



## COURSE OUTLINE

### 1. **Course:** CMMB 461, Functional Genomics and Molecular Networks - Fall 2020

Lecture 01: MWF 12:00 - 12:50 - Online

| Instructor     | Email             | Phone        | Office | Hours |
|----------------|-------------------|--------------|--------|-------|
| Dr Gordon Chua | gchua@ucalgary.ca | 403 220-7769 | BI 560 | TBA   |

#### Online Delivery Details:

This course is being offered online in real-time via scheduled meeting times, you are required to be online at the same time.

Lectures are synchronous online via Zoom occurring on Monday, Wednesday and Friday from 11:00-11:50 AM. The Zoom lectures will be recorded and posted on D2L.

#### Course Site:

D2L: CMMB 461 L01-(Fall 2020)-Functional Genomics and Molecular Networks

**Note:** Students must use their U of C account for all course correspondence.

### 2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

#### Prerequisite(s):

Biology 331.

#### Antirequisite(s):

Credit for Cellular, Molecular and Microbial Biology 461 and Biology 461 will not be allowed.

See section 3.5.c in the Faculty of Science section of the online Calendar.

Prerequisite(s): Biology 331.

### 3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

| Component(s)                          | Weighting %              | Date         |
|---------------------------------------|--------------------------|--------------|
| Take-home Assignments (4 assignments) | 70% (25%, 15%, 15%, 15%) | Dates on D2L |
| Take-home Quizzes (3 quizzes)         | 30% (10% each)           | Dates on D2L |

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

|                           | A+   | A    | A-   | B+  | B   | B-   | C+   | C   | C-  | D+   | D    |
|---------------------------|------|------|------|-----|-----|------|------|-----|-----|------|------|
| <b>Minimum % Required</b> | 95 % | 90 % | 85 % | 80% | 75% | 70 % | 65 % | 60% | 55% | 50 % | 45 % |

### 4. **Missed Components Of Term Work:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course.

#### 5. **Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

#### 6. **Course Materials:**

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

#### 7. **Examination Policy:**

No aids are allowed on tests or examinations.

Students should also read the Calendar, [Section G](#), on Examinations.

#### 8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

#### 9. **Writing Across The Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

#### 10. **Human & Living Organism Studies Statements:**

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

**STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** Students taking laboratory and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

#### 11. **Reappraisal Of Grades:**

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's

return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [1.1](#) and [1.2](#) of the University Calendar

- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section 1.3](#) of the University Calendar.

## 12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Center:** For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>).
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**
- e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head, Undergraduate of the Department of Biological Sciences, Heather Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone [403 220-6979](tel:403-220-6979). Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). [Student Ombudsman](#), Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected

by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

Preliminary Schedule: Sept 9: Introduction to Systems Biology, Functional Genomics and Molecular Networks; Sept 11: Genome Sequencing 1: Shotgun Sanger Sequencing; Sept 14: Genome Sequencing 2: Sequence Assembly and Gene Finding; Sept 16: Genome Sequencing 3: Next Generation Sequencing 1; Sept 18: Genome Sequencing 4: Next Generation Sequencing 2; Sept 21: Genome Sequencing 5: Genome structure and evolution; Sept 23: Expression Microarrays 1: Transcriptome, platforms and procedure; Sept 25: Expression Microarrays 2: Data normalization; Sept 28: Expression Microarrays 3: Clustering analysis; Sept 30: Tiling Microarrays; Oct 5: Forward Genetics 1: Mutagenesis and mutant alleles; Oct 7: Forward Genetics 2: Gene Mapping and Plasmid Complementation; Oct 9: Reverse Genetics 1: Construction and characterization of the yeast deletion collection; Oct 12: THANKSGIVING DAY: NO LECTURES; Oct 14: Reverse Genetics 2: Chemical genetic profiling; Oct 16: Reverse Genetics 3: Essential genes (TET, DAMP and TS alleles); Oct 19: Reverse Genetics 4: Multicellular organisms; Oct 21: Reverse Genetics 5: RNAi and CRISPR screening in cancer cells; Oct 23: Introduction to Transcriptional-Regulatory Networks; Oct 26: Transcription Factor Overexpression 1: Phenotypic activation of yeast transcription factors; Oct 28: Transcription Factor Overexpression 2: Motif-finding algorithms and validation of target genes; Oct 30: Workshop: Career Planning, Strategies and Opportunities; Nov 2: Transcription Factor Overexpression 3: Reprogramming differentiated cells into embryonic stem cells; Nov 4: Chromatin Immunoprecipitation 1: ChIP-chip analysis of transcription factors; Nov 6: Chromatin Immunoprecipitation 2: Global analysis of chromatin-modifying proteins; Nov 9: READING BREAK: NO LECTURES; Nov 11: READING BREAK/REMEMBRANCE DAY: NO LECTURES; Nov 13: READING BREAK: NO LECTURES; Nov 16: Introduction to Posttranscriptional Regulation and RNA-Binding Proteins; Nov 18: Protein-RNA Interactions 1: RIP-Chip/Seq; Nov 20: Translational Control and Ribosome Profiling/Ribo-Seq; Nov 23: Approaches in Proteomics 1: Antibody-based tissue profiling and yeast two hybrid assay; Nov 25: Approaches in Proteomics 2: Mass spectrometry; Nov 27: Approaches in Proteomics 3: Protein microarrays; Nov 30: Protein-Protein Interaction Networks: Topology and conservation; Dec 2: Synthetic Genetic Array Analysis 1: Large-scale genetic interaction mapping in yeast 1; Dec 4: Synthetic Genetic Array Analysis 2: Large-scale genetic interaction mapping in yeast 2; Dec 7: Synthetic Genetic Array Analysis 3: Genetic interaction networks in *C. elegans*; Dec 9: Review

#### **Course Outcomes:**

- Describe and compare technologies for whole genome sequencing including Sanger and Next-Generation Sequencing
- Describe approaches in forward and reverse genetics to determine gene function in eukaryotic model systems
- Describe genome-wide methods to identify target genes of transcription factors and the topology of transcriptional-regulatory networks
- Apply knowledge learned from expression microarrays to normalize and analyze transcriptome data
- Explain the concept of synthetic lethality and describe large-scale genetic mapping by synthetic genetic array technology in the yeast model system
- Describe proteomic methods to identify protein interactions and complexes.
- Explain functional genomic experimentation and data from the primary literature.

Electronically Approved - Sep 03 2020 15:13

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#### **Department Approval**

Electronically Approved - Sep 03 2020 19:06

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#### **Associate Dean's Approval**