

Syllabus

Course Identifier MATH 121

Course Title Calculus II for Science and Engineering

Academic Year 2019 - 2020 (Fall Semester)

Instructor Kostas Karagiannis

Office: Number 023 – Niarchos Technology Center (Lower Level Bissell Library)

Office hours: Please refer to the Instructor’s schedule at the end of this document

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Course delivery Lecture 42 hours

Prerequisites Successful Completion of Math 120 - Calculus I for Science and Engineering, or College Level Calculus I course, or Placement Test

Assessment

Assessment Type	Assessment Length/Details	Proportion
In Class Quizzes	In class 10 minute quizzes. 4 – 6 quizzes during the semester.	15 %
Take-Home Assignments	Approximately the end of each chapter an extended problem set – Skill and Applications Problems	15 %
In Class Exam 01	Approximately during the 5 th teaching week of classes	20 %
In Class Exam 02	Approximately during the 8 th teaching week of classes	20 %
In Class Final Exam	During the Final Exams week (3 hours)	30 %
Tests/Quizzes/Exams will be announced in class and/or Moodle usually two periods before they take place.		

Brief description

The purpose of this course is to give a solid foundation in Calculus concepts, tools and techniques for the student entering Science and Engineering fields.

This course is a continuation to Calculus I for Science and Engineering where the student mastered: Limits, Differentiation, Anti-Differentiation and Basic Integration skills of 2D functions as well as basic introduction to parameterized curves and motion.

This course will cover:

- Techniques and Applications of Integration. Topics will include: Integration by Parts; Integration by Partial Fractions; Trigonometric Integration; Numerical Integration; Improper Integrals; and Areas, Volumes, Mass/Moments and Work as Integrals.
- Infinite Series and Introduction to Vectors.

Other topics addressed are:

- Convergence of Sequences and Series of numbers,
- Power Series representations and Approximations of Functions,
- 3D Coordinates,
- Parameterizations,
- Vectors, Dot and Cross Products,
- Equations of Lines and Planes

The course emphasizes on skill, conceptualization and some modelling. All three are of great importance. Visualization and analysis via the use of technology is used in lecture and could be addressed in Take-Home Assignments.

Content

Topics Covered in Course (Chapter – Topic)
05. Integrals
06. Applications of Integration
07. Techniques of Integration
08. Further Applications of Integration
10. Parametric Equations and Polar Coordinates
11. Infinite Sequences and Series
12. Vectors and Geometry of Space

Required Textbook(s):

Required Textbook(s):

Stewart, James. *Calculus: Early Transcendentals, International Metric Edition, 8th Edition*. Cengage Learning EMEA, 20150825. VitalBook file.

This eBook is available through a link in our course Moodle site.

Optional Reference Textbook

- Worldwide Integral Calculus, with infinite series, by David B. Massey , and
- Worldwide Multivariable Calculus, by David B. Massey.

Calculator: A scientific graphing calculator (recommended: Texas Instruments TI-83).

In-Class Handouts provided by the instructor.

Policies:

Policy 1: There are no make-ups for quizzes & exams.

Policy 2: There is a maximum of **10** hours of absences.

Policy 3: It is each student's responsibility to meet the College's standards of academic Integrity by avoiding involvement in cheating or plagiarism. According to the policy "A student committing an act of Academic Dishonesty in a given course will receive an F (0 percentage points) in the assignment where the academic infraction took place. If a student commits an act of Academic Dishonesty for a second time in the same course, this student will receive a failing grade in that course (see details later on in syllabus)/

Policy 4: No late assignments will be accepted. There are no make-up quizzes. An exam can be rescheduled only if there is documented medical emergency, funeral or previous arrangements have been made with the instructor. Weather cancellations of classes are announced in the local mass media. The instructor reserves the right to reschedule a class, schedule an additional class or review session by announcing that in a class session. I can be reached via email (my address is stated at the top of the syllabus).

Additional Resources

Course Website in Moodle(MDL): Assignments, online tests and grades will be posted in this website. You are responsible for what is posted in this website and thus you should login and check it on a regular basis.

Moodle Login Instructions: From on campus, as well as off campus, you can access Moodle using the URL: moodle.act.edu. Use the same username and password you use to login to the ACT network.

Grading

The following is the breakdown of the letter grade percentages

Grade Description	% points	US Letter Grade	US point grade
Excellent	95-100	A	4.0
Very Good (high)	90-94	A-	3.67
Very Good (low)	85-89	B+	3.33
Good (high)	80-84	B	3.0
Good (low)	75-79	B-	2.67
Satisfactory (high)	70-74	C+	2.33
Satisfactory (low)	65-69	C	2.0
Fail	0-64	F	0

Grade Descriptors: These descriptors outline the typical characteristics of the standard work associated with each grade.

Excellent: Superior performance; a high level of critical analysis and evaluation; incisive and original; exceptionally well researched; high quality presentation; exceptional clarity of ideas; excellent coherence and logic; trivial or very minor errors.

