Course Outline (Syllabus)
Biology 2290F-Scientific Methods in Biology
Fall 2017

Course Information

Prerequisites: A grade of at least 60% in Biology 1201a/1202b/1001a/1002b (Old 1222/1223) is a prerequisite for this course. Unless you have either the prerequisite for this course or written special permission from the academic counsellors in your Faculty to enroll in it, you will be removed from the course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from the course for failing to have the prerequisites.

Course description: Biology 2290F/G is a laboratory course in the UWO Biology program dedicated to enabling students to apply sound experimental investigation and analyses to biological questions. Selected technical, analytical, and communication skills are introduced in diverse biological contexts as students rotate through four areas of study. Familiarize yourself with the philosophy and ground rules of Biology 2290F/G on pp. 6–10 in the Resource Manual.

Summary of course structure: Students will attend classes in four Units (named for the instructors: Dean, Krajnyk, Gray, and Zabulionis) according to the following timetable:

	Zabulionis Unit (Sections)	Dean Unit (Sections)	Krajnyk Unit (Sections)	Gray Unit (Sections)
Rotation # 1 Sep 11–Sep 28	001,002,003	004,005,006	007,008,009	010,011,012
Rotation #2 Oct 2–Oct 26	007,008,009	001,002,003	010,011,012	004,005,006
Rotation #3 Oct 30–Nov 16	010,011,012	007,008,009	004,005,006	001,002,003
Rotation #4 Nov 20–Dec 7	004,005,006	010,011,012	001,002,003	007,008,009

Scheduled Class Times:

Sections 001, 004, 007 and 010: Monday 2:30–5:30, Wednesday 2:30–5:30
Sections 002, 005, 008 and 011: Tuesday 8:30–11:30, Thursday 8:30–11:30
Sections 003, 006, 009 and 012: Tuesday 2:30–5:30, Thursday 2:30–5:30

You must attend your designated section unless you have received permission in writing from the instructor.

Class Locations:

Dean Unit: NCB 325
Gray Unit NCB 117
Krajnyk Unit: NCB 331
Zabulionis Unit: NCB 330

Required Course Materials

1. A **current edition** (2017–2018) of the *Resource Manual for Biology 2290* and a **hard-bound** lab notebook (preferably the "A91" style) are required and are available in the UWO Bookstore.

2. Additional required materials will be available on a regular basis from the course Biology 2290F/G OWL (Sakai) site (owl.uwo.ca). Use your UWO email username and password.

3. **Lab coats and safety glasses are required for most labs.**

Contact Information

Instructors:

Dr. Rob Dean	Tricia Gray	Irene Krajnyk	Ray Zabulionis
Ext. 86797	Ext. 80146	Ext. 86505	Ext. 86475
NCB 301F	NCB 301C	NCB 301E	NCB 342
rdean1@uwo.ca	tgray5@uwo.ca	ikrajnyk@uwo.ca	rayzab@uwo.ca
(**Course chair**)			

Office hours: By appointment.

Technical Coordination: Jeni Duro, Anica Bjelica, and Hemanta Raj Mainali

Teaching Assistants: Graduate student Teaching Assistants will be present at each laboratory class. (Exception**:** Gray Unit).

Email policy

1. When communicating with instructors and TAs use your uwo email account only**. We will not respond to emails originating from non-uwo email accounts.** Make sure, at all times, that your uwo account doesn't go over quota as you may not be able to receive any messages or responses from us. **Not checking your UWO account is not a valid excuse for missing essential communication**.

2. **Include "2290F" plus your lab section number in the subject of any emails that you send.** Emails containing unsolicited attachments will be automatically deleted.

3. All emails will be responded to within 48 hours during weekdays (not including weekends and holidays). Emails will usually be addressed during regular work hours (9–5). We may choose, at our discretion, to respond outside these hours, depending on availability.

Course Content

The content of the Dean, Gray, Krajnyk, and Zabulionis Units follows. Assignments, and the weight of each assignment as a percentage of the course mark, are included in italics in parentheses.

Dean Unit (14%):

Class #1: Introduction to the design and use of the Spectronic 20. Introduction to Lambert's Law, Beer's Law and the relationship between absorbance and transmittance. Calibration of the Spectronic 20 for measuring absorbance and use of the instrument to generate absorption spectra and a standard curve. Introduction to best practice in volumetric measurement.

Class #2: Principles of using the Spectronic 20 to estimate reaction rates. Students will also prepare a buffer solution for use in classes # 3 and #4.

Class #3: Use of the Spectronic 20 to measure rates of photoreduction of a dye by isolated, illuminated chloroplasts as a function of the photon fluence rate. **(*Graphing Assignment #1 due (1%)*)**.

Class #4: Measurement of the rate of photoreduction of a dye by isolated, illuminated chloroplasts in the presence of different concentrations of a herbicide. Introduction to light microscopy and the principles of using a haemacytometer. **(*Quiz #1 (4%)*)**.

Class #5: Determination of the number of cells/ml in liquid suspension cultures using the haemacytometer and the Spectronic 20. Start an experiment to determine the increase in cell number over a 24 hour incubation period in cultures containing different concentrations of an essential nutrient. **(*Graphing Assignment #2 due (2%)*)**.

Class #6: Complete experiment started in class #5. The meaning and significance of resolution in microscopy. **(*Quiz #2 (5%), Laboratory Notebooks marked (2%)*)**.

Gray Unit (25%):

Sequence and content may be subject to minor revisions. The Schedule for any particular rotation shall take precedence. Please note: This unit is a short rotation comprising only five sessions. No more than one absence is allowed in this unit.

Class #1: Overview of Assignments. Scholarly Research. Citations and References. Primer on Evolution. Choose topic for GEM essay. Choose project for Assignment One.

Class #2: The Art of Language (clickers!). Academic Integrity. Preparing an Annotation.

Class #3: Clarity, Conciseness, and Punctuation. Principles of Peer Review. Annotation Peer Review (submit draft to Turnitin before class). **DUE: *Submit Annotation #1 FINAL (6%) to Turnitin before 6:00 pm one day after Session 3. Submit Assignment One (2%) to Turnitin before class. See Rotation Schedule for details.***

Class #4: Logic and Reasoning. Theory Acceptance. Preparing a GEM.

Class #5: Scientific Communication. Feedback from Annotation. Peer Review of GEM (submit draft of GEM before class). **DUE:** S***ubmit GEM FINAL and Annotation #2 (17%) to Turnitin before 6:00 pm two days after Session 5. See Rotation Schedule for details.***

Krajnyk Unit (17%):

Class #1: Outline of objectives for this unit. Introduction to the importance and design of lab notebook. Introduction to the scientific method. Introduction of experimental projects. Introduction to flow chart. Assignment of team projects and discussion with each team regarding their experimental design and demonstration of experimental technique. ***(3 min. project presentation)***.

Class #2: Discussion and example on how to write hypotheses and protocol. Introduction to poster (conference-style) design and content. Set up of experiments with introduction of specific team based experimental techniques. ***Failure to participate in the experimental work (Class #2) will result in a loss of 20% of the total mark for this unit. (Submission of team flow chart, individual schematic diagram of experiment, and Part 1 of Experimental technique assessment (ETA-2%)***

Class #3: Introduction to statistical analyses. Collection of experimental data for each project. Statistical analysis of experimental data. ***(Part 2 of Experimental technique assessment (ETA-2%)***. ***SECTIONS 007, 008, 009 ONLY. Submit Assignment One (2%) to Turnitin before class.***

Class #4: Introduction with examples to writing the results section. Introduction to (conference-style) PowerPoint presentation of experimental results. Statistical analysis of experimental data. ***(Quiz #1 (2%))***.

Class #5: What is needed for Session 6? Completion of outstanding experimental work and/or statistical analysis. Lab time devoted to preparation of oral and poster presentations. ***(Quiz #2 (2%))***.

Class #6: Submission of poster to 'Turnitin.' ***PowerPoint presentation of experimental results (3%). Poster presentation of experimental results accompanied with an interview session (6%). Submission of lab notebook (2%)***.

Zabulionis Unit (14%):

Class #1: Welcome to the Zab Unit. Structure and philosophy of the unit, lab safety, pipette usage, and biology of bacterial plasmids and transformation will be introduced. Conduct a transformation of *E. coli* with an antibiotic resistance-coding plasmid.

