



# Biochemistry UNIVERSITY OF TORONTO

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September 6<sup>th</sup>, 2017

Dear BCH Specialists and Majors:

As the new school year rapidly approaches, on behalf of the Department of Biochemistry, I'd like to welcome all returning and new students of our undergraduate classes!

This newsletter contains useful information and tips for the upcoming year, including information about course selection, program requirements, research opportunities, important contacts and general information about the Department of Biochemistry. Please pay careful attention to the information provided for your specific year and the upper years within your program, as this may help prevent problems before they arise. We are here to assist you in your undergraduate studies and encourage you to ask questions that are not addressed in this information package.

I wish you all a successful year!

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# FALL 2017 NEWSLETTER

## BCH SPECIALISTS AND MAJORS

### BCH SPECIALIST STUDENTS

#### SECOND YEAR STUDENTS

First, a sincere welcome to all of you, as you begin your first year in the BCH Specialist program! You will find the BCH faculty and staff to be very informative and helpful so do not hesitate to approach them with any questions or concerns that you may have. Outlined below, are important details about required courses in second year, the BCH Shadow Program, and Research Project courses.

#### *BCH242Y*

Your first BCH course is **BCH 242Y**; an excellent, full-year course intended to give you a comprehensive background in biochemistry and preparation for the 3<sup>rd</sup> and 4<sup>th</sup> year lecture and laboratory courses in the program. For BCH 242Y, you will have lectures Mondays, Wednesdays and Fridays at 10 am in MSB 4279. Tutorials are scheduled on Wednesdays 11 am-12 noon and on certain Wednesdays the whole morning (9 am-12 noon) is devoted to laboratories. This includes one introductory lab and four laboratory periods, encompassing each of the lecture sections: Proteins and Enzymes, Molecular Biology, Biomembranes and Membrane Proteins, and Metabolism.

**The tutorial sessions will be held approximately bimonthly throughout the year and will be led by Josh Jesin**, a graduate student in the biochemistry department. He will lead discussions on material presented within lectures and address any questions arising from the lectures and past exams. Your attendance and participation at the tutorials is highly encouraged and will provide additional understanding of the course material and is excellent preparation for exams.

Please visit the [BCH242Y website](#) and [Blackboard](#) for details about the course, including the lecture, tutorial and laboratory schedule. **NOTE:** the recommended text for BCH 242Y is Biochemistry, Voet and Voet, 4<sup>th</sup> ed. (Wiley) and may be purchased at the U of T Bookstore located at 214 College St.

#### *Other 2<sup>nd</sup> Year Course Requirements*

The BCH Specialist program also requires a **Genetics** course (BIO 260H or HMB 265H).

**Note:** The large scope of the program's elective courses listed in the [Calendar](#) include courses in a wide range of Life Science Departments, as well as Chemistry, Statistics, Computer Science, and Math.

It is important to realize that second year courses are more challenging than those taken in 1<sup>st</sup> year. **Please remember: do review often and keep on top of each of your courses. Do not leave studying until the week or even days before a test or exam as low grades may impact your acceptance into research and post-graduate programs.**

### *Shadow Tours*

In and around Reading Week, we offer **Shadow Tours** for Second year Specialists in Biochemistry as an opportunity to experience what a day in a research lab is like. The Department has many faculty members with labs that specialize in a variety of research areas. This program allows you to visit and learn from a research lab specializing in protein structure, protein folding/processing /chaperones, cell signaling, bioinformatics, membrane proteins, cell biology, molecular biology or proteins in disease. If you are interested in participating in a Shadow Tour, you may obtain a Visit request form from Dr. Andreopoulos in the New Year.

### *Research Projects*

**\*\*\*The Specialist Program is designed as a route towards graduate/professional school as it offers more thorough training in biochemistry and practical laboratory experience in the sciences.\*\*\***

To develop your research skills and improve your laboratory techniques, a number of BCH-research project courses are available to you after successful completion of BCH242Y1.

**NOTE: All project courses require a cGPA minimum of 3.0 and permission of the department.** One FCE from a research course may be used for the BCH Specialist program (14 FCEs total).

The first research project course, BCH 372Y, is offered in the summer session following 2<sup>nd</sup> year.

Our Summer Student Research Program is also another opportunity to enhance your research and laboratory skills. These summer research positions provide a stipend for students but do not provide a course credit. You may contact [Jennifer Haughton](#) (Undergraduate Administrator) about the application process in December/January. More information about the Summer Student Research Program is available at the end of this Newsletter.

