Syllabus for MATH 131-02: Calculus II

Spring Semester 2020

Professor: Erika L.C. King
Preferred Pronouns: she/her/hers
Office: Lansing 304
Office Hours: M: 10:00-11:30am, T: 9:45-11:15am, W: 2:45-3:45pm, Th: 4:00-5:00pm, and by appt.
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Class: held MWF 1:30pm-2:30pm in Coxe 7
Lab: held Thursdays 10:30am-Noon in Gulick 2000
Textbook: *Calculus: Early Transcendentals, Single Variable*, by Briggs, Cochran, and Gillett, third edition
Website: http://math.hws.edu/eking/CalculusII/math131.html
WeBWorK Home Page for Our Class: https://math.hws.edu/webwork2/Math131-King-F19/
Math Intern, Sam LeGro, Office Hours at the IC: Su: 4:00-6:00pm;
in Lansing 310: Su: 7:00-10:00pm, M-Th 2:00-5:00pm and 7:30-10:30pm

Course Content

When lawmakers work to pass energy conservation bills they need to be able to prove that their new restrictions will, for example, significantly reduce the use of oil. How can they defend their predictions? In MATH 130 we focused on differentiation, and in MATH 131 we will focus on integration. One of the key applications of integration, finding the area between two curves, can help the lawmakers build their case.

This semester we will be covering most of chapters 5, 6, 8, 10 and 11. We will begin by studying the definition and basics of integration, and investigating the Fundamental Theorem of Calculus. Then we will explore applications of integration such as the one mentioned above and finding volumes of objects created by rotating a curve around a line. Later we will delve into the puzzles of integrating more complicated functions by learning additional techniques and tricks. In the last third of the semester, we will begin exploring infinite sequences and series, which give us the ability to estimate function values and integrate functions we cannot integrate with our initial techniques, and which form the foundation of important results in analytical mathematics.

Prerequisites and Goals

In order to enroll for this class, you must have earned a grade of C- or (preferably) above in MATH 130 or earned credit for the AB track of AP Calculus (or the equivalent). Many students who have taken calculus before and are confident with differentiation also succeed even without the aforementioned credits, but you must have permission from me to remain in this class. Throughout this semester, I will assume that you are fluent with the material from MATH 130. That is, I assume you understand how to use the notions of limit and derivative and are familiar with their applications and interpretations, and are familiar with l'Hôpital's Rule and basic antidifferentiation, as in Sections 4.7 and 4.9 of the text. If you have **any** questions about whether or not this is the right place for you, please speak with me **immediately**.

This course has two main goals. The first is to master certain content: to develop a proficiency in many techniques of integration and an understanding of what integration represents, to gain an understanding of the important link between differentiation and integration illuminated in the

Fundamental Theorem of Calculus, and to introduce you to sequences and series and the power they give us to solve problems. The second goal is to increase your mathematical confidence and reasoning abilities by learning how to read a mathematics text carefully, how to discover concepts, ask questions and pinpoint areas of confusion independently, and how to collaboratively work on and present challenging problems. At least half of our class time will be spent in class discussion, group work and student presentation in order to achieve these goals. You will be expected to prepare for each class by reading the text and by working on exercises. **Thus you should expect to spend at least seven hours per week on this course outside of class.**

This course significantly addresses Goal 3: the Quantitative Reasoning Goal.

Textbook and Outline of Topics

We will use our textbook regularly. You will be expected to read it before we discuss each section and we will use it for practice exercises in class. At least one student from each group should bring a copy of the text to class each day (take turns where possible!). I have put a copy of the textbook on reserve in the library. The Math Intern also has a copy that you may use during his office hours. If you purchase an electronic version of the text, ask permission to access it during class time.

This outline is meant to give you a general idea of how we will proceed through the text. It will be adjusted as necessary during the term.

Weeks/Dates	**Sections**	**Topics**
Weeks 1–3.5	5.1-5.5	Integration
Thursday, February 20	Exam 1	Chapter 5
Weeks 3.5–7	6.1-6.7	Applications of Integration
Thursday, March 12	Exam 2	Chapter 6
Weeks 8-10.5	8.1-8.6, 8.9	Techniques of Integration
Thursday, April 16	Exam 3	Chapter 8
Weeks 10.5-13.5	10.1-10.7	Sequences and Infinite Series
Monday, April 27	Quiz	Sections 10.1-10.5
Weeks 13.5–14	11.1-11.2	Power Series
Sunday, May 10	Final Exam	Cumulative

Office Hours

Please use my office hours regularly. Use my posted office hours whenever possible, but **if you have classes or other important obligations that conflict with my office hours, please make appointments at other times**. You do not need to tell me in advance that you will be attending my regular, posted office hours. Generally my office hours are like group study sessions with several people at once, so do not wait in the hall for someone to leave **unless the door is closed**. You may request one-on-one conversations. Come prepared with specific questions and be ready to share your work by showing attempts of the exercises you wish to discuss. Expect that you will have to work to answer questions and discover solutions in office hours. I will be there to guide you and work with you to come to an understanding of the ideas; I will not simply give you answers. My goal is to help you understand concepts so that you will be able to apply what you learn to new problems, and help you gain confidence in your own abilities.

