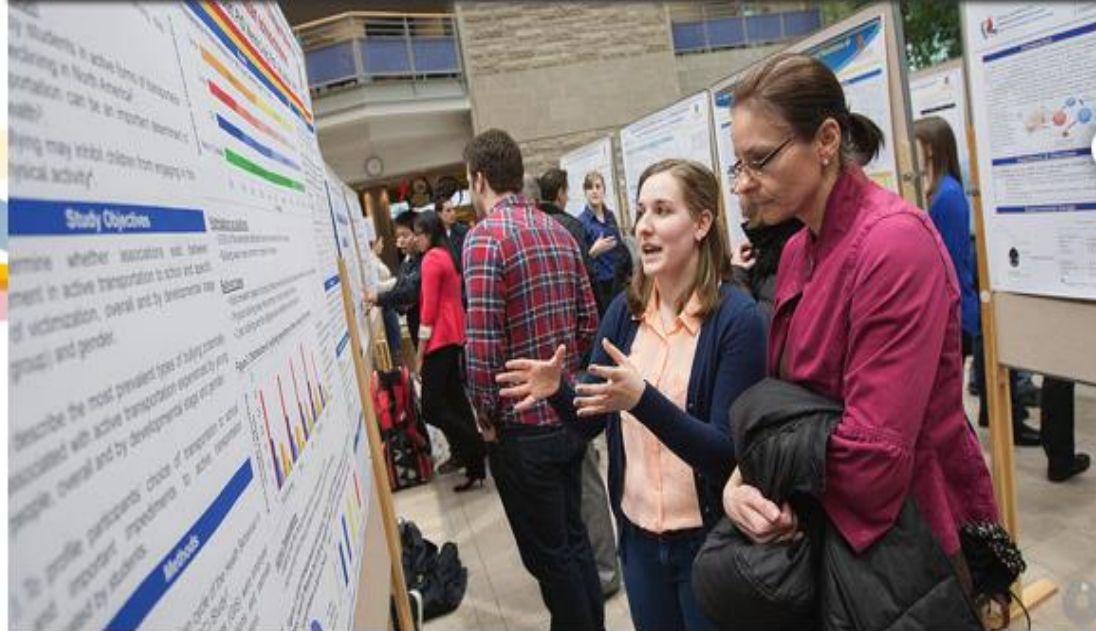


World-class Human Anatomy Labs



Research In Action!





CONNECT



VISIT

GET INVOLVED

GIVE

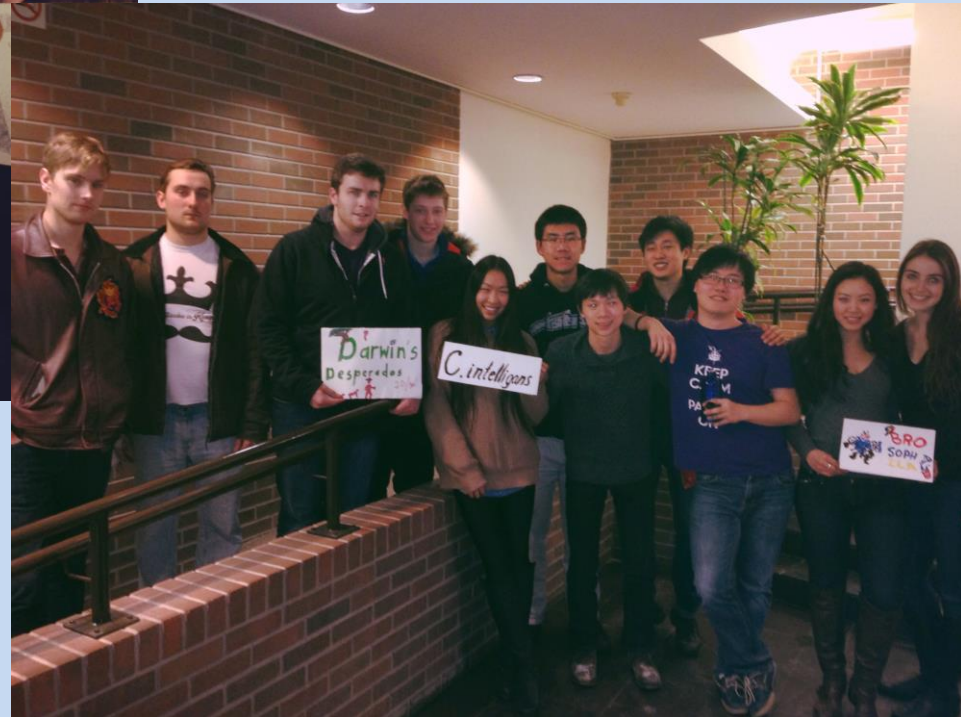


Students presented their life sciences posters in the Bioscience Complex.

