KINGDOOM OF SAUDI ARABIA
Ministry of Education
Al-Imam Mohammad Ibn Saud Islamic University
College of Sciences
Department of Mathematics & Statistics

المملكة العربية السعودية
وزارة التعليم
جامعة الإمام محمد بن سعود الإسلامية
كلية العلوم
قسم الرياضيات والإحصاء

SYLLABUS

Course Code	*Course Num.*	*Course Name*	*Credit Hours*	*Lec.*	*Lab.*	*Tut.*	*Private study*	*Pre-requisites*	*Course Level*	*Teaching Language*
MAT	**222**	**Introduction to Number Theory**	**3**	**2**	**0**	**2**	**5**	**MAT 220**	**4**[1]	**English**

A. Course Description

This course describes the most important ideas, theoretical results, and examples of divisibility, factorizations and congruences. The course includes the essential fundamentals of these topics. The emphasis is on calculations, and some applications are mentioned.

B. Course Outcomes

At the end of this course the student will be:

- Familiar with the fascinating subject of number theory.
- Familiar with basic knowledge in number theory; this is essential for subsequent courses in mathematics and computer science.
- Able to use number theory for abstract mathematics courses like "Modern Algebra".

C. References

Required Textbook

Elementary Number Theory, 7th Edition, David M. Burton, McGraw Hill, 2011.

Other references:

- *Elementary Number Theory*, K. Rosen, Addison-Wesley, 5th edition, 2004.
- *An Introduction to Mathematical Reasoning: Numbers, Sets and Functions*, P. Eccles, Academic Express, 1997.
- *Elementary Theory of Numbers*, W. Le Veque, Dover Publications, 1990.

Course Website: Google Classroom Webpage: http://www.imamm.org/

[1] *B.Sc. in Applied Mathematics.*

D. Topics Outline

1. **Basics:** Classical and Strong Mathematics Inductions, Well-Order Principal, Binomial Theorem.
2. **Divisibility And Factorizations**: Divisibility Properties, The Division Algorithm, Representation of a Number Relative to Arbitrary Base, The Binary Digit System, Fundamental Theorem of Arithmetic, Infinitude of Prime Numbers, Greatest Common Divisors and Least Common Multiple, Euclidean Algorithm and Bezout's Identity..
3. **Congruences**: Congruence and Modular Arithmetic, Diophantine Linear Equation, Chinese Remainder Theorem and System of Linear Diophantine Equations, Wilson's Theorem, Little Fermat's Theorem, Euler Phi Function and Euler Theorem.
4. **Applications**: Divisibility Tests, Round-Robin Tournaments, Pseudo Primes, Pseudorandom Numbers, Linear Codes, Pythagorean Triples and Sum of Two Squares.

E. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homework:** During the semester.
- **Final Exam:** 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 20 %	**Midterm 2:** 20 %	**Final Exam:** 40 %
Quizzes, Homework, Attendance & Participation: 20 %		

The grading distribution:

A+	A	B+	B	C+	C	D+	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)

G. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. ("Immediate family" is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

Executive Rules for Study Regulations and Exams
goo.gl/ykm7t3