Class #2: Analysis and discussion of transformation experiment from previous session. Theory of transformation and plasmid structure discussed. Introduction of "Toy Box" for Independent Experiment.

Class #3: ***Quiz #1 (3%)*** covering pipetting, the transformation experiment and theory. Discussion of dilutions, both bacterial cells and concentrated solutions. The rest of the session will be used to design your Independent Experiment.

Class #4: Conduct your Independent Experiment.

Class #5: Analysis of first attempt at your Independent Experiment. Repeat Independent Experiment.

Class #6: ***Quiz #2 (5%)*** covering dilutions, plasmid structure and transformation of *E. coli*. ***Practical Test (1%)*** involving pipetting and plating. Wrap up of Independent Experiment: ***Prediction, Protocol, Data, Biological Mechanism, and Conclusion (3%)*** in Lab Book. ***Lab books (2%)*** handed in for marking by the end of class.

Course Learning Outcomes

The **general course learning outcomes** for the four course Units are briefly summarized below. More detailed course learning outcomes, and the Units to which they apply, follow.

Upon successful completion of Biology 2290F/G, a student will be able to:

Apply the principles of light spectrophotometry covered in class to collect data for the analysis and calculation of reaction rates. Use a correctly set up microscope, together with a haemacytometer and spectrophotometer, to collect data on changes in cultured cell concentrations under experimental conditions (Dean Unit).

Explain the structure and use of R-plasmids for bacterial transformation and use this information to perform, and repeat with necessary modifications, an independent experiment using *E. coli*, and to propose a biological model to explain the results (Zabulionis Unit).

Work in a team to design and implement an experiment, perform statistical analysis on experimental data, and utilize primary articles to provide a logical and plausible interpretation of the data.

Communicate experimental findings in the form of a poster and PowerPoint presentation—conference style—incorporating relevant information from the scientific literature (Krajnyk Unit).

Research a unique topic that illustrates a principle of evolution. Use databases, classroom resources, and peer reviews to construct a scientific review adhering to scientific guidelines and conventions (Gray Unit).

Detailed Course Learning Outcomes.

Student success in achieving the following specific course learning outcomes will be assessed by the methods indicated in footnotes numbered [1] to [7].

Upon successful completion of Biology 2290F/G, a student will be able to:

- Work safely in a laboratory [1] (Dean, Krajnyk & Zabulionis Units).
- Write a protocol, a flow chart, and perform an experiment to test a hypothesis (including predictions, appropriate controls, treatments, replications, randomization and consideration of statistical tests to be used [1, 3]) and explain features that exemplify best practice in experimental design (Dean, Krajnyk & Zabulionis Units).
- Follow a standard protocol for bacterial transformation using appropriate aseptic methods [1] (Zabulionis Unit).
- Explain the purpose of reagents, temperatures, and incubation times for the theory of bacterial transformation [3, 5] (Zabulionis Unit).
- Explain the structure and use of R-plasmids for bacterial transformation [3] (Zabulionis Unit).
- Learn how to use a statistical software program and explain the outcome of statistical results with particular reference to ANOVA and Tukey's *post hoc* tests [3, 4, 5] (Krajnyk Unit).
- Search databases (e.g. PubMed, BIOSIS, Web of Science) for information from the scientific literature to create logical and plausible interpretation of experimental results [7] (Krajnyk & Gray Units).
- Maintain a laboratory note book in a manner that would be acceptable in a research laboratory [2] (Dean, Krajnyk & Zabulionis Units).
- Use equipment relevant to their individual or group experiments not mentioned elsewhere (e.g. leaf area meters, chlorophyll meter, quadrats) (Krajnyk Unit).
- Reliably dispense mL volumes using glass pipettes and µL volumes using mechanical micropipettes [1] (Dean, Krajnyk & Zabulionis Units).
- Use basic chemical equations to calculate dilutions, the concentrations and volumes of solutions or the molecular weight of the solute [3, 5] (Dean & Krajnyk Units).
- Correctly use and interconvert SI Units of Measure [3, 5] (Dean, Krajnyk & Zabulionis Units).
- Use style guidelines to create tables and figures with self-explanatory titles and legends in a style that would be acceptable for publication in the primary literature [5, 6] (Dean & Krajnyk Units).
- Communicate experimental outcomes in the form of conference style oral presentations (with PowerPoint images) and poster presentations [4, 6] (Krajnyk Unit).
- Explain how a visible range spectrophotometer works with particular reference to how monochromatic light is generated and how specific wavelengths of the monochromatic light are directed towards the sample solution [3] (Dean Unit).
- Explain how light is attenuated exponentially as it passes through the path length (l) of an absorbing solution (Lambert's Law), describe the relationship between light transmittance (T) and absorbance (A) ($A = \log_{10}\frac{1}{T}$) and the linear relationship between absorbance (A) and concentration (c) ($A = E.c.l$, Beer's Law) [3, 5] (Dean Unit).

- Set up a visible range spectrophotometer correctly and use it to measure light absorbance using an appropriate reference blank solution (Dean Unit).
- Use the spectrophotometer to create an absorption spectrum to determine the wavelength of maximum absorbance (λ_{max}) or to partially identify an unknown chemical compound by comparison to known standards [3] (Dean Unit).
- Use the spectrophotometer to create a standard curve of absorbance *vs* concentration and determine the absorption coefficient (E = the slope of the standard curve) and use the spectrophotometer to create a standard curve of apparent absorbance (turbidity) *vs* the number of cells/mL to facilitate rapid estimates of unknown numbers of cells/mL in cell suspensions [3] (Dean Unit).
- Use the spectrophotometer to measure the decline in absorbance over time during the course of a (bio)chemical reaction, equate the change in absorption to a change in concentration over time using the absorption coefficient (E) and to convert the change in concentration over time to a reaction rate with the units of moles/minute [3] (Dean Unit).
- Calculate the volume occupied above differently sized squares on a haemacytometer and use it to determine the number of cells/mL in a suspended cell culture [3] (Dean Unit).
- Set up a light microscope for Koehler Illumination to facilitate cell counting (Dean Unit).
- Calculate the number of cells/ mL in liquid bacterial cultures using the diluting and plating method [3, 5] (Zabulionis Unit).
- Use a clinical centrifuge, for example, to separate cells from liquid media (Dean, Krajnyk & Zabulionis Units).
- Explain the meaning of resolution in microscopy and calculate the theoretical limit to resolution using Abbe's Equation [3] (Dean Unit).
- Use a quantum sensor to measure irradiance (λmol photons/m^2/sec) at a distance from a light source and explain its relevance (Dean Unit).
- Use an analytical balance and pH electrode to prepare a buffer solution and explain major criteria used to select an appropriate buffer [3] solution to be used in a specific experimental context (Dean Unit).
- Remember and use the following pH related equations: $[H^+][OH^-] = 1 \times 10^{-14}$, $pH = -\log[H^+]$, $[H^+] = 10^{-pH}$, $pOH = -\log[OH^-]$, $[OH^-] = 10^{-pOH}$, $pH + pOH = 14$, $pH = pK_a + \log\frac{[base]}{[acid]}$ [3, 5] (Dean Unit).
- Calculate the volume of a chloroplast suspension that contains a specific quantity of chlorophyll [3] (Dean Unit).
- Work collaboratively in a 'research' team, assume responsibilities within the team and communicate with, and respect the opinions of, other members (Dean & Krajnyk Units).
- Use the knowledge and skills developed in the course to select relevant information that can be used to solve problems on assessments that resemble, but are not identical to, material worked on in the course [3] (Dean, Krajnyk & Zabulionis Units).
- Summarize and evaluate scientific sources [7] (Gray & Krajnyk Units).
- Write a scientific review based on given examples and an individually chosen topic [7] (Gray Unit).
- Write in a clear and concise style meeting formal guidelines and scholarly expectations [7] (Gray & Krajnyk Units).
- Cite and reference sources correctly in a given style format [7] (Gray & Krajnyk Units).

Footnotes.
Assessments.
[1] Correct aseptic technique and micropipetting are assessed in a lab test.

[2] The laboratory notebooks are handed in and assessed after each of the three laboratory units.
[3] May be assessed in the final exam.
[4] Assessed in poster and orally-delivered PowerPoint presentations.
[5] Assessed in lab quizzes.
[6] Assessed in graphing assignments.
[7] Assessed in writing assignments.

