



WALSH UNIVERSITY
SCHOOL FOR PROFESSIONAL STUDIES

BIO 402

Genetics

Assignment due the first night, see page 7

GENETICS

BIO 402

COURSE DESCRIPTION

Introduction to basic laws of heredity. Topics include DNA structure and analysis, protein translation, Mendelian genetics, applications of DNA technology, and developmental genetics. Evaluation of current issues in genetics will be integrated into the course topics.

COURSE PREREQUISITES

Bio 101.

COURSE OBJECTIVES

The Genetics course is designed to give the student a basic understanding of and the ability to discuss, orally and in writing, the following:

- The structure and function of DNA: The molecular basis of genetics
- The genetic code, transcription, and translation: Genetic expression and variation
- Mendelian genetics, mitosis, meiosis, and inheritance: Genes and heredity
- Recombinant DNA, genomics, and applications of DNA technology: DNA biotechnology and genomics
- Eukaryotic gene regulation, developmental genetics, and the genetics of cancer.
- Population genetics. Genetics and evolution.

LEARNING OUTCOMES

Upon successful completion of this course, students will be able to do the following:

- Understand the structure and functions of DNA.
- Comprehend the mechanisms of genetic expression.
- Explain the dynamics involved in heritability in humans.
- Comprehend the concepts of DNA sequencing, PCR, cloning, and other forms of genetic technology.
- Understand how genes are regulated and the consequences of the lack of control of this regulation...
- Identify the uses of genetic data in reconstructing .population and species evolutionary history.
- Analyze the ethical concerns inherent in the advancements in molecular biology.

GRADING CRITERIA

Grading scale:

| | | |
|----|---|-----------|
| A | = | 93 -100% |
| A- | = | 90 - 92% |
| B+ | = | 87 - 89% |
| B | = | 83 - 86% |
| B- | = | 80 - 82% |
| C+ | = | 77 - 79% |
| C | = | 73 - 76% |
| C- | = | 70 - 72% |
| D+ | = | 67 - 69% |
| D | = | 63 - 66% |
| D- | = | 60 - 62% |
| F | = | below 60% |

Suggested grading weights:

| | |
|------------|-----|
| Test 1 | 25% |
| Test 2 | 25% |
| Term paper | 20% |
| Final exam | 30% |

MATERIALS OF INSTRUCTION

Human Genetics, 7^h edition, by Ricki Lewis.

Supplementary material from the facilitator.

A NOTE REGARDING WORKLOAD

This course is, as are all the courses in the I.D.E.A.L. program, designed for responsible adult students. Students are expected to do **at least 15 hours** of preparation in advance of each class. All students are required to attend classes and participate in class discussions. It is **strongly** suggested that you do not turn in any assignments late or miss any tests. Points will be deducted for any late assignments. If an absence due to illness or emergency occurs, it is the **student's** responsibility to obtain class notes from another student and any handouts, etc. from the facilitator. It is also **the student's responsibility** to notify the facilitator or the office that they will not be in class. One letter grade will be deducted for any **unexplained** absence. Absences due to work responsibilities are considered unexplained absences. If you are scheduled to work during class, please take the class at another time. If you know that you cannot meet the time commitments necessary to prepare for each class, please take the class at another time.

ASSIGNMENTS

1. Examinations.

Examinations will be in-class. They will generally consist of short answer/essay type questions, although other formats may be used. The examinations will cover comprehension of the text, lectures, and supplementary readings.

2. Term paper.

Each student will write a 7-10 page paper on a genetics-related issue of his or her choice and present the findings of their research during the last workshop. This will be a scientific paper of the type known as a review article. Students are expected to review and analyze the current research and findings in their subject field. A scientific review paper usually includes the following sections:

| | |
|---------------------|--|
| Title | statement of the question or problem |
| Introduction | background and significance of the problem |

| | |
|-------------------------|---|
| Discussion | a review of the literature on the subject and a discussion and analysis of the findings of the researchers |
| Conclusion | a concise restatement of your analysis |
| References Cited | an alphabetical listing of the books and periodicals cited in the body of the paper. It is expected that your references will be from books and journal articles and not of the “encyclopedia” type. A minimum of six references is required. No more than 50% of your references may be from the Internet. |

