GPRC

DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE – WINTER 2016

MA0131 (E3): Mathematics Grade 12 Calculus Equivalent – 5 (5-0-0) HS

INSTRUCTOR:	Reddy Ganta	**PHONE:**	(780) 539-2810 or 2850
OFFICE:	J220	**E-MAIL:**	rganta@gprc.ab.ca
OFFICE HOURS:	TBA		

CALENDAR DESCRIPTION:

This course includes limits of sequences, series, and functions, secants and tangents, derivatives from first principles, chain rule, product rule, quotient rule, implicit differentiation, curve sketching, maximum and minima applications, related rates applications, anti-derivatives and area, limits and derivatives of trigonometric functions.

PREREQUISITES:

MA0120 or equivalent. Pre or Co-requisite: MA0130

REQUIRED TEXT/RESOURCE MATERIALS:

Package of MA0131 modules, 2007
Scientific calculator, graphing paper

DELIVERY MODES:

- MA0131 is a modularized math course divided into 9 separate units called modules. The instructions for each topic are given in the modules, followed by several examples and exercises. Study the instructions and work through the examples before starting each exercise. The answers for each exercise are given at the end of each module. Check your work often to make sure you understand each topic. The key to success in working with modules is to ask questions whenever you have difficulty understanding instructions, the examples, or the exercises. **Do not hesitate to ask for help.**

- **Module tests must be written as listed on page 5.** Follow these dates as closely as you can. You must revise and review the material thoroughly before taking Module test(s) / exam. You are encouraged to write a test early if you are prepared. When writing a test, be sure to show all of your work on the test paper. Marks are given for the method as well as the final answer. Even though 50% is a passing mark, a mark of at least 60% in any section(s) test is recommended.

- **Only one test re-write of your choice is allowed. It will replace the corresponding mark, and must be taken during the last week of classes.**

- Upon completion of the first four modules, a midterm test will be written on or before **Thursday, Feb. 25**. If you miss this date, you will receive a mark of 0% on your midterm. Upon completion of all nine sections, you will write a three hour final exam. Be sure to leave time to prepare for this important exam! It is worth a large percentage of your final grade.

- **Consult your instructor immediately if you find yourself falling behind schedule.** Your instructor may ask you to spend more time in the Math Lab and get help often. **All tests / rewrite must be written by Thursday, April 7.**

COURSE OBJECTIVES:

This course introduces students to:

- the review of graphing of functions by applying transformations to the graphs of a known function
- the review of factoring expressions with integral and rational exponents, rationalize expressions, and the four basic operations
- the limit of a functions using the graph of the function and using the limit theorems
- concept of a continuous and discontinuous function
- definition of a derivative to determine the derivative of $f(x) = x^n$ where n is a positive integer
- differentiation of a polynomial function and derivative to determine a rate
- chain rule in combination with a product and quotient rule to determine the derivative
- slope and equation of the tangent at a given point using the derivative of a function
- intervals where the derivative is greater than zero or less than zero
- use of the derivatives to determine maximum and minimum values for applications, and to solve rate of change applications
- anti-derivatives of polynomial, radical, and rational functions
- area between a curve and the x-axis over a given interval

- limit for a trigonometric function as the angle approaches a finite or infinite value
- derivative of thee three primary and three reciprocal trigonometric functions
- derivative of more complicated trigonometric functions using the power, chain, product, and quotient rules

COURSE OUTCOMES:

As a result of taking this course, students will gain the ability to:
- draw graphs of a functions by applying transformations to the graphs of known functions
- simplify rational expressions, using any of the four basic operations
- determine the limit of a functions for a given value using the graph of the function
- compute limits of functions, using definitions and limit theorems
- determine the slopes and equations of the tangent and the normal lines at a given point on a curve, using the definition of a derivative
- differentiate polynomial functions, using the derivative theorems for sum and difference
- determine the derivative of a combination function with the product and quotient using the chain rule
- differentiate a function using implicit differentiation
- sketch the graph of a function using first and second derivatives to find maxima, minima, and inflection point
- determine intervals where the derivative is greater than zero or less than zero in order to predict where the function is increasing or decreasing
- determine whether or not a critical point is a maximum or a minimum
- determine maximum or minimum values for application involving numbers, geometry, distance and time, economics, and science
- solve rate of change applications relating to science, area, volume, and related motion
- determine the area between a curve and the x-axis over a given interval
- determine velocity and displacement by finding the anti-derivatives of acceleration and velocity functions
- determine the limit for a trigonometric function as the angle approaches a finite or infinite value
- find the derivative of more complicated trigonometric functions using the power, chain, product and quotient rule

TRANSFERABILITY:

This course is listed in the Alberta Transfer Guide. It is accepted at colleges and universities in Alberta as equivalent to Math 31.

