

General Information.

Discipline: Mathematics

Course code: 201-NYA-05

Ponderation: 3-2-3

Credits: 2 $\frac{2}{3}$

Prerequisite: Secondary V Math TS5 or SN5 (or equivalent)

Objectives: 00UN, 00UU

Your teacher will give you his/her schedule and availability.
Students are strongly advised to seek help promptly from their teacher if they encounter difficulties in the course.

Introduction. Calculus I is the first of the required mathematics courses in the Science program. It is usually taken in the first semester and it introduces the student to the limit processes that are so vital to the development of calculus. Since differential calculus is a basic tool in physics, some of the applications will be related to problems in physics. To a lesser extent, differential calculus can also be applied to problems in chemistry and biology.

The primary purpose of the course is the attainment of objective 00UN (“To apply the methods of differential calculus to the study of functions and problem solving”). To achieve this goal, the course will help the student understand the following basic concepts: limits, continuity and derivatives involving real-valued functions of one variable (including algebraic, trigonometric, exponential, and logarithmic functions).

Emphasis will be placed on clarity and rigour in reasoning and in the application of methods. The student will learn to interpret the derivative both as a mathematical tool and as a rate of change. The derivative will be used in various contexts including velocity, acceleration, curve sketching, optimization and related rates. The basic concepts are illustrated by applying them to various problems where their application helps arrive at a solution. In this way, the course encourages the student to apply learning acquired in one context to problems arising in another. Towards the end of the course, the student will be introduced to antiderivatives in order to help with the transition from Calculus I to Calculus II.

Students may be permitted to use a scientific or graphing calculator in class; however, calculators (of any kind) will not be permitted on tests and the final exam. Students will also have access to computers where suitable mathematical software, including MAPLE, is available for student use. The course uses a standard college level calculus textbook, chosen by the Calculus I and Calculus II course committees.

Course Objectives. See below.

Required Text. *Single Variable Calculus: Early Transcendentals, 8th edition*, by James Stewart (Brooks/Cole, Cengage Learning 2012). Available from the college bookstore for about \$121.

OBJECTIVES	STANDARDS
<p>Statement of the Competency</p> <p>To apply the methods of differential calculus to the study of functions and problem solving (00UN).</p> <p>Elements of the Competency</p> <ol style="list-style-type: none"> To recognize and describe the characteristics of a function expressed in symbolic or graphic form. To determine whether a function has a limit. To determine whether a function is continuous at a point or on an interval. To determine whether a function is differentiable at a point or on an interval. To apply the rules and techniques of differentiation. To use the derivative and related concepts to analyze the variations of a function and to be able to graph it. To solve optimization and rate-of-change problems. To apply basic rules and techniques of integration. 	<p>General Performance Criteria</p> <ul style="list-style-type: none"> Appropriate use of concepts Appropriate use of terminology Representation of a situation as a function Accurate graphical representation of a function Correct choice and application of differential techniques Use of algebraic operations in conformity with rules Accuracy of calculations Correct interpretation of results Explanation of steps in problem-resolution procedure <p>Specific Performance Criteria</p> <p><i>[Specific performance criteria for each of these elements of the competency are listed in the full version of this outline, which is available online or from your instructor.]</i></p>

Teaching Methods. This course will be 75 hours, meeting three times a week for a total of five hours a week. It relies mainly on the lecture method, although some of the following techniques are also used: question-and-answer sessions, labs, problem solving periods, class discussions, and assigned reading for independent study. In general, each class begins with a question period on previous topics, then new material is introduced, followed by worked examples. No marks are deducted for absenteeism (however, see below). Failure to keep pace with the lectures results in a cumulative inability to cope with the material and a failure in the course. A student will generally succeed or fail depending on how many problems have been attempted and solved successfully. It is entirely the student’s responsibility to complete suggested homework assignments as soon as possible following the lecture, as the material will be fresher in his/her mind. This also allows the student the maximum benefit from any discussion of the homework (which usually occurs in the following class). Answers to a selected number of problems can be found in the back of the text. Individual teachers may provide supplementary notes and problems as they see fit.

