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|  | School of Arts & Science BIOLOGY DEPARTMENT BIOL 230 Cell Biology Winter 2013 (Jan-April) |
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COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/biol.html>

Ω Please note: the College electronically stores this outline for five (5) years only.
It is **strongly recommended** you keep a copy of this outline with your academic records.
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

1. Instructor Information

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|-----|--------------|--|--------------------|--|
| (a) | Instructor: | Geoff Haywood, M.Sc., Ph.D. | | |
| (b) | Office Hours | Tue 9.30 – 10.20 AM Thur 9.00- 10.00 AM | | |
| (c) | Office: | F246 | | |
| (d) | Phone: | 250-370-3196 | Alternative Phone: | |
| (e) | Email: | haywoodg@camosun.bc.ca | | |
| (f) | Website: | http://online.camosun.ca/ (D2L) (No emails to D2L please) | | |

IMPORTANT NOTE: I understand that my scheduled drop-in office hour times will not fit into everyone's class schedules. **This should not deter you from trying to visit me in my office!** My schedule will be posted on my office door and on the course D2L website: I can be available at almost any time that I'm not already in class or lab. Simply arrange an appointment by phone or e-mail and I'll be very pleased to meet with you at a mutually convenient time.

2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

Upon completion of this course the student will be able to:

1. Describe the monomeric components, synthesis and properties of the polymer for each of the four groups of macromolecule.
2. Examine the molecular structure of cellular membranes. Discuss the roles of active and passive transport mechanisms in the movement of molecules across cellular membranes.
3. Classify and describe the structural and adhesive proteins of the extracellular matrix. Describe the structure and function of the major types of cell junction. Discuss the roles of the extracellular matrix and cell junctions in cell-cell recognition, communication and adhesion.
4. Explain the structural organization of DNA and chromosomes in the nucleus. Describe the structure and function of the nuclear matrix and lamina. Discuss passive and active transport of molecules through nuclear pores.
5. Demonstrate knowledge of the molecular mechanism of eukaryotic DNA replication. Understand the events associated with, and the molecular basis of, regulation of the cell cycle. Discuss how abnormalities in cell cycle regulation contribute to the development of cancer.
6. Discuss the principles of eukaryotic transcription, RNA processing and RNA surveillance. Explain the events associated with translation, polypeptide folding, post-translational processing and protein targeting and sorting.
7. Discuss the role of the smooth endoplasmic reticulum in drug detoxification, carbohydrate metabolism, and calcium storage. Describe the flow of molecules through the endomembrane system. Explain the roles of the rough endoplasmic reticulum and the Golgi complex in glycosylation and protein sorting.
8. Describe, at the molecular level, the means by which G protein-linked and protein-kinase associated receptors activate signal transduction pathways within the cell. Discuss the molecular mechanisms of induction and regulation of apoptosis.

9. Describe and differentiate among the major structural elements of the cytoskeleton. Discuss the role of the cytoskeleton in cell movement, division and positioning and movement of organelles.
10. Conduct complex experiments and use a variety of current molecular and analytical techniques to assess various aspects of cellular biology. Critically evaluate data and present written laboratory reports.

3. Required Materials

Text

Becker, Kleinsmith, Hardin & Bertoni (2012) *The World of the Cell*, 8th Edition (Benjamin Cummings)

Lab Manual

Biology 230 lab outlines will be posted on the Biology 230 D2L website several days prior to the Monday lab times. You will be responsible for printing the outline (and any associated worksheet materials) and reading it before the lab session. You will also be responsible for following any pre-lab instructions that may be indicated in the lab. Knowledge of lab procedures and principles prior to the lab may be evaluated through pre-lab quizzes.

Lecture Outlines

Lectures will be delivered in a PowerPoint format. PowerPoint slides will be made available on the Biology 230 D2L website. These may be used or printed at the student's discretion to help follow the lectures.

4. Course Content and Schedule

Biology 230 - W12 - Course Schedule (Note: Scheduled dates are subject to change)