GRADING CRITERIA:

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	**4-point Equivalent**	**Percentage Guidelines**	**Designation**
A$^+$	4.0	90 – 100	EXCELLENT
A	4.0	85 – 89	
A$^-$	3.7	80 – 84	FIRST CLASS STANDING
B$^+$	3.3	77 – 79	
B	3.0	73 – 76	GOOD
B$^-$	2.7	70 – 72	
C$^+$	2.3	67 – 69	SATISFACTORY
C	2.0	63 – 66	
C$^-$	1.7	60 – 62	
D$^+$	1.3	55 – 59	MINIMAL PASS
D	1.0	50 – 54	
F	0.0	0 – 49	FAIL
WF	0.0	0	FAIL, withdrawal after the deadline

MA0131 TESTS / EXAMS

Module	TOPIC/DESCRIPTION	Recommended Time & Test Date	Date written	Your mark
1	Review	Thursday, Jan. 14		
2	Limits	Tuesday, Jan. 26		
3	The Derivative	Thursday, Feb. 4		
4	More Derivatives	Tuesday, Feb. 23		
	MIDTERM - must be written on or before	**Thursday February 25**		
5	Curve Sketching	Thursday, Mar. 3		
6	Applications: Maximum/Minimum	Tuesday, Mar. 15		
7	Applications: Rate of Change	Thursday, Mar. 24		
8	Anti-derivatives and Area	Thursday, Mar. 31		
9	Derivatives of Trigonometric Functions	Thursday, Apr. 7		
	FINAL EXAM - 3 HOURS	**To be announced Apr. 15 - 26**		

EVALUATION CRITERIA:

Your final mark is determined by:

9 module tests	45 %
Midterm	15 %
Final Exam	40 %

MA0131 Winter 2016
Homework Schedule

1. **Review**

1-3	4-5	
Jan. 7	**12**	**Test: Thu., Jan. 14**

2. **Limits**

1-2	3-5	Review	
Jan. 14	**19**	**21**	**Test: Tues., Jan. 26**

3. **The Derivative**

1	2-6	Review	
Jan. 26	**28**	**Feb. 2**	**Test: Thu., Feb. 4**

4. **More Derivatives**

1-2	3-4	5 & Review	
Feb. 4	**9**	**11**	**Test: Tues., Feb. 23**

Midterm Exam on Thursday, February 25

5. **Curve Sketching**

1-2	2 & Review	
Feb. 25	**Mar. 1**	Test: **Thu., Mar. 3**

6. **Applications: Maximum/Minimum**

1-2	3-4	Review	
Mar. 3	**8**	**10**	**Test: Tues., Mar. 15**

7. **Applications: Rate of Change**

1-2	3-5	Review	
Mar. 15	**17**	**22**	**Test: Thu., Mar. 24**

8. **Anti-derivatives and Area**

1-5	6-7 & Review	
Mar. 24	**29**	**Test: Thu., Mar. 31**

9. **Derivatives of Trigonometric Functions**

1-4	5 & Review	
Mar. 31	**Apr. 5**	**Test: Thu., Apr. 7**

Final Review (Apr. 7-12)

Final exam to be announced   **(April. 15 - 26)**

STUDENT RESPONSIBILITIES:

In addition to the *Student Rights and Responsibilities* as set out in the college website: https://www.gprc.ab.ca/files/forms_documents/StudentRightsandResponsibilities.pdf the following guidelines will maintain an effective learning environment for everyone:

1. Regular attendance is expected of all students in all mathematics courses. Your success in math is directly linked to your attendance. Attendance will be taken daily.

2. Students are expected to be punctual. Arrive on time for classes and remain for the duration of scheduled classes.

3. Refrain from disruptive talking or socializing during class time.

4. Be respectful of others regarding food or beverages in the classroom. Clean up your eating area and dispose of garbage.

5. Recycle paper, bottles, and cans in the appropriate containers.

6. Children are not permitted in the classrooms.

7. Students are expected to notify the instructor of any extenuating circumstances.

ELECTRONIC DEVICES:
Students are expected to turn off cell phones during class time or in labs. No unspecified electronic devices will be allowed in exams.

STUDENT PRINTING POLICY:
Please refer to the College website:
https://www.gprc.ab.ca/files/policies/admin/StudentPrintingPolicy.pdf for the printing policy which limits the free use of paper; extra charges will applied if the limit is exceeded.

STATEMENT ON PLAGIARISM AND CHEATING: Refer to the Student Conduct section of the College Admission Guide at http://www.gprc.ab.ca/programs/calendar/ or the College Policy on Student Misconduct: Plagiarism and Cheating at

http://www.gprc.ab.ca/files/forms_documents/Student_Misconduct.pdf