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**UNIVERSITY POLITEHNICA OF BUCHAREST**  
**BACHELOR PROGRAMS IN FOREIGN LANGUAGES**



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## 1. Field of study: COMPUTERS AND INFORMATION TECHNOLOGY

### 1.1 Information Engineering (taught in English)

#### Faculty of Engineering in Foreign Languages

##### a) Short description and main objectives:

The Information Engineering bachelor program, taught entirely in English, offers the abilities and knowledge to apply the best techniques and methods for designing and implementing high quality, safe, performant enterprise-level information systems based on advanced technologies. Graduates will also achieve strong foundations in electronics and system engineering, and the ability to participate in the development of complex cyber-physical systems.

##### b) Other information

All the subjects of the program are open for Erasmus students.

##### c) Website: <http://ing.pub.ro/en/education/licence/>

##### d) Contact person: Mr. Andrei VASILĂȚEANU, [andrei.vasilateanu@upb.ro](mailto:andrei.vasilateanu@upb.ro)

##### e) Curriculum:

| Year                                  | Sem | Subject name                             | Weekly number of hours |          |         |         | Practice | ECTS |
|---------------------------------------|-----|--|------------------------|----------|---------|---------|----------|------|
|                                       |     |  | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b> |     |  |                        |          |         |         |          |      |
| 1                                     | 1   | Calculus 1                               | 3                      | 2        |         |         |          | 5    |
| 1                                     | 1   | Linear Algebra                           | 2                      | 2        |         |         |          | 4    |
| 1                                     | 1   | Fundamentals of Electrical Engineering 1 | 2                      | 1        |         |         |          | 3    |
| 1                                     | 1   | Chemistry                                | 2                      | 1        |         |         |          | 3    |
| 1                                     | 1   | Operating Systems Administration         | 2                      |          | 2       |         |          | 4    |
| 1                                     | 1   | Programming Languages                    | 2                      |          | 2       |         |          | 4    |
| 1                                     | 1   | Computer Aided Graphics                  | 1                      |          | 1       |         |          | 3    |
| 1                                     | 1   | Professional communication 1             |                        | 2        |         |         |          | 2    |



|  |   |  |   |   |   |   |  |   |
|--|---|--|---|---|---|---|--|---|
| 1                                      | 1 | Physical Education 1                     |   |   | 1 |   |  | 2 |
| 1                                      | 2 | Calculus 2                               | 3 | 2 |   |   |  | 5 |
| 1                                      | 2 | Physics 1                                | 2 | 1 | 1 |   |  | 4 |
| 1                                      | 2 | Fundamentals of Electrical Engineering 2 | 2 | 2 |   |   |  | 5 |
| 1                                      | 2 | Electronic Devices                       | 2 | 1 | 1 |   |  | 4 |
| 1                                      | 2 | Data Structures and Algorithms           | 2 |   | 2 |   |  | 4 |
| 1                                      | 2 | Introduction to Web Programming          | 2 |   | 2 |   |  | 4 |
| 1                                      | 2 | Professional communication 2             |   | 2 |   |   |  | 2 |
| 1                                      | 2 | Physical Education 2                     |   |   | 1 |   |  | 2 |
| <b>Facultative subjects</b>            |   |  |   |   |   |   |  |   |
| 1                                      | 1 | European Culture and Civilization 1      | 1 | 1 |   |   |  | 2 |
| 1                                      | 1 | Foreign language 1                       | 1 | 1 |   |   |  | 2 |
| 1                                      | 1 | English for Engineering Academic Study 1 | 1 | 1 |   |   |  | 2 |
| 1                                      | 1 | Romanian language for foreign students 1 |   | 2 |   |   |  | 2 |
| 1                                      | 1 | Education psychology                     | 2 | 2 |   |   |  | 5 |
| 1                                      | 2 | European Culture and Civilization 2      | 1 | 1 |   |   |  | 2 |
| 1                                      | 2 | Foreign language 2                       | 1 | 1 |   |   |  | 2 |
| 1                                      | 2 | English for Engineering Academic Study 2 | 1 | 1 |   |   |  | 2 |
| 1                                      | 2 | Romanian language for foreign students 2 |   | 2 |   |   |  | 2 |
| 1                                      | 2 | Pedagogy 1                               | 2 | 2 |   |   |  | 5 |
| <b>Second Year Compulsory subjects</b> |   |  |   |   |   |   |  |   |
| 2                                      | 1 | Special Mathematics 1                    | 2 | 2 |   |   |  | 4 |
| 2                                      | 1 | Probabilities & Statistics               | 2 | 1 |   |   |  | 3 |
| 2                                      | 1 | Physics II                               | 2 |   | 1 |   |  | 4 |
| 2                                      | 1 | Electronic Circuits                      | 2 |   | 1 |   |  | 4 |
| 2                                      | 1 | Digital Integrated Circuits              | 2 |   | 2 |   |  | 4 |
| 2                                      | 1 | Databases                                | 2 |   | 1 | 1 |  | 5 |
| 2                                      | 1 | Object Oriented Programming              | 2 |   | 2 |   |  | 4 |
| 2                                      | 1 | Microeconomics                           | 1 | 1 |   |   |  | 4 |
| 2                                      | 2 | Microprocessor Architecture              | 2 |   | 2 |   |  | 4 |
| 2                                      | 2 | Signals and Systems                      | 2 | 1 | 1 |   |  | 5 |
| 2                                      | 2 | Fundamentals of Electrical Engineering 3 | 2 |   | 2 |   |  | 4 |
| 2                                      | 2 | Numerical Methods                        | 2 |   | 2 |   |  | 5 |
| 2                                      | 2 | Operating Systems                        | 3 | 1 | 1 |   |  | 5 |



|                                       |   |  |   |   |   |   |    |
|---------------------------------------|---|--|---|---|---|---|----|
| 2                                     | 2 | Electronic Measurements, Sensors and Transducers | 3 |   | 2 |   | 5  |
| 2                                     | 2 | Macroeconomics                                   | 1 | 1 |   |   | 2  |
| <b>Facultative subjects</b>           |   |  |   |   |   |   |    |
| 2                                     | 1 | Technical Writing 1                              |   | 2 |   |   | 2  |
| 2                                     | 1 | Romanian language for foreign students 3         |   | 2 |   |   | 2  |
| 2                                     | 1 | Foreign Language 3                               |   | 2 |   |   | 2  |
| 2                                     | 1 | Physical Education 3                             |   |   | 2 |   | 2  |
| 2                                     | 1 | Pedagogy 2                                       | 2 | 2 |   | 2 | 5  |
| 2                                     | 2 | Technical Writing 2                              |   | 2 |   |   | 2  |
| 2                                     | 2 | Romanian language for foreign students 4         |   | 2 |   |   | 2  |
| 2                                     | 2 | Foreign Language 4                               |   | 2 |   |   | 2  |
| 2                                     | 2 | Physical Education 4                             |   |   | 2 |   | 2  |
| 2                                     | 2 | Didactics  | 2 | 2 |   |   | 5  |
| <b>Third Year Compulsory subjects</b> |   |  |   |   |   |   |    |
| 3                                     | 1 | Data Transmissions                               | 2 |   | 1 |   | 4  |
| 3                                     | 1 | Algorithm Design                                 | 2 |   | 1 |   | 4  |
| 3                                     | 1 | Computer Networks                                | 3 |   | 2 |   | 5  |
| 3                                     | 1 | Formal Languages and Compilers                   | 3 |   | 2 |   | 4  |
| 3                                     | 1 | Advanced Computer Graphics                       | 1 |   | 2 |   | 4  |
| 3                                     | 1 | Money and Banking                                | 1 | 1 |   |   | 2  |
| 3                                     | 1 | Computer Architecture                            | 2 |   | 2 |   | 4  |
| 3                                     | 2 | Digital Signal Processing                        | 2 |   | 1 | 1 | 3  |
| 3                                     | 2 | Neural Networks and Genetic Algorithms           | 2 |   | 2 |   | 3  |
| 3                                     | 2 | Functional Programming                           | 2 |   | 2 |   | 3  |
| 3                                     | 2 | Business Administration                          | 1 | 1 |   |   | 2  |
| 3                                     | 2 | Software Development Methods                     | 2 |   | 1 | 1 | 3  |
| 3                                     | 2 | Web Application Development                      | 2 |   | 1 | 1 | 3  |
| 3                                     | 2 | Project: Object Oriented Programming             |   |   |   | 2 | 2  |
| 3                                     | 2 | Domain Internship                                |   |   |   |   | 30 |
| 3                                     | 2 | Specialty Internship                             |   |   |   |   | 30 |
| <b>Optional Subjects</b>              |   |  |   |   |   |   |    |



|  |   |  |   |   |   |   |    |   |
|--|---|--|---|---|---|---|----|---|
| 3                                      | 1 | Quality and Reliability                              | 2 |   | 1 |   |    | 3 |
| 3                                      | 1 | Mobile Device Application Development                | 2 |   | 1 |   |    | 3 |
| 3                                      | 2 | Internet of Things                                   | 2 |   | 1 | 1 |    | 3 |
| 3                                      | 2 | Human-Computer Interaction                           | 2 |   | 1 | 1 |    | 3 |
| <b>Facultative subjects</b>            |   |  |   |   |   |   |    |   |
| 3                                      | 2 | Ethics and Academic Integrity                        | 2 |   |   |   |    | 2 |
| <b>Fourth Year Compulsory subjects</b> |   |  |   |   |   |   |    |   |
| 4                                      | 1 | Project: Web and Cloud Applications                  |   |   |   | 2 |    | 2 |
| 4                                      | 1 | Bioinformatics                                       | 2 |   | 2 |   |    | 4 |
| 4                                      | 1 | Software Engineering                                 | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 1 | Software Design Techniques                           | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 1 | Fundamentals of Management                           | 1 | 1 |   |   |    | 2 |
| 4                                      | 2 | Semantic Web   | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 2 | Distributed and parallel algorithms                  | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 2 | Software Project Management                          | 2 |   | 1 | 1 |    | 3 |
| 4                                      | 2 | Security and Encryption                              | 2 |   | 1 |   |    | 2 |
| 4                                      | 2 | Industrial Management                                | 1 | 1 |   |   |    | 2 |
| 4                                      | 2 | Diploma Project                                      |   |   |   | 8 |    | 4 |
| 4                                      | 2 | Diploma Project Practice                             |   |   |   |   | 60 | 5 |
| <b>Optional Subjects</b>               |   |  |   |   |   |   |    |   |
| 4                                      | 1 | Artificial Intelligence                              | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 1 | Image Processing                                     | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 1 | Programmable Electronic Systems with FPGA            | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 1 | Systems Engineering                                  | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 1 | Mobile Systems and Programming for Wireless Networks | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 1 | Microprocessor Systems                               | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 2 | Robotics and virtual reality                         | 2 |   | 1 |   |    | 4 |
| 4                                      | 2 | Electronic CAD                                       | 2 |   | 1 |   |    | 4 |



## 1.2 Internet of Things Engineering (taught in English)

### Faculty of Engineering in Foreign Languages

#### a) Short description and main objectives:

The Internet of Things Engineering bachelor program, taught entirely in English, offers the abilities and knowledge to apply the best techniques and methods for managing the security of complex, distributed systems, to use best practices for the design and implementation of enterprise systems, including heterogenous software and hardware components.

Graduates will also acquire a strong foundation in artificial intelligence, networking and electronics allowing them to participate in the development of Internet of Things systems.

#### b) Other information

All subjects of the program are open for Erasmus incoming students.

#### c) Website:

<http://ing.pub.ro/en/education/licence/>

#### d) Contact person: Mrs. Iuliana MARIN, [iuliana.marin@upb.ro](mailto:iuliana.marin@upb.ro)

#### e) Curricula:

| Year                           | Sem | Subject name                             | Weekly number of hours |          |         |         | Practice | Evaluation form (E/C) | ECTS |
|--------------------------------|-----|--|------------------------|----------|---------|---------|----------|-----------------------|------|
|                                |     |  | Lecture                | Tutorial | Labwork | Project |          |                       |      |
| First Year Compulsory subjects |     |  |                        |          |         |         |          |                       |      |
| 1                              | 1   | Calculus 1                               | 2                      | 1        | 1       |         |          | E                     | 4    |
| 1                              | 1   | Linear Algebra                           | 2                      | 2        |         |         |          | E                     | 4    |
| 1                              | 1   | Fundamentals of Electrical Engineering 1 | 2                      | 1        | 1       |         |          | E                     | 4    |
| 1                              | 1   | Foreign Language 1                       |                        | 1        |         |         |          | C                     | 2    |
| 1                              | 1   | Operating Systems Utilization            | 2                      |          | 2       |         |          | V                     | 4    |
| 1                              | 1   | Programming Languages 1                  | 2                      |          | 2       |         |          | E                     | 4    |
| 1                              | 1   | Computer Aided Graphics                  | 1                      |          | 2       |         |          | C                     | 3    |
| 1                              | 1   | Mechanics and Mechanism Theory           | 2                      | 1        |         |         |          | E                     | 3    |
| 1                              | 1   | Physical education and sports 1          |                        | 1        |         |         |          | C                     | 2    |
| 1                              | 2   | Calculus 2                               | 2                      | 1        | 1       |         |          | E                     | 4    |
| 1                              | 2   | Physics 1                                | 2                      | 1        | 1       |         |          | E                     | 4    |
| 1                              | 2   | Electronic devices                       | 2                      |          | 2       |         |          | E                     | 4    |
| 1                              | 2   | Logic Design                             | 1                      |          | 1       |         |          | C                     | 2    |
| 1                              | 2   | Programming Languages 2                  | 2                      |          | 2       |         |          | E                     | 4    |



|                                 |   |  |   |   |   |   |  |   |   |
|---------------------------------|---|--|---|---|---|---|--|---|---|
| 1                               | 2 | Data Structures and Algorithms           | 2 |   | 2 |   |  | E | 4 |
| 1                               | 2 | Web Programming                          | 2 |   | 2 |   |  | E | 4 |
| 1                               | 2 | Physical education and sports 2          |   |   | 1 |   |  | C | 2 |
| 1                               | 2 | Foreign Language 2                       |   | 1 |   |   |  | C | 2 |
| Facultative subjects            |   |  |   |   |   |   |  |   |   |
| 1                               | 1 | European Culture and Civilization 1      | 1 | 1 |   |   |  | C | 2 |
| 1                               | 1 | English for Engineering Academic Study 1 | 1 | 1 |   |   |  | C | 2 |
| 1                               | 1 | Romanian language for foreign students 1 |   | 2 |   |   |  | C | 2 |
| 1                               | 1 | Education psychology                     | 2 | 2 |   |   |  | C | 5 |
| 1                               | 2 | European Culture and Civilization 2      | 1 | 1 |   |   |  | C | 2 |
| 1                               | 2 | English for Engineering Academic Study 2 | 1 | 1 |   |   |  | C | 2 |
| 1                               | 2 | Romanian language for foreign students 2 |   | 2 |   |   |  | C | 2 |
| 1                               | 2 | Pedagogy 1                               | 2 | 2 |   |   |  | E | 5 |
| Second Year Compulsory subjects |   |  |   |   |   |   |  |   |   |
| 2                               | 1 | Special Mathematics                      | 2 | 2 |   |   |  | E | 4 |
| 2                               | 1 | Probabilities & Statistics               | 2 | 1 |   |   |  | E | 3 |
| 2                               | 1 | Physics 2                                | 2 |   | 1 |   |  | E | 3 |
| 2                               | 1 | Object Oriented Programming              | 2 |   | 2 |   |  | E | 4 |
| 2                               | 1 | Microeconomics                           | 1 | 1 |   |   |  | C | 2 |
| 2                               | 1 | Digital Electronics                      | 2 |   | 2 |   |  | C | 4 |
| 2                               | 1 | Databases                                | 2 |   | 1 | 1 |  | E | 4 |
| 2                               | 1 | Foreign Language 3                       |   | 1 |   |   |  | C | 2 |
| 2                               | 2 | Macroeconomics                           | 1 | 1 |   |   |  | E | 3 |
| 2                               | 2 | Formal Languages, Automata and Compilers | 2 |   | 2 |   |  | E | 4 |
| 2                               | 2 | Numerical Methods                        | 2 |   | 2 |   |  | E | 4 |
| 2                               | 2 | Operating Systems                        | 2 |   | 1 | 1 |  | E | 4 |
| 2                               | 2 | Foreign Language 4                       |   | 2 |   |   |  | C | 2 |
| 2                               | 2 | Algorithm Design                         | 2 |   | 2 |   |  | E | 4 |
| 2                               | 2 | Systems and Signals Theory               | 2 | 1 | 1 |   |  | C | 5 |
| Optional subjects               |   |  |   |   |   |   |  |   |   |
| 2                               | 1 | Data Acquisition and Processing          | 2 |   | 1 |   |  | E | 4 |
| 2                               | 1 | Virtual Instrumentation                  | 2 |   | 1 |   |  | E | 4 |





|                                |   |  |   |   |   |   |     |   |   |
|--------------------------------|---|--|---|---|---|---|-----|---|---|
| 2                              | 2 | Electronic Measurement Sensors and Transducers | 2 |   | 2 |   |     | E | 4 |
| 2                              | 2 | Fundamentals of Electrical Engineering 2       | 2 |   | 2 |   |     | E | 4 |
| Facultative subjects           |   |  |   |   |   |   |     |   |   |
| 2                              | 1 | Technical Writing 1                            |   | 2 |   |   |     | C | 2 |
| 2                              | 1 | Romanian language for foreign students 3       |   | 2 |   |   |     | C | 2 |
| 2                              | 1 | Physical Education 3                           |   |   | 2 |   |     | C | 2 |
| 2                              | 1 | Pedagogy 2                                     | 2 | 2 |   | 2 |     | E | 5 |
| 2                              | 2 | Technical Writing 2                            |   | 2 |   |   |     | C | 2 |
| 2                              | 2 | Romanian language for foreign students 4       |   | 2 |   |   |     | C | 2 |
| 2                              | 2 | Physical Education 4                           |   |   | 2 |   |     | C | 2 |
| 2                              | 2 | Didactics                                      | 2 | 2 |   |   |     | E | 5 |
| Third Year Compulsory subjects |   |  |   |   |   |   |     |   |   |
| 3                              | 1 | Digital Signal Processing                      | 2 |   | 2 |   |     | E | 4 |
| 3                              | 1 | Data Analysis and Visualization                | 2 |   | 1 |   |     | E | 4 |
| 3                              | 1 | Computer Networks                              | 2 |   | 2 |   |     | E | 4 |
| 3                              | 1 | Image Processing                               | 2 |   | 1 |   |     | C | 4 |
| 3                              | 1 | Software Engineering                           | 2 |   | 2 |   |     | E | 4 |
| 3                              | 1 | Artificial Intelligence                        | 2 |   | 2 |   |     | C | 4 |
| 3                              | 1 | Computer Architecture                          | 2 |   | 2 |   |     | E | 4 |
| 3                              | 2 | Intelligent Systems Engineering                | 2 |   | 1 | 1 |     | E | 3 |
| 3                              | 2 | Applied Cryptography                           | 2 |   | 2 |   |     | E | 3 |
| 3                              | 2 | Computer Graphics                              | 2 |   | 1 |   |     | E | 2 |
| 3                              | 2 | Project: Computer Networks                     |   |   |   | 2 |     | C | 2 |
| 3                              | 2 | Intelligent electricity distribution networks  | 2 |   | 1 |   |     | E | 2 |
| 3                              | 2 | Deep Learning                                  | 2 |   | 1 |   |     | C | 3 |
| 3                              | 2 | Logical Programming and Functional Programming | 2 |   | 1 | 1 |     | E | 3 |
| 3                              | 2 | Digital marketing                              | 1 |   | 1 |   |     | E | 2 |
| 3                              | 2 | Internship                                     |   |   |   |   | 180 | C | 8 |
| Optional Subjects              |   |  |   |   |   |   |     |   |   |
| 3                              | 1 | Accounting and Financial Information           | 1 | 1 |   |   |     | C | 2 |



|                                 |   |   |   |   |   |   |    |   |   |
|---------------------------------|---|---|---|---|---|---|----|---|---|
| 3                               | 1 | Rights - judicial tools for engineers                       | 1 | 1 |   |   |    | C | 2 |
| 3                               | 2 | Modern Industrial Logistic                                  | 2 |   | 1 |   |    | C | 2 |
| 3                               | 2 | Nanotechnology for IoT Industry                             | 2 |   | 1 |   |    | C | 2 |
| 3                               | 2 | Robotics and Multi-Agents Systems                           | 2 |   | 1 |   |    | C | 2 |
| Facultative subjects            |   |   |   |   |   |   |    |   |   |
| 3                               | 1 | Computer Aided Training                                     | 1 |   | 1 |   |    | C | 2 |
| Fourth Year Compulsory subjects |   |   |   |   |   |   |    |   |   |
| 4                               | 1 | Interdisciplinary project                                   |   |   |   | 2 |    | C | 2 |
| 4                               | 1 | Internet of Things  | 2 |   | 1 |   |    | E | 4 |
| 4                               | 1 | Design with Microprocessors                                 | 2 |   | 1 |   |    | C | 4 |
| 4                               | 1 | Mobile and Embedded Computing                               | 2 |   | 1 | 1 |    | E | 4 |
| 4                               | 1 | Applications & Software Design                              | 2 |   | 2 |   |    | E | 4 |
| 4                               | 2 | Autonomous Systems  | 2 |   | 1 | 1 |    | C | 4 |
| 4                               | 2 | Ethical Hacking and System Defense                          | 2 |   | 2 |   |    | C | 4 |
| 4                               | 2 | Virtual and Augmented Reality                               | 2 |   | 1 |   |    | C | 3 |
| 4                               | 2 | Entrepreneurship in Industry 4.0                            | 2 |   | 1 |   |    | C | 3 |
| 4                               | 2 | Diploma Project Elaboration                                 |   |   |   | 8 |    | C | 5 |
| 4                               | 2 | Diploma Project Internship                                  |   |   |   |   | 60 | C | 5 |
| Optional Subjects               |   |   |   |   |   |   |    |   |   |
| 4                               | 1 | E-payment Systems Security                                  | 2 |   | 2 |   |    | E | 4 |
| 4                               | 1 | Decision Support Systems                                    | 2 |   | 2 |   |    | E | 4 |
| 4                               | 1 | Big Data Analytics  | 2 |   | 2 |   |    | E | 4 |
| 4                               | 1 | Mobile Communications in Industry 4.0                       | 2 |   | 2 |   |    | E | 4 |
| 4                               | 1 | Semantic Web and Open linked data                           | 2 |   | 2 |   |    | E | 4 |
| 4                               | 1 | IoT Systems Evaluation                                      | 2 |   | 2 |   |    | E | 4 |
| 4                               | 1 | Nonlinear Control Systems                                   | 2 |   | 2 |   |    | E | 4 |
| 4                               | 1 | Smart City  | 2 |   | 2 |   |    | E | 4 |
| 4                               | 2 | Bioinformatics  | 2 |   | 1 |   |    | C | 2 |
| 4                               | 2 | Key Standards in Health Information Systems                 | 2 |   | 1 |   |    | C | 2 |
| 4                               | 2 | Environmental impact and ecological concept of IoT products | 2 |   |   | 1 |    | C | 4 |
| 4                               | 2 | IoT Project Management                                      | 2 |   |   | 1 |    | C | 4 |



| Facultative subjects |   |   |   |  |   |   |   |   |
|----------------------|---|---|---|--|---|---|---|---|
| 4                    | 1 | Sensing and Actuation from Devices in IoT | 2 |  | 1 |   | C | 3 |
| 4                    | 1 | Cybersecurity                             | 2 |  | 1 | 1 | C | 4 |

### 1.3 Ingénierie de l'Information (enseigné en Français)

#### Faculté d'Ingénierie en Langues Etrangères

##### a) Description courte et objectives principaux :

Le diplôme en génie de l'information s'adresse aux étudiants attirés par les technologies de l'information, avec tous ses sous-domaines et applications. La formation couvre un **spectre large et pluridisciplinaire dans le domaine des ordinateurs et de la technologie de l'information**: micro-informatique, informatique, algorithmiques, électronique, langages de programmation, procédures relatives aux licences et garanties, procédures d'entretien de matériel informatique, règles de sécurité, télécoms, protection des données numériques, Logiciels de Gestion de Maintenance Assistée par Ordinateur (GMAO), logiciels de gestion de parc informatique, intelligence artificielle, applications web et mobiles.

La spécialisation a de **nombreux atouts**: les étudiants trouvent facilement un travail à la fin des études, la promotion de la mobilité étudiante, par l'envoi d'étudiants à l'étranger pour des périodes de pratique en entreprises, de perfectionnement linguistique et d'études dans des universités partenaires, mais aussi par l'accueil d'étudiants étrangers, la création pour les étudiants étrangers de conditions pour commencer directement les études, sans l'obligation de l'apprentissage du roumain au préalable. La spécialisation bénéficie également de la présence d'experts de l'industrie, qui interviennent dans les cours théoriques de la faculté.

Le plan d'enseignement est conçu d'une manière à couvrir et assurer le développement des compétences fondamentales de base pour un ingénieur, des compétences complémentaires, linguistiques et de l'économie.

##### b) Autre information

Tous les sujets du programme sont enseignés en Français et ils sont ouvertes aux étudiants Erasmus, sauf le stage pratique qui se déroule pendant l'été.

Le programme se déroule sur une période de 4 années, chacune ayant 2 semestres. Il faut avoir 240 ECTS obligatoires pour obtenir son diplôme.

Une présentation du programme est disponible au lien suivant :

c) **Site web:** <http://ing.pub.ro/fr/education/licence/>

d) **Personnes de contact :** Mme. Maria-Iuliana Dascalu, [maria.dascalu@upb.ro](mailto:maria.dascalu@upb.ro)

##### e) Curriculum :

| An | Sem | Sujet | Nombres des heures par semaine | St ag | ECTS |
|----|-----|-------|--------------------------------|-------|------|
|----|-----|-------|--------------------------------|-------|------|



|                                  |   |   | Cours | TD | TP | Projet |  |   |
|----------------------------------|---|---|-------|----|----|--------|--|---|
| <b>BAC+1 Sujets obligatoires</b> |   |   |       |    |    |        |  |   |
| 1                                | 1 | Analyse I   | 2     | 2  |    |        |  | 4 |
| 1                                | 1 | Algèbre linéaire  | 2     | 2  |    |        |  | 4 |
| 1                                | 1 | Bases de l'électrotechnique 1                             | 2     |    | 1  |        |  | 3 |
| 1                                | 1 | Chimie Générale   | 2     | 1  |    |        |  | 3 |
| 1                                | 1 | Systèmes d'exploitation 1                                 | 1     |    | 2  |        |  | 4 |
| 1                                | 1 | Langages de programmation                                 | 2     |    | 2  |        |  | 4 |
| 1                                | 1 | Graphique assistée par ordinateur                         | 1     |    | 1  |        |  | 2 |
| 1                                | 1 | Expression et communication 1                             | 1     | 1  |    |        |  | 2 |
| 1                                | 1 | Éducation physique et sport I                             |       | 1  |    |        |  | 2 |
| 1                                | 1 | Techniques et systèmes de travail collaboratif 1          |       | 2  |    |        |  | 2 |
| 1                                | 2 | Analyse mathématique 2                                    | 2     | 2  |    |        |  | 4 |
| 1                                | 2 | Physique I  | 2     | 1  | 1  |        |  | 4 |
| 1                                | 2 | Dispositifs électroniques                                 | 2     |    | 1  |        |  | 4 |
| 1                                | 2 | Programmation en Web                                      | 2     |    | 2  |        |  | 4 |
| 1                                | 2 | Expression et communication 2                             | 1     | 1  |    |        |  | 2 |
| 1                                | 2 | Structures de données et algorithmes                      | 2     |    | 2  |        |  | 4 |
| 1                                | 2 | Bases de l'électrotechnique 2                             | 2     |    | 2  |        |  | 4 |
| 1                                | 2 | Éducation physique et sport 2                             |       |    | 1  |        |  | 2 |
| 1                                | 2 | Techniques et systèmes de travail collaboratif 2          |       |    | 2  |        |  | 2 |
| <b>Sujets optionnelles</b>       |   |   |       |    |    |        |  |   |
| 1                                | 1 | Langue étrangère 1  |       | 2  |    |        |  | 2 |
| 1                                | 1 | Langue française pour les ingénieurs                      | 1     | 1  |    |        |  | 2 |
| 1                                | 1 | Langue et culture roumaine pour les étudiants étrangers 1 |       | 2  |    |        |  | 2 |
| 1                                | 2 | Culture et civilisation européenne                        |       | 2  |    |        |  | 2 |
| 1                                | 2 | Langue étrangère 2  |       | 2  |    |        |  | 2 |
| 1                                | 2 | Langue et culture roumaine pour les étudiants étrangers 2 |       | 2  |    |        |  | 2 |
| <b>BAC+2 Sujets obligatoires</b> |   |   |       |    |    |        |  |   |
| 2                                | 1 | Mathématiques spéciales 1                                 | 2     | 2  |    |        |  | 4 |
| 2                                | 1 | Probabilités et statistiques                              | 2     | 2  |    |        |  | 4 |
| 2                                | 1 | Physique 2  | 2     |    | 1  |        |  | 4 |
| 2                                | 1 | Programmation orientée objets                             | 2     |    | 2  |        |  | 4 |
| 2                                | 1 | Microéconomie   | 1     | 1  |    |        |  | 2 |
| 2                                | 1 | Circuits fondamentaux électroniques                       | 2     |    | 1  |        |  | 4 |
| 2                                | 1 | Bases de données  | 2     | 1  | 1  |        |  | 4 |
| 2                                | 2 | Mathématiques spéciales 2                                 | 2     | 2  |    |        |  | 4 |
| 2                                | 2 | Circuits intégrés numériques                              | 2     |    | 1  |        |  | 4 |



|  |   |  |   |   |   |   |    |   |
|--|---|--|---|---|---|---|----|---|
| 2  | 2 | Architecture des microprocesseurs  | 2 |   | 2 |   |    | 4 |
| 2  | 2 | Méthodes numériques  | 2 |   | 2 |   |    | 4 |
| 2  | 2 | Systèmes d'exploitation 2  | 2 | 1 | 1 |   |    | 4 |
| 2  | 2 | Mesures électroniques, capteurs et traducteurs (conception corps solides)  | 1 |   | 1 |   |    | 2 |
| 2  | 2 | Automates, langages formels et compilateurs  | 2 |   | 2 |   |    | 4 |
| 2  | 2 | Macroéconomie  | 1 | 1 |   |   |    | 2 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |  |   |   |   |   |    |   |
| 2  | 1 | Acquisition et traitement de données/<br>Conception des algorithmes  | 2 |   | 1 |   |    | 4 |
| 2  | 2 | Traitement des documents techniques 2/<br>Traitement de documents et services Internet/<br>Bases de l'électrotechnique 3 |   | 2 |   |   |    | 2 |
| <b>Sujets optionnelles</b>                                   |   |  |   |   |   |   |    |   |
| 2  | 1 | Langue étrangère 3   |   | 2 |   |   |    | 2 |
| 2  | 1 | Langue et culture roumaine pour les étudiants étrangers 3  |   | 2 |   |   |    | 2 |
| 2  | 1 | Éducation physique et sport 3  |   | 2 |   |   |    | 2 |
| 2  | 1 | Traitements avancés des documents techniques   |   | 2 |   |   |    | 2 |
| 2  | 2 | Éducation physique et sport 4  |   | 2 |   |   |    | 2 |
| 2  | 2 | Langue et culture roumaine pour les étudiants étrangers 4  |   | 2 |   |   |    | 2 |
| 2  | 2 | Langue étrangère 4   |   | 2 |   |   |    | 2 |
| <b>BAC+3 Sujets obligatoires</b>                             |   |  |   |   |   |   |    |   |
| 3  | 1 | Architecture des ordinateurs   | 2 |   | 2 |   |    | 4 |
| 3  | 1 | Systemes de traitement graphique   | 2 |   | 2 |   |    | 4 |
| 3  | 1 | Réseaux d'ordinateurs  | 2 |   | 2 |   |    | 4 |
| 3  | 1 | Programmation fonctionnelle  | 2 |   | 2 |   |    | 4 |
| 3  | 1 | Théorie des signaux et des systèmes  | 2 | 1 | 1 |   |    | 4 |
| 3  | 1 | Administration des affaires  | 1 | 1 |   |   |    | 2 |
| 3  | 1 | Transmission de données  | 2 |   | 1 |   |    | 4 |
| 3  | 2 | Développement des applications Web   | 2 |   | 1 | 1 |    | 3 |
| 3  | 2 | Interface homme machine  | 2 |   | 1 |   |    | 2 |
| 3  | 2 | Administration des bases de données  | 2 |   | 1 | 1 |    | 3 |
| 3  | 2 | Projet: Programmation orientée objets  |   |   |   | 2 |    | 2 |
| 3  | 2 | Théorie et traitement numériques des signaux   | 2 | 1 | 1 |   |    | 3 |
| 3  | 2 | Fondements du management   | 1 | 1 |   |   |    | 2 |
| 3  | 2 | Méthodes et techniques de développement des logiciels  | 2 |   | 1 | 1 |    | 3 |
| 3  | 2 | Pratique de domaine  |   |   |   |   | 30 | 4 |
| 3  | 2 | Pratique de spécialité   |   |   |   |   | 30 | 4 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |  |   |   |   |   |    |   |



|  |   |   |   |  |   |   |    |   |
|--|---|---|---|--|---|---|----|---|
| 3  | 1 | Systèmes de réglage automatique/<br>Technologie des microsensors<br>(Dispozitive MEMS)  | 2 |  | 1 |   |    | 4 |
| 3  | 2 | Fiabilité et controle de la qualité/<br>Systèmes programmables avec FPGA  | 1 |  | 1 |   |    | 2 |
| 3  | 2 | Réseaux de neurones et algorithmes<br>génétiques/ Apprentissage automatique   | 2 |  | 1 |   |    | 2 |
| <b>Sujets optionnelles</b>                                   |   |   |   |  |   |   |    |   |
| 3  | 2 | Systèmes de controle automate   | 2 |  | 1 |   |    | 3 |
| 3  | 2 | Instrumentation virtuelle   | 2 |  | 1 | 1 |    | 4 |
| <b>BAC+4 Sujets obligatoires</b>                             |   |   |   |  |   |   |    |   |
| 4  | 1 | Projet: Developpement des applications<br>Web   |   |  | 2 |   |    | 2 |
| 4  | 1 | Analyse et traitements d'images   | 2 |  | 1 |   |    | 4 |
| 4  | 1 | Intelligence artificielle   | 2 |  | 1 |   |    | 4 |
| 4  | 1 | Génielogiciel   | 2 |  | 1 | 1 |    | 4 |
| 4  | 1 | Sécurité et cryptage  | 2 |  | 1 | 1 |    | 4 |
| 4  | 2 | Développement des applications pour<br>les plateformes mobiles  | 2 |  | 1 | 1 |    | 4 |
| 4  | 2 | Hacking éthique et défense du système   | 2 |  | 1 |   |    | 4 |
| 4  | 2 | Robotique et agents intelligents  | 2 |  | 1 |   |    | 3 |
| 4  | 2 | Management des projets logiciels  | 2 |  | 1 | 1 |    | 3 |
| 4  | 2 | Préparation du projet de fin d'études   |   |  |   |   | 60 | 5 |
| 4  | 2 | Pratique pour le projet de fin d'études   |   |  |   |   | 60 | 5 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |   |   |  |   |   |    |   |
| 4  | 1 | Semantique Web/ Systèmes de<br>communications/ Théorie statistique des<br>signaux   | 2 |  | 1 | 1 |    | 4 |
| 4  | 1 | Commerce électronique et sécurité des<br>systèmes de paiement électronique/<br>/Communications mobiles et par<br>satellite/ Bioinformatique | 2 |  | 1 | 1 |    | 4 |
| 4  | 1 | Techniques d'optimisation des systems/<br>Internet des dispositifs intelligents/<br>/Réalité virtuelle et augmentée                         | 2 |  | 1 | 1 |    | 4 |
| 4  | 2 | Ingénierie des systems/ Systèmes à<br>microprocesseur   | 2 |  | 1 |   |    | 2 |
| 4  | 2 | Paradigmes de programmation/<br>Algorithmes parallèles et distribués  | 2 |  | 1 |   |    | 4 |
| <b>Sujets optionnelles</b>                                   |   |   |   |  |   |   |    |   |
| 4  | 1 | Architectures matériels reconfigurables   | 2 |  | 1 |   |    | 3 |
| 4  | 1 | Systèmes embarqués  | 2 |  | 1 |   |    | 3 |
| 4  | 1 | Systèmes de controle intelligent  | 2 |  | 1 |   |    | 3 |
| 4  | 2 | Électronique et informatique<br>industrielle  | 2 |  | 1 |   |    | 3 |



## 1.4 Ingénierie de l'Internet des dispositifs intelligents (enseigné en Français)

### Faculté d'Ingénierie en Langues Étrangères

#### a) Description courte et objectives principaux :

Le programme d'étude se retrouve en Roumanie seulement à l'UPB, à la Faculté d'Ingénierie en Langue Étrangères. Il s'inscrit dans le domaine des ordinateurs et technologie de l'information. Il offre les capacités et les connaissances nécessaires pour appliquer les meilleures techniques et méthodes de gestion de la sécurité de systèmes complexes et distribués, afin d'utiliser les meilleures pratiques pour la conception et la mise en œuvre de systèmes d'entreprise, y compris hétérogènes. Composants logiciels et matériels. Les diplômés posséderont également de bonnes bases en intelligence artificielle, en réseau et en électronique leur permettant de participer au développement des systèmes de l'Internet des objets.

La spécialisation a de **nombreux atouts**: les étudiants trouvent facilement un travail à la fin des études, la promotion de la mobilité étudiante, par l'envoi d'étudiants à l'étranger pour des périodes de pratique en entreprises, de perfectionnement linguistique et d'études dans des universités partenaires, mais aussi par l'accueil d'étudiants étrangers, la création pour les étudiants étrangers de conditions pour commencer directement les études, sans l'obligation de l'apprentissage du roumain au préalable. La spécialisation bénéficie également de la présence Le plan d'enseignement est conçu d'une manière à couvrir et assurer le développement des compétences fondamentales de base pour un ingénieur, des compétences complémentaires, linguistiques et de l'économie.

#### b) Autre information

Tous les sujets du programme sont enseignés en Français et ils sont ouvertes aux étudiants Erasmus, sauf le stage pratique qui se déroule pendant l'été.

Le programme se déroule sur une période de 4 années, chacune ayant 2 semestres. Il faut avoir 240 ECTS obligatoires pour obtenir son diplôme.

Une présentation du programme est disponible au lien suivant :

c) **Website:** <http://ing.pub.ro/en/education/licence/>

d) **Personne de contact:** Mrs. Iulia Cristina STĂNICĂ, iulia.stanica@upb.ro

#### e) Curricula:

| Année d'étude                        | Sem | Sujet                  | Nombres des heures par semaine |          |             |        | Stage | Forme d'évaluation (E/C) | ECTS |
|--------------------------------------|-----|------------------------|--------------------------------|----------|-------------|--------|-------|--------------------------|------|
|                                      |     |                        | Cours                          | Tutoriel | Laboratoire | Projet |       |                          |      |
| Premier an: Disciplines obligatoires |     |                        |                                |          |             |        |       |                          |      |
| 1                                    | 1   | Analyse mathématique 1 | 2                              | 1        | 1           |        |       | E                        | 4    |
| 1                                    | 1   | Algèbre linéaire       | 2                              | 2        |             |        |       | E                        | 4    |
| 1                                    | 1   | Électrotechnique 1     | 2                              | 1        | 1           |        |       | E                        | 4    |



|                                       |   |   |   |   |   |   |  |   |   |
|---------------------------------------|---|---|---|---|---|---|--|---|---|
| 1                                     | 1 | Langue étrangère 1  |   | 1 |   |   |  | C | 2 |
| 1                                     | 1 | Utilisation des systèmes d'exploitation                   | 2 |   | 2 |   |  | V | 4 |
| 1                                     | 1 | Langages de programmation 1                               | 2 |   | 2 |   |  | E | 4 |
| 1                                     | 1 | Graphique assistée par ordinateur                         | 1 |   | 2 |   |  | C | 3 |
| 1                                     | 1 | Mécanique et théorie des mécanismes                       | 2 | 1 |   |   |  | E | 3 |
| 1                                     | 1 | Éducation physique et sport 1                             |   | 1 |   |   |  | C | 2 |
| 1                                     | 2 | Analyse mathématique 2                                    | 2 | 1 | 1 |   |  | E | 4 |
| 1                                     | 2 | Physique 1  | 2 | 1 | 1 |   |  | E | 4 |
| 1                                     | 2 | Dispositifs électroniques                                 | 2 |   | 2 |   |  | E | 4 |
| 1                                     | 2 | Conception logique  | 1 |   | 1 |   |  | C | 2 |
| 1                                     | 2 | Langages de programmation 2                               | 2 |   | 2 |   |  | E | 4 |
| 1                                     | 2 | Structures de données et algorithmes                      | 2 |   | 2 |   |  | E | 4 |
| 1                                     | 2 | Programmation en Web                                      | 2 |   | 2 |   |  | E | 4 |
| 1                                     | 2 | Éducation physique et sport 2                             |   |   | 1 |   |  | C | 2 |
| 1                                     | 2 | Langue étrangère 2  |   | 1 |   |   |  | C | 2 |
| Matières facultatives                 |   |   |   |   |   |   |  |   |   |
| 1                                     | 1 | Expression et communication 1                             | 1 | 1 |   |   |  | C | 2 |
| 1                                     | 1 | Langue et culture roumaine pour les étudiants étrangers 1 |   | 2 |   |   |  | C | 2 |
| 1                                     | 1 | Psychologie de l'éducation                                | 2 | 2 |   |   |  | C | 5 |
| 1                                     | 2 | Expression et communication 2                             | 1 | 1 |   |   |  | C | 2 |
| 1                                     | 2 | Langue et culture roumaine pour les étudiants étrangers 2 |   | 2 |   |   |  | C | 2 |
| 1                                     | 2 | Pédagogie 1   | 2 | 2 |   |   |  | E | 5 |
| Deuxième année: Matières obligatoires |   |   |   |   |   |   |  |   |   |
| 2                                     | 1 | Mathématiques spéciales                                   | 2 | 2 |   |   |  | E | 4 |
| 2                                     | 1 | Probabilités et statistiques                              | 2 | 1 |   |   |  | E | 3 |
| 2                                     | 1 | Physique 2  | 2 |   | 1 |   |  | E | 3 |
| 2                                     | 1 | Programmation orientée objets                             | 2 |   | 2 |   |  | E | 4 |
| 2                                     | 1 | Microéconomie   | 1 | 1 |   |   |  | C | 2 |
| 2                                     | 1 | Electronique numériques                                   | 2 |   | 2 |   |  | C | 4 |
| 2                                     | 1 | Bases de données  | 2 |   | 1 | 1 |  | E | 4 |
| 2                                     | 1 | Langue étrangère 3  |   | 1 |   |   |  | C | 2 |





|                                       |   |   |   |   |   |   |  |   |   |
|---------------------------------------|---|---|---|---|---|---|--|---|---|
| 2                                     | 2 | Macroéconomie   | 1 | 1 |   |   |  | E | 3 |
| 2                                     | 2 | Automates, langage formels et compilateurs                | 2 |   | 2 |   |  | E | 4 |
| 2                                     | 2 | Méthodes numériques                                       | 2 |   | 2 |   |  | E | 4 |
| 2                                     | 2 | Systèmes d'exploitation                                   | 2 |   | 1 | 1 |  | E | 4 |
| 2                                     | 2 | Langue étrangère 4  |   | 2 |   |   |  | C | 2 |
| 2                                     | 2 | Conception des algorithmes                                | 2 |   | 2 |   |  | E | 4 |
| 2                                     | 2 | Théorie des systèmes et des signaux                       | 2 | 1 | 1 |   |  | C | 5 |
| Matières optionnelles                 |   |   |   |   |   |   |  |   |   |
| 2                                     | 1 | Acquisition et traitement de données                      | 2 |   | 1 |   |  | E | 4 |
| 2                                     | 1 | Instrumentation virtuelle                                 | 2 |   | 1 |   |  | E | 4 |
| 2                                     | 2 | Mesures électroniques, capteurs et transducteurs          | 2 |   | 2 |   |  | E | 4 |
| 2                                     | 2 | Électrotechnique  | 2 |   | 2 |   |  | E | 4 |
| Matière facultative                   |   |   |   |   |   |   |  |   |   |
| 2                                     | 1 | Traitement avancés des documents techniques 1             |   | 2 |   |   |  | C | 2 |
| 2                                     | 1 | Langue et culture roumaine pour les étudiants étrangers 3 |   | 2 |   |   |  | C | 2 |
| 2                                     | 1 | Éducation physique et sport 3                             |   |   | 2 |   |  | C | 2 |
| 2                                     | 1 | Pédagogie 2   | 2 | 2 |   | 2 |  | E | 5 |
| 2                                     | 2 | Traitement avancés des documents techniques 2             |   | 2 |   |   |  | C | 2 |
| 2                                     | 2 | Langue et culture roumaine pour les étudiants étrangers 4 |   | 2 |   |   |  | C | 2 |
| 2                                     | 2 | Éducation physique et sport 4                             |   |   | 2 |   |  | C | 2 |
| 2                                     | 2 | Didactique de la spécialité                               | 2 | 2 |   |   |  | E | 5 |
| Troisième année Matières obligatoires |   |   |   |   |   |   |  |   |   |
| 3                                     | 1 | Traitement numériques des signaux                         | 2 |   | 2 |   |  | E | 4 |
| 3                                     | 1 | Analyse et visualisation de données                       | 2 |   | 1 |   |  | E | 4 |
| 3                                     | 1 | Réseaux d'ordinateurs                                     | 2 |   | 2 |   |  | E | 4 |
| 3                                     | 1 | Traitements d' images                                     | 2 |   | 1 |   |  | C | 4 |
| 3                                     | 1 | Génie logiciels   | 2 |   | 2 |   |  | E | 4 |
| 3                                     | 1 | Intelligence artificielle                                 | 2 |   | 2 |   |  | C | 4 |
| 3                                     | 1 | Architecture des ordinateurs                              | 2 |   | 2 |   |  | E | 4 |



|                                   |   |   |   |   |   |   |     |   |   |
|-----------------------------------|---|---|---|---|---|---|-----|---|---|
| 3                                 | 2 | Ingénierie des systèmes intelligents                          | 2 |   | 1 | 1 |     | E | 3 |
| 3                                 | 2 | Cryptographie appliquée                                       | 2 |   | 2 |   |     | E | 3 |
| 3                                 | 2 | Traitement graphique  | 2 |   | 1 |   |     | E | 2 |
| 3                                 | 2 | Projet: Réseaux d'ordinateurs                                 |   |   |   | 2 |     | C | 2 |
| 3                                 | 2 | Réseaux intelligents  | 2 |   | 1 |   |     | E | 2 |
| 3                                 | 2 | L'apprentissage en profondeur                                 | 2 |   | 1 |   |     | C | 3 |
| 3                                 | 2 | Programmation logique et programmation fonctionnelle          | 2 |   | 1 | 1 |     | E | 3 |
| 3                                 | 2 | Marketing numérique   | 1 |   | 1 |   |     | E | 2 |
| 3                                 | 2 | Pratique  |   |   |   |   | 180 | C | 8 |
| Matières optionnelles             |   |   |   |   |   |   |     |   |   |
| 3                                 | 1 | Comptabilité et informations financière                       | 1 | 1 |   |   |     | C | 2 |
| 3                                 | 1 | Droit – outils juridiques pour l'ingénieur                    | 1 | 1 |   |   |     | C | 2 |
| 3                                 | 2 | Logistique industrielle moderne                               | 2 |   | 1 |   |     | C | 2 |
| 3                                 | 2 | Nanotechnologies pour l'industrie IoT                         | 2 |   | 1 |   |     | C | 2 |
| 3                                 | 2 | Robotique et systèmes multiagents                             | 2 |   | 1 |   |     | C | 2 |
| Matières facultatives             |   |   |   |   |   |   |     |   |   |
| 3                                 | 1 | Formation assistée par ordinateur                             | 1 |   | 1 |   |     | C | 2 |
| 4-ème année: Matière obligatoires |   |   |   |   |   |   |     |   |   |
| 4                                 | 1 | Projet interdisciplinaire                                     |   |   |   | 2 |     | C | 2 |
| 4                                 | 1 | Internet des dispositifs intelligents                         | 2 |   | 1 |   |     | E | 4 |
| 4                                 | 1 | Conception avec des microprocesseurs                          | 2 |   | 1 |   |     | C | 4 |
| 4                                 | 1 | Informatique Mobile et Embarquée                              | 2 |   | 1 | 1 |     | E | 4 |
| 4                                 | 1 | Conception des systèmes du génie logiciel et des applications | 2 |   | 2 |   |     | E | 4 |
| 4                                 | 2 | Systèmes autonomes  | 2 |   | 1 | 1 |     | C | 4 |
| 4                                 | 2 | Hacking éthique et défense du système                         | 2 |   | 2 |   |     | C | 4 |
| 4                                 | 2 | Réalité virtuelle et augmentée                                | 2 |   | 1 |   |     | C | 3 |
| 4                                 | 2 | Entrepreneuriat dans l'industrie 4.0                          | 2 |   | 1 |   |     | C | 3 |
| 4                                 | 2 | Préparation du projet de fin d'études                         |   |   |   | 8 |     | C | 5 |
| 4                                 | 2 | Pratique pour le projet de fin d'études                       |   |   |   |   | 60  | C | 5 |
| Matières optionnelles             |   |   |   |   |   |   |     |   |   |



|                       |   |   |   |  |   |   |  |   |   |
|-----------------------|---|---|---|--|---|---|--|---|---|
| 4                     | 1 | Sécurité des systèmes électroniques de paiement             | 2 |  | 2 |   |  | E | 4 |
| 4                     | 1 | Systèmes d'aide à la décision                               | 2 |  | 2 |   |  | E | 4 |
| 4                     | 1 | Analyse des données des grandes dimensions                  | 2 |  | 2 |   |  | E | 4 |
| 4                     | 1 | Communications mobiles dans l'industrie 4.0                 | 2 |  | 2 |   |  | E | 4 |
| 4                     | 1 | Web Semantique et Données liées                             | 2 |  | 2 |   |  | E | 4 |
| 4                     | 1 | Évaluation des systèmes IoI                                 | 2 |  | 2 |   |  | E | 4 |
| 4                     | 1 | Système de contrôle non-linéaires                           | 2 |  | 2 |   |  | E | 4 |
| 4                     | 1 | Ville intelligente  | 2 |  | 2 |   |  | E | 4 |
| 4                     | 2 | Bioinformatique   | 2 |  | 1 |   |  | C | 2 |
| 4                     | 2 | Principales normes des systèmes d'information sur la santé  | 2 |  | 1 |   |  | C | 2 |
| 4                     | 2 | Impact environmental et conception propres des produits IoT | 2 |  |   | 1 |  | C | 4 |
| 4                     | 2 | Gestion des projets IoT                                     | 2 |  |   | 1 |  | C | 4 |
| Matières facultatives |   |   |   |  |   |   |  |   |   |
| 4                     | 1 | Détection et activation à partir dispositifs en IoT         | 2 |  | 1 |   |  | C | 3 |
| 4                     | 1 | Sécurité cybernetique                                       | 2 |  | 1 | 1 |  | C | 4 |

## 2. Field of study: ELECTRONIC ENGINEERING, TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

### 2.1 Applied Electronics (taught in English)

#### Faculty of Engineering in Foreign Languages

##### a) Short description and main objectives:

The program has run for 30 years and produced graduates now working in key positions in renowned companies. Some of them founded their own businesses, and some chose to dedicate their activity to research and academia. The program offers a balanced arrangement between general engineering training, specific training in the electronic engineering and information technologies fields, combined with efficient professional communication and management skills.



- b) **Other information** This program accepts incoming Erasmus students for one semester or an entire year.
- c) **Website:** <http://ing.pub.ro/en/education/licence/>
- d) **Contact person:** Mr. Bujor PAVALOIU, [bujor.pavaloiu@upb.ro](mailto:bujor.pavaloiu@upb.ro)
- e) **Curriculum:**

| Year                                   | Sem | Subject name                             | Weekly number of hours |          |         |         | Practice | ECTS |
|--|-----|--|------------------------|----------|---------|---------|----------|------|
|  |     |  | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b>  |     |  |                        |          |         |         |          |      |
| 1                                      | 1   | Calculus 1                               | 3                      | 2        |         |         |          | 5    |
| 1                                      | 1   | Linear Algebra                           | 2                      | 2        |         |         |          | 4    |
| 1                                      | 1   | Fundamentals of Electrical Engineering 1 | 2                      | 1        |         |         |          | 3    |
| 1                                      | 1   | Chemistry                                | 2                      | 1        |         |         |          | 3    |
| 1                                      | 1   | Operating systems 1                      | 2                      |          | 2       |         |          | 4    |
| 1                                      | 1   | Programming Languages                    | 2                      |          | 2       |         |          | 4    |
| 1                                      | 1   | Computer aided Graphics                  | 1                      |          | 1       |         |          | 3    |
| 1                                      | 1   | Professional communication 1             |                        | 2        |         |         |          | 2    |
| 1                                      | 1   | Physical Education 1                     |                        |          | 1       |         |          | 2    |
| 1                                      | 2   | Calculus 2                               | 3                      | 2        |         |         |          | 5    |
| 1                                      | 2   | Physics 1                                | 2                      | 1        | 1       |         |          | 4    |
| 1                                      | 2   | Fundamentals of Electrical Engineering 2 | 2                      | 2        |         |         |          | 5    |
| 1                                      | 2   | Electronic Devices                       | 2                      | 1        | 1       |         |          | 4    |
| 1                                      | 2   | Data Structures and Algorithms           | 2                      |          | 2       |         |          | 4    |
| 1                                      | 2   | Introduction to Web Programming          | 2                      |          | 2       |         |          | 4    |
| 1                                      | 2   | Professional communication 2             |                        | 2        |         |         |          | 2    |
| 1                                      | 2   | Physical Education 2                     |                        |          | 1       |         |          | 2    |
| <b>Facultative subjects</b>            |     |  |                        |          |         |         |          |      |
| 1                                      | 1   | European Culture and Civilisation 1      | 1                      | 1        |         |         |          | 2    |
| 1                                      | 1   | Foreign language 1                       | 1                      | 1        |         |         |          | 2    |
| 1                                      | 1   | English for Engineering Academic Study 1 | 1                      | 1        |         |         |          | 2    |
| 1                                      | 1   | Romanian Language for Foreign Students 1 |                        | 2        |         |         |          | 2    |
| 1                                      | 2   | European Culture and Civilisation 2      | 1                      | 1        |         |         |          | 2    |
| 1                                      | 2   | Foreign Language 2                       | 1                      | 1        |         |         |          | 2    |
| 1                                      | 2   | English for Engineering Academic Study 2 | 1                      | 1        |         |         |          | 2    |
| 1                                      | 2   | Romanian Language for Foreign Students 2 |                        | 2        |         |         |          | 2    |
| <b>Second Year Compulsory subjects</b> |     |  |                        |          |         |         |          |      |
| 2                                      | 1   | Special Mathematics 1                    | 2                      | 2        |         |         |          | 4    |
| 2                                      | 1   | Probabilities & Statistics               | 2                      | 1        |         |         |          | 3    |



|                                       |   |   |   |   |   |   |    |
|---------------------------------------|---|---|---|---|---|---|----|
| 2                                     | 1 | Physics II  | 2 |   | 1 |   | 4  |
| 2                                     | 1 | Fundamental Electronic Circuits                     | 2 |   | 1 |   | 4  |
| 2                                     | 1 | Digital integrated Circuits                         | 2 |   | 2 |   | 4  |
| 2                                     | 1 | Databases   | 2 |   | 1 | 1 | 5  |
| 2                                     | 1 | Object Oriented Programming                         | 2 |   | 2 |   | 4  |
| 2                                     | 1 | Microeconomics                                      | 1 | 1 |   |   | 2  |
| 2                                     | 2 | Microprocessor Architecture                         | 2 |   | 2 |   | 4  |
| 2                                     | 2 | Signals and Systems                                 | 2 | 1 | 1 |   | 5  |
| 2                                     | 2 | Fundamentals of Electrical Engineering<br>3         | 2 | 1 | 1 |   | 4  |
| 2                                     | 2 | Numerical Methods                                   | 2 |   | 2 |   | 5  |
| 2                                     | 2 | Operating Systems 2                                 | 3 | 1 | 1 |   | 5  |
| 2                                     | 2 | Electronic Measurements, Sensors and<br>Transducers | 3 |   | 2 |   | 5  |
| 2                                     | 2 | Macroeconomics                                      | 1 | 1 |   |   | 2  |
| <b>Facultative subjects</b>           |   |   |   |   |   |   |    |
| 2                                     | 1 | Technical Writing 1                                 |   | 2 |   |   | 2  |
| 2                                     | 1 | Romanian Language for Foreign<br>Students 3         |   | 2 |   |   | 2  |
| 2                                     | 1 | Foreign Language 3                                  |   | 2 |   |   | 2  |
| 2                                     | 1 | Physical Education 3                                |   |   | 2 |   | 2  |
| 2                                     | 2 | Technical Writing 2                                 |   | 2 |   |   | 2  |
| 2                                     | 2 | Romanian Language for Foreign<br>Students 4         |   | 2 |   |   | 2  |
| 2                                     | 2 | Foreign Language 4                                  |   | 2 |   |   | 2  |
| 2                                     | 2 | Physical Education 4                                |   |   | 2 |   | 2  |
| <b>Third Year Compulsory subjects</b> |   |   |   |   |   |   |    |
| 3                                     | 1 | Data Transmissions                                  | 2 |   | 1 |   | 4  |
| 3                                     | 1 | Project Digital Integrated Circuits                 |   |   |   | 2 | 2  |
| 3                                     | 1 | Computer Networks                                   | 3 |   | 2 |   | 4  |
| 3                                     | 1 | Analog Integrated Circuits                          | 2 |   | 1 |   | 3  |
| 3                                     | 1 | Advanced Computer Graphics                          | 1 |   | 2 |   | 3  |
| 3                                     | 1 | Money and Banking                                   | 1 | 1 |   |   | 2  |
| 3                                     | 1 | Computer Architecture                               | 2 |   | 2 |   | 4  |
| 3                                     | 2 | Digital Signal Processing                           | 2 |   | 1 | 1 | 3  |
| 3                                     | 2 | Neural Networks and Genetic<br>Algorithms           | 2 |   | 2 |   | 3  |
| 3                                     | 2 | Microwaves  | 2 |   | 1 | 1 | 3  |
| 3                                     | 2 | Business Administration                             | 1 | 1 |   |   | 2  |
| 3                                     | 2 | Internet Programming Technologies                   | 2 |   | 1 |   | 2  |
| 3                                     | 2 | Microcontrollers                                    | 2 |   | 1 | 1 | 3  |
| 3                                     | 2 | Domain Internship                                   |   |   |   |   | 30 |
| 3                                     | 2 | Specialty Internship                                |   |   |   |   | 30 |
| <b>Optional Subjects</b>              |   |   |   |   |   |   |    |
| 3                                     | 1 | Reliability and Quality Control                     | 2 |   | 1 |   | 4  |
| 3                                     | 1 | Application Development for Mobile<br>Devices       | 2 |   | 1 |   | 4  |
| 3                                     | 1 | Algorithm Design and Complexity                     | 2 |   | 1 |   | 4  |



|  |   |   |   |   |   |   |    |   |
|--|---|---|---|---|---|---|----|---|
| 3                                      | 1 | Internet of Things  | 2 |   | 1 |   |    | 4 |
| 3                                      | 2 | Human-Computer Interaction  | 2 |   | 1 |   |    | 3 |
| 3                                      | 2 | Micro-sensors Technology (MEMS)                                   | 2 |   | 1 |   |    | 3 |
| 3                                      | 2 | Multiplexed Transmission Systems                                  | 2 |   | 1 | 1 |    | 3 |
| 3                                      | 2 | Nanotechnology applications in electronics and telecommunications | 2 |   | 1 | 1 |    | 3 |
| <b>Facultative subjects</b>            |   |   |   |   |   |   |    |   |
| 3                                      | 2 | Ethics and Academic Integrity                                     | 1 |   |   |   |    | 2 |
| <b>Fourth Year Compulsory subjects</b> |   |   |   |   |   |   |    |   |
| 4                                      | 1 | Image Processing  | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 1 | Project Neural Networks and Genetic Algorithms                    |   |   |   | 2 |    | 2 |
| 4                                      | 1 | Television  | 2 |   | 2 |   |    | 4 |
| 4                                      | 1 | Software Engineering  | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 1 | Fundamentals of Management  | 1 | 1 |   |   |    | 2 |
| 4                                      | 2 | Optoelectronics   | 3 |   | 2 |   |    | 5 |
| 4                                      | 2 | Security and Encryption   | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 2 | Electronic CAD  | 2 |   | 2 |   |    | 5 |
| 4                                      | 2 | Industrial Management   | 1 | 1 |   |   |    | 2 |
| 4                                      | 2 | Diploma Project   |   |   |   | 8 |    | 4 |
| 4                                      | 2 | Diploma Project Practice  |   |   |   |   | 60 | 5 |
| <b>Optional Subjects</b>               |   |   |   |   |   |   |    |   |
| 4                                      | 1 | Microprocessor Systems  | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 1 | Mobile Systems and Programming for Wireless Networks              | 2 |   | 1 | 1 |    | 4 |
| 4                                      | 1 | Analog & Digital Transmissions                                    | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 1 | Systems Engineering   | 2 |   | 1 | 1 |    | 5 |
| 4                                      | 1 | Programmable Electronic Systems with FPGA                         | 2 |   | 2 |   |    | 4 |
| 4                                      | 1 | Bioinformatics  | 2 |   | 2 |   |    | 4 |
| 4                                      | 2 | Architectures and Protocols for Integrated Net                    | 2 |   | 2 |   |    | 4 |
| 4                                      | 2 | Medical Electronics   | 2 |   | 2 |   |    | 4 |



## 2.2 Technologies and Telecommunication Systems (taught in English)

### Faculty of Electronics, Telecommunications and Information Technology

#### a) Short description and main objectives:

In the context of the current technological progress of telecommunication area, the fields of activity are practically unlimited: fixed and mobile communications, wireless networks, hardware, software and various related services, Internet of Things, audio engineering and more.

The Technologies and Telecommunication Systems study program provides the graduates with adequate skills needed for current jobs. The modern scientific and technical training, highly qualitative and competitive, offers the graduates many hiring opportunities, and international openness.

#### b) Other information

All subjects of the program are available for Erasmus incoming students.

This study program is EUR-ACE certified since 2017.

c) **Website:** <http://www.telecom.pub.ro/en/teaching/bachelor/tst/>

d) **Contact person:** Mr. Octavian FRATU, [octavian.fratu@upb.ro](mailto:octavian.fratu@upb.ro)

#### e) Curriculum:

| Year                           | Sem | Subject name                             | Weekly number of hours |          |         |         | Practice | ECTS |
|--------------------------------|-----|--|------------------------|----------|---------|---------|----------|------|
|                                |     |  | Lecture                | Tutorial | Labwork | Project |          |      |
| First Year Compulsory subjects |     |  |                        |          |         |         |          |      |
| 1                              | 1   | Mathematical Analysis 1                  | 3                      | 1        |         |         |          | 4    |
| 1                              | 1   | Algebra and Geometry                     | 3                      | 1        |         |         |          | 5    |
| 1                              | 1   | Physics 1                                | 3                      | 1        | 1       |         |          | 5    |
| 1                              | 1   | Computers Programming                    | 2                      |          | 2       |         |          | 4    |
| 1                              | 1   | Fundamentals of Electrical Engineering 1 | 3                      | 2        |         |         |          | 5    |
| 1                              | 1   | Chemistry                                | 2                      |          | 1       |         |          | 3    |
| 1                              | 1   | Foreign Language 1                       |                        | 2        |         |         |          | 2    |
| 1                              | 1   | Physical Education and Sport 1           |                        | 2        |         |         |          | 2    |



|                                 |   |  |   |   |     |  |   |
|---------------------------------|---|--|---|---|-----|--|---|
| 1                               | 2 | Mathematical Analysis 2  | 3 | 2 |     |  | 5 |
| 1                               | 2 | Physics 2  | 3 |   | 1   |  | 4 |
| 1                               | 2 | Algorithms and Data Structures                                   | 2 |   | 1   |  | 4 |
| 1                               | 2 | Fundamentals of Electrical Engineering 2                         | 3 | 1 |     |  | 5 |
| 1                               | 2 | Measurements in Electronics and Telecommunications               | 2 |   | 1.5 |  | 4 |
| 1                               | 2 | Special Mathematics  | 3 | 1 |     |  | 4 |
| Optional Subject O1             |   |  |   |   |     |  |   |
| 1                               | 2 | Office Software  | 1 |   | 1   |  | 2 |
| 1                               | 2 | Engineering Graphics and Technical Drawing                       | 1 |   | 1   |  | 2 |
| 1                               | 2 | 3D Models and Design   | 1 |   | 1   |  | 2 |
| 1                               | 2 | Practical Implementation of Electronic Schemes - Getting Started | 1 |   | 1   |  | 2 |
| Optional Subject O2             |   |  |   |   |     |  |   |
| 1                               | 2 | Philosophy   | 2 |   |     |  | 2 |
| 1                               | 2 | Sociology  | 2 |   |     |  | 2 |
| 1                               | 2 | Psychology   | 2 |   |     |  | 2 |
| 1                               | 2 | Communication  | 2 |   |     |  | 2 |
| 1                               | 2 | European Culture and Civilization                                | 2 |   |     |  | 2 |
| 1                               | 2 | European Political and Administrative Institutions               | 2 |   |     |  | 2 |
| 1                               | 2 | European Integration   | 2 |   |     |  | 2 |
| Facultative subjects            |   |  |   |   |     |  |   |
| 1                               | 2 | Internet Services  | 1 |   | 1   |  | 2 |
| 1                               | 2 | Foreign Language 2   |   | 2 |     |  | 2 |
| 1                               | 2 | Physical Education and Sport 2                                   |   | 2 |     |  | 2 |
| 1                               | 1 | Educational Psychology   | 2 | 2 |     |  | 5 |
| 1                               | 2 | Pedagogy 1   | 2 | 2 |     |  | 5 |
| Second Year Compulsory subjects |   |  |   |   |     |  |   |
| 2                               | 1 | Signals and Systems  | 3 | 2 | 1   |  | 6 |
| 2                               | 1 | Electronic Materials   | 3 |   | 1.5 |  | 5 |
| 2                               | 1 | Electronic Devices   | 3 | 2 | 1   |  | 6 |
| 2                               | 1 | Passive Components and Circuits                                  | 2 |   | 1.5 |  | 4 |
| 2                               | 1 | Object Oriented Programming                                      | 2 |   | 1   |  | 3 |





|                                |   |  |   |   |     |   |  |   |
|--------------------------------|---|--|---|---|-----|---|--|---|
| 2                              | 1 | Project - Signals and programming            |   |   |     | 1 |  | 1 |
| 2                              | 2 | Basic Electronic Circuits                    | 3 | 2 |     |   |  | 5 |
| 2                              | 2 | Digital Integrated Circuits                  | 3 | 1 | 1   |   |  | 4 |
| 2                              | 2 | Microprocessor Architecture                  | 3 |   | 1   |   |  | 5 |
| 2                              | 2 | Circuits Analysis and Synthesis              | 3 | 2 | 2   |   |  | 6 |
| 2                              | 2 | Electronic Circuits - Laboratory             |   |   | 1.5 |   |  | 2 |
| 2                              | 2 | Physical Education and Sport 4               |   | 2 |     |   |  | 2 |
| Optional Subject O1            |   |  |   |   |     |   |  |   |
| 2                              | 1 | Macroeconomics                               | 2 |   |     |   |  | 2 |
| 2                              | 1 | Microeconomics                               | 2 |   |     |   |  | 2 |
| 2                              | 1 | Elements of Law and Business Legislation     | 2 |   |     |   |  | 2 |
| Optional Subject O2            |   |  |   |   |     |   |  |   |
| 2                              | 1 | Numerical Methods                            | 1 |   | 1   |   |  | 3 |
| 2                              | 1 | A.I. Systems Engineering                     | 1 |   | 1   |   |  | 3 |
| 2                              | 1 | CAD Techniques for Electronic Modules Design | 1 |   | 1   |   |  | 3 |
| Optional Subject O3            |   |  |   |   |     |   |  |   |
| 2                              | 2 | Electronic Components Models for SPICE       | 1 |   | 1   |   |  | 3 |
| 2                              | 2 | Electronic Interconnections Technologies     | 1 |   | 1   |   |  | 3 |
| 2                              | 2 | Programming for Android                      | 1 |   | 1   |   |  | 3 |
| Optional Subject O4            |   |  |   |   |     |   |  |   |
| 2                              | 2 | Management                                   | 2 |   | 1   |   |  | 3 |
| 2                              | 2 | Marketing                                    | 2 |   | 1   |   |  | 3 |
| Facultative subjects           |   |  |   |   |     |   |  |   |
| 2                              | 1 | Foreign Language 3                           |   | 2 |     |   |  | 2 |
| 2                              | 1 | Physical Education and Sport 3               |   | 2 |     |   |  | 2 |
| 2                              | 2 | Foreign Language 4                           |   | 2 |     |   |  | 2 |
| 2                              | 1 | Pedagogy II                                  | 2 | 2 |     |   |  | 5 |
| 2                              | 2 | Didactics of the specialization              | 2 | 2 |     |   |  | 5 |
| Third Year Compulsory subjects |   |  |   |   |     |   |  |   |
| 3                              | 1 | Information Transmission Theory              | 3 | 1 | 1   |   |  | 5 |
| 3                              | 1 | Microwaves                                   | 3 | 1 | 1   |   |  | 5 |



|                      |   |   |   |   |     |     |    |   |
|----------------------|---|---|---|---|-----|-----|----|---|
| 3                    | 1 | Analogic Integrated Circuits                            | 3 | 1 | 1   |     |    | 5 |
| 3                    | 1 | Electronic Measuring Instruments                        | 3 |   | 1.5 |     |    | 4 |
| 3                    | 1 | Microcontrollers  | 2 |   | 1   |     |    | 3 |
| 3                    | 1 | Programming competences - Certifying Exam               | 1 |   |     |     |    | 2 |
| 3                    | 1 | Project 1 - Electronic Devices and Circuits             |   |   |     | 1   |    | 2 |
| 3                    | 1 | Training activity – Project 2                           |   |   |     | 0.5 |    | 1 |
| 3                    | 2 | Decision and expectation in Information Processing      | 3 | 1 | 1   |     |    | 5 |
| 3                    | 2 | Practical Activity (3rd year)                           |   |   |     |     | 30 | 6 |
| 3                    | 2 | Digital Signal Processing                               | 3 | 1 | 1   | 1   |    | 5 |
| 3                    | 2 | Analog and Digital Communications                       | 3 | 1 |     |     |    | 3 |
| 3                    | 2 | Network Architectures and Internet                      | 2 |   | 1   |     |    | 3 |
| 3                    | 2 | Microwave Circuits                                      | 2 | 1 | 1   |     |    | 3 |
| Optional Subjects O1 |   |   |   |   |     |     |    |   |
| 3                    | 1 | Automatic Control in Electronics and Telecommunications | 2 |   | 1   |     |    | 3 |
| 3                    | 1 | Electromagnetic Compatibility                           | 2 |   | 1   |     |    | 3 |
| 3                    | 1 | Audio Engineering                                       | 2 |   | 1   |     |    | 3 |
| 3                    | 1 | Fundamentals of Information Science                     | 2 |   | 1   |     |    | 3 |
| 3                    | 1 | Applied Programming of Interfaces                       | 2 |   |     | 1   |    | 3 |
| Optional Subjects O2 |   |   |   |   |     |     |    |   |
| 3                    | 2 | Project 2   |   |   |     | 1   |    | 2 |
| Optional Subjects O3 |   |   |   |   |     |     |    |   |
| 3                    | 2 | Television  | 2 |   | 1   |     |    | 3 |
| 3                    | 2 | Networks and Services Security                          | 2 |   | 1   |     |    | 3 |
| 3                    | 2 | Basics of Operating Systems and Virtualization          | 2 |   | 1   |     |    | 3 |
| 3                    | 2 | Fundamentals of Cryptology                              | 2 |   | 1   |     |    | 3 |
| Facultative subjects |   |   |   |   |     |     |    |   |
| 3                    | 1 | Development of Innovative Android Applications          | 1 |   | 1   | 1   |    | 3 |
| 3                    | 1 | Physical Education and Sport 5                          |   | 2 |     |     |    | 2 |
| 3                    | 2 | Physical Education and Sport 6                          |   | 2 |     |     |    | 2 |
| 3                    | 1 | Computer-assisted instruction                           | 1 | 1 |     |     |    | 2 |



|                                 |   |   |   |     |     |   |   |   |
|---------------------------------|---|---|---|-----|-----|---|---|---|
| 3                               | 1 | Pedagogical practice in pre-university education (1)  |   |     |     |   | 3 | 3 |
| 3                               | 2 | Classroom management                                  | 1 | 1   |     |   |   | 3 |
| 3                               | 2 | Pedagogical practice in pre-university education (2)  |   |     |     |   | 3 | 2 |
| 3                               | 2 | Graduation exam: level 1 – Didactical Portfolio       |   |     |     |   |   | 5 |
| Fourth Year Compulsory subjects |   |   |   |     |     |   |   |   |
| 4                               | 1 | Data Communications                                   | 3 | 1   |     |   |   | 5 |
| 4                               | 1 | Communications Networks                               | 2 |     | 1.5 |   |   | 4 |
| 4                               | 1 | Signal Processors for Communications                  | 2 |     | 1.5 |   |   | 4 |
| 4                               | 1 | Radio Communications Systems and Equipment            | 2 |     | 1.5 |   |   | 4 |
| 4                               | 1 | Antennas and Propagation                              | 2 |     | 1   |   |   | 3 |
| 4                               | 1 | Databases   | 2 |     | 1   |   |   | 3 |
| 4                               | 1 | Analog and Digital Communications - Laboratory        |   |     | 2   |   |   | 2 |
| 4                               | 2 | Mobile Communications                                 | 2 | 0.5 | 1.5 |   |   | 6 |
| 4                               | 2 | Multimedia Coding - Techniques and Applications       | 2 |     | 1.5 |   |   | 4 |
| 4                               | 2 | Multiplex Transmission Techniques and Systems         | 2 |     | 1.5 |   |   | 4 |
| Optional Subjects O1            |   |   |   |     |     |   |   |   |
| 4                               | 1 | Radar   | 2 |     | 1   |   |   | 3 |
| 4                               | 1 | Transmission Media                                    | 2 |     | 1   |   |   | 3 |
| 4                               | 1 | Fundamentals of Cryptology 2                          | 2 |     | 1   |   |   | 3 |
| Optional Subjects O2            |   |   |   |     |     |   |   |   |
| 4                               | 1 | Project 3   |   |     |     | 1 |   | 2 |
| Optional Subjects O3            |   |   |   |     |     |   |   |   |
| 4                               | 2 | Multiple Access Techniques                            | 2 |     | 1   |   |   | 3 |
| 4                               | 2 | Optical Communications                                | 2 |     | 1   |   |   | 3 |
| 4                               | 2 | Traffic Engineering                                   | 2 |     | 1   |   |   | 3 |
| 4                               | 2 | Neural Networks and Fuzzy Systems                     | 2 |     | 1   |   |   | 3 |
| Optional Subjects O4            |   |   |   |     |     |   |   |   |
| 4                               | 2 | Quality and Reliability                               | 1 |     | 1   |   |   | 3 |
| 4                               | 2 | Management and Legislation in Telecom and Electronics | 1 |     | 1   |   |   | 3 |
| Diploma Project                 |   |   |   |     |     |   |   |   |



|                      |   |  |   |  |   |  |    |   |
|----------------------|---|--|---|--|---|--|----|---|
| 4                    | 2 | Practical Activity for Diploma Project |   |  |   |  | 4  | 5 |
| 4                    | 2 | Diploma Project Preparation Activities |   |  |   |  | 30 | 5 |
| Facultative subjects |   |  |   |  |   |  |    |   |
| 4                    | 1 | Automotive electronics                 | 2 |  | 1 |  |    | 3 |
| 4                    | 1 | Practical Activity S7                  |   |  |   |  | 30 | 2 |
| 4                    | 1 | Introduction to Astronomy              | 1 |  | 1 |  |    | 2 |

### 2.3 Applied Electronics (taught in English)

#### Faculty of Electronics, Telecommunications and Information Technology

##### a) Short description and main objectives:

In the context of the current technological progress of electronic devices, the emerging fields of activity are practically unlimited: industrial electronics, automation, medical electronics, artificial intelligence, information technologies, image processing, military, geology, security, robotics applications (human-machine interface systems) and many more.

This program offers graduates with adequate skills for the modern jobs. The Applied Electronics study program is perfectly framed in the policy of the current field, both in terms of content and structure, as well as in terms of international skills and openness offered to students.

##### b) Other information

All subjects of the program are open for Erasmus incoming students.

This study program is EUR-ACE certified since 2017.

c) **Website:** [http://ing.pub.ro/wp-content/uploads/2014/11/12\\_ETTI\\_L\\_ELA-EN\\_2017-2021.pdf](http://ing.pub.ro/wp-content/uploads/2014/11/12_ETTI_L_ELA-EN_2017-2021.pdf)

d) **Contact person:** Mr. Bogdan FLOREA, [bogdan.florea@upb.ro](mailto:bogdan.florea@upb.ro)

