"Gheorghe Asachi" Technical University of Iaşi
Faculty of Electronics, Telecommunications and Information Technology
Department of Telecommunications and Information Technologies

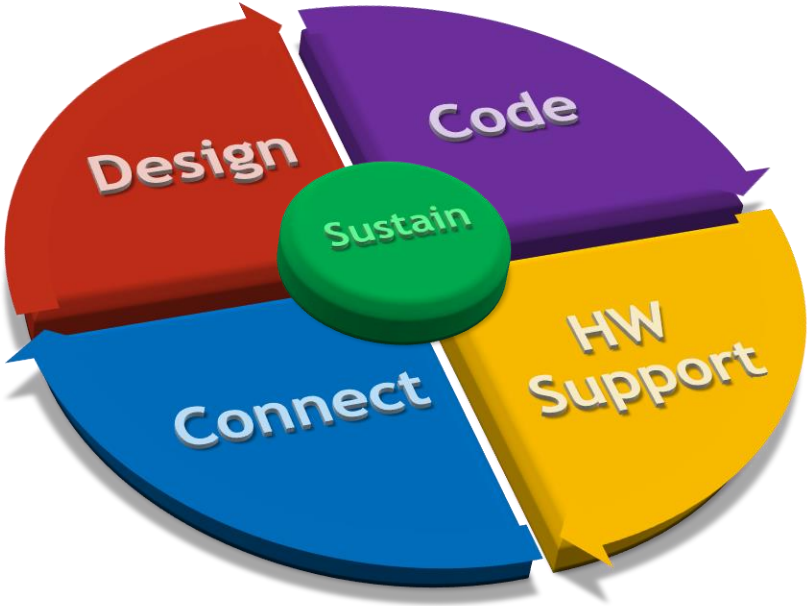
Information Technologies for Telecommunications

Master of Science Program

IT4T

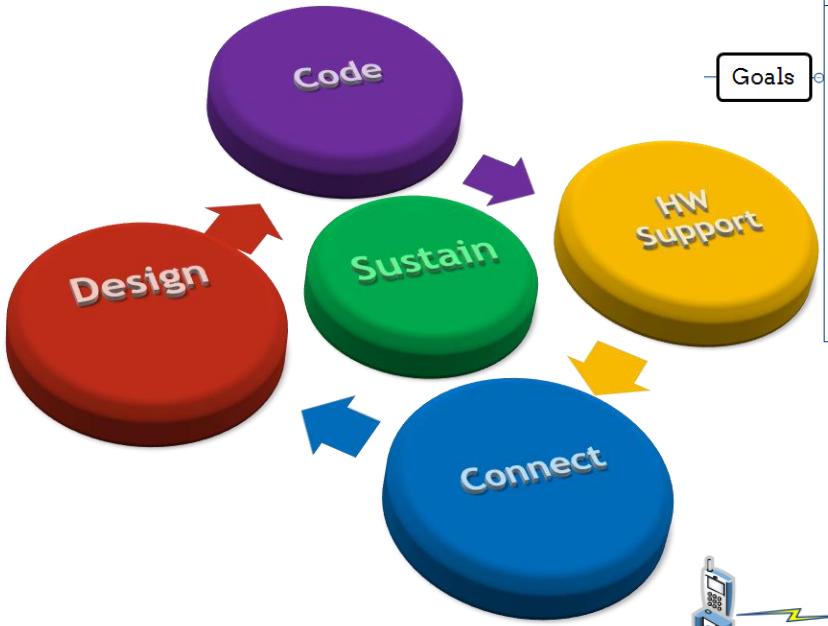
http://study.tuiasi.ro/information-technologies-for-telecommunications/program-overview/

