Syllabi of the SusTexEdu Learning units

WP2 RESULTS / 2024

Co-funded by the Erasmus+ Programme of the European Union

Education Partnership
of TCS Materials & Sustainability
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The Syllabi of the learning units

Module 1 - Textile fibres and yarns (Basics)

1.1 Definition, Classification and Properties of Textile Fibres 2 ECTS (4th and 6th levels)

1.2 Introduction to Production and Processes of Natural Textile Fibres 1 ECTS (4th and 6th levels)

1.3 Introduction to Production and Processes of Man-made Textile Fibres 1 ECTS (6th level)

1.4 Yarn classification and properties 1 ECTS (4th and 6th level)

1.5 Yarn production in basic level 1 ECTS (4th and 6th level)

Module 2 - Textile fibres and yarns (Progression)

2.1 Manufacturing technologies of man-made fibres 2 ECTS (6th level)

2.2 New fibre developments 1 ECTS (6th level)

2.3 Yarn production - advanced 1 ECTS (6th level)

2.4 Quality assessment and testing methods of textile fibres and yarns 1 ECTS (6th level)

2.5 Different aspects of sustainability and eco-friendliness of textile fibres 1 ECTS (6th level)

Module 3 - Textile structures and processing (Basics)

3.1 Basics of weaving 2 ECTS (6th level)

3.2 Basics of knitting 2 ECTS (4th and 6th level)

3.3 Basics of non-wovens 1 ECTS (4th and 6th level)

3.4 Textile printing, dyeing and pre-treatments 1 ECTS (4th and 6th levels)

3.5 Finishing: mechanical, thermal, chemical finishing 1 ECTS (4th and 6th level)

Module 4 - Textile structures and processing (Progression)

4.1 Advanced Weaving Technologies 1 ECTS (6th level)

4.2 Advanced Knitting Technologies 1 ECTS (6th level)

4.3 Advanced knitting technologies 1 ECTS (6th level)

4.4 Resource-efficient textile processes for dying, printing, coating and finishing 1 ECTS (6th level)

4.5 Quality control of fabrics, technical and smart textiles 2 ECTS (6th level)

Module 5 - Circular economy in textile and clothing (Basics)

5.1 Aspects of sustainability in the textile and clothing sector 1 ECTS (4th level)

5.2 Principles of circular economy 1 ECTS (4th and 6th levels)

5.3 Circular business models in the textile and clothing industry 1 ECTS (4th and 6th levels)

5.4 Sustainable design principles in the textile and clothing sector 2 ECTS (6th level)

5.5 Textile product health and safety regulations 1 ECTS (6th level)

5.6 Labels and certifications in the textile and clothing sector 1 ECTS (6th level)

5.7 Introduction of life cycle assessment tools 1 ECTS (6th level)

Module 6 - Circular economy in textile and clothing (Progression)

6.1 Systems thinking in the textile and clothing sector 1 ECTS (6th level)

6.2 Principles of textile waste management 1 ECTS (6th level)

6.3 Textile recycling opportunities 1 ECTS (6th level)

6.4 Circular business models in textile and clothing industry 1 ECTS (6th level) / piloted

6.5 Costing and pricing strategies for sustainable business models in the textile and clothing sector 1 ECTS (6th level)

6.6 Tools for assessing sustainability of product and value chain 1 ECTS (6th level)

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Syllabus

1.1 Definition, Classification and Properties of Textile Fibres

Reference Code: 1.1
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 2 ECTS / 2 ECVET
Education Level (6/4): 6&4
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: Introductory level
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile technology
Subject Area: Textile Fibres and Yarns
Prerequisites: None
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Certificate awarded: tbd

Content:	Definition and classification of textile fibres, their properties and areas of use. Basic knowledge for identifying textile fibres from their microscopic view.
Intended Learning Outcomes:	After completing the unit the student is able to classificate textile fibres by origin, to manage the general terms regarding their characteristics and properties, to identify both natural and manmade fibres, their structures, properties and uses, and recommend them for a given end use by noting the environmental aspects, to identify different fibres by burning test.
Teaching Methods:	tbd, e.g. lectures, group and individual tasks and interactive learning
Assessment Methods:	tbd

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Study Materials:	Textiles and Fashion; Materials, Design and Technology. Rose Sinclair 2014. International textile fibre abbreviations https://textileexchange.org/materials/ https://www.textiletoday.com https://www.fabriclink.com/University/Char.cfm https://www.fabriclink.com/University/History.cfm https://www.fabriclink.com/University/BurnTest.cfm https://www.cotton.org/pubs/cottoncounts/story/ https://iwto.org/sustainability/
Miscellaneous:	

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Syllabus

1.2 Production Processes of Natural Textile Fibres

Reference Code: 1.2
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS / 1 ECVET
Education Level/Cycle (6/4): 6&4
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: Introductory level
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile Technology
Subject Area: Textile Fibres and Yarns
Prerequisites: 1.1 or equivalent
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Reward Certificate: tbd