Course Content (with selected exercises). This is a *minimal* list of exercises which you should attempt, assuming you are also doing regular homework (e.g., WEBWORK) assigned by your instructor.

- 1.1: 1, 2, 7, 9, 14, 49, 55, 63, 72, 73
1.2: 1, 3, 8, 10, 11, 17
1.3: 3, 6, 12, 24, 30, 31, 37, 41, 45, 53, 61, 63, 65
1.4: 12, 14, 21, 23, 30, 37
1.5: 18, 21, 37, 41, 50, 53, 56, 61
Chap. 1 Review (p. 69): 2, 10, 17, 18, 23, 24, 25a, 25b
2.1: [instructor's discretion]
2.2: 6, 9, 11, 17, 31, 35, 40
2.3: 2, 9, 15, 19, 23, 29, 37, 40, 43, 45, 53, 59, 64, 65
2.4: [instructor's discretion]
2.5: 4, 7, 21, 33, 35, 41, 46, 47, 52, 69, 71
2.6: 4, 9, 21, 24, 29, 32, 33, 39, 45, 49, 52, 54, 59, 63, 67
2.7: 3, 8, 10, 11, 17, 22, 23, 28, 35, 37, 39, 59, 60
2.8: 3, 25, 28, 30, 43, 51, 57, 63, 67
Chap. 2 Review (p. 166): 1, 2, 8, 12, 15, 17, 20, 22, 23, 29, 33, 36, 43, 47, 54
3.1: 3, 9, 23, 24, 27, 31, 37, 55, 60, 62, 66, 69, 81, 83, 86
3.2: 9, 15, 20, 23, 25, 26, 27, 32, 41, 44, 48, 49, 52, 53, 62
3.3: 5, 8, 13, 16, 20, 22, 32, 34, 37, 43, 45, 50, 52, 54, 58
3.4: 19, 25, 38, 40, 41, 44, 45, 48, 53, 59, 65, 74, 76, 78, 84
3.5: 7, 16, 19, 20, 21, 23, 29, 38, 39, 43, 46, 75, 77, 79, 80
3.6: 9, 12, 13, 21, 22, 29, 34, 40, 42, 45, 49, 50, 52, 56
3.7: 1, 5, 10
3.8: [instructor's discretion]
3.9: 12, 18, 23, 27, 29, 30, 33, 42, 44, 47, 50
Chap. 3 Review (p. 267): 28, 37, 41, 50, 53, 59, 60, 66, 81, 85, 89, 95, 98, 109, 112
4.1: 5, 7, 10, 13, 27, 39, 43, 44, 51, 56, 57, 63, 67, 72, 77
4.2: 9, 12, 18, 19, 22, 24, 25, 37, 38
4.3: 8, 11, 12, 16, 18, 19, 27, 30, 35, 45, 47, 55, 60, 75, 79, 82
4.5: 7, 13, 15, 24, 27, 30, 34, 39, 40, 43, 46, 50
4.7: 13, 16, 22, 33, 34, 36, 39, 50, 58, 68, 71, 73, 74
4.9: 5, 12, 15, 16, 29, 37, 38, 47, 50, 53, 55, 61, 63, 69, 77
Chap. 4 Review (p. 359): 5, 6, 17, 24, 29, 32, 47, 54, 72, 74, 78, 79, 84, 85
5.1: 5, 7, 17, 21, 25, 27
5.2: 4, 7, 17, 25, 30, 33, 37, 49, 53
5.3: 3, 7, 18, 26, 29, 33, 37, 41, 43, 63, 65, 73, 75, 83
5.4: 1, 4, 9, 14, 15, 16, 18, 29, 31, 37, 38, 46, 49, 61, 71
Chap. 5 Review (p. 422): 2, 5, 7, 12, 25, 40, 49, 58, 62, 67, 72

To strengthen your skills with more practice, attempt any of the exercises in the sections above which not omitted explicitly below. While doing so, it is a good idea to focus on types of problems with which you struggle.

