

**HUMAN GENETICS**  
**Dr. William Hanna**

**BIOL136-01**  
**Fall 2009**

*Meetings:* Tues., Thurs. 12:30-1:45 p.m. Room S-219 (Brockton)

*Office hours:* Mon. and Wed. 9:00-10:00 a.m.  
Tues. and Thurs. 10:00-11:00 a.m., or by appointment

*Contact information:* e-mail: massasoit.bio@mac.com  
phone: (508) 588-9100 ext. 1626 (E-mail is strongly preferred.)  
office: S-220 (in the Science building; Brockton campus)

*Course website:* <http://massasoit-bio.net/courses/> Login: biology Password: genetics  
*Podcasts:* <http://www.massasoit.mass.edu>; select Massasoit OnDemand

*Required Course Materials:*

*The New Genetics* (2006). Published by the National Institute of General Medical Sciences. NIH Publication No. 07-662. Electronic copy available on course website; instructor will provide hard copies.

Three-ring binder for course handouts

*Recommended:*

Cummings, Michael R.. *Human Heredity: Principles and Issues* 8e. Brooks/Cole Cengage Learning. ISBN 978-0-495-55445-5.

*Course Description:*

This course deals with biological aspects of human reproduction and genetics. It will include such topics as cellular division, anatomy and physiology of the human reproductive systems, prenatal development, reproductive technologies, human sexuality, transmission genetics, DNA and chromosomes and genetic technology. This course is designed for the non-science major.

*Prerequisites:*

Preparing for College Reading II (ENGL092), Introductory Writing (ENGL099), and Fundamentals of Mathematics (MATH010), or waiver by placement testing results, or departmental approval.

**Who should be taking this course?**

- Students interested in a better understanding of the principles behind reproduction, genes, and inheritance; or
- Students wishing to satisfy a science (SC) elective as a graduation requirement in their program; or
- Students in, or interested in, careers in human health and/or counseling, such as:
  - Nursing Education
  - Radiologic Technology
  - Respiratory Care
  - Certificate programs in Phlebotomy, Medical Assisting, Dental Assisting, among others.

**Who should also be taking the lab portion of the course?**

- Students who need a lab science (LS) elective as a graduation requirement in their program;
  - Lab science electives are required in transfer programs (LAT, BAT, CJTR, HSTR, etc.).
- Students who are not in transfer programs, but who plan to transfer at some point; or
- Students who are interested in science and perhaps plan to continue their science education.

## TEACHING METHODS

### *Class Meetings:*

The lecture portion of the class is taught using document projection, a laptop, and whiteboard. There will be some class discussion, depending on the topic. There will be opportunities for extended discussion and questions outside of class and in the lab.

Prior to each week, you will receive an e-mail from me outlining what we will be covering in class. This e-mail will list readings, homework assignments, deadlines, departmental announcements, and other important information. My intent is to communicate with the class routinely through e-mail. I will send e-mails to your MyMassasoit e-mail account, unless you have a different one that you prefer.

If you are absent and do not receive class handouts, either e-mail me (I will attach an electronic copy in my reply) or download a copy from the course website. Being absent is not an excuse for coming to class unprepared. I do not keep extra copies of handouts distributed in class.

Your comprehension of the lecture material will be evaluated with short quizzes, homework assignments and four exams given throughout the course of the semester (see below). You should use your notes, homework, and provided study guides to prepare for the lecture exams. The dates of these exams are provided on the attached Lecture Schedule (p. 3).

Our class meetings will be recorded live and podcasted via Massasoit's OnDemand service. Visit the College website (<http://www.massasoit.mass.edu>) and select Massasoit OnDemand from the list of links on the left. When the new window launches, click on the Podcasts tab and on our class (BIOL136 01). You can listen to the audio via streaming through your web browser or you can subscribe to the podcast which will download new episodes to your computer automatically.

