

Biology 4EE3 Human Diversity and Human Nature Winter 2021 Course Outline

Course Details

Instructor: Rama Singh, singh@mcmaster.ca, 905-525-9140 x 24378

Office hours: LSB 531, Mon, Wed: 3:00-4:00 pm

TA's: TBA

Lectures: Mon, Wed, Thu: 10:30-11:20 am in T13 106

Tutorial: Wed: 3:30 – 4:20pm in KTH 105, Thu: 9:30 – 10:20 am in BSB 238

Course Description

- *The nature of genetic diversity in humans; the nature versus nurture debate in relation to genetic determinism and biological basis of behaviour.*
- *Three lectures, one tutorial; one term*
- Prerequisite(s): BIOLOGY 3FF3 and registration in Level III or above of any Honours program
- Lecture format: Live lectures with lecture material posted on avenue at least one day before the lecture.
- Presentation by students: All presentations by students will take place during lecture slots and, is necessary, during the tutorial slot.
- Tests: All tests will be conducted during lecture slots.

Details of Course format: Lectures, student research and presentations

Lectures

Lecture sessions will include seminars of relevant topics and theories related to understanding Human condition from a philosophical and evolutionary perspective to confront common misconceptions related to human biology. These seminars are important in understanding fundamental concepts and theories as well as to motivate and guide your critical evaluation of key topics related to human condition. During this time, students will select a major topic provided in the course outline for their research. Apart from the subtopics provided, students are also encouraged to develop their own specific topics **within** the broad course topics given above. One of the primary objectives is to review progress in the topic that you have chosen, in the last two decades. Following the seminars (lectures), **students will have two rounds of presentations**. The first will be a brief informal presentation of their topic – introduction of concepts and theories. The second will be the presentation of student research proposal – an outline of their research paper. Students shall introduce their topic; summarize research and the

current understanding of the topic. Finally, students will hand in a research paper on their topic at the end of the course.

1. Depending on the enrollment students will work in groups of 2-3 (maximum). **Each group will select a major topic.** They can make subgroups to cover specific topics if they wish and then put together a comprehensive paper. One group – one topic. First come, first serve basis. Topics must be chosen before the end of week 2.

2. **Presentation 1: Each group will choose one or two most recent scientific articles** (review or original work) relevant to their topic. They will provide a synthesis of their topic – introduction, concepts and theories related to the topic. You will essentially teach the class about your chosen topic. Max 20 mins followed by discussions (time may change depending on necessity). Presentations will be informal, inviting ample discussions. All members can present as a group, or one or two chosen members can do the presentation. Marks will be awarded by group.

3. **Presentation 2:** Students will have gained a better and deeper understanding of their topic after substantial research. They may have also chosen a specific topic to focus on detail. Each group will present a comprehensive synthesis of their topic and illustrate the progress made in the last two decades, comment on the status of research and knowledge the topic. Max 20 mins (may change).

4. At the end of the course each student (or groups) will submit their final research paper of about 4000 words not including references. The format may be updated in lectures.

Tutor/Tutorials:

Tutorials are meant to generate discussions and critical evaluation of key concepts discussed in this course. Discussions are usually quite lively because many of the topics apply to real life issues. The idea will be to apply ‘scientific thinking’ and explore and evaluate evidence that exists pertaining to topics in this course.

During lecture weeks, you will be discussing key topics relevant to each lecture and exploring literature pertaining to key topics. Research articles will be assigned to facilitate discussions and to see what kind of evidence exists for key topics. The TA will lead discussions with some questions, but students are encouraged to formulate their own questions and lead discussions as well.

During the presentation weeks, discussions will pertain to what has been presented, important papers used by presenters will be required reading to facilitate discussion regarding the science and social constructs behind the topic being discussed.

