**BIOLOGY 500 LEVEL ADVANCED HONOURS SEMINARS
APPLICATION FORM – 2017-18**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Student #: \_\_\_\_\_\_\_\_\_\_\_ E-mail address: **\_\_\_\_\_\_\_\_\_\_**\_\_@queensu.ca
Program: BSCH MAJ BIOL \_\_\_\_ BSCH SSP BIOL \_\_\_\_ BSCH ENSC/BIOL \_\_\_\_\_ BSCH BIPS \_\_\_\_\_ BSCH BTEC \_\_\_\_\_\_

HAVE YOU PREVIOUSLY COMPLETED A BIOL 500 SEMINAR? \_\_\_\_\_
ARE YOU ENROLLING IN, OR HAVE YOU PREVIOUSLY TAKEN BIOL 537?\_\_\_\_\_\_

From the course descriptions, choose the topics which interest you most. We will endeavour to satisfy everyone a first or second choice. The enrolment is normally limited to 14 students per course. Students taking BIOL 537 may take one advanced honours seminar if space allows. Preference will be given to students who require an advanced Honours seminar(s) for their degree program (i.e. students not doing a BIOL537 thesis project).

**The requirement for the MAJ BIOL degree plans is 6.0 units in BIOL @400 or above. There may be room for some students to be registered in two seminar courses.**

**PLEASE INDICATE THREE CHOICES FROM EACH TERM (in order of preference), type a ‘1’, ‘2’, or ‘3’ on the line beside the courses you want. *Please make sure you have (or will have) the prerequisites/corequisites***

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| **Students without the prerequisites/corequisites will not be placed in the course.****FALL TERM 2017** |
|  | BIOL | TITLE | PROF | PRE/COREQCOMPLETED? |
|  | 503 | Plant Biotechnology | K. Ko |  |
|  | 507 | **Biotechnology** | V. Walker |  |
|  | 510 | Biogeochemistry and Global Change | P. Grogan |  |

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| **Students without the prerequisites/corequisites will not be placed in the course.WINTER TERM 2018** |
|  | BIOL | TITLE | PROF | PRE/COREQCOMPLETED? |
|  | 502 | Plant Cellular Responses to Environmental Stress | J. Monaghan |  |
|  | 506 | Biochemical Adaptations to Life Under Extreme Conditions | Wm. Plaxton |  |
|  | 508 | Biology of the Cell Cycle | P. Young |  |
|  | 527 | Paleolimnology and Global Environmental Change | B. Cumming |  |
|  | 533 | Selected Topics in Biology II | R. Colautti |  |

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| Student Comment/Note:  |
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Please make your selections and return this form to **Julie French, rm. 3109d, Bioscience Complex (or via e-mail to** **frenchj@queensu.ca****>**  **no later than May 20, 2017.**  Decisions will be made in June and will be available on ***Solus*** when you register for your courses. **PLEASE** make sure you have the prerequisites/corequisites for the courses you pick**.**

*Purpose Statement: The personal information collected on this form is collected under the legal authority of the Royal Charter of 1841, as amended. The information collected will be kept in your file. This information will form part of your departmental student record and may be shared with academic advisors, Undergraduate Chair, Dept. Head, and the Faculty of Arts and Science (if required for degree assessment). This information will be retained until you complete your degree program. If you have any questions or conerns about the information collected or how it will be used, please contact either the Biology Undergraduate Assistant or the Biology Undergraduate Chair.*

**Biological Foundations List:** BIOL 102/3.0; BIOL 103/3.0; BIOL 201/3.0; BIOL 202/3.0; BIOL 205/3.0; BIOL 206/3.0; BIOL 302/3.0; BIOL 303/3.0; BIOL 330/3.0; BIOL 334/3.0; BIOL 339/3.0; BIOL 341/3.0

**FALL TERM 2017

BIOL-503 (3.0)   Plant Biotechnology**This is an experiential course on the business of science.  The focus of the course is to look at the issues behind plant biotechnology and the steps leading to the commercialization of a transgenic (or non-transgenic) plant/product. The commercialization process will be covered through a series of workshops. Students will go through the process of developing their own ideas into a commercially valuable product, plus an assessment of all related social and economic issues using business-oriented exercises.  **Professor:**  K. Ko     **PREREQUISITES**  Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and a minimum GPA of 2.0 in the Biological Foundations List and [(BIOL 205/3.0 or BCHM 218/3.0) and BIOL 341/3.0] or permission of the Department. LEARNING HOURS 120 (15L;9S;24G;72P)

**BIOL-507 (3.0)    Biotechnology**We will explore both background material and current research on a variety of biotechnologies.  Discussion groups and seminars will cover the ethical, societal and environmental impacts of biotechnology.  There will be some critical analysis of public policy and the value of biotechnologies to science and the public.  Specific topics will likely include synthetic biology, human cloning, xenotransplants, stem cells, nanomaterials, marine biotechnology, eugenics, patenting of genes, and the release of GMOs and other biotechnologies to the environment.  Plant biotechnology will not be covered in depth since there is a separate seminar course for this topic.  **Professor:**  V. Walker
**EXCLUSION**   BIOL441 **PREREQUISITE** Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and a minimum GPA of 2.0 in the Biological Foundations List  and (BIOL 330/3.0 or BIOL 334/3.0 or BIOL 341/3.0 or BIOL 430/3.0) or permission of the Department.
 **BIOL-510 (3.0)    Biogeochemistry and Global Change**This ecology course is aimed at identifying and critiquing potential mechanisms by which our civilization could most effectively move toward more sustainable living.  This topic incorporates biogeochemical, ecological, economic, social, genetic and behavioral features and constraints.   Each iteration of the course will focus on a specific thematic question related to at least some of those components. Emphasis will be on interactive discussions and student-led seminars in which participants will have ample opportunities to explore, analyze and synthesize scientific information, to learn how the scientific process works, to write and speak effectively, and to develop their understanding of global change issues and sustainability.
**Professor**: P. Grogan  **PREREQUISITES** BIOL 302 and 303 strongly recommended.

