SYLLABUS
Fundamentals of Genomics (MICR 6236)
Ross Hall 643/Himmelfarb 202, 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

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 the Midterm and Final examinations.

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

REQUIRED TEXT:

Genetics and Genomics in Medicine. Tom Strachan
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 midterm and final exams.

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

Date		Topic	Lect, Room	Reading
Section 1:		**"Big" Genomics: Acquiring and understanding whole genomes**		
Aug	27	Introduction to Pre-Genomic Thinking and Methods	McCaffrey H202	1
Sept	3	LABOR DAY, no classes		2
Sept	10	Genomic Medicine, Principles and Practice	McCaffrey 643	3
Sept	17	Bioinformatic Tools for Understanding Genomes	McCaffrey 643	4
Sept	24	Public Health Implications of Genomic Technology	McCaffrey H202	5
Section 2:		**"Micro" Genomics: Massively Parallel Methods**		
Oct	1	Introduction to Massively Parallel Methods	McCaffrey 643	6
Oct	8	Application of Genomics to Medicine-Cardiovascular	McCaffrey 643	review
Oct	15	----------**MIDTERM** Covering Chap 1-6----------	McCaffrey 643	
Oct	22	FALL BREAK – NO CLASS		
Oct	29	Next generation sequencing applications	Horvath 643	7
Nov	5	Analyzing and Mining Massive Data-Finding Causation	Fu H202	8
Nov	12	Creative Genomics—Epigenetics and Translation	McCaffrey 643	9
Nov	19	Nanotechnology in genomics and therapeutics	Fernandes 643	10
Section 3:		**"ELSI": Ethical, Legal, and Social Implications of Genomics**		
Nov	26	Ethical Implications of the Genome	McC H202	11
Dec	3	Gene therapy, gene editing, and beyond (NB: 4:30 start)	Toma 227	review
Dec	10	--------no class, reading week (make-up class if needed)		
Dec	17	----------**FINAL EXAM---------- ROSS 643**	Covering Chap 7-11	

NOTE: 202 is in Himmelfarb Library