

## New Course

Proposal Reference : 3638  
 Number  
 PRN Alias : 11-12#594  
 Version No : 3  
 Submitted By : Ms Nancy Nelson  
 Edited By : Ms Josie  
 D'Amico

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New Data					
Program Affected?	N				
Program Change Form Submitted?					
Subject/Course/Term	BIOL 597 <ul style="list-style-type: none"> <li>• one term</li> </ul>				
Credit Weight or CEU's	2 credits				
Course Activities	<table border="1"> <thead> <tr> <th>Schedule Type</th> <th>Hours per week</th> </tr> </thead> <tbody> <tr> <td>M - Seminar</td> <td>3</td> </tr> </tbody> </table>	Schedule Type	Hours per week	M - Seminar	3
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M - Seminar	3				
Total Hours per Week : 3 Total Number of Weeks : 8					
Course Title	<table border="1"> <tbody> <tr> <td>Official Course Title :</td> <td>Advanced Biostatistics</td> </tr> <tr> <td>Course Title in Calendar :</td> <td>Advanced Biostatistics</td> </tr> </tbody> </table>	Official Course Title :	Advanced Biostatistics	Course Title in Calendar :	Advanced Biostatistics
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Rationale	<p>This course is tailored to individuals who are in the midst of data analysis, namely graduate students and honours undergraduates. It is designed to follow BIOL 596, Advanced Experimental Design, and will guide students in the implementation of statistical approaches most suitable to their experimental questions.</p>				
Responsible Instructor					
Course Description	<p>This course will concentrate on the practical application of data analytical approaches with particular experimental questions in mind. Techniques presented will include statistical methods such as linear models, multivariate statistics, data reduction, information theory.</p>				
Teaching Dept.	0286 : Biology				
Administering Faculty/Unit	SC : Faculty of Science				
Prerequisites	BIOL 373 or equivalent, and permission of instructor; BIOL 596 recommended Web Registration Blocked? : N				
Corequisites					
Restrictions					
Supplementary Calendar Info					

Additional Course Charges	
Campus	Downtown
Projected Enrollment	15
Requires Resources Not Currently Available	N
Explanation for Required Resources	
Required Text/Resources Sent To Library?	
Library Consulted About Availability of Resources?	
Consultation Reports Attached?	
Effective Term of Implementation	201209
File Attachments	No attachments have been saved yet.
To be completed by the Faculty	
For Continuing Studies Use	

## Approvals Summary

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Version No.	Departmental Curriculum Committee	Departmental Meeting	Departmental Chair	Other Faculty	Curric/Academic Committee	Faculty	SCTP	Version Status
3								Approved by Departmental Curriculum Committee Edited by: Josie D'Amico on: Jan 12 2012
2	Approved Frederic Guichard Meeting Date: Dec 07 2011 Approval Date: Dec 7 2011 <a href="#">View Comments</a>							Approved by Departmental Curriculum Committee Edited by: Nancy Nelson on: Dec 7 2011
1								Submitted to Departmental

Advanced Biostatistics  
 BIOL 597  
 2 credits  
 Professors: Catherine Potvin and Jon Sakata  
 Course Syllabus  
 Wednesdays 9:00 to 12:00

This course is aimed at graduate students in the Department of Biology and at upper-level undergraduates who are in the midst of data analysis. This course is designed to be an extension of BIOL 596, Advanced Experimental Design, and will be oriented to help the students with the specific challenges that they are facing (or will be facing) in their own research. The course will consist of formal lectures, discussions of scientific papers and of model experiments, and student-led discussions of analytical techniques, and student presentations of the application of statistical approaches to their own data.

The following is a tentative list of topics to be covered during the course.

Dates	Topics	Responsible
September 26	Course introduction, Principles of biostatistics, Data preparation, Inferential vs descriptive statistics, Parametric vs non-parametric.	Sakata/Potvin
October 3	Analysis of variance (ANOVA), multivariate ANOVA, and extensions of ANOVA models (e.g., mixed effects models) Paper critique I	Potvin
October 10	Analyses of covariance, simple and multiple regression Paper critique II	Potvin
October 17	Data reduction techniques (e.g., principal components analysis, independent components analysis) Student-led method presentation I	Sakata
October 24	Information Theoretic Approaches Student-led method presentation II	Sakata
October 31	Non-parametric approaches, Bayesian statistics Student-led method presentation II	Sakata/Potvin
November 7	Student proposal own analysis	Students/ Sakata/Potvin
November 14	Student proposal own analysis	Students/ Sakata/Potvin

Format: Class will be divided in two sections with some 60-90 minutes devoted to formal teaching and 60-90 minutes to discussions. Discussions will be a “critique” of published papers and presentation and reflection on particular analyses.

Proposed evaluation and time line:

October 3	1 page presentation of research question and hypothesis	10%
October 17, 24, & 31	Student-led method presentation (teams of two)	20%
November 7 & 14	Students proposal of own data analysis	30%

November 21	Written report on implementation of statistics incorporating input	30%
	Participation	10%

**Student-led method presentation:**

Students will work in pairs to present and illustrate a statistical method not taught in class and, preferably, not using in their own work. The presentation should include the methods, assumptions, and possible applications. A list of methods to be presented will be given by the professors at the first lecture. Grades will be given to the group. Two or three student groups will present in a given day and will have 30 min. each to explain the method to the class. Students should aim at a 20 min. presentation with 10 min. of questions.

**Student's proposal of own data analysis:**

Each student will present how s/he implemented her/his data analysis to the class. The presentation will be scrutinized to ensure that it will meet the guidelines of the research question. The oral presentation will serve to help students explain their analysis and receive feedback. Students will be graded on the efficacy in which they present their data, in addition to the validity of statistical approaches used.

**Written report of own analysis:**

The written report should integrate the learning of the course and reflect the input received during the earlier discussion. It should be written in the format of a journal in the student's relevant field.

**Course registration and prerequisites:**

BIOL 373 or equivalent and consent of instructors are required. For consent, please write an email to Drs. Catherine Potvin ([catherine.potvin@mcgill.ca](mailto:catherine.potvin@mcgill.ca)) and Jon Sakata ([jon.sakata@mcgill.ca](mailto:jon.sakata@mcgill.ca)) indicating your statistics and research background (e.g., year, advisor, field of study, research question, types of analyses you anticipate to use). Space is limited to 15 students, and preference will be given to graduate students in the Biology department at McGill, then to upper level undergraduates in the Biology department, then to graduate students from other departments, then to graduate students from other universities. Preference will also be given to students that have taken BIOL 596.