



Impact

Curriculum of “Sustainable Innovation Practices” Module

IMPACT

Building values-
based innovation
cultures for
sustainable
business impact



Description

The module “**Sustainable Innovation Practices**” has been developed by a group of innovation scientists from **Complutense University of Madrid (Complutense)**, **HMKW University of Applied Sciences for Media, Communication and Management (HMKW)**, **Foundation for Research and Innovation with University of Florence (Foundation)**, **Cracow University of Technology (CracowU)** and practitioners to help improve sustainability performance through innovation and entrepreneurship.

The module is composed of **four individual courses**: “**Sustainability-oriented Communication in Organizations**” (3ECTS, developed by Complutense), “**Business Anthropology**” (3ECTS, developed by HMKW), “**Social impact assessment of a service-based remanufacturing business model**” (3ECTS, developed by FRI with the support of University of Florence) and “**Sustainable innovation in engineering practice**” (3ECTS, developed by CracowU).

The courses are an example of new, innovative and multidisciplinary approaches to teaching and learning by turning attention to the sustainability challenges and empirically generating and aggregating knowledge and best practices about Sustainability Oriented Innovation Practices (SOIE). It covers the social aspect of sustainable development, with particular emphasis on the transformation of business models and strategies of industrial companies as well as methods of developing and implementing communication strategies that promote sustainable development and involve stakeholders. At the same time, it also includes multi-faceted conditions and good practices for implementing innovations related to sustainable development in business, as well as organizational challenges and barriers in building sustainable development-oriented innovation cultures. The content of individual courses is described below.

Business Anthropology

Institution: HMKW University of Applied Sciences for Media, Communication and Management

For students in the academic year 1 of M. Sc. Business Psychology at the Faculty of Psychology

Course title no 2 (native language)	<i>Wirtschaftsanthropologie</i>
Course title no 2 (English)	<i>Business Anthropology</i>
Language	<i>English / German</i>

Field of study: Qualitative research methodology, ethnography, cultural psychology

Study profile: *general academic*

Level of study: *M. Sc.*

Field: *M. Sc. Business Psychology*

Discipline(s): Business psychology (also applicable in design research, media management and converging journalism programs)

Prerequisites for students:

methodological: Basic psychological research methods

subject-specific: Business and culture psychology

Objectives of the course:

- 1) The goal is to understand meanings and situated practices, and to generate ideas and evaluate solutions for recurring problems, relevant value propositions, as well as interventions to tackle organizational challenges in building values-based innovation cultures for sustainable business impact.
- 2) To generate ideas and evaluate solutions for recurring problems, relevant value propositions, as well as interventions to tackle organizational challenges in building values-based innovation cultures for sustainable business impact.

Learning outcomes:

- 1) **Scientific background and history:** Epistemological background, history and application domains of business anthropology and ethnographic research; introduction to concepts of sustainability, organisational values and cultures as drivers or barriers for sustainability-oriented innovation.

Learning Outcomes: Advanced understanding of epistemological assumptions, strengths and weaknesses of business anthropology in different application domains, including sustainability & innovation.

- 2) **Quality criteria and project setup:** Quality criteria of qualitative research, process (project setup, organization and cooperation), comparative review of alternative (including AI-generated) research designs.
Learning Outcomes: Advanced understanding of specific quality criteria for qualitative research, know how to set up a field research conforming with quality criteria.

- 3) **Field research process:** Preparation and documentation, selection of participants and field access, field manual design and note taking, media usage, introduction to qualitative research software, generation of ideas and requirements, debriefing, visual and rapid ethnography for elicitation of stakeholder values and challenges for sustainability-oriented innovation and culture.
Learning Outcomes: In-depth knowledge how to perform your own field research in one of the application domains (design, marketing or organizational anthropology), advanced know how to generate insights for SOI.

- 4) **Methods:** Participatory Observation, Face-to-Face Interviews, Field Visits, Shadowing, Diary Studies, Cultural Probes, Interactive online formats of inquiry and remote field research; analysis of field data through profiling, pattern recognition and insight synthesis.
Learning Outcomes: In-depth knowledge and professional application of suitable methods for data collection and analysis, and interpretation to facilitate the development of SOI innovation cultures.

