<table>
<tr><td>Course code</td><td></td></tr>
<tr><td>Type and description</td><td>Background Course</td></tr>
<tr><td>ECTS credit</td><td>2</td></tr>
<tr><td>Course name</td><td>Signals and Systems</td></tr>
<tr><td>Course name in Polish</td><td>Sygnały i systemy</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. Andrzej Materka</td></tr>
<tr><td>Course instructors</td><td>prof. dr hab. inż. Andrzej Materka</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>Activity</th><th>Total of teaching hours during semester</th></tr>
<tr><td>Contact hours</td><td>3</td><td>0</td><td>0</td><td>0</td><td>12</td><td>0</td><td>15</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></td></tr>
<tr><td>Assessment criteria (weightage)</td><td></td><td></td><td></td><td></td><td>0,80</td><td>0,20</td><td></td></tr>
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<tr><td>Course objective</td><td>1. To acquire knowledge on methods of mathematical modelling of physical systems as abstract entities which process and generate signals carrying information.
2. To apply the acquired knowledge to planning a research project whose goal is to solve, in an original way, a non-trivial scientific problem defined by the student.
3. To prepare, deliver and discuss a presentation on the proposed problem solution in terms of the involved signals and systems analysis methodology.</td></tr>
<tr><td>Learning outcomes</td><td>On completing the course, PhD student will be able to:
1. characterize main kinds of mathematical models of physical systems, as well as signals which are generated and/or processed in them – W1, W4, U3;
2. describe theoretical basis of system and signal model selection for representation of a device/measurement setup relevant to student' field of study – U3, K1, K2</td></tr>
<tr><td>Assessment methods</td><td>Methods of study effects verification
Effects W1, W4, U3, K1, K2: teacher assessment of student' presentation and activity in the class (attendance, discussion).
The final mark comprises of evaluation of
Multimedia presentation – 80%
Activity – 20%</td></tr>
<tr><td>Prerequisites</td><td></td></tr>
<tr><td>Course content with delivery methods</td><td>LECTURE and SEMINAR
1. Signals, their sources and properties. Signal spectrum. Need for signal processing. Classes of signals (analogue, discrete, digital, deterministic, periodic and aperiodic, random, stationary and non-stationary, noise).
2. Systems classification (static, dynamic, causal, non-causal, linear, nonlinear, time-invariant, time-varying, stable, unstable). Convolution. Impulse response and frequency response. Positive and</td></tr>
</table>

	negative feedback. 3.Measuring signal and system properties (checking linearity, analogue to digital converter, aliasing, spectrum analyser, filters). 4. Numerical methods for signal analysis and system simulation.
Basic reference materials	1. Tadeusiewicz M.: Signals and Systems, Technical University of Łódź Press, Łódź, 2004 2. Oppenheim A., Wilsky A., Nawab S., Signals and Systems, Pearson New International Edition, Harlow UK, 2014.
Other reference materials	
Average student workload outside classroom	35 h
Comments	
Last update	