Topics may be added or deleted depending upon time constraints

| Wk | Day | Date | | Unit | Lecture Topic | Ch | Lab | Lab Activity |
|----|-----|--------|------|------|---------------------------------|----|-----|------------------------------|
| 1 | Mon | 7-Jan | Lec | | Course Introduction | | | |
| 1 | Tue | 8-Jan | Lec | 1 | Macromolecules | 3 | | |
| 1 | Thu | 10-Jan | Both | 1 | Macromolecules | 3 | 1a | Microscopy and Histology (1) |
| 1 | Fri | 11-Jan | Lab | | | | 1a | Microscopy and Histology (1) |
| 2 | Mon | 14-Jan | Lec | 1 | Macromolecules | 3 | | |
| 2 | Tue | 15-Jan | Lec | 1 | Macromolecules | 3 | | |
| 2 | Thu | 17-Jan | Both | 1 | Macromolecules | 3 | 1b | Microscopy and Histology (2) |
| 2 | Fri | 18-Jan | Lab | | | | 1b | Microscopy and Histology (2) |
| 3 | Mon | 21-Jan | Lec | 2 | Membrane Structure & Function | 7 | | |
| 3 | Tue | 22-Jan | Lec | 2 | Membrane Structure & Function | 7 | | |
| 3 | Thu | 24-Jan | Both | 2 | Membrane Structure & Function | 7 | 2 | Leukocyte Isolation |
| 3 | Fri | 25-Jan | Lab | | | | 2 | Leukocyte Isolation |
| 4 | Mon | 28-Jan | Lec | 3 | ECM / Cell Adhesion / Junctions | 17 | | |
| 4 | Tue | 29-Jan | Lec | 3 | ECM / Cell Adhesion / Junctions | 17 | | |
| 4 | Thu | 31-Jan | Both | 3 | ECM / Cell Adhesion / Junctions | 17 | 3 | Animal Cell Culture (1) |
| 4 | Fri | 1-Feb | Lab | | | | 3 | Animal Cell Culture (1) |
| 5 | Mon | 4-Feb | Lec | 4 | Signal Transduction | 14 | | |

| | | | | | | | | |
|----|-----|--------|------|----|-----------------------------------|----|-----|--|
| 5 | Tue | 5-Feb | Lec | 4 | Signal Transduction | 14 | | |
| 5 | Thu | 7-Feb | Both | 4 | MIDTERM EXAM 1 (Units 1-3) | 14 | 4/3 | Phagocytosis (1) / Animal Cell Culture (2) |
| 5 | Fri | 8-Feb | Lab | | | | 4/3 | Phagocytosis (1) / Animal Cell Culture (2) |
| 6 | Mon | 11-Feb | Lec | 5 | No Lecture – Family Day | 18 | | |
| 6 | Tue | 12-Feb | Lec | 5 | DNA / Nucleus | 18 | | |
| 6 | Thu | 14-Feb | Both | | DNA / Nucleus | | | LAB EXAM 1 |
| 6 | Fri | 15-Feb | Lab | | | | | LAB EXAM 1 |
| 7 | Mon | 18-Feb | Lec | 5 | DNA Replication | 18 | | |
| 7 | Tue | 19-Feb | Lec | 6 | DNA Replication | 19 | | |
| 7 | Thu | 21-Feb | Both | 6 | READING BREAK | 19 | | NO LAB |
| 7 | Fri | 22-Feb | Lab | | READING BREAK | | | NO LAB |
| 8 | Mon | 25-Feb | Lec | 6 | DNA Replication | 19 | | |
| 8 | Tue | 26-Feb | Lec | 7 | Cell Cycle Regulation | 19 | | |
| 8 | Thu | 28-Feb | Both | 7 | Cell Cycle Regulation | 19 | 5 | RTK Signalling / Phagocytosis (2) |
| 8 | Fri | 1-Mar | Lab | | | | 5 | RTK Signalling / Phagocytosis (2) |
| 9 | Mon | 4-Mar | Lec | 8 | RNA Transcription / Processing | 21 | | |
| 9 | Tue | 5-Mar | Lec | 8 | RNA Transcription / Processing | 21 | | |
| 9 | Thu | 7-Mar | Both | 8 | RNA Transcription / Processing | 21 | 6a | G-Protein Signalling (1) |
| 9 | Fri | 8-Mar | Lab | | | | 6a | G-Protein Signalling (1) |
| 10 | Mon | 11-Mar | Lec | 8 | RNA Transcription / Processing | 21 | | |
| 10 | Tue | 12-Mar | Lec | 9 | Protein Translation / Sorting | 22 | | |
| 10 | Thu | 14-Mar | Both | | MIDTERM EXAM 2 (Units 4-7) | | 6b | G-Protein Signalling (2) |
| 10 | Fri | 15-Mar | Lab | 9 | Protein Translation / Sorting | 22 | 6b | G-Protein Signalling (2) |
| 11 | Mon | 18-Mar | Lec | 9 | Protein Translation / Sorting | 22 | | |
| 11 | Tue | 19-Mar | Lec | 10 | Regulation of Gene Expression | 23 | | |
| 11 | Thu | 21-Mar | Both | 10 | Regulation of Gene Expression | 23 | 7a | Erythrocyte Membrane Protein Analysis (1) |
| 11 | Fri | 22-Mar | Lab | | | | 7a | Erythrocyte Membrane Protein Analysis (1) |
| 12 | Mon | 25-Mar | Lec | 10 | Regulation of Gene Expression | 23 | | |
| 12 | Tue | 26-Mar | Lec | 10 | Regulation of Gene Expression | 23 | | |
| 12 | Thu | 28-Mar | Both | 10 | Regulation of Gene Expression | 23 | 7b | NO LAB |

