Attachment 2 to the Study and Examination Regulations

Module Descriptions

for the postgraduate and further education programme MBA Renewables

Table of Content

MBA renewables

Module number	M01
Module title	Renewable Energy and Energy Efficiency Systems and Concepts
ECTS credits	10 ECTS credits
Workload and its composition	250 h (200 h self-study; 50 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students are able to explain the most important renewable energy technologies, system designs and applications as well as energy efficiency concepts. Students can assess the performance of technologies enabling them to communicate effectively and knowledgably with relevant stakeholders.
Prerequisites	None
Level	First semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, virtual working group, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every fall semester
Duration of the module	6 months/October to March
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Project thesis (40 h); online exam (1.5 h)
Determination of the module grade	2/3 project thesis; 1/3 online exam
Applicability of module for other modules and study programmes	If desired, the modules E01, E03 or E04 could be taken after this module. Applicable for the module “Renewable Energies and Energy Efficiency Systems and Concepts” in the Master’s programme Energie- und Ressourceneffizienz.
Content	• Energy, electricity, CO_2 emissions • Technology, components, systems sizing, applications for photovoltaics, solar thermal, wind energy, biomass, biogas, biofuels, geothermal heat pumps and hydropower • Energy efficiency in industry and commerce • Energy efficiency in the built environment
Recommended literature	• Godfrey Boyle, “Renewable Energy”, Oxford University Press, 3rd edition 2012 • William H. Kemp, “The Renewable Energy Handbook”, Aztext Press 2009 • Volker Quaschning, “Understanding Renewable Energy Systems”, Earthscan Publications Ltd, 2nd edition 2016 • Barney L. Capehart, “Guide to Energy Management”, 8th edition, Fairmont Press 2016 • Additional references and study literature communicated at beginning of the module.
Comments	3/4 renewable energy; 1/4 energy efficiency

Module number	M02
Module title	Energy Policy and Economic Framework
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students are able to interpret key issues within energy policy, including drivers of the energy market, market structures and concepts, international climate policies, main actors, interests and instruments. They can implement these concepts and instruments in their RE business in order to become an important part of the global energy supply chain. Students can interpret political frameworks for the market introduction of renewable energy technologies. Due to their gained knowledge on support mechanisms students are able to evaluate how markets for renewable technologies function and to calculate projects accordingly.
Prerequisites	None
Level	First semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every fall semester
Duration of the module	6 months/October to March
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); exam under supervision (1.5 h)
Calculation of module grade	1/3 written assignment; 2/3 exam under supervision
Applicability of module for other modules and study programmes	This module is followed by the module M04. Applicable for the modules “Energy Market, Economic Framework and Policy” in the Master’s programme “Energie- und Ressourceneffizienz and “Legal Framework Conditions and Economics” in the Master’s programme Energy and Resource Efficiency International.
Content	• Future challenges of global energy supply • Drivers for energy policy • Energy sectors and related fields • International organisations • International climate policy • Support mechanisms for renewable electricity and heat and energy efficiency in buildings
Recommended literature	• Miguel Mendonca et al., “Powering the Green Economy – The feed-in tariff handbook”, Earthscan 2009 • Brenda Shaffer, “Energy Politics”, University of Pennsylvania Press 2011 • Vaclac Smil, “Energy And Civilization: A History”, MIT Press 2017 • Paul Hawken and Amory Lovins, “Natural Capitalism”, B&T 1999 • Amory Lovins, “Reinventing Fire” , Chelsea Green Publishing 2011 • Hermann Scheer, “Energy Autonomy”, 2007 • Michael Aklin, “Renewables: The Politics of A Global Energy Transition” MIT 2018 • Additional references and study literature communicated at beginning of module.

Module number	M03
Module title	Accounting
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can differentiate the concepts, processes, principles and the system of accounting. They learn to apply the basic concepts of cost accounting and management accounting and are able to use accounting techniques for decision making, planning and control in RE and EE ventures and projects.
Prerequisites	None
Level	First semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, virtual working group, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every fall semester
Duration of the module	6 months/October to March
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (40 h); online group presentation (1 h)
Calculation of module grade	1/3 written assignment; 2/3 online group presentation
Applicability of module for other modules and study programmes	This module is followed by the module M05.
Content	• Fundamentals of financial accounting (incl. overview of P&L and balance sheet) and managerial accounting, accounting cycle • Sustainability accounting, environmental (cost) accounting • Specific product costing issues for RE and EE projects • Project cost accounting with specific issues in RE and EE projects
Recommended literature	• Coline Drury, “Cost and Management Accounting – An introduction”, 7th edition, Andover 2011 • Horngren, C. T.; Harrison, W. T.; Oliver, M. S., “Financial & Managerial Accounting”, 3rd edition, Pearson 2011 • Romney, M. B.; Steinbart, P. J., “Accounting Information Systems”, 14th edition, Upper Saddle River 2017 • Weetman, P., “Financial & Management Accounting”, 7th edition, Pearson 2015 • Additional references and study literature communicated at beginning of module.

Module number	M04
Module title	International Business Law
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can determine the legal system applicable for business in other countries, the sources of international law and their underlying principles. They can decide upon corporate structures and differentiate international regulations for the exchange of goods and services (GATT, CISG). Students can specify relevant contracts for the development, construction and operation of renewable energy plants and outline their requirements.
Prerequisites	None
Level	Second semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); online exam (1.5 h)
Calculation/determination of module grade	1/3 written assignment; 2/3 online exam
Applicability of module for other modules and study programmes	This module is preceded by module M02 and is followed by M09.
Content	**International Business Law** • European business law, The World Trade Organisation (WTO, General Agreement on Tariffs and Trade (GATT), UN sales law, United Nations Convention on Contracts for the International Sale of Goods (CISG), corporate law, international property and investment law, law of trademarks **Relevant contracts for renewable energy projects** • Law of contracts – parties, offer & assumption, definition of subject matter and content, maintenance of compulsory legal provisions and formalities, legal enforceability and other aspects • Specific contracts common in renewable energy projects – wind, photovoltaics, biogas; parties and their interests, content, possible conflicts and risks
Recommended literature	• DiMatteo, L.; Dhooge, L., "International Business Law: A Transactional Approach" 3d ed., Routledge 2017 • Keizer, J.; Wevers, H., "A Basic Guide to International Business Law", Groningen/Houten, Wolters-Noordhoff, 4th edition 2016 • Schaffer, R.; Filiberto, A.; Dhooge, L., Earle, B., "International Business Law and Its Environment", Kentucky, South Western Cengage Learning, 9th edition 2014

Module number	M05
Module title	Investment and Financing
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can implement the concepts and basic principles of corporate investment and financing. They learn to apply the basic concepts of corporate finance and corporate investment and are able to make financing and investment decisions in RE and EE ventures and projects.
Prerequisites	None
Level	Second semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, virtual working group, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); online group presentation (1 h)
Calculation of module grade	1/3 written assignment; 2/3 online group presentation
Applicability of module for other modules and study programmes	This module is preceded by module M03. Applicable for the module "Investment and Financing" in the Master's programme Energie- und Ressourceneffizienz and "Investment Appraisal" in the Master's programme Energy and Resource Efficiency International.
Content	• Principles of corporate finance • Project financing with special focus on RE and EE financing schemes • Investment appraisal (techniques), business cases • Role of RE and EE support schemes for project finance and RE and EE investment attractiveness
Recommended literature	• Brealey, Richard; Myers, Stewart; Marcus, Alan, "Fundamentals of Corporate Finance", 12th edition, 2016 • Gatti, Stefano, "Project Finance in Theory and Practice", 2nd edition, 2012 • KfW Entwicklungsbank (KfW Development Bank) - Energy and Policy Division, "Financing renewable energy. Instruments, strategies, practice approaches", 2005 • Kaltschmitt, M.; Wiese, A.; Streicher, W., "Renewable Energy: technological foundations, economical and environmental aspects", Berlin 2007 • Short, W.; Packey, D.; Holt, T., "A manual for the economic evaluation of energy efficiency and renewable energy", Golden 1995 Additional references and study literature communicated at beginning of module.

