

Course Syllabus

1. **Course number and name:** 020PHONI3 Waves Physics
2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 course hours
3. **Instructor's or course coordinator's name:** Joseph KESSERWANI
4. **Text book:** The Physics of Vibrations and Waves, 6th Edition
5. **Specific course information**
 - a. **catalog description:** This course starts with an introduction on waves and vibrations. The second part covers harmonic motion and single-degree-of-freedom (SDOF) systems. Once the study of the dynamics and equations of SDOF systems, the third chapter covers the two degree of freedom systems (2DOF). This part also covers the damped harmonic motion, forced and coupled oscillations. After studying the different types of systems, the propagation equations are developed and then applied on two main applications for civil engineers: Electromagnetic waves and seismic waves.
 - b. **prerequisites or co-requisites:** None
 - c. **Required/Elective/Selected Elective:** Required
6. **Specific goals for the course**
 - a. **Specific outcomes of instruction:**
 - Describe the different types of waves
 - Study single degree of freedom systems and two degree of freedom systems
 - Study the resonance of oscillating systems, damped harmonic motion and forced oscillations
 - Establish the propagation equations in different materials
 - Determine the velocity of waves in different materials
 - Describe the propagation of EM waves
 - Study seismic waves and its propagation in different materials

b. KPIs addressed by the course:

KPI	a1	a2	b1	b2	b3
Covered	x				
Assessed	x				
Give Feedback	x				

7. **Brief list of topics to be covered and approximate number of lectures:**
 1. Introduction to waves and vibrations (1 Lectures)
 2. single-degree-of-freedom (SDOF) systems (3 Lectures)
 3. two degree of freedom (2DOF) systems (4 Lectures)
 4. Damped simple harmonic motion and resonance (4 Lectures)
 5. Superposition of two vibrations (3 Lectures)
 6. Wave propagation (3 Lectures)
 7. Electromagnetic waves (5 Lectures)
 8. Seismic waves (5 Lectures)