

١ - بيانات المقرر		
المستوى: الثاني	اسم المقرر : Real analysis	كود المادة : Math 211
عدد الوحدات الدراسية: ٣ ساعة معتمدة نظري ٢ : تمارين: ٢ عملي: ٠		التخصص: إحصاء وعلوم الحاسب

<p>For students undertaking this course, the aims are to:</p> <p>1- Provide students with the fundamental of mathematical analysis and stimulate the development of mathematical thinking.</p> <p>2- Provide students with the basic theorems and definitions of convergent sequences and series.</p> <p>3- Apply different tests of convergence of sequences and series.</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- understand the concept of function, and its role in mathematical analysis</p> <p>a2 – be aware of the relevant theories of mathematical analysis and their applications</p> <p>a3 – be aware of the basic concepts of convergent tests and their application.</p> <p>a4 – recognize different types of series such as power series and alternating series.</p> <p>a5 – understand the uniform convergence tests to a class of series.</p>	أ- المعلومات و المفاهيم :
<p>b. Intellectual Skills</p> <p>On completing this course, students will be able to:</p> <p>b1 -apply mathematical logic in testing convergent series and sequences.</p> <p>b2- Distinguish between convergent and divergent sequences</p> <p>b3 – Analyze power series and Fourier series.</p> <p>b4 - develop analytic intuition and proof skills</p> <p>b5 - Compare between different type of convergent tests</p>	ب- المهارات الذهنية :
<p>c. Professional and Practical Skills</p> <p>On completing this course, students will be able to:</p> <p>c1- Apply reasoning techniques of mathematical analysis in more advanced branches of mathematics such as functional analysis nonlinear analysis and topology</p> <p>c2- test the convergence of different type of series.</p> <p>c3- Prove theorems of convergence and divergence of series.</p> <p>c4- Apply Fourier series to a given function.</p> <p>c5- Use computer software to study the asymptotic behaviour of sequence.</p>	ج- المهارات المهنية الخاصة بالمقرر :
<p>d. General and Transferable Skills</p> <p>On completing this course, students will be able to:</p> <p>d1. Think independently, set tasks and solve problems on a scientific basis.</p> <p>d2. use , efficiently, information and communication technology</p> <p>d3. Work effectively in groups.</p>	د- المهارات العامة:
<p>– Bounded sets, upper and lower limits of functions, sequences of real numbers, Limits of sequences</p> <p>– Convergence and divergence of sequence .Bounded and monotone sequences ,Cauchy sequences</p> <p>– Real series, convergent serie,the geometric series and the the harmonic series</p> <p>– Series with positive and negative terms. Alternating series test.</p> <p>– Series with non- negativeterms, the comparison,nth root and the Ratio tests</p> <p>– Absolute and conditional convergence , power series and radius of convergence</p>	٤ - محتوى المقرر:

<ul style="list-style-type: none"> - Convergence tests : Integral. Rabbe, logarithmic, - De Morgan and Gauss - Series of functions and uniform convergence, Weierstrass, Dirichlet tests - Infinite product of series - Fourier series, sin , cos series 	
<p>1- lectures 2- tutorials 3- use information technology</p>	<p>٥- أساليب التعليم والتعلم :</p>
<p>The same as normal students, only skeletal disabilities are allowed in the faculty of science.</p>	<p>٦- أساليب التعليم والتعلم للطلاب ذوي القدرات المحدودة :</p>
٧- تقويم الطلاب :	
<p>1- Oral exam to assess a1-a5,b1-b5,d1-d3 2- Final exam to assess a1-a5, b1-b5, c1-c5 3- Mid-Term Exam to assess a1-a3,b1-b3,c1-c3</p>	<p>أ- الأساليب المستخدمة</p>
<p>1- Oral exam week 16 2- Final exam week 16 3-Mid-Term Exam week 7</p>	<p>ب- التوقيت</p>
<p>- Mid-Term Examination 10 % - Final-Term Examination 80% - Oral Examination 10% - Practical Examination 0% Total 100%</p>	<p>ج- توزيع الدرجات</p>
٨- قائمة الكتب الدراسية و المراجع :	
<p>- Available in the Dept</p>	<p>أ- المذكرات</p>
<p>- Haggerty, Rod 'Fundamentals of Mathematical Analysis' Second Edition, Addison-Wesley 1993.</p>	<p>ب- الكتب ملزمة</p>
<p>Martin Campbell-Kelly and William Aspray, Computer .A History of the information machine New York 1996 Trench, William F. Introduction to Real Analysis, Prentice Hall, 2003. Bartle, Robert G. and Sherbert, Donald R. Introduction to Real Analysis (3ed.), New York: John Wiley and Sons, 2000.</p>	<p>ج- كتب مقترحة</p>
<p>http://www.mathcs.org/analysis/reals/ http://en.wikipedia.org/wiki/Real_analysis</p>	<p>د- دوريات علمية أو نشرات</p>

(أ) مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسي

المحتويات للمقرر	اسبوع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
Bounded sets, upper and lower limits of functions, sequences of real numbers, Limits of sequences	1-2	a1, a2	b1, b2	c1, c2	d1, d2
Convergence and diverhence of sequence .Bounded and monotone sequences ,Cauchy sequences	3	a3, a4	b1, b2, b3	c1, c2, c3	d1-d3
Real series, convergent serie,the geometric series and the the harmonic series	4-5	a2, a3, a4	b1, b2, b3, b4	c1, c2, c3	d1-d3
Series with positive and negative terms. Alternating series test.	6	a2, a3	b2, b3, b5	c1, c2, c3	d1-d3
Series with non- negativeterms, the comparison,nth root and the Ratio tests	7	a5	b1, b2, b3	c1-c5	d1, d2,
Absolute and conditional convergence , power series and radius of convergence	8	a5	b1, b4, b5	c3, c5	d1, d2,
Convergence tests : Integral. Rabbe, logarithinic,	9	a3, a4, a5	b4, b5	c2, c3, c5	d1, d2, d3
De Morgan and Gauss	10	a5	b3, b4	c2, c3, c5	d1, d2, d3
Series of fulctions and uniform convergence, Virstrass, Dirchlet tests	11	a5	b4, b5	c3, c5	d2, d3
Infinite product of series	12	a5	b4, b5	c3, c5	d2, d3
Fourier series, sin , cos series.	13-14	a4, a5		c3, c4, c5	d2, d3

أستاذ المادة : د. عاطف ابراهيم المهدي

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

