

توصيف مقرر دراسي

جامعة : المنصورة

كلية : العلوم

قسم : الرياضيات

١- بيانات المقرر		
المستوى: الثالث	اسم المقرر : Electrodynamics	كود المادة : Math 321
عدد الوحدات الدراسية: ٣ ساعة معتمدة نظري ٢: تمارين: ٢ عملي: ٠		التخصص : رياضيات

<p>For students undertaking this course, the aims are to:</p> <p>- Give a thorough grounding of Electrodynamics and to develop a knowledge and understanding of a wide range of electromagnetic wave phenomena by solving, with appropriate physical insight, Maxwell's equations in particular circumstances, e.g. dielectrics, conducting media, waveguides, antenna behavior, etc.</p>		٢- هدف المقرر :
٣- المستهدف من تدريس المقرر		
<p>a- Knowledge and Understanding</p> <p>On completing this course, students will be able to:</p> <p>a1- know and understand Maxwell's equations</p> <p>a2- be familiar with the definitions of the electromagnetic scalar and vector potentials as well as</p> <p>the concepts of retarded potentials and gauge transformations</p> <p>a3- know and understand the Biot-Savart law as well as Faraday's law</p> <p>a4- be aware of Lienard-Wiechert potentials</p>		أ- المعلومات و المفاهيم :
<p>b- Intellectual Skills</p> <p>On completing this course, students will be able to:</p> <p>b1- apply Maxwell's equations to electromagnetic wave propagation in vacuum, dielectrics, conducting media, planar and rectangular waveguides.</p> <p>b2- manipulate Maxwell's equations in differential form</p> <p>b3- Solve the relativistic Maxwell's equations</p> <p>b4- solve Laplace equation in Cartesian, cylindrical, and spherical coordinates;</p>		ب- المهارات الذهنية :

b5- deduce the charge density and current density as components of a four-vector	
c- Professional and Practical Skills On completing this course, students will be able to: c1- interpret evaluated results physically (i.e. write the physical meaning of a mathematical result) c2- describe the motion of a charged particle in a constant magnetic field as well as in a crossed electric and magnetic fields; c3- describe the main features of the solutions for a range of problems	ج- المهارات المهنية الخاصة بالمقرر :
d- General and Transferable Skills On completing this course, students will be able to: d1- solve problems related to the course and connected to the special theory of relativity; d2- think critically and replace non-suitable theories by more suitable ones d3- work in team and do internet search.	د- المهارات العامة :
<ul style="list-style-type: none"> – Mathematical review and survey of some new mathematical ideas. – Principles of electrostatics: Coulomb’s law, Gauss’s law, Conductors, Laplace equation – Maxwell's equations – Electromagnetism and its relation to relativity – Time-independent current distributions – Magnetostatics: Biot-savart law, motion in magnetic and crossed electric fields – The variance of the electromagnetic field with time faraday’s law displacements; the retarded potential – Let there be light 	٤- محتوى المقرر :
1- 2 hour lecturer weekly with exercise sheets and solution sheets 2- Weekly 1 hour tutorials in groups 3- Using Internet facilities	٥- أساليب التعليم و التعلم :
The same as normal students, only skeletal disabilities are allowed in the faculty of science.	٦- أساليب التعليم و التعلم للطلاب ذوي القدرات محدودة:
٧- تقويم الطلاب :	
1- Final exam to assess a1- a4, b1- b5, c1-c3 2- Oral exam to assess a1- a4, b1-b5,d1-d3	أ- الأساليب المستخدمة

3- Mid-Term Exam	to assess	a1- a2, b1- b5,c1- c3	
1- Final exam	week	16	ب- التوقيت
2- Oral exam	week	16	
3- Mid-Term Exam	week	7	
- Mid-Term Examination	10%		ج- توزيع الدرجات
- Final-Term Examination	80%		
- Oral Examination	10%		
- Practical Examination	0		
Total 100%			
٨- قائمة الكتب الدراسية و المراجع :			
Electricity and Magnetism (Notes available in Arabic, in the Department)			أ- المذكرات
Milvin Schwarz, Principles of electrodynamics, John Weily, 1972			ب- الكتب ملزمة
J. Rotz “ Foundations of Electromagnetic Theory ” Addison Wesley 1993			ج- كتب مقترحة
1- http://www.damtp.cam.ac.uk/user/examples/B17L.pdf 2- http://www.physics.ohio-state.edu/~stroud/p834.html 3- http://www.dcu.ie/registry/module_contents.php?function=2&subcode=PS412A			د- دوريات علمية أو نشرات ... الخ

(أ) مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسي

المحتويات للمقرر	اسبوع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
Mathematical review and survey of some new mathematical ideas.	1-2	a1, a2	b4,b5		d1,d2,d3
Principles of electrostatics: Coulomb's law, Gauss's law, conductors, Laplace equation	3-5	a1, a2	b4	c1,c2,c3	d1,d2,d3
Maxwell's equations	6	a1, a2	b1,b2,b3		
Electromagnetism and its relation to relativity.	7-8	a1, a2	b5		d1,d2,d3
Time-independent current distributions.	9-10	a1, a2	b5	c1,c2,c3	d1,d2,d3

Magnetostatics: Biot-savart law, motion in magnetic and crossed electric fields.	11-12	a1,a2, a3	b5		d1,d2,d3
The variance of the electromagnetic field with time faraday's law displacements the retarded potential.	13	a1,a2, a4	b5	c1,c2,c3	d1,d2,d3
Let there be light	14	a1,a2, a4	b5		d1,d2,d3

أستاذ المادة : د. محمود حمدي

رئيس مجلس القسم العلمي : ا.د. مجدى إلیاس فارس