Module number	M06
Module title	Project Management
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can differentiate methods and techniques of Project Management and apply these to manage projects. They can develop structures within a project and are able to predict risks and chances of projects. They can critically consider a changing environment within a project.
Prerequisites	None
Level	Third semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, virtual working group, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every fall semester
Duration of the module	6 months/October to March
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); online group presentation (1 h)
Calculation of module grade	1/3 written assignment; 2/3 online group presentation
Applicability of module for other modules and study programmes	This module is followed by module M10. Applicable for the module “Project Management” in the Master’s programmes Energie- und Ressourceneffizienz.
Content	• Positioning of projects in organizations • Project objective and goal • Project structures • Stakeholder management • Scheduling • Cost management/earned value method • Multi project management • Standards in project management • Maturity models
Recommended literature	PMI, “A Guide to the Project Management Body of Knowledge”, 5rd edition, Newtown Square, Pennsylvania, USA 2013 Additional references and study literature communicated at beginning of module.

Module number	M07
Module title	Marketing Analysis and Instruments
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students are able to develop a marketing concept. They can define specific marketing goals on the basis of the market analysis. They can formulate strategies in order to reach the defined goals. Students can generate and assemble marketing-mix-instruments and implement the marketing strategy.
Prerequisites	None
Level	Third semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every fall semester
Duration of the module	6 months/October to March
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); exam under supervision (1.5 h)
Calculation of module grade	1/3 Written Assignment; 2/3 exam under supervision
Applicability of module for other modules and study programmes	This module is followed by module M11.
Content	This module provides an understanding of marketing and the decision making processes of potential customers in the market of Renewable Energies. Students will be introduced to various techniques that help to analyze the market in order to get a good understanding of needs and wants of customers, the activities as well as the potential of competitors, and finally the resources and capabilities of their own company. These tools help to develop a competitive advantage in the specific market and to address the defined customer segments in the market effectively.
Recommended literature	• Kotler, Philip; Keller, Kevin Lane, "Marketing Management", 15th edition, Pearson 2016 • Seiler, Armin, "Marketing: BWL in der Praxis IV", Orell Fuessli 2006 (German) • Wilson, Richard; Gilligan, Colin, "Strategic Marketing Management: Planning, Implementation and Control", Routledge, 3rd edition 2012 Additional references and study literature communicated at beginning of module.

Module number	M08
Module title	HR and People Management
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can identify the central elements of human resource management and explain its central instruments and methods. They can conduct and lead communication processes, mitigate or solve conflicts in an intercultural organisational set-up. They can analyze organisational personnel structures and processes and assess, evaluate and select qualified staff. Students can conduct objectives-based review discussions for performance management. They know the difference between management and leadership, and can assess which leadership styles must be used to successfully lead through the change curve.
Prerequisites	None
Level	Third semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every fall semester
Duration of the module	6 months/October to March
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Peer review assignment (20 h); online exam (1.5 h)
Calculation of module grade	1/3 peer review assignment; 2/3 online exam
Applicability of module for other modules and study programmes	This module is preceded by module M04 and is followed by M10.
Content	• Central elements of human resource management • Analysis of organisational structures • Communication, feedback, conflict solving, negotiation skills • Recruitment process and different methods of recruiting • Leading performance management • New forms of communication (virtual communication and cooperation) • Intercultural communication and diversity management • Training Needs Assessment (TNA) and capacity building • Leadership styles, change management, coaching
Recommended literature	• Scarpello, Vida G., “The Handbook of Human Resource Management Education: Promoting an Effective and Efficient Curriculum”, Sage Publications Inc., Thousand Oaks, California 2008 • Bohlander, Scott Snell, “Managing Human Resources”, South-Western Cengage Learning, 16th edition 2014 • Perkins, P. S., “The Art and Science of Communication. Tools for Effective Communication in the Workplace”, John Wiley & Sons Inc., New Jersey 2008

