SUNY SCHENECTADY Course Outline

ACADEMIC DIVISION/SCHOOL: Math. Science, Technology, and Health

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COURSE CODE: MAT 145 COURSE TITLE: Topics in Contemporary Math

LECTURE HOURS/WEEK: <u>0</u> CREDIT HOURS: <u>3</u>

PREREQUISITE/S: _____ PREREQUISITE or CONCURRENT COURSE: _____ COREQUISITES:

FINAL EXAM REQUIRED: YES X NO ____

COURSE DESCRIPTION: This course introduces mathematics as a liberal art with various contemporary applications. The course covers logic, sets, combinations and permutations as well as number bases. The instructor also chooses from among the following topics: voting and apportionment; management science and graph theory; topics in geometry, as well as the nature of growth. Students should have two years of high school math, which includes a course in algebra and some geometry.

SUNY Schenectady Core Principle Course	yes
SUNY General Education Course	yes

STUDENT LEARNING OUTCOMES:

Students successfully completing this course will:

- construct truth tables;
- interpret arguments using symbolic logic;
- write numbers in various bases such as base two and the hexadecimal system; and
- apply formulas for permutations or combinations.

REPRESENTATIVE TEXT/S:

Karl J. Smith (Current Edition), The Nature of Mathematics, Cengage, Boston, MA.

SUPPLEMENTARY MATERIALS/REFERENCES:

The instructor might use Enhanced Web Assign or Mind Tap as well as materials found on <u>www.artofinathematics.org</u>.

EVALUATION METHODS:

Evaluation methods may include, but are not limited to, exams, quizzes, graded homework, projects, calculator or computer exercises, and oral presentations.

REOUIRED ASSESSMENT METHODS:

Assessment results from these methods will be used for course-level assessment and, where applicable, for SUNY Schenectady core principles and SUNY General Education Knowledge and Skills areas. This information will be incorporated in program reviews.

Student Learning Outcome	Method(s)
Construct truth tables	Examination or assignment
Interpret arguments using symbolic logic ·	Examination or assignment
Write numbers in various bases such as base two and the hexadecimal system	Examination or assignment
Apply formulas for permutations or combinations	Examination or assignment

NOTE: College policy requires a final exam or final week activity.

COURSE CONTENT OUTLINE:

Course: MAT 145 - Topics in Contemporary Math

The instructor must cover the first 3 modules below and spend at least a total of nine weeks on them (approximately three weeks each.)

- I. Logic: Deductive vs. inductive reasoning; sequences; symbolic logic, truth tables; conditional; valid vs invalid arguments; Modus Ponens; Modus Tollens; argument forms •
- IL Combinatorics and Sets: sets and set operations; combinations and permutations; trees; probability
- III. Mathematical Systems: number theory; bases; prime numbers; modular arithmetic

The instructor must spend the remaining time up to six weeks to be split between two of the following modules:

IV.	Geometry: Euclidean and non-Euclidean geometry; linear perspective; conic sections and analytic geometry; fractal geometry
V.	Management Science: Graphs; Hamiltonian circuits; Euler circuits; scheduling; trees
VI.	Voting and Apportionment: Majority rule, tournament method; voting dilemmas; apportionment; quota rule
VII.	The Nature of Growth: Exponential equations; logarithmic equations; applications of growth and decay
Final Week	Final Examination