## UNIVERSITY OF CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1.  **Course:**          **Biology 311 - Principles of Genetics**

    Lecture Section(s):          L01          MWF          11:00/13:00                    FALL 2014

    **Instructor(s):**   Dr. David Hansen              BI 240A          220-7496          dhansen@ucalgary.ca
                 Dr. Isabelle Barrette-Ng        BI 430A          220-6240          mibarret@ucalgary.ca

    This course will use the D2L online system.

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

2.  **Prerequisites:**   Any two of Biology 231, 233, 241 and 243.
                 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:

    | | |
    |---|---|
    | **Assignments** | **5%** |
    | **Midterm Exam** | **31%** |
    | **Final Exam** | **31%** |
    | **Laboratory** | **33%** |

    There will 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 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.

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.

    **Midterm        - Saturday, October 25, 2014          10:00 am        ST 140 and ST 148**

    **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:**          An Introduction to Genetic Analysis.  10th ed., Griffiths, Wessler, Carroll, Doebley

                            Solutions Megamanual for An Introduction to Genetic Analysis, 10th Edition, Fixsen, W.D., Lavett, D.K., W.H. Freeman.

                            Carolina Drosophila Manual, Flagg, R.O., 5th Edition, Carolina Biological Supply Company

                            Biology 311 Laboratory Manual, Fall 2014 (To be downloaded from D2L)

7.  **Examination Policy**:   Non-programmable calculators are permissible during examinations. Students should also read the Calendar, Section G, on Examinations.

8. In this course, the quality of the student's writing in laboratory reports 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@ucagary.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_____Date_____


Associate Dean's Approval for
out of regular class-time activity: _____Date:_____
B311 F14;  8/21/2014 10:02 A**M**

UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE
**BIOLOGY 311**
PRINCIPLES OF GENETICS

| | | | | | |
|---|---|---|---|---|---|
| TERM: | Fall 2014 | | | SECTIONS L01and L02 | |

PREREQUISITE(S):  Any two of Biology 231, 233, 241 and 243.

A student may not register in a course unless he/she has a grade of at least C- in each prerequisite course.

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|---|---|---|---|---|
| COURSE COORDINATOR: | Dr. David Hansen | BI 240A | 220-7496 | dhansen@ucalgary.ca |
| LAB COORDINATOR: | Dr. Isabelle Barrette-Ng | BI 430A | 220-6240 | mibarret@ucalgary.ca |

LECTURERS:  Dr. David Hansen
Dr. Isabelle Barrette-Ng

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|---|---|---|---|---|---|
| LECTURES: | L01 | M W F | 11:00 | ST 148 | |
| | L02 | M W F | 13:00 | MFH 162 | |

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|---|---|---|---|
| LABS: | T | 08:30, 12:00, 15:30 | EEEL 303, 309 and 369 |
| | R | 08:30, 12:00, 15:30 | EEEL 303, 309 and 369 |
| | W | 15:30 | EEEL 303, 309 and 369 |
| | M | 15:30 | EEEL 303, 309 and 369 |

All scheduled laboratories will begin the week of September 15, 2014.  Students need to read the introduction and Lab #1 prior to attending the first lab and be comfortable with all terms used.

TEXT:  <u>Required</u>:  <u>An Introduction to Genetic Analysis</u>.  10$^{th}$ ed., Griffiths, Wessler, Carroll, Doebley

<u>Solutions Megamanual for An Introduction to Genetic Analysis</u>, 10th Edition, Fixsen, W.D., Lavett, D.K., W.H. Freeman.

<u>Carolina Drosophila Manual</u>, Flagg, R.O., 5$^{th}$ Edition, Carolina Biological Supply Company

<u>Biology 311 Laboratory Manual, Fall 2014 (To be downloaded from D2L)</u>

This course will use the D2L course delivery tool.

MARK DISTRIBUTION:  A.  <u>Composition of Grade</u>

| | |
|---|---|
| Assignments | 5% |
| Midterm exam (2 hrs)* | 31% |
| Final exam (2 hrs)** | 31% |
| Laboratory*** | 33% |

B.  <u>Final Exam</u>
There will be a final examination covering material from the last 1/2 of the course scheduled by the Registrar's Office between the 8th and 18th of December inclusive.

EXPECTED STUDY TIME:  At least two hours per one-hour lecture plus the required laboratory

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|---|---|---|---|---|
| * | Dates: Midterm | - Saturday, October 25, 2014 | 10:00 am | ST 140 and ST 148 |

This is an out-of-scheduled-class time exam that has been approved by the appropriate Dean.