## THIRD YEAR STUDENTS

Welcome back! You will find your courses this year (**BCH 340H, MGY 311Y and the lab courses BCH377H and BCH378H**) to be stimulating and challenging, bringing you that much closer to actual research in Biochemistry (if you have not participated in a research project yet!).

For [BCH377H](#) and [BCH378H](#), please log into Blackboard for this year's timetable, location, course outline and other important information including notebook requirements.

### *Course Selection*

**Review the extended list of elective courses that are available in the BCH Specialist program (see [Calendar](#)).** It is highly recommended that you complete all your 3<sup>rd</sup> year requirements this year as you will need **BCH340H, BCH377H + BCH378H, and MGY311Y** for the advanced laboratory course **BCH478H** next year. When planning the courses that you will take in 3<sup>rd</sup> year, please ensure that you have completed your needed course requirements up to the end of 3<sup>rd</sup> year.

**If you are considering dropping one of the required program courses, consult with Dr. Andreopoulos immediately!** These courses are offered only once a year and by dropping a course you may be delaying your progress through the program and you will not be permitted to enrol into BCH478H1 without the successful completion of BCH340H, 377H1, 378H1 and MGY311Y.

### *Research Project Courses*

**It is advantageous to have lab experience when applying to graduate school!** The BCH Specialist program offers a number of courses that provide research experience. One FCE from a research project course, or courses, may be used for the BCH Specialist Program requirements. Specialists may also take as many of the BCH research courses as they wish, and use them as part of their 20 credits for their degree.

**If a Specialist takes more than 1 FCE within the BCH research project courses, the extra research FCEs must be taken in different laboratories.**

You may enroll in the 3<sup>rd</sup>-year research project courses after successful completion of BCH242Y; have a cGPA greater than 3.0 and with Departmental permission. Some project courses may also require specific co-requisites.

The 3<sup>rd</sup> year research courses are BCH 372Y (summer following 2<sup>nd</sup> year), and BCH374Y (Fall and Spring terms of 3<sup>rd</sup> year). You may enroll in either BCH372Y and BCH374Y. Additional research project courses include the summer course following 3<sup>rd</sup> year (BCH472Y) and during 4<sup>th</sup> year (BCH473Y).

### *Summer Research*

After completion of your 3<sup>rd</sup> year BCH courses, you may be eligible for BCH472Y (summer research project course). It may also be possible for you to complete a paid, summer research position in a lab supervised by a Biochemistry faculty member and then take the BCH research project course BCH473Y in the same (or a different) lab during your 4<sup>th</sup> school year. A minimum cGPA of 3.0 is required, successful completion of BCH340H, 377H, 378H and departmental permission.

Information about the Summer Student Research Program may be found at the end of this Newsletter.

## **FOURTH YEAR STUDENTS**

Well, this is it, your final year! Congratulations! By using Degree Explorer, you can review your completed courses and those required for 4<sup>th</sup> year to ensure that you meet all the requirements of the BCH Specialist Program, the Degree Requirements, and the Distribution Requirement noted in the Arts and Science calendar. Arts and Science expects students to closely monitor their own progress throughout the program so that there are no surprises.

### *Course Requirements*

**You need to select 4 of the 4<sup>th</sup> year BCH/BCB/MGY/CHM lecture half courses** listed in the calendar - **2 of these must be BCH 'H' courses.** Some of these courses have enrolment controls. You will need to email Dr. Andreopoulos or [Jennifer Haughton](#) (Undergraduate Administrator) for assistance. **The prerequisites for these 4<sup>th</sup> year**

**courses are usually BCH 242Y and MGY 311Y. It is your responsibility to ensure that you have completed the prerequisites prior to enrolling into your 4<sup>th</sup> year courses.**

### ***BCH479H Seminar course (OFFERED 2017-18, minimum enrolment 6 students)***

The seminar course, BCH 479H is available for 4<sup>th</sup> year BCH Specialists. This will be a small class (maximum of 8 students) that facilitates interaction with faculty in Biochemistry. Research papers will be discussed and evaluated and students will give presentations based upon research papers. BCH 479H can fulfill one of your 4 required H courses in 4<sup>th</sup> year.

### ***BCH 478H Advanced Lab***

The advanced lab course BCH 478H is required in 4<sup>th</sup> year. **The first meeting of this course will take place on Thursday, September 9th from 9 to 10 am.** Please log into Blackboard for more detailed information about [BCH478H](#).

You are expected to attend this meeting which will introduce you to the material for the first experimental module. Failure to attend this class or any of your labs, may result in poor lab performance.