Module number	M09
Module title	International Management
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can define, discuss and compare international management concepts and methods. They can critically consider specific challenges of international business operations. Students can select and apply management concepts and techniques to their multinational environments.
Prerequisites	None
Level	Fourth semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); exam under supervision (1.5 h)
Calculation of module grade	1/3 written assignment; 2/3 exam under supervision
Applicability of module for other modules and study programmes	This module is preceded by module M07 and M09.
Content	• International management and the multinational enterprise • Legal, political and economic environment of international operations – globalization • Strategic challenges of multinational management • Internationalization strategies/options • Organising international operations • Performance management in multinational companies • Managing diversity in global operations contexts, the cultural dimension of international business
Recommended literature	• Luthans, Fred; Doh, Jonathan P., “International Management: Culture, Strategy and Behavior”, 9th edition, New York, 2014 • Duelfer, Eberhard; Joestingmeier, Bernd, “International Management in Diverse Cultural Areas”, 2nd edition Oldenbourg, München, 2011 • Deresky, Helen, “International Management: Managing Across Borders and Cultures, Text and Cases”, 9th edition, London, 2016 • Sweeney, Paul D.; McFarlin, Dean B., “International Management: Strategic Opportunities and Cultural Challenges”, 5th edition, New York, London, 2015

Module number	M10
Module title	Integrated Business Plan Development
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can estimate the importance of business plans. They can plan the conceptual framework of and elaborate a business plan. They can apply central accounting principles and methods to elaborate a business plan. Students can analyze Business Cases (BCA) and develop a well-structured business plan. They can summarize and generalize a business plan in order to prepare a presentation for potential investors.
Prerequisites	None
Level	Fourth semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, virtual working group, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (40 h); online group presentation (1 h)
Calculation of module grade	1/3 written assignment; 2/3 online group presentation
Applicability of module for other modules and study programmes	This module is preceded by module M08. Applicable for the module “Business Plan and Contracts” in the Master’s programme Energy and Resource Efficiency International.
Content	• The central elements and structure of a business plan • Business Case Analysis (BCA), resource allocation • Common planning questions • Assessment of framework conditions, market survey, competitors analysis • Systematical approach on the elaboration of business plans • Software support for the elaboration of business plans • Investor relations • Business plans adaptation • Business plans in practice – presentation of business plans to investors • Business plan examples and case studies
Recommended literature	• Learner, J.; Hardymon; Leamon, A., “Venture capital and private equity: A casebook”, 5th edition, Wiley 2012 • Pinson, L.; J. Jinnett, “Anatomy of a business plan: A step-by-step guide to starting smart, building the business, and securing your company's future”, (Paperback) 7th edition 2008 • Stevenson, H. H.; Roberts, M. J.; Sahlmann, W., “New business ventures and the entrepreneur”, 6th edition, McGraw Hill Book 2006 • Swanson, James A.; Baird Michael L., “Engineering your start-up: A guide for the high-tech entrepreneur” 2nd edition, Professional Publications, Inc. 2003

Module number	M11
Module title	Advanced Research Methods
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can identify, define and describe research proposals and questions. They can distinguish and classify important research methods. They can interpret, use and prepare designs and structures of a Master's Thesis. Students can evaluate and select research backgrounds and methods. They can collect and organize references. They can estimate and develop expected results of a research as well as assemble a focused literature review.
Prerequisites	None
Level	Fourth semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Compulsory
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Project thesis (40 h)
Calculation of module grade	1/1 Project thesis
Applicability of module for other modules and study programmes	This module is followed by module M13.1 and M13.2. Applicable for the module "Advanced Research Methods" in the Master's programme Energy and Resource Efficiency International.
Content	• Introduction to the theory of research • Screening of relevant information and sources • Research frameworks • Formulation of research proposals • Qualitative and quantitative research methods • Application of statistical methods • Verification/falsification of research questions • Phases of research work • Subsuming of research results • Research ethics • Design of a Master's thesis • International citation standards (APA, Harvard, etc.) • Applying international standards using Microsoft Word
Recommended literature	• APA, "Publication manual of the American Psychological Association", American Psychological Association (APA) 6th edition 2009 • Booth, W. C.; Colomb, G. G.; Williams, J. M., "The craft of research", The University of Chicago Press, 4th edition 2016 • Gloede, D., "The design of Bachelor's and Master's theses", Reports from Department I – Beuth University of Applied Sciences Berlin 2012

