Math 152 – Calculus II for Majors – Section C2
Summer 2013 – Instructor: Pat Devlin
Updated May 22, 2013

General Information

Class Meetings: Class meets every Monday, Tuesday, Wednesday, and Thursday starting May 28 and ending July 17. Class meets from 10am to noon in FH-A6 (Frelinghuysen Hall room A6) on College Avenue Campus. **The final is on Thursday July 18 from 10 to 1.**

Instructor Information: Pat Devlin (mathematics PhD student) [please, call me Pat!]
Office hours: Monday, Wednesday 2–3 in Hill 613, also available anytime by appointment
Email: `prd41@math.rutgers.edu` (best way to reach me)
Office phone: (732)445-2390 ext. 54193
Course webpage: Use sakai to view grades, assignments, resources, and announcements
Personal webpage: `http://www.math.rutgers.edu/~prd41/` (this may not be useful)

Text: Rogawski, Jon *Calculus: Early Transcendentals, Second Edition*
ISBN 1-4641-0376-3, published by W. H. Freeman and Company, 2012.

Departmental Information: This course fulfills both the Quantitative Information (**QQ**) and Mathematical or Formal Reasoning (**QR**) learning goals of the SAS Core Curriculum:

QQ: Formulate, evaluate, and communicate conclusions and inferences from quantitative information.
QR: Apply effective and efficient mathematical or other formal processes to reason and to solve problems.

For more information on workshops, material covered, suggested homework problems from the book, and study resources see `http://www.math.rutgers.edu/courses/151-152/`

Academic Integrity: Do not violate the academic integrity policy (i.e., *don't you dare cheat!*). The university takes that sort of thing very seriously, and cheating can get you into a lot of trouble! See `http://academicintegrity.rutgers.edu/policy-on-academic-integrity`

Resources: In addition to office hours, there are many wonderful resources for this subject including free tutoring through Rutgers `http://lrc.rutgers.edu/tutoring.shtml` and online course notes such as `http://www.math.rutgers.edu/~zeilberg/DrZhandouts.html`

My Policies and What to Expect

Learning Goals for Students: I expect students to acquire a firm understanding of the material, particularly the concepts and ideas of the course and how they fit together in a 'big picture' sort of way. By the end of the course, I expect each of you:

(i) to know ***what*** each concept is [e.g., definitions, geometric interpretation of integrals and derivatives, et cetera];

(ii) to know ***how*** to do each technique discussed [i.e., how to solve 'mundane' book problems (e.g., how to integrate by parts, determine radius of convergence, et cetera)];

(iii) to know ***when*** each technique is applicable [e.g., to develop intuition for when one technique might be more effective than another, to know when a certain theorem applies, to know applications of techniques discussed, et cetera];

(iv) to have a feeling for ***why*** things work out [e.g., why a Taylor polynomial should probably provide a good approximation, why certain integrals and summations converge/diverge together, et cetera]; and

(v) to use material we discussed and ask yourself ***why not*** [i.e., to be so comfortable with the material we learned that you can use it in new (and perhaps unexpected) ways to make connections (and mathematical discoveries) all on your own].

All of the quizzes, workshops, homeworks, and exams will be geared along these lines, training you towards this end. This is what I expect you to be able to do by the end of this course, and these are the skills that the final exam will test you on.

Goals for the Instructor: My goals as your instructor are:

1. for each student to learn and master the material of this course;
2. for each student to practice creative, abstract, and mathematical thinking whenever possible;
3. for each student to earn an A (strong emphasis on *earn* not *receive*);
4. to structure each class session in an effective and engaging manner;
5. to cultivate a safe environment for students to learn and make errors (both in the classroom and in office hours); and
6. to improve as an instuctor.

Pedagogy: The format of this course will be strongly influenced by the instructor's pedagogical beliefs (i.e., his views of how learning takes place). In short, the most fundamental of my views is the simple statement that *an instructor cannot possibly learn at you; instead, learning is an extraordinarily personal process that must occur within each student as a result of what she or he does.* If you ever have any questions or criticisms about the way this course is structured, I would sincerely love to hear from you.

Classroom Expectations: While in the class, I as the instructor expect each of you:

(a) to pay attention and ask lots and lots of questions (you're all here to learn, not to pretend that you don't have any questions);

(b) to engage your mind with the material and participate in group discussions about it;

(c) to be bold enough to express an idea even if you're not positive that you're correct;

(d) to be honest with yourself about what you do and do not know (the pace is so fast that you really need to see me as soon as you fall behind on any concept whatsoever);

(e) never to hinder any fellow student's ability to learn (e.g., don't be a distraction to everyone by texting or talking in class, and don't make anyone feel 'stupid'); and

(f) to try to enjoy the learning process!

Similarly, you can expect that:

(a) the instructor will be ready and willing to address any questions you have;

(b) the instructor will challenge you to think and reason in ways that encourage your academic and intellectual growth;

(c) the instructor will always be respectful, considerate, and patient with you;

(d) the instructor will make himself available in office hours and by appointment to provide any additional help or clarification you'd like;

(e) the instructor will present the material in multiple ways so that each student might be personally engaged in a manner and at a level by which he or she learns best; and

(f) the instructor will try his best to make the learning process enjoyable!

Attendance: Students are to attend every class and to be on time. This course has a necessarily fast past, so missing even a single class can lead to substantial gaps in your understanding. In extenuating circumstances students should email me in advance, and we will try to work something out. Please note that using the Rutgers buses takes longer in the summer.

