

Genomics

BIOL4020 3.0, Fall 2014-2015

Pre-requisites:

- SC/BIOL 2060 3.00 or SC/MATH 2560 3.00 or SC/MATH 2565 3.00 or HH/PSYC 2020 6.00 or HH/PSYC 2021 3.00 (or equivalent);
- SC/BIOL 3200 3.00;
- SC/BIOL 3110 3.00.
- or permission of the course director to enrol the course without the prerequisites; (not relevant to BIOL3110 as this prerequisite will be enforced in all cases).

Course Schedule and Location

Thursdays between 7:00-10:00pm at LSB 101

Course Director

Dr. Motti Anafi

Farquharson Room 108C

E-Mail: moanafi@yorku.ca

Office hours: E-mail to set an appointment

Grading:

Mid-Term Exam 1 (20%)

Date: Thursday, Oct 23, 2014

Time: 8:30pm

Location: CB 129

Mid-Term Exam 2 (20%)

Date: Thursday, Nov 20, 2014

Time: 8:30pm

Location: CB 129

Final Exam (20%)

Date: Thursday, Dec 4, 2014

Time: 7:00pm

Location: LSB 105

Assignment (20%)

Due Date: Thursday, Nov 13, 2014

Time: 7:00pm

Location: In class

Quizzes (20%)

Time: during class

Contribution to the Wiki (up to 2% bonus)

Course Outline (and recommended readings)

PART I: The Genetic Revolution—from Traditional Genetics to Synthetic Biology

- EMBO Rep. 2009 August; 10(Suppl 1): S50-S53.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2726003/pdf/embor2009156.pdf>
- EMBO Rep. 2009 August; 10(Suppl 1): S42-S45.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2725998/pdf/embor2009130.pdf>
- Hamilton Smith (2014) Synthetic Biology for Genetic Engineering in the 21st Century
<http://www.mediatheque.lindau-nobel.org/videos/33653/2014-synthetic-biology-for-genetic-engineering-in-the-21st-century/laureate-smith-2>
- *Nature* **456**, 310-314 (2008)
<http://www.nature.com/news/2008/081119/pdf/456310a.pdf>

PART II: Methods in Genomics, Transcriptomics and Epigenetics.

- *Nature Reviews Genetics* 11, 31-46 (January 2010)
<http://www.nature.com/nrg/journal/v11/n1/abs/nrg2626.html>
- *Hum Genet.* 2011 Apr;129(4):351-70
<http://www.ncbi.nlm.nih.gov/pubmed/21331778>
- *Nature* 461, 814-818 (8 October 2009)
<http://www.nature.com/nature/journal/v461/n7265/abs/nature08390.html>
- *Nature* 415, 530-536 (31 January 2002)
- *Cold Spring Harb Protoc* 2009. Chromatin Immunoprecipitation (ChIP)
<http://cshprotocols.cshlp.org/content/2009/9/pdb.prot5279.full.pdf+html>
- *BMC Bioinformatics* 2009, 10:80 doi:10.1186/1471-2105-10-80
<http://www.biomedcentral.com/content/pdf/1471-2105-10-80.pdf>

PART III: Sequence Analysis

- *Comparative Genomics Volumes 1 and 2*
<http://www.ncbi.nlm.nih.gov/books/NBK2590/>
- <http://www.expasy.org/tools/>
- *The Online Bioinformatics Curriculum, PLOS Computational Biology, (2012) Volume 8 Issue 9*

<http://www.ploscompbiol.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pcbi.1002632&representation=PDF>

- For more relevant readings, go to the documentations/tutorials in the website of each tool or database. Try each tool by yourself.

PART IV: The Human Genome Project

- <http://www.genome.gov/>
- Current Opinion in Biotechnology 2000, 11:581-585
http://www.who.edu/science/B/people/mhahn/Broder_581.pdf

PART V: Ancient Genomics

- Nature 499, 74-78 (04 July 2013)
<http://www.nature.com/nature/journal/v499/n7456/abs/nature12263.html>
- Nature 468, 1053-1060 (23 December 2010)
<http://www.nature.com/nature/journal/v468/n7327/pdf/nature09710.pdf>
- Published online 6 May 2010 | Nature
<http://www.nature.com/news/2010/100506/full/news.2010.225.html>

PART VI: Genome-Wide Association (GWA) and Genetic Testing

- *Nature Reviews Genetics* 9, 356-369 (May 2008)
<http://www.nature.com/nrg/journal/v9/n5/abs/nrg2344.html>
- PLoS ONE 2(12): e1361.
<http://www.plosone.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0001361&representation=PDF>
- <http://www.genome.gov/26525384>

