Biochem 2B03 (2019/20): Nucleic Acid Structure and Function

Instructor: Dr. Yingfu Li, email: liying@mcmaster.ca

TAs:

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rashik Ahmed</td>
<td><a href="mailto:ahmedrt@mcmaster.ca">ahmedrt@mcmaster.ca</a></td>
<td>Topic 1</td>
</tr>
<tr>
<td>Ashraf Bazan</td>
<td><a href="mailto:bazana@mcmaster.ca">bazana@mcmaster.ca</a></td>
<td>Topic 2</td>
</tr>
<tr>
<td>Xiong Zhang</td>
<td><a href="mailto:zhanx142@mcmaster.ca">zhanx142@mcmaster.ca</a></td>
<td>Topic 3</td>
</tr>
<tr>
<td>Jalees Nasir</td>
<td><a href="mailto:nasirja@mcmaster.ca">nasirja@mcmaster.ca</a></td>
<td>Topic 4</td>
</tr>
<tr>
<td>Mathusan Gunabalasingam</td>
<td><a href="mailto:gunabam@mcmaster.ca">gunabam@mcmaster.ca</a></td>
<td>Topic 5</td>
</tr>
<tr>
<td>Luke Yaeger</td>
<td><a href="mailto:yaegerln@mcmaster.ca">yaegerln@mcmaster.ca</a></td>
<td>Logistics</td>
</tr>
</tbody>
</table>

Lectures: Monday, Thursday 12:30PM - 1:20PM; Tuesday 1:30PM - 2:20PM

Location: KTH B135

Office Hours: By appointment.

Course Textbook: Biochemistry, Garrett & Grisham, Canadian Edition (required)

Course objectives:
Nucleic acids store and transmit genetic information in all cells. An accurate and detailed knowledge of their structure and function is vital for molecular scientists. Equally importantly, nucleic acids research has been a rich source of discovery and invention that is drastically enhancing our understanding of cells and diseases. In this course, we will examine the structure of nucleic acids, genes, the manner in which DNA is replicated and how its information is used by cells. In addition to conveying the prevailing paradigms in this field, we will discuss how nucleic acids are studied experimentally and how we know what we know about them today. Finally, students will be given opportunities, through inquiry projects, to learn how our human creativity and imagination has led to numerous important scientific findings in nucleic acids research.

Assessments Overview:
Test 1: 25%
Thursday, Jan. 30, 2020, in class. This test will be on the materials covered in Classes 2-11.

Test 2: 25%
Monday, March 9, 2020, in class. This test will be on the materials covered in Classes 13-23.

Individual Project: 5%
To be detailed below.

Group Project: 15%
To be detailed below.

Final Exam: 30%
The final will cover all lecture content by Dr. Li and by student presentations.
Course Schedule:
Class 1, Monday, Jan. 6, 2020
    Opening lecture and general outline.
Class 2, Tuesday, Jan. 7, 2020
    Nucleotides and nucleic acids 1. Ch 24-25
Class 3, Thursday, Jan. 9, 2020
    Nucleotides and nucleic acids 2. Ch 24-25
Class 4, Monday, Jan. 13, 2020
    Nucleotides and nucleic acids 3. Ch 24-25
Class 5, Tuesday, Jan. 14, 2020
    Molecular cloning 1. Ch 27.
Class 6, Thursday, Jan. 16, 2020
    Molecular cloning 2. Ch 27.
Class 7, Monday, Jan. 20, 2020
    DNA replication, recombination and repair 1. Ch 28
Class 8, Tuesday, Jan. 21, 2020
    DNA replication, recombination and repair 2. Ch 28
Class 9, Thursday, Jan. 23, 2020
    DNA replication, recombination and repair 3. Ch 28
Class 10, Monday, Jan. 27, 2020
    DNA replication, recombination and repair 4. Ch 28
Class 11, Tuesday, Jan. 28, 2020
    DNA replication, recombination and repair 5. Ch 28

Class 12, Thursday, Jan. 30, TEST #1, in-class

Class 13, Monday, Feb. 3, 2020
    Transcription 1. Ch 29
Class 14, Tuesday, Feb. 4, 2020
    Transcription 2. Ch 29
Class 15, Thursday, Feb. 6, 2020
    Transcription 3. Ch 29
Class 16, Monday, Feb. 10, 2020
    Transcription 4. Ch 29
Class 17, Tuesday, Feb. 11, 2020
    Transcription 5. Ch 29
Class 18, Thursday, Feb. 13, 2020
    Translation 1. Ch 30

Mid-term recesses Monday, February 17 to Sunday, February 23

Class 19, Monday, Feb. 24, 2020
    Translation 2. Ch 30
Class 20, Tuesday, Feb. 25, 2020
    Translation 3. Ch 30
Class 21, Thursday, Feb. 27, 2020
    Translation 4. Ch 30
Class 22, Monday, March 2, 2020
    Translation 5. Ch 30
Class 23, Tuesday, March 3, 2020

Transcription 6. Ch 30

Class 24, Thursday, March 5, 2020

Transcription and translation review

Class 25: Monday March 9, TEST #2, in-class.

