PHYS 205: ADVANCED MATHEMATICAL METHODS IN PHYSICS

In Workflow

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Approval Path

1. Fri, 13 Sep 2024 19:53:23 GMT
   Mikkel Jensen (mikkel.jensen): Approved for PHYS Committee Chair
2. Fri, 13 Sep 2024 19:59:21 GMT
   William DeGraffenreid (degraff): Approved for PHYS Chair
3. Wed, 02 Oct 2024 22:34:19 GMT
   Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Fri, 11 Oct 2024 18:35:28 GMT
   Chris Taylor (ctaylor): Approved for NSM Dean

New Course Proposal

Date Submitted: Wed, 11 Sep 2024 16:23:16 GMT

Viewing: PHYS 205 : Advanced Mathematical Methods in Physics

Last edit: Wed, 02 Oct 2024 22:33:04 GMT

Changes proposed by: Rodolfo Barniol Duran (219696192)

Contact(s):

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Catalog Title:
Advanced Mathematical Methods in Physics

Class Schedule Title:
Advanced Math Methods

Academic Group: (College)
NSM - Natural Sciences & Mathematics

Academic Organization: (Department)
Physics and Astronomy

Will this course be offered through the College of Continuing Education (CCE)?
No

Catalog Year Effective:
Fall 2025 (2025/2026 Catalog)

Subject Area: (prefix)
PHYS - Physics

Catalog Number: (course number)
205

Course ID: (For administrative use only.)
TBD

Units:
3

Is the ONLY purpose of this change to update the term typically offered or the enforcement of existing requisites at registration?
No

In what term(s) will this course typically be offered?
Fall term only

Does this course require a room for its final exam?
Yes, final exam requires a room

Does this course replace an existing experimental course?
No

This course complies with the credit hour policy:
Yes

Justification for course proposal:
Advanced physics courses make use of mathematical methods in order to analyze and solve advanced physics problems. The purpose of this course is to provide the mathematical methods needed in the MS in Physics. As such, this course serves as a "core" course in the MS in Physics program.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)
Introduction to functional analytic methods relevant for problems in advanced physics, including numerical analysis, complex variables, functional analysis, partial differential equations, boundary value problems, Green's functions, linear vector spaces, operators, complete sets of functions, and calculus of variations.

Are one or more field trips required with this course?
No

Fee Course?
No

Is this course designated as Service Learning?
No

Is this course designated as Curricular Community Engaged Learning?
No

Does this course require safety training?
No

Does this course require personal protective equipment (PPE)?
No

Does this course have prerequisites?
Yes

Prerequisite:
PHYS 105, or instructor permission

Prerequisites Enforced at Registration?
Yes

Does this course have corequisites?
No

Graded:
Letter

Approval required for enrollment?
No Approval Required

Course Component(s) and Classification(s):
Lecture

Lecture Classification
CS#02 - Lecture/Discussion (K-factor=1WTU per unit)

Lecture Units
3

Is this a paired course?
No

Is this course crosslisted?
No

Can this course be repeated for credit?
No

Can the course be taken for credit more than once during the same term?
No

Description of the Expected Learning Outcomes and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Solve partial differential equations relevant for advanced electromagnetism and advanced quantum mechanics	-homework assignments -Midterm examinations -a Final examination
2	Evaluate the role that solutions of partial differential equations have in current practical physical applications such as the wave and heat equations in different coordinate systems	-homework assignments -Midterm examinations -a Final examination
3	Construct solutions for advanced physics problems using tools such as Fourier transforms, Dirac delta function and Green's functions	-homework assignments -Midterm examinations -a Final examination
4	Analyze functions of a complex variable and their application in current practical physical applications such as the wave and heat equations in different coordinate systems	-homework assignments -Midterm examinations -a Final examination
5	Derive solutions to physical problems using advanced linear algebra methods such as Gram-Schmidt orthonormalization and tensors	-homework assignments -Midterm examinations -a Final examination

Attach a list of the required/recommended course readings and activities:
PHYS 205 Advanced Mathematical Methods in Physics.pdf

For whom is this course being developed?
Majors in the Dept

Is this course required in a degree program (major, minor, graduate degree, certificate?)
Yes

Has a corresponding Program Change been submitted to Workflow?
No

Identify the program(s) in which this course is required:

Programs:
MS in Physics

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?

No

Will there be any departments affected by this proposed course?

No

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.

I/we agree

University Learning Goals

Graduate (Masters) Learning Goals:

Disciplinary knowledge
Critical thinking/analysis

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

Is this a Graduate Writing Intensive (GWI) course?

No

Key: 14746