

The Syllabus

Cambridge International A & AS Level Physics Syllabus

Section		AS	A2
I General Physics	1. Physical quantities and units	✓	✓
	2. Measurement techniques	✓	✓
II Newtonian mechanics	3. Kinematics	✓	
	4. Dynamics	✓	
	5. Forces	✓	
	6. Work, energy, power	✓	
	7. Motion in a circle		✓
	8. Gravitational field		✓
III Matter	9. Phases of matter	✓	
	10. Deformation of solids	✓	
	11. Ideal gases		✓
	12. Temperature		✓
	13. Thermal properties of materials		✓
IV Oscillations and waves	14. Oscillations		✓
	15. Waves	✓	
	16. Superposition	✓	
V Electricity and magnetism	17. Electric fields	✓	✓
	18. Capacitance		✓
	19. Current of electricity	✓	
	20. D.C. circuits	✓	
	21. Magnetic fields		✓
	22. Electromagnetism		✓
	23. Electromagnetic induction		✓
	24. Alternating currents		✓
VI Modern Physics	25. Charged particles		✓
	26. Quantum physics		✓
	27. Nuclear physics	✓	✓
VII Gathering and communicating information	28. Direct sensing		✓
	29. Remote sensing		✓
	30. Communicating information		✓

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Component wise

1. Physical quantities and units Content

- 1.1 Physical quantities
- 1.2 SI Units
- 1.3 The Avogadro constant
- 1.4 Scalars and vectors

2. Measurement techniques Content

- 2.1 Measurements
- 2.2 Errors and uncertainties

3. Kinematics Content

- 3.1 Linear motion
- 3.2 Non-linear motion

4. Dynamics Content

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- 4.2 Linear momentum and its conservation

5. Forces Content

- 5.1 Types of force
- 5.2 Equilibrium of forces
- 5.3 Centre of gravity
- 5.4 Turning effects of forces

6. Work, energy, power Content

- 6.1 Energy conversion and conservation
- 6.2 Work
- 6.3 Potential energy, kinetic energy and internal energy
- 6.4 Power

7. Motion in a circle Content

- 7.1 Kinematics of uniform circular motion
- 7.2 Centripetal acceleration
- 7.3 Centripetal force





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8. Gravitational field Content

- 8.1 Gravitational field
- 8.2 Force between point masses
- 8.3 Field of a point mass
- 8.4 Field near to the surface of the Earth
- 8.5 Gravitational potential

9. Phases of matter Content

- 9.1 Density
- 9.2 Solids, liquids, gases
- 9.3 Pressure in fluids
- 9.4 Change of phase

10. Deformation of solids Content

- 10.1 Stress, strain
- 10.2 Elastic and plastic Behavior

11. Ideal gases Content

- 11.1 Equation of state
- 11.2 Kinetic theory of gases
- 11.3 Pressure of a gas
- 11.4 Kinetic energy of a molecule

12. Temperature Content

- 12.1 Thermal equilibrium
- 12.2 Temperature scales
- 12.3 Practical Thermometers

13. Thermal properties of materials Content

- 13.1 Specific heat capacity
- 13.2 Specific latent heat
- 13.3 Internal energy
- 13.4 First law of Thermodynamics

14. Oscillations Content



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- 14.1 Simple harmonic motion
- 14.2 Energy in simple harmonic motion
- 14.3 Damped and forced oscillations: resonance





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15. Waves Content

- 15.1 Progressive waves
- 15.2 Transverse and longitudinal waves
- 15.3 Polarisation
- 15.4 Determination of speed, frequency and wavelength
- 15.5 Electromagnetic Spectrum

16. Superposition Content

- 16.1 Stationary waves
- 16.2 Diffraction
- 16.3 Interference
- 16.4 Two-source interference patterns
- 16.5 Diffraction grating

17. Electric fields Content

- 17.1 Concept of an electric field
- 17.2 Uniform electric fields
- 17.3 Force between point charges
- 17.4 Electric field of a point charge
- 17.5 Electric potential

18. Capacitance Content

- 18.1 Capacitors and capacitance
- 18.2 Energy stored in a Capacitor

19. Current of electricity Content

- 19.1 Electric current
- 19.2 Potential difference
- 19.3 Resistance and resistivity
- 19.4 Sources of electromotive force

20. D.C. circuits Content

- 20.1 Practical circuits
- 20.2 Conservation of charge and energy
- 20.3 Balanced potentials

21. Magnetic fields Content

- 21.1 Concept of magnetic field





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22. Electromagnetism Content

- 22.1 Force on a current-carrying conductor
- 22.2 Force on a moving charge
- 22.3 Magnetic fields due to currents
- 22.4 Force between current-carrying conductors

23. Electromagnetic induction Content

- 23.1 Laws of electromagnetic induction

24. Alternating currents Content

- 24.1 Characteristics of alternating currents
- 24.2 The transformer
- 24.3 Transmission of electrical energy
- 24.4 Rectification

25. Charged particles Content

- 25.1 Electrons
- 25.2 Beams of charged Particles

26. Quantum physics Content

- 26.1 Energy of a photon
- 26.2 Photoelectric emission of electrons
- 26.3 Wave-particle duality
- 26.4 Energy levels in atoms
- 26.5 Line spectra

27. Nuclear physics Content

- 27.1 The nucleus
- 27.2 Isotopes
- 27.3 Nuclear processes
- 27.4 Mass excess and nuclear binding energy
- 27.5 Radioactive decay

28. Direct sensing Content

- 28.1 Sensing devices
- 28.2 The ideal operational amplifier
- 28.3 Operational amplifier circuits
- 28.4 Output devices



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29. Remote sensing Content

- 29.1 Production and use of X-rays
- 29.2 Production and use of ultrasound
- 29.3 Use of magnetic resonance as an imaging technique

30. Communicating information Content

- 30.1 Principles of modulation
- 30.2 Sidebands and bandwidth
- 30.3 Transmission of information by digital means
- 30.4 Different channels of communication
- 30.5 The mobile-phone network

