

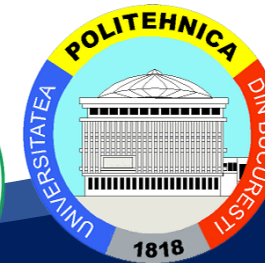


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# Progress of WP2 Curriculum Design and Development

Tomasz Nitkiewicz & Pisut Koomsap  
at UPB meeting on May 18<sup>th</sup>-21<sup>st</sup> 2020



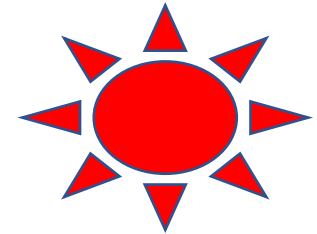
Curriculum Development  
of Master's Degree Program in  
Industrial Engineering for Thailand Sustainable Smart Industry



# WP2 Curriculum Development I: Curriculum Structure and Courses

WP Leader: CUT/ AIT

- Task 2.1 Developing curriculum structure & academic program learning outcomes (CUT)
- Task 2.2 Developing courses & course learning outcomes (CUT)
- Task 2.3 Conducting pilot test of the key courses (AIT)
- Task 2.4 Assessment of pilot test & finalize the curriculum (CUT)
- Task 2.5 Preparation for accreditation of the curriculum (KKU)
- Task 2.6 Accreditation of the curriculum by the national accreditation institution in Thailand (KKU)

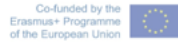




# Outcome 2.1 - A modernized curriculum for Master's degree in Industrial Engineering



ERASMUS+ CBHE PROJECT  
Curriculum Development of Master's Degree Program in  
Industrial Engineering for Thailand Sustainable Smart Industry



## WP 2 - Curriculum Development I: Curriculum Structure and Courses

### Outcome 2.1 - A modernized curriculum for Master's degree in Industrial Engineering



<b>Project Acronym:</b>	MSIE 4.0
<b>Project full title:</b>	Curriculum Development of Master's Degree Program in Industrial Engineering for Thailand Sustainable Smart Industry
<b>Project No.:</b>	586137-EPP-I-2017-I-TH-EPPKA2-CBHE-JP
<b>Funding Scheme:</b>	Erasmus + KA2 - Capacity Building in the field of Higher Education
<b>Coordinator:</b>	AIT
<b>Work Package:</b>	WP2 – Curriculum Development I: Curriculum Structure and Courses
<b>WP Leaders:</b>	Tomasz Nitkiewicz (CUT) and <u>Pisut Koomsap</u> (AIT)
<b>Task Title:</b>	Task 2.1. Developing curriculum structure and academic program learning outcomes
<b>Task Leader:</b>	Tomasz Nitkiewicz (CUT)
<b>Last version date:</b>	04/05/2020 ←
<b>Status:</b>	Final (before pilot testing)
<b>Dissemination Level:</b>	Department / Faculty - Institution - Local – Regional - National - International



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Curriculum Development of Master's Degree Program in  
Industrial Engineering for Thailand Sustainable Smart Industry