Very Good: Very good performance; a very good level of critical analysis and evaluation; significant originality; well researched; clarity of ideas, thoughtful and effective presentation; very coherent and logical; minor errors only.

Good: A good performance; a good level of critical analysis and evaluation; some evidence of originality; reasonably well researched; ideas generally clear and coherent; some but not significant weakness.

Satisfactory: Satisfactory performance—at least passable; acceptable level of critical analysis and evaluation; little evidence of originality; adequately researched; ideas fairly clear and coherent, though some significant weakness.

Fail: Clearly below the pass standard; lacking substance, knowledge and understanding; ideas confused and incoherent; fundamental weaknesses in most areas; fails to meet the Learning Outcomes.

Absence Policy

Students are expected to attend and participate in all of their courses throughout the term, including the first week. Those who fail to do so may be administratively withdrawn from individual courses of the College. This may affect the students' scholarship and financial aid eligibility.

A student is considered to have successfully attended a course if s/he has attended 75% of the course lectures. Thus, for a typical ACT course with 42 hours of contact time, the maximum number of absences stands at 10 hours per course. This policy applies to all ACT students, degree-seeking and Study Abroad. Please note that absences are counted on an hourly basis. Absences due to participation in school-related trips and activities may count toward this limit.

Class Format

1. Class Activities---200 in class minutes per week for the duration of the semester
 - a) Lecture of new material
 - b) Discovery method for presenting new material
 - c) Discussion of assigned reading and/or problems
 - d) Student presentation of problems
2. Individualized Study
 - a) Students are expected to read the textbook and work exercises over material covered in class and in the textbook.
 - b) The student will be expected to participate in each class period by asking questions and making comments on the material read and the exercises worked on.
3. Individual Student Conferences
 - a) Students can receive help from the instructor through scheduled office hours or by appointment.

Advice for Success

You are expected to:

- Attend all classes.
- Complete the reading assignments.
- Ask the instructor to aid you any problems with the material.
- Complete all homework assignments and keep them in a folder which you will bring with you in every class period.
- Complete all in class quizzes and examinations.
- Complete and turn in all class projects on the due date.
- Participate in class.

*Last Updated: Fall 2019
by Kostas Karagiannis*

Appendix A: Statements & College wide Policies

Statement on Academic Integrity

"The College has the responsibility of maintaining the highest possible standards of academic integrity for the purpose of ensuring the quality of education it provides, underscoring its dedication to fostering a love of learning for its own sake, and of protecting those who rightly practice integrity in their academic affairs. It is the responsibility of the student to be informed about the college's policy on Academic Integrity, to refrain from infractions of that policy and from conduct, which may lead to suspicion of infractions, and to refrain from aiding or encouraging others in such infractions. It is the responsibility of the faculty to establish and maintain an environment which is conducive to Academic Integrity."

Academic Honesty

"Academic Dishonesty is the violation of Academic Integrity, committed by engaging in any form of unethical behavior which violates acceptable standards of scholarly conduct. Such practices as cheating on examinations, submitting borrowed or purchased papers and/or prepared bibliographies as one's own, plagiarizing, falsifying or copying lab reports, or aiding another person in any of the above infractions of Academic Integrity, constitute acts of Academic Dishonesty."

College-wide Policy on Academic Integrity

All academic divisions at ACT, both undergraduate and graduate, will apply the following policy on academic integrity:

"A student committing an act of Academic Dishonesty in a given course will receive an F (0 percentage points) in the assignment where the academic infraction took place. If a student commits an act of Academic Dishonesty for a second time in the same course, this student will receive a failing grade in that course".

The individual faculty is responsible for enforcing the policy in a conscientious manner, for reporting all cases to the Academic Standards & Performance Committee (AS&PC) for record-keeping and for informing the affected students of their right to appeal the faculty's decision to the AS&PC. Faculty must also insert the college's policy on Academic Integrity in their course syllabi."

Academic Standards & Performance Committee

A student may appeal an initial decision made by an individual faculty to a formal body called the Academic Standards & Performance Committee (an existing standing Committee), chaired by the Director of Academic & Student Affairs.

The AS&PC will meet as needed to evaluate appeals on alleged cases of academic dishonesty referred to the Committee by an involved party. Each case referred to the Committee will have a separate hearing (several hearings could conceivably take place during a single session of the Committee). Cases sent before the Committee deemed invalid will be dismissed. The AS&PC will keep records of all academic infraction cases, whether appealed or not and it will reserve the right to invite a student who has breached repetitively the school's policy to a hearing that may lead to sanctions ranging from failure of an assignment, to failure of a course, semester-long dismissal from the college, expulsion from the college.

