MATH 107 – Survey of Mathematics Ideas in Sports and Games –

SYLLABUS

Department of Mathematics

Millersville University

Description

A liberal arts course for students who will not be scheduling a technical/professional mathematics course. Explores topics in mathematics through the lens of sports, athletic competitions, and games. Introductory modules may include (but not be limited to): number theory, geometry/measurement, algebra, probability, statistics, voting methods, and graph theory.

This course may be taken for general education credit (G2 for non-math and non-science majors). Only one of Math 100, 102, 107, and 108 may be taken for general education credit.

Prerequisites

MATH 090 with a grade of C- or higher, or MPT 100.

Course Objectives

By the conclusion of this course the successful student will be able to:

- Demonstrate competence with various undergraduate-level mathematical concepts and procedures.

- Demonstrate recognition of how mathematics can be applied to modern sports, athletic competitions, and games.

- Use mathematics to analyze a variety of sports, athletic competitions, and games.

- Make connections among mathematics topics that occur across sports, athletic competitions, and games.

Assessment

Assessment of student achievement of the course objectives will vary from one instructor to another. Typical tools for evaluating students performance may include: Journal Entries, Problem Sets, a Student Presentation, and a Final Exam.

Use of Technology

The student is required to access required readings on the Course Management System and on an MU Library web page dedicated to the course. Use of a scientific calculator is also required.

Topics

Course resources include chapters from the following:

- S. D'Agostino [2020].How to Free Your Inner Mathematician: Notes on Mathematics and Life. Oxford University Press.

- Winston, W. [2009]. Mathletics: How Gamblers, Managers and Sports Enthusiasts use Mathematics in Basketball, Baseball, and Football. Princeton University Press.

- Gallian, J. [2010]. Mathematics and Sports. American Mathematical Society.

- Millennium Mathematics Project | Maths and Sport. https://sport.maths.org/content/

- Mathematics and Sports WebQuests. https://www.mathgoodies.com/Webquests/sports

Themes and associated activities include:

Theme	Activities	Course readings/Resources
Math is reasoning & problem solving: examples from sports & games	Examples of inductive reasoning: Number puzzles Examples of deductive reasoning: Strategy games & puzzles Game Theory	S. D'Agostino [2020] Gallian, J. [2010]

Number Theory & Numeration systems in sports & games	Numerical patterns in various sports Scoring systems in athletic competitions Voting systems [e.g. voting for MVP, college football rankings, determination of city to host Olympics, etc.]	Mathematics and Sports WebQuests. Millennium Mathematics Project | Maths and Sport Winston, W. [2009].
Measurement & Geometry is sports & games	Units in sports competition, unit conversion in sports Geometric concepts in sport	Mathematics and Sports WebQuests.
Data Analysis in sports & games	Statistics/Analytics in sports Probability/Expected value applications in sports	S. D'Agostino [2020] Mathematics and Sports WebQuests. Millennium Mathematics Project | Maths and Sport Winston, W. [2009].