GENETICS: BIOL 2416.002
Department of Life Sciences
Spring 2020

A. COURSE INFORMATION

Course number/section: BIOL 2416.002
Class meeting time: Blended Course: 48% Online Instruction
For In-Class Sessions: W 3:30-4:45
For sessions On-Line: M as assigned.
Class location: In-Class CS-101
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructors: Frauke Seemann, PhD & Xavier F. Gonzales, PhD, MSPH
Office location: Seemann: TH 332 & Gonzales: TH 235
Office hours: Seemann: MW 9:30-11:30 & T 9:30-10:30
Gonzales: MW 8:00-10:30 (online or face to face)
Telephone: Seemann: 361-825-2683 & Gonzales: 361-825-3824
e-mail: frauke.seemann@tamucc.edu & Xavier.Gonzales@tamucc.edu
Appointments: email to set up appointments
Recitation Instructor: TBA

C. COURSE DESCRIPTION

Catalog Course Description
Principles of genetic transmissions and molecular basis of heredity and variation. Weekly
recitation periods will involve team assignments, problem solving activities, and seminars.
Extended Course Description
This course is a Blended Course; this indicates that lecture will be primarily through online
instruction. Most recitation will be through face-to-face instruction.

This course introduces students to the basic principles of inheritance and expression of
genetic information. Current topics in and applications of molecular genetics are briefly
covered as well. Emphasis will be placed on critical thinking and problem solving in the
context of inheritance and the molecular basis of heredity.

The recitation period is designed for discussion, idea exchange, and active learning activities
to reinforce lecture material. Emphasis will be placed on problem-solving activities, critical
thinking skills for data analysis and collaborative learning.
D. **PREREQUISITES AND COREQUISITES**

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Corequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 1406</td>
<td>CHEM 1311</td>
</tr>
<tr>
<td>BIOL 1407</td>
<td>CHEM 1312</td>
</tr>
</tbody>
</table>

E. **REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES**

**Required Textbook(s)**


**Required Course Registration:** hand out to the course Connect will be provided on the first day of class.

**Other References**
- Primary literature as directed by instructor: student will be responsible for obtaining the assigned reading from the library or online database

**Supplies**
- Textbook, paper, and pencil (scantrons when indicated)

F. **STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:
1. Describe Mendelian inheritance and its extensions, including basic quantitative genetics
2. Discuss DNA structure and replication
3. Recognize chromosome number and structure
4. Discuss the connection between mitosis, meiosis, and Mendelian Genetics
5. Demonstrate linkage, recombination and chromosome mapping
6. Support connections between Mendelian and molecular genetics
7. Assess transcription, RNA processing, genetic code, translation, and protein structure
8. Describe basic mechanisms of regulation of gene expression
9. Describe Non-Mendelian inheritance
G. INSTRUCTIONAL METHODS AND ACTIVITIES

Learner-Centered Teaching: Collaborative work, control of content selection, personal reflection, learning skill demonstration

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam</td>
<td>Comprehensive optional (75%)</td>
</tr>
<tr>
<td>Quizzes and Online assignments</td>
<td>75%</td>
</tr>
<tr>
<td>Recitation</td>
<td>35%</td>
</tr>
</tbody>
</table>

Grading scale: A>90%  B=80-89.9%  C=70-79.9%  D=60-69%  F<60%

Nature of Assignments:

Team Learning: We will use a team learning approach in this class in the recitation. Permanent groups will be established at the start of the course. Research examining team learning assignments show that the group score is HIGHER than individual scores and that students understand concepts much better as a result of discussing questions in groups. Sometimes each group member will submit answers individually and sometimes groups will submit group consensus answers to questions. We will use the team learning approach on in-class recitation assignments and lecture exams as described below.

The exam is optional and comprehensive and will be comprised mainly of multiple choice questions. Some may be setup as matching or fill-in the blank. Problems and/or essay questions may appear on the exam. Most questions, including multiple choice questions typically require analysis and interpretation of data or experimental design to assess critical thinking skills. You should bring a calculator to every exam. Cell phones must be turned off and put away during exams.

Recitation Assignments will vary depending on the activity conducted each week. All activities will involve group work. Groups will be assigned at the beginning of the semester after the first recitation. Most weeks you will work on an activity as a group; however, you will complete and turn in most written assignments individually (unless otherwise specified) using your own words. Assignments may involve solving problems, data analysis, explaining concepts, or other hands-on applications of the concepts being covered in lecture. Occasionally we will cover a concept in recitation before it is covered in lecture, and some topics will be covered only in lecture or recitation, but not both.

The majority of the credit for recitation will be gained in development of active-learning activities to explain assigned topics to peers. based on instructor and peer review.

Quizzes and Assignments will be given weekly. Quizzes may be multiple choice or short answer, primarily evaluating your mastery weekly online and textbook material. Quizzes must be
completed individually and online through blackboard in the given timeframe, with no assistance from peers, notes or aids of any kind.

**In most cases, Quizzes will be available through the textbook site. Students must purchase access.** It is the student’s responsibility to constantly check the blackboard site for quizzes that are due. Instructor reserves the right to administer pop-quizzes during face to face classes without prior notice.
## I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture (Videos OnLine or In-Class)</th>
<th>Reading</th>
<th>Quiz</th>
<th>Recitation Topic</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wed 01/22</td>
<td>Genetics Introduction (In-Class)</td>
<td>Chap. 1</td>
<td></td>
<td>Description of Tidbits &amp; Hands-on Assignment</td>
<td>Dr Seemann; Dr Gonzales</td>
</tr>
<tr>
<td>Mo 01/27</td>
<td>Mendelian Inheritance I (Online)</td>
<td>Chap. 2</td>
<td>Y</td>
<td>Topic introduction 1</td>
<td>Dr Seemann</td>
</tr>
<tr>
<td>Wed 01/29</td>
<td>Mendelian Inheritance II (In-class)</td>
<td>Chap. 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mo 02/03</td>
<td>Mendelian Inheritance III (Online)</td>
<td>Chap. 3</td>
<td>Y</td>
<td>Topic review 1 (Online)</td>
<td>Dr Gonzales</td>
</tr>
<tr>
<td>Wed 02/05</td>
<td>Mendelian Inheritance III (In-class)</td>
<td>Chap. 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mo 02/10</td>
<td>Chromosomal Organization and Inheritance (Online)</td>
<td>Chap. 4</td>
<td>Y</td>
<td>Topic presentation 1</td>
<td>Dr Seemann</td>
</tr>
<tr>
<td>Wed 02/12</td>
<td>Chromosomal Organization and Inheritance (In-class)</td>
<td>Chap. 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mo 02/17</td>
<td>Linkage, Recombination, and the Mapping of Genes on Chromosomes (Online)</td>
<td>Cap. 5</td>
<td>Y</td>
<td>Topic introduction 2</td>
<td>Dr Gonzales</td>
</tr>
<tr>
<td>Wed 02/19</td>
<td>Linkage, Recombination, and the Mapping of Genes on Chromosomes (In-class)</td>
<td>Cap. 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mo 02/24</td>
<td>DNA structure and recombination (Online)</td>
<td>Chap. 6</td>
<td>Y</td>
<td>Topic review 2 (Online)</td>
<td>Dr Seemann</td>
</tr>
<tr>
<td>Wed 02/26</td>
<td>Anatomy and Function of a Gene (In-class)</td>
<td>Chap. 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mo 03/02</td>
<td>Gene Expression (Online)</td>
<td>Chap. 8</td>
<td>Y</td>
<td>Topic presentation 2</td>
<td>Dr Gonzales</td>
</tr>
<tr>
<td>Wed 03/04</td>
<td>The role of DNA structure, gene anatomy and function as a determinant of gene expression (In-class)</td>
<td>Chap. 6-8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
<td>Chapter(s)</td>
<td>Notes</td>
<td>Instructor</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
<td>--------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>8</td>
<td>Mo 03/09</td>
<td>Digital Analysis of DNA (Online)</td>
<td>Chap. 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed 03/11</td>
<td>Genome Annotation (Online)</td>
<td>Chap. 10</td>
<td>Spring break</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Mo 03/16</td>
<td>Analyzing genomic variation (Online)</td>
<td>Chap. 11</td>
<td>Y Topic introduction 3</td>
<td>Dr Seemann</td>
</tr>
<tr>
<td></td>
<td>Wed 03/18</td>
<td>Application of Genomics (In-class)</td>
<td>Chap. 9-11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mo 03/23</td>
<td>The Eukaryotic Chromosome (Online)</td>
<td>Chap. 12</td>
<td>Y Topic review 3 (Online)</td>
<td>Dr Gonzales</td>
</tr>
<tr>
<td></td>
<td>Wed 03/25</td>
<td>Chromosomal Rearrangements and Changes in Chromosome Number (In-class)</td>
<td>Chap. 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Mo 03/30</td>
<td>Bacterial Genetics (Online)</td>
<td>Chap. 14</td>
<td>Y Topic presentation 3</td>
<td>Dr Seemann</td>
</tr>
<tr>
<td></td>
<td>Wed 04/01</td>
<td>Organellar Inheritance (In-class)</td>
<td>Chap. 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mo 04/06</td>
<td>Gene regulation: prokaryotes vs eukaryotes (Online)</td>
<td>Chap. 16/17</td>
<td>Y Topic introduction 4</td>
<td>Dr Gonzales</td>
</tr>
<tr>
<td></td>
<td>Wed 04/08</td>
<td>Gene regulation: prokaryotes vs eukaryotes (In-class)</td>
<td>Chap. 16/17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Mo 04/13</td>
<td>Manipulating the Genomes of Eukaryotes (Online)</td>
<td>Chap. 18</td>
<td>Y Topic review 4 (Online)</td>
<td>Dr Seemann</td>
</tr>
<tr>
<td></td>
<td>Wed 04/15</td>
<td>Manipulating the Genomes of Eukaryotes (In-class)</td>
<td>Chap. 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Mo 04/20</td>
<td>The Genetic Analyses of Development (Online)</td>
<td>Chap. 19</td>
<td>Y Topic presentation 4</td>
<td>Dr Gonzales</td>
</tr>
<tr>
<td></td>
<td>Wed 04/22</td>
<td>The Genetic Analyses of Development (In-class)</td>
<td>Chap. 19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Mo 04/27</td>
<td>The Genetics of Cancer (Online)</td>
<td>Chap. 20</td>
<td>Y Small group revision</td>
<td>Dr Seemann</td>
</tr>
<tr>
<td></td>
<td>Wed 04/29</td>
<td>The Genetics of Cancer (In-class)</td>
<td>Chap. 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Mo 05/04</td>
<td>Revision (Online)</td>
<td>Y</td>
<td>Small group revision</td>
<td>Dr Gonzales</td>
</tr>
</tbody>
</table>
Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. **COURSE POLICIES**