Assessment

Homework: There will be three types of collected homework assignments: Reading Assignments, WeBWorK Exercises, and Main Exercises. There will be roughly two Reading Assignments due each week which will involve reading a section of the text and submitting written responses to specific reading questions, creating some of your own questions, and reflecting on your own understanding. These will be worth eight points each. WeBWorK Exercises will be due three times a week, Monday, Wednesday and Friday before the beginning of class. These will be done online where you will receive immediate feedback as to whether or not your solution is correct. Each WeBWorK assignment will usually contain 3-6 problems, and each problem will be worth roughly one point each. Each week you will turn in one Main Exercises assignment, usually on Wednesdays. These will be worth twenty points each. You are encouraged to work on all these homework assignments with others; however, you must write up your final solutions **individually without comparing your final work to others'**. The details of these assignments are explained in a separate handout. Note that most class days there will be at least two types of assignments (one of which will be online) due. Homework should be handed in on time. Of course, I realize you may miss a couple of assignments due to illness or other emergencies. You may turn in two Main Exercises assignments up to roughly 48 hours late (due by 11:30am in my office on Friday) no questions asked. Beyond your two free lates for the Main Exercises, there will be a 10% penalty for each 24 hour period it is late after the due date and time up to four days. Anything turned in four or more days late will have a 50% penalty. Be sure to turn in everything! Work will receive at least partial credit up until the time I return assignments to the class. Once I have returned Main Exercises assignments to class, no credit can be earned, but work will be reviewed. In addition to the collected homework problems, there will be problems that we work on but may not finish in class. You will be expected to make sure you know how to complete each of those problems.

Labs: The Thursday labs will be problem-solving sessions where we will focus on more challenging problems or applications in groups of three. I will be available to answer any questions you might have, but you should first utilize the resources you have within your group. Each student should write up her/his/hir own solutions, and it is important that the group members work together to ensure that everyone understands the material. Groups are expected to be productive and work as a team. The more understanding that is accomplished in class, the less that you need to work towards outside of class. I may give announced or pop quizzes in lab to check team productivity. We will discuss this more on Thursday.

Quizzes: On Monday, April 27th there will be a 20-30 minute quiz on Sections 10.1-10.5. I may also occasionally give a 10-15 minute quiz in lab as noted above. No calculators will be allowed for quizzes. Extra time will **not** be allowed for those arriving late to class. Under **no** circumstances may a quiz be made up. In **extreme** cases and if you inform me at least two class days **in advance**, I will allow you to take a quiz **before** the scheduled time, if it is announced.

Participation: As noted, at least half of each class will be spent in class discussion, group work and presentations. Your active participation in these activities will be vital to your understanding and success in the course. Participation includes contributing questions and answers to the class, listening attentively to others' questions and answers, and writing solutions on the board with your team. Good participation also includes arriving on time to class, leaving all cell phones and other electronic devices off and stowed, and staying in class and participating until the full class period has been completed.

Exams: Exams are meant to test your ability to perform techniques quickly and efficiently and your ability to illustrate a deep understanding of the material by combining different concepts from within the material. Departmental non-graphing calculators will be provided for you at each exam;

you may **not** use your own calculator. There will be three 70-minute exams and a final exam. The exams are scheduled for the following dates:

- Exam 1: Thursday, February 20th in lab
- Exam 2: Thursday, March 12th in lab
- Exam 3: Thursday, April 16th in lab
- Final Exam: Sunday, May 10th, 1:30-4:30pm

The exams during the term are scheduled during our lab to provide you with extra time to complete them. **Note that seating will be randomized for exams.** It is impossible to construct fair makeup exams in mathematics; thus my policy is that there are **no** makeup exams. Record the above dates in your calendar now to ensure that you will be present. The final exam will be weighted as two exams. Since there are sometimes situations beyond your control, such as illness and medical or family emergencies, which may require you to miss an exam, I will drop your lowest exam grade when calculating your course grade. (If you have two such emergencies, we will discuss how to proceed.) This policy applies to all class members regardless of whether one experiences such an emergency. (If the final is your lowest grade, it is dropped just once.) Thus you will have four exam grades that will contribute to your exam average.

Bonus: There will be several Mathematics and Computer Science Departmental talks throughout the semester, providing a great opportunity for you to have exposure to mathematical topics outside of calculus, as well as applications and student research. You may earn five bonus points for each mathematics/computer science seminar talk you attend. These points contribute to the homework portion of your grade. Actively listening, participating and asking questions at the talks will earn you the maximum possible points. You may attend three talks toward extra credit.

Course Grade: Your combined homework and quiz scores will be worth 24% of your grade, and each (non-dropped) exam will be worth 19% of your grade (note that there are four such exams, "two" of which may be your final exam). I reserve the right to take class participation into account when determining your final grade. Your grade will also be influenced by your attendance. If you are absent for any portion of class, check the website and contact a classmate as soon as possible to get a copy of notes, handouts and assignments, as well as to find out about any announcements you may have missed. You are allowed four absences (note that this includes labs). **More than four unexcused absences will lower your grade by at least one full letter.** The greater the number of absences, the greater the reduction. Excused absences require documentation such as a letter from a dean. It is impolite to arrive late to class; **habitual tardiness will lower your grade**.

Disclaimer

The above quiz and exam dates, quantity of graded work, policies, and course layout are subject to change in the event of extenuating circumstances.

The Center for Teaching and Learning (CTL)

At Hobart and William Smith Colleges, we encourage you to learn collaboratively and to seek the resources that will enable you to succeed. The Center for Teaching and Learning (CTL) is one of those resources: CTL programs and staff help you engage with your learning, accomplish the tasks before you, enhance your thinking and skills, and empower you to do your best. Resources at CTL are many: Study Mentors help you manage your time and responsibilities, Writing Fellows help you

think well on paper, and professional staff help you assess academic needs, to name a few. I encourage you to explore these and other CTL resources designed to inspire your very best work. You can talk with me about these resources, visit the CTL office on the 2nd floor of the library to discuss options with the staff, or visit the CTL website at http://www.hws.edu/academics/ctl/index.aspx.

If you are a student with a "disability" (or what I like to call a "nontraditional approach to learning") for which you may need academic modifications in this course, you should self-identify, provide appropriate documentation of your disability, and register for services with Disability Services at the Center for Teaching and Learning (CTL). Disability related modifications and services will not be provided until the registration and documentation process is complete, but I will be happy to work with you once I receive the documentation from the CTL. The guidelines for documenting disabilities can be found at the following website: http://www.hws.edu/academics/ctl/disability_services.aspx

Please direct questions about this process or Disability Services at HWS to Christen Davis, Coordinator of Disability Services, at ctl@hws.edu or x 3351.

Academic Integrity

After working diligently on your own, I highly encourage you to discuss the homework problems with each other in addition to attending office hours. Verbalizing your questions, explaining your mathematical ideas and listening to others will increase your understanding. However, you should **not** feel free to copy someone else's work or make your work available to someone else. **Copying constitutes plagiarism, a violation of academic integrity which could result in failure in the course.** After discussing the concepts, final answers should be written up **in private without comparing your work**. **There is, of course, no collaboration or use of outside resources allowed on quizzes or exams.** Violation of the Colleges' Principle of Academic Integrity may result in a report sent to your file in the dean's office and/or appearance before the Committee on Standards.

How to Succeed

- Start homework assignments as soon as possible after they are assigned!
- Prepare for class by completing all homework on time.
- Turn off all cell phones, etc. and keep all phones, iPads, etc. stowed during class.
- Attend all classes and labs on time.
- Ask questions and participate in class.
- Dare to be wrong! Answering a question incorrectly is actually much more interesting than answering it correctly! Start conversations with your ideas!
- Present problems on the board and (politely) challenge or question others who are presenting.
- Discuss questions and problems with your classmates.
- Spend some time **each day** working on the material from this class by yourself – even if it is just 10 minutes of reading.
- Come to office hours, make an appointment, or email me whenever you have questions.
- Visit the Math Intern for extra help when I am not available.
- Practice problems with**out** notes, textbook, peers, the Intern or other mentors.
- Have fun!

Homework: Questionnaire and Meeting

The first part of this assignment involves going to the class website: http://math.hws.edu/eking/CalculusII/math131.html, printing the autobiographical questionnaire, filling it out and turning it in at the beginning of lab on Thursday, January 23rd. The second part is that each of you will meet with me in my office for about ten minutes. I will provide a sign up sheet to schedule these meetings during the first two weeks of classes. Please bring a photo of yourself, with which you are willing to part, to the meeting. This meeting and the photo help me get to know each of you better and more quickly. It also ensures that you know where our course website and my office are. Your grade on this assignment, out of 8 points, will be based on your prompt completion of the questionnaire and attendance of our meeting, photo in hand.