| | | | | | | | | |
|----|-----|--------|------|----|---------------------------------|----|----|---|
| 12 | Fri | 29-Mar | Lab | | GOOD FRIDAY | | 7b | NO LAB |
| 13 | Mon | 1-Apr | Lec | 11 | EASTER MONDZAY | 23 | | |
| 13 | Tue | 2-Apr | Lec | 12 | Apoptosis | 14 | | |
| 13 | Thu | 4-Apr | Both | 13 | Cancer | 24 | | Erythrocyte Membrane Protein Analysis (2) |
| 13 | Fri | 5-Apr | Lab | | | | | Erythrocyte Membrane Protein Analysis (2) |
| 14 | Mon | 8-Apr | Lec | | Intracellular Compartments | | | |
| 14 | Tue | 9-Apr | Lec | 13 | Intracellular Compartments | 24 | | |
| 14 | Thu | 11-Apr | Both | 13 | Intracellular Compartments | 24 | | LAB EXAM 2 |
| 14 | Fri | 12-Apr | Lab | | | | | LAB EXAM 2 |
| | Mon | 15-Apr | | | FINAL EXAM PERIOD BEGINS | | | |

(This section can include: class hours, lab hours, out of class requirements and/or dates for quizzes, exams, lectures, labs, seminars, practicums, etc.)

Class Schedule:

Lectures:
 Mon 11:30 AM – 12:20 PM
 Tue 11:30 AM – 12:20 PM
 Thu 11:30 AM – 12:20 PM

Course Content:

5. Basis of Student Assessment (Weighting)

(This section should be directly linked to the Intended Learning Outcomes.)

| | |
|--------------------------|-----|
| Lab Exam I | 10% |
| Lab Exam II | 15% |
| Midterm I | 15% |
| Midterm II | 20% |
| Final Lecture Exam | 25% |
| Assignments/labs/quizzes | 15% |

6. Grading System

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)

Standard Grading System (GPA)

| Percentage | Grade | Description | Grade Point Equivalency |
|------------|-------|---|-------------------------|
| 90-100 | A+ | | 9 |
| 85-89 | A | | 8 |
| 80-84 | A- | | 7 |
| 77-79 | B+ | | 6 |
| 73-76 | B | | 5 |
| 70-72 | B- | | 4 |
| 65-69 | C+ | | 3 |
| 60-64 | C | | 2 |
| 50-59 | D | Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite. | 1 |
| 0-49 | F | Minimum level has not been achieved. | 0 |

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at camosun.ca for information on conversion to final grades, and for additional information on student record and transcript notations.

| Temporary Grade | Description |
|-----------------|--|
| I | <i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family. |
| IP | <i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. (For these courses a final grade will be assigned to either the 3 rd course attempt or at the point of course completion.) |
| CW | <i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement. |

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services, or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services, and the College web site in the Policy Section.

Plagiarism

Plagiarizing is appropriating the work of another or parts or passages of another's writing (*including the ideas or language*) and passing them off as the product of one's own mind or manual skill. **Plagiarism will not be tolerated.** All written material must be done individually. This **includes lab data and graphs**; although lab work is done in groups, material submitted for grading must be processed and submitted independently. Plagiarism, **including the copying of any part of assignments or lab assignments**, is a serious offence and is considered to be academic misconduct.

Cheating

A student caught cheating on an exam will forfeit all credit for that exam and perhaps for the course. Cheating is a serious offence and is considered to be academic misconduct. **Cheating includes, but is not limited to, using unauthorized materials in a quiz/exam and providing information to another person regarding exam content.**

The consequences for cheating and plagiarism are outlined by Camosun College policies (see <http://camosun.ca/about/policies/education-academic/e-2-student-services-&-support/e-2.5.pdf> and <http://camosun.ca/about/policies/education-academic/e-2-student-services-&-support/e-2.5.1.pdf>) and may be severe.

Lab Attire

The wearing of lab coats at all lab sessions is **absolutely mandatory** for both safety and professional reasons. Cloth coats are preferable but disposable ones are acceptable. If you forget your lab coat you may rent one at a cost of \$5. The money received through lab coat rental will be donated to **Spread the Net**, an organization that supplies insecticide-impregnated bed nets to help prevent the spread of malaria in Africa.