#### REVISION SHEET

Version	Date	Author (Partner/Person)	The revision reason
1	08/04/2019	CUT / Tomasz Nitkiewicz AIT / <u>Pisut Koomsap</u>	First version – draft version of WP2 Task 2.1 – Outcome 2.1. Include contributions from CUT, AIT and all Project partners.
2	30/09/2019	CUT / Tomasz Nitkiewicz AIT / <u>Pisut Koomsap</u> UPB / Tom Savu Uminho / Rui Lima	Second version – draft version of WP2 Task 2.1 – Outcome 2.1. Include contributions from CUT, AIT, comments by Tom Savu UPB and Rui Lima, Uminho, and all Project partners.
3	18/11/2019	CUT / Tomasz Nitkiewicz AIT / <u>Pisut Koomsap</u>	Third version – draft version of WP2 Task 2.1 – Outcome 2.1. Include contributions from WP2 Task 2.1 team members
4	13/01/2020	CUT / Tomasz Nitkiewicz AIT / <u>Pisut Koomsap</u>	Fourth version – draft version of WP2 Task 2.1 – Outcome 2.1. Refers to the remarks of <u>Pisut Koomsap</u> (AIT) of splitting its content between the Outcomes 2.1 (curriculum) and 2.2 (syllabuses)
5	10/02/2020	CUT / Tomasz Nitkiewicz	Fifth version – draft version of WP2 Task 2.1 – Outcome 2.1 - updated with workload for course 6,12 and 14 and accepted by WP2 and T.2.1 teams
6	02/03/2020	CUT / Tomasz Nitkiewicz	Sixth version - draft version of WP2 Task 2.1 – Outcome 2.1 - updated after first revision of QCMB remarks
7	04/03/2020	CUT / Tomasz Nitkiewicz AIT / <u>Pisut Koomsap</u>	Final version (before finishing pilot testing) accepted by QCMB with some editorial corrections
8	04/05/2020	CUT / Tomasz Nitkiewicz AIT / <u>Pisut Koomsap</u>	Final version (before finishing pilot testing) accepted by PEC

#### DISTRIBUTION LIST

Project Partner	Acronym	Responsible (for dissemination)
University of Minho	<u>UMinho</u>	Rui Lima
Chiang Mai University	CMU	<u>Uttapol Smutkupt</u>

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# Structure of MSIE 4.0 Curriculum

Minimum Credit Requirement for Coursework:	24
Minimum Number of Courses Required to Graduate:	8
Number of Required Courses:	3
Number of Compulsory Courses:	1
Number of Elective Courses Available:	12
Number of Credits per course:	3



# Course types

No.	Course name	Course status
1	Enterprise Management in Digital Economy	elective
2	Project Management for Industry 4.0	elective
3	Smart Operations Management	<b>core</b>
4	Quality Management for Extended Enterprise	elective
5	Sustainable Supply Chain Management	elective
6	Digital Factory	<b>core</b>
7	Advanced Optimization: Techniques and Industrial Applications	elective
8	Intelligent Decision Support Systems	elective
9	Applied Data Analytics	<b>core</b>
10	Cyber-Physical Industrial Systems	elective
11	Collaborative Manufacturing Systems	elective
12	Additive Manufacturing for Industry 4.0	elective
13	Innovative Product Design and Development	elective
14	Human-Centric Design for Operator 4.0	elective
15	Customer Experience-Driven Design	elective
16	Communications and People Skills Development for Engineering Leaders	<b>compulsory</b>



# Workload in MSIE 4.0 Courses

No.	Course name	Workload
1	Enterprise Management in Digital Economy	(1-4-0)
2	Project Management for Industry 4.0	(2-2-0)
3	Smart Operations Management	(2-2-0)
4	Quality Management for Extended Enterprise	(2-2-0)
5	Sustainable Supply Chain Management	(1-4-0)
6	Digital Factory	(2-0-3)
7	Advanced Optimization: Techniques and Industrial Applications	(3-0-0)
8	Intelligent Decision Support Systems	(1-4-0)
9	Applied Data Analytics	(2-2-0)
10	Cyber-Physical Industrial Systems	(2-0-3)
11	Collaborative Manufacturing Systems	(2-0-3)
12	Additive Manufacturing for Industry 4.0	(1-2-3)
13	Innovative Product Design and Development	(1-4-0)
14	Human-Centric Design for Operator 4.0	(1-4-0)
15	Customer Experience-Driven Design	(2-0-3)
16	Communications and People Skills Development for Engineering Leaders	(1-4-0)

Status:

Final version

Waiting for final corrections

Waiting for workload adjusting



# Outcome 2.2 - Syllabuses for all courses in the curriculum

## WP 2 - Curriculum Development I: Curriculum Structure and Courses

### Outcome 2.2 - Syllabuses for all courses in the curriculum



<b>Project Acronym:</b>	MSIE 4.0
<b>Project full title:</b>	Curriculum Development of Master's Degree Program in Industrial Engineering for Thailand Sustainable Smart Industry
<b>Project No.:</b>	586137-EPP-I-2017-I-TH-EPPKA2-CBHE-JP
<b>Funding Scheme:</b>	Erasmus + KA2 - Capacity Building in the field of Higher Education
<b>Coordinator:</b>	AIT
<b>Work Package:</b>	WP2 – Curriculum Development I: Curriculum Structure and Courses
<b>WP Leaders:</b>	Tomasz Nitkiewicz (CUT) and Pisut Koomsap (AIT)
<b>Task Title:</b>	Task 2.2. Developing courses and course learning outcomes based on a matrix that maps course learning outcomes with program learning
<b>Task Leader:</b>	Tomasz Nitkiewicz (CUT)
<b>Last version date:</b>	12/05/2020
<b>Status:</b>	Final draft
<b>Dissemination Level:</b>	Department / Faculty - Institutional - National -International

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#### REVISION SHEET

Version	Date	Author (Partner/Person)	The revision reason
1	08/04/2019	CUT / Tomasz Nitkiewicz AIT / Pisut Koomsap AIT / Duangthida Hussadintorn Na Ayutthaya Course Teams	First draft version of WP2 Task 2.2 - Outcome 2.2. Include contributions from all Course Teams and consisted of working versions of all the syllabuses for mid-term reporting purposes only.
2	13/01/2020	CUT / Tomasz Nitkiewicz AIT / Pisut Koomsap Course Teams	Second draft version of WP2 Task 2.2 - Outcome 2.2. Include contributions from all the course teams after the review and revision of courses in the period October-December 2019.
3	23/04/2020	CUT / Tomasz Nitkiewicz AIT / Pisut Koomsap Course Teams	Third draft version of WP2 Task 2.2 - Outcome 2.2. Include contributions from the courses 3, 5, 6, 11 and 14 teams after the finalizing the revision of courses in the period Jan-March 2020.
4	12/05/2020	CUT / Tomasz Nitkiewicz AIT / Pisut Koomsap Course Teams	Fourth draft version of WP2 Task 2.2 - Outcome 2.2. Include contributions from the courses 5 and 11 teams after the finalizing the revision of courses in May 2020. Courses 3, 6 and 14 are still to be submitted.

#### DISTRIBUTION LIST

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Chiang Mai University	CMU	Wichai Chattinnawat
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Khon Kaen University	KKU	Komkrit Pitiruek
Prince of Songkla University	PSU	Suriya Jirasatitsin
University Politehnica of Bucharest	UPB	Tom SAVU
University of Minho	UMinho	Rui Lima
Asian Institute of Technology	AIT	Pisut Koomsap
Czestochowa University of Technology	CUT	Robert Ulewicz



# Outcome 2.2 – Annex I (16 syllabuses, 62 pages)



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## WP 2 - Curriculum Development I: Curriculum Structure and Courses

### Outcome 2.2 - Syllabuses for all courses in the curriculum ANNEX I - Syllabuses



<b>Project Acronym:</b>	MSIE 4.0
<b>Project full title:</b>	Curriculum Development of Master's Degree Program in Industrial Engineering for Thailand Sustainable Smart Industry
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<b>Work Package:</b>	WP2 – Curriculum Development I: Curriculum Structure and Courses
<b>WP Leaders:</b>	Tomasz Nitkiewicz (CUT) and Pjsut Koomsap (AIT)
<b>Task Title:</b>	Task 2.2. Developing courses and course learning outcomes based on a matrix that maps course learning outcomes with program learning
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<b>Last version date:</b>	12/05/2020
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Outcome 2.2 - Syllabuses for all courses in the curriculum

ANNEX I/1

#### Course 1: Enterprise Management in Digital Economy (1-4-0)

**Course Objective:** Digital economy has brought business entities to the limits of their capacity of traditional resources and competences while transforming the markets and opening new strategic approaches for business management. . The objective of this course is to provide the students with knowledge and competences on using integrated and system solutions in advancing the management to the requirements of Digital Economy. In this course students will learn on how to adopt management, its strategies and functions to smart and sustainable solutions that 4.0 era has brought to enterprises.

