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توصيف مقرر دراسي

جامعة : المنصورة
كـليـة : العلـــــوم
قســم : الرياضيات

١ ـ بيانات المقرر		
المستوى: الثالث	اسم المقرر : Numerical Analysis (1)	كود المادة : Math 313
عدد الوحدات الدراسية: ٣ ساعة معتمدة نظرى ٢: تمارين: ٢ عملى: ٠		البرنامج : الاحصاء وعلوم الحاسب

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For students undertaking this course, the aims are to: – Provide the student with a firm introduction to the basic algorithms – Used in scientific computations, their design and analysis and implement similar algorithms for the solution of related scientific problems. – Present the basic mathematical foundations of numerical analysis and scientific computing; – Give the students hands-on experience in solving nonlinear equations. – Provide useful tools for scientists, engineers and others.	**٢ ـ هدف المقرر :**
	٣ـ المستهدف من تدريس المقرر
a- Knowledge and Understanding **On completing this course, students will be able to:** a1 – be familiar with efficient and stable algorithms for finding roots of non-linear equations. a2 - Understand the use of interpolation for numerical differentiation and integration. a3 – know and understand stable solution algorithms for ordinary differential equations.	**أـ المعلومات و المفاهيم :**
b- Intellectual Skills **On completing this course, students will be able to:** b1- find roots of complicated nonlinear problems using MATLAB; b2- Introduce the student to modern methods, techniques, and pitfalls in scientific computing b3- develop appropriate techniques (including graphics) for particular applications and solutions	**بـ المهارات الذهنية :**
c- Professional and Practical Skills **On completing this course, students will be able to:** c1 - write programs with different languages such as C++, FORTRAN …and execute them to perform numerical problems; c2 - maintain existing numerical software c3 - demonstrate an understanding of a variety of computer-based methods and their errors, used in the solution of numerical problems	**جـ المهارات المهنية الخاصة بالمقرر :**
d- General and Transferable Skills **On completing this course, students will be able to:** d1- work in team d2- Use Internet to search in Numerical Analysis Resources d3- manage the time	**دـ المهارات العامة :**
– Introduction to computer science and number system and type of errors – Roots of Non-Linear Equations – Lagrange interpolation – Divided difference formula – Numerical integration	**٤ـ محتوى المقرر :**

– Numerical solution to ODE – Gaussian Elimination – Pivoting LU Factorization	
1- Lectures, exercise sheets and solution sheets 2- Tutorials 3- Internet facilities	٥ـ أســـاليـــب التعليـــــم و التعلـم :
The same as normal students, only skeletal disabilities are allowed in the faculty of science.	٦ـ أساليب التعليم و التعلم للطـــلاب ذوى القـدرات المحـدودة :
	٧ـ تقويـــــــــم الطـــلاب :
1- Final exam to assess a1-a3, b1-b3,c1-c3 2- Oral exam to assess a1-a3, b1-b3,d1-d3 3- Mid-Term Exam to assess a1-a3, b1-b3,c1-c3	أـ الأساليب المستخدمة
1- Final exam week 16 2- Oral exam week 16 3- Mid-Term Exam week 7	بـ التوقيت
- Mid-Term Examination 10% - Final-Term Examination 60% - Oral Examination 10% - Practical Examination 20% Total 100%	ج- توزيع الدرجات
	٨ـ قائمة الكتب الدراسية و المراجع :
- Lecture Notes	أـ المذكرات
Burden R.L. and J. D. Faires, Numerical Analysis, Sixth edition, Brooks/Cole, Pacific Grove, CA, 1997.	بـ الكتب ملزمة
Mathews, J. H., and K. D. Fink. Numerical Methods Using MATLAB®. 3rd ed. Prentice Hall, 1999.	ج- كتب مقترحة
http://en.wikipedia.org/wiki/Numerical_analysis	دـ دوريـــــات علميـــة أو نشرات

(أ) مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسى

المحتويات للمقرر	اسبوع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
Introduction to computer science and number system and type of errors	1-2	a1, a3	b1, b2	c1, c2	d1, d2
Roots of Non-Linear Equations	3-4	a2,a3	b1, b2	c1, c2	d2, d3
Lagrange interpolation	5-6	a2,a3	b2, b3	c2,c3	d2
Divided difference formula	7-8	a1,a3	b1, b3	c2,c3	d1, d2
Numerical integration	9-10	a2,a3	b2, b3	c1, c2	d2, d3
Numerical solution to ODE	11-12	a2,a3	b2, b3	c1, c2	d1, d3
Gaussian Elimination	13	a1,a2	b1, b3	c1, c2	d2, d3
Pivoting LU Factorization	14	a1,a2,a3	b1, b2, b3	c1, c2,c3	d1, d2,d3

أستاذ المادة : أ.د. المتولى محمد العباسى

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