COURSE OUTLINE : MATH 15
C Credit – Not Degree Applicable
COURSE ID 010396
Created: February 2019
Revision: March 2020

COURSE DISCIPLINE : MATH

COURSE NUMBER : 15

COURSE TITLE (FULL) : Foundations of Algebra

COURSE TITLE (SHORT) : Foundations of Algebra

CATALOG DESCRIPTION

MATH 15 is a one-semester course leading to Intermediate Algebra for BSTEM (MATH 90) or Intermediate Algebra and Pre-Statistics (MATH 30). MATH 15 includes the fundamental processes of arithmetic, pre-algebra, and selected topics from algebra. It is designed to develop skills in computation using signed numbers, fractions, decimals, and percents. Rules of exponents, first-degree equations, fundamental facts about geometry, solutions to linear equations, algebraic manipulations, exponents, polynomials, graphing linear equations, solving linear systems, and factoring are also included.

CATALOG NOTES

Note: This course may not be taken for credit by students who have completed MATH 144, 145, 245A or 245B. A maximum of 7 units will be granted for MATH 15 and any of the following courses: MATH 155, 255A, 255B, 255C, or 255D.

Total Lecture Units: 3.00

Total Laboratory Units: 1.00

Total Course Units: 4.00

Total Lecture Hours: 54.00

Total Laboratory Hours: 54.00

Total Laboratory Hours To Be Arranged: 0.00

Total Contact Hours: 108.00

Total Out-of-Class Hours: 108.00

ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1				Read, write, and converse in English;	Yes
2				use effective speaking and listening skills;	Yes
3				read and write at a level of 10th grade or above;	Yes
4				perform basic arithmetic operations of addition, subtraction, multiplication, and division of whole numbers;	Yes
5				perform basic computer operations.	Yes

EXIT STANDARDS

1 Add, subtract, multiply, and divide real numbers;
2 convert between percents, decimals and fractions;
3 solve introductory linear equations and inequalities;
4 simplify introductory exponential expressions;
5 add, subtract, multiply and divide polynomials;
6 graph introductory linear equations and inequalities;
7 find the equation of a line;
8 solve linear systems using graphing, substitution and elimination methods;
9 use algebra to solve applied problems;
10 factor polynomials;
11 demonstrate knowledge of test-taking strategies and study skills.

STUDENT LEARNING OUTCOMES

1 apply critical thinking and quantitative reasoning in using signed numbers, fractions, percents, and decimals;
2 interpret linear equations numerically, graphically, and symbolically and be able to transition between them;
3 analyze and evaluate information given in application problems to arrive at accurate solutions and communicate the solutions clearly;
4 select and execute the appropriate strategy for solving equations, solving inequalities, solving systems, simplifying polynomials, and factoring polynomials;
5 incorporate academic strategies and mindset in planning and self-assessment of mathematical success.

COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	Whole Numbers • Factors and prime factorization • Exponents and order of operations	2	0	2
2	Signed Numbers • Greater than and less than • Absolute value • Addition of signed numbers • Subtraction of signed numbers • Multiplication of signed numbers • Division of signed numbers • Order of operations	5	0	5
3	Fractions • Reducing to lowest terms • Changing improper fractions to mixed numbers • Changing mixed numbers to improper fractions • Finding common denominators and least common denominators • Addition and subtraction of fractions • Multiplication of fractions • Division of fractions • Exponents and order of operations	5	0	5
4	Decimals • Rounding decimals • Comparing decimals and fractions • Multiplying and dividing by powers of ten • Changing fractions to decimals • Changing decimals to fractions • Order of operations	3	0	3
5	Percent • Meaning of percent • Changing percent to decimals • Changing decimals to percents • Changing percents to fractions • Changing fractions to percents • Solving percent problems • Applications of percents	3	0	3

6	Linear Equations and Inequalities • Simplifying expressions • Addition property of equality • Multiplication property of equality • Solving linear equations • Formulas • Applications • Linear and compound inequalities	5	0	5
7	Ratio and Proportions • Perimeter of plane geometric figures • Ratio and ratio applications • Solving proportions • Applications of proportions • Similar triangles	3	0	3
8	Linear Equations and Inequalities in Two Variables • Graphing ordered pairs • Solutions to linear equations in two variables • Graphing linear equations in two variables • Graphing using intercepts • The slope of a line • Finding the equation of a line • Linear inequalities in two variables • Area of geometric figures	7	0	7
9	Systems of Linear Equations • Solving systems of equations by graphing • Solving systems of equations by elimination • Solving systems of equations by substitution • Applications of systems of equations	6	0	6
10	Exponents and Polynomials • Multiplication with exponents • Division with exponents • Operations with monomials • Addition and subtractions of polynomials • Multiplication with polynomials • Binomial squares and other special products • Dividing polynomials	7	0	7

11	Factoring • The greatest common factor • Factoring by grouping • The difference of two squares • Solving equations by factoring • Applications	8	0	8
12	Laboratory Content • Calculate area and perimeter • Calculate sales tax and total price • Graph lines using slope and intercepts • Apply mathematical models • Perform operations with fractions, decimals, and percents • Apply ratios and proportions to solve application problems • Solving equations, inequalities, and systems • Simplifying expressions with exponents • Dividing polynomials using long division • Factoring of polynomials • Information vs knowledge (concept maps) • Study plans • Mindset (growth, resilience, hardiness, and grit) • Recognizing and combating negative thoughts • Reading and cognitive techniques • Studying and problem solving techniques • Learning styles and thought processes • Test preparation • Test taking skills	0	54	54
				108

OUT OF CLASS ASSIGNMENTS

1 homework (e.g. problems sets related to course content);
2 lab assignments and projects (e.g. Design a matte frame for a photo using mixed numbers).

METHODS OF EVALUATION

1 group work (e.g. Find areas and volumes of shapes involving objects that can be brought into the classroom such as cans and boxes);
2 quizzes;
3 four to seven regularly scheduled examinations required;
4 a comprehensive final examination is required.

METHODS OF INSTRUCTION

- [x] Lecture
- [ ] Laboratory
- [ ] Studio
- [x] Discussion
- [x] Multimedia
- [ ] Tutorial
- [ ] Independent Study
- [x] Collaboratory Learning
- [ ] Demonstration
- [ ] Field Activities (Trips)
- [x] Guest Speakers
- [x] Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	IBSN	Date
Beginning Algebra	Required	McGraw-Hill	5	Print	Miller, Julie	978-1-259-61025-7	2018