

Department of Mathematics | School of Science
Advanced Calculus | Short Syllabus

Course name and code: Advanced Calculus (0331301).

Credit hours: 3 hrs. **Prerequisite:** Calculus III (0301201).

Instructor Name	Prof. Baha Alzalg
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Course Description: Vector differential calculus: Gradient, divergence, curl, curvilinear coordinates; Vector integral calculus: Line integral, surface integral volume integral, Green's theorem, Stokes' theorem, divergence theorem; Implicit and inverse function theorems; Leibnitz theorem; Calculus of variations (functionals of one variable).

Tests and evaluations: The final grade is calculated as follows:

Exams		
Midterm Exam (30 %)	Second Exam (20 %)	Final Exam (50 %)

Contents and schedule: The following is a rough plan. As the course progresses, I may include new topics and/or delete some of the ones listed here.

Topics	Week
Functions of several variables (limits, continuity, and partial deriv.)	1-3
The three linear operators: a) Gradient. b) Divergence. c) Curl.	4-6
The three different types of integrals: a) Line integral. b) Surface integral. c) Volume integral.	7-10
The six main theorems: a) Green's Theorem. b) Stokes' Theorem. c) Divergence Theorem. d) Implicit Function Theorem. e) Inverse Mapping Theorem. f) Leibnitz Theorem.	11-15
Calculus of variation: Functionals of one variable.	16

Textbooks:

- Calculus: Early Transcendentals*, 8th Edn, by James Stewart.
- Advanced Calculus*, 5th Edn, by Wilfred Kaplan.

References:

- Calculus: Early Transcendentals*, 10th Edn, H. Anton, I. Bivens and S. Davis.
- Advanced Calculus*, 3th Edn, by R. C. Buck.