SYLLABUS

Q SCI 291 Analysis for Biologists I

Winter 2014

Lectures: *Johnson Hall 175, 9:30-10:50am, MW*
Problem Sessions/Quizzes: *Johnson Hall 175, 9:30-10:50am, F*
Course Web Site: http://faculty.washington.edu/toths/QSci291.shtml
5 Credits

Instructor: Sándor F. Tóth
Office Address: Bloedel Hall 358; Telephone: 206-616-2738
Email: toths@uw.edu; Instructor Profile: http://faculty.washington.edu/toths/
Instructor's office hours: 2:00-4:00pm, M, Bloedel Hall 358, or by appointment.

TA: Austin Phillips
Office Address: Mary Gates Hall 084; Email: ajphil90@u.washington.edu;
TA office hours: 11:00am-12:00pm M, 2:00-3:00pm TUE, 1:30-2:30pm W

Course Summary: This is a 5-credit problem-oriented course that introduces the concepts of differential calculus, "the study of change", emphasizing the development of basic skills. The examples and exercises promote understanding of mathematics and applications to modeling and solving biological problems. Topics include optimization and curve analysis.

Prerequisites: Either MATH 120, Q SCI 190, a minimum score of 2 on advanced placement test, or a score of 153-163 on MPT-AS placement test. Not available for credit to students who have completed MATH 124 with a 2.0 or higher.

Course objectives:

By the end of this course, students should be able to understand:

(1) The concepts of elementary differential calculus techniques as applied to practical problems in biology, natural resources, environmental science and ecology;
(2) How to use differential calculus techniques to gain insight into the functioning of biological, natural resources and environmental systems;
(3) How to demonstrate the proper uses of mathematical thinking and the role mathematics plays in the scientific and the common press.
(4) How mathematics can be properly used in their disciplinary studies in biology, natural resource sciences, environmental sciences, and other physical and social sciences.

Student/Instructor Responsibilities:
Learning should be a cooperative venture between the students and the instructor and among the students of a class. The following lists are incomplete, but should help clarify our roles and responsibilities to each other. Feel free to give me your own additions or comments.

Both the Students and the Instructor:
1. Be prepared and on time for class.
2. Treat everyone in the class with respect.

Instructor:
1. Set clear expectations and provide motivation for students.
2. Select and prepare course materials, and make them readily available to students in a timely fashion.
3. Explain difficult concepts.
4. Provide fair and prompt feedback and grading.
5. Give students opportunities to provide feedback on the course and listen to their comments and suggestions.

Students:
1. Attend and participate in class and in the problem sessions.
2. Think for yourself and ask questions.
3. Give thoughtful feedback to the instructor on how to improve the course

Textbook:

- Claudia Nemhauser: Calculus for Biology and Medicine. Third Edition. Prentice Hall. ISBN 10: 0-321-64468-9; ISBN 13: 978-0-321-64468-8

Grading:

Assignment	Weights	Notes
Quizzes (weekly on Fridays, 30 minutes each, closed book)	1/3	Individual work
Midterm Exam (February 14, 9:30-10:50am, closed book)	1/3	Individual work
Final Exam (March 19, 8:30-10:20am, closed book)	1/3	Individual work

Course Policies:

- Grading: See Table 1. The scale is based on the University of Washington's grading system: http://www.washington.edu/students/gencat/front/Grading_Sys.html
- Missed Exams: The UW policies will be followed.

- Academic Integrity Statement: Please follow the UW' policies on cheating and plagiarism: http://www.washington.edu/students/handbook/conduct.html. For more information on the University's academic integrity policy, definitions and examples of academic misconduct, please refer to: http://depts.washington.edu/grading/issue1/honesty.htm
- Students with Disabilities: If you have a disability that requires special attention, please see me at my office and contact the University's Disability Resources for Students Office (448 Schmitz, (206) 543-8924, (TTY) 543-8925, uwdss@u.washington.edu.). The Disability Resources for Students has a web site at http://www.washington.edu/students/drs/.

Table 1.

UNDERGRADUATE		
A	4.00	98-100%
A	3.90	96-98%
A-	3.80	94-96%
A-	3.70	92-94%
A-	3.60	90-92%
A-	3.50	89-90%
B+	3.40	88-89%
B+	3.30	87-88%
B+	3.20	86-87%
B	3.10	85-86%
B	3.00	84-85%
B	2.90	83-84%
B-	2.80	82-83%
B-	2.70	81-82%
B-	2.60	80-81%
B-	2.50	79-80%
C+	2.40	78-79%
C+	2.30	77-78%
C+	2.20	76-77%
C	2.10	75-76%
C	2.00	74-75%
C	1.90	73-74%
C-	1.80	72-73%
C-	1.70	71-72%
C-	1.60	70-71%
C-	1.50	69-70%
D+	1.40	68-69%
D+	1.30	67-68%
D+	1.20	66-67%
D	1.10	65-66%
D	1.00	64-65%
D	0.90	63-64%
D-	0.80	62-63%
D-	0.70	60-62%
E	0.00	55-60%
E	0.00	50-55%
E	0.00	40-50%
E	0.00	30-40%
E	0.00	20-30%
E	0.00	10-20%
E	0.00	0-10%

TENTATIVE COURSE OUTLINE (Table 2):

Week 1 ***(1/6-1/10)***	**Chapter 1**: Pre-calculus. Review of sets, numbers, lines, circles and graphing. The concept of a function
	Absolute value, trigonometric, exponential, logarithmic and polynomial functions
	Problem Session with Austin Phillips / Quiz
Week 2 ***(1/13-1/17)***	**Chapter 2:** Exponential growth, discrete time models
	Difference equations, recursion, sequences and limits
	Problem Session with Austin Phillips / Quiz
Week 3 ***(1/22-1/24)***	**Chapter 3:** Limits on the continuum, the concept of continuity
	Chapter 4: Definition of the derivative, geometric interpretation. The derivative of the constant and linear functions
	Problem Session with Austin Phillips / Quiz
Week 4 ***(1/27-1/31)***	Chapter 4 cont.: The power, product and quotient rules
	The chain rule and higher derivatives
	Problem Session with Austin Phillips / Quiz
Week 5 ***(2/3-2/7)***	Chapter 4 cont.: Derivatives of trigonometric and exponential functions
	Derivatives of inverse and logarithmic function
	Problem Session with Austin Phillips / Quiz
Week 6 ***(2/10-2/14)***	Practice session for Chapters 1-4
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	Midterm (JSN 175: February 14, 9:30-10:50am)
Week 7 ***(2/19-2/21)***	**Chapter 5**: Applications of Differentiation: the Extreme-Value, the Mean-Value and Fermat's Theorem
	Monotonicity and Concavity
	Problem Session with Austin Phillips / Quiz
Week 8 ***(2/24-2/28)***	Chapter 5 cont.: Inflection points and more graphing. The Second Derivative Test.
	Finding global extrema: Optimization
	Problem Session with Austin Phillips / Quiz
Week 9 ***(3/3-3/7)***	Chapter 5 cont.: L'Hospital's Rule. More on difference equations: Stability
	Antiderivatives
	Problem Session with Austin Phillips / Quiz
Week 10 ***(3/10-3/14)***	Advanced topics: partial derivatives, Taylor's Series
	Practice session for Chapters 1-5
	Problem Session with Austin Phillips / Quiz

Note: January 20 and February 17 are university holidays.