ON-LINE MATH 21 SYLLABUS

The idea of this course is to give as complete a presentation as possible of the standard Lehigh Math 21 course, over the Web. The syllabus, amount and types of requirements, and level of presentation is taken from the on-campus course; this course should neither be harder nor easier than the on-campus version. (I even cut down a bit on the number of homework problems, though they still will seem like a lot). The "lectures" you will be reading, and the examples and animations that accompany them, are taken from my lecture notes, and the sorts of examples and presentations I give in lecture.

The differences are, of course, obvious. You will not be in lecture, and will not have easy access to me either there or in my office to ask questions. More importantly, you will not be around other students taking the course as well. Exams cannot be administered in a common room, and turning in homework is not just a matter of leaving it on the table at the beginning of class. On the other hand, you are not locked in to coming to lectures Monday-Wednesday-Friday at 11, and you can go over them as many times as you need.

The pace of this course will be somewhat faster than a regular semester, since the course must be completed by the end of June. This is typical of Summer Session courses on-campus (though it is not *quite* as compressed as a Summer course, which goes for 5.5 weeks). Be prepared to get to work quickly, so that you do not get behind the pace that has to be set.

1. Communication

Trying to learn calculus will generate a lot of questions. You need to be able to get prompt answers to them, and you need to be able to talk through the ideas – not just with your instructor, but with other students as well. We're going to push to make sure you can get your questions answered quickly and completely, and that you have opportunities to "talk" about the material with others in the course. We'll do that through e-mail and phone calls, discussion groups, and chat sessions.

1.1. **E-mail and telephone.** I am always on the net (one of the reasons I'm teaching this course), and easy to reach by e-mail, `david.johnson@lehigh.edu`. (This is really the same account as the address you see in Blackboard, `dlj0@lehigh.edu`). You can call me at:

office: (610) 758-3759

home: (610) 828-3708

car: (610) 506-6919

All of these numbers have voice-mail, in case you can't reach me. You can certainly call my office any time, but I'm only likely to be there during the day (and not every day). Feel free to call me at home as well. However, since I have two teen-age daughters, it is sometimes difficult to get through (the voice-mail will answer if someone is on the phone). Calling me on my car phone may reach me in situations where I won't be able to provide much help, but as a last resort, or if the matter is urgent, it's better than not reaching me at all.

There will be a TA (teaching assistant) for the course as well. His/her name, e-mail, and phone are on the Staff Information page.

We will also list e-mail (only) addresses of everyone in the class, so you can contact your fellow students. You can also "interact" with other students on the discussion groups and the chat room.

1.2. **Discussion Groups.** The main course Web page will have links to "discussion groups". I will start out topics, called threads, on a number of subjects. Each of you should feel free to add messages regarding any of these topics. It works something like USENET, for those of you who know about that. I have to start the "threads", but each of the discussions can branch into sub-topics.

1.3. **Chat.** There is a chat room available from the Web page, called the *Virtual Classroom*. We will be using this for regular "class meetings", at a time that is convenient for all of us. Meeting times will be determined as class gets underway, and will be announced. In addition, any of you can start a chatroom discussion at any time. The chat room has a whiteboard as well as text, and everyone can use the whiteboard.

2. Requirements

2.1. **On-line exercises.** As you read through the "lectures" you will come across, from time to time, exercises that you will have to solve, and submit answers. Those answers will be automatically e-mailed to me for grading. I will send back my comments and grade on each exercise-set. The purpose of these exercises is to give you rapid feedback about your understanding of the material, and to allow me to make sure you are keeping up with the course. These exercises will form a part of your class grade, as indicated below.

2.2. **Reading and Homework.** With each chapter, there are reading assignments in the text, and a large number of homework problems to solve in the text. Some of these homework problems may be replaced by *Web Work* problems, which are accessible from the Web (as the name implies). These are very similar to the HW in the text, but are customized for each individual student (no two get precisely the same problems). For these, you submit your answer through the Web and a machine determines whether or not the answer is correct. It cannot explain what you did wrong, but you will know when you get the right answer. You can re-work the problem until you get it right.