	• Saunders, M.; Lewis, P.; Thornhill, A., "Research methods for business students" Pearson, 7th edition 2015 • Sekaran, U.; Bougie, R., "Research methods for business: A skill-building approach", Wiley, 6th edition 2013 • Sreejesh, S.; Mohapatra, S.; Anusree, M. R., "Business research methods. An applied orientation", Springer International Publishing 2014 • Swales, J. M.; Feak, C. B., "Academic writing for graduate students: Essential tasks and skills", The University of Michigan Press, 3rd edition 2012 Additional references and study literature communicated at beginning of module.

Module number	M12.1
Module title	Master's Thesis
ECTS credits	15 ECTS credits
Workload and its composition	375 h (325 h self-study; 50 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can apply the knowledge gained during the course of studies to a practical problem. They can formulate a research question and develop an adequate research design in accordance with the formal criteria for a scientific thesis. Students are able to independently write a Master's thesis using scientific standards and methods.
Prerequisites	Minimum 65 ECTS credits completed
Level	Fifth semester
Teaching and learning methods	Independent scientific work under individual guidance. Online Master's colloquium.
Form of module	Compulsory
Frequency of module offer	Every semester
Duration of the module	5 months
Methods and duration of examination	Written Master's thesis (5 months)
Calculation of module grade	Grading of Master's thesis by examination commission
Applicability of module for other modules and study programmes	-
Content	Content depends on the topic of the Master's thesis. Topic must relate to one of the modules and should focus on the practical application of theoretical knowledge to a specific project or venture.
Recommended literature	Depends on the topic of the Master's thesis.

Module number	M12.2
Module title	Oral Final Examination
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can summarize and critically reflect the selected research approach as well as link their individual results to other research results and areas. They can illustrate the implications for business practice.
Prerequisites	Master's thesis completed successfully and in particular §30 RSPO 2016.
Level	Fifth semester
Teaching and learning methods	Independent scientific work under individual guidance.
Form of module	Compulsory
Frequency of module offer	Every semester
Duration of the module	2 hours
Methods and duration of examination	Oral examination (2 h)
Calculation of module grade	Assessment of oral examination by examination commission.
Applicability of module for other modules and study programmes	-
Content	Presentation of the essential result of the Master's thesis for a maximum of 15 minutes. Discussion and Q&A session about the students' theoretical background and the practical relevance of the thesis with the examination commission.
Recommended literature	Depends on the topic of the Master's thesis.
Comments	Attendance in Berlin, Germany is compulsory.

MBA renewables

Electives

Module number	E01
Module title	Advanced Practical Renewable Energy and Energy Efficiency Implementation
ECTS credits	5 ECTS credits
Workload and its composition	125 h (45 h self-study; 80 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can assess the appropriateness of various renewable energy technologies and their use for different requirements. They can appraise renewable energy projects taking into account the availability of natural, technical and financial resources. They can design a renewable energy system with different renewable energy technologies and evaluate the economic feasibility of renewable energy projects and energy efficiency measures by taking into consideration varying technical and economic conditions.
Prerequisites	Successful completion of M01 RE and EE Systems and Concepts
Level	Second and fourth semester
Teaching and learning methods	2-weeks full-time attendance in Berlin, Germany (theory, practice, field trips). Online distance learning (forums, chat and messaging, virtual working group, self-study)
Form of module	Elective
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Exam under supervision (1.5 h) and project thesis (45h)
Calculation of module grade	1/3 exam under supervision; 2/3 project thesis
Applicability of module for other modules and study programmes	This module is preceded by module M01.
Content	• Practical hands-on exercises for photovoltaic grid-connected and off-grid, solar thermal, wind energy and energy efficiency • Field trips to wind power plants, biogas plants, energy efficient buildings, energy efficient applications in industry and commerce, photovoltaic and solar thermal installations • Group work to perform in-depth investigation of technical and aspects of renewable energy projects
Recommended literature	• M01 RE and EE Systems and Concepts • RENAC materials handed out during the seminar • Godfrey Boyle, 'Renewable Energy', Oxford University Press • Volker Quaschning, 'Understanding Renewable Energy Systems', Earthscan Publications Ltd
Comments	Separate registration process, information at the beginning of study. Costs covered by study fee: Seminar fees