** This will be a final exam testing the material covered after the midterm exam.

*** Various lab components have predetermined weighting to a total of 33% as specified in the Lab Manual.

| Date | Topics | Chapter | Lecturer |
|---|---|---|---|
| September 8 | Explanation of course outline, exams schedule, labs, percentage weights and reading assignments. Example of genetic analysis | | Dr. Hansen |
| September 10 | Autosomal inheritance, sex-linked inheritance, cytoplasmic inheritance, pedigree analysis | 2 | Dr. Hansen |
| September 12 | Independent assortment of genes | 3 | Dr. Hansen |
| September 15 | | 3 | Dr. Hansen |
| September 17 | | 3 | Dr. Hansen |
| September 19 | Linkage, recombination, genetic mapping, chi-square, multiple cross-overs | 4 | Dr. Hansen |
| September 22 | | 4 | Dr. Hansen |
| September 24 | | 4 | Dr. Hansen |
| September 26 | | 4 | Dr. Hansen |
| September 29 | Bacterial and viral genetics | 5 | Dr. Hansen |
| October 1 | | 5 | Dr. Hansen |
| October 3 | | 5 | Dr. Hansen |
| October 6 | | | |
| October 8 | Gene Interactions: Dominance, epistasis, biosynthetic pathways | 6 | Dr. Hansen |
| October 10 | | 6 | Dr. Hansen |
| October 13 | **No Lecture- Thanksgiving** | 6 | Dr. Hansen |
| October 15 | | 6 | Dr. Hansen |
| October 17 | Large-scale chromosomal changes | 17 | Dr. Hansen |
| October 20 | Large-scale chromosomal changes | 17 | Dr. Hansen |
| October 22 | What is a gene and how can genetic variability be introduced? A review of the Central Dogma and the structure of DNA | Portions of 1, 7 | Dr. Barrette-Ng |
| October 24 | Detecting genetic variability in the human genome – a look at PCR, DNA sequencing and gel electrophoresis | Portions of 10 and 14 | Dr. Barrette-Ng |
| **October 25** | **Midterm- October 25, 10:00 am** | | |
| October 27 | Genetic variability and DNA polymorphisms – an overview of the different classes of DNA polymorphisms and methods used for their detection | Portions of 10, 16 and 18 | Dr. Barrette-Ng |
| October 29 | | | |
| October 31 | Do all DNA polymorphisms have phenotypic consequences? | Portions of 14, 16, 18 | Dr. Barrette-Ng |
| November 3 | Case studies on DNA polymorphisms, ancestry and disease | Portions of 18 | Dr. Barrette-Ng |
| November 5 | Genetic variability and the control of gene expression in prokaryotes: How a nutritional signal controls expression of the lac operon | Portions of 11 | Dr. Barrette-Ng |
| November 7 | | | |
| November 10 | **No Lecture- Reading Days** | | |
| November 12 | Genetic variability and the control of gene expression in eukaryotes: How a nutritional signal | Portions of 12 | Dr. Barrette-Ng |

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|---|---|---|---|
| | controls expression of the GAL system | | |
| November 14 | Introducing genetic variability through genetic engineering and the manipulation of DNA | Portions of 10 | Dr. Barrette-Ng |
| November 17 | Inheritance and genetic variability: is it all in the genes? | Portions of 12 | Dr. Barrette-Ng |
| November 19 | Control of gene expression and the process of development in eukaryotes | Portions of 13 | Dr. Barrette-Ng |
| November 21 | Gene regulation, development and RNA? An overview of miRNA | Portions of 8 and 13 | Dr. Barrette-Ng |
| November 24 | The story of jumping genes – introduction to transposable elements | Portions of 15 | Dr. Barrette-Ng |
| November 26 | Altering the message – the genetics of cancer | Portions of 16 | Dr. Barrette-Ng |
| November 28 | Inheritance of complex traits | Portions of 19 | Dr. Barrette-Ng |
| December 1 | Curing genetic diseases? An overview of genetic therapies | Portions of 10 | Dr. Barrette-Ng |
| December 3 | Medical Genetics | | Dr. Lamont |
| December 5 | Ethical issues in genetics- cloning, genetic testing, gene therapy, prenatal diagnosis and pre-implantation genetic testing | | Dr. Hansen |
| December 8-18 | Final exam scheduled by Registrar. This will be a comprehensive Final Exam covering all material in the course, but with emphasis on topics covered since mid-term | | |

GRADING SCALE

95 = A plus
90 = A
85 = A minus
80 = B plus
76 = B
72 = B minus
68 = C plus
64 = C
60 = C minus
55 = D plus
50 = D
under 50 = F