



DE LA SALLE UNIVERSITY – MANILA
COLLEGE OF SCIENCE
Mathematics Department

SYLLABUS

COURSE CODE	MTH611M/D
COURSE TITLE	Abstract Algebra 1
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

The course is focused on the study of groups, group homomorphisms, Cayley's Theorem, Lagrange Theorem, permutation groups, Sylow Theorem.

COURSE OBJECTIVES

The students will:

1. identify the groups from other of algebraic structures;
2. give examples of groups, subgroups, normal subgroups, homomorphisms and isomorphisms;
3. prove statements that are consequences of the standard theorems of group theory;
4. identify generators of cyclic groups and the orbit of an element of a permutation group;
5. describe the subgroup structure of a finite group by applying the Sylow theorems
6. Exhibit values in order to:
 - develop appreciation for abstract concepts and the method of dealing with them.
 - develop the ability to make logical deductions and apply abstract theory to study concrete concepts.
 - reinforce positive work habits like patience, perseverance and industry in doing exercises.
 - realize that the power of logical and analytical thinking goes beyond the realm of mathematics

Topic/Subtopic	Learning Strategies/ Activities	Week/Meeting/ Hours
I. FUNDAMENTAL CONCEPTS <ol style="list-style-type: none"> 1. Relations and Functions 2. One-to-One and Onto Mappings 3. The Integers and Some Number Theory 4. The Integers Modulo n 	Lecture Facilitated group discussion Problem solving	8 Hours

Topic/Subtopic	Learning Strategies/ Activities	Week/Meeting/ Hours
5. Equivalence Relations and Partitions		
II. GROUP THEORY 1. Semigroup and Monoid 2. Definition and Examples of Groups 3. Group Tables 4. Elementary Properties 5. Abelian and Cyclic Groups 6. Subgroups 7. Symmetric, Alternating and Dihedral Groups	Lecture Facilitated group discussion Problem solving Problem Set	12 Hours
MIDTERM EXAMINATION		2 Hours
8. Cosets and Lagrange Theorem 9. Normal Subgroup and Factor Group 10. Homomorphism and Isomorphism 11. Fundamental of Homomorphism Theorem for Groups 12. Cayley's Theorem 13. Sylow Theorems and Applications	Lecture Facilitated group discussion Problem solving Individual Inquiry	9 Hours
III. RINGS* 1. Definition and Examples of Rings 2. Fields and Integral Domains	Lecture Facilitated group discussion Problem solving Problem set	2 Hours
FINAL EXAMINATION		2 Hours

*OPTIONAL

COURSE REQUIREMENTS

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|---------------------|-----|
| • Long Tests | 50% |
| • Final Examination | 30% |
| • Problem Sets | 20% |

SOURCES

- Ayres, Frank. *Schaum's Outline of Theory and Problems of Abstract Algebra*, McGraw-Hill, New York, 2004.
- Bloch, Ethan. *Proofs and Fundamentals: A First Course in Abstract Algebra*, Springer New York, 2011.
- Dummit, David. *Abstract Algebra*. Wiley Hoboken, NJ, 2004.
- Fraleigh, John B. *A First Course in Abstract Algebra*, Addison-Wesley Boston, 2003
- Gallian, Joseph. *Contemporary Abstract Algebra*, Houghton Mifflin, Boston, 2002.
- Herstein, I. N. *Abstract Algebra*, Macmillan New York, 1986.
- Hungerford, Thomas. *Algebra*, Springer-Verlag New York, 1974.
- Klima, Richard. *Applications of Abstract Algebra with Maple*. CRC Press, 2000.
- Lang, Serge. *Algebra*, Addison-Wesley, 1995.
- Solomon, Ronald. *Abstract Algebra*, Thompson Brooks/Cole Belmont, CA, 2003.

Noted by:

A handwritten signature in black ink, appearing to read 'Isagani B. Jos', with a stylized flourish at the end.

DR. ISAGANI B. JOS
Chair, Mathematics Department

DR. JOSE SANTOS R. CARANDANG VI
Dean, College of Science