PHYS 262: COMPUTATIONAL PHYSICS

In Workflow

1. PHYS Committee Chair (mikkel.jensen@csus.edu)
2. PHYS Chair (degraff@csus.edu)
3. NSM College Committee Chair (mikkel.jensen@csus.edu)
4. NSM Dean (datwyler@csus.edu)
5. Academic Services (catalog@csus.edu)
6. Senate Curriculum Subcommittee Chair (curriculum@csus.edu)
7. Dean of Undergraduate (gardner@csus.edu)
8. Dean of Graduate (cnewsome@skymail.csus.edu)
9. Catalog Editor (catalog@csus.edu)
10. Registrar's Office (k.mcfarland@csus.edu)
11. PeopleSoft (PeopleSoft@csus.edu)

Approval Path

1. Fri, 13 Sep 2024 20:20:03 GMT
   Mikkel Jensen (mikkel.jensen): Approved for PHYS Committee Chair
2. Fri, 13 Sep 2024 20:21:00 GMT
   William DeGraffenreid (degraff): Approved for PHYS Chair
3. Wed, 16 Oct 2024 22:20:22 GMT
   Mikkel Jensen (mikkel.jensen): Rollback to Initiator
4. Fri, 31 Jan 2025 19:18:29 GMT
   Mikkel Jensen (mikkel.jensen): Approved for PHYS Committee Chair
5. Fri, 31 Jan 2025 19:38:39 GMT
   William DeGraffenreid (degraff): Approved for PHYS Chair
6. Thu, 06 Feb 2025 23:02:07 GMT
   Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
7. Wed, 19 Feb 2025 23:53:53 GMT
   Chris Taylor (ctaylor): Approved for NSM Dean

New Course Proposal

Date Submitted: Sat, 11 Jan 2025 01:22:39 GMT

Viewing: PHYS 262 : Computational Physics

Last edit: Sat, 11 Jan 2025 01:22:38 GMT

Changes proposed by: Rodolfo Barniol Duran (219696192)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
Rodolfo Barniol Duran	barniolduran@csus.edu	916-278-5827
Michael Ray	ray@csus.edu	916-278-6501
Alexander Pettitt	pettitt@csus.edu	916-278-6362
Christopher Taylor	ctaylor@csus.edu	916-278-6518
Christopher Hodges	christopher.hodges@csus.edu	916-278-6518

Catalog Title:
Computational Physics

Class Schedule Title:
Computational Physics

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)
262

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 - odd years

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:
Solving advanced physics problems using computational methods has become essential in the past several decades. For this reason, we propose an elective course to equip MS in Physics students with computational tools tailored to numerical methods commonly used in solving physics problems.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)
Numerical analysis and computational assessment of a variety of problems in advanced physics. Topics will include: basic numerical operations, structured and object-oriented programming, boundary-value and eigenvalue problems, numerical solutions of ordinary linear and nonlinear differential equations, statistical analysis of data, the Fast Fourier Transform, visualization and parallel programming.

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 and PHYS 163, 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):
Seminar

Seminar Classification
CS#05 - Seminar (K-factor=1 WTU per unit)
Seminar 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	Apply numerical methods (such as integration/differentiation and Monte Carlo methods) to solve advanced problems in physics	Homework assignments, discussions and exam focused on numerical methods.
2	Assess the efficiency of different numerical methods used in computational physics	Homework assignments and discussions on efficiency of different numerical methods.
3	Analyze the impact of numerical resolution in computational simulations	Homework assignments and discussions on numerical resolution results and their impact on simulations.
4	Apply cutting-edge computational tools (such as parallel computing or machine learning) to physics problems encountered in contemporary research	Homework assignments and review of scientific journal articles discussing cutting-edge computational tools.
5	Design and execute a computational physics project	Oral presentation and written report on methods and results of the computational project.

Attach a list of the required/recommended course readings and activities:
PHYS 262 Computational Physics.docx

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
Information literacy

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

Reviewer Comments:

Mikkel Jensen (mikkel.jensen) (Wed, 16 Oct 2024 22:20:22 GMT): Rollback: Simplify assessment strategies ("homework", "quizzes", etc.), and align with syllabus so that they all reflect the same elements (e.g., oral presentations). Check whether a final exam room is needed (currently set to "yes") - should this be no, since there is no final but instead a project?

Key: 14819