<table>
<tr><td>Course code</td><td></td></tr>
<tr><td>Type and description</td><td>EC – elective subjects from the discipline of Mechanical Engineering</td></tr>
<tr><td>ECTS credit</td><td>1</td></tr>
<tr><td>Course name</td><td>Advanced Mechanical Vibrations I</td></tr>
<tr><td>Course name in Polish</td><td>Zaawanasowane Drgania mechaniczne I</td></tr>
<tr><td>Language of instruction</td><td>English</td></tr>
<tr><td>Course level</td><td>8 PRK</td></tr>
<tr><td>Course coordinator</td><td>prof. dr hab. inż. Przemysław Perlikowski</td></tr>
<tr><td>Course instructors</td><td>prof. dr hab. inż. Andrzej Stefański, prof. dr hab. inż. Przemysław Perlikowski</td></tr>
<tr><td>Delivery methods and course duration</td><td>
<table>
<tr><th></th><th>Lecture</th><th>Tutorials</th><th>Laboratory</th><th>Project</th><th>Seminar</th><th>Other</th><th>Total of teaching hours during semester</th></tr>
<tr><td>Contact hours</td><td>0</td><td>0</td><td>0</td><td>5</td><td>0</td><td>0</td><td>5</td></tr>
<tr><td>E-learning</td><td>no</td><td>no</td><td>no</td><td>no</td><td>no</td><td>no</td><td>no</td></tr>
<tr><td>Assessment criteria (weightage)</td><td>0</td><td>0</td><td>0</td><td>100%</td><td>0</td><td>0</td><td>100%</td></tr>
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<tr><td>Course objective</td><td>1. To enable students to acquire knowledge in the field advanced theory of vibrations

2. To enable students to design machines excited by external signal</td></tr>
<tr><td>Learning outcomes</td><td>After the course the PhD student can:

1. calculate response of systems with one and multiple degree of freedom excited by external signal– outcome W1, U1

2. model mechanical systems using Lagrange equations – outcome W1, U1

3. calculate response of nonlinear systems – outcome W1, U1</td></tr>
<tr><td>Assessment methods</td><td>Outcomes 1- 3 - project

Final grade consists of:

Project - 100%</td></tr>
<tr><td>Prerequisites</td><td>1. Knowledge in the field of linear algebra and mathematical analysis, integral and differential calculus, basics of matrix algebra.

2. Theoretically founded general knowledge of dynamics of material systems.</td></tr>
<tr><td>Course content with delivery methods</td><td>Project includes following topics:

1) Response of two degree of freedom systems in both free and forced vibration regimes
2) Analysis of multi- and infinite-degree of freedom systems in both free and forced vibration regimes
3) Review of sources of nonlinearities in mechanical systems
4) Response of one and two degree of freedom nonlinear systems
5) Design of mechanical systems that can be approximated by one, two, or infinite degree of freedom systems</td></tr>
</table>

Basic reference materials	1) Rao, S. S., Mechanical Vibrations, Prentice-Hall (any edition) 2) Den Hartog, J. P., Mechanical Vibrations, Courier Corporation (any edition) 3) Leonard Meirovitch, Fundamentals of Vibrations, McGrawHill (any edition)
Other reference materials	1) Thomsen, J., Vibrations and Stability, Springer, 2003 2) Awrejcewicz J. Classical Mechanics. Dynamics. Springer, 2012
Average student workload outside classroom	20h
Comments	
Last update	July 2020