Physics Laboratory 1

1. **Course number and name:** 020PP1NI2 Physics Laboratory 1

2. **Credits and contact hours:** 2 ECTS credits, 1x1:15 contact hours

3. **Name(s) of instructor(s) or course coordinator(s):** Joseph Kesserwani, Danielle Hajj, Elias Mechref, Elie Hleihel, Robert Farha.

4. **Instructional materials:** Lab experiments – Lab manual

5. **Specific course information**
   a. **Catalog description:**
   This practical work course is designed to bridge the gap between theoretical knowledge and practical application in the field of electrical engineering and physics. Throughout the course, students will engage in hands-on activities to gain a deeper understanding of various concepts. The key topics covered include resonance in RLC Circuits, system analysis, circuit measurements, mechanics and motion, LabVIEW Software, fields and characteristics, oscilloscope applications, Single-Degree-of-Freedom Oscillator, focometry and Optical Systems.
   Overall, this practical work course is designed to equip students with the necessary skills to apply theoretical knowledge in real-world scenarios, fostering a comprehensive understanding of electrical engineering and physics concepts.

   b. **Prerequisites:** None

   c. **Required/Selected Elective/Open Elective:** Required

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
   - Apply theoretical knowledge and develop practical skills.
   - Understand and apply concepts of resonance in series or parallel RLC circuits.
   - Master the transfer function and Bode diagram for system analysis.
   - Measure resistance and impedance in circuits.
   - Study different types of motion in mechanics.
   - Familiarize with LabVIEW software for experimental data processing.
   - Measure magnetic and electrostatic fields and understand their characteristics.
   - Use the oscilloscope practically for various applications.
   - Implement a single-degree-of-freedom oscillator.
   - Apply principles of Focometry to measure and analyze optical systems.

b. PI addressed by the course:

PI	5.2	6.1	6.2	6.3	6.4
Covered		x	x	x	x
Assessed	x	x	x	x	x

7. Brief list of topics to be covered

- Resonance in a series or parallel RLC circuit / Measurement of electrostatic fields (2 lectures)
- Transfer Function and Bode Diagram / Applications of the oscilloscope (2 lectures)
- Resistance and impedance measurement / Oscillator with one degree of freedom (2 lectures)
- Study type of motions / Measurement of magnetostatics fields (2 lectures)
- Introduction to LabVIEW / Focometry (2 lectures)
- Linear filters / Prism (2 lectures)