### ***4<sup>th</sup> Year Research Project***

If you are interested in the Research Project Course, BCH473Y, you should contact Dr. Craig Smibert, the course coordinator. **NOTE: Consideration will be given to students who have successfully completed BCH340H, 377H and 378H and have a cGPA of at least 3.0. BCH478H is also a co-requisite for BCH 473Y** (the only exception to this rule is if you take BCH 473Y in a 5<sup>th</sup> year and already have a credit for BCH 478H). Check the [BCH473Y website](#) for more information about eligibility and the enrolment procedure.

## **BCH MAJOR STUDENTS**

### **SECOND YEAR STUDENTS**

First, a warm welcome to all of you, as you begin your first year in the BCH Major program! You will find the BCH Faculty and Staff very informative and available for assistance during business hours. Outlined below, are important details about courses in second year and what you should be aware of regarding program requirements. Since many of you will be combining your BCH Major with a second Major, you are strongly advised to pay careful attention to the requirements of both of your programs.

### ***BCH210H***

Your first Biochemistry course is the fall half-course **BCH210H (Biochemistry I)**; an excellent preparatory course in Biochemistry for students with broader scientific interests. Please visit the [BCH210H](#) course website for further details. Lectures are held on Tuesdays, Thursdays and Fridays at 10 am in Convocation Hall.

Slides/Notes for the course lectures by Drs. Reithmeier, Melnyk, Andreopoulos and Patterson will be available on Portal.

Help Session tutorials in **BCH210H** are held on Thursdays and Fridays from 11 am - 1 pm. In tutorials, questions and topics from the lectures are taken up, including sample exam questions.

The recommended text for BCH 210H is Biochemistry, First Canadian Ed. by Garrett, Grisham et al. (Nelson, 2013). This text is available in the U of T Bookstore, 214 College St.

**Please remember you will do best when you attend and pay attention to each lecture.** You will also do better if you take notes during the lectures, as this will help you recall the concepts more easily afterwards. **If you miss a lecture, you will miss course information and the lecturer's guidance, and this will likely result in a lower final grade in BCH 210H.**

Attending regular tutorials will enable you to work out any problems with the lecture material and familiarize yourself with the sample exam questions.

**\*\*\*NOTE: When you have successfully completed BCH210H in December 2017, you are eligible to enroll into BCH311H (Biochemistry II) and BCH370H (Laboratory Course) starting in January 2018. The only prerequisite for these courses is BCH210H.\*\*\***

### *Important Information for the Combination of Majors*

Majors also need to combine their BCH Major with a Major from another program. The required courses that you need/select for the two majors must have at least 12 FCE's that are distinct.

In other words: take the BCH Major and list the 8 FCE credits you need here. Then look at your second major. You should be able to identify at least 4 FCEs that are different in the requirements for the second major. (FCE = Full Course Equivalent)

#### **BCH Major (8 FCE)**

BIO 120H, 130H      BCH 370H  
CHM 136H (*138H*)    BCH 311H  
CHM 135H (*139H*)    BCH 340H  
MAT 135H, 136H    CHM 220H

BCH 210H            BCH 422H  
BIO 230H            BCH 426H  
CHM 247H

#### **Human Biology Major (8 FCE)**

BIO 120H, 130H    **PSL 300H**  
CHM 138H (*138H*)    **PSL 301H**  
CHM 139H (*139H*)    **IMM 334Y**  
MAT 135H, 136H    **CSB 351Y**

BCH 210H  
**BIO 220H**, 230H  
**HMB 265H**

In the example above you can see that the courses in the Human Biology Major that differ from the BCH Major are noted in bold. This schedule has 4 FCEs in the Human Biology Major that are different from the required courses in BCH.

However, you can see if this student did not take IMM334Y or CSB351Y but attempted to use the BCH340H course to fulfill part of the HMB Major this would reduce the number of different credits to 3, which would **not** fulfill the course requirements for the combination of 2 Majors.

If you are in doubt about fulfilling this double major, please contact Dr. Andreopoulos or our Administrator, [Jennifer Haughton](#). BCH Majors who also have a PSL or PCL Major should be particularly careful as the 12 FCE rule may be challenging to fulfill.

## THIRD YEAR STUDENTS

Congratulations on having successfully completed second year!

### *Program Requirements*

**It is important, as noted above in the comments to 2<sup>nd</sup> year students, that you check your required courses in your two Majors to ensure that you will have at least 12 distinct FCEs by the end of 4<sup>th</sup> year.** Students in the BCH/PSL and BCH/PCL Major programs may contact me for further clarification of this requirement. All students are strongly advised to attend to this issue *before* classes begin or before the end of the fall session.

