| Name of the module/subject Code (1010311271010311548) Field of study Profile of study (general academic, practical) (brak) Year /Semester Electrical Engineering Subject offered in: Drak) Course (compulsory, elective obligatory Cycle of study: First-cycle studies Form of study (full-time, part-time) First-cycle studies full-time No. of hours No. of credits Lecture: 1 Classes: 1 Classes: - 2 Classes full-time 1 Knowledge Indov/site 1 Project/seminars: 1 5 100% full-time Education areas and fields of science and art ECTS distribution (number and %) technical sciences 5 100% Responsible for subject / lecturer: Krzysztof Sroka fuid mechanics, basic metrology. 5 1 Knowledge Dasic knowledge of energy technology and equipment used in the power industry, mechanics, fuid mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventinoial energy devices: steam bo | STUDY MODULE DESCRIPTION FORM | | | | | | | |
|--|--|----------------------------|---|---|--|-----|--|--|
| Field of study Profile of study (general scademic), practical) Year /Semester Electric Power Systems Subject offered in: polisish Course (compulsory, elective obligatory) Cycle of study: First-cycle studies full-time No. of rarelits Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1 5 Status of the course in the study program (Basic, major, other) (university-wide, from another field) (brak) (brak) Education areas and fields of science and art ECTS distribution (number and %) 5 100% Responsible for subject / lecturer: Krzysztof sroka 5 100% 2 Responsible for subject / lecturer: Krzysztof sroka @put.poznan.pl 1 Mowledge Basic knowledge of energy technology and equipment used in the power industry, mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam bollers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fam. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as | Name of the module/subject Exploitation of power plants and of heat and power plants | | | | Code 1010311271010311548 | | | |
| Electrical Engineering (brak) 4 / 7 Electrical Engineering Subject offered in: polish Course (compulsory, elective obligatory Cycle of study: First-cycle studies form of study (full-time,part-time) Course (compulsory, elective obligatory No. of hours Electric Power Systems form of study (full-time,part-time) No. of credits Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1 5 Status of the course in the study program (Basic, major, other) (brak) (university-wide, from another field) ECTS distribution (number and %) Education areas and fields of science and att ECTS distribution (number and %) 5 100% Responsible for subject / lecturer: Krzysztof.sroka @put.poznan.pl tel, 61 665 22 75 5 100% Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge Basic knowledge, skills and social competencies: 1 Knowledge Is aware of the need to broaden their competence, willingness to work together as a team. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. 4 | Field of s | study | - | Profile of study | Year /Semester | | | |
| Elective path/specially Course (compulsory, elective obligatory) Cycle of study: First-cycle studies Form of study (full-time,part-time) obligatory No. of hours Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1 S Status of the course in the study program (Basic, major, other) (university-wide, from another field) No. of credits Education areas and fields of science and art (brak) ECTS distribution (number and %) technical sciences 5 100% Responsible for subject / lecturer: Krzysztof Sroka email: krzysztof sroka @put_poznan.pl email: krzysztof sroka @put_poznan.pl ul. el 66 52 27 5 Elektryczny Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 1 Knowledge Is aware of the need to broaden their competence, willingness to work together as a team. 2 Skills Understand the basic principles of operation of the machines and know the basic structure competencies: 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. 2 Skills Is aware | Elect | rical Engineerin | g | (brak) | 4/7 | | | |
| Form of study (full-time,part-time) Form of study (full-time,part-time) In the study program (Basic, major, other) No. of credits Lecture: 1 O. of credits Status of the course in the study program (Basic, major, other) (university-wide, from another field) (brak) (brak) CCTS distribution (number and %) Education areas and fields of science and attribution (sciences) CT distribution (number and %) technical sciences S 100% Responsible for subject / lecturer: Krzysztof Sroka email: trzysztof Sroka @put.poznan.pl Krzysztof Sroka @put.poznan.pl tel. 666 22 75 Elektryczny Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fals. Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fals. Skills Understand the need to broaden their competence, willingness to work together as a te | Elective | path/specialty Electr | ic Power Systems | Subject offered in: polish | Course (compulsory, elective) obligatory | | | |
| First-cycle studies full-time No. of hours No. of redits Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1 5 Status of the course in the study program (Basic, major, other) (university-wide, from another field) (brak) Corspan="2">Corspan="2" Responsible for subject / lecturer: Krzysztof sroka @put.poznan.pl tel. 61 665 22 75 Elektryczny Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fals. 1 Knowledge Is aware of the need to broaden the | Cycle of | study: | | Form of study (full-time,part-time) | | | | |
| No. of hours No. of credits Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1 5 Status of the course in the study program (Basic, major, other) (university-wide, from another field) (brak) Education areas and fields of science and at (brak) ECTS distribution (number and %) technical sciences 5 100% Responsible for subject / lecturer: Krzysztof Sroka % Krzysztof Sroka email: krzysztof.sroka@put.poznan.pl tel. 61 665 22 75 Elektryczny ul. Piotrowo 3A, 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge Basic knowledge of energy technology and equipment used in the power industry, mechanics, filuid mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Study outcomes and reference to the educational results for a field of study Knowledge: 1 Basic knowledge in the use of power equipment in a variety | | First-cyc | le studies | full- | III-time | | | |
| Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1 5 Status of the course in the study program (Basic, major, other) (brak) (university-wide, from another field) (brak) Education areas and fields of science and at (brak) ECTS distribution (number and %) ECTS distribution (number and %) technical sciences 5 100% Responsible for subject / lecturer: Krzysztof Sroka email: krzysztof.sroka@put.poznan.pl ECTS distribution (number and %) I.e. 61 665 22 75 Elektryczny Image: Science and email: krzysztof.sroka@put.poznan.pl Image: Science and email: krzysztof.sroka@put.poznan.pl I.e. 61 665 22 75 Elektryczny Image: Science and email: krzysztof.sroka@put.poznan.pl Image: Science and email: krzysztof.sroka@put.poznan.pl I.e. 61 665 22 75 Elektryczny Image: Science and email: krzysztof.sroka@put.poznan.pl Image: Science and email: krzysztof.sroka@put.poznan.pl I.e. 61 665 22 75 Elektryczny Image: Science and email: krzysztof.sroka@put.poznan.pl Image: Science and knowledge of energy technology and equipment used in the power industry, mechanics, fluid mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and stea | No. of ho | ours | | | No. of credits | | | |
| Status of the course in the study program (Basic, major, other) (university-wide, from another field) Log and the course in the study program (Basic, major, other) (brak) ECTS distribution (number and %) Education areas and fields of science and art ECTS distribution (number and %) ECTS distribution (number and %) technical sciences ECTS distribution (number and %) Responsible for subject / lecturer: Krzysztof Sroka email: krzysztof sroka @put.poznan.pl tel. 61 665 22 75 Elektryczny ul. Piotrowo 3A, 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge Basic knowledge of energy technology and equipment used in the power industry, mechanics, fuid mechanics, basic metrology. Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. Is aware of the need to broaden their competence, willingness to work together as a team. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09++++K_W08++] <th colsp<="" td=""><td>Lectur</td><td>e: 1 Classes</td><td>s: - Laboratory: 1</td><td>Project/seminars:</td><td>1 5</td></th> | <td>Lectur</td> <td>e: 1 Classes</td> <td>s: - Laboratory: 1</td> <td>Project/seminars:</td> <td>1 5</td> | Lectur | e: 1 Classes | s: - Laboratory: 1 | Project/seminars: | 1 5 | | |
| Education areas and fields of science and at ECTS distribution (number and %) technical sciences 5 Responsible for subject / lecturer: Krzysztof Sroka Krzysztof Sroka email: krzysztof sroka@put.poznan.pl tel. 61 665 22 75 Elektryczny ul. Piotrowo 3A, 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge Basic knowledge of energy technology and equipment used in the power industry, mechanics, fluid mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Assumptions and objectives of the course: Getting acquainted with the operation of power equipment and power plants in various operating states. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] | Status of | f the course in the study | program (Basic, major, other) (brak) | (university-wide, from another | ^(ield) | | | |
| technical sciences 5 100% Responsible for subject / lecturer: Krzysztof Sroka Status Status Itel. 61 665 22 75 Elektryczny UL Piotrowo 3A, 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge Basic knowledge of energy technology and equipment used in the power industry, mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Getting acquainted with the operation of power equipment and power plants in various operating states. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | Educatio | on areas and fields of sci | ence and art | | ECTS distribution (number and %) | | | |
| Responsible for subject / lecturer: Krzysztof Sroka email: krzysztof.sroka@put.poznan.pl tel. 61 665 22 75 Elektryczny ul. Piotrowo 3A, 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge Basic knowledge of energy technology and equipment used in the power industry, mechanics, fluid mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Study outcomes and reference to the educational results for a field of study Knowledge: 1 Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] Lek knows the basic principles of cogeneration heat and power [K_W24+] | techn | ical sciences | | | 5 100% | | | |
| Krzysztof Sroka email: krzysztof.sroka@put.poznan.pl tel. 61 665 22 75 Elektryczny ul. Piotrowo 3A, 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge 2 Skills 2 Skills 3 Social conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] | Resp | onsible for subje | ect / lecturer: | | | | | |
| Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge 2 Skills 3 Social convertional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] | Krzysztof Sroka email: krzysztof.sroka@put.poznan.pl tel. 61 665 22 75 Elektryczny | | | | | | | |
| 1 Knowledge Basic knowledge of energy technology and equipment used in the power industry, mechanics fluid mechanics, basic metrology. 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Assumptions and objectives of the course: Getting acquainted with the operation of power equipment and power plants in various operating states. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | Prere | quisites in term | s of knowledge, skills an | d social competencies: | | | | |
| 2 Skills Understand the basic principles of operation of the machines and know the basic structure conventional energy devices: steam boilers, gas and steam turbines, heat recovery units and heat regenerators, compressors and fans. 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Assumptions and objectives of the course: Getting acquainted with the operation of power equipment and power plants in various operating states. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | 1 | Knowledge | Basic knowledge of energy tech fluid mechanics, basic metrology | nology and equipment used in the power industry, mechanics, y. | | | | |
| 3 Social competencies Is aware of the need to broaden their competence, willingness to work together as a team. Assumptions and objectives of the course: Getting acquainted with the operation of power equipment and power plants in various operating states. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | 2 | Skills | Understand the basic principles conventional energy devices: ste heat regenerators, compressors | of operation of the machines and know the basic structure eam boilers, gas and steam turbines, heat recovery units and and fans | | | | |
| Assumptions and objectives of the course: Getting acquainted with the operation of power equipment and power plants in various operating states. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | 3 | Social competencies | Is aware of the need to broaden | their competence, willingness | to work together as a team. | | | |
| Getting acquainted with the operation of power equipment and power plants in various operating states. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | Assu | mptions and obj | ectives of the course: | | | | | |
| Study outcomes and reference to the educational results for a field of study Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | Getting acquainted with the operation of power equipment and power plants in various operating states. | | | | | | | |
| Knowledge: 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | Study outcomes and reference to the educational results for a field of study | | | | | | | |
| Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | Know | ledge: | | | | | | |
| 2. He knows the basic principles of cogeneration heat and power [K_W24+] Skills: | 1. Basic knowledge in the use of power equipment in a variety of operating conditions [K_W09+++K_W08++] | | | | | | | |
| | 2. He knows the basic principles of cogeneration heat and power [K_W24+] | | | | | | | |
| 1. Able to formulate the expression of the basis ministrate of energy explores at 114 140 and | | | | | | | | |
| Able to formulate the correct operation of the basic principles of energy equipment [K_U12++] Distinguish states nower plant, able to select and justify the procedure in a particular state - [K_U20++] | | | | | | | | |
| Social competencies: | Socia | competencies: | and justify the | procedure in a particular state. | | | | |
| Is aware of the impact of energy technology and equipment on the environment and understand the need to counteract these phenomena - [K_K02++] | | | | | | | | |