- 5) **Case studies:** Review and discussion of seminal and recent case studies; walkthrough the research process and key findings on building values-based innovation cultures for sustainable business impact; implications for sustainable innovation management.
Learning Outcomes: Highly specialized know how to efficiently combine methods to achieve focused results; advanced understanding how business anthropology addresses existential business challenges like values alignment or tensions between strategy and culture.

Module structure, number of hours/semester:

Semester	points ECTS	Assessment (Exam/Test)	Lecture	Exercise	Laboratory	Computer lab	Design	Seminar
1	3	Presentation	10h	15h	-	-		5h

Program content (separately for each class):

Classes	Topics	Hours
Lecture 1	Business Anthropology history, principles, application domains, introduction to concepts of sustainability, organisational values and innovation cultures	3
Lecture 2	Methodology: Research process and alternative designs, including formulation of ethnographic research questions, methods, quality criteria for qualitative research.	3
Project 3	SOI Culture (Practise): Preparation of field research, and of profile templates for storytelling and pattern recognition.	3
Project 4	SOI Culture (Practise): Field visits and documentation of ethnographic profiles.	3
Project 5	SOI Culture (Practise): Storytelling and Pattern recognition.	3
Project 6	SOI Culture (Practise): Insights synthesis.	3
Project 7	SOI Culture (Practise): Writing and Refinement of Insights.	3
Seminar 8	SOI Culture (Practise): Result Presentations.	5
Lecture 9	Case studies (historical cases): Research processes and key findings on SOI cultures for sustainable business impact;	2
Lecture 10	Implications for sustainable innovation management and the development of SOI cultures	2

Teaching methods:
Lectures

1) *Projects - Research-based learning process in 5 steps: 1) Development or reformulation of research questions; 2) Review sustainability-oriented scientific knowledge on the selected topic; 3) Methodology, Selection and application of methods; 4) Student cooperation and participation (interaction with external respondents, data analysis and interpretation).*

5) *Generation, presentation and evaluation of results or new ideas and concepts*

1) *Seminar – presentation and discussion*

2) *Tutoring*

Student workload

Activities	Number of hours (average)
Contact in person with the teacher, including:	

Hours as in the study plan	30
Subject consultation/tutoring	5
Exams and tests	5
Hours with no teacher present (resulting from the student's workload), including:	
Homework, including the study of literature on the subject	10
Discussion on results	5
Work on a report, project, presentation, discussion	20
The total number of course hours (total student workload)	75
The total number of ECTS points for the course	3.00

Verification and evaluation of learning outcomes:

Formative grade:

Each criterion evaluated from 1 to 100 points:

1) Presentation (70%), evaluation criteria:

- *Comprehensiveness (Precision and relevancy of the key issues, concepts and methodology, quality and depth of discussion, logical structure)*
- *Oral presentation of content, interaction with course participants; preparation and form of handout or an exercise with the course participants; readability & visualization*
- *Originality and development of an own unique perspective, methodological approach, integration of own findings with theoretical approaches*
- *Formal criteria (scope, citation, referencing versus own contributions, vocabulary)*

2) Documentation (20%): Elaboration of presentation in a self-explaining document with all references (connected to the presentation as a PowerPoint Presentation or a text document, assessed for structure, content and form).

3) Collaboration during course and project (10%)

Overall grade:

1) Presentation

Literature:

1. Bockhahn, S. R., & Schwarz, H. Anthropology as a tool for business innovation, in: Ethnoscritps 12 (2) 2010
2. Breuer, H., Ivanov, K., Abril, C., Dijk, S., Monti, A., Rappaccini, M., & Kasz, J. Building Values-based Innovation Cultures for Sustainable Business Impact. Proceedings of ISPIM Innovation Conference 2021, Berlin, pp. 1-31
3. Breuer, H. Eliciting stakeholder values for strategic and values-based innovation management. Proceedings of XXXIII ISPIM Conference, 2022

