

# The Human Genome and Its Impact

## Course Syllabus

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### Course Information

### Assessment

### Policies

### Course Expectations

## Course Information

### Course Description

This course will address the principles of genetics with an emphasis on the genetic code of the human genome. Through independent studies and interactions and exchanges with the online class, you will learn:

- How the genome is stored
- How the genetic code is interpreted
- How the genes are passed from one generation to the next
- How the genome is evolving
- The consequences of genetic code errors
- The medical, technological, legal, and ethical issues associated with the human genome

### Course Learning Goals

After completing this course, you will be able to:

- Increase your ability to understand and critique scientific data.
- Increase your awareness of what is inherited and what is environmental.
- Learn more about the medical, technological, legal and ethical aspects of genetics.
- Realize the importance of diversity and evolution.

### Course Resources

#### Required Textbook

Ridley M, *Genome*, Perennial, 2000.

#### Optional Books

Davies K, *Cracking the Genome: Inside the race to unlock Human DNA*, 2001.

Frank-Kamenetski MD, *Unraveling DNA: The Most Important Molecule of Life*, 1997.

Dawkins R, *River out of Eden*, Weidefeld and Nicholson, 1995.

## Course Competences

In this course, you will develop one or two of the following competences as they relate to genetics:

**S-1-E** - Can analyze inventions or technologies and can understand their underlying scientific principles

**S-2-A** - Can describe, differentiate, and explain form, function, and variation within biological systems

**S-2-D** - Can describe, categorize, and analyze the interactions and exchanges between living organisms and their physical environments

**S-3-B** - Can assess health care practices based on an understanding of the biological and social factors that contribute to definitions of health

**S-3-D** - Can use scientific knowledge to understand varying perspectives on a policy issue

## Course Structure

The course is composed of six modules and each module consists of several units. Each unit contains learning activities and questions. Learning activities include study guide and book readings, viewing of specified web site links, and independent searching. Answers to questions (paragraph to a page each) should be e-mailed to your instructor. Questions must be answered within 10 days. Lessons are usually given formally on Wednesdays and answers are expected by Saturday of the following week. Grades on unexcused overdue assignments may be penalized up to 10%. You should answer all the questions, if you are registered for 2 competences, and you should pay particular attention to the questions most relevant to your competences. If you are registered for only one competence, you should answer questions 1, 3 and 5 in five questions assignments and questions 1 and 3 in four questions assignments.

Discussion topics will be posted in the Discussion Board section of the SNL Distance Education site. The Discussion Board will provide you with the opportunity to exchange ideas with your virtual classmates. You should participate in the discussion at least 5 times.

The grading considerations are described in the Course Grading Criteria section of this study guide. If you have any question, please do not hesitate to contact your instructor.

**To view the course schedule, click on the Schedule link on the left-hand navigation bar. This page contains the most recently updated listing of the topics and assignments due for each week of the course.**

[Top](#)

## Assessment

### Course Grading

Required readings include this study guide, the specified chapters from the textbook: **Genome** by Matt Ridley (Perennial, 2000), and the specified web sites. It is also highly recommended that students search on their own for additional information on each of the topics covered. Student should explore video, audio and animation sub-links within the viewed web sites, when available. There is no need to install foreign languages modules (foreign languages sites can be viewed after answering "No"). Acrobat Reader from Adobe is needed for reading and printing pdf files (it is available free of charge at <http://www.adobe.com/products/acrobat/readstep2.html>). Students are expected to participate in discussion of genome and genetics related topics in the Discussion Boards.

The grade for the class will be based on the answers to the questions (81%) and on participation in the discussions (19%). Each assignment contributes 9% of the final grade.

Assignments are due within 10 days. Lessons are usually given formally on Wednesdays and assignments are expected by Saturday of the following week. Grades on unexcused overdue assignments may be penalized up to 10%. You should answer all the questions, if you are registered for 2 competences, and you should pay particular attention the questions most relevant to your competences. If you are registered for only one competence, you should answer questions 1, 3 and 5 in five questions assignments and questions 1 and 3 in four questions assignments.

Answers should provide simple explanations with examples and arguments when applicable (a paragraph to a page for each answer). The students can ignore the chemical structure and other fine details but they should try to focus on the principles involved and their relation to their competences. For example, there is no need to know the chemical structure of adenine or thymine but it is important to understand that base pairing (A-T and C-G) is the underlying force that hold together DNA strands and allow replication of DNA, transcription of DNA to RNA and translation of RNA to protein.

## Sample of a Good Answer

Following is an example of a question and a good answer:

Why is the quantity of nuclear DNA the same in every cell and that of mitochondrial DNA varies?

Cells usually contain a single nucleus but they contain multiple mitochondria. The number of mitochondria per cell is different depending on the tissue (skin, muscle, etc.) or organ (brain, heart, etc.) that the cells belong to, and depending on the cell age. Mitochondria multiply like cells, by division, but their divisions are not "in sync" with that of the cell they reside in. When cells divide, about half of the mitochondria, present at that time, go into each of the daughter cells.

The exceptions to constant quantity of nuclear DNA per cell are egg and sperm cells that contain only one set of chromosomes (instead of 2) and cells with several nuclei (instead of a single nucleus). Another exception is the mature red blood cell that contains no nucleus and no mitochondria either.

## Grading Scale

93% or above = A  
90% – 92% = A -  
87% – 89% = B +  
83% – 86% = B  
80% – 82% = B -  
77% – 79% = C +  
73% – 76% = C  
70% – 72% = C -  
67% – 69% = D +  
60% – 66% = D  
Less than 60% = F

## Major Web Site Sources

<http://www.nhgri.nih.gov/>

<http://www.genome.gov/glossary.cfm>

<http://www.ncbi.nlm.nih.gov/disease/>

<http://www.ornl.gov/hgmis/>

[http://www.ornl.gov/TechResources/Human\\_Genome/](http://www.ornl.gov/TechResources/Human_Genome/)

<http://www.ornl.gov/hgmis/education/education.html>

<http://bioinformatics.weizmann.ac.il/cards>

<http://www.nature.com/genomics/human/papers/articles.html>

[Top](#)

## Policies

### Academic Integrity

DePaul University is a learning community that fosters the pursuit of knowledge and the transmission of ideas within a context that emphasizes a sense of responsibility for oneself, for others and for society at large. Violations of academic integrity, in any of their forms, are, therefore, detrimental to the values of DePaul, to the students' own development as responsible members of society, and to the pursuit of knowledge and the transmission of ideas. Violations include but are not limited to the following categories: cheating; plagiarism; fabrication; falsification or sabotage of research data; destruction or misuse of the university's academic resources; alteration or falsification of academic records; and academic misconduct. Conduct that is punishable under the Academic Integrity Policy could result in additional disciplinary actions by other university officials and possible civil or criminal prosecution. Please refer to your Student Handbook or visit <http://studentaffairs.depaul.edu/homehandbook.html> for further details.

**Plagiarism:** Plagiarism is a major form of academic dishonesty involving the presentation of the work of another as one's own. Plagiarism includes but is not limited to the following:

- The direct copying of any source, such as written and verbal material, computer files, audio disks, video programs or musical scores, whether published or unpublished, in whole or part, without proper acknowledgement that it is someone else's.
- Copying of any source in whole or part with only minor changes in wording or syntax, even with acknowledgement.
- Submitting as one's own work a report, examination paper, computer file, lab report or other assignment that has been prepared by someone else. This includes research papers purchased from any other person or agency.
- The paraphrasing of another's work or ideas without proper acknowledgement.

Plagiarism, like other forms of academic dishonesty, is always a serious matter. If an instructor finds that a student has plagiarized, the appropriate penalty is at the instructor's discretion.

## Disability Accommodations

Reasonable accommodations will be provided for students with disabilities on an individualized and flexible basis. The Office of Students with Disabilities (OSD) determines appropriate accommodations through consultation with the student. For certain learning disabilities and/or attention deficit disorders, the Productive Learning Strategies Program (PLuS) determines the appropriate accommodations. See the instructor for more information or call OSD at 773-325-7290 (phone) or 773-325-7296 (TTY); or call PLuS at 773-325-1677.

## Incomplete Grades

The intent of the Incomplete grade is to allow students extra time to complete their final assignments. This need arises because, in the closing weeks of the course, they have an event of significant magnitude that adversely affects their ability to complete the course, e.g. serious illness, death in the family, overseas deployment, or natural disaster.

You must request an incomplete grade in writing two weeks before the end of the quarter. Incomplete grades will be considered only after you have satisfactorily completed at least 75 percent of the coursework, and you have such an unexpected, uncontrollable event that prevents you from completing your course. Do not assume that you will qualify for an incomplete. Students who are failing the course at the point where they request an incomplete will not receive one, nor will they be granted after the end of the quarter. Incomplete grades are given at the discretion of the instructor.

If you do receive permission from the instructor to take an incomplete in the course, you will be required to complete a contract with the instructor, specifying how you will finish the missing work within the next two quarters (excluding summer). Incompletes not finished by the end of the second quarter (excluding summer) will automatically become an F grade on your transcript.

Instructors may not change incomplete grades after the end of the grace period without the permission of a college-based Exceptions Committee.

NOTE: In the case of a student who has applied for graduation and who has been approved for an Incomplete in his or her final term, the incomplete must be resolved within the four week grace period before final degree certification.

## Protection of Human Subjects

For more information see: <http://research.depaul.edu/>.

Demonstrating the acquisition of competences in this course can involve “interactions”—interviewing and or observing other people—discussing those interviews or observations with other class members and writing them up in one or more final report(s). As such, these activities qualify as “research” with “human subjects” and are subject to University and Federal guidelines. Because it takes place in the context of this course, your research is exempt from approval by the School for New Learning’s Local Review Board only under the following conditions:

1. The information you collect is EXCLUSIVELY for the purpose of classroom discussion and will NOT be used after the term is over. If there is any possibility that you will EVER use it in further research or for publication, you must obtain approval from the Local Review Board before you begin.
2. You assess and ensure that no “harm”—physical, mental, or social—does or could result from either your interviews and/or observations or your discussion and/or reports.
3. The privacy and confidentiality of those that you interview or observe must be protected. Unless you receive specific permission, in writing, from the person(s) you interview or observe, please change their names, and make sure that their identity cannot be readily ascertained from the information you provide.
  - a. If you want to use real names and relationships, they must sign an “informed consent” document. For information on creating an “informed consent document” see, for example, <http://www.research.umn.>

[edu/consent.](#)

[Top](#)

## Course Expectations

### Time Management and Attendance

SNL's online courses are not self-paced and require a regular time commitment EACH week throughout the quarter.

You are required to log in to your course at least four times a week so that you can participate in the ongoing course discussions.

Online courses are no less time consuming than "face to face" courses. You will have to dedicate some time every day or at least every second day to your studies. A typical four credit hour "face to face" course at SNL involves three hours of classroom meeting per week, plus at least three to six hours of study and homework per week.

This course will require at least the same time commitment, but your learning activities will be spread out through the week. If you have any problems with your technology, or if you need to improve your reading or writing skills, it may take even longer.

The instructor should be notified if your life events do not allow you to participate in the course and the online discussions for more than one week. This is particularly important when there are group discussions or you are working as part of a team.

If you find yourself getting behind, please contact the instructor immediately.

### Your Instructor's Role

Your instructor's role in this course is that of a discussion facilitator and learning advisor. It is not their responsibility to make sure you log in regularly and submit your assignments. As instructor, s/he will read all postings to the general discussion forums on a daily basis but may not choose to respond to each posting. You will receive feedback to assignments.

The instructor may choose to designate "office hours" when s/he will be online and available and will immediately respond to questions. Depending on the instructor, this response may be by e-mail, instant messenger or telephone. Otherwise, you will generally receive a response to emailed or posted queries within 48 hours.

### Your Role as a Student

As an online student, you will be taking a proactive approach to your learning. As the course instructor's role is that of a learning guide, your role is that of the leader in your own learning.

You will be managing your own time so that you can complete the readings, activities and assignments for the course, and you will also be expected to take a more active role in peer learning.

## Credits

*This course was designed and produced by Dr. Yoav Ben-Yoseph and staff at the Center for Distance Education of the School for New Learning of DePaul University.*

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[Top](#)