Week 1	Topics from the book
30/09/2025	**Course Introduction** **Chapter 3. Motion Along a Straight Line** 3.1 Position, Displacement, and Average Velocity (4.5 p) Position Displacement Average Velocity 3.2 Instantaneous Velocity and Speed (3 p) Instantaneous Velocity Speed 3.3 Average and Instantaneous Acceleration (7 p) Average Acceleration Instantaneous Acceleration Getting a Feel for Acceleration
02/10/2025	3.4 Motion with Constant Acceleration (11 p) Notation Displacement and Position from Velocity Solving for Final Velocity from Acceleration and Time Solving for Final Position with Constant Acceleration Solving for Final Velocity from Distance and Acceleration Putting Equations Together Two-Body Pursuit Problems 3.5 Free Fall (6 p) Gravity One-Dimensional Motion Involving Gravity 3.6 Finding Velocity and Displacement from Acceleration (2 p) Kinematic Equations from Integral Calculus
Week 2	**Topics from the book**
07/10/2025	**Chapter 2. Vectors** 2.1 Scalars and Vectors (11 p) Algebra of Vectors in One Dimension Algebra of Vectors in Two Dimensions 2.2 Coordinate Systems and Components of a Vector (8 p) Vectors in Three Dimensions
09/10/2025	2.3 Algebra of Vectors (8 p) 2.4 Products of Vectors (11 p) The Scalar Product of Two Vectors (the Dot Product) The Vector Product of Two Vectors (the Cross Product)
Week 3	**Topics from the book**
14/10/2025	**Chapter 4. Motion in Two and Three Dimensions** 4.1 Displacement and Velocity Vectors (8 p) Displacement Vector Velocity Vector The Independence of Perpendicular Motions 4.2 Acceleration Vector (4.5 p) Instantaneous Acceleration Constant Acceleration 4.5 Relative Motion in One and Two Dimensions (5 p) Reference Frames Relative Motion in One Dimension Relative Velocity in Two Dimensions
16/10/2025	4.3 Projectile Motion (10 p) Time of Flight, Trajectory, and Range 4.4 Uniform and Nonuniform Circular Motion (4.5 p) Centripetal Acceleration Nonuniform Circular Motion

Week 4	Topics from the book
21/10/2025	**Chapter 5. Newton's Laws of Motion** 5.1 Forces (5 p) Working Definition of Force Development of the Force Concept Vector Notation for Force 5.2 Newton's First Law (3.5 p) Gravitation and Inertia Inertial Reference Frames Newton's First Law and Equilibrium 5.3 Newton's Second Law (8.5 p) Force and Acceleration Component Form of Newton's Second Law 5.4 Mass and Weight (2 p) Units of Force Weight and Gravitational Force
23/10/2025	5.5 Newton's Third Law (6.5 p) 5.6 Common Forces (10 p) A Catalog of Forces: Normal, Tension, and Other Examples of Forces Real Forces and Inertial Frames 5.7 Drawing Free-Body Diagrams (4 p)
Week 5	**Topics from the book**
28/10/2025	Bank holiday / No lecture
30/10/2025	**Chapter 6. Applications of Newton's Laws** 6.1 Solving Problems with Newton's Laws (15 p) Problem-Solving Strategies Particle Equilibrium Particle Acceleration Newton's Laws of Motion and Kinematics 6.2 Friction Static and Kinetic Friction (5 p)
Week 6	**Topics from the book**
04/11/2025	Friction and the Inclined Plane (2 p) Atomic-Scale Explanations of Friction (1 p) 6.3 Centripetal Force (9 p) Banked Curves Inertial Forces and Noninertial (Accelerated) Frames: The Coriolis Force 6.4 Drag Force and Terminal Speed (5 p) Drag Forces Terminal Velocity
06/11/2025	Review / Catch up / Exercises
Week 7	**Topics from the book**
11/11/2025	**Midterm 1**
13/11/2025	**Chapter 7. Work and Kinetic Energy** 7.1 Work (8 p) Work Done by Constant Forces and Contact Forces Work Done by Forces that Vary 7.2 Kinetic Energy (4 p)
Week 8	**Topics from the book**
18/11/2025	7.3 Work-Energy Theorem (4.5 p) 7.4 Power (2 p) **Chapter 8. Potential Energy and Conservation of Energy** 8.1 Potential Energy of a System (8.5 p) Potential Energy Basics Systems of Several Particles Types of Potential Energy
20/11/2025	8.2 Conservative and Non-Conservative Forces (4 p) 8.3 Conservation of Energy (5 p) Systems with a Single Particle or Object Systems with Several Particles or Objects 8.5 Sources of Energy (4 p)

