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FACHBEREICH WIRTSCHAFT
DARMSTADT BUSINESS SCHOOL

Enclosure 5
Module manual of the study program

Energy economics
Bachelor of Science

of the Department of Economics
of the Darmstadt University of Applied Sciences

from 27.06.2017

last modified on 06.12.2022 Changes valid from 01.04.2023

Underlying BBPO dated 27.06.2017 (Official Notices Year 2018) as amended on 13.01.2022 (Official Notices Year 2022).

Content

1	**Module name** External accounting
1.1	**Module abbreviation** 511
1.2	**Type** Mandatory Module
1.3	**Course** External accounting
1.4	**Semester** Semester 1
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** In addition to the basic knowledge of the accounting obligation, there is an overall presentation of the double-entry accounting system with the accounting treatment of the inventory and profit and loss accounts as well as explanations of the opening and closing of the accounts, including the evaluation in the form of balance sheet and profit and loss account. Students learn to structure external accounting issues, to record business transactions in the double-entry accounting system and to evaluate balance sheet items in a practice-oriented manner within the framework of exercises. Specifically, the following contents are addressed: • Double-entry accounting technique • Simple basic concepts of accounting theory, i.e. issues of periodization, valuation and the conservation problems and issues of creditor and investor protection. • Assessment and posting of typical business transactions: o Postings in the merchandise economics area o Postings in the production management area o Postings in the human resources area o Postings in the fixed assets area o Postings in the financial area o Preparation of the annual financial statements • Recognition and measurement rules

	• Functioning of the sales tax system • Provisions and liabilities
3	**Targets** Knowledge: Students will be able to classify financial accounting in the context of business accounting and name the important basic terms, principles and instruments of financial accounting. In particular, they will be able to explain who has to keep books and according to which principles this has to be done. Problems of creditor and investor protection can be presented in their own words. Upon completion of the course, students will be able to describe the effects of real business transactions on individual accounts of a company and the relationship between the changes in value on the individual accounts in the context of double-entry accounting. Skills: Students will be able to apply double-entry accounting techniques related to the specifics of industrial and commercial enterprises to sample business transactions, using the accounting rates and principles discussed in the course. Students will also be able to analyze simple periodization, valuation, and maintenance issues, derive a solution, and record it in accounting terms. Competencies: After completing the module, students will be able to independently apply the technique of commercial double-entry bookkeeping and thus master a basic tool of every economist, which is necessary for understanding real accounting processes in companies or public institutions with double-entry bookkeeping. In particular, students are able to assess the effects of economic activity on the balance sheet and income statement.
4	**Teaching and learning methods** Lecture (L) with integrated exercise (E) In the exercises, the contents taught in the lecture will be deepened by means of exercises. In doing so, attention is paid to the application of the theoretically learned concepts on the part of the students. The exercises are partly worked on in small groups. Media used: communication media (e.g. electronic learning platforms), presentation media (e.g. video projector, visualizer, whiteboard)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance times: 64 hours (incl. times for group work) Self-study: 86 hours (wrap-up of lecture, processing of exercises, exam preparation)

6	**Form of examination, duration and examination requirements** • Examination performance usually in the form of a written examination. • With regard to the duration of the examination, § 12 ABPO applies. • Other forms of examination (e.g. homework, presentations), which usually supplement the written examination, are possible. Preliminary examinations (e.g. working on exercises) - also in group work - are also possible. Preliminary examinations may be graded or ungraded. In the case of graded preliminary examinations, the share of the module grade may not exceed 30%. Preliminary examinations and examinations are announced at the beginning of the course. If preliminary examinations are required, passing the preliminary examination is a prerequisite for participation in the examination. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**
11	**Literature** Schmolke/Deitermann: Industrielles Rechnungswesen, Winklers. Döring/Buchholz: Buchhaltung und Jahresabschluss, Erich Schmidt Verlag. Wöhe/Kußmaul: Buchführung und Bilanztechnik, Vahlen.

1	**Module name** Business Informatics
1.1	**Module abbreviation** 512
1.2	**Type** Mandatory Module
1.3	**Course** Business Informatics
1.4	**Semester** Semester 1
1.5	**Module manager** Dr. Tafreschi
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Basic charges of the information and communication technology (ICT) • Fundamentals of Business Informatics • Relevance of ICT for the energy economics • Information systems development • Data protection and IT security
3	**Targets** Knowledge: Successful completion of this module will enable students to • explain the basics of ICT. • explain the structure of information systems. Skills: Successful completion of this module will enable students to • Understand and recognize potentials of ICT from the perspective of the energy economics. • opportunities and the risks of ICT.

	Competencies: Successful completion of this module will enable students to • Create models for the development of information systems.
4	**Teaching and learning methods** Lecture (L) Media used: Projector
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** Business Administration (B.Sc.), Industrial Engineering (B.Sc.), Computer Science (B.Sc.)
11	**Literature** Becker/Probandt/Vering: Grundsätze ordnungsmäßiger Modellierung, Springer Gabler Freund/Rücker: Praxishandbuch BPMN 2.0, Hanser Hansen/Neumann: Wirtschaftsinformatik 1 Grundlagen und Anwendungen, Lucius & Lucius Hansen/Neumann: Wirtschaftsinformatik 2 Informationstechnik, Lucius & Lucius Lemke/Brenner: Einführung in die Wirtschaftsinformatik, Springer Gabler Thome/Winkelmann: Grundzüge der Wirtschaftsinformatik, Springer Gabler

1	**Module name** Introduction to the energy economics
1.1	**Module abbreviation** 513
1.2	**Type** Mandatory Module
1.3	**Course** Introduction to the energy economics
1.4	**Semester** Semester 1
1.5	**Module manager** Dr. Hooß
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** This module teaches the essential interrelationships of the energy economics along its value creation stages. First of all, the basic concepts of the energy economics and the fundamentals of the raw materials industry are introduced: • Classification of energy forms, • Units of measurement and trade, • global raw material deposits and extraction, • Price development of primary energy, • Structure of energy consumption in Germany. The different types of energy conversion are considered from an economic and ecological perspective, and the essential definitions of terms and key figures are developed for this purpose. The module focuses on the grid-based energy economics in Germany with the electricity and gas sectors, taking a closer look at energy trading, energy transport and distribution as well as energy sales. In the context of grid-based energy procurement, this module deals in particular with the following topics:

	• Characteristics of the liberalized energy industry,
	• Exchange trading, operation and main products,
	• Electricity Procurement,
	• Gas Procurement.
	
	The contents regarding energy transport and distribution refer to the following:
	
	• Grid usage and grid access for electricity grids,
	  ○ Obligations of network operators,
	  ○ Basics of network usage (balancing groups, schedules, profiles),
	  ○ Control and balancing energy,
	  ○ Basics of incentive regulation.
	• Network use and network access for gas networks,
	  ○ Fundamentals of network access,
	  ○ Market areas,
	  ○ Fundamentals of network utilization and balancing group economics,
	  ○ Control and balancing energy.
	
	Finally, students are given an insight into energy sales by means of selected business models and sales strategies.
	
	The module "Introduction to the Energy economics" also introduces the essential framework conditions of energy law and climate law in the German and European context along the value-added stages of the energy economics.

3	**Targets** Knowledge: The students are able to name and explain the essential energy economic terms and units, they can distinguish between the different forms of energy and know the economic and ecological characteristics of different types of energy conversion. The students know the structure of the German energy market, they understand the basic interrelationships of liberalized energy markets and know the special features of the grid-based energy market, they can distinguish these from conventional markets. Furthermore, they are familiar with the most important energy and climate legal framework conditions and are able to name the different market roles on the energy markets, as well as their tasks and duties. The students know the principles of pricing on the stock exchange. Skills: Students will be able to recognize and critically analyze interrelationships on the energy markets. They are able to interpret price and quantity changes on the electricity and commodity markets and to name their background. They are able to understand the interdisciplinary characteristics of energy markets, including legal/regulatory, economic, ecological and technical determinants.

	Competencies: The students are enabled to view and understand the energy market with its market roles and perspectives (legal, technical, economic) in a differentiated way. Through the selected teaching and learning forms, students are encouraged to engage in critical discussion. Social competence is promoted during exercises (including group work).
4	**Teaching and learning methods** Lecture (L) Media used: Communication media (e.g. electronic learning platform), presentation media (e.g. beamer, whiteboard, flipchart, smartboard, metaplan, visualizer)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • The examination can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**
11	**Literature** Erdmann/Zweifel: Energieökonomik - Theorie und Anwendungen, Springer. Konstantin: Praxisbuch Energiewirtschaft: Energieumwandlung, -transport, -beschaffung im liberalisierten Markt, Springer Vieweg. Ströbele/Pfaffenberger: Energiewirtschaft: Einführung in Energie und Politik, Oldenbourg-Verlag.

1	**Module name** Business Mathematics
1.1	**Module abbreviation** 514
1.2	**Type** Mandatory Module
1.3	**Course** Business Mathematics
1.4	**Semester** Semester 1
1.5	**Module manager** Dr. Böhmer
1.6	**Other teachers** Micol
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Mathematical sub-areas such as linear systems of equations, sequences and series, financial mathematics, and differential and integral calculus, which have direct relevance to economics and business administration, are covered. These methods are presented in a problem-oriented manner in order to demonstrate their practical relevance.
3	**Targets** Knowledge: In particular, graduates possess the ability to read and understand mathematical formulas and facts. Skills: In particular, graduates are able to apply the basic tools of business mathematics to solve economic problems.

	Competencies: In particular, graduates possess the ability to develop mathematical models of economic relationships of medium complexity.
4	**Teaching and learning methods** Lecture (L) and exercise (E) Media used: whiteboard, overhead projector, video projector, lecture materials
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination in the form of a written exam on the entire course content of the module. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**
11	**Literature** Helm/Pfeifer/Ohser: Mathematik für Wirtschaftswissenschaftler, Hanser Verlag. Tietze: Einführung in die angewandte Wirtschaftsmathematik, Vieweg.

1	**Module name** Heat and power engineering
1.1	**Module abbreviation** 515
1.2	**Type** Mandatory Module
1.3	**Course** Heat and power engineering
1.4	**Semester** Semester 1
1.5	**Module manager** Dr. Schetter
1.6	**Other teachers** Dr. Geyer; Dr. Linow; Dr. Ruß
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Thermal state variables and equations of state • Work, dissipation and heat • First main theorem • Closed and open systems • Second main theorem • Circular processes and machines for their implementation: Carnot, Joule, Otto, Diesel, Clausius-Rankine process
3	**Targets** Knowledge: Students are able to express themselves in the terminology and way of thinking of technical thermodynamics. They have a scientifically based understanding of the possibilities and limits of the various circular processes for obtaining useful work from heat. They understand the technically common machines and equipment for their realization together with their technical limitations.

	Skills: The students have an overview of the most important thermal machines from the theoretical description to the technical realization. They are able to work on basic technical and mathematical problems for these machines. Competencies: Students will be able to select given thermal machines in terms of their usability for a given task and justify their selection based on the advantages and disadvantages of the machine.
4	**Teaching and learning methods** Lecture (L) and laboratory practical course (LP) Media used: blackboard, overhead projector, beamer; illustrative material; laboratory with experimental equipment
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Preliminary examination in the form of graded lab reports on the lab sessions. • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • Students have the opportunity to repeat the preliminary and final examinations in the following semester. • Prerequisite for participation in the examination is the passing of the preliminary examination. • The preliminary examination is ungraded.
7	**Necessary knowledge** None
8	**Recommended knowledge** None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**
11	**Literature** Cerbe/Wilhelms: Technical Thermodynamics, Hanser Zahoransky: Power Engineering, Vieweg

1	**Module name** Electrical power engineering 1
1.1	**Module abbreviation** 516
1.2	**Type** Mandatory Module
1.3	**Course** Electrical power engineering 1
1.4	**Semester** Semester 1
1.5	**Module manager** Dr. Petry
1.6	**Other teachers** Dr. Jeromin
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** The module introduces the basic electrotechnical laws and their application for the (simplified) calculation of electrical networks. The basic interrelationships in networks are explained in order to be able to calculate the technically transmissible powers, losses and efficiencies. • Introductory: European electricity interconnection, status and objectives with overview of generation, transmission and distribution of electrical energy, • Compilation of and electrical quantities and electrotechnical principles, • Laws in the electric circuit, sources and consumers, • Losses, efficiency and power maximization, • Resistor networks with current and voltage division, • Calculation of examples on the topics: Renewable energy generation, energy transmission, energy storage, electromobility, energy efficiency.
3	**Targets** Knowledge: Successful completion of this module will provide students with knowledge of the basic laws of electrical current flow, as well as the generation and transmission of electrical energy in electrical networks and their use.

	Skills and Competencies: The students are able to comprehend power engineering issues, map them into electrical equivalent circuits and, by applying the laws they have learned, calculate all the necessary quantities and evaluate and classify the results. This also includes analyzing and processing the physical tasks in such a way that the correctly recognized context, the necessary formula apparatus and the mathematical transformations lead to a correct result.
4	**Teaching and Learning Modes:** Lecture (L) and exercise (E) Media used: whiteboard, visualizer, beamer
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration of examination and examination requirements:** Examination performance usually in the form of a written examination. Duration of examination: 90 minutes Possibility of repetition according to ABPO
7	**Required Knowledge:** None
8	**Recommended Knowledge:** None
9	**Duration, time structure and frequency of the offer:** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Metz/Naundorf/Schlabbach: Small collection of formulas for electrical engineering Lindner/ Brauer/Lehmann: Pocketbook of electrical engineering and electronics Kories/Schmidt-Walter: Pocketbook of electrical engineering Albach: Fundamentals of Electrical Engineering Heuck/Dettmann: Electrical Power Supply

1	**Module name** Fundamentals of economics
1.1	**Module abbreviation** 521
1.2	**Type** Mandatory Module
1.3	**Course** Fundamentals of economics
1.4	**Semester** Semester 2
1.5	**Module manager** Puth
1.6	**Other teachers** Dr. Engelstätter, Dr. Klüh
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Introduction to economics • Subject and methods • Economic systems • Empiric Microeconomics • Markets: demand, supply, equilibrium, data changes, elasticities, efficiency, welfare. • Public sector: price controls, quantity restrictions, taxes, subsidies, externalities, public goods, commons, merit goods • Corporate behavior: Production, costs • Market forms: Perfect competition, Monopoly, Oligopoly, Monopolistic competition. • Factor markets: labor market, land market, capital market Macroeconomics • Economic accounting • Growth • Economy • Unemployment • Inflation

	International economics • Trade • Currency
3	**Targets** Knowledge: Students are familiar with the current issues and basic analytical methods of economics. Skills: Students will be able to apply the methods they have learned to simple economic problems. Competencies: Students will be able to independently assess, classify and elaborate economic policy proposals.
4	**Teaching and learning methods** Lecture (L) Media used: beamer, visualizer, whiteboard
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 514 (Business Mathematics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**

11	**Literature** Acemoglu/Laibson/List: Economics, Pearson. Beck: Volkswirtschaftslehre: Mikro- und Makroökonomie, De Gruyter Oldenbourg. Bofinger: Grundzüge der Volkswirtschaftslehre, Pearson. Krugman/Wells: Volkswirtschaftslehre, Schäffer Poeschel. Mankiw/Taylor: Grundzüge der Volkswirtschaftslehre, Schäffer Poeschel.

1	**Module name** Internal accounting
1.1	**Module abbreviation** 522
1.2	**Type** Mandatory Module
1.3	**Course** Internal accounting
1.4	**Semester** Semester 2
1.5	**Module manager** Dr. Hensberg
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Cost type accounting (basic costs, imputed depreciation, imputed interest, imputed risk, imputed entrepreneurial wage, imputed rent) • Cost center accounting (cost center formation, cost center plan, operational accounting sheet, primary and secondary cost allocation) • Unit costing (e.g. division costing, equivalence number costing, overhead costing, machine hour rate costing) • Cost unit time accounting (total cost method, cost of sales method) • Full cost accounting • Partial costing (single-stage contribution margin accounting, multi-stage contribution margin accounting)
3	**Targets** Knowledge: Students will be able to ... • Define, explain and subdivide cost elements • List criteria for cost center formation • Describe aspects of cost center and cost object accounting • Explain differences between absorption costing and direct costing

	Skills: Students will be able to ... • To compile the basic costs and calculate the cost. Calculate costs • to prepare an operational accounting sheet • Perform primary cost and secondary cost allocation • Calculate prices • set up a single-step or multi-step contribution margin calculation Competencies: Students will be able to ... • Solve internal accounting problem with the help of Excel
4	**Teaching and learning methods** Lecture (L) with integrated exercises (E) in the form of e.g. practical exercises, exercise cases and Excel applications in the computer room. The exercises are partly done in group work. Media used: beamer (PowerPoint presentations), blackboard (blackboard notes as PDF), lab computer, Excel downloads, PDF downloads, Moodle
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Form of examination: usually written examination (paper form or electronic form; announcement of the exact form in the course). • Duration: 90 minutes • Content: about the entire teaching content of the module. • Time: during the examination period at the end of the module • Possibility to repeat: in the following semester
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 511 (External Accounting)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** In economics-oriented courses of study as a basic module.
11	**Literature** Coenenberg/Fischer/ Günther: Kostenrechnung und Kostenanalyse, Schäffer-Poeschel.

	Däumler/Grabe: Kostenrechnung 1 - Grundlagen, NWB. Friedl/Hofmann/Pedell: Kostenrechnung, Vahlen. Olfert: Kostenrechnung, NWB. Perridon/Steiner/Rathgeber: Finanzwirtschaft der Unternehmung, Vahlen. Prexl: Excel für BWLer, UTB. Schels/Seidel: Excel im Controlling, Carl Hanser. Schmidt: Kostenrechnung, Kohlhammer.

1	**Module name** Energy economics policy
1.1	**Module abbreviation** 523
1.2	**Type** Mandatory Module
1.3	**Course** Energy economics policy
1.4	**Semester** Semester 2
1.5	**Module manager** Dr. Hooß
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** In this module, students are introduced to the essential regulatory values of German and European energy and climate policy from an energy policy perspective (including EnWG, EEG, TEHG). They are sensitized to regulatory aspects of energy policy and familiarized with the essential economic and political foundations (natural monopolies, external effects, market failure) and debates. Students will learn the theory of market failure and will be able to identify forms of market failure as well as critically analyze and evaluate policy measures to reduce it. Furthermore, this module discusses design aspects of energy policy and presents regulatory alternatives as well as solutions from other countries. Current energy policy discussions will be addressed and discussed.
3	**Targets** Knowledge: The students know the essential regulatory values of German and European energy and climate policy. They also know the essential theoretical foundations of energy and environmental economics (e.g. Coase theorem, Pigou tax). The students are familiar with current debates on energy policy.

	Skills: Students will be able to recognize, critically question and evaluate interrelationships and changes in energy economic policy. They are able to critically deal with the acquired theoretical models from energy and environmental economics. They are familiar with real political issues and are able to discuss and justify them using economic arguments. Competencies: The students know the special role of the state in a market economy, they thereby recognize the special features of energy regulation and can develop suitable (regulatory) measures to avoid market failure.
4	**Teaching and learning methods** Lecture (L) and Seminar (Sem) Media used: communication media (e.g. electronic learning platform), presentation media (e.g. beamer, whiteboard, flipchart, smartboard, metaplan, visualizer)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours (lectures, student presentations) Self-study: 86 hours (working out the texts as a project)
6	**Form of examination, duration and examination requirements** • Examination in the form of a term paper, possibly in group work. • Preliminary examinations (e.g. MC test) - also in group work - are possible. Preliminary examinations can be graded or ungraded. In the case of graded preliminary examinations, the share of the module grade may not exceed 30%. Preliminary examinations and examinations are announced at the beginning of the course. If preliminary examinations are required, passing the preliminary examination is a prerequisite for participation in the examination. • Students may retake the examinations in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 513 (Introduction to Energy economics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**

11	**Literature** Erdmann/Zweifel: Energieökonomik - Theorie und Anwendungen, Springer. Pollak/Schubert/Slominski: Die Energiepolitik der EU, facultas.wuv. Ströbele/Pfaffenberger: Energiewirtschaft: Einführung in Energie und Politik, Oldenbourg-Verlag. Sturm/Vogt: Umweltökonomik: Eine Anwendungsorientierte Einführung, Physica.

1	**Module name** Working methodology
1.1	**Module abbreviation** 524
1.2	**Type** Mandatory Module
1.3	**Course** Working methodology
1.4	**Semester** Semester 2
1.5	**Module manager** Dr. Grävenstein, Dr. Hooß
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** The module teaches application and science-oriented text production according to recognized standards. The students develop texts related to questions and problems from the energy economics, which meet the requirements of a science-oriented text production (e.g. problem and objective of the elaboration, research method, citation method, structure system). The texts are usually written in groups. In addition, the basics of project economics will be taught. The students will work on science-oriented texts in small project teams and will deal with questions of goal setting and project planning (definition of work packages, milestone planning, development of project structure plans) as well as project organization.
3	**Targets** Knowledge: Students will be able to describe efficient methods of literature research and explain the standards of science-oriented text production. They will also be able to name the essential elements of project economics.

