**SYLLABUS**

**PRINCIPLES OF GENETICS - BSC 324**

**Spring 2014**

**INSTRUCTOR**: **DR. N.J. LoCASCIO**

**E-Mail: locascio@marshall.edu**

**Office -** Old Main 230 **locascio@marshall.edu**

**Office Hours** - M 1:00 - 2:30; T 1:00 - 2:00; W 1:00 - 2:30 or by appointment. I make every effort to keep my scheduled office hours. Please be aware that sometimes I have conflicts with required meetings and cannot be present. If you need to meet it is best to e-mail me ahead of time.

**Course Description**: The fundamental principles and mechanisms of inheritance.

**Course prerequisite:** BSC 121 with a grade of C or better; CHM 211 and 212 recommended.

**Lecture Specific objectives:** To understand the biochemical structure and activity of genes, the organization of genes in genomes, the nature and consequences of gene mutation and the segregation of genes in families and populations. **Overall objective:** To appreciate the complex relationship between gene variation (genotype) and character variation (phenotype).

**Laboratory Specific objectives:** To gain hands-on experience of traditional and molecular approaches to genetic analysis and experience different model organisms. **Overall objective:** To learn to hypothesize (make informed guesses) based upon your own observations.

**LECTURE: 2:00 - 3:15 T,R room S376**

**LABORATORY : room S 381**

**Section 201 9:00 - 11:50 M; Section 202 9:00 - 11:50 T; Section 203 9:00 - 11:50 W**

**TEXT: *Essentials of Genetics***, Klug, Cummings, Spencer & Palladino. 8th. Edition; Pearson Benjamin Cummings.

**COURSE WEB SITE:** MuOnline (http://www.marshall.edu/muonline/)

**LAB MANUAL:** will be posted to MuOnline. Students are responsible for downloading their own copies of the exercises prior to laboratory sessions.Lecture notes, any handouts, practice tests, in addition to laboratory protocols will be posted on the BSC324 site. Students must access this site for additional information and updates to the course throughout the semester.

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| **Course Student Learning Outcomes** | **How students will practice each outcome in this course** | **How student achievement of each outcome will be assessed in this course** |
| Students will understand the molecular basis of inheritance and the flow of information from genotype to phenotype. | Content lectures, assigned textbook readings, laboratory exercises | Class participation; Exams; Practice quizzes. |
| Students will use and interpret probabilities and statistics in the gathering, predicting, and analysis of genetic data and explain more complex modes of inheritance and how sex influences the inheritance and expression of genes. | Class discussion, research and assigned readings and problems, laboratory exercises. | Class participation; Exams; homework assignments. |
| Students will describe cellular and chromosomal events that occur during the eukaryotic cell cycle and gamete formation and understand chromosome behaviour and changes in chromosome structure and number as a cell progresses through a cell cycle, meiosis I and meiosis II. | Content lectures, case studies and class discussions | Class participation; Exams; Practice quizzes. |
| Students will explain how meiosis and random fertilization contribute to genetic variation in sexually reproducing organisms. | Assigned readings and class discussion | Class participation; Exams; Practice quizzes. |
| Students will be familiar with major methods and techniques used in molecular genetics to isolate, recombine, amplify, find and study genes of interest | Content lectures, assigned textbook readings, laboratory exercises. | Class participation; laboratory exercises. |
| Show development of both oral and written communication skills | Feedback on in class writing, case study paper. | Class participation; Exam and laboratory essay questions. |

**COURSE POLICIES**

**ATTENDANCE POLICY: Attendance is mandatory**. Missing more than 3 unexcused sessions during the semester will result in the lowering by one letter grade of overall course score.

You are responsible for any material missed by being absent. Absences due to illness, death in the immediate family, or institutional activities will be excused with the appropriate written notification to the instructor. See Marshall University Undergraduate Catalogue ‐ Academic Information for guidelines. Until final grades have been submitted you are expected to keep copies of all submitted and graded work (quizzes, papers etc).No makeup exams will be permitted without an official excuse sent by Dean of Students office.

**ACADEMIC ACCOMMODATION:** 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 Disabled Student Services Office at Prichard Hall 117, phone 304‐696‐2271.

