

PHYS 272: BIOLOGICAL PHYSICS

In Workflow

1. PHYS Committee Chair (mikkel.jensen@csus.edu)
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Approval Path

1. Thu, 24 Oct 2024 00:42:41 GMT
Mikkel Jensen (mikkel.jensen): Approved for PHYS Committee Chair
2. Tue, 05 Nov 2024 15:38:31 GMT
William DeGraffenreid (degraff): Approved for PHYS Chair
3. Thu, 07 Nov 2024 01:23:33 GMT
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Mon, 18 Nov 2024 16:15:47 GMT
Chris Taylor (ctaylor): Approved for NSM Dean

New Course Proposal

Date Submitted: Sun, 13 Oct 2024 22:45:12 GMT

Viewing: PHYS 272 : Biological Physics

Last edit: Thu, 07 Nov 2024 01:23:23 GMT

Changes proposed by: Mikkel Jensen (218650862)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
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Catalog Title:

Biological Physics

Class Schedule Title:

Biological 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)

272

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:

The purpose of this proposal is to create a graduate-level biological physics course, which will be an elective course in the upcoming proposed Physics M.S. degree. The graduate-level course will be paired with the existing undergraduate course in biological physics, PHYS 172. Biological physics is a growing area in physics, and sees more PhD research than other traditional areas such as nuclear physics, according to statistical analysis by the American Institute of Physics. It is also an active research area of faculty in the Department of Physics and Astronomy. This proposed course will broaden the elective options at the masters level to this large and otherwise unrepresented area of physics.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)

Investigation of subcellular and cellular biological systems using the fundamentals of physics. Topics will include a quantitative treatment of: the role of forces and energy in biology; thermodynamics of living systems; biopolymer, cytoskeletal and cellular mechanics; the physics of molecular motors and intracellular transport; applications of physical tools to study biological systems. Focus is on the interplay between physics and biology, and on how physical properties determine the biological function and behavior of living systems.

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 106, PHYS 110, PHYS 124, and PHYS 135, 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):

Discussion

Discussion Classification

CS#04 - Lecture /Recitation (K-factor=1 WTU per unit)

Discussion Units

3

Is this a paired course?

Yes

Please confirm that it complies with the Paired Courses Policy and enter the course with which it is paired:

PHYS 172

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	Describe how biological function across length scales is governed by the principles of physics.	Homework sets - Graded homework Midterm exams Final exam
2	Explain how living systems create and maintain order and homeostasis in an entropy-driven world.	Homework sets - Graded homework Midterm exams Final exam
3	Describe ways in which biological systems sense and respond to physical stimuli from their surroundings.	Homework sets - Graded homework Midterm exams Final exam
4	Explain how biological behavior and function are linked to the systems' physical properties.	Homework sets - Graded homework Midterm exams Final exam
5	Critically assess how changes in the physical properties of a biological system can impact its behavior and function.	Homework sets - Graded homework Midterm exams Final exam
6	Describe the function of experimental tools used to probe the physical properties of biological matter.	Homework sets - Graded homework Midterm exams Final exam
7	Analyze quantitative problems in biology using principles of physics, such as forces and energy conservation.	Homework sets - Graded homework Midterm exams Final exam
8	Synthesize and present scientific literature in writing and orally.	Literature reading assignments In-class presentations Literature-based term paper

- 9 Derive detailed principles of biophysical techniques and results using mechanics, thermodynamics, electromagnetism, and modern physics principles. Homework sets - Graded homework

Attach a list of the required/recommended course readings and activities:

Syllabus PHYS 172-272.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?)

No

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
Communication
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

Key: 15222