

## SYLLABUS

### 1. Data about the program of study

|                                      |  |
|--------------------------------------|--|
| 1.1 Institution                      | Technical University of Cluj-Napoca                                      |
| 1.2 Faculty                          | Faculty of Electronics, Telecommunications, and Information Technology   |
| 1.3 Department                       | Communications   |
| 1.4 Field of study                   | Electronic Engineering, Telecommunications, and Information Technologies |
| 1.5 Cycle of study                   | Master of Science  |
| 1.6 Program of study / Qualification | Telecommunications/ Master   |
| 1.7 Form of education                | Full time  |
| 1.8 Subject code                     | TC-E20.00  |

### 2. Data about the subject

|   |   |              |   |                |   |                      |       |
|---|---|--------------|---|----------------|---|----------------------|-------|
| 2.1 Subject name  | Research activity / Practical Activity 4  |              |   |                |   |                      |       |
| 2.2 Subject area  | Theoretical area<br>Methodological area: transversal<br>Area of analysis: interdisciplinary |              |   |                |   |                      |       |
| 2.3 Course responsible                                    | -   |              |   |                |   |                      |       |
| 2.4 Teacher in charge with seminar / laboratory / project | Teachers from departments that are involved in the program                                  |              |   |                |   |                      |       |
| 2.5 Year of study   | 2   | 2.6 Semester | 4 | 2.7 Assessment | C | 2.8 Subject category | DS/DI |

### 3. Estimated total time

|  |     |                      |   |                          |       |
|--|-----|----------------------|---|--------------------------|-------|
| 3.1 Number of hours per week   | 14  | of which: 3.2 course | 0 | 3.3 applications (Pr/Re) | 14    |
| 3.4 To Total hours in the curriculum   | 196 | of which: 3.5 course | 0 | 3.6 applications (Pr/Re) | 196   |
| Distribution of time   |     |                      |   |                          | hours |
| Manual, lecture material and notes, bibliography                                   |     |                      |   |                          | 20    |
| Supplementary study in the library, online specialized platforms and in the field  |     |                      |   |                          | 12    |
| Preparation for seminars / laboratories, homework, reports, portfolios, and essays |     |                      |   |                          | 20    |
| Tutoring   |     |                      |   |                          | 0     |
| Exams and tests  |     |                      |   |                          | 2     |
| Other activities: .....  |     |                      |   |                          | 0     |
| 3.7 Total hours of individual study  | 54  |                      |   |                          |       |
| 3.8 Total hours per semester   | 250 |                      |   |                          |       |
| 3.9 Number of credit points  | 10  |                      |   |                          |       |

### 4. Pre-requisites (where appropriate)

|                |                  |
|----------------|------------------|
| 4.1 curriculum | N. A.            |
| 4.2 competence | English language |

## 5. Requirements (where appropriate)

|   |  |
|---|--|
| 5.1. for the course                             | -  |
| 5.2. for the seminars / laboratories / projects | Cluj-Napoca, computers connected to the Internet |

## 6. Specific competences

|                          |  |
|--------------------------|--|
| Professional competences | <p>C1. Use of the fundamental elements related to devices, circuits, systems, instrumentation and electronic technology</p> <p>C4. Design, implementation and operation of data, voice, video, and multimedia services. This is based on the understanding and the application of fundamental concepts in telecommunications and transmission of information.</p> <p>C2. Applying the basic methods for the acquisition and processing of signals</p> <p>C3. Application of the basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques</p> <p>C5. Selecting, installing, configuring and operating fixed or mobile telecommunications equipment. Equipping a site with usual telecommunications networks</p> <p>C6. Solving specific problems of the broadband communications networks: propagation in different environment, circuits and equipment for high frequencies (microwaves and optical)</p> <p>C7. Design, implementation and testing of systems and of various types of applications (signal processing, classification, regression, detection, natural language processing, shape recognition) based on machine learning or deep learning techniques</p> |
| Cross competences        | N/A  |

## 7. Discipline objectives (as results from the key competences gained)

|                         |   |
|-------------------------|---|
| 7.1 General objective   | Development of skills in regarding the elaboration of a research paper (journal article, conference article, project research report).  |
| 7.2 Specific objectives | <ol style="list-style-type: none"> <li>1. Skills to draw up a research and documentation plan by using indexed international databases (Web of Science, Scopus, IEEE Xplore, ACM, Science Direct, Elsevier, Springerlink, DBLP, EURASIP etc.)</li> <li>2. Skills to develop a research paper</li> </ol> |

## 8. Contents

| 8.2 Applications  | Teaching methods         | Notes |
|---|--------------------------|-------|
| 1. Choice of theme  | Discussion online/onsite | N/A   |
| 2. Preparation of the research plan and choice of bibliography  |                          |       |
| 3. State-of-the-art and objectives of the research  |                          |       |
| 4. Theoretical fundamentals   |                          |       |
| 5. Proposed solution  |                          |       |
| 6. Experimental results   |                          |       |
| 7. Research report/ journal article/ conference article. Optional presentation and publication in a journal or conference proceedings |                          |       |

### Bibliography

It shall be determined by each supervisor. It is desirable that the research topic be correlated with the topic of the dissertation thesis.

### 9. Bridging course contents with the expectations of the representatives of the community, professional associations, and employers in the field

The discipline content and the acquired skills with the expectations of the professional competences acquired will be used in the following COR occupations (Electronics Engineer; Telecommunications Engineer; Electronics Design Engineer; System and Computer Design Engineer; Communications Design Engineer) or in the new occupations proposed to be included in COR (Sale Support Engineer; Multimedia Applications Developer; Network Engineer; Communications Systems Test Engineer; Project Manager; Traffic Engineer; Communications Systems Consultant).

### 10. Evaluation

| Activity type  | 10.1 Assessment criteria   | 10.2 Assessment methods | 10.3 Weight in the final grade |
|--|--|-------------------------|--------------------------------|
| 10.5 Applications  | Verification of skills and abilities acquired as a result of research and practical activities | Verification mark       | Max. 10p<br>100%               |
| 10.6 Minimum standard of performance   |  |                         |                                |
| <b>Qualitative point of view:</b>  |  |                         |                                |
| <i>Minimal theoretical knowledge:</i>  |  |                         |                                |
| 1. Development of skills regarding the elaboration of a research paper (journal article, conference article, project research report)..  |  |                         |                                |
| <i>Minimal practical competences:</i>  |  |                         |                                |
| ✓ Skills to draw up a research and documentation plan by using indexed international databases (Web of Science, Scopus, IEEE Xplore, ACM, Science Direct, Elsevier, Springerlink, DBLP, EURASIP etc) |  |                         |                                |
| ✓ Skills to develop a research paper   |  |                         |                                |
| <b>Quantitative point of view:</b>   |  |                         |                                |
| ✓ Teaching research report/ journal article/ conference article submitted  |  |                         |                                |
| ✓ The mark at the verification must be at least 5  |  |                         |                                |

| Date of filling in: | Responsible  | Title First name SURNAME | Signature |
|---------------------|--------------|--------------------------|-----------|
| 20.06.2024          | Applications | Advisor                  |           |

|  |  |
|--|--|
| Date of approval in the Council of the Communications Department<br>10.07.2024   | Head of Communications Department<br>Prof. Virgil DOBROTA, Ph.D. |
| Date of approval in the Council of the Faculty of Electronics, Telecommunications and Information Technology<br>11.07.2024 | Dean<br>Prof. Ovidiu POP, Ph.D.                                  |