Week 9	Topics from the book
25/11/2025	**Chapter 9. Linear Momentum and Collisions** 9.1 Linear Momentum (2 p) 9.2 Impulse and Collisions (13.5 p) Effect of Impulse Momentum and Force
27/11/2025	9.3 Conservation of Linear Momentum (9.5 p) Requirements for Momentum Conservation The Meaning of 'System' 9.4 Types of Collisions (7 p) Explosions Inelastic Elastic
Week 10	**Topics from the book**
02/12/2025	9.5 Collisions in Multiple Dimensions (7 p) 9.6 Center of Mass (15 p) Internal and External Forces Force and Momentum Center of Mass Center of Mass of Continuous Objects Center of Mass and Conservation of Momentum
04/12/2025	Review / Catch up / Exercises
Week 11	**Topics from the book**
09/12/2025	**Midterm 2**
11/12/2025	**Chapter 10. Fixed-Axis Rotation** 10.1 Rotational Variables (8 p) Angular Velocity Angular Acceleration 10.2 Rotation with Constant Angular Acceleration (5.5 p) Kinematics of Rotational Motion Applying the Equations for Rotational Motion 10.3 Relating Angular and Translational Quantities (4 p) Angular vs. Linear Variables Relationships between Rotational and Translational Motion
Week 12	**Topics from the book**
16/12/2025	10.4 Moment of Inertia and Rotational Kinetic Energy (7 p) Rotational Kinetic Energy Moment of Inertia Applying Rotational Kinetic Energy 10.5 Calculating Moments of Inertia (7.5 p) Moment of Inertia The Parallel-Axis Theorem 10.6 Torque (5 p) Defining Torque Calculating Net Torque for Rigid Bodies on a Fixed Axis
18/12/2025	10.7 Newton's Second Law for Rotation (3.5 p) Newton's Second Law for Rotation Deriving Newton's Second Law for Rotation in Vector Form Applying the Rotational Dynamics Equation 10.8 Work and Power for Rotational Motion (6 p) Work for Rotational Motion Power for Rotational Motion Rotational and Translational Relationships Summarized **Chapter 11. Angular Momentum** 11.1 Rolling Motion (7.5 p) Rolling Motion without Slipping Rolling Motion with Slipping Conservation of Mechanical Energy in Rolling Motion

Week 13	Topics from the book
23/12/2025	11.2 Angular Momentum (8.5 p) Angular Momentum of a Single Particle Angular Momentum of a System of Particles Angular Momentum of a Rigid Body 11.3 Conservation of Angular Momentum (6 p)
25/12/2025	**Chapter 13. Gravitation** 13.1 Newton's Law of Universal Gravitation (5.5 p) The History of Gravitation Newton's Law of Universal Gravitation The Cavendish Experiment 13.2 Gravitation Near Earth's Surface (6.5 p) Weight The Gravitational Field Apparent Weight: Accounting for Earth's Rotation Results Away from the Equator Gravity Away from the Surface
Week 14	**Topics from the book**
30/12/2025	13.3 Gravitational Potential Energy and Total Energy (5 p) Gravitational Potential Energy beyond Earth Conservation of Energy 13.5 Kepler's Laws of Planetary Motion (6 p) Kepler's First Law Kepler's Second Law Kepler's Third Law
01/01/2026	Bank holiday / No lecture
Week 15	**Topics from the book**
06/01/2026	**Chapter 15. Oscillations** 15.1 Simple Harmonic Motion (9 p) Period and Frequency in Oscillations Characteristics of Simple Harmonic Motion Equations of SHM Summary of Equations of Motion for SHM The Period and Frequency of a Mass on a Spring Vertical Motion and a Horizontal Spring 15.2 Energy in Simple Harmonic Motion (2.5 p) Energy and the Simple Harmonic Oscillator
08/01/2026	15.3 Comparing Simple Harmonic Motion and Circular Motion (2 p) 15.4 Pendulums (4 p) The Simple Pendulum Physical Pendulum