##### e) Curriculum:

| Year                           | Sem | Subject name | Weekly number of hours |          |         |         | Practice | ECTS |
|--------------------------------|-----|--------------|------------------------|----------|---------|---------|----------|------|
|                                |     |              | Lecture                | Tutorial | Labwork | Project |          |      |
| First Year Compulsory subjects |     |              |                        |          |         |         |          |      |



|                      |   |  |   |   |     |  |   |
|----------------------|---|--|---|---|-----|--|---|
| 1                    | 1 | Mathematical Analysis 1  | 3 | 1 |     |  | 4 |
| 1                    | 1 | Algebra and Geometry   | 3 | 1 |     |  | 5 |
| 1                    | 1 | Physics 1  | 3 | 1 | 1   |  | 5 |
| 1                    | 1 | Computers Programming  | 2 |   | 2   |  | 4 |
| 1                    | 1 | Fundamentals of Electrical Engineering 1                         | 3 | 2 |     |  | 5 |
| 1                    | 1 | Chemistry  | 2 |   | 1   |  | 3 |
| 1                    | 1 | Foreign Language 1   |   | 2 |     |  | 2 |
| 1                    | 1 | Physical Education and Sport 1                                   |   | 2 |     |  | 2 |
| 1                    | 2 | Mathematical Analysis 2  | 3 | 2 |     |  | 5 |
| 1                    | 2 | Physics 2  | 3 |   | 1   |  | 4 |
| 1                    | 2 | Algorithms and Data Structures                                   | 2 |   | 1   |  | 4 |
| 1                    | 2 | Fundamentals of Electrical Engineering 2                         | 3 | 1 |     |  | 5 |
| 1                    | 2 | Measurements in Electronics and Telecommunications               | 2 |   | 1.5 |  | 4 |
| 1                    | 2 | Special Mathematics  | 3 | 1 |     |  | 4 |
| Optional Subject O1  |   |  |   |   |     |  |   |
| 1                    | 2 | Office Software  | 1 |   | 1   |  | 2 |
| 1                    | 2 | Engineering Graphics and Technical Drawing                       | 1 |   | 1   |  | 2 |
| 1                    | 2 | 3D Models and Design   | 1 |   | 1   |  | 2 |
| 1                    | 2 | Practical Implementation of Electronic Schemes - Getting Started | 1 |   | 1   |  | 2 |
| Optional Subject O2  |   |  |   |   |     |  |   |
| 1                    | 2 | Philosophy   | 2 |   |     |  | 2 |
| 1                    | 2 | Sociology  | 2 |   |     |  | 2 |
| 1                    | 2 | Psychology   | 2 |   |     |  | 2 |
| 1                    | 2 | Communication  | 2 |   |     |  | 2 |
| 1                    | 2 | European Culture and Civilisation                                | 2 |   |     |  | 2 |
| 1                    | 2 | European Political and Administrative Institutions               | 2 |   |     |  | 2 |
| 1                    | 2 | European Integration   | 2 |   |     |  | 2 |
| Facultative subjects |   |  |   |   |     |  |   |
| 1                    | 2 | Internet Services  | 1 |   | 1   |  | 2 |
| 1                    | 2 | Foreign Language 2   |   | 2 |     |  | 2 |



|                                 |   |  |   |   |     |   |  |   |
|---------------------------------|---|--|---|---|-----|---|--|---|
| 1                               | 2 | Physical Education and Sport 2               |   | 2 |     |   |  | 2 |
| 1                               | 1 | Educational Psychology                       | 2 | 2 |     |   |  | 5 |
| 1                               | 2 | Pedagogy 1                                   | 2 | 2 |     |   |  | 5 |
| Second Year Compulsory subjects |   |  |   |   |     |   |  |   |
| 2                               | 1 | Signals and Systems                          | 3 | 2 | 1   |   |  | 6 |
| 2                               | 1 | Electronic Materials                         | 3 |   | 1.5 |   |  | 5 |
| 2                               | 1 | Electronic Devices                           | 3 | 2 | 1   |   |  | 6 |
| 2                               | 1 | Passive Components and Circuits              | 2 |   | 1.5 |   |  | 4 |
| 2                               | 1 | Object Oriented Programming                  | 2 |   | 1   |   |  | 3 |
| 2                               | 1 | Project - Signals and programming            |   |   |     | 1 |  | 1 |
| 2                               | 2 | Basic Electronic Circuits                    | 3 | 2 |     |   |  | 5 |
| 2                               | 2 | Digital Integrated Circuits                  | 3 | 1 | 1   |   |  | 4 |
| 2                               | 2 | Microprocessor Architecture                  | 3 |   | 1   |   |  | 5 |
| 2                               | 2 | Circuits Analysis and Synthesis              | 3 | 2 | 2   |   |  | 6 |
| 2                               | 2 | Electronic Circuits - Laboratory             |   |   | 1.5 |   |  | 2 |
| 2                               | 2 | Physical Education and Sport 4               |   | 2 |     |   |  | 2 |
| Optional Subject O1             |   |  |   |   |     |   |  |   |
| 2                               | 1 | Macroeconomics                               | 2 |   |     |   |  | 2 |
| 2                               | 1 | Microeconomics                               | 2 |   |     |   |  | 2 |
| 2                               | 1 | Elements of Law and Business Legislation     | 2 |   |     |   |  | 2 |
| Optional Subject O2             |   |  |   |   |     |   |  |   |
| 2                               | 1 | Numerical Methods                            | 1 |   | 1   |   |  | 3 |
| 2                               | 1 | A.I. Systems Engineering                     | 1 |   | 1   |   |  | 3 |
| 2                               | 1 | CAD Techniques for Electronic Modules Design | 1 |   | 1   |   |  | 3 |
| Optional Subject O3             |   |  |   |   |     |   |  |   |
| 2                               | 2 | Electronic Components Models for SPICE       | 1 |   | 1   |   |  | 3 |
| 2                               | 2 | Electronic Interconnections Technologies     | 1 |   | 1   |   |  | 3 |
| 2                               | 2 | Programming for Android                      | 1 |   | 1   |   |  | 3 |
| Optional Subject O4             |   |  |   |   |     |   |  |   |
| 2                               | 2 | Management                                   | 2 |   | 1   |   |  | 3 |
| 2                               | 2 | Marketing                                    | 2 |   | 1   |   |  | 3 |



| Facultative subjects           |   |   |   |   |     |     |    |   |
|--------------------------------|---|---|---|---|-----|-----|----|---|
| 2                              | 1 | Foreign Language 3                                      |   | 2 |     |     |    | 2 |
| 2                              | 1 | Physical Education and Sport 3                          |   | 2 |     |     |    | 2 |
| 2                              | 2 | Foreign Language 4                                      |   | 2 |     |     |    | 2 |
| 2                              | 1 | Pedagogy II   | 2 | 2 |     |     |    | 5 |
| 2                              | 2 | Didactics of the specialization                         | 2 | 2 |     |     |    | 5 |
| Third Year Compulsory subjects |   |   |   |   |     |     |    |   |
| 3                              | 1 | Information Transmission Theory                         | 3 | 1 | 1   |     |    | 5 |
| 3                              | 1 | Microwaves  | 3 | 1 | 1   |     |    | 5 |
| 3                              | 1 | Analogic Integrated Circuits                            | 3 | 1 | 1   |     |    | 5 |
| 3                              | 1 | Electronic Measuring Instruments                        | 3 |   | 1.5 |     |    | 4 |
| 3                              | 1 | Microcontrollers  | 2 |   | 1   |     |    | 3 |
| 3                              | 1 | Programming competences - Certifying Exam               | 1 |   |     |     |    | 2 |
| 3                              | 1 | Project 1 - Electronic Devices and Circuits             |   |   |     | 1   |    | 2 |
| 3                              | 1 | Training activity – Project 2                           |   |   |     | 0.5 |    | 1 |
| 3                              | 2 | Decision and expectation in Information Processing      | 3 | 1 | 1   |     |    | 5 |
| 3                              | 2 | Practical Activity (3rd year)                           |   |   |     |     | 30 | 6 |
| 3                              | 2 | Digital Signal Processing                               | 3 |   | 1   | 1   |    | 4 |
| 3                              | 2 | Television  | 2 |   | 1   |     |    | 3 |
| 3                              | 2 | Sensors and Signal Conditioning Circuits                | 2 |   | 1   |     |    | 3 |
| 3                              | 2 | Communications Systems                                  | 2 |   | 1   |     |    | 2 |
| 3                              | 2 | Industrial Electronics and Informatics                  | 2 |   | 1   |     |    | 2 |
| 3                              | 2 | Programming Technologies for Internet                   | 2 |   | 1   |     |    | 3 |
| Optional Subjects O1           |   |   |   |   |     |     |    |   |
| 3                              | 1 | Automatic Control in Electronics and Telecommunications | 2 |   | 1   |     |    | 3 |
| 3                              | 1 | Electromagnetic Compatibility                           | 2 |   | 1   |     |    | 3 |
| 3                              | 1 | Audio Engineering                                       | 2 |   | 1   |     |    | 3 |
| 3                              | 1 | Fundamentals of Information Science                     | 2 |   | 1   |     |    | 3 |
| 3                              | 1 | Applied Programming of Interfaces                       | 2 |   |     | 1   |    | 3 |
| Optional Subjects O2           |   |   |   |   |     |     |    |   |



|                                 |   |   |   |   |     |   |   |   |
|---------------------------------|---|---|---|---|-----|---|---|---|
| 3                               | 2 | Project 2 – Programmable Electronics                  |   |   |     | 1 |   | 2 |
| Facultative subjects            |   |   |   |   |     |   |   |   |
| 3                               | 1 | Development of Innovative Android Applications        | 1 |   | 1   | 1 |   | 3 |
| 3                               | 1 | Physical Education and Sport 5                        |   | 2 |     |   |   | 2 |
| 3                               | 2 | Physical Education and Sport 6                        |   | 2 |     |   |   | 2 |
| 3                               | 1 | Computer-assisted instruction                         | 1 | 1 |     |   |   | 2 |
| 3                               | 1 | Pedagogical practice in pre-university education (1)  |   |   |     |   | 3 | 3 |
| 3                               | 2 | Classroom management                                  | 1 | 1 |     |   |   | 3 |
| 3                               | 2 | Pedagogical practice in pre-university education (2)  |   |   |     |   | 3 | 2 |
| 3                               | 2 | Graduation exam: level 1 – Didactical Portfolio       |   |   |     |   |   | 5 |
| Fourth Year Compulsory subjects |   |   |   |   |     |   |   |   |
| 4                               | 1 | Computer Architectures                                | 2 |   | 2   |   |   | 4 |
| 4                               | 1 | Programmable Electronic Systems                       | 2 |   | 1   |   |   | 5 |
| 4                               | 1 | Medical imaging                                       | 2 |   | 2   |   |   | 4 |
| 4                               | 1 | Medical electronics and informatics                   | 2 |   | 2   |   |   | 4 |
| 4                               | 1 | Power Electronic Processors                           | 2 |   | 1   |   |   | 4 |
| 4                               | 1 | 3D Graphics   | 2 |   | 1.5 |   |   | 4 |
| 4                               | 1 | Databases   | 2 |   | 1   |   |   | 3 |
| 4                               | 2 | Robotics  | 2 |   | 1   |   |   | 4 |
| 4                               | 2 | Automatic Testing of Equipment and Processes          | 2 |   | 1   |   |   | 3 |
| 4                               | 2 | Reconfigurable Computing Systems                      | 2 |   | 1   |   |   | 3 |
| 4                               | 2 | Computer aided analysis of power electronic circuits  | 2 |   | 2   |   |   | 4 |
| 4                               | 2 | Neural Networks and Fuzzy Systems                     | 2 |   | 1   |   |   | 3 |
| Optional Subjects O1            |   |   |   |   |     |   |   |   |
| 4                               | 1 | Project 3   |   |   |     | 1 |   | 2 |
| Optional Subjects O2            |   |   |   |   |     |   |   |   |
| 4                               | 2 | Quality and Reliability                               | 1 |   | 1   |   |   | 3 |
| 4                               | 2 | Management and Legislation in Telecom and Electronics | 1 |   | 1   |   |   | 3 |
| Diploma Project                 |   |   |   |   |     |   |   |   |
| 4                               | 2 | Activity for Diploma Project Preparation              |   |   |     |   | 4 | 5 |





|                      |   |                              |   |  |   |    |   |
|----------------------|---|------------------------------|---|--|---|----|---|
| 4                    | 2 | Practice for Diploma Project |   |  |   | 30 | 5 |
| Facultative subjects |   |                              |   |  |   |    |   |
| 4                    | 1 | Automotive electronics       | 2 |  | 1 |    | 3 |
| 4                    | 1 | Practical Activity S7        |   |  |   | 30 | 2 |
| 4                    | 1 | Peripherals equipment        | 2 |  | 1 |    | 2 |

## 2.4 Électronique appliquée (enseigné en Français)

### Faculté d'Ingénierie en Langues Étrangères

#### a) Description courte et objectives principaux :

Le diplôme en électronique appliquée s'adresse aux étudiants attirés par électronique, télécommunications et technologies de l'information, avec tous ses sous-domaines et applications. La formation couvre un **spectre large et pluridisciplinaire dans le domaine des ordinateurs et de la technologie de l'information** : procédures de maintenance de systèmes d'information, procédures d'entretien de systèmes d'information, audiovisuel électronique, optronique, électronique, techniques de communication, système d'information et de communication, outils bureautiques, méthode de classement et d'archivage, électromécanique, programmation et développement d'applications mobiles.

La spécialisation a de **nombreux atouts**: les étudiants trouvent facilement un travail à la fin des études, la promotion de la mobilité étudiante, par l'envoi d'étudiants à l'étranger pour des périodes de pratique en entreprises, de perfectionnement linguistique et d'études dans des universités partenaires, mais aussi par l'accueil d'étudiants étrangers, la création pour les étudiants étrangers de conditions pour commencer directement les études, sans l'obligation de l'apprentissage du roumain au préalable. La spécialisation bénéficie également de la présence d'experts de l'industrie, qui interviennent dans les cours théoriques de la faculté.

#### b) Autre information

Tous les sujets du programme sont enseignés en Français et ils sont ouvertes aux étudiants Erasmus, sauf le stage pratique qui se déroule pendant l'été.

Le programme se déroule sur une période de 4 années, chacune ayant 2 semestres. Il faut avoir 240 ECTS obligatoires pour obtenir son diplôme.

Une présentation du programme est disponible au lien suivant :

c) **Site web** : <http://ing.pub.ro/fr/education/licence>

d) **Personne de contact** : Mr. Constantin Viorel MARIAN, [viorel.marian@upb.ro](mailto:viorel.marian@upb.ro)



e) Curriculum :

| Année d' étude                   | Sem | Sujet  | Nombres des heures par semaine |    |    |        | Stage | ECTS |
|----------------------------------|-----|--|--------------------------------|----|----|--------|-------|------|
|                                  |     |  | Cours                          | TD | TP | Projet |       |      |
| <b>BAC+1 Sujets obligatoires</b> |     |  |                                |    |    |        |       |      |
| 1                                | 1   | Analyse mathématique 1                                     | 2                              | 2  |    |        |       | 4    |
| 1                                | 1   | Algèbre linéaire et géométrie descriptive                  | 2                              | 2  |    |        |       | 4    |
| 1                                | 1   | Bases de l'électrotechnique 1                              | 2                              |    | 1  |        |       | 3    |
| 1                                | 1   | Chimie générale  | 2                              | 1  |    |        |       | 3    |
| 1                                | 1   | Systèmes d'exploitation 1                                  | 1                              |    | 2  |        |       | 4    |
| 1                                | 1   | Programmation des ordinateurs et langages de programmation | 2                              |    | 2  |        |       | 4    |
| 1                                | 1   | Graphique assistée par ordinateur                          | 1                              |    | 1  |        |       | 2    |
| 1                                | 1   | Expression et communication 1                              | 1                              | 1  |    |        |       | 2    |
| 1                                | 1   | Éducation physique et sport I                              |                                | 1  |    |        |       | 2    |
| 1                                | 1   | Techniques et systèmes de travail collaboratif 1           |                                | 2  |    |        |       | 2    |
| 1                                | 2   | Analyse mathématique 2                                     | 2                              | 2  |    |        |       | 4    |
| 1                                | 2   | Physique I   | 2                              | 1  | 1  |        |       | 4    |
| 1                                | 2   | Dispositifs électroniques                                  | 2                              |    | 1  |        |       | 4    |
| 1                                | 2   | Technologies de programmation Internet 1                   | 2                              |    | 2  |        |       | 4    |
| 1                                | 2   | Expression et communication 2                              | 1                              | 1  |    |        |       | 2    |
| 1                                | 2   | Structures de données et algorithmes                       | 2                              |    | 2  |        |       | 4    |
| 1                                | 2   | Bases de l'électrotechnique 2                              | 2                              |    | 2  |        |       | 4    |
| 1                                | 2   | Éducation physique et sport 2                              |                                |    | 1  |        |       | 2    |
| 1                                | 2   | Techniques et systèmes de travail collaboratif 2           |                                |    | 2  |        |       | 2    |
| <b>Sujets optionnelles</b>       |     |  |                                |    |    |        |       |      |
| 1                                | 1   | Langue étrangère 1   |                                | 2  |    |        |       | 2    |
| 1                                | 1   | Langue française pour les ingénieurs                       | 1                              | 1  |    |        |       | 2    |
| 1                                | 1   | Langue et culture roumaine pour les étudiants étrangers 1  |                                | 2  |    |        |       | 2    |
| 1                                | 2   | Culture et civilisation européenne                         |                                | 2  |    |        |       | 2    |
| 1                                | 2   | Langue étrangère 2   |                                | 2  |    |        |       | 2    |
| 1                                | 2   | Langue et culture roumaine pour les étudiants étrangers 2  |                                | 2  |    |        |       | 2    |
| <b>BAC+2 Sujets obligatoires</b> |     |  |                                |    |    |        |       |      |
| 2                                | 1   | Mathématiques spéciales 1                                  | 2                              | 2  |    |        |       | 4    |
| 2                                | 1   | Probabilités et statistiques                               | 2                              | 2  |    |        |       | 3    |
| 2                                | 1   | Physique 2   | 2                              |    | 1  |        |       | 4    |



|  |   |  |   |   |   |   |  |   |
|--|---|--|---|---|---|---|--|---|
| 2  | 1 | Modèles SPICE  | 1 |   | 1 |   |  | 2 |
| 2  | 1 | Programmation orientée objets  | 2 |   | 2 |   |  | 4 |
| 2  | 1 | Microéconomie  | 1 | 1 |   |   |  | 2 |
| 2  | 1 | Circuits fondamentaux électroniques  | 2 |   | 1 |   |  | 3 |
| 2  | 1 | Bases de données   | 2 | 1 | 1 |   |  | 4 |
| 2  | 2 | Mathématiques spéciales 2  | 2 | 2 |   |   |  | 4 |
| 2  | 2 | Circuits intégrés numériques   | 2 |   | 1 |   |  | 4 |
| 2  | 2 | Architecture des microprocesseurs  | 2 |   | 2 |   |  | 4 |
| 2  | 2 | Méthodes numériques  | 2 |   | 2 |   |  | 4 |
| 2  | 2 | Systèmes d'exploitation 2  | 2 | 1 | 1 |   |  | 4 |
| 2  | 2 | Mesures électroniques, capteurs et traducteurs (conception corps solides)          | 1 |   | 1 |   |  | 4 |
| 2  | 2 | Automates, langages formels et compilateurs  | 2 |   | 2 |   |  | 3 |
| 2  | 2 | Macroéconomie  | 1 | 1 |   |   |  | 2 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |  |   |   |   |   |  |   |
| 2  | 1 | Traitement des documents techniques / Traitement de documents et services Internet |   |   | 2 |   |  | 2 |
| 2  | 2 | Compatibilité électromagnétique / Bases de l'électrotechnique 3                    | 2 |   | 1 |   |  | 4 |
| <b>Sujets optionnelles</b>                                   |   |  |   |   |   |   |  |   |
| 2  | 1 | Langue étrangère 3   |   |   | 2 |   |  | 2 |
| 2  | 1 | Langue et culture roumaine pour les étudiants étrangers 3                          |   |   | 2 |   |  | 2 |
| 2  | 1 | Éducation physique et sport 3  |   |   | 2 |   |  | 2 |
| 2  | 1 | Traitement avancés des documents techniques  |   |   | 2 |   |  | 2 |
| 2  | 2 | Éducation physique et sport 4  |   |   | 2 |   |  | 2 |
| 2  | 2 | Langue et culture roumaine pour les étudiants étrangers 4                          |   |   | 2 |   |  | 2 |
| 2  | 2 | Langue étrangère 4   |   |   | 2 |   |  | 2 |
| <b>BAC+3 Sujets obligatoires</b>                             |   |  |   |   |   |   |  |   |
| 3  | 1 | Architecture des ordinateurs   | 2 |   | 2 |   |  | 4 |
| 3  | 1 | Transmission de données  | 2 |   | 1 |   |  | 4 |
| 3  | 1 | Réseaux d'ordinateurs  | 2 |   | 2 |   |  | 4 |
| 3  | 1 | Systèmes de réglage automatique  | 2 |   | 1 |   |  | 4 |
| 3  | 1 | Projet: Circuits intégrés numériques   |   |   | 2 |   |  | 2 |
| 3  | 1 | Administration des affaires  | 1 | 1 |   |   |  | 2 |
| 3  | 1 | Théorie des signaux et des systèmes  | 2 | 1 | 1 |   |  | 4 |
| 3  | 1 | Bases des systèmes d'acquisition des données                                       | 2 |   | 1 |   |  | 4 |
| 3  | 2 | Interface homme machine  | 2 |   | 1 |   |  | 3 |
| 3  | 2 | Microcontrôleurs   | 2 |   | 2 |   |  | 2 |
| 3  | 2 | Électronique de puissance  | 2 |   | 1 | 1 |  | 3 |
| 3  | 2 | Circuits intégrés analogiques  | 1 |   | 1 |   |  | 2 |



|  |   |   |   |   |   |   |    |   |
|--|---|---|---|---|---|---|----|---|
| 3  | 2 | Théorie et traitement numériques des signaux  | 2 |   | 1 | 1 |    | 3 |
| 3  | 2 | Fondements du management  | 1 | 1 |   |   |    | 2 |
| 3  | 2 | Matériaux pour genie électrique   | 2 | 1 | 1 |   |    | 3 |
| 3  | 2 | Pratique de domaine   |   |   |   |   | 30 | 4 |
| 3  | 2 | Pratique de spécialité  |   |   |   |   | 30 | 4 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |   |   |   |   |   |    |   |
| 3  | 1 | Installations et appareillages électriques/ Genie Logiciel  | 2 |   | 1 |   |    | 2 |
| 3  | 2 | Fiabilité et controle de la qualité/ Systèmes programmables avec FPGA   | 1 |   | 1 |   |    | 2 |
| 3  | 2 | Technologies de programmation en Internet 2/ Systèmes de communications   | 2 |   | 1 |   |    | 2 |
| <b>Sujets optionnelles</b>                                   |   |   |   |   |   |   |    |   |
| 3  | 2 | Technologie des microsensors (Dispozitive MEMS)   | 2 |   | 1 |   |    | 3 |
| 3  | 2 | Méthodes et techniques de développement des logiciels   | 3 |   | 1 | 1 |    | 4 |
| <b>BAC+4 Sujets obligatoires</b>                             |   |   |   |   |   |   |    |   |
| 4  | 1 | Projet: Réseaux d'ordinateurs   |   |   | 2 |   |    | 2 |
| 4  | 1 | Analyse et traitements d'images   | 2 |   | 1 |   |    | 4 |
| 4  | 1 | CAO et commande des systèmes automates  | 2 |   | 1 |   |    | 3 |
| 4  | 1 | Systèmes de transmissions par multiplexage  | 2 |   | 1 |   |    | 3 |
| 4  | 1 | Management du projet  | 1 |   | 1 |   |    | 2 |
| 4  | 1 | Sécurité et cryptage  | 2 |   | 1 | 1 |    | 4 |
| 4  | 2 | Développement des applications pour les plateformes mobiles   | 2 |   | 1 | 1 |    | 4 |
| 4  | 2 | Théorie statistique des signaux   | 2 | 1 |   |   |    | 4 |
| 4  | 2 | Robotique et agents intelligents  | 2 |   | 1 |   |    | 3 |
| 4  | 2 | Automatisation en électronique et télécommunications  | 2 |   | 1 |   |    | 3 |
| 4  | 2 | Préparation du projet de fin d'études   |   |   |   |   | 60 | 5 |
| 4  | 2 | Pratique pour le projet de fin d'études   |   |   |   |   | 60 | 5 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |   |   |   |   |   |    |   |
| 4  | 1 | Instrumentation électronique de mesure/ Architecture des réseaux et Internet/ Bioinformatique                                   | 2 |   | 1 | 1 |    | 4 |
| 4  | 2 | Ingénierie des systems/ Décision et estimation dans le traitement des informations  | 2 |   | 1 |   |    | 2 |
| 4  | 1 | Identification et commande des systèmes automates/ /Communications mobiles et par satellite/ Technologies Web et Semantique Web | 2 |   | 1 | 1 |    | 4 |
| 4  | 1 | Machines électriques et entraînements/ /Internet des dispositifs intelligents/ Réseaux de neurones et algorithmes génétiques    | 2 |   | 1 |   |    | 4 |



|                            |   |  |   |  |   |   |  |   |
|----------------------------|---|--|---|--|---|---|--|---|
| 4                          | 2 | Commande des convertisseurs statiques/<br>Systèmes asservis nonlinéaires | 2 |  | 1 | 1 |  | 4 |
| <b>Sujets optionnelles</b> |   |  |   |  |   |   |  |   |
| 4                          | 1 | Architectures matérielsre configurables                                  | 2 |  | 1 |   |  | 3 |
| 4                          | 1 | Systèmes embarqués   | 2 |  | 1 |   |  | 3 |
| 4                          | 1 | Systèmes de controle intelligent   | 2 |  | 1 |   |  | 3 |
| 4                          | 2 | Electronique et informatique<br>industrielle                             | 2 |  | 1 |   |  | 3 |

## 2.5 Applied electronics / Angewandte Elektronik (taught in German)

### Faculty of Engineering in Foreign Languages

#### a) Short description and main objectives:

The mission of the program is to help future engineers to develop competencies in a range from classical to modern disciplines of electronics. The ability of the future engineer in applied electronics to adapt to a diversity of problems based on the knowledge of basic functional blocs and instruments, is essential.

The program is both research and application oriented. Interdisciplinary courses, such as economics or project management, prepare the graduates for management roles. Our graduates find well paid and challenging jobs at all levels and in all industrial sectors, in small and middle high tech, as well as in international companies.

#### b) Other information

- All the courses of the program are open for Erasmus incoming students and the program has incoming and outgoing Erasmus students for one or two semesters each year.
- The bachelor program is carried out in cooperation with companies such as Siemens, Infineon, Hornbach, IBM, P&G, Honeywell, Lidl, HP, Microsoft.
- The Bachelor Thesis can be carried out in cooperation with enterprises or foreign universities.