	Seminar materials Lunch and coffee breaks on seminar days Letter of invitation for travel visa will be provided All additional costs must be covered by participants (travel and accommodation, food, weekend activities, personal expenditures, visa fees, etc.).

Module number	E02
Module title	Entrepreneurship
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can explain entrepreneurial ventures. They can apply creative techniques to foster innovation and generation of new business models. Students can define and interpret important aspects of entrepreneurial marketing, financing and organisation. They can evaluate and decide on new business and innovation concepts in the green energy industry.
Prerequisites	None
Level	Second and fourth semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Elective
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Group assignment (40 h).
Calculation of module grade	1/1 group assignment
Applicability of module for other modules and study programmes	-
Content	• Introduction: Basic terms and definitions; Motivation for entrepreneurship • Business model generation: Customer experience and value proposition; Instruments for business model generation; Innovation management • Entrepreneurial market analysis: Understanding the market structure; Understanding the actors on the market; Market entry strategy • Public relations, surveys and communication: Empiric research based on surveys; Advertising and digital public relations; Blogging, talks and briefings • Funding a business: Venture capitalists; Angel investors; Partner financing; Crowdfunding; Government grants; Private equity, family and friends; Accelerators; Other sources of funding • Managing an enterprise: Phases of new business ventures; Building and leading teams; Intellectual property and licensing; Organisational structure and processes • Sustainable entrepreneurship: Long-term business operation vs. business exit; Business exit strategies; Criteria for successful entrepreneurship • Business opportunities and models in the renewable industry – solar PV

Recommended literature	• IRENA: Global energy transformation: A roadmap to 2050 (2019 edition), https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Apr/IRENA_Global_Energy_Transformation_2019.pdf • Banks, Ken: Social Entrepreneurship and Innovation: International Case Studies and Practice, March 2016. ISBN-13: 978-0749475918 • Ries, Eric: The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, September 2011. ISBN-13: 978-0307887894 • Kim, W. Chan & Mauborgne, Renée: Blue Ocean Strategy - How to create uncontested market space and make the competition irrelevant, January 2015. ISBN-13: 978-1625274496 • Osterwalder, Alexander: Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. John Wiley and Sons. ISBN-13: 978-0470876411

Module number	E03
Module title	Advanced Renewable Energy Technologies
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students can describe in detail the technological principles governing solar energy, wind and biomass. They can assess the suitability for each of the technologies for different applications depending upon the requirements. They can interpret the design and dimensioning principles for large-scale implementation of renewable energy systems.
Prerequisites	Successful completion of M01 RE and EE Systems and Concepts recommended.
Level	Second and fourth semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Elective
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); online exam (1.5 h)
Calculation/determination of module grade	1/3 written assignment; 2/3 online exam
Applicability of module for other modules and study programmes	This module is preceded by module M01. Applicable for the module “Advanced Renewable Energy Technologies” in the Master’s programme Energie- und Ressourceneffizienz.
Content	• Photovoltaics: components, yield analysis and optimization, engineering and construction of grid-connected and stand-alone PV plants, commissioning, monitoring and operation • CSP: the solar field – different CSP technologies, boiler and water-steam cycle, steam turbine and balance of plant system, engineering, construction and optimization aspects • Solar thermal: components, working principles, system design and dimensioning, systems configuration for different applications, maintenance, optimization, monitoring, economic aspects, basics of solar process heat • Wind energy: wind resource measurement, wind farm planning onshore and offshore, repowering • Biogas: substrates, engineering, operation and maintenance, sustainability aspects • Excursus on grid integration of renewables
Recommended literature	• Overview: Martin Kaltschmitt, Andreas Wiese and Wolfgang Streicher, “Renewable Energy: Technological Foundations, Economical and Environmental Aspects”, Springer Berlin 2010 • Photovoltaics: Deutsche Gesellschaft für Sonnenenergie, “Planning and Installing Photovoltaic Systems: A Guide for Installers, Architects and Engineers”, Earthscan Publications 2008