### *Exams:*

Your understanding of the lecture material will be assessed by three lecture exams and a cumulative final exam. The dates for the three lecture exams, and the material which they cover, are posted on the course schedule. You will be provided with study guides for each of the exams. There are no make-ups for missed lecture exams. Your grade on the Final Exam will be substituted for one missed lecture exam.

### *Calculation of Final Grade:*

Your grade in this course will be determined as follows:

Lecture Exams (3)	30%	(lowest grade replaced with final exam)
Homework Assignments: Media Assignments (6) Case Studies (6)	40%	(lowest grade will be dropped)
In-class Quizzes (6)	10%	(lowest grade will be dropped)
<u>Cumulative Final Exam</u>	<u>20%</u>	
	100%	

Your letter grade in the course will be assigned according to the following scale (all numbers are percentages):

A	Above 92.4	B-	79.5-82.4	D+	66.5-69.4
A-	89.5-92.4	C+	76.5-79.4	D	62.5-66.4
B+	86.5-89.4	C	72.5-76.4	D-	59.5-62.4
B	82.5-86.4	C-	69.5-72.4	F	Below 59.4

Your final grade in this course is a culmination of the work you complete throughout the semester. Final grades are non-negotiable and no extra credit assignments are accepted in the event you are not happy with your grade.

**TENTATIVE COURSE SCHEDULE**

<b>Week</b>	<b>Tues</b>	<b>Thurs</b>
<b>1</b>	9/8 A Perspective on Human Genetics	9/10 Cells and Cell Division (1 of 3)
<b>2</b>	9/15 Cells and Cell Division (2 of 3)	9/17 Cells and Cell Division (3 of 3)
<b>3</b>	9/22 Transmission Genetics (1 of 3)	9/24 Transmission Genetics (2 of 3)
<b>4</b>	9/29 Transmission Genetics (3 of 3)	10/1 Pedigree Analysis
<b>5</b>	10/6 Interaction of Genes & Environment	10/8 Exam 1
<b>6</b>	10/13 Interaction of Genes & Environment	10/15 Cytogenetics (1 of 2)
<b>7</b>	10/20 Cytogenetics (2 of 2)	10/22 Development & Sex Determination
<b>8</b>	10/27 Development & Sex Determination	10/29 Development & Sex Determination
<b>9</b>	11/3 Reprod Tech & Genetic Counseling	11/5 Reprod Tech & Genetic Counseling
<b>10</b>	11/10 Exam 2	11/12 DNA Structure & Chromosomes (Withdrawal deadline: 11/14)
<b>11</b>	11/17 No class Scheduling for Spring 2010	11/19 Gene Expression (1 of 2)
<b>12</b>	11/24 Gene Expression (1 of 2)	11/26 No class Thanksgiving
<b>13</b>	12/1 From Proteins to Phenotypes	12/3 Mutation
<b>14</b>	12/8 Biotechnology & Society (1 of 2)	12/10 Biotechnology & Society (2 of 2)
<b>15</b>	12/15 Exam 3	12/17 The Human Genome Last day of class

There will be a cumulative final exam that will be scheduled by the Registrar.

## **COURSE POLICIES**

### *Attendance:*

Your attendance is expected at all class meetings. I will initially take attendance by calling the roll. After the first week or so, I will have a sign-in sheet posted by the classroom door. It is your responsibility to sign in each morning. If you are absent, it is your responsibility to get copies of notes, homework sheets, and other handouts, either from the course website or from other students. Please remember that there is no make-up for missed exams or quizzes.

I must periodically provide the Registrar's Office with information on student attendance. Students who are not participating may be withdrawn from the course. Please understand that non-participation in the course can result in you being required to pay back your financial aid.

### *Late Arrivals:*

Students are expected to be in class on time. If you must come late, do not expect extra time to complete assignments in progress, do not interrupt the class, and do not expect that either myself or others will be able to work with you individually to repeat information/directions that you missed.

### *Late Assignments:*

Late assignments will not be accepted. If you are absent the day that an assignment is due, you must either e-mail or fax it to me. The number for the Science/Mathematics Division fax machine is (508) 427-1231. If you are sending materials by fax, please put my name somewhere on the assignment so it gets to me.

