BIOL 3330.01I/02I – Functions and Modeling

Spring 2018

Instructor:  Dr. K. Christopher Smith, SCIE 3.120, telephone: 665-2063, e-mail: kenneth.smith@utrgv.edu

Class Time:  Mondays and Wednesdays, 10:50am – 12:05pm, EENGR 1.262 (Edinburg) & BBRHB #99 (Brownsville)

Office hours:  M, 2:00pm – 3:00pm & T, 10:30am – 11:30am, SCIE 3.120
Office hours can also be scheduled by appointment (send e-mail)

                                b) GeoGebra app – available free to download (required)
                                c) Desmos app – available free to download (required).
                                d) TI 83/84 graphing calculator (optional – bring if you have one).

BIOL 3330 Course Description:

“Students will engage in explorations and lab activities designed to strengthen and expand their knowledge of the topics found in secondary school mathematics and other sciences through activities of data collection; modeling the data with elementary mathematical functions; using tools from calculus to determine the best model for the data; and using concepts from mathematics, physics and chemistry to interpret the results of the model. The major objective of this course is for students in the UTeach program to understand the interconnection between science and mathematics, and how to effectively use mathematics in scientific inquiry. Prerequisites: A grade of 'C' or better in the following: MATH 2413 and UTCH 1102.”

Learning Outcomes for BIOL 3330

The overall goal in terms of learning outcomes is to help you to apply mathematical functions and models to various scientific phenomena. As the course progresses and by the end of the course you will be able to: deepen and broaden function-related mathematical content knowledge from algebra by exploring relevant topics in an inquiry based learning situation; use reflective and collaborative learning, and develop a stronger sense of professionalism and leadership; demonstrate proficiency in working with the concepts of functions and models; generate or work with relevant lab or exploration data and use regression methods to generate a model of the data; present mathematical ideas and topics in a knowledgeable and effective manner; demonstrate proficiency in the use of technology in the classroom.
Learning Objectives for Core Curriculum Requirements

In addition to these learning outcomes above, there are several specific learning objectives for this course. These are to develop critical thinking skills, communication skills, empirical and quantitative skills, and teamwork skills.

Where can you go for help with BIOL 3330?

a) Professor: I have office hours available, or you can schedule an appointment or e-mail me if you need help.

c) Each other: there are a number of other students enrolled in BIOL 3330 and it is a great idea to use one another as resources. Help each other, support each other, and challenge each other!

Tips for success in BIOL 3330

a) Attend class: Class attendance is expected. Attending class, paying attention, and participating will aid your success in Functions and Modeling. The more active your role is in your learning, the greater your chances for your success. In addition, minimizing distractions during class (such as cell phones ringing, pagers beeping, etc.) encourages a more productive learning environment.

b) Review your notes after class: Go over your notes after each class, and pay special attention to ideas or concepts which may not have been clear to you during the class.

c) Get an overview of the material before coming to class: Once you attend the classes, and you review your notes after each class, you will have a good idea of the class material which will come in the following classes. Take a look at the class material to get an overview of the concepts and ideas which will be coming.

d) Form study groups: Forming study groups is a great way to learn the material and to help one another learn the material.

f) Ask questions: Don’t be afraid to ask questions about concepts or ideas that you might have difficulty with. You can ask in class, because there is always a good chance that someone else has the same question, or you get help with your questions out of class.

g) Keep up with the course material: It is very difficult to “catch up” with the material once you get behind, so try your best to keep up!
### Tentative Class and Exam Schedule:

<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Class</th>
<th>Lecture Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/15</td>
<td>1</td>
<td>--</td>
<td>Martin Luther King Jr. Holiday. No classes.</td>
</tr>
<tr>
<td>1/17</td>
<td>1</td>
<td>1</td>
<td>Introduction: What is a function?</td>
</tr>
<tr>
<td>1/22</td>
<td>2</td>
<td>2</td>
<td>Linear and quadratic functions: properties and transformations</td>
</tr>
<tr>
<td>1/24</td>
<td>2</td>
<td>3</td>
<td>Exponential and logarithmic functions: properties and transformations</td>
</tr>
<tr>
<td>1/29</td>
<td>3</td>
<td>4</td>
<td>Meniscus</td>
</tr>
<tr>
<td>1/31</td>
<td>3</td>
<td>5</td>
<td>Trajectory</td>
</tr>
<tr>
<td>2/5</td>
<td>4</td>
<td>6</td>
<td>Suspension bridges</td>
</tr>
<tr>
<td>2/7</td>
<td>4</td>
<td>7</td>
<td>Heart rates</td>
</tr>
<tr>
<td>2/12</td>
<td>5</td>
<td>8</td>
<td>Chemical reactions</td>
</tr>
<tr>
<td>2/14</td>
<td>5</td>
<td>9</td>
<td>Fireflies</td>
</tr>
<tr>
<td>2/19</td>
<td>6</td>
<td>10</td>
<td>Review</td>
</tr>
<tr>
<td>2/21</td>
<td>6</td>
<td>--</td>
<td><strong>Exam #1</strong></td>
</tr>
<tr>
<td>2/26</td>
<td>7</td>
<td>11</td>
<td><strong>Assignment of Class Project</strong></td>
</tr>
<tr>
<td>2/28</td>
<td>7</td>
<td>12</td>
<td>Population growth</td>
</tr>
<tr>
<td>3/5</td>
<td>8</td>
<td>13</td>
<td>Rate constants</td>
</tr>
<tr>
<td>3/7</td>
<td>8</td>
<td>14</td>
<td>Vapor pressure</td>
</tr>
<tr>
<td>3/12</td>
<td>9</td>
<td>--</td>
<td>Spring Break – no classes</td>
</tr>
<tr>
<td>3/14</td>
<td>9</td>
<td>--</td>
<td>Spring Break – no classes</td>
</tr>
<tr>
<td>3/19</td>
<td>10</td>
<td>15</td>
<td>Radioactive decay</td>
</tr>
<tr>
<td>3/21</td>
<td>10</td>
<td>16</td>
<td>Bouncing spheres</td>
</tr>
<tr>
<td>3/26</td>
<td>11</td>
<td>17</td>
<td>pH titrations</td>
</tr>
<tr>
<td>3/28</td>
<td>11</td>
<td>18</td>
<td>Body parts</td>
</tr>
<tr>
<td>4/2</td>
<td>12</td>
<td>19</td>
<td>Review</td>
</tr>
<tr>
<td>4/4</td>
<td>12</td>
<td>--</td>
<td><strong>Exam #2</strong></td>
</tr>
<tr>
<td>4/9</td>
<td>13</td>
<td>20</td>
<td>Simulated data: population growth</td>
</tr>
<tr>
<td>4/11</td>
<td>13</td>
<td>21</td>
<td>Simulated data: skateboard</td>
</tr>
<tr>
<td>4/16</td>
<td>14</td>
<td>22</td>
<td>Simulated data: trajectory</td>
</tr>
<tr>
<td>4/18</td>
<td>14</td>
<td>23</td>
<td>Simulated data: chemical reactions</td>
</tr>
</tbody>
</table>

*Spring Break – no classes*
Grading

Grades are based on the following scale:
100% - 90% = A; 89% - 80% = B; 79% - 70% = C; 69% - 60% = D; <60% = F

The distribution of the course grade is as follows:
Exam #1 20%
Exam #2 20%
Attendance and Participation 5%
Labs 25%
Project 10%
Final Exam 20%

Exams

There will be two exams during the semester, in addition to the final exam at the end of the semester. The semester exams will be held during the regular meeting time of the course, and in the regular meeting place of the course, as indicated at the start of this syllabus.

There will be no make-up exams. Any unexcused absence from an exam will result in a score of zero for the exam. The only excusable reasons for missing an exam are as follows: you have a major medical illness requiring immediate treatment, there is a death of an immediate family member, you must participate in a required university activity, or you are observing a religious holy day. Documentation is required for all four of these cases. In the cases of your illness or a family member’s death, documentation is required when you return to campus. In the case of a required university activity or a religious holy day, documentation is required at least one week prior to the activity.

