NORTH CAROLINA STATE UNIVERSITY
DEPARTMENT OF MATHEMATICS

MA 121 – Elements of Calculus
Summer 2022

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Textbook: *Calculus and its applications*, Bittinger et al. 11th edition

Prerequisite: MA 107 or 111 with a C- or better, or 480 on the SAT Subject Test in Mathematics Level 2 or the NCSU Math Skills Test, or 2 or better on an AP Calculus exam.

Course Description: For students who require only a single semester of calculus. Emphasis on concepts and applications of calculus, along with basic skills. Algebra review, functions, graphs, limits, derivatives, integrals, logarithmic and exponential functions, functions of several variables, applications in management, applications in biological and social sciences. Credit is not allowed in more than one of MA 121, 131, 141. MA 121 may not be substituted for MA 131 or MA 141 as a curricular requirement.

Guide to instructors: MA 121 is a terminal, one-semester course in calculus designed for those students whose degree programs require a single calculus course. The typical additional requirement is MA 114. Overall, about half of the students are in economics and business, a quarter to a third are in biological sciences, and the remainder are scattered among design, forestry, liberal arts, textiles and animal science.

This course is not a simplified 141, or even a 131. It is not easier, rather, different. It covers more topics, but in less depth, than either of those two courses. We should emphasize concepts and ideas, strive for plausibility rather than rigor, and push for as much manipulative skill as time allows. Applications should be emphasized (the text is excellent in this regard). Also, to be emphasized are exponential functions and their applications, derivatives as rates of change, integrals as approximations to sums and as total change, simple models via differential equations, and computational aspects. These students are in areas where a brief introduction to multivariate mathematics is important. Trigonometry has been deleted.

Students sometimes appear in 121 classes who have poor backgrounds in algebra. For these, and others as well, a review is helpful (Appendix A in the textbook). However, MA 107 (or equivalent) is a prerequisite for this course, and it is reasonable to expect this background. Poorly prepared students should be encouraged to go back to MA 107.

On the whole, the textbook has received a very favorable response from those who have taught from it over the past few years. Students have found it quite readable. The "margin exercises" and end of chapter tests seem to be helpful. However, there is a lot of material to be covered. Some sections are rather long, and some selection/deletion of material may be necessary. Please give any comments to the course coordinator.

Homework: will be done through WebAssign. It consists of homework sets and practice tests (both graded), study tests (not graded). Jenn Burt will provide the details.

Tests: there are usually four tests:

- Test 1: Chapter R: R.1 – R.5; Chapter 1: 1.1 – 1.6;
- Test 2: Chapter 1: 1.7, 1.8; Chapter 2: 2.1 – 2.4;
- Test 3: Chapter 2: 2.5; Chapter 3: 3.1 – 3.5;
- Test 4: Chapter 4: 4.1 – 4.5; Chapter 5: 5.1 – 5.3, 5.6, 5.7.

Final exam: cumulative, i.e., topics of Tests 1-4 plus Chapter 6: 6.1 – 6.2.

Grading:

1. WebAssign Homework Assignments	20%
2. Tests (3x20%, the lowest test score is dropped)	60%
3. Final exam	20%

Grading Scale: $96 \le A+ \le 100$, $90 \le A < 96$, $85 \le A- < 90$, $80 \le B+ < 85$, $75 \le B < 80$, $70 \le B- < 75$, $66 \le C+ < 70$, $62 \le C < 66$, $58 \le C- < 62$, $55 \le D+ < 58$, $53 \le D < 55$, $50 \le D- < 53$, $0 \le F < 50$.