

UNIVERSITY OF CALGARY  
DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

1. **Course: CMMB 461 - FUNCTIONAL GENOMICS AND MOLECULAR NETWORKS**

Lecture Sections: L01 MWF 11:00 PF 110 Fall 2015

**Instructor(s):** Dr. Gordon Chua BI 560 220-7769 [gchua@ucalgary.ca](mailto:gchua@ucalgary.ca)  
Dr. Ian Lewis BI 442 220-4366 [ian.lewis2@ucalgary.ca](mailto:ian.lewis2@ucalgary.ca)

D2L: CMMB 461 L01 (Fall 2015) Funct. Genomics and Mole Networks

Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

2. **PREREQUISITES:** Biology 331

3. **GRADING:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

<b>Assignments</b>	<b>30%</b>	
<b>Midterm Exam</b>	<b>25%</b>	<b>In Class</b>
<b>Final Exam</b>	<b>45%</b>	

There will be a final examination scheduled by the Registrar.

Each piece of work (assignments, midterm test or final examination) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components 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 letter grade scale corresponding to the overall percentage of the course is the following: A+: 90%; A: 85%; A-: 80%; B+: 76%; B: 72%; B-: 68%; C+: 64%; C: 60%; C-: 55%; D: 50%; F: <50%.

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar

5. **Scheduled out-of-class activities:** Dates and times of approved class activities held outside of class hours: N/A.

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **Course Materials:** There is no course text book. All required and recommended readings will come from the primary literature and review articles indicated in the lecture notes.

7. **Examination Policy:** No electronic or written aids (e.g. cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of any exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper.

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

8. **Writing across the curriculum statement:** e.g. "In this course, the quality of the student's writing in assignments will be a factor in the evaluation of those reports." See also [Section E.2](#) of the University Calendar.

Department Approval Original Signed \_\_\_\_\_ Date \_\_\_\_\_

9. **Human studies statement:** indicating whether students in the course may be expected to participate as subjects or researchers. See also [Section E.5](#) of the University Calendar.

STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS. Students are expected to be familiar with <http://www.ucalgary.ca/pubs/calendar/current/sc-5-1.html> of the on-line calendar.

See also <http://www.ucalgary.ca/pubs/calendar/current/e-5.html>

#### 10. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **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.

- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).

- (c) **Student Accommodations:** 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* [http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities\\_0.pdf](http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf).

Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-3140.

- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). As one consequence, 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 also <http://www.ucalgary.ca/secretariat/privacy>.

- (f) **Student Union Information:** VP Academic Phone: 403 220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca)  
SU Faculty Rep. Phone: 403 220-3913 Email: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca);  
Student Ombuds Office: 403 220-6420 Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca); <http://ucalgary.ca/provost/students/ombuds>

- (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

- (h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

**UNIVERSITY OF CALGARY**  
**DEPARTMENT OF BIOLOGICAL SCIENCES**

**FUNCTIONAL GENOMICS AND MOLECULAR NETWORKS**

**Fall 2015**

**Prerequisites:** Biology 331

**Course Coordinator:** Dr. Gordon Chua

<b>Lecturer(s):</b>	Dr. Gordon Chua	BI 560	220-7769	<a href="mailto:gchua@ucalgary.ca">gchua@ucalgary.ca</a>
	Dr. Ian Lewis	BI 442	220-4366	<a href="mailto:ian.lewis2@ucalgary.ca">ian.lewis2@ucalgary.ca</a>

**Lecture:** Mondays, Wednesdays, Fridays - 11:00 am-11:50 am

**Course Text:** there is no course text book. All required and recommended readings will come from the primary literature and review articles indicated in the lecture notes.

**The Use of World Wide Web Material in Term Papers, Lab Reports and Assignments**

As with other more traditional sources of material, information obtained from the Web must be fully and accurately cited. As with all other sources, students must take full responsibility for the quality, accuracy and verifiability of material that they cite. Because Web sites may be transient, the following must be done if Web sites are cited:

A full Website address must be provided, and the date on which it was accessed.

A print-out of the home page of the Web site and the page on which the particular information begins must be included as appendix material for the term paper, lab report or assignment.

**Academic dishonesty:** No form of academic misconduct (cheating, plagiarism, or any other form) will be tolerated. All cases will be dealt with rigorously and may lead to disciplinary probation or suspension or expulsion. The Faculty of Science has a zero tolerance policy regarding dishonesty. For further information see the appropriate sections of the University calendar.

**Assignments:** All students should make arrangements to have regular access to an Internet-capable computer. There are several microcomputer laboratories on campus for your convenience if you do not have a computer at home.

**Composition of final grade:**

Assignments	30%	
Midterm Exam	25%	In Class
Final Exam	45%	

There will be a final exam scheduled by the Registrar's Office.

**Schedule****Preliminary Title**

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: Platforms and procedure
Sept 25	Expression Microarrays 2: Data normalization and clustering analysis
Sept 28	Forward Genetics: Mutagenesis and mutant alleles
Sept 30	Forward Genetics: Gene Mapping and Plasmid Complementation
Oct 2	Reverse Genetics 1: Construction and characterization of the yeast deletion collection
Oct 5	Reverse Genetics 2: Chemical genetic profiling
Oct 7	Reverse Genetics 3: Essential genes (TET, DAMP and TS alleles)
Oct 9	Reverse Genetics 4: Multicellular organisms
Oct 12	THANKSGIVING DAY: NO LECTURES
Oct 14	Reverse Genetics 5: RNAi screening in cancer cells
Oct 16	Introduction to Transcriptional-Regulatory Networks
Oct 19	Transcription Factor Overexpression 1: Phenotypic activation of yeast transcription factors
Oct 21	Transcription Factor Overexpression 2: Motif-finding algorithms and validation of gene targets
Oct 23	IN-CLASS MIDTERM
Oct 26	Transcription Factor Overexpression 3: Reprogramming differentiated cells into embryonic stem cells
Oct 28	Chromatin Immunoprecipitation-Microarray 1: ChIP-chip analysis of transcription factors
Oct 30	Chromatin Immunoprecipitation-Microarray 2: Global analysis of chromatin-modifying proteins
Nov 2	One Hybrid Yeast Assay
Nov 4	Phylogenetic Footprinting and Protein-Binding Microarrays
Nov 6	Synthetic Genetic Array Analysis 1: Large-scale genetic interaction mapping in yeast
Nov 9	Synthetic Genetic Array Analysis 2: Genetic interaction networks in <i>C. elegans</i>
Nov 11	REMEMBRANCE DAY: NO LECTURES
Nov 13	READING DAY: NO LECTURES
Nov 16	Introduction to quantitative biology
Nov 18	Mass spectrometry
Nov 20	NMR spectroscopy
Nov 23	Proteomics
Nov 25	Metabolomics
Nov 27	Error and false discovery
Nov 30	Manipulating large datasets
Dec 2	Dynamic equilibria in biological systems
Dec 4	Kinetic flux profiling and flux balance analysis
Dec 7	Quantitative modeling of growth