27. March 2013

Canadian University Life Science Challenge

Toronto / January 2014



**LISC Formal January 2014
4th year class**



Convocation

**On the 13th of June 2013,
196 LISC students and 38 BCHM students graduated
with Bachelor of Science (Honours) degrees**

71% LISC with Distinction and 53% BCHM with Distinction



Awards Presentations



**Heather Nicol –
Gold Medal LISC
SSP LISC (neuroscience) ...**

now graduate studies at McGill

**Sean Robinson –
TriColour Award
MAJ LISC / MIN French ...**

now medicine at McMaster



**Awards Reception
Fall 2015 ...**

**Chancellor's
recipients**

Career opportunities *after* Life Sciences and Biochemistry at Queen's

Medicine

**Biomedical
Research**

Law

**Health Care, Policy,
Administration, etc**

Industry

**Pharmacy
Pharmaceutical Sciences**

Veterinary Medicine

Dentistry

Education

Chiropractic

Undergraduate degree plans of Meds Class 2018 at Queen's

91% of class completed undergraduate degrees
27% of class have post-graduate degrees, of which 9 are PhDs

30
25
20
15
10
5
0

Life Sciences, etc.

Biochemistry, Chemistry

Biology

Biomed., Health, Medical Sci.

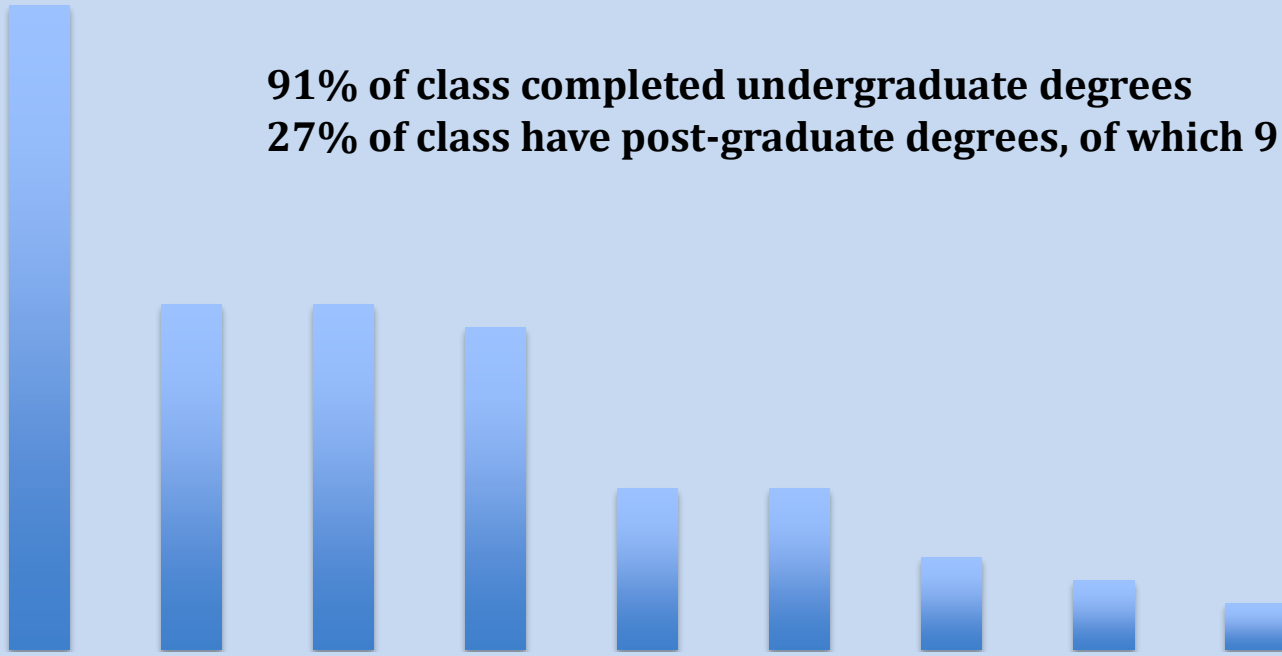
Basic / General Sciences

Neurosciences

Engineering

Arts (Engl., Music, Psych.)

Commerce, Economics



The Office of the Associate Dean

Life Sciences and Biochemistry



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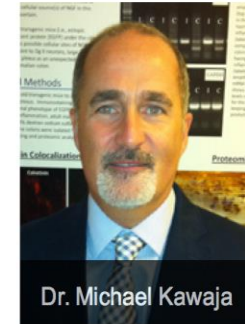
Site Search...

Life Sciences Program

The Life Sciences program at Queen's University is one of its largest Bachelor of Science degree plans on campus because of its high demand by students who wish to pursue careers in biomedical research and health care.

Biochemistry Program

The Biochemistry program is a comprehensive program in the Bachelor of Science degree plan, which provides students with an in-depth training in modern experimental Biochemistry and prepares for entry into graduate programs, industry, and careers in the biomedical sciences.



Dr. Michael Kawaja



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The Undergraduate Program Office is always available to advise students in all aspects of their studies at Queen's. Please contact us for assistance and if necessary an appointment.