For safety reasons, flip flops, sandals or shoes with holes are not acceptable.

Without exception, failure to wear proper lab attire will result in the inability to enter the lab and the subsequent **loss of credit** for that lab, including any pre-lab assessment credit.

Laboratory Attendance

The laboratory experience is critical to the course objectives and so attendance throughout the entire laboratory session is mandatory and will be noted. Lateness in arriving, failure to attend the lab or leaving the lab before its scheduled finish time will result in forfeiting credit for that lab, including any written assignments. If a lab session is missed, another student's data **may not** be used to complete a lab assignment for credit. Exceptions can be made **at the instructor's discretion** in legitimate cases of emergency (e.g. illness); in such cases the instructor must receive **advance notification** and **documented evidence** of the situation (e.g. medical certificate) and grant approval for any accommodation. In cases when a lab is done over two weeks, missing one of the weeks without instructor approval will result in a 50% reduction in the grade for any assignment associated with that lab.

Lab Assignments

All lab assignments must be submitted at the scheduled time, which is indicated on each assignment. Late assignments will be graded but for each day late, marks equivalent to 15% of the total value of the assignment.

Missed Exams

Without exception, all lecture and lab exams must be written at the scheduled times. **Under no circumstances will a make-up exam be administered.** However, it is understood that emergency circumstances occur (e.g. illness or emergency in the immediate family); for such circumstances accommodation may be offered at the discretion of the instructor, provided (a) the instructor is notified in advance of the exam (**not after**) and (b) the student provides **documented evidence** of the circumstance (i.e. medical certificate). **Without exception**, the

accommodation will be in the form of adjusting the weighting of the final exam to make up the missing marks. In such cases, the final exam will include extra questions to examine knowledge of the untested subject matter.

Please note:

*** HOLIDAYS OR SCHEDULED FLIGHTS ARE NOT CONSIDERED TO BE EMERGENCIES ***

Be sure not to plan airline flights for the end of semester until the final exam schedules are finalized and posted.

Other Instructions

Unless otherwise indicated, all written material to hand in must be prepared using a word processor. Templates will be provided, usually by posting on the course D2L website, for this purpose in MS Word .doc or .docx format, and these templates should not be altered except to complete the blank areas. With few exceptions (at the instructor's discretion), all written work must be submitted in **hard copy**, not e-mailed or posted to the D2L website. This is for purely practical reasons: printing out many assignments is problematic because instructors use shared-access printers and documents or parts of documents can go missing easily. Always be on the lookout for special instructions. Finally, unless otherwise instructed, graphs must be prepared using software with graphing capability (e.g. Excel).

Student Responsibilities

1. It is believed that attending and actively engaging in lecture times is in the best interests of student success. Should it be necessary to miss a lecture, however, it is the student's responsibility to catch up on anything that may have been missed (e.g. important announcement or assignments).
2. Students are expected to hand in any required reports on time. Late assignments will be penalized (see above).
3. All written work (including numerical entries in data tables) is to be submitted in word processed form. The only exceptions are calculations or graphs, which may be submitted handwritten or hand-drawn. Electronic submissions (e.g. as e-mail attachments) will not be accepted, except where specified **by the instructor**. Failure to comply will result in late penalties (as indicated).
4. Attendance is important to ensure success. If unable to attend a session, the student is responsible for arranging with a classmate to obtain information such as notes, handouts and announcements.
5. Examinations must be written as scheduled. Exceptions may be made for emergencies at the discretion of the instructor (see above). The student must notify the instructor in advance of the examination.
6. Any evaluation of work for in-class/lab assignments, reports and/or participation will not be given if a student is not present for any reason.
7. Students are expected to work independently on reports unless instructed that the evaluation is based on group effort and evaluation.
8. Students must know and follow all Safety Rules and Procedures. Students must sign the Safety Contract before participating in any laboratory activity. Failure to follow the Safety Rules and Procedures will result in penalties at the discretion of the instructor.
9. Eating or drinking is **strictly prohibited** and failure to comply may result in expulsion from the lab and loss of any associated lab credit. **No exceptions** will be tolerated.
10. **All students must wear a lab coat during laboratory sessions.** Failure to bring a lab coat to the lab may result in being unable to work in the lab and loss of credit for the lab.
11. Students must turn off cell phones and pagers during lectures and laboratory sessions.
12. All laboratories start punctually. Information necessary for performing the laboratory correctly and safely is given at the beginning of the lab. Late attendance may result in inability to attend the lab and subsequent loss of credit for any assignments.

