MMG 835, SPRING 2020, EUKARYOTIC MOLECULAR GENETICS

PREREQUISITE: Undergraduate general genetics course, 1 year of undergrad biochemistry.

DESCRIPTION OF THE COURSE: Genome structure and function in eukaryotic species including basic aspects of modern human genetics and the genetic basis for disease. Taught at the introductory graduate school level, MMG 835 is meant to provide a basis (not a substitute) for advanced courses that specialize in the molecular genetics of narrower groups of eukaryotes.

INSTRUCTORS: Pat Venta, 5171 BPS Bldg., 884-5350, email: venta@cvm.msu.edu
Office hours: call or email to arrange a time of mutual convenience
George Mias, 1319 Institute for Quantitative Health Science and Engineering., 353-0855, email: gmias@msu.edu
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TEXTBOOKS: Primary literature will be used. Access to assigned reading will either be through MSU Library web subscriptions, through D2L or distributed copies. Background information can be found in "Genes" (any of the various editions) by B. Lewin or in most upper level undergraduate genetics textbooks. Or see "A Primer of Genome Science, Third Edition" by G. Gibson and S.V. Muse (most closely related to 2nd half of 835). **No text is required.**

LECTURE: M,W 2:30-3:50 p.m. BPS 2245. Initial meeting on Jan. 6, 2020.

REVIEW SESSIONS: To be arranged. (Attendance optional)

EXAMS AND GRADING: There will be 2 exams, worth 100 and 55 points. They will be:

Wednesday, Feb. 26	2:30-3:50 pm	Covers material from 1/7 to 2/25
Wednesday, April 29	5:45-7:45 pm	Covers material from 3/11 to end

Note: There will be no cumulative final exam. Each exam will cover one half of the course as noted above. However, the second exam may require you to use knowledge of the principles or techniques discussed in first half of the course in formulating your answers. For the second half of the course, 45 points will be based on presentations/discussions.
Exams will be closed book, mostly short answer (1 word to 1 paragraph) in format.

GRADING: Grades will be based on total points earned out of a maximum of 200 pts.
The grading scale will be set by the instructors depending on overall class performance. A preliminary estimate is as follows: 180-200 pts., 4.0; 160-179 pts., 3.5; 140-159 pts., 3.0; 120-139 pts., 2.5; 100-119 pts., 2.0. Grade cut-offs will not be made higher than this, but might be lowered depending on overall class performance on exams. In the 2nd half of 835 (after spring break) the grade will be based on 45% presentation/discussion [45 pts] and 55% final exam [55 pts].

IF YOU MISS AN EXAMINATION: If there is an excused absence for one of the two exams, it will be up to the instructor for that portion of the course as to how to handle this.

COURSE CONTENT: Students are expected to attend class and take notes as needed. Handout material may be provided, but this will not cover all the relevant aspects of the lectures. Assigned reading material will be available on-line through the MSU Library website or D2L. **Students are encouraged to ask questions during and/or after class.** Review sessions will provide further opportunities for questions and discussion.

TENTATIVE CLASS SCHEDULE

DATE:	TOPICS:	Instructor
Jan. 6	Course overview and introductory material	PV
Jan. 8	Modes of inheritance and molecular action I	PV
Jan. 13	Modes of inheritance and molecular action II	PV
Jan. 15	Genome variation	PV
Jan. 20	Martin Luther King Day, **no classes**	PV
Jan. 23	Inbred lines and mapping I	PV
Jan. 27	Finding genes of interest; linkage and GWAS I	PV
Jan. 29	Finding genes of interest; linkage and GWAS II	PV
Feb. 3	Methods for analysis of individual genes I	PV
Feb. 5	Methods for analysis of individual genes II	PV
Feb. 10	Methods for analysis of individual genes III	PV
Feb. 12	Synthetic Biology and Genome Writing	PV
Feb. 17	Gene regulation in eukaryotes I	PV
Feb. 19	Gene regulation in eukaryotes II	PV
Feb. 24	Gene therapy	PV
Feb. 26	Midterm exam for first half of the course, 2245 BPS, 2:30-3:50	PV
March 2 to 7	Spring break	
March 9	Genome Sequencing I	GM
March 11	Genome sequencing II	GM
March 16	Presentations: Single Cell Sequencing	GM
March 18	Immunology and Genetics	GM
March 23	Presentations/Discussion: Immunogenetics	GM
March 25	Cancer Genetics	GM
March 30	Presentations/Discussion: Cancer Therapy	GM
April 1, 6	Arrays and Transcriptomics	GM
April 6	Proteomics and Other Omics	GM
April 8	Presentations/Discussion: Omics Applications	GM
April 13	Epigenetics	GM
April 15	Presentations/Discussion: Quantitative Omics Methods	GM
April 20	Systems Biology and Networks	GM
April 22	Special Topic: Genetics, other omics and Systems Medicine	GM

Second exam on Wednesday, Apr 29, 5:45-7:45 p.m; 2245 BPS

More detailed topic lists and reading assignments will be provided by the instructors.