Content:	Basic knowledge about different manufacturing processes of natural fibres. Knowledge about the production of various natural fibres. Environmental sustainability aspects based on different areas of use.
Intended Learning Outcomes:	After completing the unit the student is able to understand the production methods of the natural fibres, the effect that the cultivation, harvest and fibre extraction of the vegetable and animal fibres causes to the environment.
Teaching Methods:	tbd, e.g. blended learning (on-site and online learning)
Assessment Methods:	tbd, e.g. individual assignment
Study Materials:	Kadolph, S. J., & Marcketti, S. B. (2017). *Textiles*. Pearson. Cohen, A. C., Johnson, I., & Pizzuto, J. J. (2012). *J.J. Pizzuto's fabric science*. Fairchild Books. Corbman, B. P. (1985). *Textiles: Fiber to fabric*. McGraw-Hill. Collier, B. J., Bide, M. J., & Tortora, P. G. (2009). Understanding textiles. Pearson Education.

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Miscellaneous:	VIDEOS with keywords: Likhang Piña: Fiber Extraction Process How Cotton is Processed in Factories How was it made? Linen Wool Production and Processing How silkworms make silk

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1.3 Production processes of man-made textile fibres

Reference Code: 1.3
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS / ? ECVET
Education Level/Cycle (6/4): 6&4
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: basics
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile technology
Subject Area: Textile fibres and Yarns
Prerequisites: 1.1 or equivalent
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Reward Certificate: tbd

Content:	Basic knowledge about different manufacturing processes of man-made fibres. Knowledge about the production of various man-made fibres. Environmental sustainability aspects based on different areas of use.
Intended Learning Outcomes:	After completing the unit the student is able to understand the production methods of man-made fibres and their effect on the environment.
Teaching Methods:	tbd, e.g. blended learning (on-site and online learning)
Assessment Methods:	tbd, e.g. individual assignment
Study Materials:	Thompson, R. „Manufacturing Processes for Textile and Fashion Design Professionals“ 2014 Kadolph, S.J. „Textiles“ 2010 Pizzuto, J.J. „Fabric Science“ 2012 Sarkar, A.K., Johnson, I., Cohen, A.C. „J.J.Pizzuto´s Fabric Science“ 2023 (p. 47-56) Sinclair, R. „Textiles and Fashion. Materials, Design and Technology“ 2015 Elsasser, V.H. „Textiles. Concepts and Principles“ 2010 Gries, T., Veit, D., Wulfhorst, B. „Textile Technology“ 2015 (p.50-86)

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	Collier, B.J. „Understanding Textiles“ 2009 The Textile Institute „Textile terms and Definitions“ 2002
Miscellaneous:	VIDEOS from topics: Wet Spinning Line for Producing Fibers from Cellulose, Dry & Wet Spinning | Solution Spinning | Man made Fiber Production | Explained | TexConnect The Viscose Fibre Line The production of viscose fibres at Kelheim Fibres GmbH Lenzing Modal Textile Innovative by nature: How wood-based cellulosic fibers are made at Lenzing Lyocell: combining sustainability and comfort

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1.4 Yarn Classification and Properties

Reference Code: 1.4
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS / ECVET?
Education Level/Cycle (6/4): 6&4
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: Introductory level
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile technology
Subject Area: Textile yarns
Prerequisites: 1.1 or equivalent
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Reward Certificate: tbd

Content:	An initial overview of different types of yarns, their properties and their visual analysis to identify for their end use.
Intended Learning Outcomes:	After completing the unit the student is able to identify the properties of different yarn types and fibre mixtures and their usability and their impact on the recyclability and on the life cycle of a product, (to identify different types of yarns by their outlook, to identify yarns according to spun and texturing methods.)?
Teaching Methods:	
Assessment Methods:	
Study Materials:	
Miscellaneous:	

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1.5 Yarn production in basic level

Reference Code: 1.5
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS / 1 ECVET
Education Level/Cycle (6/4): 6&4
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: Introductory level
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile technology
Subject Area: Textile Fibres and Yarns
Prerequisites: 1.1 & 1.4 or equivalent
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Reward Certificate: tbd

Content:	Basic knowledge about different yarn manufacturing processes. The most common yarn spinning and texturing methods are included. Environmental sustainability aspects in the manufacturing of yarn.
Intended Learning Outcomes:	After completing the unit the student is able to understand the production methods of the man-made fibres based on natural polymers, their effect to the environment, to identify the most common yarn spinning and texturing methods and their usability and their impact on the recyclability and life cycle of a product.
Teaching Methods:	
Assessment Methods:	
Study Materials:	
Miscellaneous:	

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2.1 Manufacturing technologies of man-made fibres

Reference Code: 2.1
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 2 ECTS
Education Level/Cycle (4/6): 6
Learning Platform: tbd
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: advanced
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile Fibres and Yarns
Subject Area: Textile fibres
Prerequisites: tbd
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Reward Certificate: tbd

Content:	The learning unit aims to give the student in-depth knowledge of manufacturing technologies of natural and man-made fibres i.e. production stages of natural and man-made fibres (collection, sorting, mixing, primary processing, manufacturing, machinery etc.)
Intended Learning Outcomes:	After completing the unit the student is able to name special, innovative fibres for clothing and interior textiles and to identify their end use, to characterise the natural and man-made fibres on the basis of the production methods of their diverse properties and reactions towards external influences, to identify textile fibres in various textile materials by means of analysis (microscope, solvent).
Teaching Methods:	
Assessment Methods:	

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Study Materials:	“Pearson New International Edition: Textiles” by Sara J. Kadolph. (ebook) “Textiles and Fashion, Materials, Design and Technology” by R. Sinclair, ISBN: 978-1-84569-931-4. “The Chemistry of Textile Fibers”, by Robert R. Mather, 2nd Edition
Miscellaneous:	

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2.2 New fibre developments

Reference Code: 2.2
Established by (Country/ Region and the name of the issuer): tba
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/6): 6
Learning Platform: tba
Form of participation (Contact/ Virtual/ Hybrid): tba
Target group: advanced
Study language: tba
Main Field of Study (Progressive Specialisation): Textile Fibres and Yarns
Subject Area: Textile Fibres
Prerequisites: tba
Type of assessment (assessed/ graded): tba
Grading Scale: tba
Reward Certificate: tba

Content:	The learning unit aims to give the student knowledge of novel fibre developments - bio-based polymers, composite fibres, technical fibres modifications etc.
Intended Learning Outcomes:	After completing the unit the student is able to name and characterise new bio-based polymers as bioplastics and other new fibre developments including optimisation of their properties and to perform textile fibre analysis in the laboratory. After completing the unit the student is familiar with the requirements of fibre and yarn tests.
Teaching Methods:	Lectures, laboratory work, independent study
Assessment Methods:	

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Study Materials:	
Miscellaneous:	

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2.3 Yarn production - advanced

Reference Code: 2.3
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/6): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: advanced
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile Fibres and Yarns
Subject Area: Textile Yarns
Prerequisites: tbd
Type of assessment (assessed/ graded): graded
Grading Scale: tbd
Reward Certificate: tbd

Content:	The learning unit aims to give the student knowledge of spinning methods and structure of threads/yarns, plying, winding etc., properties, fancy yarns, principles of yarn producing machines, indicating yarn properties and application options according to the applied production method, a production method based on necessary fibre and yarn properties (by noting its environmental impact)
Intended Learning Outcomes:	After completing the unit the student is able to name the different kinds of spinning techniques / methods, to describe the processes and the operation principle of yarn producing machines, to indicate yarn properties and application options according to the applied production method and to select a production method based on necessary fibre and yarn properties (by noting its environmental impact).
Teaching Methods:	

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Assessment Methods:	
Study Materials:	
Miscellaneous:	

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2.4 Quality Assessment and Testing Methods of Textile Fibres and Yarns

Reference Code: 2.4
Established by (Country/ Region and the name of the issuer): tba
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/6): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tba
Target group: advanced
Study language: tba
Main Field of Study (Progressive Specialisation): Textile Fibres and Yarns
Subject Area: Textile Fibres and Yarns (or testing?)
Prerequisites: tba
Type of assessment (assessed/ graded): graded
Grading Scale: tba
Reward Certificate: tba

Content:	The learning unit aims to give the student abilities to identify textile fibres in various textile materials by means of analysis (e.g. microscope, solvent), to perform textile fibre analysis in the laboratory (when available) and is familiar with the requirements of fibre and yarn tests (quality requirements, standards).
Intended Learning Outcomes:	After completing the unit the student is able to identify textile fibres in various textile materials by means of analysis (microscope, solvent), to perform textile fibre analysis in the laboratory and is familiar with the requirements of fibre and yarn tests, and she/he knows the aspects of evaluating the quality of fibres and yarns due to their end use.
Teaching Methods:	

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Assessment Methods:	
Study Materials:	
Miscellaneous:	

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2.5 Different Aspects of Sustainability and Eco-friendliness of Textile fibres

Reference Code: 2.5
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/6): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: advanced
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile Fibres and Yarns
Subject Area: Textile Fibres
Prerequisites: tbd
Type of assessment (assessed/ graded): graded
Grading Scale: tbd
Reward Certificate: tbd

Content:	The learning unit aims to give the student knowledge of new developments and production and recycling methods for independently selecting the correct fibres and yarns for a certain application (by noting their environmental impact)
Intended Learning Outcomes:	After completing the unit the student is able to know the general possibilities to recycle fibres and the properties and possibilities to use recycled fibres in different applications depending on their quality. The student is able to independently select the correct fibres and yarns for a certain application (by noting their environmental impact). The student is able to give advice for product development regarding yarn composition, count and other properties. The student can use laboratory equipment such as microscopes and identify textile fibres in various textile materials by using a microscope and different kinds of general solvents. The student is able to make an analysis of the sustainability of fibre production and processes.

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Teaching Methods:	
Assessment Methods:	
Study Materials:	
Miscellaneous:	

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3.1 Basics of Woven Fabrics

Reference Code: 3.1
Established by (Country/ Region and the name of the issuer): Finland/Metropolia UAS
Valid from: 2024

Study workload (ECTS/ ECVET): 2 ECTS
Education Level/Cycle (4/ 6): 4/6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): Contact
Target group: beginners
Study language: Finnish & English
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: none
Type of assessment (assessed/ graded): graded
Grading Scale: 0–5
Reward Certificate:

Content:	Identify and understand basic woven structures and know the fabric trade names and context of use. Describe the technical terms of weaving, know the part of the different types of looms, and understand different production methods.
Intended Learning Outcomes:	Understanding the differences of woven structures. Analysing and selecting the appropriate woven fabrics for specific function or context of use. Understanding the connection between the fabric structure and product longevity.
Teaching Methods:	Contact teaching on-site; assignment (group work); written exam)
Assessment Methods:	Based on the assignment and exam
Study Materials:	Elsasser, V.H. Textiles: Concepts and Principles (New York: Fairchild Books, 2022) Johnson, I., Cohen, A. & Sarkar, A. J.J. Pizzuto's Fabric Science (London: Fairchild Books, 2015) Palamutchu, S. Textiles and Clothing Sustainability (Hong Kong: Springer, 2017)

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	Petrulis, D. “The influence of fabric construction and fibre type on textile durability: woven, knitted and nonwoven fabrics” In Understanding and improving the durability of textiles, Part 1 Aspects of textile durability, edited by P. Annis (Cambridge: Woodhead Publishing Limited, 2012) Salolainen, M. Interwoven (Espoo: Aalto ARTS Books, 2022) Stankard. S. “Yarn to Fabric: Weaving” In Textiles and Fashion: Materials, Design and Technology, edited by R. Sinclair (Cambridge: Woodhead Publishing Limited, 2014) Young, D.E. Swatch Reference Guide for Fashion Fabrics (New York: Fairchild Books, 2018)
Miscellaneous:	

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3.2 Basics of knitting

Reference Code: 3.2
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 2 ECTS
Education Level/Cycle (4/6): 4/6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: beginners
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: none
Type of assessment (assessed/ graded): graded
Grading Scale: tbd
Reward Certificate:

Content:	Identify and understand the knitted structures and know the fabric trade names and context of use. Summarise the technical terms of weft knitting and know the different types of knitting methods.
Intended Learning Outcomes:	Analyse and select an appropriate knitted structure for specific function or context of use. Select appropriate materials and knitting techniques in order to design a knitted structure with imposed specifications and properties, while taking into account the sustainability aspects of materials and technologies.
Teaching Methods:	tbd
Assessment Methods:	tbd
Study Materials:	tbd
Miscellaneous:	

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3.3 Basics of nonwovens

Reference Code: 3.3
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/ 6): 4/6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: beginners
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: none
Type of assessment (assessed/ graded): graded
Grading Scale: tbd
Reward Certificate:

Content:	Identify and understand different processes for nonwoven production such as dry laid web formation (i.e carding, air-laid and wet-laid), web bonding (i.e needle punching, stitch bonding, chemical bonding, hydroentanglement and thermoplastic bonding), polymer laid nonwovens as well as finishing. Moreover understand how fibre properties and production methods affect the properties and use of nonwoven fabrics.
Intended Learning Outcomes:	Recognise different nonwoven structures and manufacturing techniques. Select appropriate materials and nonwoven techniques to design a product with imposed specifications and properties, while taking into account the sustainability aspects of materials and technologies.
Teaching Methods:	tbd
Assessment Methods:	tbd

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Study Materials:	tbd
Miscellaneous:	

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3.4 Textile printing, dying and pre-treatment

Reference Code: 3.4
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS / 1 ECVET
Education Level/Cycle (4/6): 4&6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): contact
Target group: beginners
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: recommended 1.1, 1.2 and 1.3
Type of assessment (assessed/ graded): graded
Grading Scale: 1-5
Reward Certificate: tbd

Content:	The basic textile pre-treatment processes, dyeing and printing methods and their technical and chemical demands.
Intended Learning Outcomes:	After completing the unit the student is able to identify appropriate materials and techniques for resource-efficient dyeing & printing, and to identify the properties of a fabric after mechanical and/or thermal finishing.
Teaching Methods:	lecturing, group activities, independent study, learning diary
Assessment Methods:	written exams
Study Materials:	**Videos** are to be found by Textile Education Explanation of Pretreatment Process in Textile - Randoms Blog Different Pretreatment Process of Textile Materials by Textile Tutorials A Study on the Effects of Pre-treatment in Dyeing Properties of Cotton Fabric and Impact on the Environment on the Journal of Textile Science and Engineering (pdf)
Miscellaneous:	

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3.5 Finishing: mechanical, thermal, chemical finishing

Reference Code: 3.5
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1
Education Level/Cycle (4/ 6): 4/6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: beginners
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: none
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Reward Certificate: tbd

Content:	The course aims to give the student basic knowledge about finishing including pre-treatments, considering environmental sustainability aspects.
Intended Learning Outcomes:	Select appropriate materials and finishing methods to design a product with desired functionality, while taking into account the sustainability aspects of materials and technologies used. Describe the thermal (i.e. fixation of thermoplastics, polymerization of acrylates, PUR, etc), chemical (ie. FR, moisture repellants, aromatics senses) and mechanical finishing processes (i.e. calendering, emerizing, singing, roughen) and methods and summarise the different physical and fastness testing processes.
Teaching Methods:	tbd
Assessment Methods:	tbd
Study Materials:	tbd
Miscellaneous:	tbd

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4.1 Advanced Weaving Technologies

Reference Code: 4.1
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024

Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/6): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: advanced learners
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: tbd
Type of assessment (assessed/ graded): graded
Grading Scale: tbd
Reward Certificate:

Content:	The course aims to give the student in-depth knowledge about various weaving techniques with two or more warp systems such as Jacquard, spacers, 3D weaving, towelling, leno, velvet and carpet weaving.
Intended Learning Outcomes:	Describe the concept of various weaving techniques with two or more warp systems (jacquard, leno, spacers, 3D) used to obtain complex woven structures; describe the main parts of these machines and understand how the systems work; describe the manufacturing methods for complex woven structures; name the related pattern design software. Select appropriate materials and weaving techniques (i.e. flat, jacquard, leno, spacers, 3D) to obtain a woven structure with imposed specifications and properties, taking into account the sustainability aspects of materials and technologies.
Teaching Methods:	tbd

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Assessment Methods:	tbd
Study Materials:	tbd
Miscellaneous:	

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4.2 Advanced Knitting Technologies

Reference Code: 4.2
Established by (Country/ Region and the name of the issuer): Finland/Metropolia UAS
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/6): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): Contact
Target group: advanced
Study language: Finnish & English
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: Textiles Fibres and Clothing Materials course
Type of assessment (assessed/ graded): graded
Grading Scale: 0–5
Reward Certificate:

Content:	The course aims to give the student in-depth knowledge about various warp knitting techniques. For each technology i.e. warp knitting, fully fashioned seamless knitwear environmental sustainability aspects are discussed.
Intended Learning Outcomes:	Student is able after completing the unit to describe the concept of warp knit manufacturing, the properties and manufacturing methods of seamless and fully fashioned knits and to select appropriate materials and knitting techniques (warp knitted, seamless and fully fashioned) in order to obtain a knitted structure with imposed specifications and properties, while taking into account the sustainability aspects of materials and technologies.
Teaching Methods:	Contact teaching on-site; assignments (group work & individual written assignment)
Assessment Methods:	Based on the assignment and exam

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Study Materials:	Brackenbury, T. *Knitted Clothing Technology*, (London; Boston: Blackwell Scientific Publications, 1992). Brownbridge, K. *Seamless Knitting and Its Application*. In Hayes, S. G. and Venkatraman, P. (Ed.) Materials and Technology for Sportswear and Performance Apparel, (Routledge, 2016). Cassidy, T. *Knitwear Design Technology*. In Cassidy, T. & Goswami, P. (Ed.) Textile and Clothing Design Technology, (CRC Press, 2018). Palamutchu, S. *Textiles and Clothing Sustainability* (Hong Kong: Springer, 2017). Power, E.J., *Yarn to Fabric: Knitting* I In Textiles and Fashion: Materials, Design and Technology, edited by R. Sinclair, (Cambridge: Woodhead Publishing Limited, 2014). Ray, S. C. (Ed.). *Fundamentals and advances in knitting technology* (CRC Press, 2012). Ray, S. C. & Blaga, M. *Warp-Knitted Fabrics*. In Textile and Clothing Design Technology edited by T. Cassidy & P. Goswami, (Boca Raton: CRC Press, 2018). Spencer, D. J. *Knitting technology: A comprehensive handbook and practical guide*, (Elsevier Science & Technology, 2001). Thompson, R. *Manufacturing Processes for Textile and Fashion Design Professionals*, (London: Thames & Hudson, 2014).
Miscellaneous:	

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4.3 Technical and smart textiles

Reference Code: 4.3
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECT
Education Level/Cycle (4/ 6): tbd
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: advanced
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile technology and materials
Prerequisites: none
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Reward Certificate:

Content:	The course aims to give the student in-depth knowledge about technical and smart textiles i.e. classification, related manufacturing technologies, functionality and requirements.
Intended Learning Outcomes:	Describe the area of application of technical textiles in relation to requirements; describe the concept and the components of a smart system, various types of materials and integration techniques used to obtain a given functionality. Search and select appropriate functional materials and integration techniques to design a functional and/or smart textile system with a required functionality, considering the sustainability aspects on level of materials and technologies.
Teaching Methods:	tbd
Assessment Methods:	tbd

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Study Materials:	tbd
Miscellaneous:	

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4.4 Resource-efficient textile processes for dying, printing, coating and finishing

Reference Code: 4.4
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 1 ECTS
Education Level/Cycle (4/ 6): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: advanced
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: tbd
Type of assessment (assessed/ graded): graded
Grading Scale: tbd
Reward Certificate:

Content:	The course aims to give the student in-depth knowledge about various resource-efficient and environmentally-friendly processes for dying, printing and finishing processes. For each technology i.e. dying, printing and finishing environmental sustainability aspects are discussed.
Intended Learning Outcomes:	The student is after completing the unit, able to identify and understand the principles and advantages of various resource-efficient processes for dyeing, printing, finishing including digital printing, supercritical CO2, plasma, corona, spray dyeing, UV & IR curing coating. The student will be able to select appropriate materials and techniques for resource-efficient dyeing, printing and finishing (i.e. digital printing, supercritical CO2, plasma, corona, spray dying, UV & IR curing coating) to obtain coloured and/or functionalized textiles with imposed specifications and properties and she/he will be able to select the most sustainable chemicals and technologies and make the right trade off between functionality and environment. Critical reflection about the processes and chemicals.
Teaching Methods:	tbd

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Assessment Methods:	tbd
Study Materials:	tbd
Miscellaneous:	

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4.5 Quality control of fabrics, technical and smart textiles

Reference Code: 4.5
Established by (Country/ Region and the name of the issuer): tbd
Valid from: 2024
Study workload (ECTS/ ECVET): 2 ECTS
Education Level/Cycle (4/ 6): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid): tbd
Target group: advanced
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile structures and processing
Subject Area: Textile materials and technology
Prerequisites: tbd
Type of assessment (assessed/ graded): graded
Grading Scale: tbd
Reward Certificate:

Content:	The course aims to give the student in-depth knowledge about various test methods to assess the quality and comfort-related properties of woven and knitted fabrics and functionality of various technical and smart textiles.
Intended Learning Outcomes:	The student is after completing the unit, able to summarise basic and application-specific quality control ISO/ EN/ ASTM/ AAATC tests related to woven and knitted fabrics and technical and smart textiles respectively and able to select the appropriate ISO/ EN/ ASTM/ AAATC tests to assess the quality of various types of woven and knitted fabrics and specific functionality of technical and smart textiles.
Teaching Methods:	
Assessment Methods:	

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Study Materials:	
Miscellaneous:	

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5.3 Circular Business Models in the Textile and Clothing Industry

Reference Code: 5.3
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS/ 1 ECVET
Education Level (6/4): 6&4
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Introductory level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: 5.2 or equivalent
Type of assessment (assessed/ graded):
Grading Scale:
Certificate awarded:

Content:	Overview of the key actions on how to develop circular business models. Understanding how to source products and materials from the economy, not from ecological reserves. Creating value for customers by adding value to existing products and materials. Introduction of different types of circular economy business models.
Intended Learning Outcomes:	After completing the unit, the student can identify circular business model typology and provide opportunities for implementing the circularity at a practical level, and use circular economy business models, following the basic principles of circular economy.
Teaching Methods:	Lectures (activating lectures) Case-based learning
Assessment Methods:	Online quiz based on the lectures and a group work (case study) presentation
Study Materials:	Lectures Publications https://sustainabilityguide.eu/methods/circular-business-models/
Miscellaneous:	

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5.4 Sustainable Design Principles in the Textile and Clothing Sector

Reference Code: 5.4
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 2 ECTS
Education Level (6/4): 6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Introductory level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: 5.1, 5.2 or equivalent; introductory level knowledge of textile materials
Type of assessment (assessed/ graded):
Grading Scale:
Certificate awarded:

Content:	Sustainable design. Design for Sustainability (DfS) approaches in the context of textiles and clothing. Overview of sustainable and circular design tools and guides.
Intended Learning Outcomes:	After completing the unit, the student is able to understand the role of design in the context of textiles and clothing; describe various sustainable and circular design approaches covering the entire product lifecycle and textile supply chain; to design and develop a product or service in which different dimensions of sustainability are considered.
Teaching Methods:	
Assessment Methods:	
Study Materials:	Ceschin, F., & Gaziulusoy, İ. (2019). *Design for Sustainability: A Multi-level Framework from Products to Socio-technical Systems (1st ed.).* Routledge. Ellen MacArthur Foundation (2021). *Circular Design for Fashion* SVID (2018). *Sustainability Guide.* EcoDesign Circle.

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5.5 Textile Product Health and Safety Regulations

Reference Code: 5.5
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS/ 1 ECVET
Education Level (6/4): 4&6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Introductory level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites:
Type of assessment (assessed/ graded):
Grading Scale:
Certificate awarded:

Content:	Textile product health and safety regulations. Relationship of the regulations with the EU strategy for sustainable and circular textiles
Intended Learning Outcomes:	After completing the unit, the student is able to understand the regulation of the registration, evaluation, authorisation and restriction of chemicals (REACH); to know the basics of the safety of textile products and current EU legislation related to textiles and clothing; to interpret and associate aspects of main EU law to protect human health and the environment from the risks that can be posed by chemicals; to identify and provide examples of product safety regulations from various fields including the textile and clothing sector.
Teaching Methods:	Lectures, self study, visits to T&C companies and exhibitions
Assessment Methods:	
Study Materials:	Single market for goods (EU Regulation) Risk mitigation, types of risk & ensuring compliance (EU Chemicals strategy) General product safety directive/regulation (EU)

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	EU Green Deal Digital product passport (Cirpass consortium, EU Regulation) Due diligence: OECD (2018), OECD Due Diligence Guidance for Responsible Business Conduct
Miscellaneous:	

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5.6 Labels and certifications in the Textile and Clothing Sector

Reference Code: 5.6
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4):6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Introductory level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: 5.1
Type of assessment (assessed/ graded):
Grading Scale:
Certificate awarded:

Content:	Sustainability certifications used in the textile and clothing sector, ranging from responsible material sourcing to ethical product manufacturing.
Intended Learning Outcomes:	After completing the unit, the student is able to identify sustainability certifications that the production and supply chain practices in a company to meet established environmental and social standards; to explain the importance of sustainability in the clothing industry.
Teaching Methods:	
Assessment Methods:	
Study Materials:	
Miscellaneous:	

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5.7 Introduction of Life Cycle Assessment Tools

Reference Code: 5.7
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Introductory level
Study language: tbd
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: preferably 5.2
Type of assessment (assessed/ graded): tbd
Grading Scale:
Certificate awarded:

Content:	Introduction to the life cycle assessment (LCA) tools. The structure of a product's life cycle, and system analysis methodologies for its assessment; Overview of ISO14044 (Life Cycle assessment) standard.
Intended Learning Outcomes:	After completing the unit, the student is able to acquire a systematic understanding of the structure of a product's life cycle, tools, and system analysis methodologies for its assessment; to apply the whole life cycle assessment (LCA) technique in circular economy.
Teaching Methods:	Lectures Case-based study using OpenLCA or other similar tool to assess product life cycle
Assessment Methods:	Assignment based examination
Study Materials:	Lectures https://www.iso.org/standard/38498.html https://www.openlca.org/
Miscellaneous:	

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6.1 Systems Thinking in the Textile and Clothing Sector

Reference Code: 6.1
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4): 6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Advanced level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: 5.1, 5.2 or equivalent
Type of assessment (assessed/ graded):
Grading Scale:
Certificate awarded:

Content:	Understanding all the interconnected points between stakeholders in the fashion industry and beyond. Introduction of tracking technologies as better transparency of materials, manufacturing, and consumption. Making communication channels more visible in the closed loop infrastructure.
Intended Learning Outcomes:	After completing the unit, the student is able to describe the basic idea of systems thinking and its connection to circular economy; to identify how decisions and actions influence one another in the textile and clothing industry; to implement a systematic approach to decision-making in the textile and clothing industry.
Teaching Methods:	
Assessment Methods:	
Study Materials:	
Miscellaneous:	

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6.2 Principles of Textile Waste Management

Reference Code: 6.2
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4): 6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Advanced level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: 5.1, 5.2 or equivalent
Type of assessment (assessed/ graded):
Grading Scale:
Certificate awarded:

Content:	EU strategy for sustainable and circular textiles. European Commission's waste framework directive. Generation and reduction of waste in the textile industry. Overview of collection, sorting, reuse and recycling practices. Processing of textile waste as raw material.
Intended Learning Outcomes:	After completing the unit, the student is able to understand the European Commission's waste framework directive; describe the different origins of textile wastes; identify practices and processes related to textile waste minimisation and treatment; to understand the connection of these practices to EU strategy for sustainable and circular textiles; and to name actors who use textile wastes as raw material.
Teaching Methods:	Lectures (activating lectures)
Assessment Methods:	Research based assignment on textile recycling