	• CSP: **http://www.solarpaces.org** • Solar Thermal: Chris Laughton, "Solar Domestic Water Heating", Earthscan Expert Series 2010 • Wind: The European Wind Energy Association, "Wind Energy – The Facts – A guide to the technology, economics and future of wind power", Earthscan Publications 2009 **http://www.ewea.org/library/** • Biogas: Deutsche Gesellschaft für Sonnenenergie, "Planning and Installing Bioenergy Systems: A Guide for Installers, Architects and Engineers", Earthscan Publications 2006 • Internet sources: Irena Agency: http://www.irena.org/Publications/index.aspx?mnu=cat&PriMenuID=36&CatID=141 • NREL: www.nrel.gov • DENA: **https://www.dena.de/en/home/** Additional references and study literature communicated at beginning of module.

Module number	E04
Module title	Energy Management and Energy Efficiency
ECTS credits	5 ECTS credits
Workload and its composition	125 h (100 h self-study; 25 h contact time)
Learning objectives, trained competencies	Upon completion of this module, students are able to identify different energy efficiency approaches and technologies. They can critically reflect energy efficiency potentials as well as describe economic and legal aspects. Students can connect relevant aspects of project management and energy management based on case studies. They can identify operation models for energy efficiency measures.
Prerequisites	Successful completion of M01 RE and EE Systems and Concepts recommended.
Level	Second and fourth semester
Teaching and learning methods	Online distance learning (online lectures, forums, chat and messaging, self-study, exercises, video podcasts)
Form of module	Elective
Frequency of module offer	Every spring semester
Duration of the module	6 months/April to September
Methods and duration of examination	If the lecturer does not determine the form of examination and the examination modalities at the beginning of the semester in the period according to §19 (2) RSPO, the following examination form applies: Written assignment (20 h); online examination (1.5 h)
Calculation of module grade	1/3 written assignment; 2/3 online examination
Applicability of module for other modules and study programmes	This module is preceded by module M01.
Content	Energy Efficiency in Industry and Commerce – potentials, methods and instruments, stakeholders, laws, standards, codes, financing, operation models, case studies, energy efficient heating and cooling, ventilation, compressed air, electrical motors, organisational measure; energy management (ISO 50001); energy audits and energy monitoring
Recommended literature	• Kreith, Goswami (Editors), “Handbook of energy efficiency and renewable energies” CRC Press 1st edition 2007 • EC DG Joint Research Centre, “Integrated pollution prevention and control: Reference document on best available techniques for energy efficiency” 2055 • Barney L. Capehart, “Guide to energy management”, Fairmont Press 6th edition 2011 • Donald R. Wulfinghoff, “Energy efficiency manual: for everyone who uses energy, pays for utilities, designs and builds, is interested in energy conservation and the environment”, Energy Institute Press 2000 • Zoran Morvay; Dušan Gvozdenac, “Applied industrial energy and environmental management, Wiley-IEEE Press 2008 (e-book) • Thomas D. Eastop; D. R. Croft, “Energy efficiency: for engineers and technologists”, Longman Scientific & Technical 1990

	• Keith Moss, “Energy management in buildings”, Taylor & Francis Group, 2nd edition 2005 • Frank Kreith (Editor); D. Yogi Goswami (Editor), “Handbook of energy efficiency and renewable energy”, Taylor & Francis Group 2007 (e-book) • Wayne C. Turner; Steve Doty, “Energy management handbook”, Fairmont Press 2007 (e-book) Additional references and study literature communicated at beginning of module.