

Peace River High School
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Peace River High School

Mathematics 31 Course Outline and Syllabus



February 2017

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Course Philosophy

Mathematics 31 emphasizes the theoretical and practical development of topics in the algebra of functions, trigonometry, differential calculus and integral calculus up to a standard acceptable for entry into all first year programs in mathematics, science, engineering, and business. The course is designed to bridge the gap between the Mathematics 10C, 20-1, and 30-1 sequence and the calculus course sequences offered by post-secondary institutions.

The specific purposes of the mathematics 31 course of studies are as follows:

- ✓ To develop an understanding of the algebra of functions and transformations, together with their graphs and to apply these understandings in different areas of mathematics.
- ✓ To develop a fluency in algebraic computations involving rational expressions. Inequalities, absolute values, and trigonometric functions.
- ✓ To introduce the principle concepts and methods of differential and integral calculus.
- ✓ To develop skills in problem solving and reasoning, using calculus concepts and procedures as the context.
- ✓ To apply the methods of calculus to various simple applications.

Evaluation

Evaluation consists of two major components: term work, worth 65% of the final grade, and a final exam, worth 35% of the grade. The term work consists of the cumulative average of the assignments, quizzes, and unit tests as well as a scheduled midterm exam.

Evaluation Categories

Quizzes and Assignments: Homework is assigned on a daily basis, with weekly assignments. Quizzes will occur about twice a Unit and will always be announced.

Unit Exams: These will occur at the completion of a section of the curriculum. They may include more than one chapter of material.

Midterm and Final Exams: The midterm exam is scheduled for early April, and the final exam will take place during the week of June 22nd to 28th and will cover material from the entire course.

Category	Term work	Final Exam
Assignments	25%	
Quizzes	27.5%	
Tests	37.5%	
Midterm Exam	10%	
Percentage of Final Mark	65%	35%

Reporting Periods

First report card – April 6th

Second report card – First week in July.

General Expectations

1. **Regular attendance** – After an absence, it is your responsibility to catch up on missed work.
2. **Arrive on time** –If lateness is unavoidable, please enter the classroom with a minimum of disruption. Chronic lateness will not be tolerated.
3. **Come prepared** – Bring books, pencils, calculators, etc. to class each day. All math is to be done in pencil. All handouts, quizzes, assignments, and exams are to be kept in order in a binder. These will assist you as a study guide.
4. **Work Habits** – Class time will frequently be given to complete **assignments**. Stay on task during these times. While I am providing instruction, I expect you to be listening and not talking or on personal electronic devices. You may of course raise your hand and ask questions.

Course Outline

The course consists of 5 different units. Three are **required components (R)**, and two other **elective units (E)**. A tentative timeline is given for each unit as well as the student objectives.

1) **Rates of Change, Limits, and Derivatives (R)** Feb. 1st – March 7th

After completing this section, students will be expected to:

- a) Have acquired reliability and fluency in the algebraic skills of factoring, operations with radicals and radical expressions, coordinate geometry, and transformations of functions.
- b) Solve linear, quadratic and absolute value inequalities and equations.
- c) Express the concept of limit numerically and geometrically.
- d) Calculate limits, using first principles and the limit theorems.
- e) Determine the limits of convergent infinite series and sequences.
- f) Find derivatives of algebraic functions.
- g) Determine equations of tangents at specific points.
- h) For selected functions, prove derivatives using first principles.
- i) Use the power, chain, product, and quotient rules to calculate derivatives.
- j) Use implicit differentiation to find the derivatives of certain algebraic relations.
- k) Determine, algebraically, the higher derivatives of a function.

Chapters 1 and 2

2) **Applications of Derivatives (R)**

March 8th – April 6th

After completing this section, students will be expected to:

- a) Provide systematic sketches of graphs of polynomial, rational, algebraic, and trigonometric functions of one variable.
- b) Solve maximum and minimum or related rate problems in economic and geometric contexts.
- c) Construct maximum, minimum, and related rate models in geometric contexts.
- d) Use the techniques of derivatives to solve problems based on the models constructed.

Chapters 3, 4 and 5

3) **Trigonometric Functions and Derivatives of Trigonometric Functions (R)**

April 17th – May 5th

After completing this section, students will be expected to:

- a) Solve trigonometric equations and identities.
- b) Understand and use the limits of trigonometric functions.
- c) Find derivatives of trigonometric functions.

Chapters 6 and 7

4) **Calculus of Exponential and Logarithmic Functions, and Differential Equations**

(E)

May 8th – 24th

After completing this section, students will be expected to:

- a) Represent symbolically and graphically, differentiate, and integrate exponential and logarithmic functions.
- b) Solve problems where the modeling equations are given.
- c) Construct equations to model a situation with the given parameters.
- d) Find the antiderivatives of any polynomial function, simple rational, algebraic, and trigonometric functions.

Chapters 8 and 9

5) **Areas and Integrals(E)**

May 25th – June 16th

After completing this section, students will be expected to:

- a) Use antiderivatives to find areas under curves.
- b) Use the connection between derivatives and integrals to relate displacement, velocity, and acceleration.
- c) Illustrate the properties of antiderivatives, definite integrals, and the fundamental theorem of calculus, using geometric representations.

Chapters 10 and 11

6) **Review**

June 19th – 22nd

Other elective topics consisting of Biological Applications, Calculus Theorems, and Methods of Integration are also interspersed throughout the Chapters.

Textbook

The text is entitled Calculus, A First Course by James Stewart, et al.

Attendance

To be successful in Math 31 the student must be attending classes and doing the work associated with learning the concepts and skills of the course. Regular school attendance policies are followed in Math 31. If the student knows that they will be away for an extended period of time, they must notify the teacher prior to the absence so some work can be assigned to insure the student does not get behind.

Teaching Techniques

The methods used for instruction will include lecture, question and answer discussions, small group work, investigative group work, and individual tutorials. A variety of multi-media utilities will be incorporated throughout the course including software, videos, and power point presentations, edmodo site, and links to resources via the internet.

If you have any questions with the information contained in this course outline, please do not hesitate to contact me at the school. Thank you.

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