The reading is meant to give you an alternate perspective about the topics discussed in the virtual lectures (I need a better term for that). The sections listed can be read along with the lectures, but the order will not be precisely the same as in the virtual lectures. Also, since each section in the text is made to be delivered in a one-hour lecture, they are sometimes shorter, or longer, than the virtual lectures (and sometimes split into two or more sections). The homework assignments, taken from the on-campus course, are to be worked on paper (most of them; some can be done using Maple), and sent to me, or done on WebWork. The paper problems should be mailed to:

David Johnson
Department of Mathematics
Lehigh University
Christmas-Saucon Hall
14 E. Packer Avenue
Bethlehem, Pennsylvania 18015-3174

The due dates will be listed with the assignments for each chapter. In most cases, homework for a given chapter will be broken up into more than one assignment, due approximately twice per week.

You can certainly submit your homework early, when you are ready (up until the due date). Your homework will be graded and mailed back to you.

2.3. **Written Assignments.** There will be three more substantial homework assignments, using the software package Maple that you received with your course materials. These will usually be longer problems, with not only the computational difficulty requiring the use of the computer, but with conceptual challenges for you to interpret the computer output and the mathematics involved. These assignments will be completed as Maple files and submitted electronically (using the "Drop box" on the Web site).

2.4. **Exams.** There will be two mid-term exams and a final exam. The timing of these exams will be individual, but there will be deadlines imposed so that you do not fall too far behind the course. Deadlines for the first exam is May 23, and the second exam should be completed by June 13. The final exam, covering the entire course, needs to be completed by June 30.

Details of exam deadlines and material to be included will be posted on the Web page.

The two mid-term exams will cover material in discrete parts of the course. The first mid-term will cover the material of the first two chapters (plus the introduction), *Introduction*, *Limits,* and *Derivatives*. The second mid-term exam will cover the "*Zoo*" of functions, and the *Theory and Practice*. The final exam will be **comprehensive**, covering all the material in the class. It will, however, emphasize the material after the second mid-term exam (*The Integral* and *Applications of Integration*).

3. Grading

Your grade will be determined based on the total number of points scored on all of these requirements. Virtual class participation will not be a formal part of your grade; you are encouraged to participate in the chat sessions, discussion board, and e-mail, but your participation will not directly impact your grade. However, the class participation is there for your benefit, to provide the class experience that makes learning easier. In a sense, there is no reason to take any course, since the material is available at the public library. However, it considerably easier to learn material such as this if you have the opportunity to talk with instructors and students; take advantage of the resources available to you.

The points will be awarded based on the following total possible points:

	Possible points
On-line exercises	40
Homework	40
Written Assignments	20
Midterm #1	100
Midterm #2	100
Final Exam	200
Total	500

Your final grade will be determined on a percentage basis, with:

- 90% of the total (450 points) guaranteeing you at least an A-,
- 80% (400) will guarantee at least a B-

- 70% (350) guarantees a C- (required to enroll in Math 22)
- 60% (300) guarantees a passing grade.

Your grades on each part of the course (in-progress grades on homework averages, of course) will be available to you on the Web site.

4. Homework/Reading Assignments

Some of these in-text problems will be replaced with equivalent WebWork problems. check the course Web site for links to the WebWork versions.

