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**MA103 AY26-1**  
**Mathematical Modeling**  
**Project 3: Mathematical Modeling in the Real-World**

This is a group assignment worth 120 points. Groups will consist of two Cadets; groups of three may be approved only by your instructor.

1. **Proposal, 20 points, Due: Wednesday, 03 December 2025, at 2359.** As a group, provide the citation for a peer reviewed scholarly article and a short (250-400 word) summary that identifies:
  - The research question or problem.
  - The type of model used (descriptive, predictive, or prescriptive, as well as the specific name of the type of model).
  - At least two modeling decisions or assumptions made by the authors. This is intended as a starting point for you and to allow your instructor to ensure you understand the assignment; your final presentation should include more than two modeling decisions or assumptions.
  
2. **Presentation Visuals Due: Tuesday, 09 December 2025, at 2359.** Your group will submit your presentation to Canvas. This should be a PowerPoint presentation consisting of six to seven slides. Your slides should include the following:
  - Slide 1. Title Slide
  - Slide 2. Research Question and Background.
  - Slide 3. Modeling Decisions. (*may be two slides*)
  - Slide 4. Model Validation and Assessment.
  - Slide 5. Real-world Implications.
  - Slide 6. Works Cited.
  
3. **Presentation, 100 points, Due: Wednesday or Thursday, 10 or 11 December 2025, in class.** Your group will give a 5-7 minute presentation to the class on your selected article. Using the slides specified above your groups will:
  - Introduce the real-world problem.
  - Explain the modeling approach.
  - Describe key assumptions and simplifications.
  - Discuss the model assessment and validation. How did the author(s) know their model worked?
  - Discuss the real-world implications of the model. Did it answer the question? What were some of the limitations the author(s) discussed?

## Purpose

This project will primarily assess your ability to communicate modeling decisions and your understanding of the modeling process. Your team will be assessed on clarity, understanding of modeling concepts, and professionalism.

## Presentation Requirements

**Task:** Develop a five to seven minute presentation on a peer-reviewed journal article that uses mathematical modeling to answer a real-world modeling question on a topic of your choosing. You are not expected to understand or describe the math done in the paper, but you should be able to describe the modeling decisions and simplifications the author(s) of the article made. The assignment provides three articles as an example for the type of article you are looking for. You may not use the papers provided by the course as your peer-reviewed article.

## Generative AI Use

1. Generative AI may be used to assist with understanding technical concepts, mathematical terminology, or general modeling methods that appear in your selected paper.
2. Generative AI may be used to generate initial ideas and help identify potential peer-reviewed articles of interest.
3. Generative AI may NOT be used to conduct any part of your analytical work or interpretation of the article. This includes:
  - summarizing or paraphrasing the article’s argument, methods, or results;
  - identifying or describing the author’s modeling decisions, assumptions, or simplifications on your behalf;
  - explaining or listing the paper’s limitations, conclusions, or implications;
  - developing or producing any visuals or slides for your presentation.
4. All use of generative AI must be documented IAW the DAAW (2025).
5. Examples of *appropriate* questions to ask generative AI:
  - Can you explain what an exponential model shows in simple terms?
  - I’m interested in finding a peer-reviewed journal article that uses a mathematical model for something related to basketball. Can you provide recommendations?
  - What is meant by “parameter estimation” in a mathematical model?
6. Examples of *inappropriate* questions to ask generative AI:
  - How did the author(s) simplify the real-world system to create their model?
  - What are the key assumptions or limitations discussed in this paper?
  - What is the main research question or problem this paper addresses?
  - Summarize the modeling approach used in this paper.
  - Create slides that explain this article for a presentation.