FINDING INFORMATION/CITING REFERENCES

Some resources you may find useful are:

Akron Summit County Public Libraries <http://www.acorn.net/>
(Go to library homepage. good source for books)

Stark County District Library <http://www.stark.lib.oh.us/afternoon.html>
(Another good source for books)

Walsh University Library www.walsh.edu/intranet/launchpd.html
(Go to public access catalog for books)

(Go to Internet resources and search Medline or other databases for journal articles)

Searching the literature will be easier if your topic is not a broad one. For example, if you were to search for books and articles on “cancer” you would be overwhelmed with material. If you were to narrow the search to “skin cancer” or “The genetics of skin cancers”, you would find a much more manageable amount of material. Journal articles are often extremely technical and may be difficult to understand but they are generally the best source for the most recent findings in health-related research.

Internet health sites may be used as references, but please be aware that, unlike journals, these sites are not “reviewed”, that is, the information you find in them has not undergone the scrutiny of other researchers in the field and may not always be scientifically valid. A list of some of the most creditable health sites will be provided.

CITING REFERENCES

Any information you use in a term paper that is obtained from books, magazine articles, the **internet**, etc., must be cited within the body of the paper and also included in the reference section at the end of the paper. Please note that if you use the author's words directly, you must use quotation marks and include the reference. If you do not use quotation marks, the material **MUST** be **written in your own words** and referenced; to do otherwise is considered **plagiarism** and you will automatically:

1. Fail the course

or

2. Receive a grade of 0% (F) on the project in question

When citing references within the paper, you may use MLA, APA, or the following format:

For one author:

Smith (1999) found that emphysema..... **or**
Emphysema is much more common in those who smoke (Smith 1999).

For two authors:

Smith and Jones (1999) found that emphysema..... **or**
Emphysema is much more.....who smoke (Smith and Jones 1999).

For more than two authors:

Smith et al. (1999) or (Smith et al. 1999).

For Internet sources:

ex: www.healthnet.usgov.org cite as:
Healthnet (2000) or (Healthnet 2000)

The reference section at the end of the paper must include all of the references you cited in the paper. These should be listed alphabetically, using the following formats:

For books:

Donatelle, R.J. and L.G. Davis. 1997. Health. The Basics. 2nd ed., pp. 172-322. Boston: Allyn and Bacon.

For magazine or journal articles:

Drawbridge, J. 1993. Medical Report: The Chiropractic Cure. *Glamour* (or name of the journal) 10: 77-82. (volume & page numbers)

For chapters in books contributed by various authors:

Raven, J.A. 1977. The evolution of vascular land plants in relation to supracellular transport processes. In: H.W. Woolhouse (ed.) *Advances in Botanical Research*. Vol. 5, pp. 153-219. New York: Academic Press.

For Internet sources:

www.healthnet.usgov.org (alphabetized by h), 2000.

ASSIGNMENTS TO BE COMPLETED PRIOR TO WORKSHOP ONE

1. Read the course module.
2. Skim through your text. Are there any genetics topics in which you are interested that are not covered in the text? Are there any topics not covered to the extent that you would like? These are good possibilities for term papers. Please bring a list of at least three possible topics for your paper to the first class meeting. Some possibilities (these are suggestions only; any topic with a link to genetics is acceptable):
 - The genetic basis of breast cancer (or colon cancer, hemophilia, Down's Syndrome, syndactyly, or many other diseases.)
 - Frankenfoods.
 - The treatment of cystic fibrosis (or other diseases) with gene therapy.
 - The use of DNA in forensic pathology.
 - The Human Genome Project
 - Cloning
 - Prenatal genetic testing.
 - Genetically engineered pharmaceutical products.
 - The evolution of HIV
3. Read *Human Genetics*, Chapters 1 and 2. Be prepared to discuss and apply the reading.
4. Answer the following Review Questions at the end of the chapters:
 - Chapter 1 – Questions 1, 3, 5, and 6
 - Chapter 2 – Question 6