

PHY6528: ADVANCED RESEARCH IN PHYSICS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Advanced Research in Physics

Subject Code

PHY - Physics

Course Number

6528

Academic Unit

Physics (PHY)

College/School

College of Science (SI)

Course Duration

Two Semesters

Credit Units

0-9

Level

P5, P6 - Postgraduate Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This advanced research course is designed for students to acquire necessary skills for carrying out independent research in applied physics in the specialized field of biomedical physics or energy materials physics. Students will have the

opportunity to work under the direct supervision of faculties in the specialized fields on problems which are highly relevant to the current biomedical profession or energy industry.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Carry out a literature survey or search of a selected subject, plan the entire project and integrate the physical principles into the project selected.		x		
2	Carry out independent theoretical or experimental work, analyze and interpret data professionally.		x	x	x
3	Demonstrate initiative, innovative abilities, and critical thinking. Be able to write a good scientific report.		x	x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Consultation	Research meeting	1, 2, 3	1
2	Laboratory	Experiments, computer simulations, etc	2, 3	5.5
3	Outside lab activity	Literature review, data and theoretical analysis	1, 2, 3	2.5

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Project report	1, 2, 3	60	-	No
2	Oral presentation	1, 2, 3	20	-	No
3	Oral examination	1, 2, 3	20	-	No

Continuous Assessment (%)

100

Minimum Continuous Assessment Passing Requirement (%)

30

Additional Information for ATs

The advanced research project should be carried out on an individual basis. The topics will be provided by the programme. In some cases, a topic can be selected from a specialized technical problem in the company in which the student is working, provided it is approved by the project committee to be of sufficient merit. The progress of the project will be closely monitored through regular meetings between the supervisor and the student.

The oral presentation is assessed by a team of assessors, appointed by the project committee, according to style, structure and clarity, and response to questions. The assessment procedures are arranged to incorporate a uniformity of treatment across the student cohort.

Each research report is assessed by the assessor appointed by the project committee to each particular dissertation. The report is assessed as to presentation (clarity, conciseness), technical knowledge and understanding, and accomplishment (technical competence, initiative creativity, effort).

The oral examination is used to validate the extent of the student's understanding of the dissertation and the degree of self-guidance achieved.

Assessment Rubrics (AR)

Assessment Task

Report (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

ABILITY to write a comprehensive research report

Excellent

(A+, A, A-) High (excellent accomplishment with creativity, designed structure, presentation of data and figures, and reasonable conclusions)

Good

(B+, B, B-) Significant (good accomplishment with creativity, designed structure, presentation of data and figures, and reasonable conclusions)

Fair

(C+, C, C-) Moderate (fair accomplishment with creativity, designed structure, presentation of data and figures, and reasonable conclusions)

Marginal

(D) Basic (essential accomplishment with creativity, designed structure, presentation of data and figures, and reasonable conclusions)

Failure

(F) Not even reaching marginal levels

Assessment Task

Oral presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

ABILITY to communicate orally the technical details of the research project to an audience with general scientific background

Excellent

(A+, A, A-) High (excellent accomplishment of the presentation with style/structure of the presentation, clarity of the presentation, and time-keeping.)

Good

(B+, B, B-) Significant (good accomplishment of the presentation with style/structure of the presentation, clarity of the presentation, and time-keeping.)

Fair

(C+, C, C-) Moderate (fair accomplishment of the presentation with style/structure of the presentation, clarity of the presentation, and time-keeping.)

Marginal

(D) Basic (essential accomplishment of the presentation with style/structure of the presentation, clarity of the presentation, and time-keeping.)

Failure

(F) Not even reaching marginal levels

Assessment Task

Oral examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

ABILITY to EXPLAIN and respond to questions in DETAIL orally

Excellent

(A+, A, A-) High (excellent accomplishment of the oral examination with response to questions)

Good

(B+, B, B-) Significant (good accomplishment of the oral examination with response to questions)

Fair

(C+, C, C-) Moderate (fair accomplishment of the oral examination with response to questions)

Marginal

(D) Basic (essential accomplishment of the oral examination with response to questions)

Failure

(F) Not even reaching marginal levels

Assessment Task

Report (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

ABILITY to write a comprehensive research report

Excellent

(A+, A, A-) High (excellent accomplishment with creativity, designed structure, presentation of data and figures, and reasonable conclusions)

Good

(B+, B) Significant (good accomplishment with creativity, designed structure, presentation of data and figures, and reasonable conclusions)

Marginal

(B-, C+, C) Moderate (fair accomplishment with creativity, designed structure, presentation of data and figures, and reasonable conclusions)

Failure

(F) Not even reaching marginal levels

Assessment Task

Oral presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

ABILITY to communicate orally the technical details of the research project to an audience with general scientific background

Excellent

(A+, A, A-) High (excellent accomplishment of the presentation with style/structure of the presentation, clarity of the presentation, and time-keeping.)

Good

(B+, B) Significant (good accomplishment of the presentation with style/structure of the presentation, clarity of the presentation, and time-keeping.)

Marginal

(B-, C+, C) Moderate (fair accomplishment of the presentation with style/structure of the presentation, clarity of the presentation, and time-keeping.)

Failure

(F) Not even reaching marginal levels

Assessment Task

Oral examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

ABILITY to EXPLAIN and respond to questions in DETAIL orally

Excellent

(A+, A, A-) High(excellent accomplishment of the oral examination with response to questions)

Good

(B+, B) Significant (good accomplishment of the oral examination with response to questions)

Marginal

(B-, C+, C) Moderate (fair accomplishment of the oral examination with response to questions)

Failure

(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

N/A

Reading List

Compulsory Readings

Title	
1	N/A

Additional Readings

Title	
1	Assigned by the supervisor.