

Year 11 and 12 Physics

An intensive one-week course covering the core mechanics of senior Physics.

Course Overview

Year 11 and 12 Physics is an intensive one-week program designed for motivated students preparing for Year 11 and 12 Physics. It offers a comprehensive and logically structured overview of the Mechanics component across NSW, ACT, and IB curricula, helping students understand how concepts connect more clearly. Year 11 and 12 Physics has been designed by multiple Wise-Minds tutors with the goal of teaching the subject in a logical, clear and comprehensive way.

This is not a refresher course—it's an advanced introduction to nearly all standard Mechanics content from senior Physics. It also complements related subjects like Engineering and can be followed by Physics II, which covers the remaining senior Physics topics.

Students receive a detailed course book with explanations, practice questions, and worksheets—an excellent reference throughout Years 11, 12, and beyond. We've invested heavily in this program and believe it will change how students view Physics—and Science more broadly.

Course Delivery:

The course will be delivered on site at Wise Minds Tutoring Belconnen in the following formats:

- Lecture style classrooms
- Small group tutorials
- Workbooks and additional worksheets
- Examinations (if requested).

Prerequisites:

1. Completed Year 10 or 11 Mathematics
2. Completed Year 10 Science or Year 11 Physics.

Related Wise Minds Courses:

- Physics II
- Head Start: Year 11 and 12 Mathematics
- Senior Calculus
- For more information, please contact us.

Key Course Information

Length: 40 Hours total (5 days)
Dates: Monday 4th to Friday 8th January
Times: 9am to 5pm daily
Location: Wise Minds Overflow
Positions: 20 students (First in best dressed)
Price: $800 for the entire week (Including GST)
Can be paid in two equal instalments

Relevant School Subjects

- ACT Physics
- ACT Engineering
- HSC Physics
- IB SL Physics
- IB HL Physics

Enrolment:

Please email the course directors below expressing your interest and request to be enrolled in the course. Please note a deposit will be required to confirm your slot.

Course Director: Rhys@WiseMindsTutoring.com.au (Ph: 0489089919)
Course Convenor: Lachlan@WiseMindsTutoring.com.au (Ph: 0489071014)

Topic List

1. Science, Modelling, and Conceptual Framework

1. Epistemology
2. Law, Theory, and Hypothesis
3. Mathematics and Physics
4. The Scientific Method
5. Fundamental and Derived Units
6. Uncertainties, Errors, and Error Propagation
7. Analysing Data and Information
8. Exponentials, Logarithms, and Linearisation
9. Scientific Notation and Orders of Magnitude
10. Scientific Modelling

2. Vectors and Scalar

1. Coordinates and Planes
2. Right Angled Triangles and Pythagoras Theorem
3. Vectors, Scalars, and Representing the World
4. Directed intervals, lengths, opposite and parallel vectors
5. Adding vectors and multiplying a vector by a scalar
6. Components and column vectors
7. The dot product or scalar product
8. Geometric problems
9. Projections
10. Applications to physical situations

3. Kinematics

1. Displacement, Speed, and Velocity
2. Acceleration
3. Graphing position, velocity, and acceleration over time
4. Kinematic (SUVAT) Equations
5. Intro to Calculus and Deriving the SUVAT Equations
6. Vertical Motion
7. Motion in Two Dimensions
8. Relative Motion and Frames of Reference

4. Dynamics

1. Newton's First Law
2. Newton's Second Law
3. Newton's Third Law
4. Forces, Friction, and Equilibrium
5. Work
6. Energy Changes
7. Mechanical Energy and Power
8. Conserved Quantities
9. Conservation of Momentum
10. Change in Momentum
11. Momentum and Net Force

5. Projectile Motion

1. Projectiles launched horizontally
2. Projectiles launched obliquely

6. Circular Motion

1. Angular Displacement and Angular Speed
2. Centripetal Acceleration and Force
3. Circular motion on banked tracks
4. Work and Energy in Circular Motion
5. Moving in a Vertical Circle
6. Moment of Inertia
7. Torque
8. Newton's Three Laws of Angular and Rotational Motion

7. Classical Gravity

1. Gravity and Newton's Law of Gravitation
2. Satellite Motion
3. Gravitational Potential Energy
4. Kepler's Laws

8. Wave Mechanics

1. Review of Trigonometry
2. Mechanical Waves and Measuring Waves
3. Simple Harmonic Motion
4. Wave Interactions and Interference
5. Oscillations and Damping
6. Resonance and Q-Factors
7. Sound as a Wave
8. Sound Behaviour and Intensity
9. Standing waves
10. Light as a wave vs Light as a ray
11. Reflection
12. Refraction and Snell's Law
13. Diffraction
14. Polarisation
15. Malus's Law
16. The Doppler Effect

9. Imaging

1. Converging and Diverging Mirrors
2. Magnification
3. Converging and Diverging Thin Lenses
4. Imaging Aberrations
5. Imaging Instrumentation
6. Fibre Optics
7. Attenuation and Dispersion

Student progress will be evaluated throughout the course via small group tutorials and worksheets. If a student is not progressing at a satisfactory level, we will inform the parents during the course itself.