#### Learning Outcomes:

The students on the completion of this course would be able to:

- CLO1. Analyze and recommend the use sustainable business model with digital technologies and tools in order to improve market performance of specific companies (analyze)
- CLO2. Define and assess the strategy (strategic objectives, mission and vision, competitive factors, company functions: production; purchasing; marketing; logistics, financing, human resources) of I4.0 oriented companies (create)
- CLO3. Define and assess internal and external driving factors for digitization and position them in strategy and business model (evaluate)
- CLO4. Propose organizational structures appropriate for I4.0 set-up (apply)
- CLO5. Use strategic analysis tools to understand internal and external determinants influencing the company performance and propose improvements with different approaches (evaluate)
- CLO6. Demonstrate entrepreneurial attitude towards I4.0 opportunities for business (analyze)

**Prerequisite:** basic of management

#### Course Outline:

Module I. Business perspective to understand the digital economy and its influence

- I.1. How digital economy innovations and its social context impacts different types of businesses?
- I.2. Digitalization in the context of needs, markets, channels, products and services and management and organizational set-up - identification of different way digital era changes the business
- I.3. How the pace of changes affects the business in the digital economy: New business imperatives
- I.4. Organizational structures and management functions of today: reshaping structures, combining resources and competences and building relations





## Task 2.3 - Testing of MSIE 4.0 Courses

No.	Course name	Testing in autumn	Testing in spring
1	Enterprise Management in Digital Economy		CUT
2	<b>Project Management for Industry 4.0</b>	UMinho	
3	<b>Smart Operations Management</b>		CMU
4	Quality Management for Extended Enterprise		
5	<b>Sustainable Supply Chain Management</b>	CUT	CUT
6	<b>Digital Factory</b>	KMUTNB	
7	<b>Advanced Optimization: Techniques and Industrial Applications</b>		KKU
8	<b>Intelligent Decision Support Systems</b>		PSU
9	Applied Data Analytics		AIT
10	<b>Cyber-Physical Industrial Systems</b>	UPB	
11	Collaborative Manufacturing Systems		
12	Additive Manufacturing for Industry 4.0		
13	Innovative Product Design and Development		
14	<b>Human-Centric Design for Operator 4.0</b>		TU
15	Customer Experience-Driven Design		
16	<b>Communications and People Skills Development for Engineering Leaders</b>	AIT	KMUTNB





## Task 2.3 - Testing of MSIE 4.0 Courses – evaluation surveys

No.	Course name	Teacher survey	Student survey
2	Project Management for Industry 4.0	x	?
3	Smart Operations Management	✓ - 4	11
5	Sustainable Supply Chain Management	x	7
6	Digital Factory	✓ - 1	12
7	Advanced Optimization: Techniques and Industrial Applications	x	0
8	Intelligent Decision Support Systems	✓ - 1	5
9	Applied Data Analytics	✓ - 1	24
10	Cyber-Physical Industrial Systems	x	0
14	Human-Centric Design for Operator 4.0	x	0
16	Communications and People Skills Development for Engineering Leaders	✓/x - 1	0



# Execution plan of WP2

Tasks and outcomes	Expected data
Task 2.1 / Outcome 2.1	Already submitted Eventual changes after finishing Tasks 2.3 and 2.4
Task 2.2 / Outcome 2.2	Submitting final versions of remaining syllabuses to courses 3, 6, 11 and 14 23.05.2020 - submission to WP2/T2.2 team
Task 2.3 / Outcome 2.3	Pilot testing of selected courses Outcome at end of spring semester
Task 2.4 / Outcome 2.4 and revised Outcome 2.1 & 2.2	Updating course syllabuses and curriculum after Collecting of students survey (ongoing) Collecting of teachers self-survey (ongoing) Outcome in June 2020



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# Thank You

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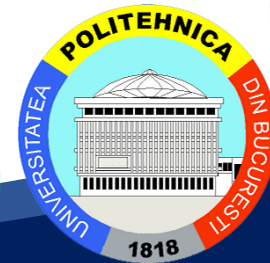
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