Chapter	Reading	Due Date	Problems
0. Intro	Cptr 1 of the text	May 8	§1.5; 7, 8, 13, 17, 18. §1.6; 5, 6, 9, 14, 23, 24, 27, 36, 38, 39, 42, 47, 49, 50, 51.
1. Limits	2.1 - 2.3	May 11	§2.1; 1, 5, 6(b), 8. §2.2; 4, 6, 7, 9, 10, 12, 20 (use calculator), 21, 22, 24, 28. §2.3; 1, 2, 3, 10, 12, 15, 19, 21, 24, 33, 39, 44, 54.
	2.4 - 2.6	May 15	§2.4; 1, 3, 4, 13, 15, 20, 29, 30, 39, 40. §2.5; 3, 4, 6, 11, 13, 18, 21, 36, 39, 43, 49, 59. §2.6; 4, 6, 16, 17, 21, 24, 31, 32, 35, 47, 59.
2. Derivatives	2.7 - 2.9	May 18	§2.7; 3, 5 (use Maple), 9, 12 (use Maple), 15, 17, 20. §2.8; 4, 5, 7, 25, 30, 33, 34. §2.9; 4, 6, 8, 9, 13, 20, 24, 34, 37, 43.
	3.1-3.3,3.5	May 25	§3.1; 4, 6, 10, 12, 14, 15, 27, 38 (by hand), 43, 47, 53, 61. §3.2; 11, 23, 32, 35. §3.3; 1, 4, 11, 18. §3.5; 1, 7, 10, 18, 54, 57, 73.
	3.6-3.7, 3.10, 3.11	May 29	§3.6; 1, 7, 21, 23, 29. 3.7; 1, 2, 3, 31, 34, 35, 43, 53, 63. §3.10; 5, 6, 7, 8, 10, 12, 16, 17, 18. §3.11; 5, 10 (use Maple), 28, 31, 41, 47.
3. The Zoo	3.1, 3.4, 3.7, 3.8, 3.9, and Appendix D	June 1	§3.1; 19, 34. §3.2; 3, 6, 20, 29 (use Maple). §3.4; 2, 3, 8, 10, 12, 15, 18, 21, 30, 35, 38, 42. §3.5; 12, 21, 22, 33, 44. §3.6; 17, 41, 46, 48. §3.7; 20, 23, 51. §3.8; 2, 3, 6, 8, 10, 13, 20, 29, 30, 35, 41, 46. §3.9; 11, 18, 22 (use Maple), 31, 34, 43. §3.10; 22, 29, 32. §3.11; 12 (use Maple), 35. Appendix D; 83, 84, 85, 87, 88, 93.
4. Theory/Prac	4.1-4.3	June 5	§4.1; 3, 4, 6, 8, 12, 31, 37, 46, 47, 48, 50, 58, 59. §4.2; 1, 5, 7, 11, 17, 23, 24, 26, 27. §4.3; 2, 6, 8, 11, 16, 21, 25, 26, 31, 40, 43, 67.

	4.4-4.5, 4.7	June 8	§4.4; 5, 14, 17, 21, 23, 24, 29, 36, 50, 52, 54, 57, 62, 65. §4.5; 3, 4, 7, 16, 29, 33, 46, 49. §4.7; 3, 4, 9, 10, 11, 25, 31, 34, 35, 48.
5. The Integral	Appendix E, 5.1-5.3	June 15	Appendix E; 1, 10, 11, 12, 21, 33. §5.1; 1, 3, 4, 11, 18. §5.2; 1, 2 (use Maple), 5, 17, 20, 30, 33, 36, 47, 50 §5.3; 2, 5, 9, 14, 17, 21, 26, 29, 34, 38, 39, 47, 55, 62.
	4.10, 5.4-5.5, 7.1	June 19	§4.10; 2, 8, 11, 12, 18, 29, 46, 48, 59, 65, 66. §5.4; 2, 5, 10, 14, 25, 26, 41, 48, 52, 56, 57. §5.5; 6, 7, 10, 12, 22, 28, 35, 37, 42, 43, 51, 58, 65, 77. §7.1; 3, 6, 9, 13, 18, 21, 26, 30.
6. Applications	6.1-6.3, 6.5	June 22	§6.1; 1, 2, 3, 6, 9, 21, 41, 45. §6.2; 1, 5, 6, 8, 12, 15, 31, 34, 43 (use Maple), 46, 48, 56, 59. §6.3; 3, 8, 13, 15, 21, 36, 38, 39, 44. §6.5; 3, 5, 10, 16.

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