

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Number Theory		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	MS 308		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Rana hazim Jasim	e-mail	Rana.hazim@tu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	
Module Tutor	Rana hazim Jasim	e-mail	Rana.hazim@tu.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To understand the properties and behavior of numbers particularly integers. 2. To cover topics of number theory. 3. To understand the fundamental properties of integers and their relationship with other mathematical structures. 4. It involves exploring the properties and relationships of numbers, as well as their patterns and structures. 5. The main topics studied in number theory include prime number, divisibility, congruence's.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Understanding the properties of prime numbers and composite numbers. 2. Developing skills in finding the greatest common divisor (GCD) and least common multiple (LCM). 3. Learning about modular arithmetic and its applications. 4. Studying Diophantine equations and their solutions. 5. Exploring the concept of congruence and its uses in number theory. 6. Understanding the distribution of prime numbers and the Riemann Hypothesis. 7. Learning about continued fractions and their applications. 8. Investigating the properties of perfect numbers, Mersenne primes, Fermat primes, and other special types of numbers. 9. Studying number-theoretic functions, such as Euler's totient function and the Mobius function. 10. Exploring cryptography and its mathematical foundations.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Chapter 1</u> The background of number theory, the natural number, the integer number, the properties of integer numbers, the algebraic operations with integers, the main theorems of integer numbers. [15 hrs]</p> <p><u>Chapter 2</u> The principle of mathematical induction, The integer divisibility, The Division algorithm, The greatest common divisor, the related theorems and examples. [15 hrs]</p> <p><u>Chapter 3</u> The Euclidean algorithm, The prime numbers, the related theorems and examples. [15 hrs]</p> <p><u>Chapter 4</u> Congruencies, The linear Congruencies, the Chinese Remainder Theorem, the related theorems and examples. [15 hrs]</p> <p><u>Chapter 5</u> Euler and Fermat theorem, Fermat's little theorem, Residue system, Linear Diophantine equations, the related theorems and examples. [15 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	5,8,10	LO #1, 2 and 3
	Assignments	3	15% (15)	2,7,11	LO # 1-4
	Projects / Lab.				
	Report	2	10%(10)	5,10	LO# 1-5 and 8-10
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The background of number theory, the natural number.
Week 2	the integer number, the properties of integer numbers
Week 3	the algebraic operations with integers, the main theorems of integer numbers.
Week 4	The principle of mathematical induction and examples.
Week 5	The integer divisibility, The Division algorithm.
Week 6	Examples of integer divisibility and the Division algorithm.
Week 7	The greatest common divisor, the related theorems and examples.
Week 8	Mid-term Exam+The Euclidean algorithm, The prime numbers.
Week 9	the related theorems and examples
Week 10	Congruencies, The linear Congruencies.
Week 11	Examples of the linear Congruencies.
Week 12	the Chinese Remainder Theorem, the related theorems and examples.
Week 13	Euler and Fermat theorem, Fermat's little theorem.
Week 14	Residue system, Linear Diophantine equations
Week 15	Examples of the Residue system, Linear Diophantine equations.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. William Stein, "Elementary Number Theory: Primes, Congruences and Secrets", November 16, 2011. 2. Victor Shop, "A Computational Introduction to Number Theory and Algebra", 2008.	No
Recommended Texts	Wissam Raji, "An Introductory Course in Elementary Number Theory", 2020	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.