Appendix B – Course Content

Integrals

- §5.1 Areas and Distances
- §5.2 The Definite Integral
- §5.3 The Fundamental theorem of Calculus
- §5.4 Indefinite Integrals and the Net Change Theorem
- §5.5 The Substitution Rule

Applications of Integration

- §6.1 Areas Between Curves
- §6.2 Volumes
- §6.3 Volumes by Cylindrical Shells
- §6.4 Work

Techniques of Integration

- §7.1 Integration by Parts
- §7.2 Trigonometric Integrals
- §7.3 Trigonometric Substitution
- §7.4 Integration of Rational Functions by Partial Fractions
- §7.7 Approximate Integration
- §7.8 Improper Integrals

Further Applications of Integration

- §8.1 Arc Length
- §8.2 Area of a Surface of revolution
- §8.3 Applications to Physics and Engineering (Moments & Centers of Mass)

Parametric Equations and Polar Coordinates

- §10.1 Curves Defined by Parametric Equations
- §10.2 Calculus with Parametric Curves
- §10.3 Polar Coordinates
- §10.4 Areas and Lengths in Polar Coordinates

Infinite Sequence and Series

- §11.1 Sequences
- §11.2 Series
- §11.3 The Integral Test and Estimates of Sums
- §11.4 The Comparison Tests
- §11.5 Alternating Series
- §11.6 Absolute Convergence and the Ratio and Root tests
- §11.7 Absolute Convergence and the Ration and Roots tests
- §11.7 Strategy for Testing Series
- §11.8 Power Series
- §11.9 Representations of Functions as Power Series
- §11.10 Taylor and Maclaurin Series
- §11.11 Applications of Taylor Polynomials

Vectors and the Geometry of Space

- §12.1 Three-Dimensional Coordinate Systems
- §12.2 Vectors
- §12.3 The Dot Product
- §12.4 The Cross Product
- §12.5 Equations of Lines and Planes

Note:

Practice problems per section will be posted in Moodle and students are expected to solve all of the practice problems posted there. Odd problems have solutions at the end of the textbook.

The graded Take-Home Assignments may include some of the above problems and they will be made available to the students in printed form in class and electronically on Moodle.

Take-Home Assignments must be turned in handwritten form and on the handout provided by the instructor at the date assigned on Moodle.

Appendix C: Tentative Day-by-Day Lecture Schedule including assignments and assessments

MT121 - Calculus II					
Tentative Schedule. Follow Moodle for actual Schedule					
	Monday	Tuesday	Wednesday	Thursday	Friday
Week 01	23-Sep	24-Sep	25-Sep	26-Sep	27-Sep
	5.1		5.1 / 5.2-5.3-5.4	5.2-5.3-5.4	5.5
Week 02	30-Sep	1-Oct	2-Oct	3-Oct	4-Oct
	7.1		QZ 01	7.2	7.3
Week 03	7-Oct	8-Oct	9-Oct	10-Oct	11-Oct
	7.3-7.4		QZ 02	7.7	7.8
Week 04	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct
	6.1		QZ 03	6.2-6.3	6.3-6.4
Week 05	21-Oct	22-Oct	23-Oct	24-Oct	25-Oct
	Review		EXAM 01	6.4-6.5	FALL BREAK
Week 06	28-Oct	29-Oct	30-Oct	31-Oct	1-Nov
	FALL BREAK		8.1	ATHENS TRIP	ATHENS TRIP
Week 07	4-Nov	5-Nov	6-Nov	7-Nov	8-Nov
	8.1-8.2	8.2-8.3	8.3	ATHENS TRIP	ATHENS TRIP
Week 08	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov
	10.1		HW 05 DUE	EXAM 02 Review	EXAM 02
Week 09	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov
	11.1		11.2	11.2	11.3
Week 10	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov
	11.3		QZ 04	11.5	11.6-11.8
Week 11	2-Dec	3-Dec	4-Dec	5-Dec	6-Dec
	11.9		QZ 05	11.10	11.10
Week 12	9-Dec	10-Dec	11-Dec	12-Dec	
	Final Exams				
		Quiz Day			MidTerm/Final
		HomeWork			No Class

Appendix D: Tentative Instructor Schedule

FALL 2019 - KARAGIANNIS					
Time Block	Monday	Tuesday	Wednesday	Thursday	Friday
09:00 - 09:30					
09:30 - 10:00					
10:00 - 10:30	Office Hours		Office Hours	Office Hours	Office Hours
10:30 - 11:00					
11:00 - 11:30					
11:30 - 12:00					
12:00 - 12:30	MATH 121 K L2		MATH 121 K L2	MATH 121 K L2	MATH 121 K L2
12:30 - 13:00					
13:00 - 13:30	MATH 201 K L2		MATH 201 K L2	MATH 201 K L2	MATH 201 K L2
13:30 - 14:00					
14:00 - 14:30	MATH 120 K L2	Available by Appointment	MATH 120 K L2	MATH 120 K L2	MATH 120 K L2
14:30 - 15:00					
15:00 - 15:30		STAT 205 A LAB 6		STAT 205 A LAB 6	
15:30 - 16:00	Office Hours		Office Hours		Office Hours
16:00 - 16:30					
16:30 - 17:00	Available by Appointment		Available by Appointment		Available by Appointment
17:00 - 17:30					
17:30 - 18:00					
18:00 - 18:30					
18:30 - 19:00					
19:00 - 19:30					
19:30 - 20:00					