



Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	06

1.	Course Title	Plasma Physics
2.	Course Number	0302967
3.	Credit Hours (Theory, Practical)	3 Theory
	Contact Hours (Theory, Practical)	3 Hours/Week
4.	Prerequisites/ Corequisites	Department Approval
5.	Program Title	PhD in Physics
6.	Program Code	021
7.	School/ Center	School of Science
8.	Department	Physics
9.	Course Level	
10.	Year of Study and Semester (s)	
11.	Other Department(s) Involved in Teaching the Course	
12.	Main Learning Language	English
13.	Learning Types	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
14.	Online Platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams
15.	Issuing Date	2024
16.	Revision Date	2024

17. Course Coordinator:

Name:	Contact hours:
Office number:	Phone number:
Email:	

**18. Other Instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19. Course Description:

Introduction to the concept of plasma, Properties of a Coulomb Gas with and without a Magnetic Field: Equilibrium, Oscillations, Instabilities, Fluctuations, Collective Phenomenon, Transport Properties and Radiations. Description of Single-Particle Orbit Theory, Magneto Hydrodynamics and Kinetic Equations of Various Types.

20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1. **SO1:** to be able to demonstrate an advanced and comprehensive understanding of core physics concepts and specialized knowledge in a chosen field of research, contributing to the frontier of physics.
2. **SO2:** to be able to develop and execute independent, original research projects that address complex scientific problems, advancing theoretical and experimental physics.
3. **SO3:** to be able to apply advanced mathematical and computational techniques to analyze complex physical phenomena and critically evaluate scientific literature and experimental results.
4. **SO4:** to be able to effectively communicate complex physics concepts, research findings, and their significance through academic writing, presentations, and public outreach.
5. **SO5:** to be able to adhere to high ethical standards and professional responsibility in conducting research, including data integrity, ethical treatment of subjects, and the responsible use of resources.
6. **SO6:** to be able to demonstrate leadership and collaborative skills within multidisciplinary teams, contributing to the development of new scientific knowledge and promoting knowledge-sharing across disciplines.
7. **SO7:** to be able to cultivate the ability to adapt to new scientific advancements and continuously engage in professional development to contribute to innovation in the field of physics.



8. **SO8:** to be able to master experimental and computational techniques relevant to the research field, demonstrating competency in operating and developing specialized physics instrumentation and software.

21. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

- 1. Students are expected to develop a good understanding of the plasma phenomena and the physics and mathematics behind it.**
- 2. Students are expected to develop a good understanding of Coulomb gas and its interaction with external fields.**
- 3. Students are expected to develop the necessary understanding and the necessary mathematics to study the plasma equilibrium.**
- 4. Students are expected to understand transport properties and radiation in plasmas.**
- 5. Students are expected to understand magneto hydrodynamics and the related kinetic equations in plasmas.**

Course ILOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating



2٢. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program ILOs / Course ILOs	ILO (1)	ILO (2)	ILO (3)	ILO (4)	ILO (5)
1	X		X	X	X
2					
3	X	X	X		X
4	X	X	X	X	X
5					
6					
7					
8					

2٣. Topic Outline and Schedule:

Week	Lecture	Topic	ILO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1	1.1							
	1.2							
	1.3							
2	2.1							
	2.2							
	2.3							
3	3.1							
	3.2							
	3.3							
4	4.1							
	4.2							



	4.3							
5	5.1							
	5.2							
	5.3							
6	6.1							
	6.2							
	6.3							
7	7.1							
	7.2							
	7.3							
8	8.1							
	8.2							
	8.3							
9	9.1							
	9.2							
	9.3							
10	10.1							
	10.2							
	10.3							
11	11.1							
	11.2							
	11.3							
12	12.1							
	12.2							
	12.3							
13	13.1							
	13.2							
	13.3							
14	14.1							
	14.2							
	14.3							
15	15.1							
	15.2							
	15.3							

2٤. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:



Evaluation Activity	Mark	Topic(s)	ILO/s Linked to the Evaluation activity	Period (Week)	Platform
Midterm Exam	30%			8 th week	Paper Based
Homework Assignments	20%			Biweekly	Paper Based
Class Project	10%			End of Semester	Theory or experiment
Final Exam	40%			End of Semester	Paper Based

2٥. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform...etc.):

2٦. Course Policies:

A- Attendance policies:

B- Absences from exams and submitting assignments on time:

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

F- Available university services that support achievement in the course:

2٧. References:

A- Required book(s), assigned reading and audio-visuals:

*Plasma Physics, An Introduction, R. Fitzpatrick, 2nd Edition.



B- Recommended books, materials, and media:

*Plasma Physics and Engineering, A. Fridman, L. A. Kennedy, 2nd Edition.

*Introduction to Plasma Physics and Controlled Fusion, F. F. Chen, 3rd Edition.

2^ Additional information:

Name of the Instructor or the Course Coordinator:	Signature:	Date:
Name of the Head of Quality Assurance Committee/ Department	Signature:	Date:
Name of the Head of Department	Signature:	Date:
Name of the Head of Quality Assurance Committee/ School or Center	Signature:	Date:
Name of the Dean or the Director	Signature:	Date: