

Module Syllabus:

Course Title: Set Theory
 Course Code: 250251
 Semester: Second 2009/2010
 Lecturer : Amin Witno
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 Office Hours: STR 10–11; MW 11–12
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Short Description:

This course is an introduction to Abstract Mathematics, also known as Transition to Advanced Mathematics, wherein heavy emphases are placed on proof structures in the settings of Logic and Set Theory. Topics include Propositional Logic and Quantification, Methods and Structure of Proof, Set Operations and Identities, Relations and Functions, Cardinal Numbers and Countability.

Topics by the Week:

Week	Dates	Topics
1	22/02 – 25/02	Review of the real numbers, some notations, functions and sequences
2	28/02 – 04/03	Logic and operators, Truth Tables, Quantification
3	07/03 – 11/03	Proving Conditional Statements, Equivalence, Contrapositive
4	14/03 – 18/03	Proof by Cases, Proving Existence Statements
5	21/03 – 25/03	The Principles of Mathematical Induction
6	28/03 – 01/04	Set operations, Venn diagrams and Truth Tables, Set Identities
7	04/04 – 08/04	Power Sets, Cross Product, Generalized Union and Intersection
8	11/04 – 15/04	Relations, Inverse and Composition, Equivalence Relations
9	18/04 – 22/04	Partial Ordering, Total Order, Well Ordering Principle
10	25/04 – 29/04	Functions as relations, Composition of functions
11	02/05 – 06/05	One-to-one and onto functions, Inverse functions
12	09/05 – 13/05	Cardinality and Cardinal Arithmetic
13	16/05 – 20/05	Properties of Infinite Countable Sets
14	23/05 – 27/05	Uncountable Sets, The Continuum Hypothesis
15	30/05 – 03/06	Review for Final Exam
16	07/06 – 15/06	Final Exam will be held in this period

Mark Distribution:

- Exam 1 30/03/2010 15%
- Exam 2 04/05/2010 15%
- Quizzes TBA 20%
- Final Exam TBA 50%

References:

- Smith, Eggen, and St. Andre, A Transition to Advanced Mathematics, 6th Edition 2006, Brooks Cole
- Keith Devlin, Sets, Functions, and Logic: An Introduction to Abstract Mathematics, 3rd Edition 2004, CRC Press
- Michael L. O'Leary, The Structure of Proof with Logic and Set Theory, 2002, Prentice Hall
- David L. Johnson, Elements of Logic via Numbers and Sets, 1998, Springer Verlag.

Textbook:

- Amin Witno, Logic and Sets. These notes are required for every student and are available for free from Amin Witno Website.
- Amin Witno, Discrete Structures in Five Chapters. Some chapters from this book will be used. The text will soon be available at Amazon.com, but the softcopies can be downloaded for free from the website.

Websites:

- Basic Sciences Department- <http://www.philadelphia.edu.jo/math>
- Amin Witno Website- <http://www.witno.com/>