Practice exercises: Omissions

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| 1.5: Omit 63–76 | 4.5: omit 41, 42, 45, 48, 51–54, 71 |
| Chap. 1 Review: omit 25c, 25d, 26d | 4.9: omit 18, 19, 22, 24, 33, 44 |
| 2.5: omit 29, 32, 60 | Chap. 4 Review: omit 7–14, 31, 33, 34, 61–64, 66, 68, 73, 81–83 |
| 2.6: omit 35, 40 | 5.3: omit 38, 39, 42, 62 |
| Chap. 2 Review: omit 19 | 5.4: omit 12, 13, 30, 40, 41, 43, 48 |
| 3.5: omit 17, 49–64 | Chap. 5 Review: omit 8, 14, 17–24, 26–38, 41, 42, 44, 56, 63, 65, 66, 71 |
| Chap. 3 Review: omit 6, 12, 17, 31, 38, 43, 45, 47, 48 | |
| 4.1: omit 42, 62 | |
| 4.2: omit 34, 35 | |
| 4.3: omit 56, 64 | |

Other Resources.

Math Website.

<http://departments.johnabbott.qc.ca/departments/mathematics>

Math Study Area. Located in H-200A and H-200B; the common area is usually open from 8:30 to 17:30 on weekdays as a quiet study space. Computers and printers are available for math-related assignments. It is also possible to borrow course materials when the attendant is present.

Math Help Centre. Located near H-211; teachers are on duty from 9:00 until 16:00 to give math help on a drop-in basis.

Peer Tutoring. Starting on the fifth week of each semester, first year students can be paired with a fellow finishing student for a weekly appointment of tutoring. Ask your teacher for details.

Academic Success Centre. The Academic Success Centre, located in H-117, offers study skills workshops and individual tutoring.

Departmental Attendance Policy. Regular attendance is expected. Missing six classes is grounds for automatic failure in this course. Many of the failures in this course are due to students missing classes.

Evaluation Plan. A student's Final Grade is a combination of the Class Mark and the mark on the Final Exam. The Class Mark will be 75% (three to five tests) and 25% at your teacher's discretion (more tests, quizzes or assignments). The specifics of the Class Mark are included in an appendix that is distributed to students along with this course outline. The Final Exam is set by the NYA course committee (which consists of all instructors currently teaching this course), and is marked by each individual instructor. Every effort is made to ensure equivalence between the various sections of the course.

The Final Grade will be the better of:

50% Class Mark and 50% Final Exam Mark

or

25% Class Mark and 75% Final Exam Mark

A student *choosing not to write* the Final Exam will receive a failing grade of 50% or their Class Mark, whichever is less.

Students must be available until the end of the final examination period to write exams.

Course Costs. In addition to the cost of the textbook (see above), your instructor might recommend you acquire an inexpensive scientific calculator (\$15-\$25). *No calculators are allowed during tests or the final exam.*

College Policies. Article numbers refer to the IPESA (Institutional Policy on the Evaluation of Student Achievement, available at <http://johnabbott.qc.ca/ipesa>). Students are encouraged to consult the IPESA to learn more about their rights and responsibilities.

Changes to Evaluation Plan in Course Outline (Article 4.3). Changes to the evaluation plan, during the semester, require unanimous consent.

Mid-Semester Assessment MSA (Article 3.3). Students will receive an MSA in accordance with College procedures.

Religious Holidays (Article 3.2). Students who wish to observe religious holidays must inform their teacher in writing within the first two weeks of the semester of their intent.

Grade Reviews (Article 3.2, item 19). It is the responsibility of students to keep all assessed material returned to them in the event of a grade review. (The deadline for a Grade Review is 4 weeks after the start of the next regular semester.)

Results of Evaluations (Article 3.3, item 7). Students have the right to receive the results of evaluation, for regular day division courses, within two weeks. For evaluations at the end of the semester/course, the results must be given to the student by the grade submission deadline.

Cheating and Plagiarism (Articles 8.1 & 8.2). Cheating and plagiarism are serious infractions against academic integrity, which is highly valued at the College; they are unacceptable at John Abbott College. Students are expected to conduct themselves accordingly and must be responsible for all of their actions.