### *Academic Integrity (from the College Catalog):*

Students are responsible for maintaining the highest standards of academic honesty and integrity in this course. Violations of academic honesty will usually fall in one of two categories: cheating or plagiarism. Cheating includes, for example, copying or buying the work of others; hiring or persuading others to do work under a false name; concealing notes or other helpful materials during an exam; communicating with your classmates during an exam. Plagiarism is the use of another person's work or ideas as one's own without giving appropriate credit. In short, plagiarism is intellectual theft and is, therefore, taken seriously; consequently, using the ideas or language of others in an oral, written, technical, or artistic work must be properly acknowledged and documented. Students are responsible for understanding what constitutes plagiarism in their classes and should note that these offenses are often very easy for the instructor to catch. In this class, the penalty for cheating or plagiarism will be a grade of zero (0) for the work in question and possibly a failing grade for the course.

Please note that copying either text or drawings out of textbooks, course materials and websites is also prohibited. All work conducted in this course is to be yours and yours only!

### *Cell Phone Usage:*

During lecture and pre-lab instructions, I ask that you turn any noise-emitting device on your person to its vibrate or silent feature.

Texting and other cell phone-related activity is never appropriate during class. You don't think I can see you doing it, but here's the truth. ❶ I can see it. In fact, it's pretty hard for me to miss. ❷ Your classmates will get irritated with you and they'll turn you in. *They always do.* I've had students rat out their best friends. Your fellow students really don't like it when you're not paying attention, so either give the class your entire attention or leave.

During any exam, if a device in your possession makes any type of audible noise that I can hear (hence, disrupting your classmates), you will swiftly earn a zero (0) for the exam. If you have a personal issue which requires that you be in cell phone contact, you must inform me prior to the start of the exam.

### *Students with Disabilities:*

Students with disabilities who believe that they may need accommodations in the classroom are encouraged to contact a disability counselor as soon as possible. Students at the Brockton Campus with learning disabilities should contact Andrea Henry (ext. 1805). Students with physical disabilities at the Brockton Campus should contact Mary Berg (ext. 1425). All students at the Canton Campus should

contact Mary Berg (ext. 2132).

## **COURSE OUTCOMES**

*By the end of this course, you should be able to:*

- Describe the cell cycle and mitosis.
- Describe meiosis.
- Compare and contrast mitosis and meiosis.
- Describe the anatomy of the male and female reproductive systems.
- Explain the physiology of gametogenesis.
- Describe spermatogenesis and oogenesis.
- Compare and contrast spermatogenesis and oogenesis.
- Describe the series of events from fertilization through birth.
- Know the key features of development in each trimester.
- Be familiar with teratogens and their effects.
- Explain various causes of infertility.
- Describe current reproductive technologies, and explain pros/cons, misconceptions, and controversies surrounding the various reproductive technologies in order to make informed decisions about issues related to infertility.
- Explain sex determination in humans.
- Describe physiology of sexual development.
- Be fluent in disagreements between chromosomal and physical sex.
- Discuss possible genetic influences on sexual orientation in order to evaluate issues related to sex and sexuality.
- Describe the basic structure of the DNA molecule in order to understand the molecular basis of inheritance and the use of DNA in engineering, biotechnology and forensics.
- Describe what a mutation is and the various causes of mutations.
- Describe the basic structure of a chromosome.
- Describe the normal human karyotype, abnormalities in chromosome number, and chromosome structural aberrations.
- Describe basic Mendelian genetics in humans and know example traits.
- Describe polygenic and multifactorial inheritance and give example traits in humans.
- Describe the use of pedigrees in the study of human genetics.
- Compare and contrast patterns of inheritance.
- Describe various genetic technologies, and explain pros/cons, misconceptions, and controversies surrounding the various genetic technologies.
- Strengthen Core Competencies in order to increase success in this and other courses and in the workplace.