# COURSE DESCRIPTION

1. **Course title:** PHYSICS  
2. **Course code:** PHY

3. **Validity of course description:** 2018/2019

4. **Level of studies:** BSc

5. **Mode of studies:** intramural

6. **Field of study:** Informatics  
   **Faculty symbol:** ACECS

7. **Profile of studies:** academic

8. **Programme:** -

9. **Semestr:** 2 (Lectures, Classes), 3 (Lectures, Classes, Laboratory)

10. **Faculty teaching the course:** ACECS – Institute of Electronics (RAu3)

11. **Course instructor:** D.Sc. Monika KWOKA – Assoc.Prof.

12. **Course classification:** common

13. **Course status:** compulsory

14. **Language of instruction:** English

15. **Pre-requisite qualifications:**

   Course attendants are supposed to have the general knowledge concerning physics and mathematics at the level of secondary school, what allows the understanding of main physical phenomena around us in the nature.

16. **Course objectives:**

   The aim of course is to explain the common physical phenomena in the nature, combined with their mathematical description, mainly for application in modern engineering sciences including informatics.

17. **Description of learning outcomes:**

<table>
<thead>
<tr>
<th>No</th>
<th>Learning outcomes description</th>
<th>Methods of assessment</th>
<th>Teaching methods</th>
<th>Learning outcomes reference code</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2</td>
<td>Possesses knowledge in the field of physics including mechanics, therodynamics, electromagnetism, optics, atomic physics necessary for understanding of basic physical phenomena in nature with potential application in electronics</td>
<td>Examination</td>
<td>Lectures (Multimedia)</td>
<td>K1A_W03</td>
</tr>
<tr>
<td>W2</td>
<td>Knows methodology of solving of physical tasks within the scope of lectures</td>
<td>Colloquium</td>
<td>Classes</td>
<td>K1A_W04</td>
</tr>
<tr>
<td>U1</td>
<td>Is able to perform the simple measurements of basic physical quantities</td>
<td>Colloquium</td>
<td>Laboratories</td>
<td>K1A_U09</td>
</tr>
<tr>
<td>U2</td>
<td>Is able to perform the analysis of experimental results, and then to determine the basic physical parameters</td>
<td>CL, PS, OS</td>
<td>Laboratories</td>
<td>K1A_U10 K1A_U13</td>
</tr>
<tr>
<td>K1</td>
<td>Is able to think and work creatively, also in group, within the solving the specific tasks (calculations, measurements)</td>
<td>CL, PS, OS</td>
<td>Laboratories</td>
<td>K1A_K04</td>
</tr>
</tbody>
</table>

18. **Teaching modes and hours**

   Lectures: 30  
   Classes: 30  
   Laboratory: 30  
   P. Sem.

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[1] należy wskazać ok. 5 – 8 efektów kształcenia
19. Syllabus description:

LECTURES:

Semester 2:
- Introduction to physical universe – Aim and scope of the course
- Kinematics and dynamics of material point and rigid body
- Motion in inertial and non-inertial frames
- Conservation principles in mechanics
- Mechanical vibrations
- Wave motion and sound propagation
- Thermal effects in nature – role of temperature
- Thermal gas transitions and kinetic theory of gases
- Thermodynamics of gases and potential application
- Mechanics of fluids in nature

Semester 3:
- Gravitational field
- Electrostatic field including dielectric phenomena
- Magnetic field including electromagnetic induction
- Electromagnetic radiation in nature
- Wave optics
- Quantum optics
- Wave properties of matter
- Atomic spectra and classical atomic models
- Quantum mechanics including quantum model of atoms
- Band structure of solids including semiconductors.

Classes:

Semester 2:
- Physical quantities, vectors and fundamentals of mathematical analysis
- Kinematics and dynamics of material point and rigid body
- Conservation principles for material point and rigid body
- Mechanical vibrations in nature
- Wave propagation and sound waves
- Gas transitions and kinetic theory of gases
- Thermodynamics of ideal gas

Semester 3:
- Gravitational field in the nature
- Electrostatic field including dielectric phenomena
- Magnetic field including electromagnetic induction
- Electromagnetic radiation and wave optics
- Quantum optics and related effects
- Atomic spectra in the nature
- Bohr model of atoms and related effects

Laboratories:

Determination of the following physical parameters: gravitational acceleration g, moment of inertia of rigid body, coefficient of viscosity, focus of lenses, constant of diffractive mesh by light diffraction, work function of metals, lifetime of carriers in semiconductors, carrier concentration by Hall effect, absorption of beta radiation, spectral characteristics of excited atoms.

20. Examination: written form with additional discussion (optional)
21. Primary sources:
3. M. Kwokar: Lecture’s in the form of multimedia presentations available on request in electronic version.

22. Secondary sources:

23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>No.</th>
<th>Teaching mode</th>
<th>Contact hours/student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>30/30</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>30/45</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>30/60</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>0/0</td>
</tr>
<tr>
<td>5</td>
<td>BA/MA seminar</td>
<td>0/0</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td>0/0</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>90/135</td>
</tr>
</tbody>
</table>

24. Total hours: 225

25. Number of ECTS credits: 9

26. Number of ECTS credits allocated for contact: 4

27. Number of ECTS credits allocated for in-practice hours (laboratory, classes, projects): 3

26. Comments:

Approved:

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(date, instructor’s signature)  (date, the Director of the Faculty Unit signature)