

جامعة المنصورة

كلية العلوم

قسم الرياضيات

توصيف مقرر دراسي

١- بيانات المقرر		
المستوى: الثالث	اسم المقرر : Number Theory	كود المادة : Math 319
عدد الوحدات الدراسية: ٣ ساعة معتمدة نظري ٢: تمارين: ٢ عملي: ٠		التخصص : رياضيات

students undertaking this course, the aims are to: <ul style="list-style-type: none">• Revise the basic concepts of number theory.• Learn some central themes of elementary number theory, and its relationship to algebraic number theory• Foster an appreciation of the extent, importance, utility and beauty of number theory, and of the historical contexts• Develop mathematical skills, particularly those associated with proof.	٢- هدف المقرر:
٣- المستهدف من التدريس المقرر:	
a- Knowledge and Understanding On completing this course, students will be able to: a1- Have a complete understanding of the division algorithm. a2- Understand and be able to use Euclid's algorithm, continued fractions. a3- Understand Prime numbers and Fundamental Theorem of Arithmetic. a4- Explain Diophantine equations and Fermat's last theorem.	أ-المعلومات والمفاهيم:
b- Intellectual Skills On completing this course, students will be able to: b1- Be familiar with common arithmetic functions and their expressions in terms of prime factors; b2- Be aware with the definition of a multiplicative function and how new multiplicative functions can be made up from others by summing over divisors. b3- Improve ability to solve mathematical problems.	ب- المهارات الذهنية
c- Professional and Practical Skills	ج- المهارات المهنية الخاصة بالمقرر:

<p>On completing this course, students will be able to:</p> <p>c1- Be able to solve appropriate problems involving congruencies and modular arithmetic</p> <p>c2- Improve ability to read mathematics texts.</p> <p>c3- Develop skills in independent study and to foster a reflective and self- analytical approach to learning</p>	
<p>d-General and Transferable Skills:</p> <p>On completing this course, students will be able to:</p> <p>d1- Encourage the students to express them selves in the class and to present their views</p> <p>d2- Work effectively in a group and independently.</p> <p>d3- Improve ability to communicate mathematics, both orally and in writing.</p> <p>d4- Improve student's ability to think logically, analytically, and abstractly.</p>	<p>د- المهارات العامة :</p>
<p>1- Fundamentals: The division algorithm, The Euclidean algorithm, Diophantine equations, The Chinese Remainder Theorem.</p> <p>2- Prime numbers and their Distribution :The infinitude of primes, The fundamental theorem of arithmetic and unique factorization domains(viz "algebraic number theory"), Dirichlet's theorem.</p> <p>3-Theory of Congruencies: Congruence, Linear congruencies, Modular arithmetic and multiplicative inverses, Fermat's Factorization, Fermat's little theorem.Wilson's theorem,</p> <p>4- Euler's generalization of Fermat's Theorem, Euler's phi-unction. Euler's theorem</p> <p>5- Primitive roots, order and indices Primitive Roots of Primes, Composite Numbers Having Primitive Roots, The Theory of Indices.</p> <p>6- Number Theoretic Functions, Multiplicative Functions, The Mobius Inversion Formula</p> <p>7- Introduction to algebraic number Theory, Ring of integers, ideals, Galois theory, Decomposition laws.</p> <p>8- Continued Fractions: introduction-Solving Diophantine equations using continued Fractions.</p>	<p>٤- محتوى المقرر:</p>
<p>1- Lectures 2- Tutorials</p>	<p>٥- أساليب التعليم والتعلم:</p>
<p>The same as normal students, only skeletal disabilities are allowed in the</p>	<p>٦- أساليب التعليم والتعلم</p>

Faculty of Science.			للطلاب ذوي القدرات المحدودة:
٧- تقويم الطلاب :			
1- Final exam	to assess	a1-a4, b1-b3,c1-c3	أ- الأساليب المستخدمة :
2- Oral exam	to assess	a1-a4, b1-b3,d1-d3	
3- Mid-Term Exam	to assess	a1,a3,a4, b1-b3, c1-c3	
1- Final exam	week	16	ب- التوقيت :
2- Oral exam	week	16	
3- Mid-Term Exam	week	6	
- Mid-Term Examination	10%		ج- توزيع الدرجات :
- Final-Term Examination	80%		
- Oral Examination	10%		
- Practical Examination	0		
Total 100%			
٨- قائمة الكتب الدراسية والمراجع :			
			أ- مذكرات:
G.H. HARDY and E.M.WRIGHT (1975) An Introduction to the theory of Numbers.			ب- كتب ملزمة
David M. Burton (2005) Elementary Number Theory, William Brown Publ.			ج- كتب مقترحة :
http://www.liv.ac.uk/math/PURE/wipm.html http://www.archive.org/details/coursepuremath00hardrich			د- دوريات علمية أو نشرات..

(أ) مصفوفة المعارف والمهارات المستهدفة من المقرر الدراسي

المحتويات للمقرر	اسبوع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
Fundamentals: The division algorithm, The Euclidean algorithm, Diophantine equations, The Chinese Remainder Theorem.	1-2	a1,a3, a4	b1-b3	c1-c3	d1-d4
Prime numbers and their Distribution: The infinitude of primes. The fundamental theorem of arithmetic and unique factorization domains (viz "algebraic number theory"), Dirichlet's theorem.	3-4	a3	b1-b3	c1-c3	d1-d4
Theory of Congruencies: Congruence, Linear congruencies. Modular arithmetic and multiplicative inverses. Fermat's Factorization. Fermat's little theorem. Wilson's theorem.	5-6	a4	b1-b3	c1-c3	d1-d4
Euler's generalization of Fermat's Theorem Euler's phi-unction. Euler's theorem.	7-8	a3,a4	b1-b3	c1-c3	d1-d4
Introduction to algebraic number Theory. Ring of integers, ideals. Decomposition laws.	9-11	a4	b1-b3	c1-c3	d1-d4
Continued Fractions: introduction-Solving Diophantine equations using continued Fractions.	12-14	a2	b1-b3	c1-c3	d1-d4

أستاذ المادة :

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