Final Exam

The final exam will be held on Monday May 7th from 10:15am-12:00pm in the regular meeting place of the course, as indicated at the start of this syllabus. There will be no make-up final exam.

Attendance and Participation

Since a majority of this work hinges on group work done during the class time, attendance is of utmost importance. Therefore, you are expected to be in class each and every class period. You will be considered tardy if you arrive to class more than five
minutes late. Coming to class late, being tardy or leaving early will be treated as half an absence. Arriving more than 15 minutes late for class or leaving more than 15 minutes before the end of class will constitute an absence. An attendance sheet will be provided. It is your responsibility to sign in when it is passed around. Regarding consistent absences, I reserve the right to lower your grade by one letter or drop you from the course for excessive (more than 3) absences.

Labs

Labs will be done in class. You must attempt all assigned work and show your complete thought process to receive full credit. Activities will take place in class daily for most class days. For lab activities, students will form groups of two (or three with permission). Activity groups must turn in a group report for each activity. If you know you and your partner(s) are going to be absent the day an activity report is due, make arrangements with someone else to bring it in. You are responsible for all items in your care and must return them in a timely fashion. The reports will be collected the next class day at the beginning of the class. No late reports will be accepted, unless approved by the instructor in advance.

Project

You will explore the applications of mathematical functions and models to scientific phenomena. Details will be given later in the semester.

Important Dates to Remember

The UTRGV academic calendar can be found at https://my.utrgv.edu/home prior to login. Important dates for Spring 2018 include:

Jan. 15 (Mon.) Martin Luther King Jr. Holiday. No classes.
Jan. 16 (Tues.) Spring classes begin
Jan 19 (Fri.) Last day to add a class or register for Spring classes
Jan. 22 (Mon.) Last day to withdraw (drop all classes) and receive an 80% refund
Jan. 31 (Wed.) Census Day (last day to drop without it appearing on the transcript)
Mar. 12 – Mar. 17 (Mon. – Sat.) Spring Break. No classes
Mar. 30 – Mar. 31 (Fri. – Sat.) Easter Holiday. No classes.
April 12 (Thurs.) Last day to drop a class (grade of DR) or withdraw (grade of W)
May 3 (Thurs.) Study Day. No classes.
May 4 – 10 (Fri. – Thurs.) Final Exams

There are several other important dates on the webpage; you are encouraged to look.
Students with Disabilities

Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through SAS at any time, but are not retroactive. Students who suffer a broken bone, severe injury or undergo surgery during the semester are eligible for temporary services. **Brownsville Campus:** Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at ability@utrgv.edu. **Edinburg Campus:** Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at ability@utrgv.edu.

Mandatory Course Evaluation Period

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account ([http://my.utrgv.edu](http://my.utrgv.edu)); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available: April 11 – May 2.

Attendance

Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

Scholastic Integrity

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism (including self-plagiarism), and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.
Sexual Harassment, Discrimination, and Violence

In accordance with UT System regulations, your instructor is a “Responsible Employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect that is free from sexual misconduct and discrimination.

Course Drops

According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-repeat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-repeat rule refers to additional fees charged to students who take the same class for the third time.

Student Services

Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Students Services Center (U Central) for additional information. U Central is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email (ucentral@utrgv.edu) or telephone: (888) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor’s office hours. University Resources include the Learning Center, Writing Center, Advising Center and Career Center. The centers provide services such as tutoring, writing help, critical thinking, study skills, degree planning, and student employment. Locations are:

- Learning center: BSTUN 2.10 (Brownsville) or ELCTR 100 (Edinburg)
- Writing center: BLIBR 3.206 (Brownsville) or ESTAC 3.119 (Edinburg)
- Advising center: BMAIN 1.400 (Brownsville) or ESWKH 101 (Edinburg)
- Career center: BCRTZ 129 (Brownsville) or ESSBL 2.101 (Edinburg)