

# MSE6309: ADVANCED RESEARCH

---

## Effective Term

Semester A 2025/26

## Part I Course Overview

### Course Title

Advanced Research

### Subject Code

MSE - Materials Science and Engineering

### Course Number

6309

### Academic Unit

Materials Science and Engineering (MSE)

### College/School

College of Engineering (EG)

### 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

AP6309 Advanced Research (From the old curriculum)

### Exclusive Courses

AP6306 Dissertation (From the old curriculum) ; MSE6306 Dissertation

## Part II Course Details

### Abstract

The course is designed to develop methodological approaches in advanced materials research, organization and planning as well as skills in documentation and presentation of a selected topic. It is aimed to allow students to gain self-confidence and

ability to solve emerging problems in materials science and engineering based on experimental and analytical approaches. The course is specifically designed to bridge theoretical knowledge and practice, stimulate the student's ingenuity, and build up skills in conducting independent materials research and creating novel materials and nanomaterials.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Prepare a comprehensive review report in the selected research field; create the project structure with milestones, formulate the research goals and methods to achieve them; integrate the theoretical knowledge on physics and materials principles into the selected project to support experimental realization.		x	x	
2	Carry out independent experimental work, analyze and interpret data based on contemporary scientific understanding.		x	x	x
3	Demonstrate skills in scientific reasoning; make evident initiative, innovative abilities, and critical and constructive thinking; write a comprehensive research report on the selected project comprising motivation, objectives, background, experimental, methodological approach, results and their discussion, and conclusions with potential for further development.		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	6
3	Outside lab activity	Literature review, data and theoretical analysis	1, 2, 3	5

### Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Project proposal and oral presentation	1	25	During the first semester	Yes
2	Project report and oral examination	1, 2, 3	75	During the second semester	Yes

**Continuous Assessment (%)**

100

**Additional Information for ATs**

The dissertation is carried out on an individual basis. The topics are provided by the programme and are normally associated with departmental research activities. The topic of Advanced Research is selected by students with assistance of the course leader, who has knowledge and expertise of the proposed research. The progress in the course of Advanced Research is closely monitored and regulated in all aspects by the academic staff through his or her research group meetings.

At the beginning of the course, students carry out literature survey and discuss with a project supervisor and research group members to develop a research proposal. The idea and contents of the proposal are presented to a panel for review and assessment.

Each advanced research report is evaluated by an assessor who is an expert in the field and therefore he/she is appointed by the programme committee in accordance with the research field. The report is assessed based on presentation (clarity, conciseness), technical knowledge, understanding, and accomplishment (technical competence, initiative creativity, effort). The oral presentation is assessed by a team of assessors, appointed by the programme committee, according to the style, structure and presentation clarity, and student's response to panel's questions. The assessment procedures are arranged based on the principle of equal treatment across the student cohort and with respect to an international benchmark to maintain fairness and high education standard. The oral examination is used to validate the extent of the student's understanding of the advanced research report and the degree of self-guidance achieved.

**Assessment Rubrics (AR)****Assessment Task**

\*Project proposal and oral presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

ABILITY to write a research proposal, and able to EXPLAIN and respond to questions in DETAIL orally

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

**Assessment Task**

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

**Criterion**

ABILITY to EXPLAIN orally the technical details of the research project

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

---

**Assessment Task**

\*\*Project Report and oral examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

ABILITY to write a comprehensive research report, and able to EXPLAIN and respond to questions in DETAIL orally

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

---

**Assessment Task**

\*Project proposal and oral presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

ABILITY to write a research proposal, and able to EXPLAIN and respond to questions in DETAIL orally

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Moderate

**Marginal**

(B-, C+, C) Basic

**Failure**

(F) Not even reaching marginal levels

---

**Assessment Task**

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

**Criterion**

ABILITY to EXPLAIN orally the technical details of the research project

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Moderate

**Marginal**

(B-, C+, C) Basic

**Failure**

(F) Not even reaching marginal levels

---

**Assessment Task**

\*\*Project Report and oral examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

ABILITY to write a comprehensive research report, and able to EXPLAIN and respond to questions in DETAIL orally

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Moderate

**Marginal**

(B-, C+, C) Basic

**Failure**

(F) Not even reaching marginal levels

---

**Additional Information for AR**

\*Write a research proposal comprising relevant literature review and analysis, and a proposed work plan.

\*\*Write a comprehensive research report on the selected project comprising motivation, objectives, background, experimental, methodological approach, results and their discussion, and conclusions with potential for further development.

## Part III Other Information

### Keyword Syllabus

N/A

### Reading List

#### Compulsory Readings

Title	
1	N/A

#### Additional Readings

Title	
1	N/A