مواصفات مقرر فيزياء البلازما

- **البرنامج الذي يقدم المقرر من خلاله** (إعداد معلم الفيزياء)
- **يمثل المقرر عنصرا (**رئيسيا **) بالنسبة للبرنامج**
- **القسم العلمي المسئول عن البرنامج (**متعدد**)**
- **القسم العلمي المسئول عن تدريس المقرر (**قسم الفيزياء**)**
- **السنة الدراسية / المستوى** (الفرقة الرابعة عام. شعبة الفيزياء / الفصل الدراسى الأول)
- **تاريخ اعتماد توصيف البرنامج ( )**

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Basic Data — بيانات أساسية

(1)	العنوان : فيزياء البلازما	**(1) Course Title: Plasma Physics**
(2)	الكود : 415 ph	**(2) Course Code No.: 415 ph**
(3)	الساعات المعتمدة:	**(3) Credit Hours: Three credit hours**
	• المحاضرة :	**Lectures: 2 credit hours**
	• الدروس العملية:	**Tut. practice: 1credit hour**
	• المجموع:	**Total hours: 3 credit hours**

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Professional Data — بيانات مهنية

1) General goals of the course — (1) الأهداف العامة للمقرر

The course is designed to help student-teachers achieve the following goals:

- Developing the student's skills and creative thought needed to meet new trends in plasma, fusion research and space plasma physics.

2) Operational learning objectives of the course — (2) الأهداف الإجرائية للمقرر

By the end of this course, student teachers are expected to achieve the following objectives:

A) Knowledge and Comprehension: — **(أ) المعرفة والفهم**

The students have to recognize the following :

a.1 Characterictics of plasma and plasma interaction with the magnetic field of Sun's surface, sun spot, the ionosphere, magnetic storms and the aurora belts.
a.2 Motion of charged particle in time dependant magnetic field and torodial magnetic field.
a.3 Transmission of electromagnetic waves through plasma and Alfen waves.
a.4 Transmission coefficient and plasma instabilities.
a.5 Plasma radiation and diagonostic techniques.

B) Cognitive Skills: **(ب) المهارات العقلية:**

b.1 Develop an understanding and appreciation for the nature of scientific inquiry

b.2 Apply mathematics, including statistics and calculus and introductory differential equations, to investigations in physics and the analysis of data.

b.3 Locate resources, design and conduct inquiry-based open-ended investigations in physics, interpret findings, communicate results, and make judgments based on evidence.

C) Practical Skills: **(جـ) المهارات العملية:**

c.1 the appropriate use and storage of scientific equipment.

c.2 safe storage, use, and disposal of materials.

D) Enabling Skills: **(د) المهارات العامة والمنقولة:**

d.1 Relate the concepts of physics to contemporary, historical, technological, and societal issues; in particular.

d.2 Relate concepts of physics to current controversies and other issues.

d.3 Construct new knowledge for themselves through research, reading and discussion, and reflect in an informed way on the role of physics in human affairs

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Contents المحتويات

Week	Topic	Assigned hours		
		Lectures	Tut.	Total
First	▪ Characteristics of plasma, the plasma interaction with a magnetic field (magnet – hydromagentic fluids).	2	1	3
Second	▪ detailed maps of the magnetic field on the sun spots.	2	1	3
Third	▪ the ionospherem the magnetic storms,the aurora belts if energetic radiation above the earth's atmosphere.	2	1	3
Fourth	▪ the direct conversion of kinetic energy in a gas to electricity , ion jet propulsion and controlled molecular reaction.	2	1	3
Fifth	▪ Derbye radius, motion of charged particles in a uniform magnetic field , Plasma Larmony frequency and plasma magnetic moment.	2	1	3
Sixth	▪ Motion of charged particles in an non- uniform magnetic field, the magnetic mirror, drift in Toroidal magnetic fied, rotating plasma, and pinch effect.	2	1	3
Seventh	▪ Plasma electron oscillation, ion oscillation and waves, Debye screening.	2	1	3

Week	Topic	Assigned hours		
		Lectures	Tut.	Total
Eighth	▪ transmission of electro magnetic waves / Alfven waves.	2	1	3
Ninth	▪ Lagrange interaction, rexalation time,electrical conductivity of plasma.	2	1	3
Tenth	▪ thermal conductivity and viscocity of plasma .	2	1	3
Eleventh	▪ Bermsstrahlung radiation emitted by excited ions and Atoms, betatron emission from plasma Measurements of currents and voltages of moving plasma Electron density .	2	1	3
Twelfth	▪ Flux density and plasma spectrometry	2	1	3
Thirteenth	▪ Waste production, safty . Introduction to fusion reactors, fusion reactors, self- sustaining reactions, fusion reactors and Tokamak applications.	2	1	3

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Activities, tasks and assignments: أساليب التعليم والتعلم:

- **Lectures**
- **Laboratory experiments.**
- **Demonstrations**
- **report writing**
- **brainstorming**
- **discussions**
- **Problems and essay assignments.**

Assessment and Evaluation tools: أساليب التقييم

- **Semester activities including classroom interactions and Quizzes.**
- **Oral exam.**
- **Final exam.**
- **Lab performance evaluation**

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Summative Evaluation table جدول التقييم

Assessment	Final exam	Fifteenth Week	الأسبوع الخامس عشر	نهاية الفصل الدراسي	التقييم

النسبة المئوية لكل تقييم

Assessment		التقييم
1. Midterm exam	--	1. امتحان نصف الفصل الدراسي
2. Final written exam	%80	2. امتحان نهاية الفصل الدراسي
3. Final oral exam	--	3. الامتحان الشفوي
4. assignments	%20	4. أعمال السنة
Total	%100	المجموع

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References: قائمة المراجع

- "Introduction to Plasma Phys, And Controlled fusion", by F.Chen, Plentum Press
- "Introduction to Plasma Theory" by D.R Nicholoson, Wiley publisher.
- Waves in dusty space plasmas" by F.Verheest, Kluwer pub.

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Educational Resources الإمكانات المطلوبة للتعليم والتعلم

- Computer simulation programs and slides.
- Transparences.
- Manual of solved problems (answer and solutions)
- Text books.

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- منسق المقرر: Course coordinator:
- رئيس القسم: Head of the Department:
- التـــــاريخ: Date: