توصيف مقرر دراسي

جامعة : المنصورة

كليـة : العلـــوم

قســم : الرياضيات

١- بيانات المقرر		
كود المادة : Math 424	**اسم المقرر :** **Advanced Mechanics**	**المستوى: الرابع**
التخصص : رياضيات	**عدد الوحدات الدراسية: ٢ ساعة معتمدة نظرى ٢: تمارين: ١ عملى: ٠**	

٢- هدف المقرر :	**For students undertaking this course, the aims are to:** - Introduce the dynamical equations of rotation. - Develop mathematical tools for the solution of simple problems in kinematics and dynamics. - Illustrate the idea of integrability.
٣- المستهدف من تدريس المقرر	
أ- المعلومات و المفاهيم :	**a-Knowledge and Understanding :** **On completing this course, students will be able to:** a1 – Understand elliptic integrals and functions. a2 - Understand Euler – Poisson equations for simple problems in rigid body (gyrostat) dynamics. a3 – Be aware of the integrals of motion. a4 - Be familiar with the notions rotation, integrability, and gyroscopic forces. a5- Be familiar with the explicit solution of dynamical problems.
ب- المهارات الذهنية:	**b- Intellectual Skills** : **On completing this course, students will be able to:** b1- Use integrals of motion in mechanics problems. b2- Develop and apply modeling skills, logical thought and analysis.
ج- المهارات المهنية الخاصة بالمقرر:	**c-Professional and Practical Skills:**

On completing this course, students will be able to: c1- Hand homework and attendance at tutorials described in Handbook. c2 - Draw qualitative conclusions about the motion from mechanics equations.	
d-General and Transferable Skills : **On completing this course, students will be able to:** d1- Solve real simple problems in mechanics. d2- Work in a team. d3- Learn independently in library and internet.	**د- المهارات العامة:**
– Elliptic integrals and Elliptic functions. – Inertia tensor. – Definition of a dynamical system – Motion of a rigid body around a fixed point description of rotation. – Euler's case. – Lagrange's case and the gyroscope. – Kovalevskaya's case – Motion of the top. – The gyrostat.	**٤- محتوى المقرر:**
1- Lectures, exercise sheets and solution sheets. 2- 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 ذوى القدرات المحدودة:**
	٧- تقويم الطلاب :
1- Oral Exam. to assess a1-a5,b1-b2,d1-d3 2- Final Exam to assess a1-a5,b1-b2,c1-c2 3- Mid-Term Exam to assess a1-a4,b1-b2,c1-c2	**أ- الأساليب المستخدمة**
1- Oral Exam week 16 2- Final Exam week 16 3- Mid-Term Exam week 7	**ب- التوقيت**
- Mid-Term Examination 10 - Final-Term Examination 80	**ج- توزيع الدرجات**

- Oral Examination 10 - Practical Examination 0 Total 100%	
٨- قائمة الكتب الدراسية و المراجع :	
Yehia H. M. Advanced mechanics, (in Arabic).	**أ- المذكرات**
Leimanis E., The general problem of motion of coupled rigid bodies about a fixed point (Berlin: Springer) 1965.	**ب- الكتب ملزمة**
Golubev V. V. Lectures on integration of the equations of motion of a rigid body about a fixed point, State Publishing house of theoretical technical Literature , Moscow 1953. Beletsky, V V, The Motion of an Artificial Satellite about Its Mass Center (Moscow: Nauka) 1965 (in Russian).	**ج- كتب مقترحة**
http://www.engr.wisc.edu/ep/ema/courses/ema506.html	**د- دوريـــات علميـــة أو نشرات**

(أ) مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسي

المحتويات للمقرر	اسبوع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
Elliptic integrals and Elliptic functions.	1-3	a1	b2	c1, c2	d1,d2,d3
Inertia tensor.	4-5	a2	b1	c1	d1,d2,d3
Definition of a dynamical system – Motion of a rigid body around a fixed point description of rotation.	6-7	a3, a4	b1, b2	c1, c2	d1,d2,d3
Euler's case.	8	a1,a2,a3,a4,	b1, b2	c1, c2	d1,d2,d3
Lagrange's case and the gyroscope.	9-10	a2,a3,a4,a5	b1, b2	c1, c2	d1,d2,d3
Kovalevskaya's case – Motion of the top.	11-12	a2,a3,a4,a5	b1, b2	c1, c2	d1,d2,d3
The gyrostat.	13-14	a2,a3,a4,a5	b1, b2	c1, c2	d1,d2,d3

أستاذ المادة : أ.د. حمد حلمى يحيى

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