SYLLABUS FOR CARNEGIE MELLON UNIVERSITY MATH $21-123$: CALCULUS OF APPROXIMATION

Instructor: Scott Robertson

Office : Wean Hall 6218
Phone : 412-268-8486
Email : scottrob@andrew.cmu.edu

Teaching Assistant (TA): Lisa Espig

Office : Wean Hall 7207
Email : lespig@andrew.cmu.edu

Course Website: On Blackboard("www.cmu.edu/blackboard')

Lectures: Class meets Mon, Wed, Fri from 11:30 AM - 12:20 PM in PH A18C.

Recitation Sessions: Recitation sessions are run by the TA and vary by class section:

A1 : Tue, Thu 8:30 AM in DH 1211 B1 : Tue, Thu 9:30 AM in PH 226C

Textbook: Two textbooks may be used for this course. They are

Single Variable Essential Calculus, Early Transcendentals
James Stewart
Thomson Publishing
ISBN-10: 0495109576

Essential Calculus, Early Transcendentals
James Stewart
Thomson Publishing
ISBN-10: 0495014281

There is a textbook supplement at "www.stewartcalculus.com/media/6_inside_topics.php".

Office Hours: Mon 10:00 AM - 11:00 AM, Thu 12:00 PM - 1:00 PM and by appointment. Additionally the TA will hold office hours on Tue and Thu, 10:30 AM - 12:00 PM.

Additional Help: The University operates a walk-in Peer Tutoring Center in the Mudge Library and the Donner Reading Room on Sun-Thu evenings from 8:30 to 11:00 PM. Individualized tutoring and other help options are also available through Academic Development at "www.cmu.edu/academic-development/".

Exams: There will be two exams. The dates of the exams are:

Exam 1 : Fri, September 18 Exam 2 : Fri, October 16

Homework: Homework is due at the beginning of recitation each Tuesday, starting the second week of class. Late homework which is turned in before solutions are posted on the course website will receive half credit. Homework turned in after solutions are posted will receive no credit. Late (or early) homework may be turned in to your TA's mailbox in Wean 6113 but you should alert the

TA ahead of time with a brief explanation.

Grading: The course grade is determined as follows:

Exam 1 : 40% Exam 2 : 40% Homework : 20%

Calculators: It is encouraged to not rely too heavily upon calculators for completing the homework assignments. Calculators should be used to check, rather than determine, answers. Calculators will not be allowed during exams unless explicitly stated otherwise.

Course Objectives: In this course, students will learn how to approximate complicated functions with large polynomials. To this end, sequences and series will be introduced as well as the critical concepts of limits and convergence. Error bounds will be obtained for the polynomial approximations. Using the large polynomial approximations, methods for solving ordinary differential equations will be given.

Course Schedule (Tentative)

Week One - August 24 to 28

Welcome and Introduction
Section 8.1 - Sequences
Section 8.2 - Series

Week Two - August 31 to September 4

Section 8.3 : The Integral Test
Section 8.3 : The Comparison Tests
Section 8.4 : Alternating Series

Week Three - September 7 to 11

Labor Day (no class)
Section 8.4 : Absolute Convergence and the Ratio and Root Tests
Strategy for Testing Series

Week Four - September 14 to 18

Section 8.5 : Power Series
Review for Exam
First Exam

Week Five - September 21 to 25

Section 8.6 Representations of Functions as Power Series
Section 8.7 Taylor and Maclaurin Series
Section 8.7 Taylor and Maclaurin Series (continued)

Week Six - September 28 to October 2

Section 8.8 Applications of Taylor Polynomials
Fourier Series
Second-Order Linear Differential Equations

Week Seven - October 5 to 9

Nonhomogeneous Linear Equations
Using Series to Solve Differential Equations
Using Series to Solve Differential Equations (continued)

Week Eight - October 12 to 16

Review for Exam
Reading Day (no class)
Second Exam