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Częstochowa University of Technology and its Industrial Engineering experience

Tomasz Nitkiewicz

CZĘSTOCHOWA UNIVERSITY OF TECHNOLOGY



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

Częstochowa University of Technology – who are we?



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Czestochowa University of Technology (CUT) is the **largest state university in the region** with 7 decades of scientific and educational tradition. Its mission is to

„assist economic and social development with innovation and reliable technical solutions and high quality engineering education”.

Currently, CUT hires with 1000+ academic staff and offers courses to 11,000 students within 19 fields of study, in Polish and in English.





At present, CUT offers courses to 11,000 students within the framework of six Faculties:

- Faculty of Mechanical Engineering and Computer Science
- Faculty of Production Engineering and Materials Technology
- Faculty of Electrical Engineering
- Faculty of Civil Engineering
- Faculty of Infrastructure and Environment
- Faculty of Management

Industrial Engineering Programs



Why Faculty of Management?



Faculty of Management (FMCUT):

- 20 years old
- about 3500
- participative development of educational programs (industrial and institutional partners),
- internal quality assurance based on the ISO 9001
- Academic Entrepreneurship Incubator





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Identifying key criteria in development of Industrial Engineering education

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with

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SAKARYA UNIVERSITY



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1. Definition of the goal and scope of the study
2. Definition of search keywords
3. Identification of resources / databases
4. Search of related studies
5. Screening of studies and establishment of basic criteria
6. Explaining the criteria

Status	Status
Already done	Intended





The objective of the study is to **define criteria** in current development of Industrial Engineering education on the basis of studies and concepts published in commonly accessible databases and knowledge exchange platforms.

General assumption of the study is that the universal criteria used in developing IE study programs **are already defined** and some experiences on their use are already published.

The expected outcome of the study is to identify the criteria that could support the development of curriculum for MSc in IE studies in Thailand.



At first, search basic keywords are defined as:

Basic keywords

Industrial Engineering

Education

The search includes the fields available. As a support, to filter the results or to broaden the search, the following keywords are proposed:

Supporting keywords

Management and Production Engineering

Manufacturing Engineering

Quality Management

Product Management

Master of Science (MSc)

Studying Program

Additional filters

Publication year (2012+)



The intention is to use all the renowned academic resources. Firstly, ELSEVIER database is used. All the remaining databases will be used in a follow-up search.

Resources used

ELSEVIER

Remaining resources (to be used)

EBSCO

EMERALD

GOOGLE SCHOLAR

SCOPUS

SPRINGER

etc.

Web of Science conference proceedings

National databases (p.e. BazEcon in PL)

Citted sources





As a result thousands of publications including search keywords were found, but about 200 most relevant publications were screened. In the selection made through the results the following publications were excluded:

- Not referring to the IE directly
- Referring to different education level or not referring to education at all
- Referring to very specific field of education or issue only

As a result **12 publications** are selected for further analysis.





Establishment of basic framework



Basing on the scope of the publications the following issues are identified as framework for basic criteria for IE education development:

- General program
- Educational methods and tools
- Cooperation and networks
- Industry based training
- Competences and skills
- Quality assurance and accreditation



Criteria	Description
General program	Sustainable value creation; outcome-based education structure; cooperative and participative education
Methods and Tools	Experimental and problem based learning; Interactive tools; environment impact assessment tools, participative education
Cooperation and networks	Cooperative and participative education, incorporation of international exchange; experience sharing
Industry based training	Cooperative training; industrial talks and visits; industry pulled MSc theses and projects; evaluation of competences and skills
Competences and skills	Industry-based evaluation; soft skills (p.e. communication and language); ICT and software skills; managing innovation skills
Quality assurance and accreditation	Benchmarking of accreditation and quality assurance systems; certifying and adapting QMS



Criteria vs MSIE4.0 pillars



	Co-created product design	Advanced manufacturing processes	Smart production
General program	Cooperative and participative education		Sustainable value creation
Methods and Tools			Experimental and problem based learning; interactive tools
Cooperation and networks	Cooperative and participative education, experience sharing		Cooperative and participative education, experience sharing
Industry based training	Industry pulled msc theses and projects	Cooperative training; industrial talks and visits;	Evaluation of competences and skills
Competences and skills	Managing innovation skills	Industry-based evaluation; ICT and software skills; managing innovation skills	Industry-based evaluation; managing innovation skills



- Search keywords used promoted the „education” oriented resources over „industrial” oriented ones
- The gap between the educational program and industrial needs should be also understood from the perspective of methodology
- There are huge amounts of „solutions” described and certainly some of them are suitable for the purpose of developing MSc in IE program but could be used as development criteria
- ?



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Thank You

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