

MAT8101
Differential Calculus

Course Section Information

Text: Basic Technical Mathematics with Calculus – SI Version, 9th Edition, Allyn Washington, Pearson Education Canada.

Topics	References	Hours
1. Derivatives of Algebraic Functions <ul style="list-style-type: none"> • Limits • Indeterminate form 0/0 • Limits at infinity • Definition of the derivative at a point • Interpretation of the derivative as the slope of a tangent • Definition of the derivative at any point • Average rate of change • Instantaneous rate of change • Derivative of a constant • Derivative of a power of x • Derivative of a constant times a function • Derivative of a sum/difference • Derivatives of polynomials 	Chapter 23 Sec. 23.1 Sec. 23.2, 23.3 Sec. 23.4 Sec. 23.5 Sec. 23.6 Sec. 23.7 Sec. 23.8 Sec. 23.9	12
Assignment 1 (Sec. 23.1 – 23.5) <ul style="list-style-type: none"> • Derivatives of products of functions • Derivatives of quotients of functions • Chain rule • Derivative of a power of a function • Derivatives of implicit functions • Higher-order derivatives 	Sec. 23.6 Sec. 23.7 Sec. 23.8 Sec. 23.9	
Assignment 2 (Sec. 23.6 – 23.9) Test 1 (Sec. 23.1 – 23.9)		
2. Graphical Applications of the Derivative <ul style="list-style-type: none"> • Tangents and normals • Approximate solution of equations by Newton's method • Curve sketching – Domain, x and y intercepts, intervals of increase and decrease, local maximum and minimum points, concavity and points of inflection • Curve sketching – Vertical and horizontal asymptotes 	Chapter 24 Sec. 24.1 Sec. 24.2 Sec. 24.5 Sec. 24.6	10
Assignment 3 (Sec. 24.1, 24.2, 24.5, 24.6)		
3. Other Applications of the Derivative <ul style="list-style-type: none"> • Rate of change • Related rates 	Chapter 24 Sec. 24.4	5

- Applied maximum and minimum problems Sec. 24.7
 - Differentials and estimating errors in measurement Sec. 24.8
- Assignment 4 (Sec. 24.4, 24.7, 24.8)**
Test 2 (Sec. 24.1, 24.2, 24.4 - 24.8)

4. Derivatives of Transcendental Functions	Chapters 27	9
• Derivatives of the sine and cosine functions	Sec. 27.1	
• Derivatives of the tan, cot, sec, and csc functions	Sec. 27.2	
• Derivatives of the inverse trigonometric functions	Sec. 27.3	
Quiz 1 (Sec. 27.1 – 27.3)		
• Derivatives of the natural logarithmic function	Sec. 27.5	
• Derivatives of the exponential function to base e	Sec. 27.6	
5. Integration	Chapter 25	3
• Antiderivatives	Sec. 25.1	
• The indefinite integral notation	Sec. 25.2	
• The indefinite integral of a polynomial		
Quiz 2 (Sec. 27.5, 27.6, 25.1, 25.2)		

Teaching hours: 39

Evaluation

• 4 Assignments	20%	
• 2 In Class Quizzes (20 minutes maximum)	10%	1
• 2 Tests	40%	2
• 1 Final Assessment	30%	3

Evaluation hours: 6

Total hours: 45