**Emails**

We are happy to communicate with you through emails but we do expect you to do so in a professional manner. Emails are not text messages, therefore, please do not right them in that style. We prefer an appropriate salutation followed by a brief explanation of the purpose of your email. We would also like that you ask everything at once and it would be best to put all your questions in bullets to allow me to answer behind the question. Further, we do not answer emails on the weekend. If you sent your email during professional working hours (M-F: 9am-5pm) and it did not get answered after 24hrs it was more than likely lost in all my emails. Please resend the email.

**Attendance/Tardiness**

Attendance: Students are expected to attend every scheduled class and recitation meeting. It is the responsibility of the student to obtain any material missed during an absence from his/her classmates. For recitation, the instructor (TA) should be notified PRIOR to recitation if the student will be absent (except in emergency situations). Students must attend the recitation section for which they originally registered.

Tardiness: Students may enter when late but be respectful of your peers and do not disrupt the class as you enter.

**Late Work and Make-up Exams**

No late work will be accepted without some official documentation (i.e. doctors note or coaches letter). It is your responsibility to review the syllabus for when items are due. It is also your responsibility to get it turned in through the appropriate outlet on the designated day.

No make-up exams will be given without some official documentation (i.e. doctors note or coaches letter); the quiz grade can be dropped and replaced by the grade from the Cumulative Final Exam.

**Extra Credit**

Missed extra credit opportunities—Instructor is not obligated to give make-up assignments for extra credit opportunities, whether excused or unexcused.

**Cell Phone Use**
Lecture/Recitation: Students are not allowed to use cell phones in recitation. Students will be asked to leave the room if found using cell phones in class or recitation. If it is urgent for you to use your phone feel free to exit the room to utilize your phone.

Laptop Use
Lecture: Students may utilize their laptops as long as it does not disrupt others in class. Recitation: Students are allowed to use laptops as long as it does not disrupt the activities.

Food in Class
Lecture/Recitation: Students may eat food as long as it does not disrupt others in class. It is the student’s responsibility to clean up after themselves. If you fail to do so, you will no longer be allowed to have food in class.

Missed Exam
No make-up exams will be given without some official documentation (i.e. doctors note or coaches letter); one exam can be dropped and replaced by the grade from the Cumulative Final Exam.

Participation
Lecture: Students are required to participate in all group activities. Peer evaluations will be given with each activity to determine your final assessment. Recitation: Students are expected to attend every session and have an equal contribution in the completion of the group activities. Peer evaluations will be given with each session to determine your final assessment.

BlackBoard Genetics Course and Other Electronic Resources:
Students are responsible for visiting the course BlackBoard site regularly. Updates to lecture outlines or study guides and other information, such as recitation, quizzes and homework assignments, will be available on this site. If you have never used BlackBoard before, click on Island Online on the homepage, choose BlackBoard under “Island Online Login” and then on “We am a new user” and follow the instructions. If you have any problems logging into BlackBoard, please call the Online Help Desk at x2825 (or 825-2825 from off-campus or 1-866-353-2491 for long distance).

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.
• **Classroom/Professional Behavior**
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

• **Statement of Civility**
Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

• **Deadline for Dropping a Course with a Grade of W (University)**
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

• **Grade Appeals (College of Science and Engineering)**
As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at
http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.