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BIOL 243
Statistics for Biologists

Fall Term (2014-15)

Introduces descriptive and inferential statistics and data analysis strategies. Topics include probability, correlation/regression, experimental design and analysis of variance. Online learning and weekly laboratories provide practice in computation, interpretation and communication of statistical findings, and large class review sessions and individual drop in assistance ensure mastery. Applications appropriate to different fields of study will be explored.

NOTE Enrolment is limited. Priority will be given to students registered in BIOL Major (Science); BIOL, BIMA, BIPS, EBIO Specialization (Science) Plans.
LEARNING HOURS 126 (12L;18Lb;96P)
RECOMMENDATION 12U Functions and 12 U Calculus or equivalent high school background or MATH P06/3.0 is highly recommended.
EXCLUSION No more than 3.0 units from BIOL 243/3.0; CHEE 209/3.0; ECON 250/3.0; GPHY 247/3.0; KNPE 251/3.0 (formerly *PHED 251/3.0*); NURS 323/3.0; POLS 385/3.0; PSYC 202/3.0; SOCY 211/3.0; STAT 263/3.0; STAT 267/3.0; STAT 367/3.0; COMM 162/3.0. ONE-WAY EXCLUSION May not be taken with or after STAT 269/3.0.

SCHEDULE

Lecture 001: Friday 11:30-12:30pm. ELLIS AUD.
Lecture 002: Thursday 4:30-5:30pm. WALTER LIGHT 205.
Lecture 003: Monday 1:30-2:30pm. ELLIS AUD.
Tuts: Various days and times in BIOSCI, refer to SOLUS for details.

Instructor	**Dr. C. Molson and Dr. Wm. Nelson**
Instructor Contact	charles.molson@queensu.ca; Phone: 613-533-32416 nelsonw@queensu.ca; Phone: 613-533-6130, BIOSC 3506
Office Hours	
TA:	See Course on Moodle
TA Contact Information	See Course on Moodle
Office Hours	See Course on Moodle

Method of Delivery

Blended course using Acrobatiq's adaptive learning program, weekly lectures and labs. Drop in tutorials will also be available where students can come without appointment to seek assistance with course material.

Learning Outcomes

After completing this course, students should have the knowledge and skills to do the following:
- Identify the features of a data set to determine how best to summarize and display it.
- Choose the appropriate statistical test and provide the rationale for selection.

• Compute basic parametric and nonparametric statistical tests to test hypotheses.
• Interpret the results of statistical tests and data software output to be able to draw valid conclusions.
• Apply knowledge of statistics and research design (e.g., sampling) to critically evaluate research findings.

Learning Hours

Teaching method		Average hours per week	Number of weeks	Total hours
In-class hours	Lecture	1	12	12
	Seminar			
	Laboratory	1.5	12	18
	Tutorial			
	Practicum			
	Group learning			
	Individual instruction			
Other	Online activity	4	12	48
	Off-campus activity			
	Private study	4	12	48
Total hours on task				126

Course Outline

Week 1: Exploratory Data Analysis
Week 2: Examining Distributions
Week 3: Examining Relationships
Week 4: Probability (Introduction), Finding Probability of Events
Week 5: Random Variables
Week 6: Sampling Distributions
Week 7: Inference Intro; Estimation
Weeks 8-9: Hypothesis Testing
Weeks 10-12: Inference For Relationships

Course Materials
Acrobatiq Probability and Statistics (*http://acrobatiq.com/*), Calculator Casio FX 991

Grading Scheme

Component	Weight (%)	Date
Online checkpoints	15	Weekly
Term tests (2 x 10%)	20	Scheduled during term
Labs (10 x 3%)	30	Weekly
Final Exam	35	End of term

Grading Method

All components of this course will receive letter grades which, for purposes of calculating your course average, will be translated into numerical equivalents using the Faculty of Arts and Science Letter Grade Input Scheme.

The following scale will be employed for purposes of calculating your course average:

Arts & Science Letter Grade Input Scheme

Assignment mark	Numerical value for calculation of final mark
A+	93
A	87
A-	82
B+	78
B	75
B-	72
C+	68
C	65
C-	62
D+	58
D	55
D-	52
F48 (F+)	48
F24 (F)	24
F0 (0)	0

Your course average will then be converted to a final letter grade according to Queen's Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale

Grade	Numerical Course Average (Range)
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

Academic Integrity and Queen's Code of Conduct

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments and conduct conform to the principles of academic integrity. Information is available in the Arts and Science Calendar (see Academic Regulation 1 - http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations, on the Arts and Science website (see http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity), and at Biology's website (http://www.queensu.ca/biology/undergrad/integrity.html) and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulations on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Accommodation Policy, Exam Conflicts, and Other Conflicts

Students who feel they need accommodations for disabilities or extenuating circumstances, or have a conflict between exams or other commitments should consult the Biology Department's website for details about how to proceed (http://www.queensu.ca/biology/undergrad/integrity.html). In general, the earlier a course coordinator is apprised of an extenuating circumstance, the more likely an accommodation can be made. Students are encouraged to be proactive in anticipating difficulties, when it is possible to do so.

Students may apply to write a make-up or deferred exam if they have an exam conflict as defined in the Academic Regulations of the Faculty (See Arts and Science Calendar Regulation 8 - http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations). In this case, the student should report to the Exams Office first to verify that there is a genuine exam conflict. Biology professors will not consider your situation to be a conflict unless it meets the criteria set out by the Faculty of Arts and Sciences.

Students may request a make-up or deferred exam if they have an exam conflict with off-campus travel associated with a field course (e.g BIOL-307/3.0 or 407/3.0) that is held during the fall or winter terms.

Copyright

This material is copyrighted and is for the sole use of students registered in this course. This material shall not be distributed or disseminated to anyone other than students registered in this course. Failure to abide by these conditions is a breach of copyright, and may also constitute a breach of academic integrity under the University Senate's Academic Integrity Policy Statement.

Accommodation of Disabilities

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact the Disability Services Office (DSO) and register as early as possible. For more information, including important deadlines, please visit the DSO website at: http://www.queensu.ca/hcds/ds/