DE LA SALLE UNIVERSITY – MANILA
COLLEGE OF SCIENCE
Mathematics Department

SYLLABUS

COURSE CODE	MTH621M/D
COURSE TITLE	Number Theory
CLASS DAY & TIME	
ROOM	
NAME OF FACULTY	
COURSE CREDIT	3 Units
CONTACT NO. (DEPT)	(02) 536-0270, (02) 524-4611 loc. 420/413
TERM/SCHOOL YEAR	

COURSE DESCRIPTION
An introductory course on game theory which tackles both the non-cooperative and cooperative streams.

COURSE OBJECTIVES
The students will:
1. Appreciate the many varied properties of integers.
2. Be familiar with some applications of number theoretic concepts and results to real-life problems
3. Use appropriate methods of proof to establish a number theoretic result
4. Exhibit values like:
   - cooperation through group study;
   - honesty by claiming credit only for the work he has done;
   - patience, perseverance and diligence by solving assigned exercises completely including the difficult ones;
   - faith by doing what is right and giving his best in performing any assigned task;
   - self-reliance by being able to solve problems independently.

Topic/Subtopic	Learning Strategies/ Activities	Week/Meeting
1. Divisibility in the Set of Integers 1.1 The Division Algorithm 1.2 Greatest Common Divisor 1.3 Euclidean Algorithm	Lecture Facilitated group discussion Problem solving	Weeks 1-2

Topic/Subtopic	Learning Strategies/ Activities	Week/Meeting
1.4 Least Common Multiple 1.5 Prime and Composite Numbers 1.6 Unique Factorization		
2. The Theory of Congruences 2.1 Basic Properties of Congruences 2.2 Linear Congruences 2.3 Linear Diophantine Equations 2.4 The Chinese Remainder Theorem 2.5 Fermat's Theorem 2.6 Wilson's Theorem 2.7 Euler's Phi Function and Its Properties 2.8 Euler's Generalization of Fermat's Theorem	Lecture Facilitated group discussion Problem solving Problem Set	Weeks 3-5
LONG TEST 1		Weeks 6
3. Primitive Roots 3.1 Exponents and Orders 3.2 Primitive Roots of Prime and Composite Numbers	Lecture Facilitated group discussion Problem solving Individual Inquiry	Weeks 7-8
4. Quadratic Reciprocity 4.1 Euler's Criterion 4.2 The Legendre Symbol and Its Properties 4.3 Quadratic Residues 4.4 The Quadratic Reciprocity Law	Lecture Facilitated group discussion Problem solving Problem set	Weeks 9-10
5. Number Theoretic Functions 5.1 The Functions and 5.2 The Mobius Inversion Formula 5.3 The Greatest Integer Function 5.4 Pythagorean Triples	Lecture-Discussions Individual/Group ReportingLecture Facilitated group discussion Problem solving	Weeks 11
LONG TEST 2	Lecture-Discussions Individual/Group Reporting	Weeks 12
Oral Report: Exposition of Paper		Week 13
FINAL EXAMINATION		Week 14

COURSE REQUIREMENTS

- 2 Long Tests
- 2 Problem Sets
- 1 Final Examination
- 1 Partial exposition of an article on Number Theory

SOURCES

TEXTBOOKS

- Baldoni, Maria, et. al. (2009) (electronic). Elementary Number Theory, Cryptography and Codes. Springer Link.
- Stein, Williman (2009) (electronic). Elementary Number Theory: Primes, Congruences and Secrets (*Undergraduate Texts in Mathematics*). Springer Link.
- Mollin, Richard. (2008). Fundamental Number Theory with Applications. Boca Raton: Chapman and Hall
- Robbins, Neville. (2006). Beginning Number Theory. Massachusetts: Jones and Bartlett Publishers.
- Burton, David. (2007). Elementary Number Theory, 7th edition. Boston: McGraw-Hill/Higher Education.
- Niven, Ivan Morton. (1991). An Introduction to the Theory of Numbers. New York: Wiley.

REFERENCES
- Yu, Hong-Bing. (2010). Problems of Number Theory in Mathematical Competitions. Shanghai: East China Normal University Press.
- Gioia, Anthony. (2001). The Theory of Numbers: An Introduction. Mineola, New York: Dover Publications

RELATED WORKS OF FACULTY

- Ruivivar, Leonor A.(2010) *"Some Properties of the Digraph $\wp(n)$ and the Zero Divisor graph of the Ring Z_n,* 15th Joint Osaka University-De La Salle University Research Workshop.

- Mordeno, Mark Oyelle (2011). *On Generalized Carmichael Numbers*. Unpublished masteral thesis. De La Salle University.
- Gervacio, Severino and Ruivivar, Leonor. (2007). *The Three-Way Lights Out Puzzle*. 9th 15th Joint Osaka University-De La Salle University Research Workshop.
- Ruivivar, Leonor (2006). *"Singular and Nonsingular Circulant Graphs",* Journal of Research in Science, Computing and Engineering,

Noted by:

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