	The students know the challenges of working in a group and can explain the importance of coordinating the activities of the individual persons involved. They are sensitized to the appropriate handling of clients, stakeholders and the various project employees and their different functions and roles in projects. The students are familiar with presentation media and can use them in a targeted manner. Skills: Students are able to independently apply the standards of science-oriented text production to given topics. In doing so, they are able to assess the relevance of publications for the topic area to be worked on, to present the problem, to formulate an objective, to structure the topic and to present it in an understandable, balanced, complete and error-free manner. Students are able to present the results of their text production in a comprehensible and target group-oriented manner. They have the skills to initiate, plan and carry out and control projects. Competencies: Students are able to analyze and evaluate the texts of others with regard to their own research question in order to independently answer a posed scientific problem in a timely manner based on the techniques and principles of scientific work.
4	**Teaching and learning methods** Lecture (L) and Seminar (Sem) Media used: communication media (e.g. electronic learning platform), presentation media (e.g. beamer, whiteboard, flipchart, smartboard, metaplan, visualizer)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP). Attendance time: 64 hours (lecture on project economics and the essential requirements of scientific working methodology, presentation and discussion of the texts) Self-study: 86 hours (working on the texts as a project)
6	**Form of examination, duration and examination requirements** Examination in the form of a term paper, usually as group work. Preliminary examinations (e.g. MC test) - also in group work - are possible. Preliminary examinations can be graded or ungraded. In the case of graded preliminary examinations, the share of the module grade may not exceed 30%. Examinations and preliminary examinations are announced at the beginning of the course. If preliminary examinations are required, passing the preliminary examination is a prerequisite for participation in the examination. Students may retake the examinations in the following semester.
7	**Necessary knowledge** None

8	**Recommended knowledge** Module 513 (Introduction to Energy economics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Theisen: Scientific Work: Technique - Methodology - Form, Vahlen Brink: Anfertigung wissenschaftlicher Arbeiten: Ein prozessorientierter Leitfaden zur Erstellung von Bachelor-, Master- und Diplomarbeiten, Springer Gabler. Heesen: Wissenschaftliches Arbeiten: Methodenwissen für das Bachelor-, Master- und Promotionsstudium, Springer Gabler

1	**Module name** Building physics and energy efficient buildings
1.1	**Module abbreviation** 525
1.2	**Type** Mandatory Module
1.3	**Course** Building physics and energy efficient buildings
1.4	**Semester** Semester 2
1.5	**Module manager** Dr. Brinkmann
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • general physical basics • Thermal insulation (physical fundamentals, steady-state heat transfer through building components, fundamentals of legal requirements for thermal insulation, summer thermal insulation) • Moisture protection (basics, vapor diffusion through building components, condensation, calculation methods) • Sound insulation (sound, measured quantities, propagation, airborne sound attenuation, impact sound attenuation) • Heat storage (short-, long-term storage, conventional/thermochemical storage) • Energy-relevant building materials and components (insulating materials, combination of static and thermal function, designs of highly heat-insulating windows) • Standards of energy-efficient buildings • Exemplary prototypes and special forms of energy-efficient buildings
3	**Targets** Knowledge: The students know • the basic physical concepts relevant to energy. • materials to be used for thermal insulation and their properties.

	• Process of conversion and storage of conventional and renewable energy for heating purposes. • the basics for understanding the current legal regulations. • the properties and interactions of moisture in and with building components. • the physical principles of the propagation and perception of sound. • Fundamentals of measurement technology for determining acoustic properties of components. • the essential quantities of the room acoustics. Skills: Students will be able to, • calculate the required properties of buildings and building components from thermal environmental and demand data. • dimension the corresponding components. • evaluate components dimensioned from a thermal and/or structural point of view with regard to their suitability in terms of moisture technology. • to evaluate components dimensioned from a thermal, static and/or moisture engineering point of view with regard to their acoustic suitability. • calculate acoustic properties of rooms from their component data. Competencies: Students will be able to use the above knowledge and skills to design building components that meet thermal, moisture and sound insulation requirements.
4	**Teaching and learning methods** Lecture (L) Material samples are used and experiments are performed in the lecture. Media used: communication media (e.g. electronic learning platforms), presentation media (blackboard, overhead projector, beamer)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** Examination usually in the form of a written examination (duration: 90 minutes). The examination can be repeated in the following semester. There are no examination requirements or prerequisites.
7	**Necessary knowledge** None
8	**Recommended knowledge**

	Module 514 (Business Mathematics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Bläsi: Building physics, Europe teaching material Lübbe: Klausurtraining Bauphysik, Europa Lehrmittel Bach/Herr/Maier/Mattheus: Technische Physik, Europa Lehrmittel

1	**Module name** Electrical power engineering 2
1.1	**Module abbreviation** 526
1.2	**Type** Mandatory Module
1.3	**Course** Electrical power engineering 2
1.4	**Semester** Semester 2
1.5	**Module manager** Dr. Petry
1.6	**Other teachers** Dr. Jeromin
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** The module introduces AC technology and its application to the calculation of electrical power networks. The following topics are covered in detail: • Alternating current variables, complex pointers • Impedances in the AC circuit • AC networks • Power in the alternating current network • Complex calculation for the analysis of alternating current networks • Power factor correction and losses • Three-phase technology and power transmission • The induction and the transformation
3	**Targets** Knowledge: By successfully completing this module, students will have knowledge of the basic laws of AC and three-phase engineering and will be able to calculate electrical power networks.

	Skills and Competencies: The students are able to comprehend power engineering issues, map them into electrical equivalent circuits and, by applying the laws they have learned, calculate all the necessary quantities and evaluate and classify the results. This also includes analyzing and processing the physical tasks in such a way that the correctly recognized context, the necessary formula apparatus and the mathematical transformations lead to a correct result.
4	**Teaching and Learning Modes:** Lecture (L) and exercise (E) Media used: whiteboard, visualizer, beamer
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements:** Examination performance usually in the form of a written examination. Examination duration: 90 minutes Repeat option according to ABPO
7	**Required Knowledge:** None
8	**Recommended Knowledge:** None
9	**Duration, time structure and frequency of the offer:** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Metz/Naundorf/Schlabbach: Small collection of formulas for electrical engineering Lindner/ Brauer/Lehmann: Pocketbook of electrical engineering and electronics Kories/Schmidt-Walter: Pocketbook of electrical engineering Albach: Fundamentals of Electrical Engineering Heuck/Dettmann: Electrical Power Supply

1	**Module name** Marketing
1.1	**Module abbreviation** 531
1.2	**Type** Mandatory Module
1.3	**Course** Marketing
1.4	**Semester** Semester 3
1.5	**Module manager** Dr. Kopsch
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Relevance of the topic especially in the energy economics • Conceptual introduction as well as characteristics, goals, guiding ideas, perspectives, marketing ethics • Purchasing behavior in consumer goods markets and industrial goods markets • Market research • Marketing conception (analysis, goals, strategies) • Marketing mix (product, price, communication and distribution policy) • Selected other aspects such as international marketing, services marketing, branding implementation and customer relationship management.
3	**Targets** Knowledge Students can ... • name basic marketing terms; • Provide an overview of the different perspectives of marketing; • name important determinants of purchasing behavior; • name basic terms of market research; • name the components of strategic marketing; • an overview of important instruments of product-, price-, distribution-,

	communication policy and customer relationship management; • Provide an overview of selected marketing areas such as international marketing, services marketing, marketing and sales organization; Skills Students can ... • explain basic marketing terms; • Explain the different perspectives of marketing; • Distinguish buying behavior in different markets with a focus on the energy economics; • explain the basic concepts and process of market research and name and critically evaluate important methods and instruments of data collection and evaluation; • explain and critically evaluate selected instruments of strategic analysis and explain important marketing strategies; • evaluate important instruments of product, price, distribution, communication policy and customer relationship management with regard to their relevance for the energy economics; Competencies Students will be able to ... • Provide recommendations for various purchase properties and situations; • Apply selected strategic analysis tools and marketing strategies in simple cases; • transfer the theoretically taught contents to energy economics issues and topics; • Analyze, critically evaluate, and address marketing problems and issues relevant to the energy industry.
4	**Teaching and learning methods** Lecture (L) with integrated exercises (E) Seminar-style lecture with lecture hall exercises and small case studies, self-study. Media used: communication media (including electronic learning platforms), presentation media (including beamer presentations, lecture notes)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination usually in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge**

	None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** Core module of all business administration bachelor's degree programs at Darmstadt University of Applied Sciences. It prepares students for requirements in the practical portions of the program as well as the elective courses.
11	**Literature** Homburg/Krohmer: Marketingmanagement, Strategie - Instrumente - Umsetzung - Unternehmensführung, Gabler. Meffert et al.: Marketing: Grundlagen marktorientierter Unternehmensführung: Konzepte - Instrumente - Praxisbeispiele, Gabler. Kotler et al: Grundlagen des Marketing, Schäffer-Poeschel. Herrmann/Homburg: Marktforschung, Methoden, Anwendungen, Praxisbeispiele, Gabler.

1	**Module name** Investment and financing
1.1	**Module abbreviation** 532
1.2	**Type** Mandatory Module
1.3	**Course** Investment and financing
1.4	**Semester** Semester 3
1.5	**Module manager** Dr. Hensberg
1.6	**Other teachers** Glass
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Planning of individual investments (suggestion, search, decision, implementation, control) • Static investment calculations (e.g. comparative cost calculation, comparative profit calculation, comparative profitability calculation, comparative amortization calculation) • Dynamic investment calculations (e.g. net present value method, internal rate of return method, annuity method) • Utility analysis • Equity financing / debt financing / external financing / internal financing • Introduction to Excel (main elements of the Excel application, data entry, data manipulation, form-matations, charts). • General functions in Excel (e.g. find, sum, round, average, if, sreference) • Specific Excel functions for investment calculation (e.g. NBW, IKV)
3	**Targets** Knowledge: Students will be able to ... • outline the main steps in an investment process • Explain and compare investment appraisal procedures • Describe and structure financing alternatives • explain the Excel interface

	Skills: Students will be able to ... • Review and select investment appraisal methods for their suitability • Perform investment calculations and utility analyses independently • Determine the advantageousness of investment alternatives • Structure and classify types of financing • Enter, format and edit data in Excel • Use Excel functions and create Excel charts Competencies: Students will be able to ... • Visualize and structure investment processes with the help of a flow chart • Solve investment and financing problems and structure and evaluate data with the help of Excel calculations.
4	**Teaching and learning methods** Lecture (L) with integrated exercises (E) in the form of e.g. practical exercises, exercise cases and Excel applications in the computer room. The exercises are partly done in group work. Media used: Projector (PowerPoint presentations), blackboard (blackboard notes as PDF), lab computer, Excel downloads, PDF downloads, Moodle.
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Form of examination: usually written examination (paper form or electronic form; announcement of the exact form in the course). • Duration: 90 minutes • Content: about the entire teaching content of the module. • Time: during the examination period at the end of the module • Possibility to repeat: in the following semester
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 511 (External Accounting) Module 514 (Business Mathematics) Module 522 (Internal Accounting)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.

10	**Usability of the module** In economics-oriented courses of study as a basic module.
11	**Literature** Däumler /Grabe: Grundlagen der Investitions- und Wirtschaftlichkeitsrechnung, NWB. Dittmann/Zschernig: Energiewirtschaft, B.G. Teubner. Götze: Investitionsrechnung, Springer. Konstantin: Praxisbuch Energiewirtschaft, Springer. Microsoft online documentation Olfert/Reichel: Investment, NWB. Olfert/ Reichel: Kompakt-Training Finanzierung, NWB. Schäfer: Unternehmensinvestitionen, Physica. Perridon, Louis / Steiner, Manfred (2012). Finanzwirtschaft der Unternehmung, Vahlen. Prexl, Sebastian: Excel für BWLer, UTB. Schels, Ignatz / Seidel, Uwe M.: Excel im Controlling, Carl Hanser.

