



Course Syllabus

Department of Mathematics and Computer Science, Lincoln University (SPRING 2010)

COURSE ID: MAT-221
COURSE NAME: Calculus III
CREDITS: 4

TEXT BOOK: Thomas, G., Calculus: Early Transcendentals, 11th Edition. Boston: Pearson, 2006.

Instructor: Dr. Moses W. Haimbodi

Office: 242 New Science Building

Office Hours: M-F: 1-2 pm, T: 2-3 pm, R: 2-3 pm. Students are *also* encouraged to call (ext. 7455) or email (mhaimbodi@lincoln.edu) to make an appointment. (NB! Office hours are at the mercy of the demands of departmental duties).

COURSE DESCRIPTION:

This course is a continuation of MAT 122 including three dimensional Analytic Geometry, Partial derivatives, Multiple integrals, Vector Calculus, and their applications.

PREREQUISITE: [MAT-122 \(Calculus II\)](#) or Placement.

COURSE REQUIREMENTS: Take all the in-class exams, quizzes, midterm and the final exam. Complete all homework assignments and submit in timely schedule as requested. Students are required to put in extensive study time, an estimate of more than 10 hours each week outside of class. **There will be NO make-up exams and any additional un-scheduled "extra-credit."**

COURSE GOALS- STUDENT LEARNER OUTCOMES:

Upon completion of this course, students should be able to:

- Find the radius of convergence of power series; derive other power series using known Taylor & Maclaurin series; and by term by term integration and differentiation of known power series.
- Transfer between Cartesian & polar co-ordinates; graph polar equations; and evaluate area and arc-length in polar co-ordinates.
- Understand the concepts of three dimensional co-ordinates and vectors; and define, calculate and apply dot and cross products.
- Evaluate limits, integrals, and derivatives of vector functions; understand the properties of dot and cross products and their derivatives, and calculate arc-length, unit tangent and normal vectors, and curvature.
- Understand the concepts of limits and continuity of multi-variable functions; calculate partial derivatives using the chain rule; define directional derivatives and gradient; derive tangent planes and differentials; and find extreme values by a variety of methods, including Langrange multipliers.
- Calculate and evaluate multiple integrals in rectangular and polar co-ordinates by multiple methods; and apply them to area and volume problems.

TENATIVE SCHEDULE:

Chapter 11 - Infinite Series (Week 1-2)

11.5 – The Ratio and Root Tests

11.6 – Alternating Series, Absolute and Conditional Convergence

11.7 - Power Series

11.8 - Taylor & Maclaurin Series

11.9 - Convergence of Taylor Series

11.10 - Applications of Power Series

Test 1

Chapter 10 – Conic Sections (Optional), Polar Coordinates (Week 3)

10.1 - Quadratic Equations

10.2 – Eccentricity

10.5 - Polar Coordinates

10.6 – Graphing

10.8 - Areas & Lengths

Test 2

Chapter 12 - Vectors & the Geometry of Space (Week 4-6)

12.1 - Three Dimensional Co-ordinate Systems

12.2 – Vectors

12.3 - Dot Products

12.4 - Cross Products

12.5 - Lines and Planes in Space

Test 3

Chapter 13 - Vector Valued Functions & Motion in Space (Week 7-8)

13.1 - Vector Functions

13.2 - Modeling Projectile Motion

13.3 - Arc Length and Unit Tangent Vector T

13.4 - Curvature and the Unit Normal Vector B

Test 4

Chapter 14 - Partial Derivatives (Week 9-10)

14.1 - Functions of Several Variables

14.2 - Limits and Continuity

14.3 - Partial Derivatives

14.4 - Chain Rule

Test 5

Chapter 14 - Partial Derivatives (cont.) (Week 11-13)

14.5 - Directional Derivatives & Gradient Vectors

14.6 - Tangent Planes & Differentials

14.7 - Extreme Values & Saddle Points

14.8 - Lagrange Multipliers

14.9 - Partial Derivatives with Constrained Variables

Test 6

Chapter 15 - Multiple Integrals (Week 14-15)