Course Policies

1. **Attendance in each session of each unit at your designated time is essential** in order to maintain the continuity of your experiments and obtain maximum credit.

2. **Students who are absent for three of the six sessions or two of the five sessions of any given rotation will receive a grade of "F" for the entire course.** This "F" may be revised to "INC" (incomplete) only upon recommendation from the academic counsellors in your Dean's Office in cases of documented health or compassionate concerns.

3. **You must initial the attendance sheet in each unit at the appropriate time. If you fail to do so, you will be considered absent.**

4. **Because this course is an "Essay" course, students who fail to complete and submit all written assignments in the Gray Unit term work will receive a grade of "F" for the entire course.**

5. This course requires substantial written work on assignments and the Final Exam. Although much of the work in Biology 2290 is collaborative in some way, students are expected to write independently, and in their own words. Whenever students take an idea or data from another source, they must acknowledge their debt by proper referencing. Appropriate examples will be discussed in class.

   All required papers, assignments and posters will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.

6. **The copy submitted to Turnitin (on OWL (Sakai)) must be identical to the hard copy, except the Gray Unit for which there are no paper submissions. Failure to comply with this guideline will result in a mark of zero.** Resubmission of any assignment is not permitted without consent of instructor. A late penalty may be applied. Assignments submitted outside Turnitin on OWL (Sakai) or outside the designated "gateway" will be assessed a penalty of up to but not exceeding 25%.

7. All assignments requiring a submission to Turnitin on OWL (Sakai) must be received in hard (paper) copy and in Turnitin before the deadlines to be relieved of any late penalty, except the Gray Unit for which there are no paper submissions. It is the responsibility of the student to ensure proper access to the Turnitin site. Assignments submitted outside Turnitin on OWL (Sakai) or outside the designated "gateway" will be assessed a penalty of up to but not exceeding 25%. If access to

Turnitin is unavailable (due to maintenance, etc. by UWO), then appropriate alternate arrangements will be announced by the instructor.

8. **Late Submissions** received **within** 24 hours of the deadline will be assessed a penalty of 25%. Submissions received **later than 24 hours past the deadline** will receive a mark of zero. It is the responsibility of the student to immediately consult with an instructor and deliver late assignments to the appropriate marker. Any and all requests for an extension or a grade of "absent" in cases involving documentable health or compassionate concerns must be referred to the academic counsellors in your Faculty.

9. **A Personal Response System ("iClicker Cloud")** will be used in the Gray Unit to facilitate class discussion. Responses will be neither assessed nor saved.

10. If you would like to make an audio recording of the lectures/tutorials in this course, you MUST first obtain permission from each instructor in writing. According to intellectual property laws, not asking permission constitutes stealing. **We do NOT permit videotaping or photographing lectures.**

11. **Course material (i.e. lecture slides, videos, and other supplementary material posted on OWL) is the intellectual property of your instructor** and is made available to you for your personal use in this course. Sharing, posting or using this material outside of your personal use in this course is considered an infringement of intellectual property rights.

Evaluation/Grading Assignments and Final Exam

1a. Final Grades will be derived from "in-class" term work and a Final Exam.

1b. 70%–Assignments and tests completed while the course is in progress.

1c. 30%–Final Exam (as scheduled by the Registrar). The final exam covers materials from the Dean (10%), Krajnyk (10%), and Zabulionis (10%) units only. Only **non-programmable calculators** may be used in the final examination.

2. **The final exam in this course must be attempted otherwise a grade of "F" will be assigned to the course.** There will be one written make-up examination in Biology 2290F/G. Students who have valid documented reasons (through the academic counsellors in the Dean's Office) for missing the make-up will write the exam during the final exam period the next time the course is offered.

3. Assignments (including in-class quizzes, writing and graphing exercises, oral and poster presentations, practical tests and a properly maintained lab notebook) will be administered or due as indicated in the section on course content.

4. **Once assignments, etc. have been returned there is a 48 hr cool-down period before asking questions.**

5. **Reassessing your term work/final exam.** If you wish to have any rotation work reassessed, the instructor of the unit will instruct you on the appropriate procedure to take. **Your mark may**

remain the same, increase, or decrease. The revised mark will replace the original mark with no basis for appeal.