Course Learning Objectives

By the end of this course students will be able:

- To provide a clear understanding of the basic evolutionary principles.
- To understand how genes and environment interact to produce a trait (physical, social, behavioural).
- To see how lack of opportunity can lead to lack of achievements.
- To understand the difference between “biological potential” vs. “biological limits”.
- To provide a critical analysis of the major socio-biology topics that have plagued societies in the nature-nurture debate.
- To be able to make a critical presentation on a given socio-biological topic and handle questions from the audience.

Course Schedule

Biology 4EE3: Human Diversity and Human Nature

Course outline/Research Topics

1. The Science and Politics of Race

It may not be an exaggeration to say that abuse of the biological concept of race has done more damage to the human condition than any other socio-biological doctrine. The race card continues to play a significant role and is being revived by the misuse of findings from molecular biology research.

Question: Are races real, if so, what does it mean to the human condition?

2. The Science and Politics of IQ

The problem of racism is more than skin deep. No other trait has been more synonymous with race and racism than the idea that races differ in levels of intelligence, as measured by IQ, that these differences are controlled mostly by genes, and that differences in IQ account for the disparity in the socio-economic conditions between races.

*Questions: What are the relative contributions of genes vs. environment in the determination of IQ?
How much of the differences in the social ladders (Inequality) are explained by genes?
Do successful civilizations owe it to their biology or to their historical contingency?*

3. Science and Women

Even if current low numbers of women in science can be explained by historical reasons, what cannot be explained is that while the sex ratio is 1:1 in university students doing graduate work, women graduates continue to disappear from science after graduation. The pipeline from graduation to the echelon of academia is very leaky.

Question: Why do women still not fair at par with men in the academia?

4. Sex and Gender

Nature has a variety of sexual systems: separate males and females, bisexuals, hermaphrodites, asexuals, and transsexuals who can change sex depending on environmental conditions. Human reproduction requires males and females. But starting first with gay and lesbian, genders have begun to multiply including bisexual, transsexual, and transgender.

Question: Is sexual preference controlled by genes? What is the relation between sex, preference, and gender? How does it affect our perception of human culture that is built on two gender human sexuality?

5. Female choice vs. male driven sexual selection

Sexual dimorphism is common in nature, including humans. It finds its most extreme expression in insects, birds, and mammals. Darwin noticed that certain male traits, call them secondary sexual traits, appeared maladaptive and contrary to the dictates of natural selection. Darwin thought such traits could be explained if they were involved in mate choice and were used by female to choose mates. Theory of 'female choice' and 'male modification' became the hallmark of Darwin's sexual selection theory.

Question: Can female choice theory explain the peculiar features of human sexuality which shows signs of male driven sexual selection and 'female modification'?

6. Men & Women; Patriarchy & Feminism

Aggression, invasion, war, and decimation comprise a major portion of human history. While women find a central place in the mythology of wars, men have kept them away from real wars. One wonders if patriarchy is a socio- historical convention that found it profitable to keep women away from all public affairs outside the home, or has the women's role has been defined by female-choice subversion through male driven sexual selection and 'female modification'.

Question: Is patriarchy simply an outcome of historical/social convention, or is it an outcome of sexual selection?

Question: Why feminism failed and what can be done about it?

7. Genes, Aggression, Violence

Individuals and populations can differ in temperament. Temperament can be biologically or developmentally controlled and/or environmentally triggered. Genes are known to affect aggression in model organisms like mice. Individuals involved in drugs, prostitution, smuggling, robbery, gang-related activities, and terrorism are generally found to be more aggressive and violence prone and their counterparts. Are they driven by genes or do they pick the trick of the trade including violence while on the job?

Question: How much of the aggressive behavior of an individual controlled by genes and what is the relationship between individual aggression and group violence?

8. Biological basis of complex diseases

It is the dream of medical research and drug companies to find simple, single Mendelian genes causing genetic diseases. Many such genes have been discovered. Indeed, much of the medical research assumes that simple Mendelian genes will be found. Genetic homogeneity is preferred over genetic heterogeneity and is ideologically imposed on the research methodology. It is a fact of genetics about disease causing genes - the more deleterious and harmful they are in their effects, the rarer they are. Such genes are hard to be selected out from the population as most of the culprit gene copies hide in the heterozygous condition.

