Description

This course discusses about the basic of mathematics, which consists of logic in mathematics, sets, and an introduction to elementary calculus. The students are expected to be able to think deductively and systematically. The main course are the theory of set: subset, operation of sets, function and its properties; logic: proposition, quantifier, argument, and methods of deduction; and the elementary calculus: limit, differential, and integral.

Syllabus

1. Course Identity

   Name   : Foundation of Mathematics
   Code   : SE 201
   Credit(s)   : 3
   Grade   : 1ˢᵗ grade, on 1ˢᵗ semester
   Classification : GSC (General Science Education)
   Program   : IPSE-FPMIPA UPI/S-1
   Statue   : Compulsory
   Prerequisite   : -
   Lecturer   : Prof. Dr. Yaya S. Kusumah, M.Sc., Ph.D.

2. Goal
   a. To understand basic concepts of mathematics for advance mathematical applications
   b. To understand mathematical reasoning in order to read, comprehend, and construct mathematical arguments.

3. Course approach
   a. Sets (Definition, Set Operations)
   b. Real Numbers and Coordinates (Open and Closed Intervals, Inequalities, Absolute Values, Rectangular Coordinates in the Plane, Equations and Curves including Straight lines, Parabola, and Circles)
   c. Functions and Their Graphs
   d. System of Equations (System of Linear Equations, System of Non linear Equations)

    e. Logic and Methods of Proof (Statements, Arguments, Method of Deduction, and Quintifiers)

4. Learning Activities
   a. Methods : Lecturing, Discussion, Problem Solving, Inquiry/Discovery
   b. Approaches : Open Ended, Analogy, Deductive-Inductive, Computer-Assisted Instruction (CAI)
   c. Media: Internet, Computers, LCD Projectors

5. Assessment
   a. Type of Tests: Essay and Objective Tests
   b. Mode of Tests: Mid Term Test, Final Test, Assignment
   c. Policy of its own lecturer.

6. Material course schedule

WEEK	TOPICS	REMARKS
1-2	1. Set (Definition, Set Operations)	
3	2. Real Numbers and Coordinates a. Open and Closed Intervals, Inequalities, Absolute Values	
4	b. Rectangular Coordinates in the Plane c. Equations and Curves (Straight lines, Parabola, Circles)	
5	3. Functions and Their Graphs	

6	4. System of Equations
	   a. System of Linear Equations
	   b. System of Non linear Equations	

7	Tutorial 1	
8	Mid Term Test	
9	5. Logic and Methods of Proof a. Statements (Definition, Monary and Binary Operations, Table of Truth, Converse, Inverse and Contrapositive, Application of Logic in Electrical Networks/Circuits)	
10-12	b. Arguments (Inferences, Validity and Invalidity) c. Methods of Deduction (Direct and Indirect Proofs)	
13-14	d. Quintifiers (Universal Quintifiers, Particular Quintifiers, Syllogism)	
15	Tutorial 2	
16	Final Test	

7. References

- Goodman, A.W., and E.B. Saff (1981). *Calculus: Concepts and Calculations*. New York: Macmillan Publishing Co., Inc.
- Grimaldi, R.P. (1994). *Discrete Combinatorics Mathematics, An Applied Introduction*. New York: Addison-Wesley Publishing Company.
- Rosen, K.H. (2003). *Discrete Mathematics and Its Applications* (5 edition). Boston: Mc-Graw Hill Company.
- Copi, I. (1973). *Symbolic Logic*. New York: Macmillan Publishing Co., Inc.