c) **Website:** <http://ing.pub.ro/en/education/licence/>

d) **Contact person:** Mrs. Ioana Guica, [ioana.guica@upb.ro](mailto:ioana.guica@upb.ro)



e) Curriculum:

| Year                                   | Sem | Subject name   | Weekly number of hours |          |         |         | Practice | ECTS |
|--|-----|--|------------------------|----------|---------|---------|----------|------|
|  |     |  | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b>  |     |  |                        |          |         |         |          |      |
| 1                                      | 1   | Mathematik 1a  | 2                      | 2        | -       | -       |          | 3    |
| 1                                      | 1   | Mathematik 1b  | 2                      | 2        |         |         |          | 3    |
| 1                                      | 1   | Physik   | 2                      |          | 2       | -       |          | 4    |
| 1                                      | 1   | Angewandte Informatik 1                              | 2                      |          | 1       | -       |          | 3    |
| 1                                      | 1   | Computergraphik                                      | 1                      |          |         | 2       |          | 3    |
| 1                                      | 1   | Allgemeine Wirtschaftslehre                          | 0                      |          |         | -       |          | 2    |
| 1                                      | 1   | Grundlagen der Elektrotechnik 1                      | 2                      | 1        | 1       | -       |          | 4    |
| 1                                      | 1   | Buchführung  | 2                      |          |         | -       |          | 3    |
| 1                                      | 1   | Datenbanken 1  |                        | 2        |         |         |          | 3    |
| 1                                      | 2   | Mathematik 2   | 4                      | 2        |         |         |          |      |
| 1                                      | 2   | Informatik 2   | 2                      |          | 2       |         |          | 6    |
| 1                                      | 2   | Komponenten und passive Schaltkreise                 | 2                      |          | 2       |         |          | 4    |
| 1                                      | 2   | Deutsch Interkulturell 1                             |                        | 2        |         |         |          | 4    |
| 1                                      | 2   | Halbleiterbau elemente                               | 2                      |          | 2       |         |          | 2    |
| 1                                      | 2   | Grundlagen der Elektrotechnik 2                      | 2                      | 1        | 1       |         |          | 4    |
| 1                                      | 2   | Sport 1  |                        | 2        |         |         |          | 5    |
| <b>Elective subjects</b>               |     |  |                        |          |         |         |          |      |
| 1                                      | 1   | Fachkommunikation 1                                  |                        | 2        |         |         |          | 2    |
| 1                                      | 1   | Expression et communication 1                        |                        | 2        |         |         |          | 2    |
| 1                                      | 2   | Fachkommunikation 2                                  |                        | 2        |         |         |          | 2    |
| 1                                      | 2   | Expression et communication 2                        |                        | 2        |         |         |          | 2    |
| <b>Facultative subjects</b>            |     |  |                        |          |         |         |          |      |
| 1                                      | 1   | Erziehungspsychologie (in rumänischer Sprache)       | 2                      | -        | -       | -       |          | 2    |
| 1                                      | 1   | Landeskunde 1  |                        | 2        |         |         |          | 2    |
| <b>Second Year Compulsory subjects</b> |     |  |                        |          |         |         |          |      |
| 2                                      | 1   | Mathematik 3 für ETiT                                | 4                      | 2        |         |         |          | 6    |
| 2                                      | 1   | Programmierung von Computern und Programmiersprachen | 2                      |          | 3       |         |          | 5    |



|                                       |   |   |   |   |   |   |   |   |
|---------------------------------------|---|---|---|---|---|---|---|---|
| 2                                     | 1 | Messungen in Elektronik und Telekommunikation | 2 |   | 2 |   |   | 4 |
| 2                                     | 1 | Signale und Systeme                           | 3 |   |   | 1 |   | 4 |
| 2                                     | 1 | Labview                                       | 1 |   | 2 |   |   | 4 |
| 2                                     | 1 | Matlab  | 2 |   | 2 |   |   | 5 |
| 2                                     | 2 | Sensoren und Aktuatoren                       | 2 |   | 2 |   |   | 3 |
| 2                                     | 2 | Grundlagen der Mechanik und Mechanismen       | 2 | 2 |   |   |   | 4 |
| 2                                     | 2 | Digitalsignalverarbeitung                     | 2 |   | 2 |   |   | 4 |
| 2                                     | 2 | CAD Technik                                   |   |   | 2 |   |   | 2 |
| 2                                     | 2 | Alternative Energiequellen                    | 2 | 1 |   |   |   | 3 |
| 2                                     | 2 | Marketing                                     | 2 |   |   |   |   | 2 |
| 2                                     | 2 | Elektronische Grundsaltungen                  | 2 |   |   |   |   | 3 |
| 2                                     | 2 | Spice-Modelle                                 | 1 |   | 2 |   |   | 5 |
| 2                                     | 2 | Projektseminar:Elektronische Grundsaltungen   |   |   |   | 2 |   | 2 |
| <b>Elective subjects</b>              |   |   |   |   |   |   |   |   |
| 2                                     | 1 | Unternehmenskommunikation 1                   | 2 |   |   |   |   | 2 |
| 2                                     | 1 | Wirtschaftsenglisch 1                         | 2 |   |   |   |   | 2 |
| 2                                     | 2 | Unternehmenskommunikation 2                   |   | 2 |   |   |   | 2 |
| 2                                     | 2 | Langue francais pour ingenieurs               |   | 2 |   |   | C | 2 |
| <b>Facultative subjects</b>           |   |   |   |   |   |   |   |   |
| 2                                     | 1 | Landeskunde 2                                 |   | 2 |   |   |   | 2 |
| 2                                     | 1 | Fredsprache                                   |   | 2 |   |   |   | 2 |
| 2                                     | 1 | Sport 2                                       |   | 2 |   |   |   | 2 |
| <b>Third Year Compulsory subjects</b> |   |   |   |   |   |   |   |   |
| 3                                     | 1 | Regelungstechnik 1                            | 3 | 1 |   |   |   | 4 |
| 3                                     | 1 | Logischer Entwurf                             | 3 | 1 | 1 |   |   | 5 |
| 3                                     | 1 | Leistungselektronik                           | 3 |   | 2 |   |   | 5 |
| 3                                     | 1 | Elektrische Antriebe                          | 2 |   | 2 |   |   | 4 |
| 3                                     | 1 | Grundlagen der Nachrichtentechnik             | 3 | 1 |   |   |   | 5 |
| 3                                     | 2 | Numerische Berechnungsverfahren               | 1 | 2 |   |   |   | 3 |
| 3                                     | 2 | Analoge Schaltungen                           | 2 | 2 | 2 |   |   | 5 |



|  |   |  |   |   |   |   |     |   |
|--|---|--|---|---|---|---|-----|---|
| 3                                      | 2 | Kommunikationstechnik                        | 3 |   | 1 |   |     | 3 |
| 3                                      | 2 | Projektseminar:Entwurf eingebetteter Systeme |   |   |   | 2 |     | 2 |
| 3                                      | 2 | Rechnersysteme 1                             | 2 | 2 |   |   |     | 4 |
| 3                                      | 2 | Werkstoffe der Elektrotechnik                | 2 |   | 2 |   |     | 3 |
| 3                                      | 2 | Technisches Praktikum                        |   |   |   |   | 240 | 4 |
| 3                                      | 2 | Technisches Praktikum                        |   |   |   |   | 120 | 4 |
| <b>Elective Subjects</b>               |   |  |   |   |   |   |     |   |
| 3                                      | 1 | Moderieren und Präsentieren                  |   | 2 |   |   |     | 2 |
| 3                                      | 1 | Einführung in das wissenschaftliche Arbeiten |   | 2 |   |   |     | 2 |
| 3                                      | 1 | Datenstrukturen und Betriebssysteme          | 2 | 2 |   |   |     | 5 |
| 3                                      | 1 | Die Grundlagen von Datenerfassungssystemen   | 2 | 2 |   |   |     | 5 |
| 3                                      | 2 | Softwaresysteme                              | 2 | 2 |   |   |     | 2 |
| 3                                      | 2 | Bionik                                       | 2 | 2 |   |   |     | 2 |
| <b>Facultative subjects</b>            |   |  |   |   |   |   |     |   |
| 3                                      | 1 | Pädagogik 1 (in rumänischer Sprache)         | 2 | 2 |   |   |     | 4 |
| 3                                      | 1 | General Management                           |   | 4 |   |   |     | 4 |
| 3                                      | 2 | EBCL   |   | 3 |   |   |     | 3 |
| 3                                      | 2 | Pädagogik 2 (in rumänischer Sprache)         | 2 |   |   |   |     | 2 |
| <b>Fourth Year Compulsory subjects</b> |   |  |   |   |   |   |     |   |
| 4                                      | 1 | Kommunikationsnetze                          | 3 | 2 |   |   | E   | 5 |
| 4                                      | 1 | Rechnersysteme 2                             | 2 |   | 2 |   | E   | 4 |
| 4                                      | 1 | Regelungstechnik 2                           | 2 |   |   |   | E   | 4 |
| 4                                      | 1 | Projektseminar Regelungstechnik 2            |   |   |   | 2 | C   | 4 |
| 4                                      | 1 | Hochfrequenztechnik                          | 2 | 1 | 1 |   | E   | 2 |
| 4                                      | 1 | Projektmanagement                            | 2 | 2 |   |   | E   | 4 |
| 4                                      | 1 | Technologie hochintegrierter Schaltungen     | 2 |   | 1 |   | E   | 3 |
| 4                                      | 2 | Embedded Systems                             | 2 |   | 2 |   | C   | 2 |
| 4                                      | 2 | Kommunikationssysteme                        | 2 |   | 2 |   | C   | 2 |
| 4                                      | 2 | Mikroelektronik                              | 2 |   | 2 |   | C   | 2 |





|                             |   |   |   |   |   |   |   |   |
|-----------------------------|---|---|---|---|---|---|---|---|
| 4                           | 2 | Computernetze                                 | 2 |   | 2 |   | C | 2 |
| 4                           | 2 | Erarbeitung Bachelor Thesis                   |   |   |   |   | 8 | 5 |
| 4                           | 2 | Praktikum Bachelor Thesis                     |   |   |   |   |   | 5 |
| <b>Elective Subjects</b>    |   |   |   |   |   |   |   |   |
| 4                           | 1 | Kollaborative Techniken und Systeme           | 2 |   | 2 |   | C | 4 |
| 4                           | 1 | Internet-Programmiertechnologien              | 2 |   | 2 |   | C | 4 |
| 4                           | 2 | Bearbeitung von technischen Dokumenten        | 2 |   |   |   | C | 2 |
| 4                           | 2 | Dokumentenverarbeitung und Internetdienste    | 2 |   |   |   | C | 2 |
| 4                           | 2 | Qualität und Zuverlässigkeit                  | 2 |   |   |   | C | 3 |
| 4                           | 2 | Zuverlässigkeit                               | 2 |   |   |   | C | 3 |
| <b>Facultative subjects</b> |   |   |   |   |   |   |   |   |
| 4                           | 1 | Unterrichtspraktikum (in rumänischer Sprache) |   |   |   | 2 |   | 2 |
| 4                           | 1 | Methodik des Faches (in rumänischer Sprache)  | 2 |   |   |   |   | 2 |
| 4                           | 2 | Business Plan                                 |   | 2 |   |   |   | 2 |
| 4                           | 2 | Europäische Studien                           | 2 |   |   |   |   | 2 |

### 3. Field of study: Mechanical Engineering

#### 3.1. Mechanical Engineering (taught in English)

#### Faculty of Engineering in Foreign Languages

##### a) Short description and main objectives:

The bachelor program in Mechanical Engineering targets students attracted to the various application fields of Mechanics: fluid mechanics, power engineering (heat engines, turbines, air conditioning, etc.), environmental engineering, structural mechanics, mechanics of materials, robotics etc.

The training covers a **broad and multidisciplinary spectrum in the field of mechanical engineering**, which allows graduate engineers to access different jobs in a company: design, production, maintenance, quality, safety.

##### b) Other information



All the lectures of the program are fully taught in English and they are open for Erasmus incoming students.

The program extends on 4 study years, each one having two semesters. A total of 240 compulsory ECTS are required to graduate the program.

- c) **Website:** <http://ing.pub.ro/en/education/licence/>
- d) **Contact person:** Mrs. Camelia STANCIU, [camelia.stanciu@upb.ro](mailto:camelia.stanciu@upb.ro)
- e) **Curriculum:**

| Year  | Sem | Subject name                                   | Weekly number of hours |          |         |         | Practice | ECTS |
|---|-----|--|------------------------|----------|---------|---------|----------|------|
|   |     |  | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b>                                     |     |  |                        |          |         |         |          |      |
| 1   | 1   | Calculus I                                     | 3                      | 2        |         |         |          | 6    |
| 1   | 1   | Linear Algebra                                 | 2                      | 2        |         |         |          | 4    |
| 1   | 1   | Engineering Graphics I                         | 1                      |          | 2       |         |          | 4    |
| 1   | 1   | Chemistry                                      | 2                      | 1        |         |         |          | 3    |
| 1   | 1   | Materials Science I                            | 2                      |          | 1       |         |          | 4    |
| 1   | 1   | Professional Communication                     |                        | 2        |         |         |          | 2    |
| 1   | 1   | European Culture & Civilization I              | 1                      | 1        |         |         |          | 2    |
| 1   | 2   | Calculus II                                    | 3                      | 2        |         |         |          | 6    |
| 1   | 2   | Physics I                                      | 2                      | 1        | 1       |         |          | 5    |
| 1   | 2   | Mechanics I                                    | 2                      | 1        |         |         |          | 3    |
| 1   | 2   | Engineering Graphics II                        | 2                      |          | 2       |         |          | 4    |
| 1   | 2   | Programming Languages                          | 1                      |          | 2       |         |          | 3    |
| 1   | 2   | Materials Science II                           | 2                      |          | 1       |         |          | 3    |
| <b>Elective subjects (one subject must be chosen among the following)</b> |     |  |                        |          |         |         |          |      |
| 1   | 1   | Applied Informatics                            | 2                      |          | 2       |         |          | 3    |
|   |     | Discrete Mathematics                           | 2                      | 2        |         |         |          | 3    |
| 1   | 1   | Physical Education I                           |                        |          | 2       |         |          | 2    |
|   |     | Foreign Language b (French/<br>German/Spanish) |                        | 2        |         |         |          | 2    |
| 1   | 2   | European Culture & Civilization II             | 1                      | 1        |         |         |          | 2    |
|   |     | Ethics and Academic Integrity                  | 1                      | 1        |         |         |          | 2    |
| 1   | 2   | Physical Education II                          |                        |          | 2       |         |          | 2    |



|  |   |  |   |   |   |  |  |   |
|--|---|--|---|---|---|--|--|---|
|  |   | Foreign Language b (French/<br>German/Spanish)                     |   | 2 |   |  |  | 2 |
| <b>Optional subjects</b>               |   |  |   |   |   |  |  |   |
| 1                                      | 1 | English for Engineering Academic<br>Study I                        | 1 | 1 |   |  |  | 2 |
| 1                                      | 1 | Romanian Language (for foreign<br>students) I                      |   | 2 |   |  |  | 2 |
| 1                                      | 1 | Langue francaise pour ingenieurs I                                 |   | 2 |   |  |  | 2 |
| 1                                      | 1 | Educational Psychology   | 2 | 2 |   |  |  | 5 |
| 1                                      | 2 | English for Engineering Academic<br>Study II                       | 1 | 1 |   |  |  | 2 |
| 1                                      | 2 | Romanian Language (for foreign<br>students) II                     |   | 2 |   |  |  | 2 |
| 1                                      | 2 | Langue francaise pour ingenieurs II                                |   | 2 |   |  |  | 2 |
| 1                                      | 2 | Pedagogy 1   | 2 | 2 |   |  |  | 5 |
| <b>Second Year Compulsory subjects</b> |   |  |   |   |   |  |  |   |
| 2                                      | 1 | Mathematics for Engineers I  | 2 | 2 |   |  |  | 5 |
| 2                                      | 1 | Probabilities & Statistics   | 2 | 1 |   |  |  | 2 |
| 2                                      | 1 | Physics II   | 2 |   | 1 |  |  | 4 |
| 2                                      | 1 | Strength of Materials I  | 2 | 1 | 1 |  |  | 4 |
| 2                                      | 1 | Introduction to Mechanical Engineering                             | 1 |   | 2 |  |  | 4 |
| 2                                      | 1 | Electrical engineering I   | 2 | 1 |   |  |  | 3 |
| 2                                      | 1 | Mechanics II   | 2 | 1 | 1 |  |  | 4 |
| 2                                      | 1 | Collaborative Work II  |   | 2 |   |  |  | 2 |
| 2                                      | 1 | Microeconomics   | 1 | 1 |   |  |  | 2 |
| 2                                      | 2 | Material Technology  | 2 |   | 1 |  |  | 3 |
| 2                                      | 2 | Mechanics III  | 1 | 1 |   |  |  | 2 |
| 2                                      | 2 | Strength of Materials II   | 2 | 1 |   |  |  | 3 |
| 2                                      | 2 | Manufacturing Processes I  | 2 |   | 1 |  |  | 3 |
| 2                                      | 2 | Machine Elements & Mechanisms I                                    | 2 |   | 1 |  |  | 4 |
| 2                                      | 2 | Numerical Methods  | 2 | 2 |   |  |  | 5 |
| 2                                      | 2 | Software Tools for Mechanical<br>Engineering I (solid body design) | 1 |   | 2 |  |  | 3 |
| 2                                      | 2 | Technical writing  |   | 2 |   |  |  | 2 |
| 2                                      | 2 | Macroeconomics   | 1 | 1 |   |  |  | 2 |



| <b>Elective subjects</b>               |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| 2                                      | 2 | Electrical engineering II (Electrical machines) | 2 | 1 |   |   | 3 |
|  |   | Electrical measurements & Transducers           | 2 | 1 |   |   | 3 |
| <b>Optional subjects</b>               |   |   |   |   |   |   |   |
| 2                                      | 1 | Romanian Language (for foreign students) III    |   | 2 |   |   | 2 |
| 2                                      | 1 | Pedagogy 2                                      | 2 | 2 |   |   | 5 |
| 2                                      | 2 | Romanian Language (for foreign students) IV     |   | 2 |   |   | 2 |
| 2                                      | 2 | Didactics of the specialization                 | 2 | 2 |   |   | 5 |
| <b>Third Year Compulsory subjects</b>  |   |   |   |   |   |   |   |
| 3                                      | 1 | Finite Element Analysis                         | 2 |   | 2 |   | 4 |
| 3                                      | 1 | Engineering Thermodynamics                      | 2 | 1 | 1 |   | 5 |
| 3                                      | 1 | Fluid Mechanics                                 | 2 | 1 |   |   | 4 |
| 3                                      | 1 | Machine Elements & Mechanisms II                | 2 |   | 1 | 2 | 5 |
| 3                                      | 1 | Manufacturing Processes II                      | 2 |   | 1 |   | 3 |
| 3                                      | 1 | Design for recycling                            | 2 |   |   | 2 | 3 |
| 3                                      | 1 | Mechanical Behavior of Materials                | 2 | 1 |   |   | 4 |
| 3                                      | 1 | Money & Banking                                 | 1 | 1 |   |   | 2 |
| 3                                      | 2 | Heat & Mass Transfer                            | 3 | 1 | 1 |   | 4 |
| 3                                      | 2 | Dynamics of Machinery                           | 2 |   | 2 |   | 3 |
| 3                                      | 2 | Mechanical Transmissions                        | 3 |   | 1 |   | 3 |
| 3                                      | 2 | Computational Structural Mechanics              | 2 | 1 | 1 |   | 3 |
| 3                                      | 2 | Mechanical Transmissions Project                |   |   |   | 2 | 2 |
| 3                                      | 2 | Practical Workshop                              |   |   |   |   | 4 |
| 3                                      | 2 | Practical Workshop                              |   |   |   |   | 4 |
| 3                                      | 2 | Business Administration                         | 1 | 1 |   |   | 2 |
| <b>Elective Subjects</b>               |   |   |   |   |   |   |   |
| 3                                      | 2 | Mechanical Measurements                         | 2 |   | 1 |   | 2 |
|  |   | Electronic Devices & Circuits                   | 2 |   | 1 |   | 2 |
| 3                                      | 2 | Engineering analysis and control technics       | 2 |   | 2 |   | 3 |
|  |   | Applied Fluid Dynamics (Pumps,...)              | 2 |   | 2 |   | 3 |
| <b>Fourth Year Compulsory subjects</b> |   |   |   |   |   |   |   |



|                          |   |   |   |   |   |   |  |   |
|--------------------------|---|---|---|---|---|---|--|---|
| 4                        | 1 | Software Tools for Mechanical Engineering II (thermal design) | 2 |   | 2 |   |  | 4 |
| 4                        | 1 | Tribology   | 2 |   | 2 |   |  | 5 |
| 4                        | 1 | Design of Innovative Products                                 | 1 |   |   | 2 |  | 3 |
| 4                        | 1 | Nanotechnology applications in mechanical engineering         | 1 |   |   | 2 |  | 3 |
| 4                        | 1 | Heat Engines I (Internal Combustion Engines)                  | 2 |   | 1 | 2 |  | 6 |
| 4                        | 1 | Fundamentals of management                                    | 1 | 1 |   |   |  | 2 |
| 4                        | 2 | Heat Engines II (Turbines & Steam Generators)                 | 2 |   | 2 |   |  | 4 |
| 4                        | 2 | Refrigeration and Air Conditioning                            | 2 | 1 | 2 |   |  | 5 |
| 4                        | 2 | Environmental Engineering                                     | 2 | 1 |   |   |  | 3 |
| 4                        | 2 | Diploma Project   |   |   |   | 8 |  | 4 |
| 4                        | 2 | Diploma Project Internship                                    |   |   |   |   |  | 6 |
| 4                        | 2 | Compressors and Fans  | 2 |   |   | 1 |  | 3 |
| 4                        | 2 | Fluid Power Systems   | 2 |   | 1 |   |  | 3 |
| <b>Elective Subjects</b> |   |   |   |   |   |   |  |   |
| 4                        | 1 | Electronics   | 2 |   | 1 |   |  | 4 |
|                          |   | Control Theory  | 2 |   | 1 |   |  | 4 |
| 4                        | 1 | Advanced Manufacturing Processes and Quality Assurance        | 2 |   | 1 |   |  | 3 |
|                          |   | Image Processing  | 2 |   | 1 |   |  | 3 |
| 4                        | 2 | Industrial Management   | 1 | 1 |   |   |  | 2 |
|                          |   | Robotics & Virtual Reality                                    | 1 |   | 1 |   |  | 2 |

### 3.2 Ingénierie Mécanique (enseigné en Français)

#### Faculté d'Ingénierie en Langues Étrangères

##### a) Description courte et objectifs principaux :

La Licence en Ingénierie Mécanique s'adresse à des étudiants attirés par les Sciences de l'Ingénieur dans les différents domaines d'applications de la Mécanique, qu'il s'agisse de : la mécanique des fluides, l'énergétique (moteurs, turbines, conditionnement de l'air, etc.) et l'environnement, la mécanique des structures, la mécanique des matériaux, la robotique etc.



La formation couvre un **spectre large et pluridisciplinaire dans le domaine de la mécanique** ce qui permet aux ingénieurs diplômés d'accéder à toutes les fonctions d'une entreprise : bureaux d'études, de production, maintenance, qualité, sécurité. Ayant une **orientation vers la conception, modélisation et simulation numérique en mécanique** en couvrant à la fois la mécanique des solides, des fluides et l'énergétique le principal débouché demeure les carrières de l'ingénierie dans les bureaux d'études.

Le plan d'enseignement est conçu d'une manière à couvrir et assurer le développement des compétences fondamentales de base pour un ingénieur, des compétences complémentaires, linguistiques et de l'économie.

**b) Autre information**

Tous les sujets du programme sont enseignés en Français et ils sont ouverts aux étudiants Erasmus, sauf le stage pratique qui se déroule pendant l'été.

Le programme se déroule sur une période de 4 années, chacune ayant 2 semestres. Il faut avoir 240 ECTS obligatoires pour obtenir son diplôme.

c) **Site web** : <http://ing.pub.ro/en/education/licence/>

d) **Personne de contact** : Mme. Camelia STANCIU, [camelia.stanciu@upb.ro](mailto:camelia.stanciu@upb.ro)

**e) Curriculum :**

| Année d'étude                    | Sem | Sujet  | Nombres des heures par semaine |    |    |        | Stage | ECTS |
|----------------------------------|-----|--|--------------------------------|----|----|--------|-------|------|
|                                  |     |  | Cours                          | TD | TP | Projet |       |      |
| <b>BAC+1 Sujets obligatoires</b> |     |  |                                |    |    |        |       |      |
| 1                                | 1   | Analyse I  | 2                              | 2  |    |        |       | 4    |
| 1                                | 1   | Algèbre linéaire, géométrie analytique et différentielle | 2                              | 2  |    |        |       | 4    |
| 1                                | 1   | Graphique technique et infographie I                     | 1                              |    | 2  |        |       | 4    |
| 1                                | 1   | Chimie   | 2                              | 1  |    |        |       | 4    |
| 1                                | 1   | Science et ingénierie des matériaux I                    | 2                              |    | 1  |        |       | 4    |
| 1                                | 1   | Communication I  | 1                              | 1  |    |        |       | 2    |
| 1                                | 1   | Techniques et systèmes de travail collaboratif I         |                                | 2  |    |        |       | 2    |
| 1                                | 1   | Éducation physique et sport I                            |                                |    | 1  |        |       | 1    |
| 1                                | 2   | Analyse II   | 2                              | 2  |    |        |       | 5    |
| 1                                | 2   | Physique I   | 2                              | 1  | 1  |        |       | 4    |
| 1                                | 2   | Mécanique I  | 2                              | 1  |    |        |       | 3    |
| 1                                | 2   | Graphique technique et infographie II                    | 2                              |    | 2  |        |       | 4    |
| 1                                | 2   | Science et ingénierie des matériaux II                   | 2                              |    | 1  |        |       | 4    |
| 1                                | 2   | Langages de programmation                                | 2                              |    | 2  |        |       | 3    |



|  |   |   |   |   |   |  |   |
|--|---|---|---|---|---|--|---|
| 1  | 2 | Communication II  | 1 | 1 |   |  | 2 |
| 1  | 2 | Techniques et systèmes de travail collaboratif II                   |   | 2 |   |  | 2 |
| 1  | 2 | Éducation physique et sport II                                      |   |   | 1 |  | 1 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |   |   |   |   |  |   |
| 1  | 1 | Informatique appliquée/<br>Probabilités et statistique mathématique | 1 |   | 2 |  | 3 |
| 1  | 1 | Langue Anglaise I /<br>Langue Allemande I                           | 1 | 1 |   |  | 2 |
| 1  | 2 | Langue Anglaise II /<br>Langue Allemande II                         |   | 1 |   |  | 2 |
| <b>Sujets optionnelles</b>                                   |   |   |   |   |   |  |   |
| 1  | 1 | Langue Roumaine (pour étudiants étrangers) I                        |   | 2 |   |  | 2 |
| 1  | 1 | English for Engineering Academic Study I                            | 1 | 1 |   |  | 2 |
| 1  | 1 | Langue française pour ingénieurs I                                  |   | 2 |   |  | 2 |
| 1  | 1 | Psychologie de l'éducation  | 2 | 2 |   |  | 5 |
| 1  | 2 | Langue Roumaine (pour étudiants étrangers) II                       |   | 2 |   |  | 2 |
| 1  | 2 | English for Engineering Academic Study II                           | 1 | 1 |   |  | 2 |
| 1  | 2 | Langue française pour ingénieurs I                                  |   | 2 |   |  | 2 |
| 1  | 2 | Pédagogie 1   | 2 | 2 |   |  | 5 |
| <b>BAC+2 Sujets obligatoires</b>                             |   |   |   |   |   |  |   |
| 2  | 1 | Mathématiques pour ingénieurs I                                     | 2 | 2 |   |  | 4 |
| 2  | 1 | Physique II   | 2 |   | 1 |  | 4 |
| 2  | 1 | Resistance des matériaux I  | 2 | 2 |   |  | 4 |
| 2  | 1 | Conception assiste par ordinateur                                   | 2 |   | 2 |  | 5 |
| 2  | 1 | Electrotechnique  | 2 | 1 |   |  | 3 |
| 2  | 1 | Mécanique II  | 2 | 1 |   |  | 3 |
| 2  | 1 | Traitement des documents techniques I                               |   | 2 |   |  | 2 |
| 2  | 1 | Éducation physique et sport III                                     |   |   | 1 |  | 1 |
| 2  | 1 | Microéconomie   | 1 | 1 |   |  | 2 |
| 2  | 2 | Mathématiques pour ingénieurs II                                    | 2 | 2 |   |  | 4 |
| 2  | 2 | Resistance des matériaux II   | 2 | 1 |   |  | 4 |
| 2  | 2 | Procédés de fabrication I   | 2 |   | 1 |  | 4 |
| 2  | 2 | Éléments des machines I   | 2 |   | 1 |  | 4 |
| 2  | 2 | Méthodes numériques   | 2 |   | 2 |  | 3 |
| 2  | 2 | Logiciels de génie mécanique I (conception corps solides)           | 2 |   | 1 |  | 3 |
| 2  | 2 | Traitement des documents techniques II                              |   | 2 |   |  | 2 |
| 2  | 2 | Macroéconomie   | 1 | 1 |   |  | 2 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |   |   |   |   |  |   |
| 2  | 1 | Langue Anglaise III /<br>Langue Allemande III                       |   | 1 |   |  | 2 |
| 2  | 2 | Langue Anglaise IV /<br>Langue Allemande IV                         |   |   | 1 |  | 1 |
| 2  | 2 | Machines électriques/<br>Tolérance et contrôle dimensionnel         | 2 |   | 1 |  | 3 |
| <b>Sujets optionnelles</b>                                   |   |   |   |   |   |  |   |



|  |   |   |   |   |   |   |  |   |
|--|---|---|---|---|---|---|--|---|
| 2  | 1 | Langue Roumaine (pour étudiants étrangers) III  |   | 2 |   |   |  | 2 |
| 2  | 1 | Pedagogie 2   | 2 | 2 |   |   |  | 5 |
| 2  | 2 | Langue Roumaine (pour étudiants étrangers) IV   |   | 2 |   |   |  | 2 |
| 2  | 2 | Didactique de la spécialité   | 2 | 2 |   |   |  | 5 |
| <b>BAC+3 Sujets obligatoires</b>                             |   |   |   |   |   |   |  |   |
| 3  | 1 | Analyse par éléments finis  | 2 |   | 2 |   |  | 4 |
| 3  | 1 | Thermodynamique technique   | 2 | 1 | 1 |   |  | 5 |
| 3  | 1 | Mécanique des fluides   | 2 | 1 |   |   |  | 4 |
| 3  | 1 | Systèmes de réglage automatique   | 2 |   | 1 |   |  | 4 |
| 3  | 1 | Éléments des machines II  | 2 |   | 1 | 2 |  | 5 |
| 3  | 1 | Procédés de fabrication II  | 2 |   | 1 |   |  | 3 |
| 3  | 1 | Mécanique III   | 1 | 1 |   |   |  | 2 |
| 3  | 2 | Transfert de chaleur et de masse  | 3 | 1 | 1 |   |  | 3 |
| 3  | 2 | Dynamique des machines  | 2 |   | 2 |   |  | 3 |
| 3  | 2 | Éléments des machines III (Transmissions mécaniques)  | 3 |   | 1 |   |  | 3 |
| 3  | 2 | Mécanique des fluides et machines hydrauliques (pompes,...)                                   | 2 |   | 2 |   |  | 3 |
| 3  | 2 | Mécanique structurelle  | 2 | 1 | 1 |   |  | 3 |
| 3  | 2 | Éléments des machines III (projet de transmissions mécaniques)                                |   |   |   | 2 |  | 2 |
| 3  | 2 | Stage industriel en domaine   |   |   |   |   |  | 4 |
| 3  | 2 | Stage industriel de spécialité  |   |   |   |   |  | 4 |
| 3  | 2 | Management (Fondements du management)   | 1 | 1 |   |   |  | 2 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |   |   |   |   |   |  |   |
| 3  | 1 | Résistance des matériaux III (Mécanique appliquée des matériaux) / Technologies des matériaux | 2 |   | 1 |   |  | 3 |
| 3  | 2 | Mesures mécaniques/ Systèmes d'acquisitions et interfaces                                     | 2 |   | 1 |   |  | 3 |
| <b>Sujets optionnelles</b>                                   |   |   |   |   |   |   |  |   |
| 3  | 1 | Administration des affaires   | 1 | 1 |   |   |  | 2 |
| <b>BAC+4 Sujets obligatoires</b>                             |   |   |   |   |   |   |  |   |
| 4  | 1 | Logiciels de génie mécanique II (conception thermique)  | 2 |   | 2 |   |  | 5 |
| 4  | 1 | Tribologie  | 2 |   | 2 |   |  | 4 |
| 4  | 1 | Conception des produits innovants   | 2 |   |   | 2 |  | 4 |
| 4  | 1 | Asservissement hydraulique et pneumatiques  | 2 |   | 1 |   |  | 4 |
| 4  | 1 | Électronique appliquée  | 2 |   | 1 |   |  | 4 |
| 4  | 1 | Machines thermiques I (Moteurs à combustion interne)  | 2 | 1 | 1 | 1 |  | 6 |
| 4  | 2 | Machines thermiques II (Turbines et Générateurs de vapeurs)                                   | 2 | 1 | 2 |   |  | 5 |
| 4  | 2 | Réfrigération et conditionnement de l'air   | 2 | 1 | 2 |   |  | 5 |
| 4  | 2 | Projet de fin d'études  |   |   |   | 8 |  | 4 |
| 4  | 2 | Stage pour projet fin d'étude (60h)   |   |   |   |   |  | 6 |
| 4  | 2 | Compresseurs et ventilateurs  | 2 |   |   | 1 |  | 3 |
| <b>Sujets au choix (un sujet obligatoire parmi les deux)</b> |   |   |   |   |   |   |  |   |
| 4  | 1 | Assurance de la qualité/ Management des projets industriels                                   | 2 |   | 1 |   |  | 3 |





|   |   |   |   |   |  |   |  |   |
|---|---|---|---|---|--|---|--|---|
| 4 | 2 | Éco-conception/<br>Énergie renouvelables (solaire<br>thermique) | 2 |   |  | 1 |  | 3 |
| 4 | 2 | Génie de l'environnement/<br>Optimisation en génie mécanique    | 2 | 1 |  |   |  | 4 |

## 4. Field of study: Chemical Engineering

### 4.1 Chemical Engineering (taught in English)

#### Faculty of Engineering in Foreign Languages

##### a) Short description and main objectives:

The program of Chemical Engineering aims at providing graduates with competencies and skills according to the European Qualifications Framework regarding the area of Chemical Engineering. A series of optional classes offer knowledge on *polymer science* (synthesis, characterization, processing, materials and biomaterials) or *organic chemistry* (natural products, catalysis, tensioactive compounds, dyes).

Graduates can work in all areas of chemistry and chemical engineering, such as: research, manufacture, petrochemistry, organic chemistry, rubber industry, plastics industry, cosmetics, paints, environmental protection, polymer recycling, biomaterials, etc.

##### b) Other information

- ✓ This program receives incoming Erasmus+ for one semester or an entire year.
- ✓ There are many partnerships with various research and production companies where students participate in internships.
- ✓ The university research centers offer students and graduates the possibility of participating in *research activities*. For example, the *Center for Advanced Research on New Materials, Products and Innovative Processes - CAMPUS*, integrates several labs, equipped at European standards, that cover various scientific areas. The *Advanced Polymer Materials Group (APMG)*, as part of the Faculty of Applied Chemistry and Materials Science from the University POLITEHNICA of Bucharest, dedicates a lot of research to the field of *Polymer Science and Engineering*.

c) **Website:** <http://ing.pub.ro/en/education/licence/>

d) **Contact person:** Mrs. Adriana LUNGU, [adriana.lungu@upb.ro](mailto:adriana.lungu@upb.ro)



e) Curriculum:

| Year                                  | Sem | Subject name                                   | Weekly number of hours |          |         |         | ECTS |
|---------------------------------------|-----|--|------------------------|----------|---------|---------|------|
|                                       |     |  | Lecture                | Tutorial | Labwork | Project |      |
| <b>First Year Compulsory subjects</b> |     |  |                        |          |         |         |      |
| <i>Basic Subjects</i>                 |     |  |                        |          |         |         |      |
| 1                                     | 1   | Calculus 1                                     | 3                      | 1        |         | 6       |      |
| 1                                     | 1   | Linear Algebra                                 | 2                      | 1        |         | 4       |      |
| 1                                     | 1   | Inorganic Chemistry 1                          | 3                      | 2        |         | 4       |      |
| 1                                     | 1   | Analytical Chemistry 1                         | 2                      |          | 3       | 4       |      |
| <i>Basic Engineering Courses</i>      |     |  |                        |          |         |         |      |
| 1                                     | 1   | Introduction to information technology         | 1                      |          | 2       | 3       |      |
| 1                                     | 1   | Engineering Graphics I                         | 1                      |          | 1       | 3       |      |
| <i>Humanities and Social Sciences</i> |     |  |                        |          |         |         |      |
| 1                                     | 1   | Professional Communication                     |                        | 2        |         | 2       |      |
| 1                                     | 1   | European Culture and Civilization 1            | 1                      | 1        |         | 2       |      |
| <b>Optional Subjects</b>              |     |  |                        |          |         |         |      |
| <i>Humanities and Social Sciences</i> |     |  |                        |          |         |         |      |
| 1                                     | 1   | Foreign Language B (Spanish Language I)        |                        | 2        |         | 2       |      |
| 1                                     | 1   | Physical Education I                           |                        | 2        |         | 2       |      |
| <b>Free Choice Subjects</b>           |     |  |                        |          |         |         |      |
| <i>Complementary topics</i>           |     |  |                        |          |         |         |      |
| 1                                     | 1   | English for Engineering Academic Study 1       |                        | 2        |         | 2       |      |
| <i>Humanities and Social Sciences</i> |     |  |                        |          |         |         |      |
| 1                                     | 1   | Romanian Language and Culture (for foreigners) |                        | 2        |         | 2       |      |
| <b>Compulsory subjects</b>            |     |  |                        |          |         |         |      |
| <i>Basic Subjects</i>                 |     |  |                        |          |         |         |      |
| 1                                     | 2   | Calculus 2                                     | 3                      | 1        |         | 6       |      |
| 1                                     | 2   | Physics I                                      | 2                      |          | 1       | 5       |      |
| 1                                     | 2   | Inorganic Chemistry 2                          | 2                      | 2        | 2       | 5       |      |
| 1                                     | 2   | Analytical Chemistry 2                         | 2                      |          | 2       | 3       |      |
| 1                                     | 2   | Programming Languages                          | 1                      |          | 1       | 3       |      |
| <i>Basic Engineering Courses</i>      |     |  |                        |          |         |         |      |
| 1                                     | 2   | Transition Metals Chemistry                    | 2                      | 1        |         | 2       |      |
| 1                                     | 2   | Theoretical Mechanics                          | 1                      | 1        |         | 2       |      |
| <i>Specialties</i>                    |     |  |                        |          |         |         |      |
| 1                                     | 2   | Collaborative Work 1                           |                        | 2        |         | 2       |      |
| <i>Humanities and Social Sciences</i> |     |  |                        |          |         |         |      |
| 1                                     | 2   | European Culture and Civilization 2            | 1                      | 1        |         | 2       |      |
| <b>Optional Subjects</b>              |     |  |                        |          |         |         |      |



|  |   |  |   |   |   |   |
|--|---|--|---|---|---|---|
| <b>Humanities and Social Sciences</b>  |   |  |   |   |   |   |
| 1                                      | 2 | Foreign Language B (Spanish Language 2)        |   | 2 |   | 2 |
| <b>Free Choice Subjects</b>            |   |  |   |   |   |   |
| <b>Complementary topics</b>            |   |  |   |   |   |   |
| 1                                      | 2 | English for Engineering Academic Study 2       | 1 | 1 |   | 2 |
| <b>Humanities and Social Sciences</b>  |   |  |   |   |   |   |
| 1                                      | 2 | Romanian Language and Culture (for foreigners) |   | 2 |   | 2 |
| 1                                      | 2 | Pedagogy I                                     | 2 | 2 |   | 5 |
| <b>Second Year Compulsory subjects</b> |   |  |   |   |   |   |
| <b>Basic Subjects</b>                  |   |  |   |   |   |   |
| 2                                      | 1 | Probabilities and Statistics                   | 1 | 1 |   | 2 |
| 2                                      | 1 | Physics 2                                      | 2 |   | 1 | 4 |
| 2                                      | 1 | Physical Chemistry 1                           | 3 | 2 |   | 5 |
| 2                                      | 1 | Physical Chemistry 1 Lab                       |   |   | 2 | 2 |
| 2                                      | 1 | Organic Chemistry 1                            | 3 | 1 | 2 | 6 |
| <b>Basic Engineering Courses</b>       |   |  |   |   |   |   |
| 2                                      | 1 | Strength of Materials 1                        | 2 | 1 |   | 4 |
| 2                                      | 1 | Electrical Engineering 1                       | 2 | 1 |   | 3 |
| <b>Specialties</b>                     |   |  |   |   |   |   |
| 2                                      | 1 | Collaborative Work II                          |   | 2 |   | 2 |
| <b>Economics</b>                       |   |  |   |   |   |   |
| 2                                      | 1 | Microeconomics                                 | 1 | 1 |   | 2 |
| <b>Free Choice Subjects</b>            |   |  |   |   |   |   |
| <b>Humanities and Social Sciences</b>  |   |  |   |   |   |   |
| 2                                      | 1 | Romanian Language and Culture (for foreigners) |   | 2 |   | 2 |
| <b>Compulsory subjects</b>             |   |  |   |   |   |   |
| <b>Basic Subjects</b>                  |   |  |   |   |   |   |
| 2                                      | 2 | Physical Chemistry 2                           | 3 | 2 |   | 6 |
| 2                                      | 2 | Physical Chemistry 2 Lab                       |   |   | 2 | 4 |
| 2                                      | 2 | Organic Chemistry 2                            | 3 | 1 | 2 | 7 |
| <b>Basic Engineering Courses</b>       |   |  |   |   |   |   |
| 2                                      | 2 | Instrumental Analysis in Organic Chemistry     | 2 |   | 2 | 6 |
| 2                                      | 2 | Numerical Methods                              | 2 |   | 2 | 3 |
| <b>Specialties</b>                     |   |  |   |   |   |   |
| 2                                      | 2 | Technical Writing                              |   | 2 |   | 2 |
| <b>Economics</b>                       |   |  |   |   |   |   |
| 2                                      | 2 | Macroeconomics                                 | 1 | 1 |   | 2 |
| <b>Free Choice Subjects</b>            |   |  |   |   |   |   |
| <b>Humanities and Social Sciences</b>  |   |  |   |   |   |   |
| 2                                      | 2 | Romanian Language and Culture (for foreigners) |   | 2 |   |   |
| <b>Third Year Compulsory subjects</b>  |   |  |   |   |   |   |



|   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|----|
|   |   | <b>Basic Subjects</b>                                 |   |   |   |   |    |
| 3 | 1 | Organic Chemistry 3                                   | 2 |   | 2 |   | 4  |
|   |   | <b>Basic Engineering Courses</b>                      |   |   |   |   |    |
| 3 | 1 | Transport Processes 1                                 | 3 | 1 | 2 |   | 6  |
| 3 | 1 | Organic and Composite Materials                       | 3 |   | 2 |   | 5  |
| 3 | 1 | Electrochemistry                                      | 2 |   | 2 |   | 4  |
| 3 | 1 | Reaction Mechanisms                                   | 2 | 1 |   |   | 4  |
| 3 | 1 | Organic Technologies                                  | 2 |   | 2 |   | 5  |
|   |   | <b>Management</b>                                     |   |   |   |   |    |
| 3 | 1 | Money and Banking                                     | 1 | 1 |   |   | 2  |
|   |   | <b>Compulsory subjects</b>                            |   |   |   |   |    |
|   |   | <b>Basic Engineering Courses</b>                      |   |   |   |   |    |
| 3 | 2 | Inorganic Industrial Chemistry                        | 2 | 1 |   |   | 2  |
| 3 | 2 | Biochemistry  | 2 |   | 2 |   | 3  |
| 3 | 2 | Organic Technologies I                                | 2 |   | 2 |   | 5  |
| 3 | 2 | Oxide and Metallic Materials                          | 3 |   | 2 |   | 4  |
| 3 | 2 | Macromolecular Compounds I                            | 3 |   | 2 |   | 4  |
| 3 | 2 | Unit Operations I                                     | 2 | 1 | 1 |   | 4  |
|   |   | <b>Specialties</b>                                    |   |   |   |   |    |
| 3 | 2 | Practical Workshop                                    |   |   |   |   | 6  |
|   |   | <b>Management</b>                                     |   |   |   |   |    |
| 3 | 2 | Business Administration                               | 1 | 1 |   |   | 2  |
|   |   | <b>Fourth Year Compulsory subjects</b>                |   |   |   |   |    |
|   |   | <b>Basic Engineering Courses</b>                      |   |   |   |   |    |
| 4 | 1 | Unit Operations 2                                     | 3 | 1 | 1 | 1 | 6  |
| 4 | 1 | Macromolecular Compounds 2                            | 3 |   | 1 |   | 5  |
|   |   | <b>Management</b>                                     |   |   |   |   |    |
| 4 | 1 | Fundamentals of Management                            | 1 |   | 1 |   | 2  |
|   |   | <b>Optional Subjects</b>                              |   |   |   |   |    |
|   |   | <b>Specialties A – Organic Chemistry<sup>*)</sup></b> |   |   |   |   |    |
| 4 | 1 | Pesticides  | 2 |   |   |   | 3  |
| 4 | 1 | Stereochemistry                                       | 2 | 1 |   |   | 3  |
| 4 | 1 | Drugs   | 2 |   |   |   | 2  |
| 4 | 1 | Fine Organic Syntheses                                |   |   | 5 |   | 5  |
| 4 | 1 | Dyes  | 2 |   | 2 |   | 4  |
|   |   | <b>Specialties B – Polymer Science<sup>*)</sup></b>   |   |   |   |   |    |
| 4 | 1 | Polymer Physics                                       | 3 |   | 3 |   | 6  |
| 4 | 1 | Technologies of Polymer Synthesis                     | 3 |   | 3 |   | 6  |
| 4 | 1 | Biopolymers and Bio-composites                        | 2 |   | 2 |   | 5  |
|   |   | <b>Compulsory subjects</b>                            |   |   |   |   |    |
|   |   | <b>Specialties</b>                                    |   |   |   |   |    |
| 4 | 2 | Chemical Reactors                                     | 3 |   | 2 | 1 | 6  |
| 4 | 2 | Diploma Project                                       |   |   |   | 4 | 1- |
|   |   | <b>Management</b>                                     |   |   |   |   |    |
| 4 | 2 | Industrial Management                                 | 1 | 1 |   |   | 2  |
|   |   | <b>Optional Subjects</b>                              |   |   |   |   |    |



| <i>Specialties A – Organic Chemistry</i> <sup>*)</sup> |   |  |   |  |   |   |
|--|---|--|---|--|---|---|
| 4  | 2 | Petrochemical and Carbochemical Technologies | 2 |  | 1 | 2 |
| 4  | 2 | Tensioactive Compounds                       | 2 |  | 2 | 3 |
| 4  | 2 | Catalysis                                    | 2 |  | 2 | 3 |
| 4  | 2 | Natural Products                             | 2 |  | 1 | 2 |
| 4  | 2 | Pollution and Depollution                    | 2 |  |   | 2 |
| <i>Specialties B – Polymer Science</i> <sup>*)</sup>   |   |  |   |  |   |   |
| 4  | 2 | Polymer Processing                           | 3 |  | 2 | 4 |
| 4  | 2 | Industrial Polymer Materials                 | 3 |  | 2 | 3 |
| 4  | 2 | Adhesives, Paints and Putties                | 2 |  | 1 | 3 |
| 4  | 2 | Polymer Recycling                            | 2 |  | 1 | 2 |

<sup>\*)</sup> – specialties A and B are alternating every other year

## 5. Field of study: Engineering and Management

### 5.1 Business Engineering and Management (taught in English)

#### Faculty of Entrepreneurship, Business Engineering and Management

##### a) Short description and main objectives:

The Business Engineering and Management Bachelor's Degree Program offers an undergraduate specialization which is highly appreciated by employers on the international labour market. As a distinguishing element, the program offers a wide range of entrepreneurial, technical and management competences necessary for a successful management or entrepreneurship career. Also, students can access study mobilities programs, and they will receive the benefits of a multicultural learning environment, due to the interactions with international students enrolled in this program.

##### b) Other information

All subjects of the program are open for Erasmus incoming students.

c) **Website:** <http://faima.pub.ro/programe.php?hl=ro>

d) **Contact person:** Mrs. Dana Corina DESELNICU, dana.deselnicu@upb.ro

##### e) Curriculum:

| Year | Sem | Subject name | Weekly number of hours |          |         |         | Practice | ECTS |
|------|-----|--------------|------------------------|----------|---------|---------|----------|------|
|      |     |              | Lecture                | Tutorial | Labwork | Project |          |      |
|      |     |              |                        |          |         |         |          |      |



| <b>First Year Compulsory subjects</b>  |   |   |   |   |   |   |  |   |
|--|---|---|---|---|---|---|--|---|
| 1                                      | 1 | Mathematical Analysis                               | 2 | 2 | 0 | 0 |  | 5 |
| 1                                      | 1 | Physics 1   | 2 | 0 | 2 | 0 |  | 5 |
| 1                                      | 1 | Chemistry   | 2 | 0 | 2 | 0 |  | 5 |
| 1                                      | 1 | Computer Programming 1                              | 2 | 0 | 2 | 1 |  | 5 |
| 1                                      | 1 | Fundamentals of Economics 1                         | 2 | 1 | 0 | 0 |  | 4 |
| 1                                      | 1 | English for Engineering 1                           | 1 | 1 | 0 | 0 |  | 3 |
| 1                                      | 1 | Physical Education and Sport 1                      | 0 | 2 | 0 | 0 |  | 3 |
| 1                                      | 2 | Linear Algebra, Analytic and Differential Geometry  | 2 | 2 | 0 | 0 |  | 4 |
| 1                                      | 2 | Physics 2   | 2 | 0 | 2 | 0 |  | 4 |
| 1                                      | 2 | Fundamentals of Economics 2                         | 2 | 1 | 0 | 0 |  | 4 |
| 1                                      | 2 | Computer Programming 2                              | 2 | 0 | 2 | 0 |  | 4 |
| 1                                      | 2 | Biotechnology                                       | 2 | 1 | 0 | 0 |  | 4 |
| 1                                      | 2 | English for Engineering 2                           | 1 | 1 | 0 | 0 |  | 3 |
| 1                                      | 2 | Introduction to Materials Science and Engineering   | 2 | 0 | 1 | 0 |  | 4 |
| 1                                      | 2 | Physical Education and Sport 2                      | 0 | 2 | 0 | 0 |  | 1 |
| <b>Optional subjects</b>               |   |   |   |   |   |   |  |   |
| 1                                      | 1 | Entrepreneurial Culture                             | 1 | 1 | 0 | 0 |  | 2 |
| 1                                      | 1 | Corporate Social Responsibility                     | 1 | 1 | 0 | 0 |  | 2 |
| 1                                      | 2 | Sociology   | 2 | 1 | 0 | 0 |  | 2 |
| 1                                      | 2 | Psychology  | 2 | 1 | 0 | 0 |  | 2 |
| <b>Facultative subjects</b>            |   |   |   |   |   |   |  |   |
| 1                                      | 1 | The Psychology of Education                         | 2 | 2 | 0 | 0 |  | 5 |
| 1                                      | 1 | German Language 1                                   | 1 | 1 | 0 | 0 |  | 3 |
| 1                                      | 2 | Pedagogy 1  | 2 | 2 | 0 | 0 |  | 5 |
| 1                                      | 2 | German Language 2                                   | 1 | 1 | 0 | 0 |  | 3 |
| <b>Second Year Compulsory subjects</b> |   |   |   |   |   |   |  |   |
| 2                                      | 1 | Statistics and Stochastics                          | 2 | 2 | 0 | 0 |  | 5 |
| 2                                      | 1 | Mechanics and Strength of Materials                 | 2 | 0 | 2 | 0 |  | 4 |
| 2                                      | 1 | Production, Transmission and Distribution of Energy | 2 | 0 | 2 | 0 |  | 4 |
| 2                                      | 1 | Fundamentals of Electrical Engineering              | 2 | 2 | 0 | 0 |  | 5 |
| 2                                      | 1 | Fundamentals of Management                          | 2 | 1 | 0 | 0 |  | 5 |



|                                       |   |  |   |   |   |   |   |
|---------------------------------------|---|--|---|---|---|---|---|
| 2                                     | 1 | English for Engineering 3                              | 0 | 2 | 0 | 0 | 2 |
| 2                                     | 1 | Physical Education and Sport 3                         | 0 | 2 | 0 | 0 | 1 |
| 2                                     | 2 | Advanced Mathematics for Decision Making               | 2 | 2 | 0 | 0 | 5 |
| 2                                     | 2 | Mechanical Technologies and Equipment                  | 2 | 0 | 2 | 0 | 5 |
| 2                                     | 2 | Marketing  | 2 | 2 | 0 | 0 | 4 |
| 2                                     | 2 | Electronic Measurements and Technical Systems          | 2 | 0 | 2 | 0 | 5 |
| 2                                     | 2 | Applied Informatics                                    | 2 | 0 | 1 | 0 | 4 |
| 2                                     | 2 | English for Engineering 4                              | 0 | 2 | 0 | 0 | 2 |
| 2                                     | 2 | Physical Education and Sport 4                         | 0 | 1 | 0 | 0 | 1 |
| <b>Optional subjects</b>              |   |  |   |   |   |   |   |
| 2                                     | 1 | Processing of Business Data                            | 2 | 2 | 0 | 0 | 5 |
| 2                                     | 1 | Algorithms and Data Structures                         | 2 | 1 | 2 | 0 | 3 |
| 2                                     | 2 | Statistical Techniques in Business Processes           | 2 | 2 | 0 | 0 | 4 |
| 2                                     | 2 | Economic Statistics                                    | 2 | 2 | 0 | 0 | 4 |
| <b>Facultative subjects</b>           |   |  |   |   |   |   |   |
| 2                                     | 1 | Pedagogy 2   | 0 | 2 | 0 | 0 | 2 |
| 2                                     | 1 | German Language 3                                      | 0 | 0 | 2 | 0 | 2 |
| 2                                     | 2 | Didactics of the specialization                        | 2 | 2 | 0 | 0 | 5 |
| 2                                     | 2 | German Language 4                                      | 0 | 2 | 0 | 0 | 4 |
| <b>Third Year Compulsory subjects</b> |   |  |   |   |   |   |   |
| 3                                     | 1 | Human Resources Management                             | 2 | 2 | 0 | 0 | 5 |
| 3                                     | 1 | Operations and Supply Chain Management                 | 3 | 2 | 0 | 1 | 5 |
| 3                                     | 1 | Quality Engineering                                    | 2 | 2 | 0 | 0 | 5 |
| 3                                     | 1 | Computer Aided Design and Technical Drawing            | 2 | 0 | 2 | 0 | 5 |
| 3                                     | 1 | Risk Assessment Techniques in Industrial Organizations | 2 | 2 | 0 | 0 | 4 |
| 3                                     | 2 | Management of Technology and Innovation                | 2 | 2 | 0 | 0 | 4 |
| 3                                     | 2 | Financial Management                                   | 2 | 2 | 0 | 0 | 4 |
| 3                                     | 2 | Business Research Methods                              | 2 | 2 | 0 | 0 | 3 |
| 3                                     | 2 | Organizational Behaviour                               | 2 | 1 | 0 | 0 | 2 |
| 3                                     | 2 | Industrial Logistics                                   | 2 | 2 | 0 | 0 | 4 |



|  |   |  |   |   |   |   |     |   |
|--|---|--|---|---|---|---|-----|---|
| 3                                      | 2 | Business Law   | 2 | 1 | 0 | 0 |     | 2 |
| 3                                      | 2 | Practical Stage (12 weeks)   | 0 | 0 | 0 | 2 | 360 | 8 |
| <b>Optional Subjects</b>               |   |  |   |   |   |   |     |   |
| 3                                      | 1 | Management Accounting  | 2 | 2 | 0 | 0 |     | 3 |
| 3                                      | 1 | Financial Accounting   | 2 | 2 | 0 | 0 |     | 3 |
| 3                                      | 2 | Cost-Benefit Analysis for Business   | 2 | 2 | 0 | 0 |     | 3 |
| 3                                      | 2 | Business Forecasting   | 2 | 2 | 0 | 0 |     | 3 |
| <b>Facultative subjects</b>            |   |  |   |   |   |   |     |   |
| 3                                      | 1 | Computer aided training  | 1 | 1 | 0 | 0 |     | 2 |
| 3                                      | 1 | Pedagogical practice in compulsory pre-university education (1)            | 0 | 3 | 0 | 0 |     | 3 |
| 3                                      | 1 | Business English   | 0 | 2 | 0 | 0 |     | 4 |
| 3                                      | 1 | German Language 5  | 0 | 2 | 0 | 0 |     | 4 |
| 3                                      | 2 | Pedagogical practice in compulsory pre-university education (2) (12 weeks) | 0 | 3 | 0 | 0 |     | 2 |
| 3                                      | 2 | Student class management   | 1 | 1 | 0 | 0 |     | 3 |
| 3                                      | 2 | Graduation Exam - Level 1  | 0 | 0 | 0 | 0 |     | 5 |
| 3                                      | 2 | Business English   | 0 | 2 | 0 | 0 |     | 4 |
| 3                                      | 2 | German Language 6  | 0 | 2 | 0 | 0 |     | 4 |
| <b>Fourth Year Compulsory subjects</b> |   |  |   |   |   |   |     |   |
| 4                                      | 1 | Project Management   | 2 | 0 | 2 | 1 |     | 5 |
| 4                                      | 1 | Business Process Modelling and Simulation                                  | 2 | 0 | 2 | 0 |     | 4 |
| 4                                      | 1 | Business Integrated Information Systems                                    | 2 | 0 | 2 | 0 |     | 5 |
| 4                                      | 1 | Entrepreneurship   | 2 | 2 | 0 | 0 |     | 5 |
| 4                                      | 1 | Intellectual Property  | 2 | 1 | 0 | 0 |     | 3 |
| 4                                      | 1 | Organizational Design and Change Management                                | 2 | 1 | 0 | 0 |     | 4 |
| 4                                      | 2 | International Law  | 2 | 1 | 0 | 0 |     | 4 |
| 4                                      | 2 | Factory Planning and Ergonomics  | 2 | 2 | 0 | 2 |     | 5 |
| 4                                      | 2 | Electronic Businesses  | 2 | 2 | 0 | 0 |     | 4 |
| 4                                      | 2 | Business Start-up with Innovative Products                                 | 2 | 2 | 0 | 1 |     | 5 |
| 4                                      | 2 | Management Communication   | 2 | 2 | 0 | 0 |     | 4 |
| 4                                      | 2 | Development of Graduate Project  | 0 | 0 | 0 | 4 |     | 4 |





|                             |   |  |   |   |   |   |    |   |
|-----------------------------|---|--|---|---|---|---|----|---|
| 4                           | 2 | Practical stage for development of Graduate Project (60 hours) | 0 | 0 | 0 | 0 | 60 | 4 |
| <b>Optional Subjects</b>    |   |  |   |   |   |   |    |   |
| 4                           | 1 | Sustainable Development  | 2 | 1 | 0 | 0 |    | 4 |
| 4                           | 1 | Eco-technology   | 2 | 1 | 0 | 0 |    | 4 |
| <b>Facultative Subjects</b> |   |  |   |   |   |   |    |   |
| 4                           | 1 | Business English   | 0 | 2 | 0 | 0 |    | 4 |
| 4                           | 1 | German Language 7  | 0 | 2 | 0 | 0 |    | 4 |
| 4                           | 2 | Business English   | 0 | 2 | 0 | 0 |    | 4 |
| 4                           | 2 | German Language 8  | 0 | 2 | 0 | 0 |    | 4 |

|  |  |              |   |   |   |   |  |    |
|--|--|--------------|---|---|---|---|--|----|
|  |  | Diploma Exam | 0 | 2 | 0 | 0 |  | 10 |
|--|--|--------------|---|---|---|---|--|----|

## 5.2 Mechanical Engineering and Management / Wirtschaftsingenieurwesen-technische Fachrichtung Maschinenbau (taught in German)

### Faculty of Engineering in Foreign Languages

#### a) Short description and main objectives:

The Faculty of Engineering in Foreign Languages (FILS) developed the bachelor program “*Mechanical Engineering and Management*” together with renown Professors from the Technical University of Darmstadt, Technical University of Braunschweig, and the University of Applied Sciences of München, and offers an interdisciplinary experience: business, engineering and law sciences for students which already master German as well as for those who graduate a preparatory year with intensive teaching of German with accent on technical language and communication.

#### b) Other information

- All subject of the program are open for Erasmus incoming students for one or two semesters.
- The bachelor program is carried out in cooperation with companies as Stein & Partner Management Consulting, Hewlett-Packard Enterprise und APT Resources and Services.
- The Bachelor Thesis can be carried out in cooperation with companies or foreign universities.

c) **Website:** <http://ing.pub.ro/de/education/licence/>

d) **Contact person:** Mrs. Laura TRIFAN, [laura.trifan@upb.ro](mailto:laura.trifan@upb.ro)



e) Curriculum:

| Year                                  | Sem | Subject name                            | Weekly number of hours |          |         |         | Practice | ECTS |
|---------------------------------------|-----|---|------------------------|----------|---------|---------|----------|------|
|                                       |     |   | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b> |     |   |                        |          |         |         |          |      |
| 1                                     | 1   | Mathematik 1a                           | 2                      | 2        | -       | -       |          | 3    |
| 1                                     | 1   | Mathematik 1b                           | 2                      | 1        |         |         |          | 3    |
| 1                                     | 1   | Grundlagen der Wirtschaftslehre         | 1                      | 1        | -       | -       |          | 2    |
| 1                                     | 1   | Allgemeine Wirtschaftslehre 1           | 1                      | 1        | -       | -       |          | 3    |
| 1                                     | 1   | Betriebswirtschaftslehre 1              | 2                      | 1        | 1       | -       |          | 3    |
| 1                                     | 1   | Technische Mechanik 1                   | 3                      | 2        | -       | -       |          | 5    |
| 1                                     | 1   | Physik                                  | 2                      | -        | 1       | -       |          | 3    |
| 1                                     | 1   | Buchführung                             | 2                      | -        | -       | -       |          | 3    |
| 1                                     | 1   | Technologie der Fertigungsverfahren     | 2                      | -        | 1       | -       |          | 4    |
| 1                                     | 1   | Angewandte Informatik 1                 | 2                      |          |         |         |          | 2    |
| 1                                     | 2   | Mathematik 2                            | 4                      | 2        |         |         |          | 6    |
| 1                                     | 2   | Betriebswirtschaftslehre 2              | 1                      | 1        |         |         |          | 2    |
| 1                                     | 2   | Technische Mechanik 2                   | 2                      |          | 2       |         |          | 4    |
| 1                                     | 2   | Wirtschaftsinformatik                   | 1                      | 1        |         |         |          | 3    |
| 1                                     | 2   | Angewandte Informatik 2                 | -                      | -        | 2       |         |          | 2    |
| 1                                     | 2   | Elektrotechnik u. elektrische Maschinen | 2                      | -        | 1       |         |          | 3    |
| 1                                     | 2   | Werkstoffkunde und –prüfung             | 2                      | -        | 1       |         |          | 3    |
| 1                                     | 2   | Vertragsrecht                           | 2                      | -        | -       |         |          | 3    |
| 1                                     | 2   | Deutsch Interkulturell 1                |                        | 2        |         |         |          | 2    |
| <b>Elective subjects</b>              |     |   |                        |          |         |         |          |      |
| 1                                     | 1   | Fachkommunikation 1                     | 2                      |          |         |         |          | 2    |
| 1                                     | 1   | Expression et communication 1           | 2                      |          |         |         |          | 2    |
| 1                                     | 2   | Fachkommunikation 2                     |                        | 2        |         |         |          | 2    |
| 1                                     | 2   | Expression et communication 2           |                        | 2        |         |         |          | 2    |
| <b>Facultative subjects</b>           |     |   |                        |          |         |         |          |      |
| 1                                     | 1   | Psihologia educației (Ro)               | 2                      | -        | -       | -       |          | 2    |
| 1                                     | 1   | Landeskunde 1                           |                        | 2        |         |         |          | 2    |



| <b>Second Year Compulsory subjects</b> |   |  |   |   |   |   |  |   |
|--|---|--|---|---|---|---|--|---|
| 2                                      | 1 | Mathematik 3 für MB                                      | 2 | 2 |   |   |  | 4 |
| 2                                      | 1 | Technische Thermodynamik 1                               | 2 | 1 |   |   |  | 4 |
| 2                                      | 1 | Mechanismen u. Maschinenelemente 1                       | 2 |   | 2 |   |  | 5 |
| 2                                      | 1 | Projekt Mechanismen und Maschinenelemente 1              |   |   |   | 2 |  | 2 |
| 2                                      | 1 | Technisches Zeichnen und Infografik I                    | 2 |   |   | 2 |  | 4 |
| 2                                      | 1 | E-Commerce   | 1 | 2 |   |   |  | 3 |
| 2                                      | 1 | Wahrscheinlichkeitstheorie und mathematische Statistik 1 | 2 | 2 |   |   |  | 3 |
| 2                                      | 1 | Sport 1  |   | 2 |   |   |  | 3 |
| 2                                      | 2 | Technische Thermodynamik 2                               | 2 | 2 |   |   |  | 5 |
| 2                                      | 2 | Mechanismen u. Maschinenelemente 2                       | 4 |   | 2 |   |  | 6 |
| 2                                      | 2 | Projekt Mechanismen u Maschinenelemente 2                |   |   |   | 2 |  | 3 |
| 2                                      | 2 | Numerische Berechnungsverfahren                          | 1 | 2 |   |   |  | 4 |
| 2                                      | 2 | Investition und Finanzierung                             | 2 |   |   |   |  | 2 |
| 2                                      | 2 | Marketing  | 2 |   |   |   |  | 2 |
| 2                                      | 2 | Operations Research                                      | 2 | 2 |   |   |  | 3 |
| 2                                      | 2 | Wahrscheinlichkeitstheorie und mathematische Statistik 2 | 2 | 2 |   |   |  | 3 |
| <b>Elective subjects</b>               |   |  |   |   |   |   |  |   |
| 2                                      | 1 | Unternehmenskommunikation 1                              | 2 |   |   |   |  | 2 |
| 2                                      | 1 | Wirtschaftsenglisch 1                                    | 2 |   |   |   |  | 2 |
| 2                                      | 2 | Unternehmenskommunikation 2                              |   | 2 |   |   |  | 2 |
| 2                                      | 2 | Wirtschaftsenglisch 2                                    |   | 2 |   |   |  | 2 |
| <b>Facultative subjects</b>            |   |  |   |   |   |   |  |   |
| 2                                      | 1 | Landeskunde 2  |   | 2 |   |   |  | 2 |
| 2                                      | 2 | Landeskunde 3  |   | 2 |   |   |  | 2 |
| <b>Third Year Compulsory subjects</b>  |   |  |   |   |   |   |  |   |
| 3                                      | 1 | Mechanische Schwingungen                                 | 3 | 2 |   |   |  | 6 |
| 3                                      | 1 | Regelungstechnik   | 3 | 1 |   |   |  | 4 |
| 3                                      | 1 | Technische Strömungslehre                                | 2 | 1 | 1 |   |  | 4 |
| 3                                      | 1 | Unternehmensführung                                      | 2 |   |   |   |  | 2 |



|  |   |  |   |   |   |    |   |
|--|---|--|---|---|---|----|---|
| 3                                      | 1 | Wirtschafts- und Finanzpolitik               | 2 |   |   |    | 2 |
| 3                                      | 1 | Produktion und Supply Chain Management       | 2 |   |   |    | 3 |
| 3                                      | 1 | Empirische Wirtschaftsforschung              | 2 |   |   |    | 2 |
| 3                                      | 1 | Seminar VWL/BWL                              |   | 2 |   |    | 3 |
| 3                                      | 1 | Moderieren und Präsentieren                  |   | 2 |   |    | 2 |
| 3                                      | 2 | Kosten- und Leistungsrechnung                | 2 | 1 |   |    | 2 |
| 3                                      | 2 | Produkt Design Projekt                       | 1 |   |   | 2  | 2 |
| 3                                      | 2 | Modellierung und Simulation im MB            | 1 |   | 2 |    | 2 |
| 3                                      | 2 | Wärme- und Stoffübertragung                  | 2 |   | 2 |    | 3 |
| 3                                      | 2 | Werkzeugmaschinen und Industrieroboter       | 2 |   | 2 |    | 3 |
| 3                                      | 2 | Einführung in das wissenschaftliche Arbeiten |   | 2 |   |    | 2 |
| 3                                      | 2 | Technisches Praktikum (240 h)                |   |   |   | 20 | 4 |
| 3                                      | 2 | Technisches Praktikum (120 h)                |   |   |   | 10 | 4 |
| 3                                      | 2 | Einführung in die Makroökonomie              | 2 | 1 |   |    | 2 |
| 3                                      | 2 | Bilanzierung                                 | 2 |   |   |    | 2 |
| <b>Elective Subjects</b>               |   |  |   |   |   |    |   |
| 3                                      | 1 | Unternehmensrecht                            | 2 |   |   |    | 2 |
| 3                                      | 1 | Arbeitsrecht                                 | 2 |   |   |    | 2 |
| 3                                      | 2 | Produktdatentechnologie                      | 2 | 2 |   |    | 4 |
| 3                                      | 2 | Procédés de fabrication                      | 2 | 2 |   |    | 4 |
| <b>Facultative subjects</b>            |   |  |   |   |   |    |   |
| 3                                      | 1 | Pedagogie 1 (lb. română)                     | 2 | 2 |   |    | 4 |
| 3                                      | 1 | Logistik                                     | 2 |   |   |    | 2 |
| 3                                      | 2 | Bionik                                       | 2 |   |   |    | 2 |
| 3                                      | 2 | Pedagogie 2 (lb. română)                     | 2 |   |   |    | 2 |
| <b>Fourth Year Compulsory subjects</b> |   |  |   |   |   |    |   |
| 4                                      | 1 | Verbrennungskraftmaschinen                   | 2 |   | 2 |    | 5 |
| 4                                      | 1 | Virtual Prototype 1                          | 2 |   | 2 |    | 4 |
| 4                                      | 1 | Modellierung und Systemanalyse               | 1 |   | 2 |    | 4 |
| 4                                      | 1 | Projektmanagement                            | 2 | 1 |   |    | 4 |



|                             |   |   |   |   |   |   |   |
|-----------------------------|---|---|---|---|---|---|---|
| 4                           | 1 | Öffentlichkeitsarbeit                         |   | 2 |   |   | 2 |
| 4                           | 1 | Projektmanagement                             | 2 | 2 |   |   | 4 |
| 4                           | 1 | Wirtschaftstheorie 1                          | 2 | 1 |   |   | 3 |
| 4                           | 1 | Ökonometrie                                   | 2 | 1 |   |   | 2 |
| 4                           | 2 | Geschäftskompetenzen                          |   |   |   | 2 | 2 |
| 4                           | 2 | Qualitätssicherung / F&E                      | 2 |   |   |   | 2 |
| 4                           | 2 | Technische Dokumentation                      | 2 |   |   |   | 2 |
| 4                           | 2 | Wirtschaftstheorie 2                          | 2 |   |   | 1 | 3 |
| 4                           | 2 | Controlling                                   | 2 |   |   |   | 2 |
| 4                           | 2 | Arbeitsrecht                                  | 2 |   |   |   | 2 |
| 4                           | 2 | Erarbeitung Bachelor Thesis                   |   |   |   |   | 8 |
| 4                           | 2 | Praktikum Bachelor Thesis                     |   |   |   |   | 5 |
| <b>Elective Subjects</b>    |   |   |   |   |   |   |   |
| 4                           | 1 | Maschinendynamik                              | 2 |   | 2 |   | 4 |
| 4                           | 1 | Angewandte Informatik (fr.)                   | 2 |   | 2 |   | 4 |
| 4                           | 1 | Betriebliche Organisation                     | 2 |   |   |   | 2 |
| 4                           | 1 | General Management                            | 2 |   |   |   | 2 |
| 4                           | 2 | Produkt Design Projekt 1                      |   |   |   | 3 | 3 |
| 4                           | 2 | Webdesign                                     |   |   |   | 3 | 3 |
| 4                           | 2 | Messtechnik für MB                            | 2 |   |   | 2 | 4 |
| 4                           | 2 | Tribologie                                    | 2 |   |   | 2 | 4 |
| <b>Facultative subjects</b> |   |   |   |   |   |   |   |
| 4                           | 1 | Unterrichtspraktikum (in rumänischer Sprache) |   |   |   | 2 | 2 |
| 4                           | 1 | Methodik des Faches (in rumänischer Sprache)  | 2 |   |   |   | 2 |
| 4                           | 2 | Business Plan                                 |   | 2 |   |   | 2 |
| 4                           | 2 | Europäische Studien                           | 2 |   |   |   | 2 |



### 5.3 Electrical Engineering and Management (taught in German)

#### Faculty of Engineering in Foreign Languages

##### a) Short description and main objectives:

The Faculty of Engineering in Foreign Languages (FILS) established and developed the bachelor program “*Electric Engineering and Management*” together with renown Professors of Technical University of Darmstadt, Technical University of Braunschweig, the University of Applied Sciences of München and it offers an interdisciplinary combination of disciplines of business, engineering and law for students who already master German, as well as for those who graduate from a preparatory year with intensive teaching of German with stress on technical language and communication.

##### b) Other information

- All the courses of the program are open for Erasmus incoming students and the program has incoming and outgoing Erasmus students for one or two semesters each year.
- The bachelor program is carried out in cooperation with reputed companies: Stein & Partner Management Consulting, Bosch Romania, Selgros Cash and Carry Romania, Honeywell Garret Romania, IBM Romania, Microsoft Romania, Hewlett-Packard Enterprise und APT Resources and Services.
- The Bachelor Thesis can be carried out in cooperation with enterprises or foreign universities.

c) **Website:** <http://ing.pub.ro/en/education/licence/>

d) **Contact person:** Mr. Cristian MUSTAȚĂ, [cristian.mustata@upb.ro](mailto:cristian.mustata@upb.ro)

##### e) Curriculum:

| Year                                  | Sem | Subject name                      | Weekly number of hours |          |         |         | Practice | ECTS |
|---------------------------------------|-----|-----------------------------------|------------------------|----------|---------|---------|----------|------|
|                                       |     |                                   | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b> |     |                                   |                        |          |         |         |          |      |
| 1                                     | 1   | Mathematik 1                      | 4                      | 2        | -       | -       |          | 6    |
| 1                                     | 1   | Physik                            | 2                      | 1        |         |         |          | 3    |
| 1                                     | 1   | Informatik 1                      | 2                      |          |         |         |          | 2    |
| 1                                     | 1   | Grundlagen der Wirtschaftslehre 1 | 1                      | 1        |         | -       |          | 2    |
| 1                                     | 1   | Betriebswirtschaftslehre I        | 1                      | 1        |         |         |          | 3    |
| 1                                     | 1   | Grundlagen der Elektrotechnik 1   | 3                      | 2        |         | -       |          | 6    |



|  |   |  |   |   |   |   |  |   |
|--|---|--|---|---|---|---|--|---|
| 1                                      | 1 | Buchführung                                    | 2 | 1 |   | - |  | 3 |
| 1                                      | 1 | Datenbanken                                    |   | 2 |   |   |  | 3 |
| 1                                      | 2 | Mathematik 2                                   | 4 | 2 |   |   |  | 6 |
| 1                                      | 2 | Informatik 2                                   |   |   | 2 |   |  | 2 |
| 1                                      | 2 | Betriebswirtschaftslehre II                    | 1 | 1 |   |   |  | 2 |
| 1                                      | 2 | Halbleiterbauelemente                          | 2 |   | 2 |   |  | 4 |
| 1                                      | 2 | Grundlagen der Elektrotechnik 2                | 3 | 2 |   |   |  | 6 |
| 1                                      | 2 | Wirtschaftsinformatik                          | 1 | 1 |   |   |  | 3 |
| 1                                      | 2 | Vertragsrecht                                  | 2 |   |   |   |  | 3 |
| <b>Elective subjects</b>               |   |  |   |   |   |   |  |   |
| 1                                      | 1 | Fachkommunikation 1                            |   | 2 |   |   |  | 2 |
| 1                                      | 1 | Expression et communication 1                  |   | 2 |   |   |  | 2 |
| 1                                      | 2 | Deutsch Interkulturell 1                       |   | 2 |   |   |  | 2 |
| 1                                      | 2 | Fachkommunikation 2                            |   | 2 |   |   |  | 2 |
| 1                                      | 2 | Expression et communication 2                  |   | 2 |   |   |  | 2 |
| <b>Facultative subjects</b>            |   |  |   |   |   |   |  |   |
| 1                                      | 1 | Erziehungspsychologie (in rumänischer Sprache) | 2 | - | - | - |  | 2 |
| <b>Second Year Compulsory subjects</b> |   |  |   |   |   |   |  |   |
| 2                                      | 1 | Mathematik 3 für ETiT                          | 4 | 2 |   |   |  | 6 |
| 2                                      | 1 | Grundlagen der Elektrotechnik 3                | 3 | 2 |   |   |  | 6 |
| 2                                      | 1 | Elektrische Messtechnik                        | 2 |   | 1 |   |  | 4 |
| 2                                      | 1 | Objektorientierte Softwareentwicklung          | 2 |   | 2 |   |  | 4 |
| 2                                      | 1 | Kosten- und Leistungsrechnung                  | 2 | 1 |   |   |  | 3 |
| 2                                      | 1 | Statistik I                                    | 2 | 1 |   |   |  | 3 |
| 2                                      | 1 | Unternehmensrecht                              | 2 |   |   |   |  | 2 |
| 2                                      | 2 | Sensoren und Aktuatoren                        | 2 |   | 1 |   |  | 3 |
| 2                                      | 2 | Technische Mechanik                            | 2 | 2 |   |   |  | 4 |
| 2                                      | 2 | Digitalisignalverarbeitung                     | 3 |   | 1 |   |  | 5 |
| 2                                      | 2 | e-Commerce                                     | 1 |   | 2 |   |  | 4 |
| 2                                      | 2 | Grundlagen der Energietechnik                  | 2 | 1 |   |   |  | 2 |
| 2                                      | 2 | Marketing                                      | 2 |   |   |   |  | 2 |
| 2                                      | 2 | Operations Research                            | 2 | 1 |   |   |  | 3 |
| 2                                      | 2 | Unternehmensführung                            | 2 |   |   |   |  | 2 |
| 2                                      | 2 | Statistik II                                   | 2 | 1 |   |   |  | 3 |



| Elective subjects              |   |  |   |   |   |  |    |   |
|--------------------------------|---|--|---|---|---|--|----|---|
| 2                              | 1 | Unternehmenskommunikation 1                  | 2 |   |   |  |    | 2 |
| 2                              | 1 | Wirtschaftsenglisch 1                        | 2 |   |   |  |    | 2 |
| 2                              | 2 | Unternehmenskommunikation 2                  |   | 2 |   |  |    | 2 |
| 2                              | 2 | Langue francaise pour ingenieurs             |   | 2 |   |  |    | 2 |
| Facultative subjects           |   |  |   |   |   |  |    |   |
| 2                              | 1 | Landeskunde                                  |   | 2 |   |  |    | 2 |
| 2                              | 1 | Fredsprache                                  |   | 2 |   |  |    | 2 |
| 2                              | 1 | Sport  |   | 2 |   |  |    | 2 |
| Third Year Compulsory subjects |   |  |   |   |   |  |    |   |
| 3                              | 1 | Regelungstechnik 1                           | 3 | 1 |   |  |    | 4 |
| 3                              | 1 | Logischer Entwurf                            | 3 | 1 |   |  |    | 5 |
| 3                              | 1 | Investition und Finanzierung                 | 2 |   |   |  |    | 2 |
| 3                              | 1 | Wirtschafts- und Finanzpolitik               | 2 |   |   |  |    | 2 |
| 3                              | 1 | Produktion und Supply Chain Management       | 2 |   |   |  |    | 2 |
| 3                              | 1 | Marketingforschung                           | 2 |   |   |  |    | 3 |
| 3                              | 1 | Moderieren und Präsentieren                  |   | 2 |   |  |    | 2 |
| 3                              | 2 | Numerische Berechnungsverfahren              | 1 | 2 |   |  |    | 4 |
| 3                              | 2 | Analoge Schaltungen                          | 2 | 2 |   |  |    | 3 |
| 3                              | 2 | Softwaresysteme                              | 2 | 1 |   |  |    | 2 |
| 3                              | 2 | Einführung in das wissenschaftliche Arbeiten |   | 2 |   |  |    | 2 |
| 3                              | 2 | Bilanzierung                                 | 2 |   |   |  |    | 2 |
| 3                              | 2 | Einführung in die Makroökonomie              | 1 | 1 |   |  |    | 2 |
| 3                              | 2 | Werkstoffe der Elektrotechnik                | 2 |   | 2 |  |    | 3 |
| 3                              | 2 | Praktikum                                    |   |   |   |  | 30 | 6 |
| Elective subjects              |   |  |   |   |   |  |    |   |
| 3                              | 1 | Leistungselektronik                          | 3 |   |   |  |    | 4 |
| 3                              | 1 | Grundlagen der Nachrichtentechnik            | 3 | 1 |   |  |    | 4 |
| 3                              | 1 | Sport  |   | 2 |   |  |    | 2 |
| 3                              | 2 | Rechnersysteme 1                             | 3 | 1 |   |  |    | 3 |
| 3                              | 2 | Elektrische Maschinen und Antriebe           | 2 |   | 2 |  |    | 3 |





| <b>Facultative subjects</b>            |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|----|
| 3                                      | 1 | Pädagogik 1 (in rumänischer Sprache)          | 2 | 2 |   |   | 4  |
| 3                                      | 1 | Logistik                                      | 2 |   |   |   | 2  |
| 3                                      | 1 | Wirtschaftsenglisch                           |   | 2 |   |   | 2  |
| 3                                      | 2 | Grundlagen der Wirtschaftslehre 2             | 2 |   |   |   | 2  |
| 3                                      | 2 | Bionik  | 2 |   |   |   | 2  |
| 3                                      | 2 | Pädagogik 2 (in rumänischer Sprache)          | 2 |   |   |   | 2  |
| <b>Fourth Year Compulsory subjects</b> |   |   |   |   |   |   |    |
| 4                                      | 1 | Übertragungstechnik                           | 2 |   | 2 |   | 5  |
| 4                                      | 1 | Modellierung und Systemanalyse                | 1 |   | 2 |   | 4  |
| 4                                      | 1 | Seminar BWL/VWL                               |   | 3 |   |   | 3  |
| 4                                      | 1 | Öffentlichkeitsarbeit                         |   | 2 |   |   | 2  |
| 4                                      | 1 | Hochfrequenztechnik                           | 2 | 1 | 1 |   | 5  |
| 4                                      | 1 | Projektmanagement                             | 2 | 1 |   |   | 4  |
| 4                                      | 1 | Wirtschaftstheorie I                          | 2 | 1 |   |   | 3  |
| 4                                      | 1 | Ökonometrie                                   | 2 |   |   |   | 2  |
| 4                                      | 1 | Betriebliche Organisation                     | 2 |   |   |   | 2  |
| 4                                      | 2 | Geschäftskompetenzen                          |   |   |   | 2 | 2  |
| 4                                      | 2 | Qualitätsmanagement                           | 2 |   |   |   | 2  |
| 4                                      | 2 | Elektrische Energieversorgung                 | 2 | 1 |   |   | 3  |
| 4                                      | 2 | Controlling                                   | 2 |   |   |   | 2  |
| 4                                      | 2 | Hochspannungstechnik                          | 2 | 1 |   |   | 4  |
| 4                                      | 2 | Wirtschaftstheorie II                         | 2 |   |   | 2 | 3  |
| 4                                      | 2 | Technische Dokumentation                      | 2 |   |   |   | 2  |
| 4                                      | 2 | Arbeitsrecht                                  | 2 |   |   |   | 2  |
| 4                                      | 2 | Bachelorthesispraktikum                       |   |   |   | 8 | 10 |
| <b>Facultative subjects</b>            |   |   |   |   |   |   |    |
| 4                                      | 1 | Unterrichtspraktikum (in rumänischer Sprache) |   |   | 2 |   | 2  |
| 4                                      | 1 | Methodik des Faches (in rumänischer Sprache)  | 2 |   |   |   | 2  |
| 4                                      | 2 | Business Plan                                 |   | 2 |   |   | 2  |
| 4                                      | 2 | EBCL  |   | 3 |   |   | 3  |



|   |   |                       |   |   |  |  |  |   |
|---|---|-----------------------|---|---|--|--|--|---|
| 4 | 2 | General Management II |   | 4 |  |  |  | 4 |
| 4 | 2 | Europäische Studien   | 2 |   |  |  |  | 2 |

#### 5.4. Business Engineering and Management (taught in German)

##### **Faculty of Entrepreneurship, Business Engineering and Management**

##### **a) Short description and main objectives:**

The Business Engineering and Management Bachelor's Degree Program aims at ensuring the perfect balance between modern engineering and technology subjects on one hand and management, business and entrepreneurial subjects on the other hand. It offers a multidisciplinary approach to an undergraduate specialization which is highly appreciated by employers on the European and international labour market. As a distinguishing element, apart from learning in the German language, which is extremely valuable to all companies with a German background, the program offers a wide range of entrepreneurial, technical and management competences necessary for a successful management career in any technology-driven industry. Also, students can access study mobilities programs, and they will receive the benefits of a multicultural learning environment, due to the interactions with international students and German teaching staff enrolled in this program.

