Game Theory Syllabus

Instructor: Shawzub Raza  
Audience: High school students  
Total Classes: 16  
Class Length: 45 minutes

Course Description: This course introduces students to the fundamentals of game theory—the study of strategic decision-making. Through real-world examples, interactive games, and problem-solving challenges, students will learn how math influences the choices we make in life, including those related to economics and relationships.

Class-by-Class Breakdown:

Class 1 – What is Game Theory? Overview, real-life examples, intro to players/strategies/payoffs. Activity: Rock-Paper-Scissors Tournament.

Class 2 – Strategy Matrices Representing games in matrix form. Activity: Design a 2x2 game based on cafeteria or sports scenario.

Class 3 – Dominated Strategies Elimination technique for bad strategies. Game: “Snack Line Showdown” (selecting shortest lines). or pick right, middle, left

Class 4 – Nash Equilibrium I Intro to NE in pure strategies. Game: Prisoner’s Dilemma and discussion.

Class 5 – Nash Equilibrium II Coordination & multiple equilibria. Game: Driving sides, picking outfits.

Class 6 – Mixed Strategies I Why mix? Use of randomness. Game: Matching Pennies. Group brainstorm of mixed-strategy scenarios.

Class 7 – Mixed Strategies II Math behind mixed strategies. Practice: Solving games using expected value for matching pennies.

Class 8 – Midpoint Review Game Day Jeopardy-style quiz or Kahoot review of Classes 1–7. Optional candy or prizes.

Class 9 – Sequential Games I Game trees, decisions over time. Game: Ultimatum Game.

Class 10 – Sequential Games II Backward induction. Solve tree-based games (e.g., sharing tasks, chores).

Class 11 – Repeated Games Trust and cooperation. Game: Repeated Prisoner’s Dilemma (3–5 rounds). Reflect on evolving behavior.

Class 12 – Game Theory in Real Life: Markets Intro to auctions and economic competition. Activity: Mini-auction game with tokens.

Class 13 – Game Theory in Social Life Texting, dating, ghosting as strategic games. Anonymous poll and group discussion.

Class 14 – Voting & Fairness Borda Count, Condorcet method. Game: Elect your favorite snack. Discuss paradoxes.

Class 15 – Final Project Workshop Group prep: Each team chooses or creates a game to model. Instructor feedback.

Class 16 – Presentations & Wrap-Up Student presentations, reflection, fun awards or certificates.