Math 152 – Mathematics for the Life Sciences II

Time: 12:40 pm – 1:55 pm TR Section: 005 Location: WLS M401 Labs: Ayres 15
Course website: http://www.math.utk.edu/~dilling/math152/

Instructor: Rick Dilling Email: dilling@math.utk.edu
Office: Ayres 107C Mailbox: Ayres 119 (next to Department of Mathematics – Main Office)
Hours: Tuesday/Thursday, 12:00 pm – 12:30 pm, and Monday/Wednesday/Friday, 10:30 am – 11:00 am

Course Overview: This course is a continuation of Math 151 and will provide an introduction to a variety of mathematical topics of use in analyzing problems arising in the biological sciences. It is designed for students in biology, agriculture, forestry, wildlife, pre-medicine and other pre-health professions. The Math 151-2 sequence will partially satisfy graduation requirements for your major (depending upon your curriculum). The general aim of the sequence is to show how mathematical and analytical tools may be used to explore and explain a wide variety of biological phenomena that are not easily understood with verbal reasoning alone. Note that this semester provides a very rapid overview of calculus, covering a large portion of the material covered in Math 141-2, but in one semester and with biological rather than physical examples. Students who do well in Math 152 could potentially go on to take 200-level math courses (particularly Math 231), but it is better to take the complete Math 141-2 sequence if you intend to go on to 200-level math courses.
Prerequisites: Two years of high school algebra; one year of geometry; half a year of trigonometry; and successful completion of Math 151.

This course includes a laboratory component, which makes use of computer facilities in the Math Department. No prior background in the use of the main software package for the course (Maple) is expected, though from exposure to Matlab in Math 151, students are expected to be able to rapidly utilize this other program. The textbook will be followed much more closely than in Math 151, but there will be additional topics discussed, particularly in conjunction with computer assignments, and biological examples. Students should plan to attend all class sessions.

Text: *Mathematics for the Biosciences* by Michael Cullen.

Calculator: A graphing calculator is recommended but not required for this course although some type of scientific calculator should be brought to every class (along with the book). The Math Department recommends and provides support for the TI-83+ and TI-84+ models. Use of cell phone calculators and advanced calculators, such as the TI-89 and TI-92 are not allowed in this course. If you aren't sure if your calculator is allowed or not, ask the instructor in advance.

Course Goals:

- Develop an appreciation for the application of the ideas of calculus to biological problems.
- Develop your ability to quantitatively analyze problems arising in the biological areas of interest to you.
- Illustrate the great utility of mathematical models to provide answers to key biological problems.
- Develop your appreciation of the diversity of mathematical approaches potentially useful in the life sciences.
- Provide experience using a computer algebra system (CAS) to rapidly analyze problems that may be difficult to analyze without this.

Course Grading: There are 1000 points possible in the course broken down as follows:

Points:

Quizzes (best 8):	200
Projects:	200
Exams (best 2):	300
Final Exam:	300
Total:	1000

Grading Scale:

A	900 – 1000
B+	850 – 899
B	800 – 849
C+	750 – 799
C	700 – 749
D	600 – 699
F	below 600

Quizzes: These will be given in class every week (usually) when an exam is not scheduled (for a maximum of 12). They will be over the topics covered in class since the last quiz/exam and will generally be very similar to or taken directly from problems from the homework. Only your best 8 quiz scores will be included in the calculation of your overall grade. (Your lowest scores will be dropped.) There are no makeup quizzes. **Each quiz is worth 25 points.**

Projects: There will be 4 projects assigned during the semester. You are encouraged to use Maple to help you with the projects (and in some cases you will be required to). Project results and analysis must be typed up using a word processing program (such as MS Word). You may work on the projects within small groups (2 – 3 persons) as long as you clearly note who participated and each person types up and hands in her/his own results. I will offer several help sessions during the semester in the Ayres computer lab to go over how to use Maple for the projects. It is greatly to your advantage to attend these help sessions, which will be announced in advance. **Each project is worth 50 points.**

Exams: There will be three in-class exams during the semester. Only your best 2 exam scores will be included in the calculation of your overall grade. (Your lowest score will be dropped.) There are no makeup exams. **Each exam is worth 150 points.**

Final Exam: The final is comprehensive and will include all topics covered in class during the semester. **The final exam is worth 300 points.**

Homework: Homework problems will be assigned on a regular basis to allow you to practice the topics that we cover in class. They will not be collected or graded, but it is greatly to your advantage to work on the homework problems since problems on the quizzes and exams will generally be very similar to or taken directly from problems from the homework. As time permits, we will go over some of the homework problems in class. (Also, I am planning to have an optional, one hour, weekly meeting to go over homework problems.)