Class 26, Tuesday March 10, 2020

Group project time – no lecture

Class 27, Thursday March 12, 2020

Group project time – no lecture

Class 28, Monday March 16, 2020

Group project time – no lecture

Class 29, Tuesday March 17, 2020

Group presentation (3 groups)

Class 30, Thursday March 19, 2020

Group presentation (3 groups)

Class 31, Monday March 23, 2020

Group presentation (3 groups)

Class 32, Tuesday March 24, 2020

Group presentation (3 groups)

Class 33, Thursday March 26, 2020

Group presentation (3 groups)

Class 34, Monday March 30, 2020

Group presentation (3 groups)

Class 35, Tuesday March 31, 2020

Group presentation (3 groups)

Class 36, Thursday April 2, 2020

Group presentation (3 groups)

Class 37: Monday, April 6, 2020

Group presentation (3 groups)

After April 6, 2020, there are no more classes for Biochemistry 2B03

Please use the time following this to study for the final exam.

Final Exam - Date: TBA.

Group project – Self-directed learning, group learning, discussion and writing assignment:

Topics: This year, I have selected 5 topics for our group projects.

Topic 1 – Scientific Discoveries. An important discovery related to nucleic acids.

TA – Rashik Ahmed

Topic 2 – Research techniques. A widely used research technique related to nucleic acids

TA – Ashraf Bazan
**Topic 3 – Famous scientists.** Life and contributions of a scientist who made ground-breaking discoveries related to nucleic acids.

*TA – Xiong Zhang*

**Topic 4 – Canadian biochemists.** Life and research of a Canadian scientist who has worked or is doing research related to nucleic acids.

*TA – Jalees Nasir*

**Topic 5 – Hot research topics.** An exciting current research topic related to nucleic acids.

*TA – Mathusan Gunabalasingam*

2. **Responsibilities of students**

Each student should sign up for one of ~27 groups. Each student can sign up in Avenue to Learn on Jan. 17 at 10 pm. You must sign up by Jan. 24, 2020 at 10 pm (the site will be closed then and you will be assessed a 5% penalty). You can sign up for a group according to your interest; however, each group can have maximal 6 students. Therefore, you should be prepared to have a second or third choice.

Each group must select a group leader who will be in charge of group activities; otherwise Dr. Li will arbitrarily select a group leader. Please e-mail the name and contact information of the group leader (name, email and phone – for emergency use only) to Luke Yaeger and your designated teaching assistant (TA) by Jan. 24, 2020 at 10 pm. Your TA will function as a resource person for guidance on your selected topic.

Each student in the group needs to select a specific item that fits within the topic the group has selected to work on, and conduct independent research on this item. For this part of inquiry, you need to produce two outcomes that will be marked by your TA – a 2-page assay (2%) on this item and a 2-minute YouTube clip (3%).

Each group must decide on choosing one of the member items as the focus of the group project. To help you with the choice of the topic, each group must contact their TA to set up ONE mandatory meetings before Feb. 7. The session can be up to an hour (but a minimum of 30 min to be able to appropriately answer questions from the students). This meeting is required as part of 2.5% marks on attendance and participation.

Each group then focuses on this item as a group project. For this part of inquiry, you need to produce two outcomes that will be marked – a 5-page assay on this item (5%) and a 15-minute presentation as part of student lectures (7.5%).

It is everyone’s responsibility to be an active member of your group and to make sure that YOU ABSOLUTELY UNDERSTAND THE TOPIC YOUR GROUP HAS CHOSEN AND KNOWS DETAILS. It is not for the TA’s to choose the topic for you.

Be aware that your assays will be screened for plagiarism using computer software. Each group member and leader should e-mail Luke Yaeger and your designated TA, your individual assay and group assay (in a Word file – please make sure to properly identify group number and group member names on the document) by **Wednesday, March 16 2020 at 5 pm**. Each group leader should e-mail Luke Yaeger and your designated TA by **Thursday, March 17 at 5 pm** your PPT file for class lectures. Each late submission will be assessed a 5% penalty.
Course Policies

Modification of course elements the term
The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

Academic Integrity
You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:
• Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
• Improper collaboration in group work.
• Copying or using unauthorized aids in tests and examinations.

Academic Accommodation of Students with Disabilities
Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s Academic Accommodation of Students with Disabilities policy.

Requests for Relief for Missed Academic Term Work
In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.
If you are absent from the university for a minor medical reason, lasting fewer than 5 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to liying@mcmaster.ca. You must then contact Dr. Yingfu Li immediately (normally within 2 working days) by email to learn what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam. Please note that the MSAF may not be used for term work worth 30% or more, nor can it be used for the final examination.

Academic Accommodation for Religious, Indigenous or Spiritual Observances
Students requiring academic accommodation based on religious, indigenous or spiritual observances
should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact Dr. Yingfu Li as soon as possible to make alternative arrangements for classes, assignments, and tests.

Extreme Circumstances
The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

Courses with an On-Line Element
In this course we will use Avenue to Learn. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Authenticity/Plagiarism Detection
In this course we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. Students will be expected to submit their work electronically either directly to Turnitin.com or via Avenue to Learn (A2L) plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish to submit their work through A2L and/or Turnitin.com must still submit an electronic and/or hardcopy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com or A2L. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). To see the Turnitin.com Policy, please go to www.mcmaster.ca/academicintegrity.