1	**Module name** Energy trading
1.1	**Module abbreviation** 533
1.2	**Type** Mandatory Module
1.3	**Course** Energy trading
1.4	**Semester** Semester 3
1.5	**Module manager** Dr. Perlwitz, Dr. Grävenstein
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** A basic overview of the topic of energy trading is to be given. The topic should be developed as close to practice as possible. For this purpose, an information and data provider in the energy sector (e.g. Montel platform) will be used for analyses of prices, trading volumes, load factors as well as weather data and newsflows. Students will use Excel to evaluate derivatives used in energy trading. In addition, students will learn to work independently on current topics and to take a stand on them in case studies and short presentations. In order to establish a link to practice, a visit to a commodity trading floor (e.g. RWE Supply & Trading in Essen or EnBW in Karlsruhe) is planned. The following topics are covered: • Basics of energy trading and its development in Europe: e.g. functioning of trading places, roles/motives, products. • Valuation principles for standard trading products in the spot and futures market as well as derivate/complex products e.g. options, caps, floors, swaps (especially for electricity) • Characteristics of global trade in coal, oil and gas, and trade in emission rights. • Development perspectives for energy trading (e.g. in the context of changes in regulation as well as structural changes due to the energy transition).

3	**Targets** Knowledge: The students know the main energy markets in Europe and can name trading places, players, roles and products. They can explain how energy trading works and describe the problems, challenges and development prospects of the energy markets in their own words. In addition, the students can describe the various standard trading products and derivatives and explain how they work. Skills: The students are able to classify electricity trading products with regard to their mode of operation and to evaluate them without arbitrage using basic methods. They can evaluate and interpret the data provided by information providers in the energy sector for concrete tasks. You will be able to work independently on current topics from the energy trade and prepare the results in writing in a way that is appropriate for the target group and present them in an understandable and plausible manner. Competencies: Students will be able to evaluate the influence of current developments relevant to energy trading and comment on them.
4	**Teaching and learning methods** Lecture (L) with integrated exercises (E) Seminar-style lecture with lecture hall exercises, small case studies, presentations, independent study. Media used: communication media (e.g. electronic learning platforms), presentation media (e.g. video projector, visualizer, whiteboard)
5	Total workload of 150 hours for 5 credit points (CP) Attendance times: 64 hours (incl. times for group work) Self-study: 86 hours (wrap-up of lecture, processing of exercises, exam preparation)
6	• Examination performance usually in the form of a written examination. • With regard to the duration of the examination, § 12 ABPO applies. • Other forms of examination (e.g. homework, presentations), which usually supplement the written examination, are possible. Preliminary examinations (e.g. working on exercises) - also in group work - are also possible. Preliminary examinations may be graded or ungraded. In the case of graded preliminary examinations, the share of the module grade may not exceed 30%. Preliminary examinations and examinations are announced at the beginning of the course. If preliminary examinations are required, passing the preliminary examination is a prerequisite for participation in the examination. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 513 (Introduction to Energy economics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.

10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Bergschneider/Karasz/Schumacher: Risk Management in Energy Trading, Schäffer-Poeschel. Borchert/Schemm/Korth: Stromhandel, Schäffer-Poeschel. Burger/Gräber/Schindlmayr: Managing Energy Risk, Wiley & Sons. Hirth: Risikomanagement und Kapitalmarkt, Callsen-Bracker Verlag. Hull: Options, Futures and other Derivatives, Pearson. Konstantin: Praxishandbuch Energiewirtschaft, Springer.

1	**Module name** Quantitative methods of energy economics
1.1	**Module abbreviation** 534
1.2	**Type** Mandatory Module
1.3	**Course** Quantitative methods of energy economics
1.4	**Semester** Semester 3
1.5	**Module manager** Puth
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Introduction • Subject of the statistics • Basic terms • Data mining • Statistics with Excel Descriptive statistics • Univariate data analysis • Bivariate data analysis • Forecasting method • Index figures Probability • Combinatorics • Probabilities • Random variables • Special distributions Inductive statistics • Sampling theory • Estimation methodology

	• Test procedure Applied statistics in the energy economics • Analysis techniques • Forecasting models
3	**Targets** Knowledge: Students know the basic methods of descriptive and inductive statistics and can explain these methods and their significance for the energy economics. Skills: Students will be able to present data in tabular or graphical form and select and calculate appropriate measures and procedures to characterize empirical data. Competencies: Students will be able to independently perform and evaluate data analyses using Excel.
4	**Teaching and learning methods** Lecture (L) Media used: beamer, visualizer, whiteboard
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 514 (Business Mathematics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.

10	**Usability of the module**
11	**Literature** Anderson/Sweeny/Williams/Camm/Cochran: Statistics for Business & Economics, Cengage Learning. Bleymüller/Weißbach: Statistik für Wirtschaftswissenschaftler, Vahlen. Fahrmeir/Heumann/Künstler/Pigeot/Tutz: Statistics, Springer. Meißner/Wendler: Statistik-Praktikum mit Excel, Springer. Schira: Statistical Methods in Economics and Business Administration, Pearson. Serletis: Quantitative and Empirical Analysis of Energy Markets, World Scientific.

1	**Module name** Power plant technology
1.1	**Module abbreviation** 535
1.2	**Type** Mandatory Module
1.3	**Course** Power plant technology
1.4	**Semester** Semester 3
1.5	**Module manager** Dr. Schetter
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Steam and its real behavior • Steam power plants: model process, real state changes, process improvements. • Gas turbine plants: model process, real condition changes, process improvements. • Combined cycle power plants, GUD plants • Combined heat and power, combined heat and power plants
3	**Targets** Knowledge: Students will have an in-depth understanding of the circuitry, function, technology, and thermodynamics of modern thermal power plants. They have a precise knowledge of the current state of the art in the field of energetic plants and their components. In addition, there is good knowledge of the current limiting effects and the status of further development.

	Skills: The students are able to perform global and component-oriented calculations on power, efficiency and energy conversion at the most important types of thermal power plants. This is done with the help of realistic descriptions that enable reliable technical and economic statements. Competencies: Students will be able to competently plan and independently conduct analytical, modeling, and experimental investigations of thermal energy conversion systems. They are able to critically evaluate existing or measured data of corresponding plants or their components in a comparative way. They will also be able to assess energy-related equipment and evaluate its position in relation to current technical and scientific limits.
4	**Teaching and learning methods** Lecture (L) and laboratory practical course (LP) Media used: blackboard, overhead projector, beamer; illustrative material; laboratory with experimental equipment
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Preliminary examination in the form of graded lab reports on the lab sessions. • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • The exam can be repeated in the following year. • The exam can be repeated in the following semester. • Prerequisite for participation in the examination is the passing of the preliminary examination. • The preliminary examination is ungraded.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 515 (Heat and Power Engineering) Modules 516/526 (Electrical Power Engineering)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.

10	**Usability of the module**
11	**Literature** Cerbe/Wilhelms: Technical Thermodynamics, Hanser Baehr/Kabelac: Themodynamics, Springer Zahoransky: Energy Technology, Vieweg Strauß: Power Plant Technology, Springer

1	**Module name** Regenerative energies
1.1	**Module abbreviation** 536
1.2	**Type** Mandatory Module
1.3	**Course** Regenerative energies
1.4	**Semester** Semester 3
1.5	**Module manager** Dr. Petry
1.6	**Other teachers** Dr. Jeromin
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** The module deals with the potentials of the most important renewable energies (geothermal energy, solar energy, wind energy, hydropower, biomass) and their environmental impact, also in comparison with fossil and nuclear energy sources. The utilization techniques are elaborated, the currently achieved uses are discussed and an outlook into the future is given. Energy yield and economic efficiency calculations are carried out for selected applications and compared with the cost calculations of conventional power plants.
3	**Targets** Knowledge: By successfully completing this module, students have knowledge of the potentials of and techniques for using regenerative energy sources, they are aware of their importance against the background of the finite nature of fossil energy resources and their impact on the environment and climate. Skills and Competencies: The students are able to calculate the potential of regenerative energies at different locations on earth. Based on this, they can design and economically evaluate a regenerative energy generation plant.

	Students recognize the close interconnection between scientific theory, real-world application, and environmental and climate impacts.
4	**Teaching and Learning Modes:** Lecture (L) Media used: whiteboard, visualizer, beamer
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements:** Examination performance usually in the form of a written examination. Examination duration: 90 minutes Repeat option according to ABPO
7	**Required Knowledge:** None
8	**Recommended Knowledge:** None
9	**Duration, time structure and frequency of the offer:** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** The module can be used in all technical and environmental protection-oriented courses.
11	**Literature** Quaschning: Regenerative Energy Systems, Carl Hanser Verlag

1	**Module name** Management and organization
1.1	**Module abbreviation** 541
1.2	**Type** Mandatory Module
1.3	**Course** Management and organization
1.4	**Semester** Semester 4
1.5	**Module manager** Dr. Kopsch
1.6	**Other teachers** Dr. Nettelbeck, Dr. Stork, Dr. Seibert
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Basic concepts of management and organization • Decision making and decision methods • Concepts and methods of strategic, normative and operational management. • Organizational forms of companies • Organizational design and change management • Business process management and continuous improvement processes • Recent organizational and management concepts • People management (motivation and leadership styles) and personnel
3	**Targets** Knowledge Students will be able to ... • provide an overview of the concept, tasks and sub-areas of management and organization as well as their basic conceptual approaches; • Provide an overview of characteristics of entrepreneurial decision making. • provide an overview of selected models and methods of operational, strategic and normative corporate management (e.g. portfolio analysis, product-market and competitive strategies, corporate mission statement, balanced scorecard, MbO)

	• give an overview of simple concepts of people management as well as tasks of personnel management (especially motivation theories and leadership style models); • name different (also newer) forms of organizational structure in companies • Provide an overview of simple concepts of organizational change (change management). Skills Students can ... • explain simple systematic methods of decision making (esp. systematic problem solving process, utility analysis, uncertainty/risk calculus) • explain and critically evaluate the basic model and selected methods of operational, strategic and normative corporate management (e.g. portfolio analysis, product-market and competitive strategies, corporate mission statement, balanced scorecard, MbO). • describe the various (also newer) forms of organizational structure in companies and explain their respective advantages and disadvantages (esp. functional and divisional organization, matrix organization, group organization, virtual and network organizations); • Explain procedures and methods for the analysis and presentation of organizational and procedural issues. • explain selected concepts and methods for process improvement Competencies Students will be able to ... • apply simple systematic methods of decision making to simple problems; • apply the basic model and selected methods of operational, strategic and normative corporate management to simple problems; • Apply selected process improvement concepts and methods to simple problems; • Link current events and developments in business and the economy to knowledge content.
4	**Teaching and learning methods** Lecture (L) with integrated exercises (E) Seminar-style lecture with lecture hall exercises and small case studies, self-study Media used: communication media (including electronic learning platforms), presentation media (including beamer presentations, lecture notes)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination usually in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • The exam can be repeated in the following semester.