Program structure

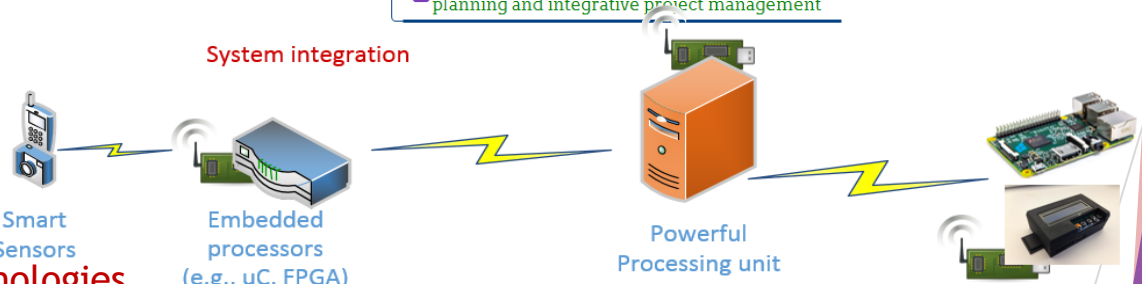


- **SW / Algorithm Design**
  - Topics
    1. Advanced Signal Processing Techniques
    2. Object Oriented Software Design
    3. Machine Learning
    4. Software Engineering
  - Keywords: Thinking, Analysis, Planning, Processing, Algorithms
  - Goal: Ensure knowledge for usage of tools and methods for architectural and algorithm design for information systems in telecommunications
- **Programming / Coding**
  - Topics
    1. Advanced Programming for Communication Systems (Java, Android)
    2. Databases and Web Programming and Interfacing (e.g., HTML, CSS, PHP, MySQL, XML, M.S.Access)
    4. Model Based Development (Simulink, Statefloe, code generation)
    5. Scripting for Communication Systems (with Python)
  - Keywords: Programming, SW Development, SW Tools, Coding, Testing, Deployment on Embedded platform such as Raspberry Pi
  - Goal: Ensure knowledge and usage of telecommunications relevant programming languages for computers and embedded devices (SW tools)
- **HW Support**
  - Topics
    1. Embedded Architectures and Operating Systems
    2. Smart Sensors and Sensor Networks
    3. Applications of Smart Sensors
    4. Hardware Acceleration for Communication Systems
  - Keywords: HW devices, HW accelerated processing, Smart Sensing
  - Goal: Ensure Functional understanding of hardware support components: devices, platforms, sensors and actuators (HW tools)
- **Connectivity and Integration**
  - Topics
    1. Networking, Cloud Computing and Cyber-security
    2. Mobility and Wireless Technologies
    3. Control Systems and Virtual Instrumentation
    4. Smart Home with Internet of Things
    5. Software Defined Radio
  - Keypoints
  - Keywords: Connectivity, Communication, Mobility, Protection, Integration, Testing
  - Goal: Deployment of communication techniques into the design and implementation of information systems. Model, simulate and analyze designed information systems.
- **Sustainability**
  - Topics
    1. Project Management for Information Systems
    2. Social Competence & Interpersonal Skills
    3. Application Project
  - Facultative
  - Keywords: Sustainability, Career Path, Personal Development, Engineering, Soft Skills, Research, Development Project
  - Goal: Apply knowledge on process, methods and tools for information systems and product development within the context of an organizational culture

Objective



- Goals
  - Information systems understanding, design and programming
    - General professional competencies acquired
      1. Usage of tools and methods for architectural and algorithm design for information systems in telecommunications (SW Design)
      2. Usage of telecommunications relevant programming languages for computers and embedded devices (Programming)
      3. Functional understanding of hardware support components: devices, platforms, sensors and actuators (HW Support)
      4. Deployment of communication techniques into the design and implementation of information systems (Connectivity)
      5. Model, simulate and analyze designed information systems (Connectivity)
      6. Apply knowledge on process, methods and tools for information systems and product development within the context of an organizational culture (Sustainability)
    - Specific professional competencies acquired
      1. Smart sensors and wireless sensor networks design. Remote control and interfacing in wireless sensor networks
      2. Wireless communications simulation with Simulink and implementation with Software Defined Radio
      3. Machine learning algorithms for multimedia signal acquisition, transmission and processing
      4. Software approaches for modeling and simulation of information systems and systems components
      5. Deployment of wireless and control systems by using the Raspberry Pi embedded platform
      6. Organizational culture, personal development planning and integrative project management



Information Technologies for Telecommunications

1st

- Embedded Architectures and Operating Systems
- Advanced Signal Processing Techniques
- Object Oriented Software Design
- Software Engineering
- Smart Sensors and Sensor Networks
- Social Competence & Interpersonal Skills
- Application Project

Learn to use Embedded Platform – Raspberry Pi

2nd

- Networking, Cloud Computing and Cyber-security
- Scripting for Communication Systems
- Mobility and Wireless Technologies
- Control Systems and Virtual Instrumentation
- Project Management for Information Systems
- Application Project and Professional Training

Every discipline will also be applied on Raspberry Pi

3rd

- Databases, Web Programming and Interfacing
- *Machine Learning*
- *Advanced Programming for Communication Systems*
- *Model Based Development*
- Applications of Smart Sensors
- Application Project

Every discipline will also be applied on Raspberry Pi

4th

- Hardware Acceleration for Communication Systems
- *Software Defined Radio*
- *Smart Home and Internet of Things*
- Application Project
- Dissertation Project

Integrate knowledge onto Raspberry Pi

Program structure
Details – Sustainability

Application Project

Examples

One project example — Mobile phone build on Raspberry Pi

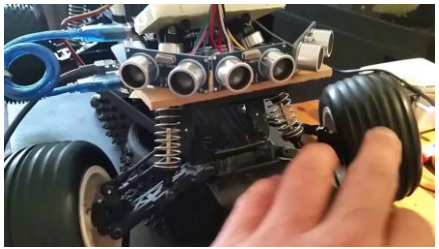
https://www.raspberrypi.org/blog/piphone-home-raspberry-pi-smartphone/

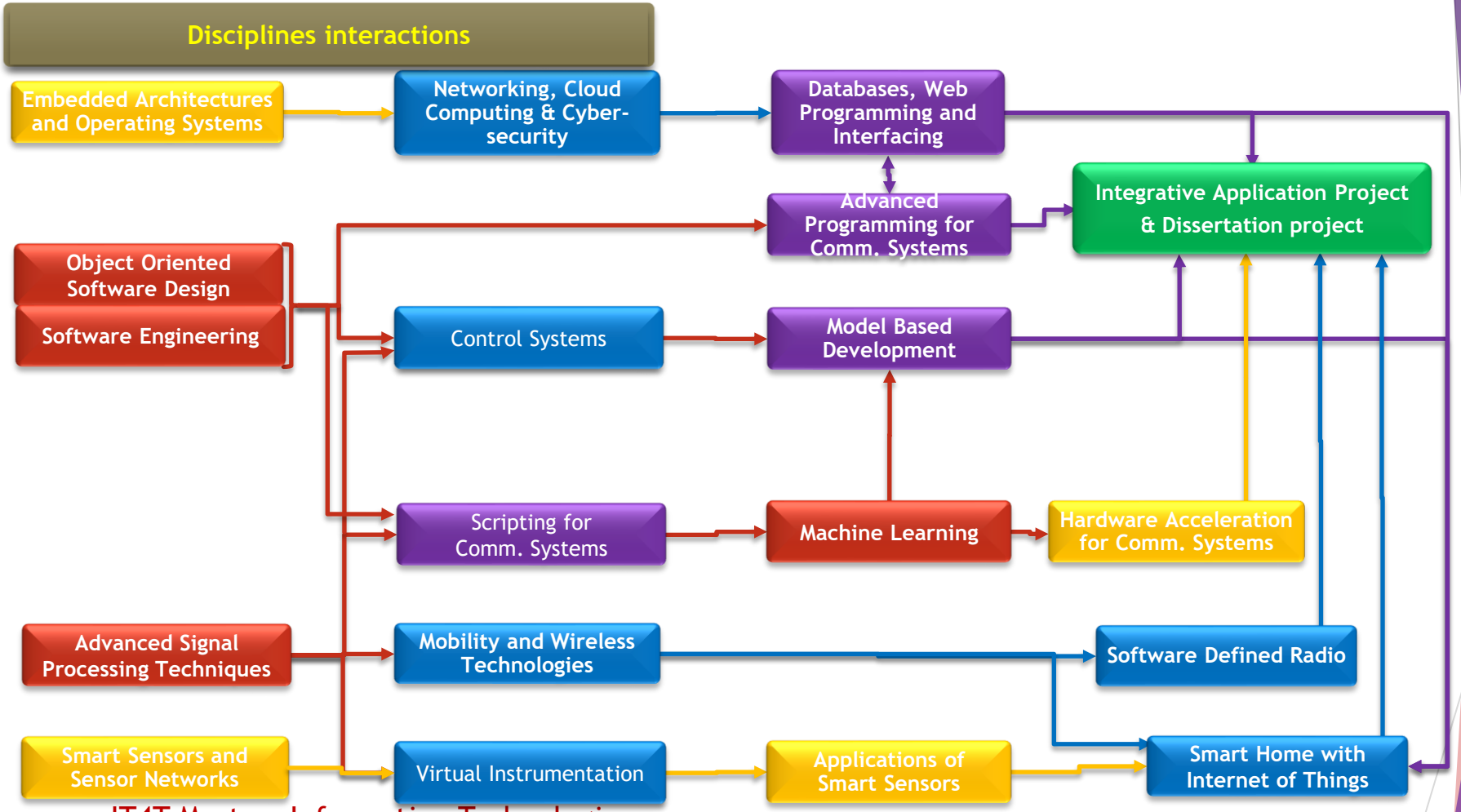
One project example — Software Defined Radio / Radar with Raspberry Pi