PART VII: Cancer Genomics

- Retroviruses: chapter 3- Oncogenesis
<http://www.ncbi.nlm.nih.gov/books/NBK19409/>
- Nature Reviews | Molecular Cell Biology Volume 2 | June 2001 | P. 467
- Science. 2013 March 29; 339(6127): 1546-1558
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3749880/pdf/nihms496129.pdf>
- Nature Genetics 45: 1113-1120 (2013)
<http://www.nature.com/ng/journal/v45/n10/full/ng.2764.html>
- Science. 2007 Nov 16;318(5853):1108-13.
<http://www.google.co.uk/url?sa=t&rc=1&ig=1&esrc=s&source=web&cd=4&ved=0CFKQF1AD&url=http%3A%2F%2Fwww.gastricbreastcancer.com%2Fpdf%2Fscience%2520genome%2520breast%2520colrec%2520vogelstein.pdf&ei=uNPzUvKLMomuyQGUjYCA&usq=AFQjCNFdk8W26CcdDAP5zCrdELbwwwJe7q&sig2=eXFS3lASpkuyUvYVkaXkWA>
- Cell, Volume 144, Issue 5, 646-674, 4 March 2011
[http://www.cell.com/abstract/S0092-8674\(11\)00127-9#Summary](http://www.cell.com/abstract/S0092-8674(11)00127-9#Summary)
- The Journal of Clinical Investigation 117(8) 2036-2043 (2007)
<http://www.jci.org/articles/view/31691/files/pdf>

The course MOODLE web site

To access Moodle, please follow the instructions below.

1. Go to: <http://moodle.yorku.ca>
2. Log in with your Passport York account.

Here you will find

- An updated course outline and recommended reading
- The course wiki
- Forum
- Announcements
- Grades
- Assignment

Please note that course director's announcements on the Moodle and in-class updates take precedence over any other information in the course MOODLE web site. The course director is not responsible for the accuracy of the notes posted by students in the wiki/forum. The exam is not restricted to the material posted on wiki. If you have technical moodle-related questions, please direct them to UIT Client Services at 416.736.2100 x55800 or email helpdesk@yorku.ca.

Sending e-mail to the Course Directors

Your e-mail will be read and answered as soon as possible. However, we will open only e-mails that fulfill the following requirements:

- Your email must be sent from your regular yorku.ca email account (<https://mymail.yorku.ca/> - **not from the moodle server**). Do not use non-yorku.ca accounts (such as hotmail or gmail). Emails from non-yorku.ca accounts will likely languish in a spam folder that is checked only intermittently.
- Be sure to include your full name and student number in your email text.
- Your e-mail must include "BIOL/4020" in the subject line
- Your e-mail must NOT include an attachment.

Important Dates

(from <http://www.registrar.yorku.ca/enrol/dates/fw14.htm> please check there for updates:

- Sept. 8, 2014: Fall Classes Start
- Sept 22, 2014: Last day to ENROL without requiring the permission of the Course Director.
- Oct. 9-Nov. 2, 2014: Co-curricular days

- Oct. 6, 2014: Last day to ENROL even with the permission of the Course Director.
- Nov. 7, 2014: Last date to drop courses without receiving a grade
- Dec. 7, 2014: Fall classes end

Tests and Exams:

Attendance for all exams is mandatory. Exams missed on the ground of medical circumstances must be supported by an Attending Physician's Statement, which can be downloaded from:

http://www.yorku.ca/grads/forms/attending_physician_statement.pdf , or a statement by a psychologist or counselor. The documentation must be dated on the same day as the exam or earlier, or it will not be accepted. The Course Director must be notified by email within 24 hours in the case of a missed test or exam. Appropriate documentation must be submitted to the Course Director within one week after the test or exam. No opportunities to make up missed mid-term exams will be offered. However, after acceptable justification for a missed exam has been received, the percentage value of the missed mid-term will be added to the final exam. If you missed a quiz, the percentage value of the missed quiz will be added to the final exam (no justification will be required for a missed quiz).

Accommodations

Students who feel that there are extenuating circumstances that may interfere with the successful completion of their exams or other course requirements are encouraged to discuss their concerns with the Course Director as soon as possible.

Students with physical, learning or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods should discuss the matter with the Course Director early in the term so that appropriate arrangements can be made.

Cheating and Plagiarism:

Cheating and plagiarism are major academic offences and carry serious penalties, ranging from a failing grade on the work in question to expulsion from the university. For more details about cheating, see York University's academic dishonesty policy at the following link:

http://www.yorku.ca/secretariat/policies/document.php?document=69#_Toc89156096.