7	**Necessary knowledge** None
8	**Recommended knowledge** None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** Core module of all business administration bachelor's degree programs at Darmstadt University of Applied Sciences. It prepares students for the requirements of the practical parts of the program and the elective courses.
11	**Literature** Schreyögg/Koch: Grundlagen des Managements - Basiswissen für Studium und Praxis, SpringerGabler Dillerup/Stoi: Unternehmensführung, Vahlen. Hungenberg/Wulf: Grundlagen der Unternehmensführung, Einführung für Bachelorstudierende, SpringerGabler. Thommen/Achleitner: Allgemeine Betriebswirtschaftslehre: Umfassende Einführung aus managementorientierter Sicht, Gabler (chapter Management and chapter Organization). Breisig: Betriebliche Organisation: Organisatorische Grundlagen und Managementkonzepte, nwb. Klimmer: Unternehmensorganisation: Eine kompakte und praxisnahe Einführung, nwb. Vahs: Organisation - Einführung in die Organisationstheorie und -praxis, Schaeffer-Poeschel.

1	**Module name** Business English for Energy economics (B2)
1.1	**Module abbreviation** 542
1.2	**Type** Mandatory Module
1.3	**Course** Business English for Energy economics (B2)
1.4	**Semester** Semester 4
1.5	**Module manager** Dr. d'Aquino Hilt, Stammnitz-Kim
1.6	**Other teachers** Lecturers of the Language Center
1.7	**Degree level** Bachelor
1.8	**Teaching language** English
2	**Content** This is a university-specific English course with 4 SWS (5 CP). The ability to communicate in English and in an interculturally sensitive manner, to understand documents and to write texts in the working world is now considered a key qualification in the globalized working environment. The aim of this module is for students - in addition to developing efficiency in typical professional forms of communication such as telephone calls and meetings and forming a differentiated picture of intercultural differences - to be able to accept and pass on most English messages that arise during a normal working day and to respond spontaneously to such messages. In addition, they should be able to understand and write complex business correspondence, reports and product descriptions as well as handle all routine inquiries regarding goods and services, actively participate in discussions and present arguments. This corresponds to level B2 in the area of "occupation" (Common European Framework of Reference/GER).
3	**Targets** All knowledge, skills and competencies relate to the use of English as a target language. Upon completion of the module, students will have acquired the following knowledge and skills:

	Knowledge: • Students are familiar with even difficult grammar topics that cover the most important aspects of the work environment • Students master extended technical vocabulary • Students can express and deepen their expertise in the target language Skills: • In work-related contexts (e.g., in group discussions, telephone conversations, negotiations, presentations, conversation), students communicate fluently and participate actively and spontaneously in discussions, including with native speakers. • Students can write sophisticated texts on specialized topics (reports, summaries, etc.) as well as sophisticated business correspondence (letters, emails), minutes of meetings, detailed notes of conversations, etc. and prepare effective presentation materials. • Students can also understand details of complex listening texts on general and job-related topics, e.g. reports, presentations, etc. • Students independently understand sophisticated texts such as technical articles and analyses as well as many types of business correspondence Competencies: • Students can analyze the intercultural aspects of job-related situations in a differentiated manner and adapt to them spontaneously • Students can analyze and interpret complex graphics • Students are able to summarize and critically engage with challenging technical texts and articles, both orally and in writing. • Students actively provide feedback to each other in group activities and presentations and are able to discuss and independently solve subject-related problems in groups
4	**Teaching and learning methods** The lessons take place in the form of an exercise (E). Learning forms: Project work, group and partner work, presentations, role plays, communicative activities, etc. Media used: blackboard, beamer, sound system, course book, worksheets, online learning platform, etc.
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: approx. 52 hours Self-study: approx. 98 hours
6	**Form of examination, duration and examination requirements** • Preliminary examination in the form of active participation in the processing of oral exercises in the classroom and texts and homework to be completed at home (30% of the total grade). • Preliminary examination in the form of a presentation (20% of the final grade) • Examination in the form of a 90-minute written exam (50% of the total grade) • The exam can be repeated in the following semester.

	• Prerequisite for the acquisition of the module grade or for the participation in the examination is the attendance of at least 75% of the classroom sessions. • Any deviations in the type and evaluation of individual examinations or examinations will be communicated at the beginning of each semester in class or via Moodle.
7	**Necessary knowledge** None
8	**Recommended knowledge** At least 7 years of school English or general English knowledge at the level B2 (CEFR) and at least sufficient technical English knowledge or English knowledge in the field of "profession" at the level B1 (CEFR).
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**
11	**Literature** Textbooks from the field of Business English and English for the Energy Industry, e.g.: Frendo/Bonamy: English for Oil & Gas 2; Pearson, Harlow 2012 Naunton/Poh: Oxford English for Careers: Oil and Gas 2; Oxford University Press, Oxford 2011 Campbell: English for the Energy Industry; Cornelsen, Berlin 2008 Levrai: English for the Energy Industries: Oil, Gas and Petrochemicals; Garnet Education, Reading 2006 Dummett: Energy English; Heinle/Langenscheidt, Hampshire 2010 Glendinning / Lansford / Pohl: Oxford English for Careers: Technology for Engineering & Applied Sciences; Oxford University Press, Oxford 2013 In addition, current technical texts from journals, official publications and online sources are included.

1	**Module name** Practice project 1
1.1	**Module abbreviation** 547
1.2	**Type** Mandatory Module
1.3	**Course** Practice project 1
1.4	**Semester** Semester 4
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers**
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Working on a basic energy economics issue depending on the supervising company. During the project, students should grasp the company-specific manifestations of the content presented in the corresponding modules in the previous semesters and become familiar with the corresponding practical solutions. They should be able to deepen the contents learned in the university education and transfer them to practical problems in the companies. Students should develop their ability to think analytically and critically and constructively and become familiar with working and problem-solving techniques. They should gain insight into the company and operational processes and develop an understanding of operational interrelationships. They should be able to orient themselves in the company and work constructively and supportively in work teams.
3	**Targets** Knowledge: Students will be able to, • describe the service production and utilization process of the organization in which the practical activity was carried out, • classify the department or organizational area in which the practical activity was carried out,

	• Describe the mission of the department or organizational area in which the practical activity was performed; and • Describe the activities performed in the department by the student. Skills: Students are able to apply the relevant knowledge, skills and competences acquired during their studies to practical problems. They are able to classify the processes found in practice in the current state of science. Competencies: Students will be able to critically examine and evaluate the processes found in practice based on the current state of science.
4	**Teaching and learning methods** Depending on the respective topic
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) for carrying out the practical activities and for processing and presenting the results.
6	**Form of examination, duration and examination requirements** • Project work, scope to be determined in consultation with the university supervisor, 80% of the total grade. • Presentation including discussion: approx. 30 minutes, 20% of the total grade • Please also refer to the Practical Projects Guide, which is available on the website. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 524 (Work Methodology)
9	**Duration, time structure and frequency of the offer** The module covers one semester or 4 weeks with a total duration of 150 hours. The module is offered once per semester.
10	**Usability of the module** The module can be used for the study program form "Dual Study Model".
11	**Literature** Depending on the topic

1	**Module name** Fundamentals of energy economic modeling
1.1	**Module abbreviation** 543
1.2	**Type** Mandatory Module
1.3	**Course** Fundamentals of energy economic modeling
1.4	**Semester** Semester 4
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Modeling • Simple linear optimization/programming • Simplex algorithm and interpretation • Dual simplex algorithm • Graph Theory • Minimal paths and minimal exciting trees • Linear problems of special structure, transport, assignment and reloading problem • Network planning technique
3	**Targets** Knowledge: Students will be able to explain modeling concepts for complex linear problems in operational decision-making situations - e.g. production decisions or investment decisions. They can name the prerequisites for the application of the models and know the essential terms of operations research.

	Skills: Students will be able to select suitable operations research methods for solving a given problem, apply them and thus successfully transfer the theoretical knowledge of relevant methods into practice. They can express themselves in the language of Operations Research. Competencies: The students are able to model complex business and technical planning problems, even if they are still unknown to them, to analyze them with the methods of operations research and to develop solutions as well as to interpret and critically evaluate the results.
4	**Teaching and learning methods** Lecture (L) with integrated exercises (E) In the exercises, the contents taught in the lecture will be deepened by means of exercises. In doing so, attention is paid to the application of the theoretically learned concepts on the part of the students. The exercises are partly worked on in small groups. Media used: communication media (e.g. electronic learning platforms), presentation media (e.g. beamer, visualizer, whiteboard)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance times: 64 hours (incl. times for group work) Self-study: 86 hours (wrap-up of lecture, work on exercises, exam preparation)
6	**Form of examination, duration and examination requirements** • Examination performance usually in the form of a written examination. • With regard to the duration of the examination, § 12 ABPO applies. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 514 (Business Mathematics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**

11	**Literature** Domschke/Drexl: Introduction to Operations Research, Springer Gohout: Operations Research, Oldenbourg Nickel/Stein/Waldmann: Operations Research, Springer Werners: Grundlagen des Operations Research, Springer

1	**Module name** Fundamentals of Energy and Business Law
1.1	**Module abbreviation** 544
1.2	**Type** Mandatory Module
1.3	**Course** Fundamentals of Energy and Business Law
1.4	**Semester** Semester 4
1.5	**Module manager** Dr. Hahn, Dr. Schulz
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Legal foundations of grid-based energy supply • International energy law (esp. WTO, UNCLOS) • European primary and secondary law (esp. Art. 194 TFEU, internal energy market "package") • National law Core areas of the Energy economics Act • Energy supply company • Unbundling • Network access and use • Basic supply • Metering and metrology • Concession law • Regulators

	Law of energy supply contracts • Conclusion of contract • Contract types • General terms and conditions • Price control law • Performance failures and liability • Termination • Consumer complaints and arbitration board Main features of the Renewable Energy Sources Act Main features of energy antitrust law Methodology of the application of law
3	**Targets** Knowledge: Students will be familiar with the major regulations that apply. Skills: They are able to survey the essential international, Union and national legal bases of grid-based energy, to apply the general jurisprudential methods to selected problems and case scenarios of energy law and to arrive at jurisprudentially correct solutions. Competencies: Students will be able to work independently on further developments in energy law and subject them to critical reflection.
4	**Teaching and learning methods** Lecture (L), Exercise (E), Media used: (e.g. beamer, visualizer, blackboard, electronic learning platform)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination in the form of a written exam (duration: 120 min) on the entire course content of the module at the end of the module. • Students have the opportunity to repeat the preliminary and final examinations in the following semester.

7	**Necessary knowledge** None
8	**Recommended knowledge** None
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Current textbooks: Klees, Introduction to Energy Law Pritzsche/Vacha, Energy Law Kühling/Rasbach/Busch, Energy Law Mitto: Energy law For more in-depth: Schneider/Theobald: Law of the Energy Industry FERNER: Current collections of regulations such as "Beck-Texte im dtv: Energierecht

1	**Module name** Building services engineering and technical environmental protection
1.1	**Module abbreviation** 545
1.2	**Type** Mandatory Module
1.3	**Course** Building services engineering and technical environmental protection
1.4	**Semester** Semester 4
1.5	**Module manager** Dr. Brinkmann, Dr. Wachs
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Contents from the area of heating/air conditioning/ventilation are: • Basic physical concepts of heat and heat transport • Basics of humidity (room climatic) • Thermal physiology • Heat demand • Energy source • Renewable energy sources for heating buildings (solar thermal energy, renewable energy sources, geothermal energy, heat pumps) • Heating systems • Heat generation from renewable and conventional sources • Heat distribution, heat output to the room • Regulation • Operating principle of the heat pump • Basics of ventilation technology • Airflow in the room • Residential and office ventilation • Ventilation and energy

	Contents from the field of technical environmental protection are: • Chemical basics (focus: air purification and environmental toxins) • Basic concepts of environmental protection (emission, immission, transmission, contamination, persistence etc.) • Air pollution control (dust removal techniques, flue gas desulfurization, flue gas denitrification) • Keeping water clean (water pollutants and polluters, wastewater treatment, functioning of wastewater treatment plants) • Waste treatment (waste quantities and composition, waste treatment and waste recovery, problems of recycling, waste incineration). • Current issues (acid rain, smog, nuclear power and final disposal, emissions from motor vehicle traffic, etc.)
3	**Targets** Knowledge: Students will be able to describe the thermodynamic principles of heat transport, heat demand, and the various methods of generating heat from renewable sources. They are familiar with the familiar with the concept of room humidity and know the room air ducting in living and office areas. The students know the scientific basics of the ecological aspects of the energy economy. They are familiar with the resulting interaction between man and the environment. Hazard potential in the areas of air, water, waste familiar. Skills and Competencies: The students are able to analyze general questions from building technology and environmental protection and to develop appropriate solutions.
4	**Teaching and learning methods** Lecture (L) Material samples are used and experiments are performed in the lecture. Media used: communication media (e.g. electronic learning platforms), presentation media (table, overhead projector, beamer)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours Equal parts for building technology and technical environmental protection.
6	**Form of examination, duration and examination requirements** Examination performance usually in the form of two written examinations of 45 minutes each. Both exams must be passed individually to pass the module. Participation in the two written examinations in different semesters is possible. The examination can be repeated in the following semester. There are no examination requirements or prerequisites.

	The overall evaluation of the module is calculated from the average of the results of the two examinations.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 516 (Electrical Power Engineering 1) Module 525 (Building Physics and Energy Efficient Buildings) Module 535 (Technology of Energy Systems)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 2x2 SWS and is offered once a year.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Heintz/Reinhardt: Chemie und Umwelt, Vieweg Schwister: Taschenbuch der Umwelttechnik, Hanser Bronder: Technical Environmental Protection: A Guide for Scientists and Engineers, Spektrum Verlag

1	**Module name** Energy measurement technology, control technology and operation of power grids
1.1	**Module abbreviation** 546
1.2	**Type** Mandatory Module
1.3	**Course** Energy measurement technology, control technology and operation of power grids
1.4	**Semester** Semester 4
1.5	**Module manager** Dr. Graf
1.6	**Other teachers** Anthes
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Structure of power supply networks, voltage levels, transmission, distribution • Network control technology, control systems and training simulator, visualization, operating concepts • Switchgear, switch types, switch operation, interlocking tests, topological coloring. • Operational switching tasks, safety rules, work markings, tracking operation • Operational measured values, power balances, power flows, measured values in process images • Lines and transformers, component behavior, system behavior, network losses • Voltage stability, voltage reactive power control, reactive power compensation • Transformer voltage regulation, parallel operation of transformers • Frequency maintenance: power-frequency control, interconnected operation, step plan • Mains faults and protection, n-1 principle, neutral point treatment, analysis of mains disturbances
3	**Targets** Knowledge: Structure and mode of operation of the components of today's electrical power supply and their interaction in the system context. Requirements, functions and structure of network control systems.

	Skills: Understand basic tasks and problems of electrical network management. Carry out elementary operational management tasks. Competencies: Perform calculations on relevant topics. Plan switching operations in the correct sequence. Interpret the significance of operational measured values and understand their system relevance. Consolidation of the skills from the subject Fundamentals of Electrical Power Engineering 1+2.
4	**Teaching and learning methods** Lecture (L), exercise (E) and laboratory practical course (LP) Media used: communication media (e.g. electronic learning platform), presentation media (pen display, beamer, whiteboard), network training system
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours (lecture, laboratory exercises) Self-study: 86 hours (laboratory preparation and follow-up, laboratory report)
6	**Form of examination, duration and examination requirements** • Preliminary examination (laboratory participation and laboratory report) • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • Possibilities to repeat the preliminary examinations and examinations exist in the following semester. • Prerequisite for participation in the examination is the passing of the preliminary examination. • The share of the preliminary examination performance in the module grade is a maximum of 20%.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 516 (Electrical Power Engineering 1) Module 526 (Electrical Power Engineering 2)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**

11	**Literature**
	Heuck/Dettmann/Schulz: Elektrische Energieversorgung, Springer Vieweg.
	Schlabbach/Metz: Netzsystemtechnik, VDE Verlag.

1	**Module name** Energy economics elective module
1.1	**Module abbreviation** 551, 561, 562
1.2	**Type** Optional Module
1.3	**Course** Energy economics elective module
1.4	**Semester** Semester 5 and 6
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** See separate module descriptions for elective modules.
1.7	**Degree level** Bachelor
1.8	**Teaching language** German or English
2	**Content** See separate module descriptions for elective modules.
3	**Targets** See separate module descriptions for elective modules.
4	**Teaching and learning methods** See separate module descriptions for elective modules.
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** See separate module descriptions for elective modules.

	Requirements for the participation in the module and the examination result from § 7 Abs. 3 BBPO.
7	**Necessary knowledge** See separate module descriptions for elective modules. Requirements for the participation in the module and the examination result from § 7 Abs. 3 BBPO.
8	**Recommended knowledge** See separate module descriptions for elective modules.
9	**Duration, time structure and frequency of the offer** See separate module descriptions for elective modules.
10	**Usability of the module** See separate module descriptions for elective modules.
11	**Literature** See separate module descriptions for elective modules.

1	**Module name** Energy economics
1.1	**Module abbreviation** 552
1.2	**Type** Mandatory Module
1.3	**Course** Energy economics
1.4	**Semester** Semester 5
1.5	**Module manager** Dr. Herold
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** professional: • Economic, technical and political background • Collection, balancing and evaluation of energy data • Energetic site assessment, benchmarking • Ecological effects of energy use, life cycle assessments • Legal framework • Management processes, energy economics systems and certifications • Selected specialist functions of energy economics • Operational energy procurement • Special features of municipal energy management supra-disciplinary: • Project management basics • Giving presentations • Writing Management Summaries

3	**Targets** Knowledge: Students will be able to present the basics of corporate and municipal energy economics and explain the procedures of energy economics processes. Skills: Students will be able to discuss and evaluate practical issues and case studies in energy economics. Competencies: Students will be able to analyze energy economics problems properly, develop solutions independently and present them. They are able to question solution approaches with regard to economic, legal and political framework conditions.
4	**Teaching and Learning Modes:** Lecture (L), Project (Pro) in group work Media used: whiteboard, beamer
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours

6	**Form of examination, duration and examination requirements**
	
	• Examination Credits:
	  ○ Presentation of the independently developed results of the (group) project (details will be discussed at the beginning of the event) and
	  ○ Written exam (duration: 90 min) on the entire course content of the module at the end of the module.
	• Both examination performances must be passed individually and each count for 50 percent of the grade.
	• The exam can be repeated in the following semester.

7	**Necessary knowledge** See § 7 para. 3 BBPO.
8	**Recommended knowledge** Module 513 (Introduction to Energy Economics) Module 521 (Fundamentals of Economics) Module 522 (Internal Accounting) Module 531 (Marketing)

9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Textbooks on energy management and energy efficiency, e.g. • Geilhausen et al.: Energy Management, Springer Vieweg • Kals: Operational Energy Management, Kohlhammer o Pehnt (Ed.): Energy Efficiency, Springer • Relevant laws, regulations and directives (Ecodesign Directive, Energy Saving Ordinance, etc.) • Current articles in professional journals

1	**Module name** Digitization of the energy economics
1.1	**Module abbreviation** 553
1.2	**Type** Mandatory Module
1.3	**Course** Digitization of the energy economics
1.4	**Semester** Semester 5
1.5	**Module manager** Dr. Hooß
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** The students learn how energy suppliers deal with the digitalization of the energy industry, which strategies they pursue and which solution options are open to them. They learn in a practical way what the digitalization of the energy industry means and which drivers are decisive. Project management is of particular importance for digital innovations, which is why students are introduced to iterative and agile methods (design thinking, scrum, canvas, etc.). In this module, students are shown IT-supported and process-oriented approaches to operational processes in energy utilities. Selected processes are evaluated in the context of this module, using them as examples to highlight IT support in energy utilities. For this purpose, relevant application programs are presented and the processes are developed in compliance with regulatory requirements. Furthermore, the students are introduced to the necessity of data analyses with the help of application examples and they learn the basics and necessity of the topics of data protection and IT security in the energy supplier environment.

3	**Targets** Knowledge: The students are familiar with relevant IT programs in the energy sector, they understand the basic procedure for IT projects in the energy environment and they know the essential strategies of the utilities in dealing with digitalization (including know-how development, platforms, outsourcing). They know the basics of market communication, data protection and IT security as well as the essential industry standards and association agreements. Skills: The students are able to apply selected project management methods and to comprehend and understand regulatory requirements in terms of processes. Competencies: The promotion of factual and methodological competence takes place through the development of interdisciplinary contexts. The selected teaching and learning forms encourage students to engage in critical discussion. Social competence is promoted during the exercises (e.g. group work).
4	**Teaching and learning methods** Lecture (L) and Seminar (Sem) Media used: communication media (e.g. electronic learning platform), presentation media (e.g. beamer, whiteboard, flipchart, smartboard, metaplan, visualizer)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours (lectures, student presentations) Self-study: 86 hours (development of a project)
6	**Form of examination, duration and examination requirements** • Examination in the form of an examination paper according to §13 (2) ABPO. Group work is generally possible; the results are to be presented in a lecture. • Students may retake the examinations in the following semester.
7	**Necessary knowledge** See § 7 para. 3 BBPO.
8	**Recommended knowledge** Module 513 (Introduction to Energy Management) Module 544 (Fundamentals of Energy and Business Law)

9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**
11	**Literature** Doleski: Utility 4.0: Transformation vom Versorgungs- zum digitalen Energiedienstleistungsunternehmen, Springer Vieweg. Köhler-Schute (ed.): Die Digitalisierung der Energiewirtschaft; Transformation und Organisation, Technologien und Prozessoptimierung, Innovative Geschäftsmodelle. KS-Energy-Verlag.

1	**Module name** Energy-relevant environmental and planning law
1.1	**Module abbreviation** 554
1.2	**Type** Mandatory Module
1.3	**Course** Energy-relevant environmental and planning law
1.4	**Semester** 5
1.5	**Module manager** Dr. Führ
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Goals and structures of energy and environmental law • Environmental administrative law: requirements of the state • Plant-related law • Water law • Recycling and waste management law • EC Environmental Law • Energy-related planning law • Environmental private law: liability for environmental damage • Environmental criminal law: What is at stake before the criminal court? • Contribution of environmental law to sustainable development?
3	**Targets** Knowledge: The students know the essential basics of energy-relevant environmental and planning law, including its European and international references.

