

Content

| Course Code | Course Name | Semester | Theory | Practice | Lab | Credit | ECTS |
|-------------|-------------|----------|--------|----------|-----|--------|------|
| ING116-B | Physics I | 1 | 3 | 0 | 2 | 4 | 5 |

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| Prerequisites | |
| Admission Requirements | |

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| Language of Instruction | French |
| Course Type | Compulsory |
| Course Level | Bachelor Degree |
| Objective | - |
| Content | <p>-1. Mathematical Introduction</p> <ul style="list-style-type: none">• Vector analysis (Scalar/dot and vector/cross products)• Cartesian and cylindrical coordinate systems• Applications of differential and integral calculus• Differential equations (Fundamental level for mechanics) <p>2. Kinematics</p> <ul style="list-style-type: none">• Motion in one dimension (Position, velocity, and acceleration vectors)• Motion in two and three dimensions (Projectile motion)• Uniform circular motion <p>3. Dynamics</p> <ul style="list-style-type: none">• Concept of force and free-body diagrams• Newton's Laws of Motion• Friction force and dynamics of circular motion (Centripetal force) <p>4. Kinetics (Work and Energy)</p> <ul style="list-style-type: none">• Work-Kinetic Energy Theorem• Conservative and non-conservative forces• Potential energy• Conservation of mechanical energy <p>5. Linear Momentum and Collisions</p> <ul style="list-style-type: none">• Center of mass (Transition from point particles to rigid bodies)• Linear momentum and Impulse• Conservation of linear momentum• Elastic and inelastic collisions <p>6. Rotational Kinematics and Dynamics</p> <ul style="list-style-type: none">• Rotational kinematics of rigid bodies• Moment of inertia and rotational kinetic energy• Torque and Newton's 2nd Law for rotational motion• Angular Momentum and its conservation• Rolling motion (Combination of translation and rotation) <p>7. Oscillations and Simple Harmonic Motion (SHM)</p> <ul style="list-style-type: none">• Hooke's Law and restoring force• Kinematic equations of SHM (Time dependence of position, velocity, and acceleration)• Energy transformations and conservation in SHM• Applications: Simple pendulum and physical pendulum• Introduction to damped and driven oscillations, Resonance |
| References | |

Theory Topics

| Week | Weekly Contents |
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