METIS

MicroElectronics, Training Industry and Skills

METIS (2019-2023)

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METIS implements a **new strategic approach** to sectoral cooperation on skills for microelectronics by involving the **key players across industry, education & training, and regulatory/certification bodies**.

- METIS will:

- Develop the **Microelectronics Sector Skills Strategy** to help match the demand and supply of skills in microelectronics industry

- Define and refine **occupational profiles** based on existing competence frameworks and the ESCO classification system of skills,

- Introduce innovative learning-outcome-based **VET curricula** jointly developed by industry & education that are modular,

- Benchmark and align the METIS curricula and training with ESCO, EQF and EQVET principles of quality and relevance.

- Enhance the visibility of the microelectronics sector as a professional option,

- Ensure durable impact and sustain project results beyond EU co-financing, through the **establishment of the Microelectronics Observatory & Skills Council.**

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Industry Partners

Industry

semi

infineon

BOSCH
Invented for life

xfab

Graphenea

SUMMA SEMICONDUCTOR

Arçelik

SILICON SAXONY
THE HIGH-TECH NETWORK

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University Partners

TU Graz

imec

SBH SÜDOST dresden chip academy

MŰEGYETEM 1782

IALFVG

USN University of South-Eastern Norway

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Other partners

Regulatory body

CIMEA
THE ART OF CONNECTING ACADEMIA

Social Partners

WITEC
EUROPEAN ASSOCIATION FOR WOMEN IN SCIENCE ENGINEERING & TECHNOLOGY™

European Association of Career Guidance

Market Research & Intelligence

DECISION
ETUDES & CONSEIL

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Countries

- The stakeholders represent 13 countries:

  Austria (Infineon Technologies, Technical University of Graz), **Belgium** (imec), **Cyprus** (European Association of Career Guidance), **Germany** (Bosch, Silicon Saxony, Dresden Chip Academy), **Hungary** (Budapest University of Technology and Economics), **Finland** (Summa Semiconductor Oy), **France** (X-FAB France, DECISION), **Italy** (IAL-FVG, CIMEA), **Norway** (University of South-Eastern Norway), **Spain** (Graphenea), **Sweden** (WiTEC) and **Turkey** (Arcelik).

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The first step of the METIS project (2020)

- Building an EU sectoral skills strategy and a methodology to monitor and anticipate skills in the European microelectronics industry.
- A multi- stakeholder's approach was adopted and
  - 10 Focus Groups,
  - 50 live interviews
  - online survey
  - market research,
- **First report entitled "Skills and Occupational Profiles for Microelectronics".**

https://www.metis4skills.eu/wp-content/uploads/2023/12/Yearly-Monitoring-Report-2023.pdf

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Policy recommendations in 2023

- A. Increase the involvement of the microelectronics industry in the education process.
- B. Communication campaigns to improve the image of the sector.
- C. Develop clusters and networks favoring dialog between industry and education representatives.
- D. Favor intra and extra-EU mobility.
- E. Introduce an EU chip academy.
- F. Develop interdisciplinarity and joint degrees in microelectronics.
- G. Others •
  - Raise the public funding of universities and VET providers,
  - Wages should be more comparable to USA and to other industries

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Critical skills in 2023

Nine fields of skills are confirmed as the most critical across the different job profiles (relatively stable since 2020).

- 1. System architectures: Knowledge of systems architectures: SoC, SiP, complex ASICs… Ability to design such architectures.
- 2. Data analysis. Increasingly needed by the industry.
- 3. Artificial Intelligence / Machine learning.
- 4. Analog design.
- 5. Knowledge of applications (specificities, linking components, materials, design constraints to apps).
- 6. Quality – reliability related skills.
- 7. Security related skills.
- 8. Hardware / software integration, although less brought forward in 2023.
- 9. Knowledge of new materials. Especially important for process engineers and material engineers, although this field of skills has been less brought up in 2023 by the interviewed stakeholders.

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METIS Curriculum & Training

The METIS consortium developed curricula, training content and learning settings in the 4 main areas of microelectronics

- **Component Design**
- **System Design**
- **Basics of Manufacturing**
- **Key Competencies and Innovative Thinking**

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Learning-Outcome-based training
Catalogue and Training

Area	Total Duration	# of Modules	EQF
1. Component Design	300	10	4 to 6
2. System Design	400	13	4 to 6
3. Basics of manufacturing	300	10	4 to 6
4. Key Competences & Innovative Thinking	100	10	5 to 7

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Courses provided by USN

ID	Course Name	Learning Hours	EQF level	Lecturer	Period (Week nr)
P12.1	Mechanics of Si beam and diaphragm structures	80	7	Ulrik Hanke	33-36
P12.2	Viscous damping in microstructures	40	7	Ulrik Hanke	23-24
P12.3	Non-viscous damping in microstructures	40	7	Ulrik Hanke	39-40
P12.4	Resistive sensor front-end	40	7	Mehdi Azadmehr	36-37
P12.5	Capacitive sensor front-end	40	7	Mehdi Azadmehr	38-39
P12.6	Physics of resistivity measurements	60	7	Ulrik Hanke	9-10
P12.7	Piezoresistive Si sensors	80	7	Ulrik Hanke	16-19
P12.9	Piezoelectric microsensors	40	6	Mehdi Azadmehr	9-10
P12.10	Capacitive microsensors	40	6	Mehdi Azadmehr	14-16
P12.11	Thermal and radiation sensors	60	6	Mehdi Azadmehr	17-20

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Thank you for your attention!

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