**Complete all of your 3<sup>rd</sup> year requirements this year.** You do have priority for 3<sup>rd</sup> year course selections in Biochemistry as a 3<sup>rd</sup> year student. If you leave 3<sup>rd</sup> year courses until your 4<sup>th</sup> year, you may not have space in your timetable for 3<sup>rd</sup> year courses as conflicts may arise with the 4<sup>th</sup> year courses. Many of the 4<sup>th</sup> year BCH courses also require the successful completion of the 3<sup>rd</sup> year molecular biology course **BCH 311H (Biochemistry II, Nucleic Acids and Biologic Information Flow).**

**NOTE:** you may enroll into BCH 311H and/or BCH 370H in your 2<sup>nd</sup> year after successfully completing BCH 210H in the Fall session.

**\*\* BCH311H is the required 3<sup>rd</sup> year molecular biology course. PSL350H cannot be used for BCH Major Students.\*\***

**Withdrawing from any of the required courses in your 3<sup>rd</sup> year will result in a delay of your progress through the program. You are encouraged to discuss your concerns with Dr. Andreopoulos prior to taking this action.**

You may also be thinking about **employment** at this time or possibly entrance into professional programs. Majors can combine BCH with a Major on the Arts and Humanities side. English and BCH could very well lead to careers in scientific journalism. Visual Studies and BCH could lead to scientific illustrations, programming of molecular structure and science in communication. Economics and Biochemistry could lead to careers in the financial investment industry. You can certainly e-mail me with questions about medical school or concerns about courses.

## FOURTH YEAR STUDENTS

Welcome back! You are now in your final year!

### *Program Requirements*

**BCH Majors** in 4<sup>th</sup> year are expected to review their course credits and the courses they wish to take this year and ensure:

1. You meet the requirements of each of your two Major programs
2. You have at least 12 distinct FCEs among the designated required courses for your two Majors



3. You meet the Degree Requirements and Distribution Requirements noted in the Arts and Science calendar
4. You have utilized Degree Explorer to obtain a snapshot of your schedule

If you have difficulty in registering for a 4<sup>th</sup> year BCH lecture course, please contact [Jennifer Haughton](#) (Undergraduate Administrator).

**If you have not already done so and you are in the BCH/PSL Major or a BCH/PCL Major programs, please contact me if you are having difficulty with the 12 distinct FCE rule for required courses in BCH + PSL or BCH + PCL.**

## SOME HINTS FOR FIRST YEAR STUDENTS

If you have friends or relatives entering Life Science at the First Year level, I invite you to share the following information to aid them in making their decision about their Program of Study.

### *Course Requirements*

1. **Both our Specialist and Major programs require that you complete at least four FCEs (full course credits) from the prerequisite courses in 1<sup>st</sup> year prior to applying to these programs. Students usually complete five FCEs in their first (and each subsequent) year.**

If you leave a course or two until the summer, your applications to the BCH programs may need to be considered in the second round of program applications (early September, after most students have entered programs of study).

2. **Prerequisites for all our courses are required without exception.** So if you do not have the necessary prerequisites (e.g. CHM135H and 136H for BCH242Y and BCH210H), you will not be permitted to enroll in these courses. You may initially register for the courses, but within the first few weeks, prerequisite checks will be performed randomly. Students who do not have the required prerequisites will be removed.
3. **If you are transferring from UTM or UTSC to St George to begin your 2<sup>nd</sup> year, your first year CHM course at UTM or UTSC will NOT give you an equivalent credit for CHM136H (organic). Thus, it is wise to take this course over the summer at the St George campus if you are planning to take courses downtown for 2<sup>nd</sup> year. Additionally, investigate the value of your Biology courses in relation to BIO120H and BIO130H at St. George.**
4. **The BCH Specialist and several of the other Medical Life Science Specialist programs do require a first year PHY credit. If you wish to pursue graduate studies and a career in research, your best choice is a Specialist program that offers in depth practical laboratory training.**



### ***Double Major or Specialist Program?***

Major programs have been quite popular for many years and certainly provide students with a diverse selection of courses. You can also combine strategically two Majors to follow a particular career path.

Students are often interested in applying to professional schools (medicine, dentistry, veterinary and chiropractic schools) and naturally have an active, ongoing interest in maintaining high grades for entry. As a result, students choose Major programs and often find themselves in larger classes of more general courses offered at the university. As well, if there is a choice, Major students may opt out of laboratory or research courses since there is the perception that these courses are time intensive.

It is important to consider the following when deciding to select the Major or Specialist program:

**If you are interested in a research career either at the university, in a hospital research institute, in government or industrial laboratories, an appropriate Specialist program will give you more theoretical and practical lab and research training. This is the best route to graduate school and research careers (including clinical research).**

1. If you are considering a Major program as a route to a professional school, one of the admission criteria will be the achievement of a minimum mark in the courses for entry and/or a minimum cGPA. Often, only a small percentage of applications are successful. If your applications are unsuccessful, you may find that your alternate career choices are limited especially if you lack the advanced laboratory or research experience, which is a principal feature of Specialist programs. Specialist programs are the preferred route into Graduate School, and will expose you to advanced practical and research experience. As a graduate of the Specialist program, you will be a member of a small class of highly trained students who will have greater access to one-on-one guidance as you personally get to know Biochemistry faculty members. As a Major student, your graduating class will be considerably larger and you may not have the practical skills needed to further your education.
2. One **very** important feature of professional school applications are **letters of reference**. These letters require knowledge of your academic performance beyond your term test and exam results. The best letters will inevitably come from small classes where the instructor knows you well or research courses where you have a supervisor who interacts closely with you. These are hallmarks of Specialist programs.

These important interactions will not arise if you take larger classes and avoid laboratory or research courses. You can imagine that a reference letter that says: "Student X was a member of our class, received a grade of 85% (class average 73%) and thus I can recommend X to you." is **insufficient** when professional schools are asking detailed assessments about initiative, leadership, maturity, cooperation, integrity, problem solving, fluency in spoken and written English, ability to communicate, relate to others and self-directed learning and critical thinking. A referee who is familiar with your academic performance will be highly beneficial.

3. At the University of Toronto, the Faculty of Medicine places tremendous value in research. The phrase “From Bench to Bedside” stresses the very substantial link between research and successful clinical treatment. The research experience acquired in the Specialist programs is very much an asset for professional applications. Research experience will also increase your chances of entry into graduate school and as a successful graduate student with a graduate degree you can also apply to professional schools.
4. **The grade averages in specialist courses are often just as good or better than average grades in general courses.** The Specialist courses may be more intensive than general courses but, as it is your future that is in the balance, it is worth it to spend the extra time.
5. **Relying on friends and colleagues for advice about programs or courses is not helpful in the long term.** You are your own person and you owe it to yourself to find out all the details about different programs before making a program decision. Consult with students who are performing well and are in the programs that interest you. Consult with the course coordinators. Make an informed choice. Think about where you will be in four years and what career or career path is your best choice, and choose a program that can get you there!

## BUSS

The Biochemistry Undergraduate Students’ Society (BUSS) organizes great extracurricular events for BCH students. These will include the **Biojeopardy** evening in the winter, which pits students and faculty from BCH, IMM and MGY against each other, as well as course and program information sessions throughout the year. **Please visit [BUSS’s Website](#) for updates on events and meetings – do attend them!**

If you have any further questions about the nature of required courses and wish a student perspective (level of difficulty, method of preparation for examinations, etc..) you may contact any of the BUSS Executive. Their e-mail addresses are listed on the BUSS website.

## SUMMER STUDENT RESEARCH PROGRAM

At the end of 3<sup>rd</sup> year in the Specialist Program, and after intensive, formal lab training in biochemistry (**BCH242Y, BCH377H, BCH378H**) and possibly also the research courses (**BCH372Y, 374Y**), you may be able to find summer employment within a lab! In the past, third year students and, exceptional second year students have been accepted into the Summer Research Program.

Students within the program receive a stipend for their summer work but may not use their summer stipend work for a course credit. In December/January, please contact [Jennifer Haughton](#), (Undergraduate Administrator) about the application process. In the New Year, you may also consider approaching the research institutes at the hospitals for opportunities for summer employment located in their labs.

Check out the [Summer Student Research Program website](#) for more information.

## GRADUATE & LIFE SCIENCES EDUCATION

Interested in other research and graduate opportunities? You can explore the programs offered within the Faculty of Medicine at the following url: [www.glse.utoronto.ca](http://www.glse.utoronto.ca) and/or you can follow GLSE on twitter: <https://twitter.com/UofTGLSE>

**NOTE:** GLSE will be holding their Third Annual Graduate and Undergraduate Research Information Fair during November in the Medical Sciences Building, Student Commons, 1 King's College Circle. We encourage you to attend as many events as you can to learn more about the interesting and exciting graduate and undergraduate programs within the Faculty of Medicine!

## CONTACT INFORMATION

The Biochemistry Faculty and Undergraduate Office are available to assist you.

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Contact information for faculty members involved in specific undergraduate courses can be found on the [Biochemistry website](#).