 **WINTER TERM 2018**

**BIOL-502 (3.0)** **Plant Cellular Responses to Environmental Stress**
Literally rooted in place, plants have adapted robust ways to survive in a changing environment.This course will dissect signal transduction pathways and other molecular responses that are activated in plant cells exposed to environmental stresses such as pathogen infection, drought, or temperature fluctuations. Students will explore and critically evaluate current literature in plant molecular biology and genetics. Emphasis will be placed on understanding techniques used to investigate changes in gene expression, protein-protein interactions, sub-cellular localization, as well as the analysis of mutant and transgenic plant lines. **Professor:** J. Monaghan **PREREQUISITE**  Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and a minimum GPA of 2.0 in the Biological Foundations List and (BIOL 330/3.0 or BIOL 334/3.0 or BIOL 341/3.0 or BIOL 430/3.0) or permission of the Department. LEARNING HOURS 120 (36S;84P)

**BIOL-506 (3.0)  Biochemical Adaptations to Life Under Extreme Conditions**Life on earth has radiated to exploit virtually every conceivable habitat and lifestyle.  Biochemical adaptation is a fundamental aspect of biological diversity because it integrates molecular structure, with metabolic function and control.  The purpose of the course is to evaluate the impressive array of mechanisms whereby animals, plants, and microbes acclimate at the biochemical level to 'extreme' environmental conditions such as temperature stress, high pressure, lack of oxygen, salt stress, oxidative stress, and desiccation.  Students are expected to read and to lead discussion on original research publications, and to develop a general literature review and research proposal on a relevant topic that will be presented in a seminar and submitted as a written report.
**Course Goals and Objectives**

* To understand the diversity and scope of biochemical adaptations of species to environmental extremes (and practical applications of this research area for helping humanity & our planet)
* To develop the ability to critically analyze and synthesize science literature
* To improve oral and written communication skills

**Professor:**   Wm. Plaxton  **RECOMMENDED**  BIOL 341 and BIOL 322   **PREREQUISITE**  BIOL 334 or (BCHM 315 and BCHM 316) or BCHM 310. Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and a minimum GPA of 2.0 in the Biological Foundations List  and (BIOL 330/3.0 or BIOL 334/3.0 or BIOL 341/3.0 or BIOL 430/3.0) or permission of the Department.

 **BIOL-508 (3.0)   Biology of the Cell Cycle**Cell proliferation underlies development and tissue renewal and is implicated in many diseases. Our universal model of eukaryotic cell cycle control is based on studies in a number of model systems. The course will focus on control mechanisms, deriving information from systems as diverse as yeast and human cells. Introductory material will follow D. Morgan’s book, The Cell Cycle, and then focus on the current research literature. Students will give an introductory as well as a research level seminar and write a research paper on the same theme of their choice.
**Professor**:  P. Young **PREREQUISITE**  BIOL 330 or BCHM 218 (MBIO218).  BIOL 334 or (BCHM 315 and BCHM 316) or BCHM 310. Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and a minimum GPA of 2.0 in the Biological Foundations List  and (BIOL 330/3.0 or BIOL 334/3.0 or BIOL 341/3.0 or BIOL 430/3.0) or permission of the Department.

 **BIOL 527 (3.0)   Paleolimnology and Global Environmental  Change**The main aim of this course is to provide students with a background in studies of long-term environmental change, with a focus on research that is especially relevant to today's environmental problems. Key topics include:  climatic change, lake pollution, atmospheric deposition of contaminants and related topics. Paleolimnological techniques using lake sediments will be the focus in the first part of the course, but other approaches used to explore environmental change (such as ice cores, tree rings, corals) will be explored in student presentations and papers.   **Professor:**  B. Cumming    **RECOMMENDATION** BIOL 335 **PREREQUISITE**   Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and a minimum GPA of 2.0 in the Biological Foundations List or permission of the Department. LEARNING HOURS   132 (21L;15S;96P)

 **BIOL-533 (3.0) Selected Topics in Biology II
Invasion Genetics**Biological invasions profoundly impact biodiversity and ecosystem function worldwide, yet they represent an evolutionary paradox. How is it possible that a small population of individuals can rapidly proliferate in a novel environment and outcompete native species that have evolved under natural selection in those same environments for centuries to millennia? Invasion genetics is an attempt to address this question through the study of genetic diversity and evolutionary processes in the context of contemporary environmental changes (e.g. habitat modification, climate change). This course emphasizes the application of knowledge from coursework in ecology, statistics, population genetics, genomics, and evolutionary ecology to a common goal of understanding how species become invasive. Coursework will involve reading, interpreting and discussing recently published studies.  Group assignments will place modern advances into their historical context. Students who complete this course will gain appreciation for the integrated nature of biological research and its application to the challenges of global change. **Professor:** R. Colautti **PREREQUISITE**   Level 4 and registration in a Biology Honours Plan (BIOL-M-BSH, BIOL-P-BSH, BIMA-P-BSH, BIPS-P-BSH, BTEC-P-BSH, EBIO-P-BSH) and a minimum GPA of 2.0 in the Biological Foundations List or permission of the Department.