



Approved Innovative Course

Course: Number Theory
PEIMS Code: N1110025
Abbreviation: NUMTHY
Grade Level(s): 11-12
Number of Credits:

Course description:

The topics of study contribute to the student's enhanced understanding of historical developments, proofs, and discoveries of mathematical numerical relationships. The study of number theory broadens the student's ability to include not only deductive but inductive reasoning, develop a heightened recognition of numerical relationships, and increase skills in discerning unique mathematical relationship.3 (eas)18 (e)]T (d)



- (A) examine unsolved problems in number theory including the Twin Prime Conjecture and the Goldbach Conjecture;
- (B) determine the quantity of divisors of a given number from its prime factorization;
- (C) determine the sum of divisors of a given number from its prime factorization;
- (D) compute the least common multiple of two numbers from the greatest common divisor;
- (E) explore Fermat and Mersenne primes;
- (F) prove the fundamental theorem of arithmetic;
- (G) prove certain roots are irrational using the fundamental theorem of arithmetic ;
- (H) develop Euclid's proof of the infinitude of the primes; and
- (I) examine arithmetic progressions of primes and Dirichlet's theorem.



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Description of specific student needs this course is designed to meet:

This course is an extensive source of information about interesting classical and modern numbers. It will provide problems, facts, and challenges in number lore that may become the beginning of a lifetime adventure with numbers. It will stimulate imaginative solutions to existing problems, to their creative extensions, and to entirely new problems. It is also an essential primer for students who want to ultimately pursue an undergraduate major in mathematics.

Major resources and materials:

Marshall, D., & Odell, E. (2007). Number theory through inquiry. Washington, DC: Mathematical Association of America.

Suggested course activities:

Students will work independently and in groups to debate strategies for proofs and problem solving. Calculators will be used to accelerate the discovery of key concepts. Internet research will also be done on unsolved problems in number theory.

Suggested methods for evaluating student outcomes:

Daily grades will be given on presentations of practice problems using skills and concepts.

Test grades will be given on evaluation of knowledge of concepts and the methods for applying them.

Research projects will be given individually based on research and presentation of the historical developments of number theory. Art work will be evaluated by a committee of two or three teachers.

Teacher qualifications:

Secondary teaching certificate in mathematics,

Recommended: Master's Degree with at least 15 graduate hours in mathematics, and continuing education in mathematics through graduate courses, summer workshops, and staff development training

Additional information: