

Calculus has two main branches. *Differential calculus* is the study of rate of change, and its uses. *Integral calculus* is the study of how amount is deduced from rate of change. Students completing the course should be able to recognize and use the concepts and methods of differential and integral calculus when they occur in their disciplines.

**Text**

Hughes-Hallett et al, Applied Calculus, 3rd ed. (2005), John Wiley & Sons. Your instructor may also ask you to purchase Classpac material at NU Reprographics and/or download and print documents from the web.

**Prerequisites**

Knowledge of basic algebra at the level of MTHU121, including an introduction to functions and their graphs. You instructor may give an algebra quiz at the start of the course which you can use to gauge your preparation.

**Goal**

Develop graphical, numerical, and algorithmic understanding of:

1. the basic ideas of differential calculus, including average and instantaneous rates of change, and the derivative function;
2. the basic functions, including polynomial, exponential, logarithmic, and trigonometric functions, using the graphing calculator as a tool;
3. applications of differential calculus to optimization, motion problems, and mathematical models of physical and biological processes; and
4. the basic ideas of integral calculus: accumulated change, amount from rates, and the area under a curve (introduction).

**Office hours, Email, Web pages**

Office hours: Monday, 1–2pm and Wednesday, 12:30–2. 527 NI (Nightingale).

Email: [j.frampton@neu.edu](mailto:j.frampton@neu.edu).

Web: <http://www.math.neu.edu/~frampton/U141/>. Presently, only this syllabus and some information on where you can get assistance (other than office hours) is posted. But various other things will be posted later.

**Examinations and grading**

There will be at least one hour full period examination and 5 or 6 quizzes during the term. All will be announced at least one week before they occur. The final examination is a comprehensive two hour examination which will count for either 40% or 50% of your grade, depending on which is more advantageous for you. All students except those with legitimate conflicts will take the final exam at the scheduled time. The final exam is cumulative and is common to all sections of MTH U141. *Do not make travel plans which might conflict with the final exam.*

It is the Mathematics Department policy that an I (Incomplete) grade is rarely given. It is intended to cover real emergency situations in which a student is doing reasonably well (at least C minus) but is unable, due to circumstances beyond the student's control, to complete all course

requirements (e.g., is unable to take the final exam due to hospitalization). An I grade may not be used to rescue a failing grade or to postpone the final in the absence of a real emergency.

### **Problem resolution**

From time to time, issues or concerns arise in student/teacher interactions. Do not hesitate to let me know about the problem so we can attempt to resolve it. If there is a problem that we cannot resolve and you want to pursue the issue, you are encouraged to contact the Vice-Chair of the Mathematics Department, Professor Stanley Eigen (567 Lake, 373-5647, [eigen@lepton.neu.edu](mailto:eigen@lepton.neu.edu)).

### **Extra help**

For help other than what you get from asking questions in class and seeing me during office hours, see <http://www.math.neu.edu/~frampton/U141/academicassistance.html>.

### **Calculator**

You need to own and know how (or learn how) to use a graphing calculator. You should bring it to every class so that are prepared to use it in class when required. Learning how to use your calculator to do the kinds of things that calculus requires is considered part of the course. You should ask questions in class or get other help if you need it. You should not expect to ask questions about how to use your calculator when you are taking examinations.

**Detailed course contents** (2.4, for example, refers to Chapter 2, Section 4 of the textbook)

1. Functions	1.1–1.10
2. Rates of Change	2.1–2.4
3. Analytic tools for determining rates of change	3.1–3.5
4. Applications	4.1–4.4, 4.7
5. Differential equations	7.1, 10.1, 10.4
6. Integration	5.1–5.5, 7.3

Optional topics: One or more of the following optional topics will be studied. There will be one question on the final examination in which you will have a choice of problems to do, one of which will correspond to an optional topic which has been discussed in class. (Different sections may study different optional topics.)

1. More on optimization (using supplementary material).
2. More on related rates (using supplementary material).
3. More on differential equations (10.2, or 10.5).