15.1 - Double Integrals

15.2 - Areas

15.3 - Double Integrals in Polar Form

15.4 - Triple Integrals in Rectangular Coordinates

15.7 - Substitutions in Multiple Integrals

Test 7

Day	Date	Topic	Due Date	Day	Date	Topic	Due Date	Day	Date	Topics	Due Date
M				M	8-Feb	Chap10		M	15-Mar	Chap14	Quiz4
T				T	9-Feb	Chap10		T	16-Mar	Chap14	
W	6-Jan	Intro		W	10-Feb	Chap10		W	17-Mar	Chap14	
R	7-Jan	Chap11		R	11-Feb	Chap10		R	18-Mar	Chap14	
F	8-Jan	Chap11		F	12-Feb	Chap10		F	19-Mar		Test#5
M	11-Jan	Chap11	Quiz1	M	15-Feb	Chap12	Quiz3	M	22-Mar	Chap14	
T	12-Jan	Chap11		T	16-Feb	Chap12		T	23-Mar	Chap14	
W	13-Jan	Chap11		W	17-Feb	Chap12		W	24-Mar	Chap14	
R	14-Jan	Chap11		R	18-Feb	Chap12		R	25-Mar	Chap14	
F	15-Jan	Chap11		F	19-Feb	Chap12		F	26-Mar	Chap14	
M	18-Jan		MLK Day	M	22-Feb	Chap12		M	29-Mar	Chap15	
T	19-Jan	Chap11		T	23-Feb	Chap12		T	30-Mar	Chap15	
W	20-Jan	Chap11		W	24-Feb	Chap12		W	31-Mar	Chap15	
R	21-Jan	Chap11		R	25-Feb	Chap12		R	1-Apr		Test#6
F	22-Jan		Test#1	F	26-Feb	Chap12	Test#3	F	2-Apr		Easter
M	25-Jan	Chap10		M	1-Mar	Chap13	Quiz4	M	5-Apr	Chap15	Quiz5
T	26-Jan	Chap10		T	2-Mar	Chap13		T	6-Apr	Chap15	
W	27-Jan	Chap10		W	3-Mar	Chap13		W	7-Apr	Chap15	
R	28-Jan	Chap10		R	4-Mar	Chap13		R	8-Apr	Chap15	
F	29-Jan	Chap10		F	5-Mar		MidTerms	F	9-Apr		Test#7
M	1-Feb	Chap10	Quiz2	M	8-Mar	Chap13		M	12-Apr		
T	2-Feb	Chap10		T	9-Mar		Convocation	T	13-Apr	Review	
W	3-Feb	Chap10		W	10-Mar	Chap13		W	14-Apr	Review	
R	4-Feb	Chap10		R	11-Mar	Chap13		R	15-Apr	Review	
F	5-Feb		Test#2	F	12-Mar	Chap13	Test#4	F	16-Apr	Review	

COURSE ASSESSMENT- LEARNING OPPORTUNITIES:

- Homework

Problems for homework will be given on material covered in class on a cumulative basis to be collected as announced in class. Homework will be graded on a random basis. On all assignments, all work must be shown for credit.

Students are encouraged to work cooperatively. The objective of group work is to develop individual skills while learning to work effectively as a team, to think and talk about problem solving and the underlying mathematical concepts, and to develop the ability to ask and answer questions as they arise. However, each student is responsible for all the assigned material, in other words, students can work together, but should not simply copy work from each other. Students are also encouraged to make regular visits during office hours, to meet in study groups, and to use the Math Tutors from the School of Natural Sciences.

- Quizzes, Tests and Final Exam

Short (15 – 20 minute) quizzes will be given at the beginning of the assigned date. Tests are for the duration of the class – 50 minutes as scheduled. A midterm and a cumulative two hour Final Exam will be given as scheduled by the Registrar. All work must be shown for full credit.

- Late Work And Make-Ups

All graded assignments, quizzes and exams must be completed when scheduled. Late assignments or make-up tests or quizzes will only be allowed with **official documentation** and grades may be lowered.