Complex diseases such as cardiovascular conditions, Type II diabetes, obesity, schizophrenia, and depressions are complex diseases as they often involve many genes and are affected by the environment. Complex diseases kill many times more than the simple genetic diseases in total but even

here the medical research plugs along believing in the luck of the lottery, i.e., hitting upon a simple gene with significant effects on the condition. Even here search for cure predominates over prevention.

Developments in molecular biology are promoting/ forcing two new ideas on the population for staying healthy; one is to take pills to ward off a suspected disease, and the other is the promise of individually tailored, genomic medicine. Under the latter scenario, in theory, all individuals can be put on pills as all will be found to have some “disease genes”- of major or minor effects.

Question: What are the relative roles of gene vs. environment in the control of complex diseases such as cardiovascular diseases, diabetes, and schizophrenia?

Question: What kind of check and balance can be put on drug companies involved in developing cure vs. promoting health medicine?

9. Altruism/ kin selection/group selection

The central theme of Darwinian evolution is individual-based selection through survival and reproduction. Cooperation (among individuals) as a rule is expected to arise and be favored only if it benefits the participants. Individual-based selection is expected to be stronger and more common than group selection as there will be fewer groups than individuals.

Hamilton (1964) introduced the concept of kin selection in which an individual’s fitness is made up of two components: individual’s own fitness, and fitness accruing from relatives with whom the individual shares genes. The total fitness is called “inclusive fitness”. Kin selection can be called a form of group selection, but kin selection raises problem for the concept of “true” altruism. One can argue that we are always getting something in return directly or indirectly.

*Question: Is there is no such thing as true altruism? Are we all selfish?
What is the role of kin selection vs. group selection in human evolution?*

10. The Biological Basis of Human Freedom

Human consciousness and free will (freedom to choose) are the two most cherished human characteristics and while the former taken as a hallmark of humans; the latter has been the subject of intense debate among philosophers. We are biological entities and like all biological entities our choice must be, directly or indirectly, context dependent. How can there be free choice? We must differentiate between freedom to think (and deliberate the available, appropriate choices) and freedom to act (the actual choice). We may have freedom to choose but the choices are never fully context free.

Question: Do we have free will? What is its implication to individual responsibility?

Note: Detailed course schedule, week by week, will be provided before the classes begin.

IMPORTANT NOTE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If any modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and

course websites weekly during the term and to note any changes. Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.

Course Materials

There is no textbook in this course.

The course material consists of topical research papers which are either provided by the instructor (and posted on Avenue

Course Evaluation

There will be no final exam in this course.

Participation	10%	
Seminar presentation -Round 1:	10%	(dates -TBA -at the beginning of the class)
Seminar presentation -Round 2:	10%	(dates -TBA -at the beginning of the class)
Midterm test (Date -TBA):	15%	(50 min test, in class)
Final Test:	15%	(50 min test, in class)
Research paper:	40%	(Due: a week after the last day of class, a hard copy as well as a soft copy)

Notes:

- **Missed test:** No makeup test will be provided, either for midterm or for the final test; instead the marks from the missed midterm test will be added to the Final test. If you miss both tests, a maximum of 10% will be added to your Research paper but you will lose 10% from the test. This means you must take at least one of the two tests offered.
- **Penalty for late paper submission.** Foreach day of late submission you will lose one mark.

Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

Authenticity/Plagiarism Detection

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. Avenue to Learn, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

Courses with an On-line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, Echo360, Microsoft Teams, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx, Echo360, Microsoft Teams or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [Academic Accommodation of Students with Disabilities](#) policy.

Requests for Relief for Missed Academic Term Work

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

View the [McMaster Student Absence Form \(MSAF\)](#) for more information.

Academic Accommodation for Religious, Indigenous or Spiritual Observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar’s Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.

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