4. Cefkin, M. Ethnography and the Corporate Encounter New York: Berghahn Books, 2009
5. Jordan, A. Business Anthropology. 2nd edition. Long Grove, IL: Waveland Press, 2013
6. Spradley, J.P. The ethnographic interview Wadsworth, CA: Cengage Learning, 1979
7. Boenink, M. & Kudina, O. Values in responsible research and innovation: from entities to practices. Journal of Responsible, Innovation, Vol. 7, No. 3, 450–470 (2020).
8. Breuer, H. & Ivanov, K. Sustainable Innovation Cultures, deGruyter (forthcoming 2024)
9. Mariampolski, H. Ethnography for Marketers. A Guide to Consumer Immersion, 2005, Thousand Oaks, CA: Sage
10. Sutherland, P., & Denny, R. Doing Anthropology in Consumer Research, Walnut Creek, CA: Left Coast Press

Information about teachers:

Henning Breuer (Ph.D.) is founder of UXBerlin – Innovation Consulting (www.uxberlin.com) and professor of business psychology at the University of Applied Sciences for Media, Communication and Management in Berlin, Germany. His consulting work for clients such as General Motors, PSA Groupe, Dropbox or Lufthansa Systems focuses on innovation management and culture, sustainable business models, future scenarios, and ethnographic researchethnographic field research. For Deutsche Telekom set up a project field for User Driven Innovation as research and innovation director. As visiting professor and researcher he also worked at the University of Chile (Santiago), the University of Applied Sciences in Potsdam and WasedaUniversity (Tokyo).

Kiril Ivanov (M. A.) is a doctoral student at the center for sustainability management of the Leuphana University Lüneburg. He also works as a research assistant at the HMKW University of Media, Communication and Management, Berlin, where he currently supports the IMPACT Erasmus+ project and teaches in the Innovation and Entrepreneurship and Business Anthropology. Prior to that, he graduated as a Master of Business Psychology and worked for UXBerlin - Innovation Consulting, where he supported projects on values-based innovation management and ethnographic research. After studying psychology and doing a doctorate at RWTH Aachen University, **Eva Eick (Ph.D.)** has been working as a professor for media and business psychology at HMKW Cologne since 2012, with a focus on work psychology, UX and humane work design. She also advises companies in the area of occupational health and the effects of digitization as well as humane work and technology design.

Person responsible for the module: Prof. Dr. Henning Breuer

Lecturer(s): Prof. Dr. Henning Breuer; Kiril Ivanov; Dr. Eva Eick; Dr. Arito Rüdiger Sakai

Sustainability-oriented Communication in Organizations

Institution: Complutense University of Madrid

For students in the academic year 2023-24 Complutense University

Course title no 1 (native language)	<i>La Comunicación de la Sostenibilidad en la empresa</i>
Course title no 1 (English)	<i>Sustainability-oriented Communication in Organizations</i>
Language	<i>Spanish/English</i>

Field of study: all

Study profile: *general academic*

Level of study: *First (Undergraduate) level or second (Master in Science) level*

Field: Business Management, Communication

Discipline(s): all disciplines related to innovation and sustainability

Prerequisites for students: none

Objectives of the course:

1) The objective of this course is to equip students with knowledge and skills to effectively communicate sustainability initiatives and objectives within an organizational context. Through theoretical and practical approaches, students will learn how to develop and implement communication strategies that promote sustainability and engage stakeholders.

Learning outcomes:

By the end of this module students will be able to :

1. Knowledge: students gain an awareness of the importance of sustainability in organizations and of the critical role of the internal and external communication of the sustainability efforts
2. Knowledge: students know how to identify sustainability issues and challenges in the context of external and internal communication
3. Skills: students are capable to develop effective communication strategies that support sustainability objectives
4. Skills: students are capable to evaluate the effectiveness of sustainability communication initiatives
5. Knowledge: Understand the role of stakeholders in sustainability communication

6. Social Competence: students are able to advise on best practices to develop effective stakeholder engagement in sustainability communication

Module structure, number of hours/semester:

Semester	points ECTS	Assessment (Exam/Test)	Lecture	Exercise	Laboratory	Computer lab	Design	Seminar
	3	Test and Case project	20	2	-	-	4	4

Program content (separately for each class):

Classes	Topics	Hours
Lecture 1	Introduction to Sustainability in Organizations	2
Lecture 2	Introduction to Communication in Organizations	2
Lecture 3	Sustainability Issues and Challenges in Internal and External Communication	2
Lecture 4	Stakeholder Analysis and Engagement in Sustainability Communication. Materiality analysis.	2
Lecture 5	Developing Sustainability Communication Strategies and Plans	2
Lecture 6	Developing Sustainability Communication Plans- Case analysis discussion	4
Lecture 7	Implementation of Sustainability Communication Strategies and media planning	2
Lecture 8	Measuring Effectiveness of Sustainability Communication	2
Lecture 9	Sustainability Communication Ethics	2
Test		2
Seminar	Group work and Presentation of the results of the project work	8

Teaching methods:

- 3) Lectures
- 4) Cases
- 5) Projects
- 6) Seminar – presentation, and discussion

Student workload

Activities	Number of hours (average)
Contact in person with the teacher, including:	
Hours as in the study plan	30
Subject consultation/tutoring	8
Hours with no teacher present (resulting from the student's workload), including:	
Homework, including the study of literature on the subject	12
Discussion on results	
Work on a report, project, presentation, discussion	25
The total number of course hours (total student workload)	75
The total number of ECTS points for the course	3.00

Verification and evaluation of learning outcomes:

Formative grade:

1) Team project, with presentation and discussion of a sustainability-oriented communication strategy for a real case

Overall grade:

1) Test and Project presentation

Evaluation criteria:

Grade 2.0	Did not meet the requirements for a positive grade
Grade 3.0	The student is able to develop and implement a sustainability oriented communication strategy. Scored between 50% and 60% of the correct answers on the test. Fair analysis and proposal of the case project.
Mark 3.5	The student is able to develop and implement a sustainability oriented communication strategy. Scored between 61% and 70% of the correct answers on the test

Grade 4.0	The student is able to develop and implement a sustainability oriented communication strategy. Scored between 71% and 80% of the correct answers on the test.
Mark 4.5	The student is able to develop and implement a sustainability oriented communication strategy. Scored between 81% and 90% of the correct answers on the test.
Grade 5.0	The student is able to develop and implement a sustainability oriented communication strategy. Scored more than 90% for the correct answers on the test.

Literature:

1. Allen, M. (2016). Strategic communication for sustainable organizations. *Theory and Practice*. Fayetteville, USA: University of Arkansas.
2. Godemann, J., & Michelsen, G. (2011). *Sustainability communication—an introduction* (pp. 3-11). Springer Netherlands.
3. Epstein, M. J., & Buhovac, A. R. (2014). Making sustainability work: Best practices in managing and measuring corporate social, environmental and economic impacts. Routledge.
4. Linnenluecke, M. K., & Griffiths, A. (2010). Corporate sustainability and organizational culture. *Journal of World Business*, 45(4), 357-366.
5. Lüdeke-Freund, F., Breuer, H., & Massa, L. (2020, June). Sustainable business model design.

Information about teachers:

Carmen Abril, Professor of Marketing, Faculty of Business and Economics, Complutense University of Madrid

Person responsible for the course:

Carmen Abril: cabrilba@ucm.es

Lecturer(s):TBD

Social impact assessment of a service-based remanufacturing business model

Institution: University of Florence

For students in the academic year 2023-24 at the School of Engineering, University of Florence

Course title no 3 (native language)	<i>Modello di valutazione dell'impatto sociale di un business di remanufacturing integrato a servizi avanzati</i>
Course title no 3 (English)	<i>Social impact assessment of a service-based remanufacturing business model</i>
Language	<i>Italian/English</i>

Field of study: all

Study profile: *general academic*

Level of study: *second (Master of Science) level*

Field: Management Engineering; Mechanical Engineering; Mechanical Engineering for Sustainability

Discipline(s): all disciplines related to innovation and sustainability

Prerequisites for students: none

Objectives of the course:

- 1) understanding of the social aspect of sustainability with particular emphasis on the transformation of the business models and strategies of industrial firms (e.g., adoption of circular business models, servitization, advanced services, end-of-life services such as remanufacturing, revamping, refurbishment, etc.).
- 2) analysis of the models (data, procedures, metrics, KPI's) for Social Impact Assessment (SIA)
- 3) application of the SIA models in cases and real examples.