GRADING:

5% Attendance; 5% Quizzes, 40 % Tests; 10 % Homework; 15 % Midterm; 25 % Final
 Final Grade Calculation = $0.05*A + 0.05*Q + 0.40*T + 0.1*HW + 0.15*MT + 0.25*F$
 Key: A = Attendance, Q = Quizzes, T = Test, HW = Homework, MD = MidTerm, F = Finals

A	92-100 %
A-	89-91 %
B+	86-88 %
B	82-85 %
B-	79-81 %
C+	76-78 %
C	72-75 %
C-	69-71 %
D+	62-68 %
D	55-61 %
F	0-54 %

Class Attendance, Academic Integrity & Class Etiquette

Students are strongly advised to read the University Bulletin pp. 59-70. The instructor intends to enforce the regulations and penalties about class attendance, in-class behavior and academic integrity as outlined in the University Bulletin.

UNIVERSITY POLICY:

1) Attendance:

Lincoln University uses the class method of teaching, which assumes that each student has something to contribute and something to gain by attending class. It further assumes that there is much more instruction absorbed in the classroom than can be tested on examinations. Therefore, students are expected to attend all regularly scheduled class meetings and should exhibit good faith in this regard. For the control of absences, the faculty adopted the following regulations:

- Four absences may result in an automatic failure in the course.
- Three tardy arrivals may be counted as one absence.
- Absences will be counted starting with whatever day is specified by the instructor but not later than the deadline for adding or dropping courses.
- In case of illness, death in the family, or other extenuating circumstances, the student must present documented evidence of inability to attend classes to the Vice President for

Student Affairs and Enrollment Management. However, in such cases the student is responsible for all work missed during those absences.

- Students representing the University in athletic events or other University sanctioned activities will be excused from class (es) with the responsibility of making up all work and examinations. The Registrar will issue the excused format to the faculty member in charge of the off- or on-campus activity for delivery by the student(s) to their instructors.

2) Statement on Academic Integrity:

Students are responsible for proper conduct and integrity in all of their scholastic work. They must follow a professor's instructions when completing tests, homework, and laboratory reports, and must ask for clarification if the instructions are not clear. In general, students should not give or receive aid when taking exams, or exceed the time limitations specified by the professor. In seeking the truth, in learning to think critically, and in preparing for a life of constructive service, honesty is imperative. Honesty in the classroom and in the preparation of papers is therefore expected of all students. Each student has the responsibility to submit work that is uniquely his or her own. All of this work must be done in accordance with established principles of academic integrity. An act of academic dishonesty or plagiarism may result in failure for a project or in a course. Plagiarism involves representing another person's ideas or scholarship, including material from the Internet, as your own. Cheating or acts of academic dishonesty include (but are not limited to) fabricating data, tampering with grades, copying, and offering or receiving unauthorized assistance or information.

3) The Student Conduct Code:

Students will be held to the rules and regulations of the Student Conduct Code as described in the Lincoln University Student Handbook. In particular, excessive talking, leaving and reentering class, phones or pagers, or other means of disrupting the class will not be tolerated and students may be asked to leave. Students who constantly disrupt class may be asked to leave permanently and will receive an F.

4) The Core Curriculum Learner Competencies:

All courses offered through the Department of Mathematics and Computer Science require students to meet at least the following out of the 8 Core Curriculum Learner Competencies:

- (1) Listen and effectively communicate ideas through written, spoken, and visual means;
- (2) Think critically via classifying, analyzing, comparing, contrasting, hypothesizing, synthesizing, extrapolating, and evaluating ideas;
- (6) Apply and evaluate quantitative reasoning through the disciplines of mathematics, computational science, laboratory science, selected social sciences and other like-minded approaches that require precision of thought;
- (8) Demonstrate positive interpersonal skills by adhering to the principles of freedom, justice, equality, fairness, tolerance, open dialogue and concern for the common good.

My late High School mathematics teacher used to say:

Ex Nihilo Nihil Fit = Nothing comes from Nothing = “Out of nothing comes nothing”

The professor reserves the right to change the content of this course syllabus.