

**SYLLABUS**  
**Fundamentals of Genomics (MICR 6236)**  
**Ross Hall Rm 402, Tuesday 4-6 pm**  
**Professor Tim McCaffrey**

**COURSE DESCRIPTION:**

This course provides a broad overview of the goals, methods, and applications for genomics and genomic medicine, with a focus on the discovery of disease processes.

**LEARNING OBJECTIVES:**

By the end of this course, each student should:

1. be familiar with the terminology, underlying principles and strategies, and the technical methodology involved in genomics and proteomics.
2. be able to compare and contrast the strengths and limitations of this methodology.
3. be able to emphasize the use of these methods for problem-solving and hypothesis testing/hypothesis generation.
4. be able to distinguish trait-based genetics from gene-based genomics.

**CREDIT HOURS: 2**

**COURSE DIRECTOR:** Dr. Tim McCaffrey, Professor of Medicine and Director of the Division of Genomic Medicine. 202-994-8919, [mcc@gwu.edu](mailto:mcc@gwu.edu)

**PREREQUISITE:** permission of instructor or program director.

**LECTURE CONTACT TIME/HOURS:** one two hour-long lecture on Tuesdays from 4-6 pm.

**METHOD OF ASSESSMENT:** The final grade will be calculated from two class presentations, combined with Midterm and Final examinations.

**EXAMINATIONS:** One Midterm exam, multiple choice, one Final exam, multiple choice.

**REQUIRED TEXT:**

**Genetics and Genomics in Medicine. Tom Strachan. Available as e-book also. \$20-\$67.**

[https://www.amazon.com/Genetics-Genomics-Medicine-Tom-Strachan/dp/0815344805/ref=sr\\_1\\_1?ie=UTF8&qid=1470338645&sr=8-1&keywords=genetics+and+genomics+in+medicine](https://www.amazon.com/Genetics-Genomics-Medicine-Tom-Strachan/dp/0815344805/ref=sr_1_1?ie=UTF8&qid=1470338645&sr=8-1&keywords=genetics+and+genomics+in+medicine)

**CLASS POLICIES:** *Attendance policy:* Attendance required. Each absence, after the first, reduces the final grade by 3%. *Late work:* accepted with permission, penalty may be incurred if unduly late as determined by instructor. *Religious Holidays:* will be accommodated if requested [NOTE: for university policies on teaching, see <http://www.gwu.edu/~academic/Teaching/main.htm>]

**Required readings are listed in the detailed weekly folders on BLACKBOARD:**

**OPTIONAL READING: NOT REQUIRED**

**Genes VII.** Editor: Ben Lewin, Oxford Press.

**Functional Genomics.** Hunt and Livesey. Oxford Press

**Primer of Medical Genomics.** Tefferi and Spelsberg. Mayo Clinic Proceedings.

**GRADING:** The grade for course is the numerical average of the class presentations with the midterm and final exams. (i.e., ¼ midterm, ¼ final, ¼ presentation 1, ¼ presentation 2).

**CLASS PRESENTATION/REPORT:** There will be 2 class presentations by you. You can choose a disease of your particular interest and prepare a short ‘review article’ about it, with a 10 minute oral presentation to the class. I will post a template/example in Bb. You can submit a ‘preview’ 2-weeks prior for feedback.

**BLACKBOARD:** MICR6236 materials are also available through the Blackboard portal. Lecture notes and slides for each week’s material will be posted as soon as possible. To log onto Blackboard, you must have registered for the course and have a GWU email address. In addition, when possible, we will record lectures for review online.

**ACADEMIC INTEGRITY:** I strongly support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one’s own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: <http://www.gwu.edu/~ntegrity/code.html>.

**SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM:**

*DISABILITY SUPPORT SERVICES (DSS)* Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to:

<http://gwired.gwu.edu/dss/>

*UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300*

The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:

- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals

<http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices>

**SECURITY:** In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

## LECTURE TOPICS AND SCHEDULE. ROSS 402

Date	Topic	Lecturer	Reading
<b>Section 1: “Big” Genomics: Acquiring and understanding whole genomes</b>			
Aug 29	Introduction to Pre-Genomic Thinking and Methods	McCaffrey	1
Sept 6	-----LABOR DAY break, no class	READ	2
Sept 12	Genomic Medicine, Principles and Practice	McCaffrey	3
Sept 19	Bioinformatic Tools for Understanding Genomes	McCaffrey	4
Sept 26	Public Health Implications of Genomic Technology	McCaffrey	5
Oct 3	Class Presentation #1 --Genetic Basis of Disease	Class	6
<b>Section 2: “Micro” Genomics: Massively Parallel Methods</b>			
Oct 10	Introduction to Massively Parallel Methods	McCaffrey	review
Oct 17	-----TEST #1 -----	Covering Chap 1-6	
Oct 24	Application of Genomics to Medicine	McCaffrey	7
Oct 31	Next generation sequencing applications	Horvath	8
Nov 7	Creative Genomics—Epigenetics and Translation	McCaffrey	9
Nov 14	Gene therapy, gene editing, and beyond	McCaffrey	10
Nov 21	-----THANKSGIVING Break, no class	READ	11
<b>Section 3: “ELSI”: Ethical, Legal, and Social Implications of Genomics</b>			
Nov 28	Class Presentation #2 --Genetic Basis of Disease	Class	
Dec 7	Ethical Implications of the Genome	McCaffrey	review
Dec 12 or 19	-----TEST #2-----	Covering Chap 7-11	