	Skills: They are able to independently solve simple case scenarios using the legal principles according to the legal subsumption scheme and to develop recommendations for action on this basis. Students will recognize the connections between legal regulations and economic maxims and constraints on action.
4	**Teaching and learning methods** Lecture (L) Media used: communication media (e.g. electronic learning platform), presentation media (e.g. beamer, whiteboard)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** • Examination in the form of a written exam on the entire course content of the module at the end of the module. • The exam can be repeated in the following semester.
7	**Necessary knowledge** See § 7 para. 3 BBPO.
8	**Recommended knowledge** Module 544 (Fundamentals of Energy and Business Law)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**
11	**Literature** Guidelines, laws and regulations of energy law, for example the editions of the Deutscher Taschenbuchverlag (dtv). Relevant textbooks on environmental and planning law; recent articles in professional journals.

1	**Module name** Power engineering elective module
1.1	**Module abbreviation** 555, 565, 566
1.2	**Type** Optional Module
1.3	**Course** Power engineering elective module
1.4	**Semester** Semester 5 and 6
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** See separate module descriptions for elective modules.
1.7	**Degree level** Bachelor
1.8	**Teaching language** German or English
2	**Content** See separate module descriptions for elective modules.
3	**Targets** See separate module descriptions for elective modules.
4	**Teaching and learning methods** See separate module descriptions for elective modules.
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours Self-study: 86 hours
6	**Form of examination, duration and examination requirements** See separate module descriptions for elective modules.

	Requirements for the participation in the module and the examination result from § 7 Abs. 3 BBPO.
7	**Necessary knowledge** See separate module descriptions for elective modules. Requirements for the participation in the module and the examination result from § 7 Abs. 3 BBPO.
8	**Recommended knowledge** See separate module descriptions for elective modules.
9	**Duration, time structure and frequency of the offer** See separate module descriptions for elective modules.
10	**Usability of the module** See separate module descriptions for elective modules.
11	**Literature** See separate module descriptions for elective modules.

1	**Module name** Practice project 2
1.1	**Module abbreviation** 557
1.2	**Type** Mandatory Module
1.3	**Course** Practice project 2
1.4	**Semester** Semester 5
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** All teachers at the department of economics
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Working on a basic energy engineering problem depending on the supervising company. During the project, students should grasp company-specific manifestations of the content presented in the corresponding modules in the preceding semesters and become familiar with the corresponding practical solutions. They should be able to deepen the contents learned in the university education and transfer them to practical problems in the companies. Students should develop their ability to think analytically and critically and constructively, and become familiar with work and problem-solving techniques. They should gain an insight into the company and operational processes and develop an understanding of operational interrelationships. They should be able to orient themselves in the company and work constructively and supportively in work teams.
3	**Targets** Knowledge: Students will be able to, • describe the service production and utilization process of the organization in which the practical activity was carried out, • classify the department or organizational area in which the practical activity was carried out,

	• Describe the mission of the department or organizational area in which the practical activity was performed; and • Describe the activities performed in the department by the student. Skills: Students are able to apply the relevant knowledge, skills and competences acquired during their studies to practical problems. They are able to classify the processes found in practice in the current state of science. Competencies: Students will be able to critically examine and evaluate the processes found in practice based on the current state of science.
4	**Teaching and learning methods** Depending on the respective topic
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) for carrying out the practical activities and for processing and presenting the results.
6	**Form of examination, duration and examination requirements** • Project work, scope to be determined in consultation with the university supervisor, 80% of the total grade. • Presentation including discussion: approx. 30 minutes, 20% of the total grade • Please also refer to the Practical Projects Guide, which is available on the website. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 524 (Work Methodology)
9	**Duration, time structure and frequency of the offer** The module covers one semester or 4 weeks with a total duration of 150 hours. The module is offered once per semester.
10	**Usability of the module** The module can be used for the study program form "Dual Study Model".
11	**Literature** Depending on the topic

1	**Module name** Transformation of the energy supply (smart grids)
1.1	**Module abbreviation** 556
1.2	**Type** Mandatory Module
1.3	**Course** Transformation of the energy supply (smart grids)
1.4	**Semester** Semester 5
1.5	**Module manager** Dr. Graf
1.6	**Other teachers** Anthes
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Challenges, opportunities, drivers, political requirements, approaches to solutions • Smart Grid research projects (E-DeMa, SoEasy, SolVer, Flex4Energy), research funding • Development of the share of renewable energy generation: installed capacity, annual energy • Energy data, energy estimates, work, power, energy density • Forecasting tasks, data analysis and solution approaches: Consumption, generation, price sensitivity • Energy storage: properties, storage applications, dimensioning, storage management • Virtual power plants, load management, demand response, electric vehicles as buffer storage • Smart meter applications, energy transparency, energy market solutions, trading platforms • Innovative electricity tariffs, incentive models, prosumers, user acceptance, system requirements. • Distribution grid automation, distribution grid applications, voltage maintenance in the low-voltage grid • Network Development Plan, Transmission Capacity Increase, Flexible AC Transmission Systems. • MicroGrids, stand-alone power supply • (Crisis Management)

3	**Targets** Knowledge: Overview of the topics, challenges and discussed solutions for future energy supply systems based on renewable resources. Characteristics of the different energy sources and storage technologies. Skills: Understand, classify and evaluate proposed solutions and components of future energy supply concepts. Competently discuss and explain energy concepts. Competencies: Perform calculations on relevant topics, analyze and calculate storage management concepts, calculate innovative tariffs and tariff optimizations.
4	**Teaching and learning methods** Lecture (L), exercise (E) and laboratory practical course (LP) Media used: communication media (e.g. electronic learning platform), presentation media (pen display, beamer, whiteboard), network training simulator
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours (lecture, laboratory exercises) Self-study: 86 hours (laboratory preparation and follow-up, laboratory report)
6	**Form of examination, duration and examination requirements** • Preliminary examination (laboratory participation and laboratory report) • Examination in the form of a written exam (duration: 90 min) on the entire course content of the module at the end of the module. • Possibilities to repeat the examinations exist in the following semester. • Prerequisite for participation in the examination is the passing of the preliminary examination. • The share of the preliminary examination performance in the module grade is a maximum of 20%.
7	**Necessary knowledge** See § 7 para. 3 BBPO.
8	**Recommended knowledge** Module 546 (Energy measurement technology, control technology and operation of power grids)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.

10	**Usability of the module**
11	**Literature** Buchholz/Styczynski: Smart Grids, Grundlagen und Technologien der elektrischen Netze der Zukunft, VDE Verlag. Maubch: Energiewende, Springer VS. Maubach: Strom 4.0, Springer Vieweg. Sterner/Stadler: Energiespeicher, Bedarf, Technologien, Integration, Springer Vieweg.

1	**Module name** Energy Informatics
1.1	**Module abbreviation** 563
1.2	**Type** Mandatory Module
1.3	**Course** Energy Informatics
1.4	**Semester** Semester 6
1.5	**Module manager** Dr. Tafreschi
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** • Analysis of the functional and technical requirements of energy management and energy technology processes (including market communication, smart metering systems, smart grids, tariff setting, data-based services, forecasts) • Development of energy management and energy technology information systems (data and process modeling, programming) • Preparation and presentation of scientific papers • Project Management
3	**Targets** Knowledge: Successful completion of this module will enable students to • Explain the basics of modeling. • To explain the basics of logic. Skills: Successful completion of this module will enable students to

	• create energy-related and energy-technical data and process models. • program simple applications. • Plan and execute projects. Competencies: Successful completion of this module will enable students to • Work and report in project teams in a goal-oriented manner. • write scientific papers. • Present work results.
4	**Teaching and learning methods** Lecture (L), Exercise (E) and Projects (Pro) Media used: computer and beamer
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 50 hours Self-study: 100 hours
6	**Form of examination, duration and examination requirements** • The deliverables of the student projects and the solutions of the programming tasks are examined and evaluated. Both parts are taken into account with 50% each in the overall assessment of the module. • Repeat opportunities for the examination performance exist in the following year.
7	**Necessary knowledge** See § 7 para. 3 BBPO.
8	**Recommended knowledge** Module 512 (Business Informatics)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module** Business Administration (B.Sc.), Industrial Engineering (B.Sc.), Computer Science (B.Sc.)
11	**Literature** Balzert: Lehrbuch der Softwaretechnik Basiskonzepte und Requirements Engineering, Spektrum Akademischer Verlag Balzert: Lehrbuch der Softwaretechnik Entwurf, Implementierung, Installation und Betrieb, Spektrum Akademischer Verlag

	Business & Information Systems Engineering - The International Journal of WIRTSCHAFTSINFORMATIK - Professional Journal
	Freund/Rücker: Praxishandbuch BPMN 2.0, Hanser
	Informatik Spektrum - Trade Journal
	Jobst: Programming in Java, Hanser
	Project Management Institute: A Guide to the Project Management Body of Knowledge (PMBOK Guide)
	Ratz/Scheffler/Seese/Wiesenberge: Grundkurs Programmieren in Java, Hanser

1	**Module name** Energy supervision and regulation
1.1	**Module abbreviation** 564
1.2	**Type** Mandatory Module
1.3	**Course** Energy supervision and regulation
1.4	**Semester** Semester 6
1.5	**Module manager** Dr. Hooß
1.6	**Other teachers** None
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** The students learn about the history and the design of the liberalization of the energy market. This module deals with company, sales and network structures and provides students with insights into possible organizational structures and design scenarios. In addition, technological and process-related requirements that unbundling entails are addressed, and application-related aspects of data separation and energy data management are discussed. Students are familiarized with the role and powers of the regulatory authority. This module focuses on specific issues from regulatory practice and the associated challenges for data management and processes. Central points are the compliance with regulatory requirements and the presentation of the same.
3	**Targets** Knowledge: The students know the possible designs of the company, sales and network structures, as well as the associated challenges and design options. They know the essential regulatory requirements and the rules of data separation and energy data management. They are familiar with the role of the regulatory authority and know its tasks and duties.

	Skills: The students know the essential regulatory requirements, association agreements and data exchange rules and can apply them. They recognize processes that are not unbundling-compliant and can adapt these processes. Competencies: Students will be able to recognize the problems of liberalization and develop adequate solution strategies. They know the essential, practical effects of the regulatory measures on the business practice of energy suppliers.
4	**Teaching and learning methods** Lecture (L) and Seminar (Sem) Media used: communication media (e.g. electronic learning platform), presentation media (e.g. beamer, whiteboard, flipchart, smartboard, metaplan, visualizer)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) Attendance time: 64 hours (lectures, presentations by students) Self-study: 86 hours (development of a project)
6	**Form of examination, duration and examination requirements** • Examination in the form of a term paper, possibly in group work. • Preliminary examinations (e.g. MC test) - also in group work - are possible. Preliminary examinations can be graded or ungraded. In the case of graded preliminary examinations, the share of the module grade may not exceed 30%. Preliminary examinations and examinations are announced at the beginning of the course. If preliminary examinations are required, passing the preliminary examination is a prerequisite for participation in the examination. • Students may retake the examinations in the following semester.
7	**Necessary knowledge** See § 7 para. 3 BBPO.
8	**Recommended knowledge** Module 513 (Introduction to Energy Management) Module 544 (Fundamentals of Energy and Business Law)
9	**Duration, time structure and frequency of the offer** The module covers one semester with 4 SWS and is offered once a year.
10	**Usability of the module**

11 Literature

Federal Network Agency: Monitoring Report (current years)

Leprich/Georgi/Evers (eds.): Strommarktliberalisierung durch Netzregulierung, Berliner Wissenschaftsverlag.

