

PHYSICS 400-001 / CRN 73200
APPLICATIONS OF MATHEMATICS IN PHYSICAL SCIENCES
FALL 2010 / August 23-December 17
Watanabe Hall 114 / MWF, 11:30 AM - 12:20 PM

Instructor

Dr. Chester Vause

Professor, Department of Physics & Astronomy

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Office Hours: MW 2:00PM-3:00PM, TTh 12:00 PM-1:00 PM, or by appointment.

Textbook (Required)

Mathematical Methods for Physicists (6th edition), George B. Arfken and Hans J. Weber
(Elsevier Academic Press, Oxford, UK, 2005)

Chapters

Selected topics in textbook chapters:

- 6 Functions of a Complex Variable I
- 7 Functions of a Complex Variable II
- 15 Integral Transforms
- 2 Vector Analysis in Curved Coordinates and Tensors
- 3 Determinants and Matrices
- 9 Differential Equations
- 10 Sturm-Liouville Theory-Orthogonal Functions
- 12 Legendre Functions
- 13 More Special Functions

Omitted sections in chapters to be announced in class. Selected topics in other chapters may be included, time permitting.

Student Learning Outcomes

Among the student learning outcomes of this course are the abilities to:

- (a) Use complex variables, analytic function theory, and contour integration in the solution of mathematical problems applied to physics
- (b) Apply vector and tensor calculus in the formalism of physical theories
- (c) Formulate general linear equations in terms of matrix algebra and the eigenvalue problem as applied in physics
- (d) Understand the general mathematical formulation of orthogonal functions resulting from ordinary differential equations used in physics and the relationship to linear algebraic vector spaces

Holidays

Monday	September 6	Labor Day
Tuesday	November 2	General Election Day
Thursday	November 11	Veterans Day
Thursday	November 25	Thanksgiving Day
Friday	November 26	Instructional Holiday

2010-2011 Calendar: <http://www.catalog.hawaii.edu/about-uh/calendar.htm>

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Grade

Homework Problems

Homework problems assigned weekly. Selected problems will be graded.

Exams

In-class exams are open textbook, class notes, table of integrals and mathematical formulas, and calculator. Exam dates are:

Exam 1	Friday	September 24, 2010
Exam 2	Friday	October 22, 2010
Exam 3	Friday	November 19, 2010
Final Exam	Monday	December 13, 2010, 12:00PM – 2:00PM

$$\text{Total Score (100\%)} = 64\% \text{ (Exams)} + 36\% \text{ (Homework)}$$

Each Exam is worth 16% of the Total Score ($4 \times 16\% = 64\%$). Each Exam (including the Final Exam) is based on material covered since the previous Exam. Letter grade is determined from the total score according to the following scale:

A- (86%-90%)	A (91%-95%)	A+ (96%-100%)
B- (61%-70%)	B (71%-80%)	B+ (81%-85%)
C- (31%-40%)	C (41%-50%)	C+ (51%-60%)
	F (0%-20%)	D (21%-30%)

NO INCOMPLETE GRADE GIVEN