Learning outcomes:

- 1) **Social dimensions of sustainability in B2B settings.** Product vs Service-Oriented Business Models in some B2B industries (e.g. turbomachines, machines tools, printing industries)

Learning Outcomes (knowledge): Students know how to identify product and service-oriented Business Models (BM) in selected B2B industries. Distinguish the main characteristics of both BM (product and service oriented). Describe the basic concepts of sustainability and of the three dimensions, with a focus on the social dimension. Exemplify the complexity of social.

2) **Social Impact Assessment models:** Comparison of the social impact of different business solutions and of the corresponding business models and design choices.

Learning Outcomes (knowledge): Students know how to explain the basic concepts of the Social Impact Assessment model. Identify the features and implications of sustainable innovations in industrial contexts. Distinguish the possible design choices related to solutions with a social impact for a business and identify the consequent implications in the BMs.

3) **Sustainability Measures:** Development of measures of the social impact of service-oriented business models.

Learning Outcomes (skills): Students are capable to describe the main characteristic of remanufacturing services. Interpret the social impact of service-oriented industrial initiatives such as remanufacturing services. Interpret the social impact of an industrial initiative that shifts to advanced services.

4) **Project Work:** Measuring the social impact of a case example (Remanufacturing).

Learning Outcomes (skills and social competence): Students are able to identify the variables related to social impact in a real case of remanufacturing. Apply the SIA model to at least one real case of remanufacturing. Identify alternative paths that could be undertaken with the results coming from the application of the SIA model. Students are able to advise on best practices and make recommendations on Social Impact Assessment in a business

Module structure, number of hours/semester:

Semester	points ECTS	Assessment (Exam/Test)	Lecture	Exercise	Laboratory	Computer lab	Design	Seminar
	3	test	17 h	-	-	-	8	5

Program content (separately for each class):

Classes	Topics	Hours
Lecture 1	Overview of the basic concepts of sustainability and circular economy.	2
Lecture 2	Overview of the main circular business models.	2
Lecture 3	Features, barriers, and benefits of a remanufacturing and service-based Business Model.	2
Lecture 4	The social dimension of sustainability: meaning and methods for the evaluation.	2
Lecture 5	Presentation of the developed Social Assessment Model.	2
Lecture 6	Workshop with company managers to illustrate some real examples of remanufacturing initiatives.	6
Lecture 7	Exams and Test.	2
Project	Application of the model to a business case.	8
Seminar	Presentation of the results of the project work.	4

Teaching methods:

- 1) *Lectures*
- 2) *Projects*

- 3) Seminar – presentation, and discussion
- 4) Tutoring

Student workload

Activities	Number of hours (average)
Contact in person with the teacher, including:	
Hours as in the study plan	30
Subject consultation/tutoring	6
Exams and tests	2
Hours with no teacher present (resulting from the student's workload), including:	
Homework, including the study of literature on the subject	12
Discussion on results	
Work on a report, project, presentation, discussion	25
The total number of course hours (total student workload)	75
The total number of ECTS points for the course	3.00

Verification and evaluation of learning outcomes:

Formative grade:

- 1) Team project, with presentation and discussion of the application of the SIA model to a real case

Overall grade:

- 1) Written test

Evaluation criteria:

Grade 2.0	Did not meet the requirements for a positive grade
Grade 3.0	The student is able to develop and apply indicators to assess the social impact of a service-based remanufacturing business model. Scored between 50% and 60% of the correct answers on the test.
Mark 3.5	The student is able to develop and apply indicators to assess the social impact of a service-based remanufacturing business model. Scored between 61% and 70% of the correct answers on the test.

