University at Buffalo

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MTH 138: College Calculus 2A

Number of Course Credits: 2

Course Description

This half-semester course comprises the first half of MTH 142.
MTH 138 and MTH 139 together are equivalent to MTH 142.

Required Text(s) & Materials

Calculus: Early Transcendentals, Ninth Edition, James Stewart, Daniel Clegg, Saleem Watson.

Prerequisites

MTH 137 with a recommended grade of C or higher.

Notes

This course covers the first half of the material of MTH 142. Topics of MTH 138 include differentiation and integration of transcendental functions; integration methods; additional topics in analytic geometry.

Learning Outcomes

Outcome (Student will be able to...)	Method of Assessment
– Interpret the area enclosed between curves as a definite integral and compute its value. – Using disks/washers, interpret the volume of a solid of revolution as a definite integral and compute its value. – Compute indefinite and definite integrals using integration by parts, by substitution (including trigonometric substitutions)	HW 1, 2, 3 Exam 1
– Compute indefinite and definite integrals using decomposition of rational expressions into partial fractions. – Compute indefinite and definite integrals using strategy for integration. – Determine convergence or divergence of an improper integral. When convergent, determine the value of the improper integral. – Compute the length of a curve segment from its Cartesian representation.	HW 4, 5, 6 Exam 2
– Choose appropriate methods or models for a given problem, using information from observation or knowledge of the system being studied.	HW 1, HW 2, HW 3, HW 4, HW 5, HW 6, Exam 1, Exam 2
– Employ quantitative methods, mathematical models, statistics, and/or logic to analyze data and solve real-world problems beyond the level of basic algebra.	HW 1, HW 2, HW 3, HW 4, HW 5, HW 6, Exam 1, Exam 2
– Identify common mistakes and/or limitations in a.) empirical and/or deductive reasoning, and b.) mathematical, quantitative, and/or logical problem solving.	HW 1, HW 2, HW 3, HW 4, HW 5, HW 6, Exam 1, Exam 2
– Interpret mathematical models, formulas, graphs, and/or tables, to draw inferences from them, and explain these inferences.	HW 1, HW 2, HW 3, HW 4, HW 5, HW 6, Exam 1, Exam 2

Course Schedule

Week	Sections	Topics	Exams
1	5.5, 6.1	The substitution rule. Areas between curves.	
2	6.2, 7.1	Volumes (Solids of revolution: dish/washer method). Integration by parts.	
3	7.1, 7.2, 7.3	Integration by parts. Trigonometric integrals. Trigonometric substitution.	
4	7.3, 7.4	Trigonometric substitution. Integration of Rational Function by Partial Fractions.	Exam 1
5	7.4	Integration of Rational Function by Partial Fractions. Strategy for Integration.	
6	7.5, 7.8	Strategy for Integration. Improper Integrals.	
7	8.1	Arc length.	Exam 2

Exam Schedule

Date	Subject
Week 4	Exam 1
Week 7	Exam 2