PwC: Regulation in the German Energy Industry, Haufe Lexware.

Rasbach: Unbundling-Regulierung in der Energiewirtschaft; Gemeinschaftsrechtliche Vorgaben und deren Umsetzung in die deutsche Energierechtsordnung, Beck.

1	**Module name** Practice project 3
1.1	**Module abbreviation** 567
1.2	**Type** Mandatory Module
1.3	**Course** Practice project 3
1.4	**Semester** Semester 6
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** All teachers at the department of economics
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Working on a fundamental issue depending on the supervising company. During the project, students should grasp company-specific manifestations of the content presented in the corresponding modules in the preceding semesters and become familiar with the corresponding practical solutions. They should be able to deepen the contents learned in the university education and transfer them to practical problems in the companies. Students should develop their ability to think analytically and critically and constructively, and become familiar with work and problem-solving techniques. They should gain an insight into the company and operational processes and develop an understanding of operational interrelationships. They should orient themselves within the company and constructive and supportive in work teams.
3	**Targets** Knowledge: Students will be able to, • describe the service production and utilization process of the organization in which the practical activity was carried out, • classify the department or organizational area in which the practical activity was carried out, • Describe the mission of the department or organizational area in which the practical activity was performed; and • Describe the activities performed in the department by the student. Skills: Students are able to apply the relevant knowledge, skills and competences acquired during their studies to practical problems. They are able to classify the processes found in practice in the current state of science.

	Competencies: Students will be able to critically examine and evaluate the processes found in practice based on the current state of science.
4	**Teaching and learning methods** Depending on the respective topic
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) for carrying out the practical activities and for processing and presenting the results.
6	**Form of examination, duration and examination requirements** • Project work, scope to be determined in consultation with the university supervisor, 80% of the total grade. • Presentation including discussion: approx. 30 minutes, 20% of the total grade • Please also refer to the Practical Projects Guide, which is available on the website. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 524 (Work Methodology)
9	**Duration, time structure and frequency of the offer** The module covers one semester or 4 weeks with a total duration of 150 hours. The module is offered once per semester.
10	**Usability of the module** The module can be used for the study program form "Dual Study Model".
11	**Literature** Depending on the topic

1	**Module name** Practice module
1.1	**Module abbreviation** 571
1.2	**Type** Mandatory Module
1.3	**Course** Practice module
1.4	**Semester** Semester 7
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** All faculty in the department or program.
1.7	**Degree level** Bachelor
1.8	**Teaching language** German or English
2	**Content** The practical module is to be completed as a practical activity in a company or an administration outside of Darmstadt University of Applied Sciences and addresses issues with concrete and current practical relevance, the solution of which requires subject-related in-depth knowledge and interdisciplinary knowledge and skills.
3	**Targets** Knowledge: Students will be able to, • describe the service production and utilization process of the organization in which the practical activity was carried out, • classify the department or organizational area in which the practical activity was carried out, • Describe the mission of the department or organizational area in which the practical activity was performed and • Describe the activities performed in the department by the student.

	Skills: Students are able to apply the relevant knowledge, skills and competences acquired during their studies to practical problems. They are able to classify the processes found in practice in the current state of science. Competencies: Students will be able to critically examine and evaluate the processes found in practice based on the current state of science.
4	**Teaching and learning methods** Practical work experience in a company or administration outside Darmstadt University of Applied Sciences. Media used: communication media (including email)
5	**Workload and Credit Points** Total workload of 300 hours for 10 credit points (CP) for carrying out the practical activities and for processing and presenting the results.
6	**Form of examination, duration and examination requirements** Examination performance in the form of a practical report. The exam can be repeated in the following semester. Requirements for the participation in the module and the examination result from § 10 Abs. 4 BBPO. The specific requirements for the design of the practical report in terms of content and scope can be found on the web pages of the study program.
7	**Necessary knowledge** Requirements for the participation in the module and the examination result from § 10 Abs. 4 BBPO.
8	**Recommended knowledge** Depending on the content of the practical activities.
9	**Duration, time structure and frequency of the offer** The module covers a period of 8 weeks and is offered in both summer and winter semesters.
10	**Usability of the module** The module can be used for the regular course form.
11	**Literature** Depending on the content of the practical activities.

1	**Module name** Practice project 4
1.1	**Module abbreviation** 574
1.2	**Type** Mandatory Module
1.3	**Course** Practice project 4
1.4	**Semester** Semester 7
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** All teachers at the department of economics
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** Working on a fundamental issue depending on the supervising company. During the project, students should grasp company-specific manifestations of the content presented in the corresponding modules in the preceding semesters and become familiar with the corresponding practical solutions. They should be able to deepen the contents learned in the university education and transfer them to practical problems in the companies. Students should develop their ability to think analytically and critically and constructively, and become familiar with work and problem-solving techniques. They should gain an insight into the company and operational processes and develop an understanding of operational interrelationships. They should be able to orient themselves in the company and work constructively and supportively in work teams.

3	**Targets** Knowledge: Students will be able to, • describe the service production and utilization process of the organization in which the practical activity was carried out, • classify the department or organizational area in which the practical activity was carried out, • Describe the mission of the department or organizational area in which the practical activity was performed; and • Describe the activities performed in the department by the student. Skills: Students are able to apply the relevant knowledge, skills and competences acquired during their studies to practical problems. They are able to classify the processes found in practice in the current state of science.

	Competencies: Students will be able to critically examine and evaluate the processes found in practice based on the current state of science.
4	**Teaching and learning methods** Depending on the respective topic
5	**Workload and Credit Points** Total workload of 300 hours for 10 credit points (CP) for carrying out the practical activities and for processing and presenting the results.
6	**Form of examination, duration and examination requirements** • Project work, scope to be determined in consultation with the university supervisor, 80% of the total grade. • Presentation including discussion: approx. 30 minutes, 20% of the total grade • Please also refer to the Practical Projects Guide, which is available on the website. • The exam can be repeated in the following semester.
7	**Necessary knowledge** None
8	**Recommended knowledge** Module 524 (Work Methodology)
9	**Duration, time structure and frequency of the offer** The module covers one semester or 8 weeks with a total duration of 300 hours. The module is offered once per semester.
10	**Usability of the module** The module can be used for the study program form "Dual Study Model".
11	**Literature** Depending on the topic

1	**Module name** Seminar accompanying the project
1.1	**Module abbreviation** 572
1.2	**Type** Mandatory Module
1.3	**Course** Seminar accompanying the project
1.4	**Semester** Semester 7
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** Dr. Engelstätter
1.7	**Degree level** Bachelor
1.8	**Teaching language** German
2	**Content** The seminar accompanying the project serves to prepare for the practical module (introductory seminar) as well as to reflect on the findings and experiences in the practical module from a professional and sociological point of view (evaluation seminar).
3	**Targets** Knowledge: Students will be able to describe activities performed in the field. Skills: Students are able to examine the relevant knowledge, skills and competences acquired during their studies for their relevance to practical issues. They are able to present and discuss activities carried out, methods used as well as processes and workflows but also findings and results derived from them in a comprehensible and target group-oriented manner.

	Competencies: The students are able to critically question and evaluate the knowledge gained in the context of the practical professional activities with regard to methods, processes and workflows and to draw conclusions from this. They are able to reflect on the experiences gained during the practical phase of the internship module from a professional and sociological point of view.
4	**Teaching and learning methods** Seminar (Sem) Media used: communication media (e.g. electronic learning platforms), presentation media for the presentation of the activities carried out (e.g. beamer, whiteboard, flipchart, smartboard, metaplan)
5	**Workload and Credit Points** Total workload of 150 hours for 5 credit points (CP) for the processing, presentation of the results from the practical module.
6	**Form of examination, duration and examination requirements** Examination performance (evaluation seminar) in the form of a presentation. The presentations are open to the public. The exam can be repeated in the following semester. Prerequisites for participation in the module are set out in § 7 Para. 3 BBPO. Prerequisite for participation in the examination is a completed practical phase according to § 10 para. 1 BBPO as well as the successful participation in the introductory seminar (ungraded preliminary examination).
7	**Necessary knowledge** Prerequisites for the participation in the module result from § 7 Abs. 3 BBPO. The prerequisite for participation in the examination is a completed practical phase according to § 10 para. 1 BBPO.
8	**Recommended knowledge** Depending on the content of the practical activities in the practical module.
9	**Duration, time structure and frequency of the offer** The module comprises 4 SWS and is offered in both summer and winter semesters.
10	**Usability of the module** The module can be used for the regular course form.
11	**Literature** Depending on the content of the practical activities in the practical module.

1	**Module name** Bachelor thesis module
1.1	**Module abbreviation** 573
1.2	**Type** Mandatory Module
1.3	**Course** Bachelor thesis module
1.4	**Semester** Semester 7
1.5	**Module manager** Dr. Grävenstein
1.6	**Other teachers** All full-time faculty in the department or program.
1.7	**Degree level** Bachelor
1.8	**Teaching language** German or English
2	**Content** The bachelor thesis module consists of a bachelor thesis and a colloquium. It includes the independent preparation of a thesis on a defined topic according to scientific methods and its presentation.
3	**Targets** Knowledge: Students are able to explain the requirements of scientific work and to describe challenges (e.g. literature research and source management, compliance with formal requirements, structuring of topics, comprehensible, balanced and error-free formulation) as well as efficient possible solutions in this regard. Skills: Students are able to work on a problem from the field of energy economics independently and in a practice-oriented manner according to scientific methods by linking and deepening specific areas of knowledge within the framework of the problem in an argumentative manner and presenting it in a coherent manner. The

	Students are also able to present the knowledge gained from writing the Bachelor's thesis in a comprehensible and target group-oriented manner. Based on a problem, they can develop a specific objective for the thesis and, by applying scientific methods, develop an understandable, balanced and error-free result for this that leads to a gain in knowledge. Competencies: The students are able to evaluate the knowledge gained during the preparation of the bachelor thesis and to draw conclusions from it.
4	**Teaching and learning methods** Thesis Media used: communication media (e.g. email), presentation media for the presentation of the activities carried out (e.g. beamer, whiteboard, flipchart, smartboard, metaplan)
5	**Workload and Credit Points** Total workload of 450 hours for 15 credit points (CP) for the preparation of the bachelor thesis and for the processing, presentation and presentation of the results.
6	**Form of examination, duration and examination requirements** Examination in the form of the Bachelor thesis and the colloquium. The examination can be repeated in the following semester. Requirements for the participation in the module and the examination result from § 12 Abs. 5 BBPO.
7	**Necessary knowledge** Requirements for the participation in the module and the examination result from § 12 Abs. 5 BBPO.
8	**Recommended knowledge** Depending on the objective of the bachelor thesis.
9	**Duration, time structure and frequency of the offer** The module covers a period of 12 weeks and is offered in both summer and winter semesters.
10	**Usability of the module** The module cannot be used for other courses of study.
11	**Literature** Depending on the objective of the bachelor thesis.