https://www.rtl-sdr.com/tag/raspberr

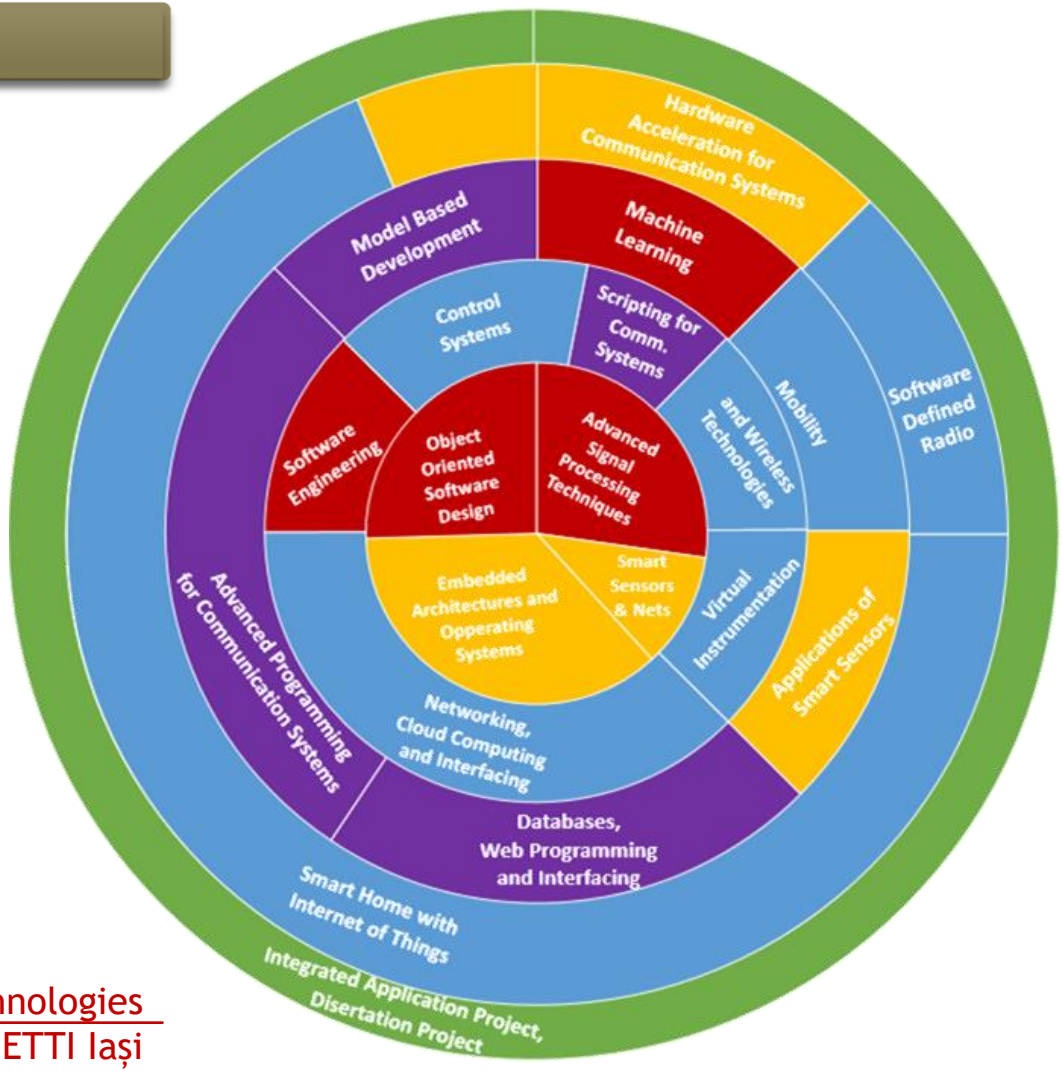
One project example — Smart House with Raspberry Pi

