

Intermediate Physics Course Syllabus (Summer 2022)

Course Aims: The Intermediate Physics Course is an intensive, 12-week long course that prepares students for the NSB High School Regional and Middle School National Competitions. This course will teach the topics that most frequently show up in the Physics category, as well as topics in the Energy category that pertain to Physics. Students should note that the course will be rigorous and fast-paced, but if one puts in the work, they will see significant improvement in their physics knowledge and Science Bowl skills.

Prerequisites: Students should have an understanding of basic physics, and should have completed Algebra 2. If students don't meet these requirements, the instructor will send resources to get students caught up.

What's Included:

- Weekly lectures on Zoom
- List of recommended reading material and supplemental resources
- 1-on-1 advising about study planning (by appointment)
- Access to exclusive discord server
- Seminars about study tips, buzzing strategies, teamwork skills
- Weekly Office Hours
- Packet readings to test retention of course material

Week 1:	Mathematics I: Vectors and Trigonometry Mathematics II: Calculus
Week 2:	1D Kinematics 2-3D Kinematics
Week 3:	Forces, circular motion, and Newton's laws Torques, and angular momentum
Week 4:	Momentum and energy Orbital Mechanics
Week 5:	Waves and Oscillations Fluid Mechanics
Week 6:	Ideal gases Heat Engines, efficiency and the second law

Week 7:	The electric field and the electric potential Magnetic fields and Maxwell's equations
Week 8:	Resistors, Capacitors, and Inductors AC-circuits and other circuit elements
Week 9:	Geometric Optics and Wave Optics Special relativity
Week 10:	Wave-particle duality Schrodinger wave equation and atoms
Week 11:	Solid-state physics Nuclear Physics
Week 12:	Particle Physics Miscellaneous Modern Physics