*General Information:*

Course Title/Number: Special Topics: POPULATION GENETICS/BSC680 (section 101)

Semester/Year: FALL/2018

Days/Time: MWF 11:00 – 11:50 pm

Location: Science Building 374

Instructor: Herman L. Mays Jr., PhD

Office: Science Building 390

Phone: (304) 696-6692

Email: [maysh@marshall.edu](mailto:maysh@marshall.edu)

Web: [www.monofilia.org](http://www.monofilia.org)

Twitter: [www.twitter.com/hermmays](http://www.twitter.com/hermmays)

Linkedin: [www.linkedin.com/in/hermanmays/](http://www.linkedin.com/in/hermanmays/)

Office hours: MW 9:30 am–11:00 pm or by appointment

Credit: 3 hours

*University policies:*

By enrolling in this course, you agree to the University Policies listed below. Please

read the full text of each policy be going to [www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs) and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to <http://www.marshall.edu/academic-affairs/policies>

Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

*Course description: 3 credit hrs:*

This course will be a general review of the field of population genetics. We will be exploring the population genetic theory and methodology used to address fundamental questions in biology across a range of organisms.

*Requirements:*

Students should enter into the course with a general algebraic knowledge and some prior introduction to probability and statistics.

*Student learning outcomes:*

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| **Student learning outcomes** | **Student learning outcomes: practice** | **Student learning outcomes: assessment** |
| Students will develop a solid foundation in classical and coalescent based population genetics including the Hardy-Weinberg equilibrium, Wright-Fisher population models, genetic drift, selection, population structure, gene flow, mutation, coalescent models and gene genealogies, as well as the fundamentals of molecular evolution. | Students will be exposed to the terminology, empirical data and conceptual landscape of classical population genetics through lectures, data analysis problems, class discussion and supplemental reading. | Students will be expected to recall the basic empirical findings of population genetics and be familiar with the terminology and identify key figures on quizzes and exams. |
| Students will learn to integrate and evaluate information and think critically, analytically and conceptually. | Students will be exposed to fundamental concepts in conservation genetics through a combination of lecture and seminar-style format and encouraged to discuss these concepts in the classroom in addition to seeking out the literature and independently conducting data analysis. | Students will be required to apply key concepts in novel situations in exams through conceptual word problems and other problem solving exercises as well as in the context of data analysis projects using existing molecular genetic datasets derived from the literature. |
| Students will be introduced to the scientific literature in population genetics. | Students will be expected to learn several of the fundamental research programs in conservation genetics and be introduced to the primary literature in the field. Students will obtain first-hand knowledge of the scientific method by reanalyzing existing genetic datasets to answer basic questions in conservation biology. | Students will be expected to recall the methodology, rationale and key conclusions of key experimental and observational studies in conservation genetics on exams. Students will be evaluated on their understanding of the scientific method graded write-ups of their analyses of conservation genetic datasets. |

*Required material:*

*Population Genetics.* Matthew B. Hamilton. 2009. John Wiley & Sons, Inc. ISBN 9781405132770

*Digital and used copies of the textbook are available through the Marshall University campus bookstore.* The companion website to the textbook is available at <http://www.wiley.com/go/hamiltongenetics>

*Computing*:

Admin access to a desktop or laptop computer is required as is access to the Internet to download and install free software and datasets used in analysis of population genetic data.

*Grading policy:*

Participation in paper discussions (scaled to 10% of overall grade)

Leading a paper discussion (x2; 50 points each; 100 points total)

Data analysis projects (x1; 100 points each; 100 points total)

Exams (x2; 100 points each; 200 points total)

Final exam (cumulative; 100 points)

*Grading scale:*

100-90% = A; 89-80% = B; 79-70% = C; 69-60% = D; <60% = F

*Attendance:*

The best strategy for succeeding in the course begins with going to class. I may occasionally take attendance but will not penalize for missing class. However, missing class will invariably result in missing material that will be covered on class activities, and exams. The textbook is largely a supplement to the lectures and there may often be material in lectures that is not in the textbook. Also there will be material in the textbook that is not in the lectures. Students are expected to speak up in class and contribute to class discussion, especially during paper presentations. I will keep track of participation during weekly paper discussions and this participation score will constitute 10% of the overall grade in the course. ***The lectures are your primary guide for highlighting the material you need to know for the exams, which is why it is imperative that you attend class.*** The official MU attendance policy may be found here <http://www.marshall.edu/student-affairs/files/Excused-Absence-Policy-15-16.pdf>

*Students with disabilities:*

Marshall University is committed to equal opportunity in education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disabled Student Services (DSS) in Prichard Hall 117, phone (304) 696-2271 to provide documentation of their disability.  Following this, the DSS Coordinator will send a letter to each of the student’s instructors outlining the academic accommodation he/she will need to ensure equality in classroom experiences, outside assignment, testing and grading.  The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, please visit <http://www.marshall.edu/disabled> or contact DSS Office at Prichard Hall 11, phone (304) 696-2271.

*Schedule:*

**Tentative** Lecture Schedule\*

**PAPER DISCUSSIONS WILL BE HELD WEEKLY ON FRIDAYS STARTING ON 8/31.**

**Week Date General Lecture Topics**

1 8/20-8/24 Course overview

Hamilton chapters 1

Hamilton chapter 2.1-2.4

2 8/27-8/31 Hamilton chapter 2.5-2.7

3 9/3 **LABOR DAY – NO LECTURE on 9/3**

9/5-9/7 Hamilton chapter 3.1-3.4

4 9/10-9/14 Hamilton chapter 3.5-3.7

5 9/17-9/21 Hamilton chapter 4

6 9/24-9/28 Hamilton chapter 5; **EXAM I 9/28**

7 10/1-10/5 Hamilton chapter 6

8 10/8-10/12 Hamilton chapter 7

9 10/15-10/19 Hamilton chapter 8

10 10/22-10/26 Hamilton chapter 9

11 10/29-11/2 Hamilton chapter 10

12 11/5-11/9 Hamilton chapter 11

13 11/12-11/16 Review and catch up; **EXAM II 11/16**

14 11/19-11/23 **Thanksgiving/Fall Break** **NO LABS or LECTURE FOR THE WEEK**

15 11/26-11/30 Catch up on any leftover topics, review, and work on data analysis.

16 12/3-12/7 Review and catch up on additional topics and papers; **Data analysis project due 12/7**

**Final Exam** (cumulative): Tuesday 12/11 – 10:15AM – 12:15PM in SCI BLD 374

**\*-Subject to change – we may start specific topics earlier or later than outlined here, depending on how things progress through the term.**