One project example — Smart TV with Raspberry Pi




Disciplines interactions
Embedded Architectures and Operating Systems
Networking, Cloud Computing & Cyber-security
Databases, Web Programming and Interfacing
Advanced Programming for Comm. Systems
Integrative Application Project & Dissertation project
Object Oriented Software Design
Software Engineering
Control Systems
Model Based Development
Scripting for Comm. Systems
Machine Learning
Hardware Acceleration for Comm. Systems
Advanced Signal Processing Techniques
Mobility and Wireless Technologies
Software Defined Radio
Smart Sensors and Sensor Networks
Virtual Instrumentation
Applications of Smart Sensors
Smart Home with Internet of Things

Disciplines interactions



Employment Opportunities

ETTI
LS ETC
www.liga-etc.ro
FACULTATEA DE ELECTRONICĂ, TELECOMUNICAȚII ȘI TEHNOLOGIA INFORMAȚIEI
WWW.TUIASI.RO | WWW.ETTI.TUIASI.RO | WWW.LIGA-ETC.RO
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Information Technologies for Telecommunications (IT4T)

OVERVIEW:

Faculty Name: **Faculty of Electronics, Telecommunications and Information Technologies**

Study domain: **Engineering in Electronics, Telecommunications and Information Technology**

Name of the university programme: **Information Technologies for Telecommunications – IT4T**

Language of instruction: **English**

Type of studies: **Full time**

Standard length of studies: **2 years / 4 semesters**

Number of ECTS Credits: **30 credits / semester, 120 credits in total**

Academic calendar (starting and ending dates of the courses): **October 1st – June 30th. Extended as needed to September 30th for resits.**

http://study.tuiasi.ro/information-technologies-for-telecommunications/

PROGRAMME OBJECTIVES

The general objective of this programme is to ensure understanding of information systems and to develop abilities to design, program and interconnect such systems.

The specific objectives undergo the preparation of the Bachelor graduates in the sub-domain of software engineering for the design, implementation and integration of software systems with orientation in the field of embedded systems and particularly of telecommunication systems, networks and services.

The programme aims at consolidating organizational, communication and relational skills while covering both cognitive and practical (instrumental-operational) dimensions of the following topics: Smart sensors and wireless sensor networks design. Remote control and interfacing in wireless sensor networks; Wireless communications simulation with Simulink and implementation with Software Defined Radio; Machine learning algorithms for multimedia signal acquisition, transmission and processing; Software approaches for modeling and simulation of information systems and systems components; Deployment of wireless and control systems by using the Raspberry Pi embedded platform; Innovation and intrapreneurship mindset; Organizational culture, personal development planning and integrative project management.

SHORT DESCRIPTION

The programme provides training on level 7 EQF (European Qualifications Framework) (Bologna cycle II – Masters studies) and it is mainly aimed at graduates of the Electronics Engineering, Telecommunications and Information Technology license cycle but can also be followed by graduates of university license degree programmes such as: Computer Science, Systems Engineering, Informatics, Information Engineering, Electrical Engineering and others from a close profile.

The programme is thought as of the "professional type" and it gives special weight to the practical dimension. To this end, the programme is structured in five categories: 1. Design of software architectures and algorithms; 2. Programming and coding techniques and languages; 3. Hardware support in terms of tools and devices; 4. Connectivity and system integration; 5. Sustainability.

LEARNING OUTCOMES

- Usage of tools and methods for architectural and algorithm design for information systems in telecommunications (SW Design)
- Usage of telecommunications relevant programming languages for computers and embedded devices (Programming)
- Functional understanding of hardware support components: devices, platforms, sensors and actuators (HW Support)
- Deployment of communication techniques into the design and implementation of information systems (Connectivity)
- Model, simulate and analyze designed information systems (Connectivity)
- Apply knowledge on process, methods and tools for information systems and product development within the context of an organizational culture (Sustainability)

STRUCTURE

FIRST YEAR

MANDATORY COURSES

Embedded Architectures and Operating Systems; Advanced Signal Processing Techniques; Software Engineering and Model Based Design; Scripting for Communication Systems; Networking, Cloud Computing and Cybersecurity; Software Defined Radio; Mobility and Wireless Technologies; Control Systems and Virtual Instrumentation, Smart Sensors and Sensor Networks, Ethics and Academic Integrity

