# COURSE SYLLABUS

## Math 3334

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**YEAR COURSE OFFERED:** 2018

**SEMESTER COURSE OFFERED:** Fall

**DEPARTMENT:** Mathematics

**COURSE NUMBER:** 3334, section 1, UH class #23033

**NAME OF COURSE:** Advanced Multivariable Calculus

**PREREQUISITES:** Math 3333 or Instructor's consent

**CLASS MEETING TIMES:** MWF 10 non - 11 AM, AH 301

**NAME OF INSTRUCTOR: David H. Wagner, 615 PGH**

**Contact:** Email wagner@math.uh.edu, phone 713-743-3460

**Office hours: MW 1-2:30 pm in 615 PGH**, available by appointment almost any time except **MWF 10 - 11 am, Noon-1 pm, F 2-3 PM**.

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**The information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course**.

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## Learning Objectives

Students will learn:

1. The basic topology and geometry of $\mathbf{R}^n$: open sets, closed sets, and compact sets.
2. Distance, norms, and dot products in $\mathbf{R}^n$.
3. Convergence of sequences in $\mathbf{R}^n$.
4. Various characterizations of continuous functions and their relationship with convergent sequences.
5. Uniform continuity and its connection with compact sets.
6. Useful properties of continuous functions.
7. Derivatives of functions of one variable.
8. Derivatives of functions of several variables.
9. How to rigorously estimate the difference between a function and its Taylor polynomials on a bounded set.
10. About the equality of mixed partial derivatives for sufficiently smooth functions.

11. The chain rule for the derivative of $f(\mathbf{g}(t))$, where f is a vector valued function of several variables and g is a vector-valued function.
12. How to find points where a function of several variables is "stationary" or has a local extreme value.
13. How to apply the second partials test to classify a stationary point.
14. About the integral of a function of n variables.
15. Change of variables for an integral of a function of n variables.
16. The Implicit function theorem: When an equation F(u,v) = 0 determines v as an implicitly defined function of u.
17. Curves and their arc length; surfaces and their surface area; integrals over curves and surfaces.
18. As time permits, differential forms and their connection to vector analysis; the theorems of Green, Gauss and Stokes.

## Required Reading

Textbook: *"Advanced Calculus, Third Edition"* by R. Creighton Buck, Waveland Press, ISBN-10: 1-57766-302-0, ISBN-13: 978-1-57766-302-7

## Recommended Reading

*"Calculus on Manifolds"* by Michael Spivak

## List of discussion/lecture topics

The schedule and topics below are subject to change in the event of extenuating circumstances, including, but not limited to, instructor illness or class cancellations due to inclement weather.

I hope to cover chapters 1-4, and 7-9 of the text.

## Attendance Policy

Students are expected to attend class. However, I will not check attendance. While I will try to help students who miss class due to illness or other valid excuse, students are still responsible for learning the course material.

## Communication

Be aware that University policy states that email sent to students' UH destination email address is the official form of communication. The University presumes that email, which has been properly addressed and sent to the destination address, has been received by the student. Other forms of communication are not backed by the force of policy.

I will not be using Blackboard this semester and I do not receive email through Blackboard.

## Incomplete Grade Policy

From the UH Student Handbook:

The temporary grade of I (incomplete) is a conditional and temporary grade assigned when students for non-academic reasons beyond their control have not completed a relatively small part of all requirements for a course.

The student must:

- be currently passing the course or have a reasonable chance of passing the course, in the judgment of the instructor;
- contact the instructor immediately regarding the reasons that prevent the student from completing the course, final assignment and/or final examination;
- initiate the request for an I grade within 90 days of the posting of the course grade;
- make arrangements with the instructor to complete the course requirements, if assigned;
- understand that the only way to have an I grade changed to a passing grade is to fulfill course requirements in accordance with the conditions specified by the instructor;
- understand that the grade of I may be changed only to another letter grade. If the student does not complete the course requirements in the time allotted (a maximum of one year) the I grade will convert to an F grade and will be noted as a lapsed incomplete on the student's transcript. An I grade once lapsed to an F grade may not be changed to a grade of W; and
- not re-enroll for the courses in which their grade is currently recorded as an I. Even when the conditions for fulfilling the course requirements include participation in all or part of the same course in another term, the student must not re enroll for the course.

All grades of **I** shall be computed as grades of **F** in calculating a student's cumulative grade point average for purposes of determining fulfillment of grade requirements for a degree.

After the student has completed the remaining coursework, the instructor will submit a grade change via the myUH Faculty Center to change the I grade to the grade earned.

## Major Assignments/Exams

There will be two in-class hour exams and a final exam. There will also be weekly graded homework assignments. Each hour exam will count for 20% of a student's grade, and the final exam will count for 40%. The homework will make up the remaining 20%.

The first in-class hour exam will be given on or near September 26 (subject to change) and will cover the material listed under **lecture topics** from Chapters 1-2 of the text. The date for this exam will be confirmed one week before the exam.

The second in-class hour exam will be given on or near October 29 (subject to change) and will cover the material listed under **lecture topics** from Chapters 3-4 of the text. The date for this exam will be confirmed one week before the exam.

The date and time for the Final Exam are given in the University's online Final Exam Schedule:

# COURSE SYLLABUS

## Math 3334

Wednesday, Dec. 12, 11 am – 2 pm, in our usual classroom, SEC 104. The Final Exam will cover the entire course.

Exam review sheets will be made available one week before each exam. Students should not rely on review sheets for complete exam preparation.

Requests for review of exam or homework grading should be submitted to Professor Wagner within one week of the date that such papers are returned to the class. Students should not write on returned exams or homework papers in case a grading review will be requested.

Please note that this course has the following missed-exam policy: No make-up exams will be offered. Instead, you have the option to drop your lowest exam grade.. This policy applies whether you miss an exam for a legitimate reason or just decide to go to the beach, and it ensures that you will not be penalized for missing an exam for any reason. It also means, however, that you cannot make up a missed exam for any reason.

Students who miss the final exam with a strong excuse will be permitted to take a make-up exam.

## UH CAPS

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach (CAPS) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus.