Math 221 – Calculus & Analytic Geometry III
Fall 2013 Course Syllabus

James Jones, Professor of Mathematics
Mathematics & Sciences Division – Richland Community College

Meeting Information

Section 01 meets from 11:00 am to 12:10 pm on Monday, Wednesday, and Friday in room S137.
The WebAssign class key for this course is: **richland 9802 2139**

Instructor Information

James Jones, Professor of Mathematics.   Phone: 875-7211, ext 490
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Office Hours

I spend most of my office hours in the classroom, room S137. This allows me to help students with their assignments, homework, projects, exams, and questions.

Monday:	9:00-9:30 am, 10:45-10:55 am, 12:50-1:15 pm, 2:45-2:55 pm, 4:15-4:30 pm
Wednesday:	9:00-9:30 am, 10:45-10:55 am, 12:50-1:15 pm, 2:45-2:55 pm, 4:15-4:30 pm
Friday:	9:00-9:30 am, 10:45-10:55 am, 12:50-1:15 pm, 2:45-2:55 pm

Text

There is a textbook and an electronic homework package required for this course. The electronic package also includes an electronic version of the textbook and you do not have to buy a printed textbook if you want to go completely electronic.

- *Essential Calculus: Early Transcendentals, 2nd edition*. James Stewart. Copyright 2013, Brooks/Cole Cengage Learning. ISBN-13 978-1-133-11228-0 (Required textbook, but printed version is optional)
- *Enhanced WebAssign Homework and eBook LOE Instant Access for Multi Term Math and Science, 1st Edition*. ISBN13: 978-1-285-18421-0 (Required – can also be purchased within WebAssign)

The two items above can be bundled together for cost savings.

- *ePack: Essential Calculus: Early Transcendentals, 2nd + Enhanced WebAssign Homework and eBook LOE Instant Access for Multi Term Math and Science*. ISBN-13: 978-1-285-94067-0 (Required)

Student Audience

Transfer students. Students pursuing degrees in engineering, mathematics, life sciences.

Prerequisite

Successful completion (C or better grade) of Math 122, Calculus and Analytic Geometry II.

Course Description

MATH 221 - Calculus and Analytic Geometry III
Hours: 4 lecture - 0 lab - 4 credit
MATH 221 is a standard multivariable calculus course intended for students going into areas of science, technology, engineering, or mathematics. Topics covered include three-dimensional space, vectors and their operations, vector-valued functions, arc length, and curvature; partial derivatives with applications, tangent planes, directional derivatives, gradients, and optimization problems; multiple integrals with applications in rectangular, polar, cylindrical, and spherical coordinates systems. The course concludes with vector calculus, line integrals, parametric surfaces, and their applications.
Applicable toward graduation where program structure permits.

- Certificate or degree: All certificates and all degrees.
- Group requirement: Mathematics
- Area of Concentration: Not applicable.

Illinois Articulation Initiative (IAI)

The Illinois Articulation Initiative is a statewide transfer agreement. Their website is at
http://www.itransfer.org.

Math 221, Calculus & Analytic Geometry III, satisfies the Illinois Articulation Initiative Definition of a General Education Mathematics Course. It corresponds to M1900-3, College-level Calculus III. It also corresponds to the Baccalaureate Major's Recommendation course MTH 903: Calculus III.

When three courses are required to convey the necessary skills in calculus to mathematics majors, it is highly advised that students complete the entire sequence at a single institution. Course content may vary widely among institutions depending on the credits assigned to each course, and completing the sequence at a single institution is the best way to assure that neither credit nor content is lost in transfer.

General Course Objectives

A topical outline of the content covered in the course is given at the end of the syllabus. While learning calculus is certainly one of the goals of this course, it is not the only objective. Upon completion of this course, the student should be able to ...
- Demonstrate comprehension and understanding in the topics of the course through symbolic, numeric, graphic, and verbal methods.
- Demonstrate the proper use of mathematical notation.
- Use technology when appropriate and know the limitations of technology.
- Work collaboratively with others towards the completion of a common goal.
- Use deductive reasoning and critical thinking to solve problems.
- Apply common sense to mathematical problems.
- Effectively communicate the student's understanding of the subject.

Type of Instruction

Learning will occur via discussion, problem solving, student questions, student participation, group work, oral presentations, and/or lecture. Students are expected to read the material before coming to class and are strongly encouraged to come to class with a list of questions and to ask these questions.

Method of Evaluation

Evaluation could include any of the following: problem solving exams, objective exams, essays, research papers, oral presentations, group projects, individual projects, quizzes, and homework
- 50.0% of your grade will be based on work conducted in the Enhanced WebAssign online homework and grading system.
- 25.0% of your grade will be based on in-class, paper and pencil exams.
- 12.5% of your grade will be based on quizzes.
- 12.5% of your grade will be based on projects.

Grading Policy

Letter grades will be assigned to final adjusted scores as follows:
A: 90-100%   B: 80 - 89%   C: 70-79%   D: 60-69%   F: below 60%

Missed quizzes may not be made up.

Consideration may be given to such qualities as attendance, class participation, attentiveness, attitude in

class, and cooperation to produce the maximum learning situation for everyone.

The instructor will give you a grade sheet so that you can record your scores and keep track of your progress in the course. If you are concerned about your grades, see the instructor.

Assignments are due at the beginning of the class period on the date they are due. The instructor may allow you to turn them in later that day without counting them late, but do not count on his graciousness. Late assignments lose 20% of their value per class period. The instructor reserves the right to apply this rule to missed exams as well as regular assignments. No late work will be accepted after the final.

Attendance Policy

Regular attendance is essential for satisfactory completion of this course. Mathematics is a cumulative subject and each day builds on the previous day's material. If you have excessive absences, you cannot develop to your fullest potential in the course.

Students who, because of excessive absences, cannot complete the course successfully, are required to be administratively dropped from the class at midterm. If a student stops attending after midterm, it is the student's responsibility to withdraw to avoid an "F". Do not stop attending and assume that you will be withdrawn from the class by the instructor.

Although dropping students for non-attendance at midterm is required, students whose attendance is occasional or sporadic may be dropped from the class at any point during the semester at the instructor's discretion. If you miss any two consecutive days without communicating with the instructor, you may be dropped. The safest way to make sure you're not dropped for non-attendance is to continue to attend classes.

The student is responsible for all assignments, changes in assignments, or other verbal information given in the class, whether in attendance or not.

If a student must miss class, a call to the instructor (RCC's phone system has an answering system) should be made or an email message sent. When a test is going to be missed, the student should contact the instructor ahead of time if at all possible. Under certain circumstances, arrangements can be made to take the test before the scheduled time. If circumstances arise where arrangements cannot be made ahead of time, the instructor should be notified and a brief explanation of why given by either voice or email. This notification must occur before the next class period begins.

Homework

Attempting and completing homework is vital to your success in this course. Homework is the practice that strengthens your skills and prepares you to learn the material. Some students will need lots of practice and some students will only need to hone their skills.
The Enhanced WebAssign package that we are using allows you to try homework online, immediately see if you have the right answer, get help, and practice a similar problem if you want. Some students like the online version, other students don't work well behind a computer and prefer paper and pencil.

Regardless of how practice problems, it is imperative that you practice. That said, homework will not be part of the grade in this course. Instead, it will help you master the skills needed to learn the material and perform well on the exams.

As calculus students, you are some of the best and brightest mathematics students we have and you have some algebraic and trigonometric skills that most students are lacking. You should voluntarily do as much homework as you need to master the material. In this class, you will be given a list of suggested problems. If you find that you are understanding the concepts, this may be enough for you, but if you find that you still don't understand the material after working those problems, it may be necessary for you to work additional problems.

Technology

The use of technology in this course is consistent with the Technology Statement in the *Illinois Mathematics & Computer Science Articulation Guide* (IMACC, 2008, p. 4). Technology is used to enhance the learning of Calculus, but it is not the focus of the instruction. There will be instances when we will use the calculator or computer to aid in our understanding or remove some of the tediousness of the calculations (especially in the area of numerical approximations). There may be some projects, homework, or portions of a test that require you to use technology to complete.

Here are some of the technology tools that we may use.

WebAssign

WebAssign is an online homework and grading system. Stewart's Calculus text is available in WebAssign as an enhanced electronic version. The full text of the book is there as well as tutorials, videos, and explorations. WebAssign is available at https://webassign.net/

Calculator

This class is a mathematics class and a graphing calculator is required. A scientific calculator is not sufficient. The calculator should be capable of graphing functions, finding roots, maximums, and minimums from a graph, displaying tables of values, and finding the definite integral numerically. A Texas Instruments TI-84 or TI 83 is the recommended calculator.   That said, a TI-92, TI-89, or TI Nspire CAS calculator is recommended for this course if you plan on taking additional calculus or engineering courses.

Maxima

Maxima is an open-source computer algebra system. Maxima may be downloaded from the Internet and used for free. The main page for Maxima is http://maxima.sourceforge.net

WinPlot

WinPlot is a free graphing software package for Windows written by Rick Parris at Phillips Exeter Academy in NH. The software is useful for creating graphs and it is easy to copy/paste the graphs into other applications. You may download the software by right-clicking your mouse on the word "WinPlot" at the top of the page http://math.exeter.edu/rparris/winplot.html and choosing save.

DPGraph

DPGraph is a 3D graphing package, written by David Parker, that will be useful for visualizing the graphs of multi-variable functions. The software is not free, but Richland has a site license that allows students to download and use it without additional charge. You may download it from http://www.dpgraph.com/graphing-users.html (be sure to find the entry for Richland Community College)

CalcPlot3D

This is an online 3D graphing calculator Java applet written by Paul Seeburger at Monroe Community College in Rochester, NY. It allows you to visualize vectors, space curves, surfaces, normal lines, tangent planes, and contour plots. It is available online at http://web.monroecc.edu/calcNSF/

Additional Supplies

The student should have a pencil, red pen, ruler, graph paper, stapler, and paper punch. The student is expected to bring calculators and supplies as needed to class. The calculator should be brought daily. There will be a paper punch and stapler in the classroom.

Additional Help

The student is encouraged to seek additional help when the material is not comprehended. Mathematics is a cumulative subject; therefore, getting behind is a very difficult situation for the student. There are several places where you can seek additional help in your classes.

You may use a recording device to record the lectures. Feel free to use a camera or cell phone to take pictures of the boards if you have trouble getting all of the information into your notes.

I try to make myself as available to the students as I can. My office hours are listed at the beginning of this syllabus, but those are just the times I'm scheduled to be in my office. Grab me and ask me questions if you see me in the hallway. Ask questions before or after class. If I'm in my office and it's not my scheduled office hours, go ahead and stop in.

The instructor should be considered the authoritative source for material related to this class. If a tutor or other student says something that disagrees with the instructor, believe the instructor.

Study Groups

Probably the best thing you can do for outside help is to form a study group with other students in your class. Work with those students and hold them accountable. You will understand things much better if you explain it to someone else and study groups will also keep you focused, involved, and current in the course.

Academic Success Center

The Academic Success Center consolidates several student services into one area. It is located in the south wing of the first floor next to the Kitty Lindsay Learning Resources Center (library).

Testing

The testing center is located in room S116. You must provide a photo identification and know the name of your instructor to use this service.

Tutoring

The tutoring center provides tutoring on a walk-in or appointment basis in room S118. They also have computers with the mathematical software loaded on it.

Quality tutors for the upper level mathematics are difficult to find. Please consider forming a study group among your classmates.

Accommodations

There are accommodations available for students who need extended time on tests, note takers, readers, adaptive computer equipment, braille, enlarged print, accessible seating, sign language interpreters, books on tape, taped classroom lectures, writers, or tutoring. If you need one of these services, then you should see Learning Accommodation Services in room C148. If you request an accommodation, you will be required to provide documentation that you need that accommodation.

College & Division Policies

Academic Dishonesty

Each student is expected to be honest in his/her class work or in the submission of information to the College. Richland regards dishonesty in classroom and laboratories, on assignments and examinations, and the submission of false and misleading information to the College as a serious offense.

A student who cheats, plagiarizes, or furnishes false, misleading information to the College is subject to disciplinary action up to and including failure of a class or suspension/expulsion from the College.

Non-Discrimination Policy

Richland Community College policy prohibits discrimination on the basis of race, color, religion, sex, marital or parental status, national origin or ancestry, age, mental or physical disability (except where it is a bonafide occupational qualification), sexual orientation, military status, status as a disabled or Vietnam-era veteran.

Electronic Communication Devices

The Mathematics and Sciences Division prohibits the use of cell phones, pagers, and other non-learning electronic communication equipment within the classroom. All equipment must be turned off to avoid disturbances to the learning environment. If a student uses these devices during an examination, quiz, or

any graded activity, the instructor reserves the right to issue no credit for these assignments. The instructor needs to approve any exceptions to this policy.

Topical Outline

The following topical outline is an estimate of how much time will be spent on each topic and is aligned with the chapters in the textbook.

Vectors and the Geometry of Space - 16 hours
- Three-Dimensional Coordinate Systems
- Vectors
- The Dot Product
- The Cross Product
- Equations of Lines and Planes
- Cylinders and Quadric Surfaces
- Vector Functions and Space Curves
- Arc Length and Curvature
- Motion in Space: Velocity and Acceleration

Partial Derivatives - 14 hours
- Functions of Several Variables
- Limits and Continuity
- Partial Derivatives
- Tangent Planes and Linear Approximations
- The Chain Rule
- Directional Derivatives and the Gradient Vector
- Maximum and Minimum Values
- Lagrange Multipliers

Multiple Integrals - 15 hours
- Double Integrals over Rectangles
- Double Integrals over General Regions
- Double Integrals in Polar Coordinates
- Applications of Double Integrals
- Triple Integrals
- Triple Integrals in Cylindrical Coordinates
- Triple Integrals in Spherical Coordinates
- Change of Variables in Multiple Integrals

Vector Calculus - 15 hours
- Vector Fields
- Line Integrals
- The Fundamental Theorem for Line Integrals
- Green's Theorem
- Curl and Divergence
- Parametric Surfaces and Their Areas
- Surface Integrals
- Stokes' Theorem
- The Divergence Theorem