ELECTIVE COURSES

Object Oriented Software Design, Embedded System Design and Modeling

OPTIONAL COURSES

Social Competence & Interpersonal Skills, Project Management for Information Systems

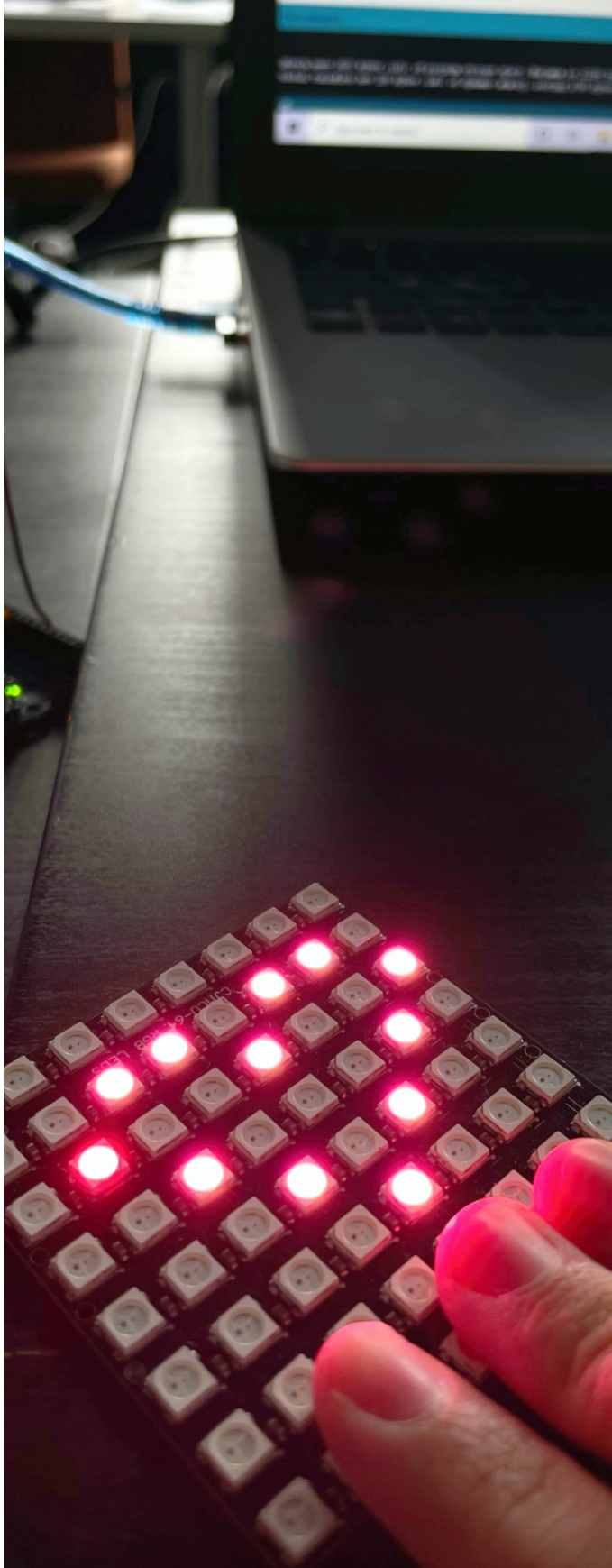
SECOND YEAR

MANDATORY COURSES

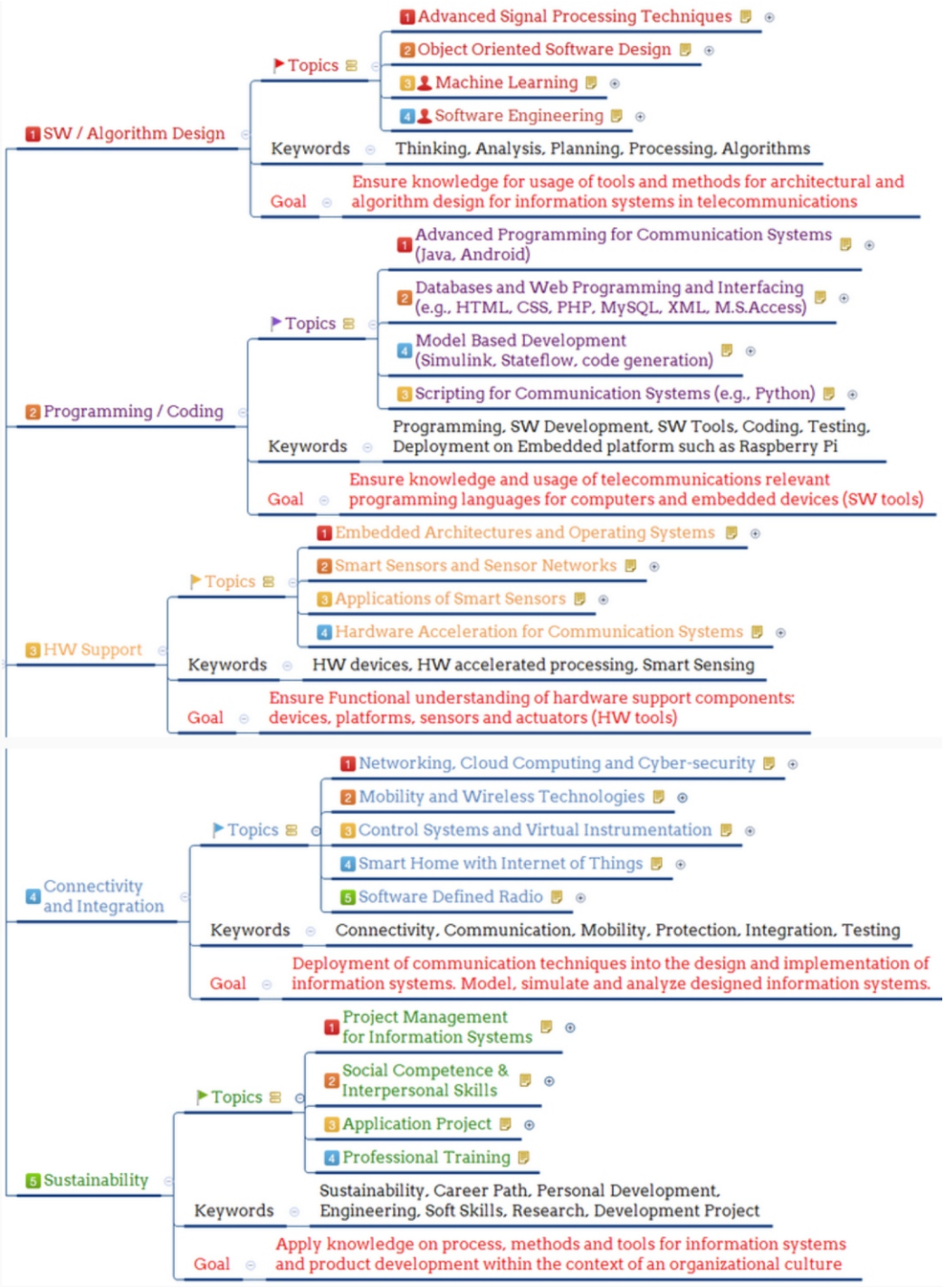
Databases, Web Programming and Interfacing, Machine Learning, Hardware Acceleration for Communication Systems, Advanced Programming for Communication Systems; Dissertation work; Dissertation Training

ELECTIVE COURSES

Smart Home and Internet of Things, Embedded Application Project



PROGRAMME CONTENT



LABOUR MARKET

In 2030, the number of people who will work in the IT&C industry in the North-East Region of Romania is estimated at ~35.000, compared to ~20.000 in 2020 and ~5.000 in 2005.

Among the largest employers in the field in the region, we mention: Continental Automotive, Veoneer, Preh, Oracle, Huawei, Ericsson, Orange, Vodafone, Telekom, Tivo, UniCredit, Conduent, SCC Services, Amazon, Atexis, Arcadis, Centric, Mind, Basware, Sonovision, HEG, Beenear, 3Pillar, Focality, Gemini Cad, Tec Telecom, Thinslices, RomSoft, Red Point.

The IT4T program is specially designed to assure competencies and skills that ensure rapid absorption of graduates on the labour market regionally to internationally.

ADMISSION REQUIREMENTS

For detailed information regarding the admission procedure at TUIASI, both for the citizens from European Union / European Economic Area Member States or the Swiss Confederation and for the citizens from non-EU countries please access:

http://study.tuiasi.ro/admission/

CONTACT INFORMATION

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