**WITHDRAWAL:** If you are not happy with your academic performance in this class please come see me. Students should keep the W date for this semester clearly in mind. Do not just stop attending. This will result in an F on your transcripts.

***ACADEMIC DISHONESTY IN ANY FORM WILL NOT BE TOLERATED***.

All written assignments, quizzes, and exams are to be independent efforts of each student. If you have any questions please ask. Refer to Undergraduate Catalogue pages 69-71.

**UNIVERSITY POLICIES AND PROCEDURES:** Additional information, including inclement weather policies, can be found in the Marshall Undergraduate Catalogue at **http://www.marshall.edu/www/ugradcat/PDF/05\_08.pdf**

**ASSESSMENT** **& GRADING**: **GRADING SCALE (%):** 100 - 90 = A; 89 - 80 = B; 79 - 70 = C; 69 - 60 = D; < 59= F

4 exams @ 100 pts = 400 pts

10 laboratory quizzes @ 10 pts =100 pts

Case study report @ 40pts = 40 pts

Attendance @ 10pts = 10 pts

Total = 550 pts

**If you miss a quiz or an exam you can** **make it up only if you have university excuse.**

There is ***NO EXTRA CREDIT*.**

**Principles of Genetics**

**Tentative class and exam schedule:**

**Date**

**1/14 - 1/16**

**1/20**

**1/21; 1/23**

**1/28**

**1/30; 2/4**

**2/6**

**2/11**

**2/13**

**2/18 - 2/20**

**2/25 - 2/27**

**3/4 - 3/6**

**3/11**

**3/13**

**3/17 - 3/22**

**3/25 - 3/27**

**3/28**

**4/1 - 4/3**

**4/8 - 4/10**

**4/15**

**4/17**

**4/22 - 4/24**

**4/29 - 5/1**

**5/8 (12:45)**

**Introduction to Genetics; Mitosis & Meiosis**

**No labs for this week.**

**Martin Luther King Day - no classes**

**Review of Meiosis; Mendelian Genetics**

**No labs for this week. Online assignment**

**Mendelian Genetics II**

**No class**

**Non-Mendelian Genetics**

**\*EXAM I\***

**Sex Determination & Sex Chromosomes**

**Chromosome Mutations: Linkage**

**DNA Structure; DNA Replication**

**Genetic Code: Transcription**

**Translation**

**\*EXAM II\***

**Spring Break**

**Gene Mutation and Repair**

**Last day to drop class**

**Regulation of Gene Expression**

**Genetics of Cancer; Genomics**

**\*EXAM III\***

**Bioethics**

**Developmental Genetics**

**Quantitative Genetics; Population Genetics**

***"Dead Week"* catch up**

**\*FINAL EXAM\***

**Text Chapters**

**1, 2**

**2, 3**

**3**

**4**

**5**

**6,7**

**9,10**

**12**

**13**

**14**

**15**

**16, 18**

**19**

**20**

**22,23**

**Principles of Genetics - Laboratory Exercises**

Quizzes will be given within the first 15 minutes of lab. If you are absent there is no make-up. The same lab exercise is offered three times each week and students can come to another section (depending on available seats) if they cannot attend their regular time.

**Tentative Laboratory Schedule**

**Week of 1/27 lab 1 Laboratory Techniques and Math**

**Week of 2/3 *no labs***

**Week of 2/10 lab 2 Mitosis and Cytokinesis; Meiosis**

**Week of 2/17 lab 3 Analysis of *Drosophila –* life cycle and crosses**

**Week of 2/24 lab 4 Mendelian/ Non Mendelian Genetics**

**Week of 3/3 lab 5 Characterization of DNA and Introduction to Gel Electrophoresis**

**Week of 3/10 lab 6 Analysis of a Mutant Haemoglobin Gene**

**Week of 3/24 lab 7 Analysis of a Mutant Haemoglobin Gene II**

**Week of 3/31 lab 8 *Arabidopsis* DNA extraction**

**Week of 4/7 lab 9 *Arabidopsis* PCR**

**Week of 4/14 lab 10 Alu Genotype and Population Genetics**

**Week of 4/21 lab 11 Analyses of Alu gels**

**Week of 4/28 lab 12 wrap up**