| Z1-PU7 | WYDANIE N1 | Strona 1 z 2 |
|---|---|---|

(*faculty stamp*)

**COURSE DESCRIPTION**

| | |
|---|---|
| **1. Course title: FUNDAMENTALS OF DESIGN INFORMATICS** | **2. Course code** |
| **3. Validity of course description:** 2019/2020 | |
| **4. Level of studies: BA, BSc programme** / MA,MSc programme lub 1st cycle / 2nd cycle of higher education | |
| **5. Mode of studies: intramural studies** / extramural studies | |
| **6. Field of study**: ENERGY SCIENCE | **(FACULTY SYMBOL)** RIE |
| **7. Profile of studies:** academic | |
| **8. Programme:** Sustainable energy engineering | |
| **9. Semester:** 3 | |
| **10. Faculty teaching the course:** POWER AND ENVIRONMENTAL ENGINEERING | |
| **11. Course instructor**: dr inż. Andrzej Sachajdak | |
| **12. Course classification:** common subjects | |
| **13. Course status: compulsory** /elective | |
| **14. Language of instruction:** English | |
| **15. Pre-requisite qualifications:** mathematics, physics, CAD, information technologies | |
| **16. Course objectives:** skills in engineering calculations and design of energy systems using computer tools**.** | |

**17. Description of learning outcomes:**

| Nr | Learning outcomes description | Method of assessment | Teaching methods | Learning outcomes reference code |
|---|---|---|---|---|
| 1. | Learning computer computational techniques in engineering calculations and energy systems design. | test | lecture | KW04, KU03 |
| 2. | Designing basic energy processes in Excel, VBA, Autocad environments. Using Refprop/Coolprop tools. | training tasks, reports | hands-on training (laboratory) | KW04, KU10, KU03 |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |

**18. Teaching modes and hours**

**Lecture 15h/** BA /MA Seminar / Class / Project / **Laboratory 30h**

**19. Syllabus description:**

**Lectures:** 1. Calculation environment, code preparation, running calculations, I/O instructions. 2. Built-in functions, engineering calculation functions, calling thermodynamic libraries. 3. Control instructions: conditional, loop. 4. Work with VBA objects. 5. Graphical user interface. 6. Basics of numerical methods. 7. VBA as a tool for automating the design process.

**Laboratories:** 1. Calculation environment, source code preparation, program launch, input-output instructions. 2. Starting functions and procedures. 3. Built-in functions, calculation functions, thermodynamic libraries. 4. Control instructions: conditional, loop. 5. Operations on VBA objects. 6. Graphical user interface. 7. Numerical solving of nonlinear equations. 8. Numerical integration. 9. Solving linear systems of equations. 10. Interpolation, approximation.

**20. Examination:**

**21. Primary sources:**

- Ronald W. Larsen, Engineering with Excel (5th Edition), Pearson; 2018
- Bernard V Liengme, Excel VBA for Physicists, Morgan & Claypool Publishers; 2016

**22. Secondary sources:**

https://www.excel-pratique.com/en/vba/introduction.php
http://www.coolprop.org/
https://www.nist.gov/srd/refprop

**23. Total workload required to achieve learning outcomes**

| Lp. | Teaching mode : | Contact hours / Student workload hours |
|---|---|---|
| 1 | Lecture | 15/15 |
| 2 | Classes | / |
| 3 | Laboratory | 30/30 |
| 4 | Project | |
| 5 | BA/ MA Seminar | / |
| 6 | Other | / |
| | Total number of hours | / |

**24. Total hours:** 90

**25. Number of ECTS credits:** 3

**26. Number of ECTS credits allocated for contact hours:** 3

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

**26. Comments:**

Approved:

…….
*(date, Instructor's signature)*

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(*date , the Director of the Faculty Unit signature)*