Homework: Homework is given so that a student is *forced* to practice new material, and the fast pace of this course makes doing homework absolutely vital. Your *graded* 'homework' will be very short problem sets that I daily assign for you to do in class (you would then finish these at home as needed); these are to be turned in at the start of the next class session. However, since the vast majority of you would greatly benefit from more practice, I strongly suggest that every day you work on the recommended homework problems here `http://www.math.rutgers.edu/courses/151-152/` (although these would not be graded).

Quizzes: Short in-class quizzes will be given very frequently to ensure continual understanding. Think of these quizzes as helpful little indicators of how well you are internalizing the material. If on any quiz you get a lower grade than the one you want for the course, then you simply ***need*** to practice by doing more homework, and you should probably see me.

Workshops: Once or twice per week, time will be given in class for students to work in groups on "workshop problems" (certain math problems that require critical thinking). At the end of each workshop session, I will announce one of the given problems, to which you will each individually be expected to provide a well-written solution. Your solution will be graded with equal emphasis on its mathematical correctness and on its overall quality as a written presentation/explanation. These will be due at the beginning of class on the day of the next workshop session. See `http://www.math.rutgers.edu/courses/151-152/` for advice on workshops as well as (graded) workshop examples.

Exams: There will be two 'midterm' exams (Thursday June 13 and Tuesday July 2) and one final exam (Thursday July 18). These exams will be cumulative (especially the final). They will be given in class at our usual class time, and you will *not* be allowed to have notes, book, calculators, or formula sheets. The two midterm exams will only be 80 minutes, and we will spend the final thirty minutes of class reviewing the exams. **The final will be three hours; make sure that you are available from 10am to 1pm on Thursday July 18** (and let me know immediately if that will be a problem).

Late Work and Absences: Exams simply may *not* be taken late unless there is an overwhelmingly valid and documented excuse. Quizzes and homeworks may be taken or turned in up to a week late by seeing me in office hours [or by appointment], but your grade on the assignment drops 10% for every day it is late (including a 10% drop for work turned in late on the same day).

Grades: My goal as your instructor is for literally every single student to earn an A in this course (emphasis on *earn* not *receive*). For this reason, you are always welcome to see me in office hours [or by appointment], where I can provide the opportunity for you to improve any grade you got in my class (including quizzes and exams). However, the degree to which your grade could be improved and the corresponding amount of extra learning and work that you would need to put in would of course depend heavily on the assignment in question. To clarify: *I am by no means saying it will be 'easy' to get a good grade in this course; but I am saying it will be easy to find [potentially difficult] opportunities to do so.*

Your grade will be broken into five categories. Namely:

	Portion of Total Grade
Homework and Quizzes	1/6
Workshops	1/6
Midterm Exam 1	1/6
Midterm Exam 2	1/6
Final Exam	1/3

The categories of 'Homework and Quizzes' and 'Workshops' will each be individually graded based on total points.

Schedule of Topics Covered

This is a tentative outline for the course material. Time permitting, we will cover additional topics from areas including differential equations, spherical and cylindrical coordinates, and recurrence relations. There will be one or two in-class workshops per week, short homework assignments, and very short quizzes that will be given quite frequently (see previous sections). There will be two "midterm" exams and a final, each of which will be cumulative. The column **WS** denotes an in-class workshop. All workshops are due at the beginning of class on the day of the next workshop[1]. Topics in *italics* are optional. The exact structure of the course may vary.

Date	Lect.	WS	Reading	Topics
Tue 5/28	1		1.1—5.7	Introduction and review of 151 (calculus I)
Wed 5/29	2	W-1	6.1, 7.8	Area between curves; numerical integration
Thu 5/30	3		6.2, 6.3	Volume, density, averages; volumes of revolution
Mon 6/03	4	W-2	6.4, 6.5	Shell method, work
Tue 6/04	5		7.1	Integration by parts
Wed 6/05	6		7.2	Trigonometric integrals
Thu 6/06	7	W-3	7.3	Trigonometric substitutions
Mon 6/10	8		7.5	Partial fraction decomposition
Tue 6/11	9		7.6	Improper integrals
Wed 6/12	10	W-4	—	Catch up and review for midterm 1
Thu 6/13	11	**Midterm Exam 1**		
Mon 6/17	12	W-5	10.1	Sequences
Tue 6/18	13		10.2	Infinite series
Wed 6/19	14		10.3	Convergence of series with positive terms
Thu 6/20	15	W-6	10.4	Absolute and conditional convergence
Mon 6/24	16		10.5	Ratio and root tests
Tue 6/25	17		10.6	Power series
Wed 6/26	18	W-7	8.4, 10.7	Taylor polynomials; Taylor series
Thu 6/27	19		Sakai	Applications of Taylor series; generating functions
Mon 7/01	20	W-8	—	Catch up and review for midterm 2
Tue 7/02	21	**Midterm Exam 2**		
Wed 7/03	22		8.1	Arc length and surface area
Thu 7/04	*No class in observance of Independence Day*			
Mon 7/08	23	W-9	11.1	Parametric equations
Tue 7/09	24		11.2	Arc length and speed with parametric equations
Wed 7/10	25		11.3, *12.7*	Polar coordinates; *cylindrical and spherical coordinates*
Thu 7/11	26	W-10	11.4, *11.5*	Area and arc length in polar coordinates; *conics*
Mon 7/15	27		5.8, 9.1	Exponential growth; solving differential equations
Tue 7/16	28		9.2	Models involving $y' = k(y - b)$
Wed 7/17	29		—	Catch up and review for final
Thu 7/18	30	**Final Exam** (From 10:00 am to 1:00 pm)		

[1] Workshop 10 is due in class on Wednesday July 17.