6. **Re-assessment of all rotation work (assignments and tests) must be completed within one week of grades appearing on OWL in the Gradebook or in the Turnitin marked document, whichever applies to your rotation.**

7. No special rounding rules (e.g. to meet GPA cut-offs, minimal requirements for programs, etc.) are applied in this course when calculating final course grades. Course components will not be re-weighted, nor will additional assignments be accepted, to accommodate perceived poor performance on any assessment or for any unaccommodated absence during a graded component of this course.

8. Non-programmable calculators are permitted for use during the course assessments. No other aids (notes, etc.) are allowed. Cellular phones, iPods, and other similar technology are not permitted in the exam rooms for any reason.

9. If a component of the course is missed for a validly documented reason and no make-up is possible, the instructor may transfer the allocated percentage for the missed component to the percentage of the final examination (exception Gray unit).

10. **Answers to frequent questions:**

    How can I "make up" a missed lab?
    There are no make-up labs in this course.

    I was feeling unwell when I wrote the quiz/exam, so I did poorly. What should I do?
    If you have deemed yourself fit to write the quiz/exam or submit the assignment, it is too late to do anything after the fact. If you are genuinely unwell, do not write it. Consult the Accommodation for Medical Illness policy:
    http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

Additional Information

1. **Accessibility**-Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661–2111 ext. 82147 for any specific question regarding an accommodation.

2. A student requiring academic **accommodation due to illness** must use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services.
   The form can be found here: *https://studentservices.uwo.ca/secure/medical_document.pdf*

3. **Course Communications**-Students must check OWL (http://owl.uwo.ca) and their uwo.ca email on a regular basis. This is the primary method by which information will be disseminated to all

students in the class. The missing of critical information due to your failure to check OWL or email cannot be used as a basis for appeal.

4. Students who are in emotional/mental distress should refer to Mental Health@Western ***http://www.uwo.ca/uwocom/mentalhealth/*** for a complete list of options about how to obtain help.

> ***"The capacity to feel, think and act in ways that enhance our ability to enjoy life and deal with the challenges we face"*** **(Public Health Agency of Canada)**

Prevention	At Risk	Crisis
• Sleep • Exercise • Nutrition • Connect • Health & Wellness Website • Learning Skills & Writing Skills • Student Success Centre	• Stress Management • Peer Support • Academic Counsellor • Counselling SHS, SDC, Residence • Good2Talk (Post-Secondary Phone Line) 1–866–925–5454	• Monday to Friday 8:30–4:30 Go in person or Call • Student Health Services, UCC, Rm 11 519-661-3030 • Student Development Centre WSS, 4th Floor 519–661–3031 • Campus Police 911 • London Crises Response 519–433–2023

Additional student-run support services are offered by the USC, ***http://westernusc.ca/services***.

5. **Academic Offences**-Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site ***http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf***

6. **Plagiarism**-Plagiarism is a major academic offence (see Scholastic Offence Policy in the UWO Calendar) and UWO uses software and marking practices designed for plagiarism checking. The Biology 2290 Resource Manual (pp. 8–9) defines plagiarism with respect to this course.

7. **Academic Accommodations for Religious Holidays**-The Faculty of Science strictly adheres to the University policy on accommodation for students based upon conflicts with religious holidays. Accommodation will only be granted for the specified date of the religious holiday. Only holidays appearing on the University-approved list of dates will be accommodated. See the academic counsellors in the Office of your Dean for the list of approved dates. Students requesting accommodation must do so, in writing, to the academic counsellors in the Office of your Dean at least one month before the scheduled exams/assignments.

8. **SDC's Learning Skills Services**, Rm 4100 WSS, ***www.sdc.uwo.ca/learning.*** LS counsellors are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

9. **Code of Student Conduct**-To foster a supportive and enriching academic environment that is conducive to learning and free inquiry, Western has a Code of Student Conduct (available in the Administration folder on OWL) ***(http://www.uwo.ca/univsec/pdf/board/code.pdf)***

10. If you are a science student, the Academic Counselling Office of the Faculty of Science is located in WSC 140, and can be contacted at 519–661–3040. Their website is ***http://www.uwo.ca/sci/undergrad/academic_counselling/index.html.***

11. The website for Registrarial Services is ***http://www.registrar.uwo.ca.***