



UNITED STATES INTERNATIONAL UNIVERSITY

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**SEMESTER:**

**MTH 1109H: COLLEGE ALGEBRA**

**CREDIT: 3 UNITS.**

**LECTURER: SINGH C. B.**

**DAY/ TIME: SAT : 9.00 – 12.20 P.M.**

**ROOM: J**

**CONSULTATION: 8 – 9A.M. (TUE/THURS)**

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**COURSE DESCRIPTION**

This course is aimed at exposing students to the concepts and theories in modern algebra, with emphasis on functions, graphical methods, and theory of equations; including the study of quadratic equations, complex variables, systems of equations and inequalities, polynomial functions, logarithmic and exponential functions, arithmetic and geometric progression.

**Pre-requisite:** MTH 1105 or a pass in the mathematics placement test.

**COURSE LEARNING OUTCOMES**

At the end of the course every learner should be able to,

- Collect, analyze and evaluate data/information to formulate valid conclusions.
- Demonstrate the ability to reason critically and creatively in an algebraic context.
- Demonstrate competence in oral and written algebraic related communication.
- Apply basic scientific, quantitative, and technological skills (IT) in a changing environment.

**COURSE CONTENT AND LEARNING OUTCOMES ALIGNMENT**

**WEEK 1 SETS** (a, b, c, d)

Definition, denotations, description of a set, the symbols:  $\in$ ,  $\notin$ ,  $\subseteq$ ,  $\subset$ , finite and infinite sets, operations on sets i.e. formations of unions ( $\cup$ ), intersections ( $\cap$ ), differences ( $\setminus$ ) and universal set, complementation operation.

**WEEK 2 SETS (Continued)** (a, b, c, d)

Use of Venn diagrams, number of elements in a set (cardinality of a set). Application of Venn diagrams to overlapping survey of information problems.

The set of real numbers ( $\mathbb{R}$ ,  $\mathbb{W}$ ,  $\overline{\mathbb{R}}$ ,  $\mathbb{Q}$ ,  $\mathbb{Z}$ ,  $\mathbb{N}$ ,  $\mathbb{C}$ ,  $\mathbb{I}$ ) and its subsets, real number line, operations with real numbers ( $+$ ,  $-$ ,  $\times$ ,  $\div$ ), properties and rules of real numbers; directed numbers and their order of operation (BODMAS).

**WEEK 3 Polynomials** (a, b, c, d)

Different possible ways of expressing a product of two factors, bases, exponents, and  $n^{\text{th}}$  power of a factor.

Definition of a polynomial (monomials, binomials, trinomials etc.). Numerical coefficients, literal coefficients, the degree of a polynomial, like terms, addition and subtraction of polynomials.

Multiplication and division of monomials, and multiplication and division of polynomials.

**WEEK 4 FACTORING EXPRESSIONS** (a, b, c, d)

Factorizing polynomials of two terms, with a common factor, and factoring by grouping.

Factorizing quadratic expressions.

**WEEK 5 RATIONAL EXPRESSIONS** (a, b, c, d)

Rational expressions, simplifications of rational expressions with the aid of factoring. Addition and subtraction of rational expressions. Multiplication and division of rational expressions.

**WEEK 6 EQUATIONS** (a, b, c, d)

Definition of a first order linear equation in one unknown (variable). Solutions, and solving linear equations in one unknown. Solving equations involving rational expressions.

**MID-SEMESTER EXAM****Week 7 INEQUALITIES AND WORD PROBLEMS** (a, b, c, d)

Inequalities in one variable (definition), solution set, solving inequalities in one variable. Word problems and applications.

**WEEK 8 EXPONENTS AND ROOTS** (a, b, c, d)

Integer exponents (zero exponent, negative exponents and positive exponents). Rules for exponents.

Definition of square roots, cube roots, fourth roots etc. Rational exponents.

**WEEK 9 RADICALS** (a, b, c, d)

Definition, multiplication and division of radicals. Simplification of radicals.

Complex numbers, definition, real and imaginary components of a complex number, equality of two complex numbers, addition and subtraction of complex numbers.

**WEEK.10 QUADRATIC EQUATIONS** (a, b, c, d)

Multiplication of complex numbers and division of complex numbers..

Definition of a quadratic equation, methods of solving quadratic equations: factor, completing the square method, formula). Derivation of the formula for solving quadratic equations.

**WEEK 11 SYSTEMS OF EQUATIONS** (a, b, c, d)

Simultaneous linear equations in two unknowns. Elimination and substitution methods of solving simultaneous equations.

**WEEK 12 GRAPHICAL METHODS** (a, b, c, d)

Rational, exponential, logarithmic functions.

**WEEK 13 PROGRESSIONS AND EXPANSIONS (a, b, c, d)**

Arithmetic and geometric progressions. Binomial expansion and Pascal's triangle.

**WEEK 14 FINAL EXAMS****TEACHING METHODOLOGY**

The methods that will be used to present the course will include,

- Lectures and class discussions and demonstrations when possible.
- Individual assignments and quizzes.
- Exams: mid-semester and the final exam.
- Consultations.
- Use of the calculator in checking results.

Each student will be required to adhere to the following requirements.

- Own a scientific calculator.
- Avoid plagiarism. Plagiarism will result into an instant F.
- Avoid absenteeism from the course. Five absences will lead to an F.
- Plan to attend all the semester exams. There will be no make-ups.

**COURSE LEARNING EVIDENCES**

The learning out comes evidences includes direct and indirect types as described below.

**A. Direct**

Individual assignments

Quizzes

Exams

**B. Indirect**

Class discussions

Consultations on the weak areas

Course students' evaluation forms

**COURSE TEXTS**

The text books recommended for this course includes,

- Stainlage Raph C. (1990), College Algebra, 3rd Edition, West Publishing Company.
- James Stewart et al. (2004), College Algebra, 4th Edition, Thomas Learning, Incl.

**COURSE EVALUATION**

The course evaluation for each student will be as follows.

Attendance and participation	5%
Assignments	20%
Quizzes	25%
Mid-semester exam	25%
Final exam	<u>25%</u>
Total score	<u>100%</u>

**GRADING SYSTEM**

The grading system used applies to all the programs offered in USIU. It is as tabulated below.

90 – 100	A	80 – 83	B	70 – 73	C	62 – 63	D
87 – 89	A-	77 – 79	B-	67 – 69	C-	60 – 61	D-
84 – 86	B+	74 – 76	C+	64 – 66	D+	59 –	F