Grade 4.0	The student is able to develop and apply indicators to assess the social impact of a service-based remanufacturing business model. Scored between 71% and 80% of the correct answers on the test.
Mark 4.5	The student is able to develop and apply indicators to assess the social impact of a service-based remanufacturing business model. Scored between 81% and 90% of the correct answers on the test.
Grade 5.0	The student is able to develop and apply indicators to assess the social impact of a service-based remanufacturing business model. Scored more than 90% for the correct answers on the test.

Literature:

1. Chou, C. J., Chen, C. W., & Conley, C. (2015). An approach to assessing sustainable product-service systems. *Journal of Cleaner Production*, 86, 277-284
2. Contini, G., & Peruzzini, M. (2022). Sustainability and Industry 4.0: Definition of a Set of Key Performance Indicators for Manufacturing Companies. *Sustainability*, 14(17), 11004.
3. Corvo, L., Pastore, L., Manti, A., & Iannaci, D. (2021). Mapping social impact assessment models: A literature overview for a future research Agenda. *Sustainability*, 13(9), 4750.
4. Goodall, P., Rosamond, E., & Harding, J. (2014). A review of the state of the art in tools and techniques used to evaluate remanufacturing feasibility. *Journal of Cleaner Production*, 81, 1.
5. Hazen, B. T., Boone, C. A., Wang, Y., & Khor, K. S. (2017). Perceived quality of remanufactured products: construct and measure development. *Journal of Cleaner Production*, 142, 716-726.
6. Lüdeke-Freund, F., Gold, S., & Bocken, N. M. (2019). A review and typology of circular economy business model patterns. *Journal of Industrial Ecology*, 23(1), 36-61.

Information about teachers:

Mario Rapaccini, professor of innovation management, school of engineering, University of Florence

Person responsible for the module:

Maria Spadafora: maria.spadafora@unifi.it

Lecturer(s):

Maria Spadafora, PhD candidate in Mechanical and Industrial Engineering, University of Brescia; Researcher, Department of Industrial Engineering, University of Florence; Research affiliate, Interuniversity Research Center ASAP Service Management Forum; short bio (after +10 years of experience in managerial role in major brands of the fashion industry, today she is doing research in the field of sustainable innovation and social impact assessment).

Sustainable innovation in engineering practice

Institution: Cracow University of Technology

Course title no 4 (native language)	<i>Dobre praktyki dla zrównoważonego rozwoju</i>
Course title no 4 (English)	<i>Sustainable innovation in engineering practice</i>
Language	<i>Polish/English</i>

Field of study: ***all***

Study profile: ***general academic***

Level of study: ***first (bachelor) level or master level***

Field: ***engineering and technical sciences***

Discipline(s): ***environmental engineering, mining and energy, chemical engineering, biotechnology***

Objectives of the course:

- 1) Introduction of basic concepts related to the principles of sustainable development
- 2) Overview of conditions for implementing innovations based on the principles of sustainable development and good practices applicable in business for sustainable development

Learning outcomes:

- 1) Knowledge: The student knows and understands the issues and basic concepts related to the principles of sustainable development
- 2) Knowledge: The student knows and understands the conditions for implementing innovations based on the principles of sustainable development
- 3) Skills: The student is able to apply the principles of sustainable development to create the concept of a business model
- 4) Social competence: The student is ready to inspire and take action towards sustainable development in society and business

Course structure, number of hours/semester:

Semester	points ECTS	Assessment (Exam/Test)	Lecture	Exercise	Laboratory	Computer lab	Design	Seminar
3	3	Test	15 h	-	-	-	10 h	5 h

Program content (separately for each class):

Classes	Topics	Hours
Lecture 1	Introduction to sustainable development issues. Definitions and basic principles.	2

Lecture 2	Business models: Business Model Canvas and Value Proposition.	2
Lecture 3	Legal conditions for SOI implementation.	2
Lecture 4	Company values. Integration of the company's values with the values of external stakeholders and its impact on the investment outcome.	2
Lecture 5	Barriers created by limited resources and different systems of values. Market requirements and regulations as both chances and barriers for sustainable development innovations.	2
Lecture 6	Market requirements for introducing SOI.	2
Lecture 7	Methods and practices supporting development of sustainable innovations and their introduction to the market.	2
Lecture 8	Test	1
Project	The concept of a business model including the principles of sustainable development.	10
Seminar	Business models presentations by students.	5

