



UNIVERSITY OF CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES COURSE OUTLINE

1. **Course:** **CMMB 637 – ADVANCED TOPICS IN MOLECULAR MICROBIOLOGY**

| | | | | | |
|-----------------------|-------------------|-----|-----------|----------|----------------------------------------------------------------|
| Lecture Section(s) | L01 | MWF | 10:00 | ST 059 | Fall 2014 |
| Instructor(s): | Dr. M.F Hynes | | BI 429C | 220-8473 | hynes@ucalgary.ca |
| | Dr. J.J. Harrison | | BI 429B | 220-7627 | jjharris@ucalgary.ca |
| | Dr. C.R.J. Hubert | | EEEL 509E | 220-7794 | chubert@ucalgary.ca |
| | Dr. R.J. Turner | | BI 487 | 220-4308 | turnerr@ucalgary.ca |

Course website or Desire 2 Learn (D2L) course name, D2L CMMB 637

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

2. **Prerequisites:** Permission of department; graduate students and senior undergrads only. See section 3.5.C in the Faculty of Science section of the online Calendar www.ucalgary.ca/pubs/calendar/current/sc-3-5.html
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:

| | |
|-------------------------------------------------------------------------|-------------|
| Major term paper (grant) (Hynes, Due Nov. 1, 2014) | 25 % |
| Major term paper (Harrison, Due Dec. 1, 2014) | 25 % |
| In class presentations, participation assignments and/or quizzes | 50 % |

* There will NOT be a final exam scheduled by the Registrar's office

Each piece of work (assignment, laboratory report, midterm test or final examination) submitted by the student will be assigned a percentage score. The student's 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, using the conversion scheme provided on this course outline.

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:** References and links will be provided in class and on D2L
7. **Examination Policy:** For quizzes and other in-class assignments, students will not be allowed any notes, books or electronic aids, except non-programmable calculators. 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 on quizzes, tests, term papers and other written assignments will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.

9. ETHICS IN THE BIOLOGICAL SCIENCES

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.

10. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **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) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: [Calendar entry on students with disabilities](#) and [Student Accessibility Services](#).
- (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 (FOIPP). 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
- (f) <http://www.ucalgary.ca/secretariat/privacy>.
- (g) **Student Union Information:** [VP Academic](#) Phone: 220-3911 Email: suvpaca@ucalgary.ca.
SU Faculty Rep. Phone: 220-3913 Email: sciencerep@su.ucalgary.ca; [Student Ombudsman](#)
- (h) **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.
- (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). Your responses make a difference - please participate in USRI Surveys.

Department Approval _____ **ORIGINAL SIGNED** _____ Date _____

Department Approval
for NO Final Exam: _____ **ORIGINAL SIGNED** _____ Date: _____
M637F14; 9/5/2014 10:28 AM

UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

TERM: Fall 2014 SECTION NO.: 01
PREREQUISITE: Permission of Department; Graduate students and senior undergrads.
COURSE COORDINATOR: Dr. Michael F. Hynes
Instructor(s): Dr. **Michael F. Hynes** BI 429C 220-8473 hynes@ucalgary.ca
Dr. Joe Harrison BI 429B 220-7627 jjharris@ucalgary.ca
Dr. Casey R. Hubert EEEL 509E 220-7794 chubert@ucalgary.ca
Dr. Raymond J. Turner BI 487 220-4308 turnerr@ucalgary.ca

LECTURES: MWF 10:00 AM ST 059

LABORATORIES/TUTORIALS: Students have the opportunity to use techniques learned in class in the instructors' laboratories if they so desire (optional, by appointment)

TEXTS: A. Required NONE
B. Other Supplies NONE

MARK DISTRIBUTION: A. Composition of Final Grade

| | | |
|-------------------------------------------------------------------|----------------------|------|
| Major term paper, - grant (Dr. Hynes) | Due November 1, 2014 | 25 % |
| Major term paper (Dr. Harrison) | Due December 1, 2014 | 25 % |
| In class presentations, assignments, participation and/or quizzes | | 50 % |

Students will submit a major paper worth 25% of their final mark each of the two major instructors. The rest of the final grade will be based on various in-class assessments, including presentations and/or quizzes if applicable, or short take home assignments, **as well as on in class participation**. The breakdown for each instructor will be explained in his first lecture and posted on Desire 2 Learn Dr. Hynes will allocate 20 of these marks, Dr. Harrison 15,, Dr. Hubert 10 and Dr. Turner 5 marks.

Exact details on each assignment, as well as due dates, will be introduced by each instructor and posted to D2L. Each course component will be assigned a % grade and the total % grade for the course, calculated using the weightings above will be converted to a letter grade using the scheme in this course outline.

B. Final Examinations

There will be no final examination.

C. Components of course for which a passing grade is essential

Nil.

CALENDAR DESCRIPTION:

Techniques, and discussion of recent literature in molecular microbiology. Topics covered will vary from year to year, but could include bioinformatics, genomics, mutagenesis, advanced microscopy techniques, proteomics, vectors and cloning techniques, gene expression, and over-expression of proteins, as they relate to the study of prokaryotic systems. Course content will be tailored to the interests of the graduate students enrolled in the class in a given year. Students who are interested in hands on experience with techniques described in the course will be able to set up times to carry out such experiments if desired.

Tentative Lecture topics and locations – some details yet to be finalized. The order and content of lectures may change from what is suggested here. There is no textbook and material will be taught using recent and classic papers in the field.

Section I Dr. Hynes ST 059 at 10:00 AM MWF

Sept 8-12 No classes. Students will be given, via D2L, a short written assignment (not to be marked)

Sept 15,17 Gene cloning – history and state of the art

Sept 19,22 Broad host range vectors and applications
Sept 24, 26, 29 Gene fusions and applications; expression vectors

October 1,3 Transposon Mutagenesis, Mutagenesis screens, STM

October 6, 8, 10 Student presentations, Quiz

Section II Dr. Harrison Genomics (8 lectures), Bioinformatics workshops (3 lectures)

October 15 Massively parallel DNA-sequencing technology
October 17 Tools of the trade and how to build sequencing libraries
October 20 Genome sequencing, assemblers and variant detection
Student presentation: Sequencing the origins of the Ebola outbreak

October 22, 24, 27 Genomics literacy: Laptop bioinformatics workshops (BYOL)
Student competition: The Annotathon

October 29 Microbial diversity, metagenomics and 16S amplicon sequencing
Student presentation: The Human or Earth Microbiome Projects

October 31 Transposon-sequencing (Tn-seq)
Student presentation: Single-cell genomics

November 17 or 3 Prokaryotic transcriptomics – RNA-sequencing
Student presentation: Evaluating methods for rRNA depletion

November 19 or 5 Prokaryotic transcriptomics – RNA-sequencing
Student presentation: Differential expression analysis

November 21 or 7 Probing regulatory networks – ChIP-seq and RIP-seq
Student presentation: Analysis of transcription factors or RNA-binding proteins

Section III Dr. Hubert (November 3 to November 14; 5 lectures) (Possibly November 12-21 ?)

Case studies in molecular microbial ecology

-student presentations November 24, 26 tentative. Possibly switch with Career management section in December.

Section IV. Dr. Turner. Systems for gene expression and synthesis of proteins; protein protein interactions.

TBA - due to scheduling conflict this will be arranged at a time convenient for all students in later November. (approx. 3 hours)

December 1-5 Dr. Hynes Sessions and discussions on

- A) Jobs, interviews, CVs, and what you can do with a graduate degree
- B) The editorial process and publishing papers, from an editor's perspective
- C) The Canadian granting agency scene and how grants get reviewed.

Mark conversion scheme:

**A+ > 92 % A > 85 % A- > 80 % B+ > 77 % B > 74 % B- > 70 % F = < 70 %
(for Undergrads, if any, C+ > 66, C > 63, C- > 60, D > 50, F < 50)**