Deliverable Report

HEI Project	
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Deliverable	
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1. Executive Summary

This report presents deliverable D3.1 that focus on teaching modules for innovation and entrepenurship curricula. A peer-to-peer training program was established to achieve this deliverable. Constructive alignment was adopted in this training programme to develop and share teaching modules with project partners. The report includes details on the template developed to share curricula as well as descriptive summaries of curriculas shared.

CONTENTS

2 Introduction

The project "Nordic Baltic Universities boosting entrepreneurial and innovation support systems (NOBALIS)" is implemented by a consortium of five higher education institutions (HEIs) and two innovation support organizations from the Nordic and Baltic region. NOBALIS is part of HEI Initiative program of the European Institute of Innovation & Technology (EIT) (cohort 2) and is supported by EIT Food and funded by the European Union. The overall objectives of NOBALIS are:

- To integrate innovation and entrepreneurship as part of daily routines in all parts of the activities of higher education institutions (HEIs),
- To leverage the integration of HEIs and their contribution to the innovation ecosystem through close collaboration on the part of a variety of knowledge triangle stakeholders.

The present document is the deliverable of the work package WP3. Enhancing the quality of innovation and entrepreneurship (I&E) education.

2.1 Enhancing the quality of I&E education

WP3 aims to enhance the quality of innovation and entrepreneurship education. A peer-to-peer training program was established to achieve this aim. Participants in the training program developed teaching modules for I&E curricula with guidelines. Curricula (teaching modules) developed in phase 1 (July – December 2022) will be made available for educators and trainers in the HEIs in NOBALIS project and will be implemented in the NOBALIS partner institutions during the second half of phase 1.

- This report focus on Deliverable 3.1 - teaching modules for innovation & entreprenurship (I&E) curricla with guidelines; *Guidelines that capture lessons learned from training programs and development of curricula, completed in phase 1. Curricula (teaching modules) developed in phase 1 will be made available for educators and trainers in the HEIs in NOBALIS.*

A peer-to-peer training program (WP task 3.1) was established to achieve this deliverable. Participants in the training program develops teaching modules for I&E curricula with guidelines. Curricula (teaching modules) developed in phase 1 are made available for educators and trainers in the HEIs in NOBALIS. Curricula in this context refers to a taught module that includes 1) intended learning outcomes, 2) teaching and learning activities and 3) assessment task, that encompasses

approx. 1.5 Credits (or 40 hours of work). This means that an I&E curricula is not a full course, but a part of a course. For example, if a course on Industrial management is 5 ECT, the teaching module on innovation is 1,5 ECT. This framing of a curricula, as a specific teaching module rather than a full course, is adopted to enable teaching practices to be shared between the partners.

2.2 The peer-to-peer training programme

The peer-to-peer training programme for academics, in phase 1 of the Nobalis project, is organised into 3 interrelated workshops:

- The purpose of workshop 1 (23.08.22) was to develop a structure for peer-to-peer training programme, which can be deployed to enhance quality of innovation & entrepreneurship education. Prior to the workshop, the participants were asked to prepare a presentation of their I&E teaching practices and modules of interest. Structure for the curricula and guidelines was identified. The concept of constructive alignment (see Biggs and Tanng, 2011[1]) were selected by task leaders as structure to share good teaching practice.
- The purpose of workshop 2 (12.09.22) was to introduce the structure of constructure alignment to participants in the training programme as well as to test the appropriatness of this framework to facilitate peer-to-peer learning as well as to share descriptive summaries of good I&E teaching practices.
- The purpose of workshop 3 is to learn about the implementation of curricula in each HEI in the phase 1. The workshop will be conducted in December 2022.

The annex of present deliverable report contains the guidelines for co-development of curricula and structured summaries of modules developed by NOBALIS partners in the phase 1.

2.3 Template for sharing I&E teaching practices

The approach deployed in Nobalis for sharing I&E curriucals (D3.1) is inspired by the concept of constructive alignment (see Biggs and Tanng, 2011). An overview of constructive alignment is

[1] The guidelines for describing good teaching practices is inspired by the concept Constructive Alliance, for reference see Biggs, J. and Tang, C. 2011 *Teaching for Quality Learning at University.* Open University Press, UK.

presented in Table 1, and detailed template for codifying curriculas is displayed in Appendix 3.1. This concept was introduced and tested by the participants in the peer-to-peer training program. The participants where asked to codify their curriculas using the concept of constructive alignment. The tangible outcomes from Workshop 1 and 2 includes descriptive summaries of I&E taught modules (see Appendix 3.2).

Table 1: template for sharing good teaching practice

Curricula themes	Meaning
Teaching context	Information about educational programme, course name/code, level, nr of students, total ETC; and aprox ECT for the I&E
Intended learning outcome (ILO)	What are the students expected to learn?
Teaching and Learning Activities (TLA)	What teaching and learning activities are deployed to help students achieve the intended learning objectives
Assessment Task (AT)	What methods are deployed to assess the students

The peer-to-peer training program will meet in two additional workshops in phase 1 to compare and contrast I&E curricula at each HEI as well as to identify measures to improve the quality of I&E curricla.

Annexes

Annex 3.1 template for describing I&E curricula

Template	*Meaning*
Course name	*What is the course name*
Classification	*Innovation and/ or Entrepreneurship*
Course code	*What is the course code*
Course period	*Start and end of taught module*
Educational program	*What is the name of educational program*
Educational level	*What level, e.g. Bachelor; master, doctoral*
Responsible institution	*What responsible institution delivers the course*
Teacher	*What person delivers the taught module: name and email*
Country	*Country*
Approx nr. of ECT	*What is the approx. nr of credits for curricula*
Intended Learning Outcome	*Define the learning outcome: What are (or is) the intended learning outcome of the taught module, what are the students expected to learn? Explain verb and/or skill*
Teaching & Learning Activity	*What do you as teaching do to help the students achieve the learning outcome; what teaching practices do you deploy*
Assessment Task	*What method do you deploy to assess that students have achieved learning outcome*
Course literature/ material	*Literature reference list/ Complementary teaching material*

Appendix 3.2 Curriculas

Tabel 1: An Innovation curricula at SLU

Template	*Descriptive summary*
Course name; ECT	*Industrial Management and Sustainable Innovation (5 ECT)*
Classification	*Innovation*
Course code;	*FÖ0477*
Educational program	*Energy system*
Educational level	*Introductory/ level 1*
Approx nr. of students	*15*
Responsible faculty/ institution	*the Department of Economics, at SLU*
Teacher	*Per-Anders Langendahl; per-anders.langendahl@slu.se*
Country	*Sweden*
Name of the I&E taught module	*Innovation for sustainability:* *A group project investigation to analyze and discuss business opportunities and challenges for sustainable innovation in energy- as well as environmental technology sectors*
Intended LO	• *To demonstrate an understanding of innovation conceptualised as outputs and process* • *To analyse and discuss business opportunities and challenges for sustainable innovations* • *Generic skills: Information literacy, critical discussion, oral and written communication, teamwork*
Teaching & Learning Activity	• *Lecture that introduce innovation and the assignment* • *Group project investigation/ Case based learning (ca 30 hrs): Students are asked to identify a sustainability initiative within their sector (e.g. energy-, water engineering), and complete a case study guided by these questions: what is the purpose of the initiative?; what problem does the initiative aim to address, and for whom?; what are the expected effects of implementing the initiative? Analyse and discuss opportunities and challenges for implementing innovation* • *Complementary resources: Literatures and websites – selection of chapters from course literature and journal papers: Supervision*
Assessment Task	• *Seminar: Student groups prepare and present a 15 min power point* • *Reporting: Submit a 1000 word report (excluding references, tables and figures); Report template: Title/ authors; The sustainability initiative; Opportunities and challenges for implementation; References* • *Assessment: Participating/ contributing to seminar/ report – Pass/ Fail*
Course literature	*Berkhout, F. Sustainable Innovation Management. In: Mark Dodgson, David Gann and Nelson Phillips (eds), The Oxford Handbook of Innovation Management, Oxford: Oxford University Press, 2014: 290-315.* *Trott, Paul. 2021. Innovation Management: An Introduction* *Geels, F.W., 2019. Socio-technical transitions to sustainability: a review of criticism and elaborations of the Multi-Level Perspective. Curr. Opin. Environ. Sustain. 39, 187–201.*

Table 2: An I&E curricula at NMBU

Template	*Information*
Course name	Biotechnology and Chemistry in Business Life
Classification	Industrial biotechnology
Course code	BIO235
Course period	Sep-Nov (Autumn parallel)
Educational program	B-BIOTEK/B-KJEMI/M-KB/M-BIOTEK/M-KJEMI
Educational level	BSc and MSc
Responsible faculty/ institution/ country	Faculty of Chemistry, Biotechnology and Food Science/University of Life Science/Norway
Responsible Teacher	Professor Knut Rudi
Approx ECT	5
Intended Learning Outcome	**Knowledge** • Knowledge of quality standards and legislation related to manufacturing in business • Knowledge of product development processes • Knowledge of risk assesment • Knowledge of documentation requirements • Knowledge of chemistry and biotechnology in business in Norway **Skills** • Be able to set up quality systems for simple services and products • Be able to perform risk assessment of products/processes • Be able to set up a plan for development of simple products • Be able to document products and processes **General competence** • Be able to work in business • Know about the interaction between business, government and academia
Teaching & Learning Activity	Lectures. Group tasks. Oral presentation. Excursion to companies. Career day (KBM).
Assessment Task	Skills in report writing and oral presentation, both must be passed. Evaluation of students 'learning will be based on their theoretical knowledge and understanding. Pass/Fail
Course literature/ material	Literature reference list/ Complementary teaching material/Presentations.

Table 3 I&E Curricula at EMU

Template	Descriptive summary
Course name; ECT	Entrepreneurship and Innovation Management (2 ECT)
Classification	Innovation
Course code;	EkonD125
Educational program	Agrarian and regional economics
Educational level	Doctoral studies
Approx nr. of students	10
Responsible faculty/ institution	Faculty of Economics and Social Development, LLU
Teacher	Anne Põder, anne.poder@emu.ee
Country	Latvia
Name of the I&E taught module	Research commercialization: Introduction to research commercialization, commercialization strategies and a group work on a case analysis
Intended LO	Upon completation of module, the students ▪ Can explain knowledge transfer and transfer channels ▪ Demonstrate understanding of research commericialization processes ▪ Can identify various types of intellectual property ▪ Can select and and evaluate commercialization strategies for scientific research ▪ Are capable of planning commercialization process for their idea ▪ Demonstrate skills for crticial analysis and team working
Teaching & Learning Activity	The module will combine lectures (3 hours); seminars (5 hours), independent work (30 hours) Lectures: introduction to knowledge transfer and commericialization, IPR and commercialization strategies. Seminars: discussion of reading materials, in class practical exercise, presentation of case analysis

	Independent work: reading material for seminars, group work on commercialization case analysis Practical exercise: students are divided into groups of 2-5 persons. Groups work in breakout rooms and select an idea from their research for commercialization, explain the related IPR, agree on a commercialization strategy, identify potential clients and risks. The group works are presented and discussed in the seminar. Group project: preparation of a case analysis of successful or unsuccessful commercialization. Students independently work in groups (2-5), find a case of successful or unsuccessful commercialization and analyse it based on a set of questions divided into four blocks: background of the case & opportunity recognition; commercialization process and strategy; market penetration and diffusion; lessons learned.
Assessment Task	Discussion and practical exercise in seminars: all students participate in seminar discussion and in the practical exercise Case analysis: groups submit 3000 word report on the case analysis and present the case in the seminar. Report and presenation is evaluated on a scale of 40 (24 points required to pass the module).
Course literature	European Commission. (2009). Metrics for Knowledge Transfer from Public Research Organisations in Europe. Brussels: Directorate-General for Research. Goldfarb, B., Henrekson, M. (2003). Bottom-Up versus Top-Down Policies towards the Commercialization of University Intellectual Property. Research Policy 32 (4), 639–658. Paul, M. J., Thangaraj, H., & Ma, J. K. (2015). Commercialization of new biotechnology: a systematic review of 16 commercial case studies in a novel manufacturing sector. Plant biotechnology journal, 13(8), 1209–1220. Duening, T.N., Hisrich, R.A, Lechter, M.A. (2020). Technology Entrepreneurship : Taking Innovation to the Marketplace. Academic Press. Trott, P. (2021). Innovation Management and New Product Development. Pearson. Zanetti, G. C (2019) Handbook on IP commercialisation. Stategies for Managing IPRs and Maximising Value. Jakarta: the ASEAN Secretariat.

Table 4: An I&E Curricula at EMU

Template	Descriptive summary
Course name; ECT	Basics of bioeconomy (4 ECT)
Classification	Entrepreneurship
Course code;	MI.1930
Educational program	Rural Entrepreneurship and Financial Management
Educational level	Bachelor studies
Approx nr. of students	38
Responsible faculty/ institution	Chair of Rural Economics, EMU
Teacher	Liis Oper, liis.oper@@emu.ee
Country	Estonia
Name of the I&E taught module	Bio-based business models: Development of a business model for biobased value chains
Intended LO	Upon completation of module, the students ▪ Understand value creation in biobased value chains ▪ Can explain different types of business models in bioeconomy context ▪ Know different types of business model canvases ▪ Are capable of developing a business model for a biobased business idea ▪ Demonstrate the ability to pitch their business idea ▪ Demonstrate entrepreneurial ability and team working skills in development of a business idea
Teaching & Learning Activity	The module will combine lecture (2 hours); seminar (2 hours), independent work (12 hours) Lecture: introduction to business models, elements of a business model, types of business models in bioeconomy, business model canvas as a planning tool, presenting a business model. Seminar: presentation of business model Independent work: reading material for seminars, group work on business model development Group project: development of a business model using business model canvas. Students independently work in groups (2-4), find an idea for development, use business model canvas to refine the idea, present the idea in the seminar.

Assessment Task	Groups submit the report on business models and present it. Report and presentation is evaluated on a scale of 20 (12 points required to pass the module).
Course literature	Bocken, N.M.P., Short, S.W., Rana, P., Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. Journal of Cleaner Production, 65, 42–56. Lüdeke-Freund, F., Carroux, S., Joyce, A., Massa, L., & Breuer, H. (2018). The sustainable business model pattern taxonomy—45 patterns to support sustainability-oriented business model innovation. Sustainable Production and Consumption, 15, 145-162. Osterwalder, A., Pigneur, Y. (2010). Business Model Generation. A Handbook for visionaries, game changers and challengers. New Jersey: John Wiley and Sons. Viira, A.-H.; Lillemets, J.; Põder, A.; Ariva, J.; Aro, K.; Lehtsaar, J.; Kogabayev, T.; Barth, H.; Ulvenblad, P.; Ulvenblad, P.-O.; Hermus, S.; Durchgraf, J. (2021). Report on Good Practice Business Models and Example Small and Medium Scale Pilot Business Projects for Sustainable Bioenergy and Side Bioproducts Production in the BSR.

Table 5: An I&E Curricula at LBTU

Template	Descriptive summary
Course name; ECT	Innovation in Business (3 ECT)
Classification	Innovation
Course code;	VadZ4078
Educational program	Economics
Educational level	Bachelor studies
Approx nr. of students	5
Responsible faculty/ institution	Institute of Business and Management, at LLU (LBTU)
Teacher	Elīza Līga Līdaka eliza.lidaka@lbtu.lv
Country	Latvia
Name of the I&E taught module	Innovation in business: Students gain theoretical knowledge of and practical skills in implementing innovation in an enterprise, assessing the innovations and designing an innovation strategy
Intended LO	• To know and understand the importance of the innovation infrastructure and the opportunities it offers for company development • Is able to integrate ideas and take decisions in the creation of innovation • Is able to choose and successfully apply the methods of managing creativity and innovation • Are able to plan the tasks assigned responsibly, make reasoned and reasonable conclusions
Teaching & Learning Activity	• Lecture (2 h) that introduces concepts of innovation, creativity & innovation, innovation infrastructure in university, region and country. • Training tour (3h) to the Business Incubator: Innovation infrastructure. Entrepreneurship and a process of commercialization of innovation. • Independent work (5h) for preparing the review of the Training tour • Practical works/group works (6h) : Creative thinking methods. Tools for the development of innovative solutions.

Assessment Task	• Review of the Training Tour and discussions about possibilities to gain support for innovation or for your innovative business idea • Practical works and Group works using the StoryBoard method and the Business Canvas method • Assessment: Participating in practical works/ contributing to Training Tour report – Pass/ Fail
Course literature	Von Stamm, B. (2008). Managing innovation, design and creativity. John Wiley & Sons. Daim, T. U., Dabić, M. B., JRN, L., & Galli, B. J. (2019). R&D Management in the Knowledge Era. Springer International Publishing. Goller, I., & Bessant, J. (2017). Creativity for innovation management. Taylor & Francis.

Table 6:: An I&E Curricula at LBTU

Template	Descriptive summary
Course name; ECT	Sustainable Development (3 ECT)
Classification	Development Studies
Course code;	Ekon3096
Educational program	Economics with specialization in Regional and Agrarian Economics
Educational level	Bachelor studies
Approx nr. of students	5
Responsible faculty/ institution	Institute of Economics and Regional Development, at LLU (LBTU)
Teacher	Gunta Grīnberga-Zalite gunta.grinberga@lbtu.lv
Country	Latvia
Name of the I&E taught module	Green Innovation: The course gives knowledge of the complex nature of development, in which three interrelated dimensions – economic growth, population prosperity and the environment – are equally important, while also stressing global problems that arise from ignoring the basic principles of sustainability. The course deals with such categories as eco-efficiency, the eco-innovation, green innovation and environmental and waste management systems

Intended LO	• To know and recognize the factors affecting sustainable development • Independently analyse and assess resources for development in the context of sustainability • See the global nature of local problems of sustainable development • Identify and assess local and global challenges for sustainable development • Knowledge of assessment of sustainable development dimensions: economic, environmental and social and make innovative solutions
Teaching & Learning Activity	• Lecture (3 h) general idea and elements of sustainability. The concept, substance, goals and tasks of sustainable development. Goals of sustainable development. Green economy. Green procurement. Environment-friendly goods and services • Practical work/group work (8h) Assessment of environmental indicators at the regional level. Urgency of sustainable development and future challenges • Independent work (5h) for preparing the review of the visibility of environment-friendly goods and informative material on urgent sustainable development problems.
Assessment Task	• Presentation and discussions about the visibility of environment-friendly goods and informative material on urgent sustainable development problems; • Practical work and Group work using the case analysis method and benchmarking method • Assessment: Pass/ Fail
Course literature	Bakari M. El-Kamel. The Dilemma of Sustainablility in the Age of Globalization: A Quest for a Paradigm of Development. Lanham: Lexington Books, 2017. 223 p. Brebbia C.A., Miralles i Garcia J.L. Environmental and Economic Impact on Sustainable Development. UK: WIT Press, 2017. 250 p. 25 Cases for Bioeconomy Innovation Around the Baltic Sea Region. RDI2CluB, 2020. ISBN: 978-9934-8940-0-8 Kopnina H., Poldner K. Circular Economy: Challenges and Opportunities for Ethical and Sustainable Business. Abingdon, Oxon; New York, NY: Routledge, 2022. 226 pp. ISBN: 978-0-367-41864-9

	Bhat R. Valorization of Agri-Food Wastes and By-Products: Recent Trends, Innovations, and Sustainability Challenges. London, UK; Cambridge, US: Academic Press Inc, 2021. 994 pp. ISBN: 978-0-12-824044-1