Important Dates:

Friday, 9/1/06	Last day to drop without a W
Tuesday, 10/3/06	Last day to drop with a W
Tuesday, 11/14/06	Last day to drop with a WP/WF

Math Tutorial Center: The Math Tutorial Center (MTC) is in Ayres 322. It provides **free tutoring**. Please make use of this free service. Hours for the MTC are listed at http://www.math.utk.edu/MTC/.

Disability Services: If you need course accommodations because of a documented disability or if you have emergency information to share, please contact the Office of Disability Services in 2227 Dunford Hall or at 865-974-6087.

Classroom Etiquette: Be on time. Turn off cell-phones and beepers during class. Do not read the newspaper or do other work during our class. Do not talk to classmates at inappropriate times.

Academic Standards of Conduct: All students are expected to abide by the University Honor Statement. In mathematics classes, violations of the honor statement include copying another person's work on any graded assignment or test, collaboration on a graded assignment without instructor's approval, using unauthorized "cheat sheets" or technical devices such as calculators, cell phones or computers for graded tests or quizzes, or other infractions listed in "Hilltopics". These violations are serious offenses, subject to disciplinary action that may include failure in a course and/or dismissal from the University. See "Hilltopics" for more complete information.

NOTE: The instructor reserves the right to make changes to this syllabus as necessary. If changes are made, they will be made available in writing and/or on the course website. If you have questions, please consult the copy of the syllabus on the course website first.

Math 152.005 – Mathematics for the Life Sciences II

Revised Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8/21/06	**8/22/06**	**8/23/06**	**8/24/06**	**8/25/06**
			section 6 limits of functions	
8/28/06	**8/29/06**	**8/30/06**	**8/31/06**	**9/1/06**
	section 7 continuous functions and limits		**section 8** the derivative concept	**(last day to drop w/o a W)**
9/4/06	**9/5/06**	**9/6/06**	**9/7/06**	**9/8/06**
LABOR DAY	**section 9** formulas for obtaining derivatives		**section 10** composite functions and the chain rule	
9/11/06	**9/12/06**	**9/13/06**	**9/14/06**	**9/15/06**
	section 11 the derivative as a rate of change		**exam 1 review** **exam 1**	
9/18/06	**9/19/06**	**9/20/06**	**9/21/06**	**9/22/06**
	section 12 the first derivative test and curve sketching		**section 13** the second derivative and concavity	
9/25/06	**9/26/06**	**9/27/06**	**9/28/06**	**9/29/06**
	section 14 applied problems in optimization		**section 16** derivatives of exponential and logarithmic functions	
10/2/06	**10/3/06**	**10/4/06**	**10/5/06**	**10/6/06**
	section 17 applications of exponential functions **(last day to drop w/ a W)**		**section 19** summation and the integral	

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10/9/06	**10/10/06**	**10/11/06**	**10/12/06**	**10/13/06**
	section 18 finding antiderivatives		**FALL BREAK**	**FALL BREAK**
10/16/06	**10/17/06**	**10/18/06**	**10/19/06**	**10/20/06**
	section 20 computing integrals: the fundamental theorem of calculus		**exam 2 review** **exam 2**	
10/23/06	**10/24/06**	**10/25/06**	**10/26/06**	**10/27/06**
	section 22 basic integration methods		**section 22** basic integration methods **section 24** additional integration techniques	
10/30/06	**10/31/06**	**11/1/06**	**11/2/06**	**11/3/06**
	section 24 additional integration techniques **section 21** average values, areas, and volumes		**section 32** implicit differentiation and related rates **section 33** separation of variables	
11/6/06	**11/7/06**	**11/8/06**	**11/9/06**	**11/10/06**
	section 33 separation of variables		**section 34** the von Bertalanffy growth model	
11/13/06	**11/14/06**	**11/15/06**	**11/16/06**	**11/17/06**
	section 35 models for limited population growth **(last day to drop)**		**exam 3 review** **exam 3**	
11/20/06	**11/21/06**	**11/22/06**	**11/23/06**	**11/24/06**
	section 29 trigonometric functions **section 30** calculus of the trigonometric functions		**THANKSGIVING DAY**	**THANKSGIVING BREAK**
11/27/06	**11/28/06**	**11/29/06**	**11/30/06**	**12/1/06**
	section 30 calculus of the trigonometric functions **section 31** triangle trigonometry w/ calculus applications		**section 31** triangle trigonometry w/ calculus applications	
12/4/06	**12/5/06**	**12/6/06**	**12/7/06**	**12/8/06**
	final exam review			
12/11/06	**12/12/06**	**12/13/06**	**12/14/06**	**12/15/06**
final exam **12:30 PM – 2:30 PM**				