



**SKILL
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Sector Skills Alliance
for Advanced Manufacturing
in the Transport Sector

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European VET system and Skillman agreement


Tiziana Chiappelli

CSCS – Dept. of Education, University of Florence



The European Credit system for Vocational Education and Training (ECVET)

- validation and recognition of work-related skills and knowledge acquired in different systems and countries
- to move between different countries and learning environments
- compatibility of VET systems and the qualifications
- employability of VET graduates



European Quality Assurance Reference Framework (EQAVET)

- contribute to quality improvement in VET
- build mutual trust between the VET systems
- make it easier to accept and recognise the skills and competencies
- EQAVET is a voluntary system

The European Qualifications Framework (EQF)

- “a common European reference framework whose purpose is to make qualifications more readable and understandable across different countries and systems”
- “a bridge between national qualifications systems”
- **eight reference levels** defined in terms of **learning outcomes**
- **Learning outcomes** express what individuals know, understand and are able to do at the end of a learning process

Knowledge, Skills and Competence



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Skillman Project

Skillman project focuses on the Vocational Education & the Training challenges in the transport sector in three specific fields:

- Industry & Production 4.0 Manager
- Robotics
- Composite Materials



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Skillman Curricula

- new curricula in the three fields
 - ICT, Robotics and Composite Materials in the Transport sector
- enabling VET representatives and practitioners working in skills requirements in the field of Advanced Manufacturing for the Transport Sector



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The Skillman Template

B. Curriculum template

Module Number and title	
Unit of learning Number and title	
Duration Hours	Lessons hours: Self-study hours: Hands-on hours: Other (please specify): Assessment hours:
Number of ECVET Points (if applicable)	



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Learning Outcomes

Learning outcome <i>Number and title</i>		
Competences		
Knowledge 1. 2. 3.		Skills 1. 2. 3.
Assessment methods <i>(Click appropriate box/s)</i>	<input type="checkbox"/> <u>Written exercises and test</u> <input type="checkbox"/> <u>Oral examination and exercises</u> <input type="checkbox"/> <u>Practical assignment under supervision</u> <input type="checkbox"/> <u>Practical assignment autonomously and responsibly</u> <input type="checkbox"/> <u>Other activities (please specify):</u>	
Assessment criteria <i>Description and timing</i>		
Qualifications framework <i>Reference to EQF and NVQ</i>		
Delivery methods	<input type="checkbox"/> <u>Hands-on</u> <input type="checkbox"/> <u>Lectures/lessons/presentations</u> <input type="checkbox"/> <u>Job-shadowing</u> <input type="checkbox"/> <u>Placement</u> <input type="checkbox"/> <u>Project work</u> <input type="checkbox"/> <u>Role-play</u> <input type="checkbox"/> <u>Video tutorials</u> <input type="checkbox"/> <u>Other activities (please specify):</u>	
Resources	<u>Readings:</u> <u>Websites:</u> <u>Videos and tutorials:</u>	
Activities		

B. Curriculum template		
Unit of learning <i>Number and title</i>	1. Introduction to Industrial revolution	
Duration <i>Hours</i>	10	Lessons hours: 4 Self-study hours: 5 Hands-on hours: Other (please specify): Assessment hours: 1

Learning outcome <i>Number and title</i>	1.1 – The industrial revolution	
Competences <div><div>1. Analyses and defines current and target status.</div><div>2. Estimates cost effectiveness, points of risk, opportunities, strengths and weaknesses, with a critical approach.</div><div>3. Creates structured plans; establishes time scales and milestones, ensuring optimisation of activities and resources.</div><div>4. Manages change requests.</div><div>5. Defines delivery quantity and provides an overview of additional documentation requirements.</div><div>6. Specifies correct handling of products, including legal issues, in accordance with current regulations</div></div>		
Knowledge <div><div>1. Effective frameworks and methodologies for governance plans</div><div>2. typical KPI (key performance indicators)</div><div>3. basic decision-making methods</div><div>4. IPR principles and regulation</div><div>5. agile techniques</div><div>6. structured Project Management Methodologies (e.g. agile techniques)</div><div>7. optimisation methods (e.g. lean management)</div><div>8. new emerging technologies</div></div>	Skills <div><div>1. Identify all potential targets for the product or service</div><div>2. Define the communication plan; identify key users and create related documentation</div><div>3. Manage the change request process</div></div>	
Assessment methods <i>(Click appropriate box/s)</i>	<div><div><input checked="" type="checkbox"/> Written exercises and test</div><div><input checked="" type="checkbox"/> Oral examination and exercises</div><div><input type="checkbox"/> Practical assignment under supervision</div><div><input checked="" type="checkbox"/> Practical assignment autonomously and responsibly</div></div>	

	<input type="checkbox"/> Other activities (please specify):
Assessment criteria <i>Description and timing</i>	<p>In designing their tests the teachers are suggested to set at least one 'Performance-based' assessment.</p> <p>At the end of the module the learners are expected to have acquired a clear aspect on the different industrial revolutions over the different industrial ages.</p> <p>Assessment criteria should:</p> <ul style="list-style-type: none"> • relate closely to the unit Learning Outcomes, describing those aspects of the Learning Outcome which will be assessed • indicate what is required at a pass level, in a positive way • help students know what they need to do • help students understand what you expect at differing levels of achievement • be understandable to all stakeholders • be manageable in number • be distinct from each other • be seen as an indication of achievement .rather than an exact measurement. <p>Learners, in this unit, are expected to be able to clearly describe the main drivers of the past and current industrial revolution, to identify the enabling technologies which have modified and improved the state of the art in each period (industrial age).</p> <p>Assessment method:</p> <p>In the context of the teaching session, observed by the mentor/teacher, the learners will demonstrate 5 different example of enabling technologies for the current industrial revolution, ranking them on impact on the current SoTA (state of the art), describing them. For each industrial revolution, learners will identify the most relevant drivers, ranking them for importance.</p>
Qualifications framework <i>Reference to EQF and NVQ</i>	Level EQF V
Delivery methods	<input type="checkbox"/> Hands-on <input checked="" type="checkbox"/> Lectures/lessons/presentations <input type="checkbox"/> Job-shadowing <input type="checkbox"/> Placement <input checked="" type="checkbox"/> Project work <input type="checkbox"/> Role-play <input type="checkbox"/> Video tutorials <input type="checkbox"/> Other activities (please specify):

Resources	<p>Readings:</p> <p>Industry 4.0: The New Industrial Revolution, Deloitte Study 2015</p> <p>The Industrie 4.0 transition: How it reshuffles the economic, social and industrial model, Max Blanchet (Roland Berger), April 2016</p> <p>Shaping the Digital Transformation Plattform Industrie 4.0, Thomas Hahn, Siemens AG February 8th, 2017</p> <p>BDC Study: Industry 4.0: The New Industrial Revolution, May 2017</p> <p>Design Principles for Industrie 4.0 Scenarios: A Literature Review Hermann, Mario Pentek, Tobias* Otto, Boris. Working Paper No. 01 / 2015</p> <p>Industry 4.0 Digitalization for productivity and growth. Briefing September 2015. Ron Davies, EPRS (European Parliamentary Research Service)</p> <p>Industrie 4.0, Smart manufacturing for the future. William MacDougall, Germany trade and invest, July 2014.</p> <p>2016 Global Industry 4.0 Survey. Industry 4.0: Building the digital enterprise. Dr. Reinhard Geissbauer, Head of EMEA Industry 4.0 Digital Operations Team (PWC)</p> <p>From Industry 4.0 to Digitising Manufacturing, An End User Perspective, Conference Papers. Manufacturing Technology Centre Pilot Way, Ansty Business Park, Coventry CV7 9JU</p> <p>Industry 4.0 Making your business more competitive, 2017 CGI GROUP INC.</p> <p>Industry 4.0 How to navigate digitization of the manufacturing sector, McKinsey Digital 2015.</p> <p>Industry 4.0, the future of productivity and growth in manufacturing industries, BCG (Boston Consulting Group), April 2015</p> <p>On the Way to Industrie 4.0 – The Digital Enterprise, Klaus Helmrich, Member of the Managing Board of Siemens AG, 2015</p> <p>Industry 4.0 – Opportunities and challenges of the industrial internet, Dr. Reinhard Geissbauer, Head of EMEA Industry 4.0 Digital Operations Team (PWC), 2015</p> <p>Websites:</p> <p>www.pwc.com/industry40</p> <p>https://en.wikipedia.org/wiki/Industrial_Revolution</p> <p>Videos and tutorials:</p> <p>Coal, Steam, and The Industrial Revolution: Crash Course World History #32:</p> <p>https://www.youtube.com/watch?v=zhL5DCizj5c</p> <p>The next manufacturing revolution is here Olivier Scalabre. TED (2016):</p> <p>https://www.youtube.com/watch?v=AyWtlwwEgS0</p> <p>Documentary The Fourth Industrial Revolution. World Economic Forum (2016):</p>
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