Month 1 – Mechanics Crash Course (ECE Student)

Daily time: ~1 hour | Focus: Core mechanical intuition for Mechatronics All resources listed below are FREE and beginner-friendly.

Day 1 – Scalars, Vectors, Units

- Khan Academy – Vectors & Scalars
- YouTube: Engineering Explained – Why vectors matter in mechanics

Day 2 – Forces & Free Body Diagrams

- MIT OpenCourseWare – Statics Lecture 1
- YouTube: Learn Engineering – Free Body Diagrams

Day 3 – Resultant Forces & Equilibrium

- Khan Academy – Force Equilibrium
- YouTube: Neso Academy – Resultant of Forces

Day 4 – Moments & Torque

- MIT OCW – Moments and Torque (Statics)
- YouTube: Practical Machinist – Torque explained

Day 5 – Rigid Body Equilibrium

- MIT OCW – Equilibrium of Rigid Bodies
- YouTube: Engineer4Free – Beam equilibrium

Day 6 – Mechanical Applications

- YouTube: Learn Engineering – How gears & levers work
- YouTube: Real Engineering – Mechanical systems

Day 7 – Revision Day

- Rewatch previous videos
- Solve 5 basic statics problems

Day 8 – Friction Basics

- Khan Academy – Friction
- YouTube: Neso Academy – Friction mechanics

Day 9 – Friction Applications

- MIT OCW – Friction examples
- YouTube: Learn Engineering – Why friction matters

Day 10 – Center of Mass

- Khan Academy – Center of Mass
- YouTube: Physics Galaxy – Stability examples

Day 11 – Beams & Supports

- MIT OCW – Beams and Supports
- YouTube: Engineer4Free – Simply supported beams

Day 12 – Shear & Bending (Concept)

- YouTube: Learn Engineering – Why beams bend
- MIT OCW – Shear and bending overview

Day 13 – Trusses & Frames

- MIT OCW – Trusses basics
- YouTube: Practical Machinist – Structural basics

Day 14 – Weekly Revision

- Redraw diagrams
- Summarize concepts in your own words

Day 15 – Motion Basics

- Khan Academy – Kinematics
- YouTube: Physics Galaxy – Motion explained

Day 16 – Newton’s Laws

- MIT OCW – Newton’s Laws
- YouTube: Veritasium – Inertia explained

Day 17 – Linear Motion Problems

- Khan Academy – Motion problems

- YouTube: Neso Academy – Numerical examples

Day 18 – Work & Energy

- MIT OCW – Work Energy Principle
- YouTube: Learn Engineering – Energy in machines

Day 19 – Power & Efficiency

- YouTube: Learn Engineering – Mechanical power
- Khan Academy – Power

Day 20 – Momentum & Impulse

- MIT OCW – Momentum
- YouTube: Physics Galaxy – Collisions

Day 21 – Revision

- Solve mixed problems
- Explain concepts verbally

Day 22 – Angular Motion

- Khan Academy – Angular kinematics
- YouTube: Physics Galaxy – Rotational motion

Day 23 – Moment of Inertia

- MIT OCW – Moment of Inertia
- YouTube: Learn Engineering – Rotational resistance

Day 24 – Torque & Angular Acceleration

- MIT OCW – Rotational dynamics
- YouTube: Neso Academy – Torque numericals

Day 25 – Rotational Energy

- YouTube: Learn Engineering – Flywheels
- MIT OCW – Rotational energy

Day 26 – Gears & Speed Reduction

- YouTube: Learn Engineering – Gear ratios
- MIT OCW – Gears overview

Day 27 – Mechanisms

- YouTube: Real Engineering – Linkages
- MIT OCW – Mechanism basics

Day 28 – Final Revision

- Summarize entire month
- Prepare to explain mechanics in interviews