Assessment methods of study outcomes

Lectures:

- evaluate the knowledge and skills demonstrated on a written test,

- continuous evaluation skills and expertise for each class by conducting discussions on current issues related to the rational methods of operation of power plants.

Laboratory:

- tests to check the knowledge necessary for the accomplishment of the problems in the area of ??laboratory tasks,

- evaluation knowledge and skills related to the implementation of the tasks, the assessment report of performed exercise,
 - obtaining additional points for the ability to work within a team practice performing the task detailed in the laboratory and developed aesthetic diligence reports

Project / seminar:

- evaluation of the project made ??and presented in the framework of the project activities

Course description

Basic concepts of operating. Principles of operation of the equipment. Using of the power unit in steady states. Working generating equipment in transient conditions due to failures and disruptions or in planned transient states. Load changes, stopping and starting of the power unit. Content of the laboratory exercise is consistent with the theme of the lecture and includes the use of power equipment in a variety of operating conditions.

Basic bibliography:

1. R.Janiczek ? Eksploatacja elektrowni parowych, WNT W-wa 1990

Additional bibliography:

1. Gładyś H., Matla R.: Praca elektrowni w systemie elektroenergetycznym. WNT. W-wa 1995

2. D.Laudyn, M.Pawlik, F.Strzelczyk ? Elektrownie, WNT W-wa 2000

3. M.Pawlik, J.Skierski ? Układy i urzadzenia potrzeb własnych. WNT W-wa 1986

Result of average student's workload

| Activity | Time (working hours) |
|--|----------------------|
| 1. participation in the lectures | 15 |
| 2. participation in the laboratory exercises | 15 |
| 3. participation in the project/seminar | 15 |
| 4. preparation to the laboratory exercises | 15 |
| 5. preparation of practical exercises reports | 15 |
| 6. participation in the consulting on the laboratory exercises and project | 10 |
| 7. preparation of project report | 15 |
| 8. preparation for the test on the lectures | 10 |
| Student's workload | |

| Source of workload | hours | ECTS |
|----------------------|-------|------|
| Total workload | 110 | 5 |
| Contact hours | 55 | 3 |
| Practical activities | 85 | 3 |