Teaching methods:

- 5) *Lectures*
- 6) *Projects*
- 7) *Seminar – presentation and discussion*
- 8) *Tutoring*

Student workload

Activities	Number of hours (average)
Contact in person with the teacher, including:	
Hours as in the study plan	30
Subject consultation/tutoring	5
Exams and tests	3
Hours with no teacher present (resulting from the student's workload), including:	
Homework, including the study of literature on the subject	15
Discussion on results	-
Work on a report, project, presentation, discussion	22
The total number of course hours (total student workload)	75
The total number of ECTS points for the course	3.00

Verification and evaluation of learning outcomes:

Formative grade:

- 1) *Team project*
- 2) *Presentation and discussion*

Overall grade:

- 1) *Written test*

Evaluation criteria:

Grade 2.0	Did not meet the requirements for a positive grade
Grade 3.0	Can create and present a business model and prove in a discussion that it was based on the principles of sustainable development. Scored between 50% and 60% of the correct answers on the test
Mark 3.5	Can create and present a business model and prove in a discussion that it is based on the principles of sustainable development. Scored between 61% and 70% of the correct answers on the test
Grade 4.0	Can create and present a business model and prove in a discussion that it was based on the principles of sustainable development. Scored between 71% and 80% of the correct answers on the test.
Mark 4.5	Can create and present a business model and prove in a discussion that it is based on the principles of sustainable development. Scored between 81% and 90% of the correct answers on the test.
Grade 5.0	Can create and present a business model and prove in a discussion that it was based on the principles of sustainable development. Scored more than 90% for the correct answers on the test.

Literature:

1. Chesbrough, H. (2010). Business model innovation: opportunities and barriers. *Long range planning*, 43(2-3), 354-363.
2. Ho, J. K. K. (2014). Formulation of a systemic PEST analysis for strategic analysis. *European academic research*, 2 (5), 6478-6492.
3. Homburg, C., Klarmann, M., & Vomberg, A. (eds.). (2022). *Handbook of market research*. Springer.
4. Knudson, H. (2023). Business Models for Sustainability. In: Fet, A. M. (eds.) *Business Transitions: A Path to Sustainability*. Springer, Cham. https://doi.org/10.1007/978-3-031-22245-0_10
5. Koziol-Nadolna, K., Beyer, K. (2021). Barriers to innovative activity in the sustainable development of public sector organizations. *Procedia Computer Science*, 192, 4376–4385.
6. Osterwalder, A., Pigneur, Y. (2012). *Tworzenie modeli biznesowych. Podręcznik wizjonera*. Wydawnictwo Helion.
7. Wasiluk, A. (2003). Bariery wprowadzania innowacji w przedsiębiorstwach, *Zeszyty Naukowe Politechniki Białostockiej: Ekonomia i Zarządzanie*, 8, 319-336.

Information about teachers:

dr inż. Piotr Beńko, prof. PK - professor at Faculty of Environmental Engineering and Energy of the Cracow University of Technology

mgr. inż. Małgorzata Ciesielska, MBA - innovation broker at the Cracow University of Technology

dr inż. Jacek Kasz - director of the Technology Transfer Center of the Cracow University of Technology

dr hab. inż. Katarzyna Matras-Postołek, prof. PK – professor at Faculty of Chemical Engineering and Technology of the Cracow University of Technology

dr inż. Irena Śliwińska – assistant professor, Department of Market Analysis and Marketing Research, Krakow University of Economics

Person responsible for the curriculum: dr hab. inż. Katarzyna Matras-Postołek, prof. PK
k.matras@pk.edu.pl

Lecturer(s): dr inż. Piotr Beńko, prof. PK, mgr. inż. Małgorzata Ciesielska, MBA, dr inż. Jacek Kasz, MBA, dr hab. inż. Katarzyna Matras-Postołek, prof. PK, dr inż. Irena Śliwińska