The course will typically meet once per week Wednesdays at 9:30-11:30 in room 346 MSB. There will be an interruption in the course, and additional sessions will be scheduled to account for this interruption.

###NOTE: This is intended to be focussed largely on practical aspects of analysis

Instructor: Greg Gloor, ggloor@uwo.ca, 519-661-3526 (office)

Students will be expected to bring a functional laptop to class with the R programming environment already loaded and functional. Students should be familiar with the file system of their computer and be able to locate files associated with R on their own. Students should have a working text editor installed. For Macs this could include Textwrangler, for PCs the could include Notepad++. Students should have a copy of "Analyzing compositional data with R" loaded on their computer for reference. We will use many of the principles outlined in that book.

**The first class will be on Wednesday November 11, 2015 and will be 4 hours in length.**

**Wednesday November 11 (4 hrs in length)**
- Session 1: An introduction to high throughput sequencing approaches (how sequencing on the illumina platform works)
- Session 2: Designing and critiquing RNA-seq experiments: from theory to costing

**Wednesday November 18**
- Session 3: Obtaining an RNA-seq dataset. Where is the data? how do I get it. Now what?

**Wednesday November 25**
- Session 4: Exploring the dataset, outlier detection, do I have a difference?

**Wednesday December 2**
- Session 5: Differential abundance ALDEx2 and DESeq

**Wednesday December 9**
- Session 6: Issues with RNA-seq

Assignment 1: will be an essay assignment critiquing an RNA-Seq analysis paper. As part of this, the student will be asked to conduct a costing for the experiment to be reproduced as reported using current techniques (25%)

Assignment 2: will be a re-analysis of a dataset to determine if the paper has stood the test of time. This analysis will be done with two different RNA-seq analysis tools: DESeq2 and ALDEx2.

2A: I am going to mark your R scripts for completeness, comments and simplicity. This will be worth 25% of your mark

2B: I am going to mark your final data for how you went about comparing the three sets of results, the quality of your data. This will be worth 25%

2C: I am going to mark your conclusions and their support in your data. Critique the original paper and be sure to explain what you would do differently given what you now know with the best technology available today. Again worth 25%

The course is largely practical. Assignments are to be worked on and handed in individually, and are equally weighted. Students will be expected to conduct independent learning to practice the concepts and tools.

Students will need to bring a reasonably recent laptop to class and be willing to install a number of freely available scientific software packages. Students are expected to bring a laptop with R
preinstalled (http://cran.utstat.utoronto.ca). We will be learning theory and some practice on how to use R and its packages for the analysis of high throughput sequencing data.

readings and sources
R installation
http://cran.utstat.utoronto.ca

All assignments are due one week after they are given. All assignments must be handed in and passed to obtain course credit.

Statement on Academic Offences

The statement: “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/scholastic_discipline_grad.pdf

All required papers may 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 for such checking 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.com (http://www.turnitin.com).

Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western’s Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca/, and our own McIntosh Gallery http://www.mcintoshgallery.ca/. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html

To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.

Helpful Resources @ Western for Graduate Students

Writing Support Centre http://www.sdc.uwo.ca/writing/  SDC’s Learning Skills Services, Rm 4100 WSS, www.sdc.uwo.ca/learning
LS counsellors are ready to help you improve your learning skills. We 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.

*The Student Success Centre: http://success.uwo.ca/*