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Study Materials:	Lectures (see learning material 6.2) European Commission (n.d.) *EU strategy for sustainable and circular textiles.* European Commission (n.d.) *Waste Framework Directive.*
Miscellaneous:	

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6.3 Textile Recycling Opportunities

Reference Code: 6.3
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4): 6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Advanced level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: 6.2 or equivalent, introductory level knowledge of textile materials
Type of assessment (assessed/ graded):
Grading Scale:
Certificate awarded:

Content:	Overview of textile recycling processes. Open and closed loop recycling. Traditional and emerging textile recycling technologies, their possibilities and current challenges.
Intended Learning Outcomes:	After completing the unit, the student is able to describe the different types of textile recycling technologies, their current possibilities, challenges and the state-of-the-art textile recycling; to identify suitable textile recycling technologies for different textile materials; and to understand the role of technological developments in facilitating the circular economy in the context of textiles and clothing.
Teaching Methods:	E.g. Lectures (activating lectures), case-based learning
Assessment Methods:	
Study Materials:	*Study on the technical, regulatory, economic and environmental effectiveness of textile fibres recycling - Publications Office of the EU (europa.eu)*

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6.4 Introduction to Circular Business Strategies in the Textile and Clothing Sector

Reference Code: 6.4
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4): 6
Learning Platform: Moodle
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Advanced level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: 5.1, 5.2, 5.3
Type of assessment (assessed/ graded): tbd
Grading Scale: tbd
Certificate awarded: tbd

Content:	An introduction to the R-ladder/hierarchy theory as an useful tool for visualising and understanding the different stages of resource use and waste management in a circular economy.The R-hierarchy includes ten circular economy strategies classified into three categories. Examples of circular strategies in textile and clothing industry.
Intended Learning Outcomes:	After completing the unit, the student is able to understand the different stages of resource use and waste management and how it relates to different circular cycles (e.g butterfly model), also to know most common circular economy strategies (R-ladder/hierarchy) and their categories.
Teaching Methods:	Lectures, workshop, case-based study
Assessment Methods:	Assignment based examination
Study Materials:	Lectures Publications Thematic websites, e.g *Creating a circular and regenerative textile sector (pdf)*

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6.5 Costing and Pricing Strategies for Sustainable Business Models in the Textile and Clothing Sector

Reference Code: 6.5
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4): 6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Advanced level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: Introductory level knowledge of textile materials and basic mathematics
Type of assessment (assessed/ graded): tbd
Grading Scale:tbd
Certificate awarded:tbd

Content:	Textile product Costing Elements of costing, systems of costing, stages of costing during collection planning, buyer's perspective, manufacturers perspective, Product calculation, Calculation of standard minute, salary cost Textile product Pricing Concept of pricing , Pricing objectives and factors to consider, Methods of pricing
Intended Learning Outcomes:	After completing the unit, the student is able to know the effects of sustainable solutions on textile related business models with consideration of product costing and pricing in the market; to create critical analysis of costing and pricing elements based on adaptation of sustainable solutions in textile and clothing related business models, such as direct labour, direct material, manufacturing overheads, general operating expenses and profit margins.
Teaching Methods:	Lectures Case-based learning

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Assessment Methods:	Online quiz (multiple choice questions) based on the lectures
Study Materials:	Lecture material Book : Apparel Merchandising, the line starts here, Chapter 7 pp. 227–260
Miscellaneous:	

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6.6 Tools for Assessing Sustainability of Textile Product and Value Chain

Reference Code: 6.6
Established by (Country/ Region and the name of the issuer):
Valid from: 2024
Study workload (ECTS/ECVET): 1 ECTS
Education Level (6/4): 6
Learning Platform:
Form of participation (Contact/ Virtual/ Hybrid):
Target group: Advanced level
Study language:
Main Field of Study (Progressive Specialisation): Textile/Clothing Design, Textile Management
Subject Area: Circular Economy in Textile and Clothing
Prerequisites: Introductory level knowledge of textile materials & product assembly
Type of assessment (assessed/ graded): tbd
Grading Scale:tbd
Certificate awarded:tbd

Content:	Assessment areas (Global warming, Eutrophication, water scarcity, Resource depletion and chemistry)Product Material tool for raw material source, yarn formation method, textile formation, preparation, coloration, additional certification requirement. Product tool for Bill of material, finished goods manufacturing, packaging, logistics, retail, product care, end of use and duration of service.
Intended Learning Outcomes:	After completing the unit, the student is able to have a practical knowledge of different programs of sustainability assessment; to (demonstrate the ability to assess and) choose relevant tools for assessing, designing and development of sustainable textile products.
Teaching Methods:	Lectures Workshops Case study
Assessment Methods:	Assignment based examination

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Study Materials:	
Miscellaneous:	

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