**SYLLABUS**

**regarding the qualification cycle FROM 2024 TO 2025**

1. Basic Course/Module Information

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| --- | --- |
| Course/Module title | Modern engineering materials |
| Course/Module code \* |  |
| Faculty (name of the unit offering the field of study) | College of Natural Sciences |
| Name of the unit running the course |  |
| Field of study | materials science |
| Qualification level | Master Degrees |
| Profile | general academic |
| Study mode | stationary |
| Year and semester of studies | I year, semester I |
| Course type | laboratory |
| Language of instruction | English |
| Coordinator | Dr Piotr Potera |
| Course instructor |  |

\* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Semester  (n0.) | Lectures | Classes | Colloquia | Lab classes | Seminars | Practical classes | Internships | others | **ECTS credits** |
| I |  |  |  | 30 |  |  |  |  | 5 |

1.2. Course delivery methods

- conducted in a traditional way

- involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

Laboratory - pass with a grade

2. Prerequisites

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| Basic knowledge of the structure and physical properties of engineering materials. |

3. Objectives, Learning Outcomes, Course Content, and Instructional Methods

3.1. Course/Module objectives

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| --- | --- |
| O1 | The aim of the course is to acquire knowledge in the field of engineering materials used in modern construction solutions; study skills physical and structural properties of modern engineering materials |

3.2. Course/Module Learning Outcomes (to be completed by the coordinator)

|  |  |  |
| --- | --- | --- |
| Learning Outcome | The description of the learning outcome  defined for the course/module | Relation to the degree programme outcomes |
| LO\_01 | have expanded and deepened knowledge from mathematical methods, processes in the description and modeling of physical phenomena and processes  • have knowledge from the construction, use and production of advanced materials;  • have a detailed knowledge from thermodynamics necessary for the description and modeling of heat treatment processes,  • have expanded and deepened knowledge in solving problems related to industrial technologies  • have knowledge from the development of engineering materials in the country and the world;  • have knowledge from the techniques and methods of assessing the physical, mechanical, and supplies,  have knowledge from raw materials, products and processes used in the manufacture of materials.  • have a broader and deeper substantive knowledge in the field of: methods, techniques, and processes for the preparation and processing of engineering materials,  • have knowledge of management, including quality management and technology transfer  SKILLS:  • able to decide on how to learn and carry out the process of self-education  • able to plan and carry out a basic study of the structure and physical properties of engineering materials, interpret the results and draw conclusions and associate the structure of the material from its properties  •able to make the selection of equipment, methods, techniques and materials for engineering applications, including new technologies, depending on the structure, properties, and conditions of use  • able to use the known experimental methods, computer simulations and theoretical models to analyze and solve simple engineering problems  • Have preparation necessary for use in industrial environments  •able to make a critical analysis of the functioning of existing technologies  FINAL COURSE OUTPUT - SOCIAL COMPETENCES  •understands the need to improve their skills  •is able to adequately define priorities for •implementation specified by you or other tasks  able to think and act creatively  • understands the need of providing the public with information related to materials engineering |  |

**3.3. Course content (to be completed by the coordinator)**

1. Lectures

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| Content outline |
|  |

1. ~~Classes, tutorials/seminars, colloquia~~, laboratories, ~~practical classes~~

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| Content outline |
| The optical properties and the pumping bands of the rare earth ion laser material  Spectroscopy of iron ions in the laser material.  Study Materials by EPR technique  Determination of the lattice constant from XRD for the selected material  Determination of optical band gap of material |

3.4. Methods of Instruction

*Laboratory classes: designing and conducting experiments*

4. Assessment techniques and criteria

Assessment methods:

-laboratory classes: credit with grade

Forms of assessment:

- credit: identification of a class assessment based on the average ratings of the partial test, active participation in classes and laboratory reports

4.1 Methods of evaluating learning outcomes

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| --- | --- | --- |
| Learning outcome | Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes) | Learning format (lectures, classes,…) |
| LO-01 | report, observation during classes | laboratory |

4.2 Course assessment criteria

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| *Completion of the course will confirm the student's level of achievement of the intended learning outcomes. Verification of learning outcomes achieved is controlled during the time of the course. Obtained from the credit rating of the course will assess the results achieved. Verification of learning outcomes with the knowledge and skills provided by the teacher take the form of tests, reports, active participation in classes and participate in the discussion. Verification of learning outcomes without the participation of teachers' activities will be carried out based on the evaluation of the student prepare for the laboratory. Social competence verification will take place through active participation in classes and participate in the discussion*  *laboratory*  *- Points obtained from the test in each subject matter content of the program*  *sufficient - (51 - 60)% point,*  *+ sufficient - (61 - 70)% point,*  *Good (71 - 80)% point,*  *+ Good (81 - 90)% point,*  *very good (91 - 100)% point.*  *- Points obtained from prepared report on and the activity of laboratory classes:*  *sufficient - (51 - 60)% point,*  *+ sufficient - (61 - 70)% point,*  *Good (71 - 80)% point,*  *+ Good (81 - 90)% point,*  *very good (91 - 100)% pts.* |

5. Total student workload needed to achieve the intended learning outcomes

– number of hours and ECTS credits

|  |  |
| --- | --- |
| Activity | Number of hours |
| Scheduled course contact hours | 30 |
| Other contact hours involving the teacher (consultation hours) | 5 |
| Non-contact hours - student's own work (preparation for classes, projects, etc.) | 90 |
| Total number of hours | 125 |
| Total number of ECTS credits | 5 |

\* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

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| --- | --- |
| Number of hours |  |
| Internship regulations and procedures |  |

7. Instructional materials

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| Compulsory literature:  Design and Computation of Modern Engineering Materials Editors: Öchsner, Andreas, Altenbach, Holm (book)  -Modern Physical Metallurgy and Materials Engineering By R. E. Smallman,  -Internet source |
| Complementary literature: |

Approved by the Head of the Department or an authorised person