##### **b) Other information**

- All subjects of the program are open for Erasmus incoming students.
- The bachelor program is organized in cooperation with the local branches of some of the most important global companies, from a wide range of industries, such as:
  - Automotive: Mercedes, BMW, Porsche, Volkswagen, Audi, Skoda etc.
  - Finance: Erste Bank, Raiffeisen Bank, Deutsche Bank etc.
  - Retail: Lidl, Kaufland, Penny, Profi, Metro, Selgros, Hornbach, OBI etc.
  - Infrastructure: Porr, Strabag, Schindler, Otis, Deutsche Bahn, DB Schenker, DHL etc.
  - Medical: Bayer, Merck, BASF, Roche, Hoechst etc.
  - Engineering: Bosch, Siemens, Vaillant, Salesianer etc.
- Throughout the duration of the program, students will also benefit from a number of different interactions, such as seminars and workshops with German teaching staff and internships, company visits and workshops with the help of senior company representatives from the above-mentioned companies.

c) **Website:** <http://faima.upb.ro/licenta.php>

d) **Contact person:** Andrei NICULESCU, [andrei@niculescu.ro](mailto:andrei@niculescu.ro)



e) Curriculum:

| Year                                   | Sem | Subject name                                      | Weekly number of hours |          |         |         | Practice | ECTS |
|--|-----|---|------------------------|----------|---------|---------|----------|------|
|  |     |   | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b>  |     |   |                        |          |         |         |          |      |
| 1                                      | 1   | Mathematische Analyse                             | 2                      | 1        | 0       | 0       |          | 4    |
| 1                                      | 1   | Physik I  | 2                      | 0        | 1       | 0       |          | 4    |
| 1                                      | 1   | Angewandte Informatik I                           | 2                      | 0        | 2       | 0       |          | 4    |
| 1                                      | 1   | Grundlagen der Wirtschaftslehre I                 | 2                      | 2        | 0       | 0       |          | 4    |
| 1                                      | 1   | Personalmanagement                                | 2                      | 0        | 0       | 0       |          | 3    |
| 1                                      | 1   | Computerprogrammierung und Programmiersprachen I  | 2                      | 0        | 2       | 0       |          | 4    |
| 1                                      | 1   | Fremdsprachen Deutsch I                           | 1                      | 1        | 0       | 0       |          | 2    |
| 1                                      | 1   | Sport I   | 0                      | 2        | 0       | 0       |          | 3    |
| 1                                      | 2   | Algebra, analytische und differentielle Geometrie | 2                      | 1        | 0       | 0       |          | 4    |
| 1                                      | 2   | Physik II   | 2                      | 0        | 1       | 0       |          |      |
| 1                                      | 2   | Angewandte Informatik II                          | 2                      | 0        | 2       | 0       |          |      |
| 1                                      | 2   | Grundlagen der Wirtschaftslehre II                | 2                      | 1        | 0       | 0       |          | 4    |
| 1                                      | 2   | Betriebswirtschaftslehre I                        | 2                      | 1        | 0       | 0       |          | 4    |
| 1                                      | 2   | Computerprogrammierung und Programmiersprachen II | 2                      | 0        | 2       | 0       |          | 4    |
| 1                                      | 2   | Fremdsprachen Deutsch II                          | 1                      | 1        | 0       | 0       |          | 3    |
| 1                                      | 2   | Sport II  | 0                      | 2        | 0       | 0       |          | 4    |
| <b>Optional subjects</b>               |     |   |                        |          |         |         |          |      |
| 1                                      | 1   | Fremdsprachen Englisch I                          | 0                      | 2        | 0       | 0       |          | 2    |
| 1                                      | 1   | Fremdsprachen Französisch I                       | 0                      | 2        | 0       | 0       |          | 2    |
| 1                                      | 2   | Fremdsprachen Englisch II                         | 0                      | 2        | 0       | 0       |          | 2    |
| 1                                      | 2   | Fremdsprachen Französisch II                      | 0                      | 2        | 0       | 0       |          | 2    |
| <b>Facultative subjects</b>            |     |   |                        |          |         |         |          |      |
| 1                                      | 1   | Bildungspsychologie                               | 2                      | 2        | 0       | 0       |          | 5    |
| 1                                      | 2   | Pädagogik I                                       | 2                      | 2        | 0       | 0       |          | 5    |
| <b>Second Year Compulsory subjects</b> |     |   |                        |          |         |         |          |      |



|                                       |   |   |   |   |   |   |     |
|---------------------------------------|---|---|---|---|---|---|-----|
| 2                                     | 1 | Computergraphik   | 2 | 0 | 2 | 0 | 4   |
| 2                                     | 1 | Recht   | 3 | 2 | 0 | 0 | 5   |
| 2                                     | 1 | Führungskommunikation I   | 2 | 0 | 0 | 0 | 3   |
| 2                                     | 1 | Verhandlung und Geschäftsethik  | 2 | 1 | 0 | 0 | 3   |
| 2                                     | 1 | Elektrische und elektronische Technologien, Ausrüstungen und Anlagen I  | 2 | 0 | 2 | 1 | 5   |
| 2                                     | 1 | Betriebswirtschaftslehre II   | 2 | 2 | 0 | 0 | 5   |
| 2                                     | 1 | Sport III   | 0 | 1 | 0 | 0 | 3   |
| 2                                     | 2 | Buchhaltung   | 2 | 2 | 0 | 0 | 4   |
| 2                                     | 2 | Internationales Privatrecht   | 2 | 0 | 0 | 0 | 3   |
| 2                                     | 2 | Betriebliche Datenverarbeitung  | 2 | 0 | 2 | 0 | 3   |
| 2                                     | 2 | Elektrische und elektronische Technologien, Ausrüstungen und Anlagen II | 3 | 0 | 2 | 1 | 6   |
| 2                                     | 2 | Führungskommunikation II  | 2 | 2 | 0 | 0 | 4   |
| 2                                     | 2 | Fachkommunikation II  | 2 | 0 | 0 | 0 | 2   |
| 2                                     | 2 | Sport IV  | 0 | 1 | 0 | 0 | 3   |
| <b>Optional subjects</b>              |   |   |   |   |   |   |     |
| 2                                     | 1 | Fachkommunikation I   | 1 | 1 | 0 | 0 | 3   |
| 2                                     | 1 | Berufskommunikation I   | 1 | 1 | 0 | 0 | 3   |
| 2                                     | 2 | Technologiemanagement   | 2 | 0 | 1 | 0 | 3   |
| 2                                     | 2 | Statistik in Produktionsprozessen                                       | 2 | 0 | 1 | 0 | 3   |
| <b>Facultative subjects</b>           |   |   |   |   |   |   |     |
| 2                                     | 1 | Pädagogik II  | 0 | 2 | 0 | 0 | 2   |
| 2                                     | 2 | Lehrdidaktik  | 0 | 0 | 2 | 0 | 2   |
| 2                                     | 2 | Fremdsprache III  | 2 | 2 | 0 | 0 | 5   |
| <b>Third Year Compulsory subjects</b> |   |   |   |   |   |   |     |
| 3                                     | 1 | Energieerzeugung, - transport und -nutzung                              | 2 | 1 | 1 | 0 | 5   |
| 3                                     | 1 | Produktionswirtschaft   | 2 | 2 | 0 | 0 | 5   |
| 3                                     | 1 | Mechanik und Festigkeitslehre   | 3 | 2 | 0 | 0 | 6   |
| 3                                     | 1 | Marketing   | 2 | 2 | 0 | 1 | 3+2 |
| 3                                     | 1 | Projektmanagement   | 2 | 0 | 1 | 1 | 5   |
| 3                                     | 2 | Operations Research   | 1 | 1 | 0 | 0 | 3   |
| 3                                     | 2 | Qualitätsmanagement   | 2 | 1 | 0 | 1 | 3   |
| 3                                     | 2 | Nachhaltige Entwicklung   | 2 | 2 | 0 | 1 | 5   |



|  |   |  |                                    |   |   |   |     |     |   |
|--|---|--|------------------------------------|---|---|---|-----|-----|---|
| 3                                      | 2 | Innovationsmanagement                                | 2                                  | 1 | 0 | 1 |     | 4   |   |
| 3                                      | 2 | Marketingforschung                                   | 2                                  | 0 | 1 | 1 |     | 4   |   |
| 3                                      | 2 | Kosten- und Leistungsrechnung                        | 2                                  | 1 | 0 | 0 |     | 3   |   |
| 3                                      | 2 | Praktikum  | 360 ore (12 sapt x 5 zile x 6 ore) |   |   |   | 360 |     | 4 |
| <b>Optional Subjects</b>               |   |  |                                    |   |   |   |     |     |   |
| 3                                      | 1 | Finanzierung und Kreditvergabe                       | 2                                  | 2 | 0 | 0 |     | 4   |   |
| 3                                      | 1 | Geld, Banken und Kapitalmärkte                       | 2                                  | 2 | 0 | 0 |     | 4   |   |
| 3                                      | 2 | Finanzielles Management                              | 2                                  | 2 | 0 | 0 |     | 4   |   |
| 3                                      | 2 | Europäische Wirtschaftspolitik                       | 2                                  | 2 | 0 | 0 |     | 4   |   |
| <b>Facultative subjects</b>            |   |  |                                    |   |   |   |     |     |   |
| 3                                      | 1 | Computergestützte Schulung                           | 1                                  | 1 | 0 | 0 |     | 2   |   |
| 3                                      | 1 | Pädagogisches Praktikum I                            | 0                                  | 3 | 0 | 0 |     | 3   |   |
| 3                                      | 2 | Pädagogisches Praktikum II                           | 0                                  | 3 | 0 | 0 |     | 2   |   |
| 3                                      | 2 | Schülerklassenmanagement                             | 1                                  | 1 | 0 | 0 |     | 3   |   |
| 3                                      | 2 | Abschlussprüfung - Stufe I                           | 0                                  | 0 | 0 | 0 |     | 5   |   |
| <b>Fourth Year Compulsory subjects</b> |   |  |                                    |   |   |   |     |     |   |
| 4                                      | 1 | Geschäftsentwicklung im Dienstleistungsbereich       | 2                                  | 2 | 0 | 1 |     | 5   |   |
| 4                                      | 1 | Umwelttechnik und -management                        | 2                                  | 0 | 1 | 1 |     | 5   |   |
| 4                                      | 1 | Simulation der Produktionsprozesse                   | 2                                  | 0 | 2 | 0 |     | 5   |   |
| 4                                      | 1 | Computergestütztes Produktdesign                     | 2                                  | 0 | 1 | 1 |     | 5   |   |
| 4                                      | 1 | Geschäfte mit innovativen Produkten                  | 2                                  | 1 | 0 | 0 |     | 4   |   |
| 4                                      | 2 | Durchführbarkeit und Effizienz der Investitionen     | 2                                  | 2 | 0 | 2 |     | 6   |   |
| 4                                      | 2 | Logistik   | 2                                  | 2 | 0 | 2 |     | 6   |   |
| 4                                      | 2 | E-Commerce   | 2                                  | 0 | 2 | 1 |     | 3+2 |   |
| 4                                      | 2 | Technologisches Unternehmertum                       | 2                                  | 2 | 0 | 1 |     | 5   |   |
| 4                                      | 2 | Praktikum für die Erstellung der Diplomarbeit        | 60 ore                             |   |   |   |     |     | 4 |
| 4                                      | 2 | Erstellung der Diplomarbeit                          | 0                                  | 0 | 0 | 4 |     | 4   |   |
| <b>Optional Subjects</b>               |   |  |                                    |   |   |   |     |     |   |
| 4                                      | 1 | Risikobewertungsverfahren in Industrieorganisationen | 2                                  | 2 | 0 | 2 |     | 6   |   |
| 4                                      | 1 | Geschäftsbewertung                                   | 2                                  | 2 | 0 | 2 |     | 6   |   |



|  |  |                |   |   |   |   |  |    |
|--|--|----------------|---|---|---|---|--|----|
|  |  | Examen Diplomă | 0 | 0 | 0 | 0 |  | 10 |
|--|--|----------------|---|---|---|---|--|----|

## 6. Field of study: AEROSPACE ENGINEERING

### 6.1. Air Navigation (taught in English)

#### Faculty of Aerospace Engineering

##### a) Short description and main objectives:

The program provides theoretical and applied knowledge for engineers in the field of aerospace engineering. Air Navigation was established in 2009, with the objective to cover the needs of the modern civil aviation and aligned to the International Civil Aviation Organization – Next Generation of Aviation Professionals (ICAO NGAP) strategy. The program includes the process of planning and controlling the movement of an aircraft and mechanical engineering.

##### b) Other information

All the courses of the program are open for Erasmus incoming students.

c) **Website:** <http://www.aero.pub.ro/wordpress/index.php/en/bachelor-programs-2/>

d) **Contact person:** Mr. Octavian Thor PLETER, [octavian.pleter@upb.ro](mailto:octavian.pleter@upb.ro)

##### e) Curriculum:

| Year                                  | Sem | Subject name                            | Weekly number of hours |          |         |         | Practice | ECTS |
|---------------------------------------|-----|---|------------------------|----------|---------|---------|----------|------|
|                                       |     |   | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b> |     |   |                        |          |         |         |          |      |
| 1                                     | 1   | Differential and Integral Calculus      | 2                      | 2        |         |         |          | 4    |
| 1                                     | 1   | Algebra                                 | 2                      | 2        |         |         |          | 4    |
| 1                                     | 1   | Programming Languages 1                 | 2                      |          | 2       |         |          | 4    |
| 1                                     | 1   | Aircraft Materials                      | 2                      |          | 2       |         |          | 4    |
| 1                                     | 1   | Atmosphere Physics                      | 2                      | 1        |         |         |          | 4    |
| 1                                     | 1   | Descriptive Geometry                    | 2                      |          | 2       |         |          | 4    |
| 1                                     | 1   | Aviation English 1                      |                        | 2        |         |         |          | 2    |
| 1                                     | 2   | Geometry                                | 2                      | 2        |         |         |          | 4    |
| 1                                     | 2   | Mechanics (Matter, Statics, Kinematics) | 2                      | 1        | 1       |         |          | 4    |



|  |   |  |   |   |   |   |  |   |
|--|---|--|---|---|---|---|--|---|
| 1                                      | 2 | Programming Languages 2                          | 2 |   | 2 |   |  | 4 |
| 1                                      | 2 | Engineering Drawings, Diagrams, Standards        | 2 |   | 2 |   |  | 4 |
| 1                                      | 2 | Electrical Fundamentals                          | 2 | 2 |   |   |  | 4 |
| 1                                      | 2 | Meteorology                                      | 2 |   | 1 |   |  | 4 |
| 1                                      | 2 | Aviation English 2                               |   | 2 |   |   |  | 2 |
| <b>Optional Subjects</b>               |   |  |   |   |   |   |  |   |
| 1                                      | 1 | Geomatics  | 2 | 1 |   |   |  | 4 |
| 1                                      | 1 | Astronomy  | 2 | 1 |   |   |  | 4 |
| 1                                      | 2 | Aviation Legislation and Regulations             | 2 | 1 |   |   |  | 4 |
| 1                                      | 2 | Aviation International and National Requirements | 2 | 1 |   |   |  | 4 |
| <b>Second Year Compulsory subjects</b> |   |  |   |   |   |   |  |   |
| 2                                      | 1 | Differential Equations                           | 2 | 2 |   |   |  | 4 |
| 2                                      | 1 | Solid Dynamics                                   | 2 | 2 |   |   |  | 4 |
| 2                                      | 1 | Fluid Dynamics                                   | 2 | 1 | 1 |   |  | 4 |
| 2                                      | 1 | Electrical Machines                              | 2 | 1 | 1 |   |  | 4 |
| 2                                      | 1 | Mechanical Engineering                           | 2 | 1 |   |   |  | 4 |
| 2                                      | 1 | Fundamentals of Navigation                       | 2 | 1 |   |   |  | 3 |
| 2                                      | 2 | Statistics and Probability Theory                | 2 | 2 |   |   |  | 4 |
| 2                                      | 2 | Calculus (Numerical Methods)                     | 2 |   | 2 |   |  | 4 |
| 2                                      | 2 | Microprocessors and Microcontrollers             | 2 |   | 1 |   |  | 4 |
| 2                                      | 2 | Aerodynamics and Theory of Flight                | 2 | 1 | 1 |   |  | 4 |
| 2                                      | 2 | Strength of Materials                            | 2 |   | 2 |   |  | 4 |
| 2                                      | 2 | Electronic Circuits                              | 2 |   | 2 |   |  | 4 |
| 2                                      | 2 | Aeronautical Charts                              | 1 | 1 |   |   |  | 3 |
| <b>Optional Subjects</b>               |   |  |   |   |   |   |  |   |
| 2                                      | 1 | Human Factors                                    | 1 | 2 |   |   |  | 3 |
| 2                                      | 1 | Human Performance                                | 1 | 2 |   |   |  | 3 |
| 2                                      | 1 | Programming Languages 3                          | 1 | 1 |   | 1 |  | 4 |
| 2                                      | 1 | Software Engineering                             | 1 | 1 |   | 1 |  | 4 |
| 2                                      | 2 | Optics and Acoustics                             | 2 |   | 1 |   |  | 3 |
| 2                                      | 2 | Vibrations and Noise                             | 2 |   | 1 |   |  | 3 |



| <b>Third Year Compulsory subjects</b>  |   |                                      |   |   |   |   |    |   |
|--|---|--------------------------------------|---|---|---|---|----|---|
| 3                                      | 1 | Thermodynamics                       | 2 | 2 |   |   |    | 4 |
| 3                                      | 1 | Flight Dynamics and Stability        | 2 |   |   | 2 |    | 4 |
| 3                                      | 1 | Digital Avionics                     | 2 | 1 | 1 |   |    | 4 |
| 3                                      | 1 | Composite Materials                  | 2 |   | 2 |   |    | 4 |
| 3                                      | 1 | Business Strategy                    | 2 | 1 |   |   |    | 4 |
| 3                                      | 1 | Electrical Power Systems             | 2 |   | 2 |   |    | 4 |
| 3                                      | 1 | Aeronautical Information             | 1 |   | 1 |   |    | 3 |
| 3                                      | 2 | Electronic Flight Instrument Systems | 2 |   | 1 |   |    | 3 |
| 3                                      | 2 | Flight Controls                      | 2 | 2 |   |   |    | 3 |
| 3                                      | 2 | Aircraft Structure and Systems       | 2 | 2 |   |   |    | 3 |
| 3                                      | 2 | Financial Accounting                 | 2 | 2 |   |   |    | 3 |
| 3                                      | 2 | Interchange of Aeronautical Data     | 2 |   | 2 |   |    | 3 |
| 3                                      | 2 | Airport Operations and Navigation    | 2 | 1 |   |   |    | 3 |
| 3                                      | 2 | Navigation Systems Databases         | 1 | 1 |   |   |    | 3 |
| 3                                      | 2 | Internship (30 hours/week *12 weeks) |   |   |   |   | 30 | 6 |
| <b>Optional Subjects</b>               |   |                                      |   |   |   |   |    |   |
| 3                                      | 1 | Safety Analysis                      | 1 | 1 |   |   |    | 3 |
| 3                                      | 1 | Quality Assurance                    | 1 | 1 |   |   |    | 3 |
| 3                                      | 2 | Aviation Databases                   | 2 |   |   | 1 |    | 3 |
| 3                                      | 2 | Computer Interfacing                 | 2 |   |   | 1 |    | 3 |
| <b>Fourth Year Compulsory subjects</b> |   |                                      |   |   |   |   |    |   |
| 4                                      | 1 | Systems Engineering 1                | 2 | 1 |   |   |    | 4 |
| 4                                      | 1 | Automatic Flight Control             | 2 | 1 |   | 1 |    | 3 |
| 4                                      | 1 | Turbine Engines                      | 2 |   | 2 |   |    | 4 |
| 4                                      | 1 | Air Navigation Services              | 2 | 1 |   |   |    | 4 |
| 4                                      | 1 | Radio Navigation Systems             | 2 |   | 2 |   |    | 3 |
| 4                                      | 1 | Flight Operations                    | 1 | 1 |   |   |    | 2 |
| 4                                      | 1 | Aircraft Maintenance                 | 2 | 1 |   |   |    | 3 |
| 4                                      | 1 | Project Preparation 1                |   |   |   | 3 |    | 4 |





|                          |   |   |   |   |   |   |  |   |
|--------------------------|---|---|---|---|---|---|--|---|
| 4                        | 2 | Systems Engineering 2                         | 2 | 1 |   |   |  | 3 |
| 4                        | 2 | Avionics Integrated Systems                   | 2 | 2 |   |   |  | 4 |
| 4                        | 2 | Management                                    | 2 | 2 |   |   |  | 4 |
| 4                        | 2 | Surveillance Systems (Radars)                 | 2 | 1 | 1 |   |  | 4 |
| 4                        | 2 | Air Traffic Management                        | 2 | 2 |   |   |  | 4 |
| 4                        | 2 | Environmental Aviation                        | 1 | 1 |   |   |  | 2 |
| 4                        | 2 | Procedures for Air Navigation Services<br>OPS | 1 | 1 |   |   |  | 2 |
| 4                        | 2 | Project Preparation 2                         |   |   |   | 4 |  | 4 |
| <b>Optional Subjects</b> |   |   |   |   |   |   |  |   |
| 4                        | 1 | Financial Management                          | 2 | 1 |   |   |  | 3 |
| 4                        | 1 | Financial Analysis                            | 2 | 1 |   |   |  | 3 |
| 4                        | 2 | Accident Investigation                        | 2 | 2 |   |   |  | 3 |
| 4                        | 2 | Systemic Occurrence Analysis                  | 2 | 2 |   |   |  | 3 |

## 7. Field of study: INDUSTRIAL ENGINEERING

### 7.1 Industrial Engineering (taught in English)

#### Faculty of Industrial Engineering and Robotics



#### a) Short description and main objectives:

The Industrial Engineering bachelor study program aims to help students acquire technical, managerial and economic skills in order to enroll in agile, sustainable, resilient companies designing and implementing competitive technologies and complex products in line with market requirements and regulations etc.

The study program covers basic engineering technical skills and deepens conception, design and implementation of manufacturing technologies, equipment and tools.

#### b) Other information

All subjects of the program are fully taught in English. The program welcomes ERASMUS students, usually the group being quite heterogeneous, supporting the fostering of the multicultural dimension.

Companies such as Siemens, Tenaris, Dr. Kocher, Hesper, AssaAbloy, Renault, General Turbo, Segula Technologies, Makita, Cameron, Arctic (Beko) a.s.o., offering internships for the 8-week long practical compulsory period, express the need for trained staff in terms of CAD/CAM, manufacturing processes modelling & control, production planning &



scheduling, creativity in product development & design, intellectual property, quality assurance. Additive manufacturing linked to Robotics plays a central role in the students' projects, student teams being involved in design, manufacturing and processes improvement as topics of their final diploma papers.

- c) **Website:** <http://www.imst.upb.ro/index.php/en/home/calendar/959-plan-de-invatamant-industrial-engineering>
- d) **Contact person:** Mrs. Irina SEVERIN, [irina.severin@upb.ro](mailto:irina.severin@upb.ro)
- e) **Curriculum:**

| Year                                  | Sem | Subject name                      | Weekly number of hours |          |         |         | ECTS |
|---------------------------------------|-----|-----------------------------------|------------------------|----------|---------|---------|------|
|                                       |     |                                   | Lecture                | Tutorial | Labwork | Project |      |
| <b>First Year Compulsory subjects</b> |     |                                   |                        |          |         |         |      |
| 1                                     | 1   | Technical Mechanics               | 2                      |          | 2       |         | 5    |
| 1                                     | 1   | General Chemistry                 | 2                      |          | 2       |         | 4    |
| 1                                     | 1   | Mathematics 1                     | 2                      | 2        |         |         | 5    |
| 1                                     | 1   | Computer Programming 1 *          | 3                      |          | 2       | 1       | 5    |
| 1                                     | 1   | Communication *                   | 3                      |          | 1       |         | 4    |
| 1                                     | 1   | English language *                | 1                      |          | 1       |         | 4    |
| <b>Optional Subjects</b>              |     |                                   |                        |          |         |         |      |
| 1                                     | 1   | Foreign Language 1 (French)       | 1                      |          | 1       |         | 3    |
|                                       |     | Foreign Language 1 (Romanian)     |                        |          |         |         |      |
| <b>Elective Courses</b>               |     |                                   |                        |          |         |         |      |
| 1                                     | 1   | Sport                             |                        | 1        |         |         | 2    |
| 1                                     | 1   | Ethics                            | 2                      | 2        |         |         | 5    |
| <b>Compulsory subjects</b>            |     |                                   |                        |          |         |         |      |
| 1                                     | 2   | Mechanics of Materials 1          | 2                      | 2        | 1       | 0       | 6    |
| 1                                     | 2   | Mathematics 2                     | 2                      | 2        | 0       | 0       | 6    |
| 1                                     | 2   | General Physics                   | 2                      | 0        | 2       | 0       | 5    |
| 1                                     | 2   | Materials Science                 | 2                      | 0        | 2       | 0       | 5    |
| 1                                     | 2   | Computer Programming 2 *          | 3                      | 0        | 2       | 1       | 5    |
| <b>Optional Subjects</b>              |     |                                   |                        |          |         |         |      |
| 1                                     | 2   | European Culture and Civilization | 2                      | 1        |         |         | 3    |
|                                       |     | European Integration              |                        |          |         |         |      |
| <b>Elective Courses</b>               |     |                                   |                        |          |         |         |      |
| 1                                     | 2   | Sport**                           |                        | 1        |         |         | 2    |
| 1                                     | 2   | Practical stage                   | 60 hours               |          |         |         | 2    |
| 1                                     | 2   | Foreign Languages 2 - French      | 1                      |          | 1       |         | 5    |
| 1                                     | 2   | Foreign Languages 2 - English     | 1                      |          | 1       |         | 5    |



|  |   |                                   |                    |   |   |   |   |
|--|---|-----------------------------------|--------------------|---|---|---|---|
| 1                                      | 2 | Volunteering 1                    | 70 hours           |   |   |   | 3 |
| <b>Second Year Compulsory subjects</b> |   |                                   |                    |   |   |   |   |
| 2                                      | 1 | Technical Drawing                 | 2                  | 1 | 2 |   | 6 |
| 2                                      | 1 | Mechanics of Materials 2          | 2                  | 2 | 2 |   | 7 |
| 2                                      | 1 | Probability and Statistics        | 2                  | 2 |   |   | 5 |
| 2                                      | 1 | Computer Aided Design 1           | 2                  |   | 2 | 1 | 6 |
| 2                                      | 1 | Databases *                       | 2                  |   | 2 | 2 | 6 |
| <b>Elective Courses</b>                |   |                                   |                    |   |   |   |   |
| 2                                      | 1 | Sport                             |                    | 1 |   |   | 2 |
| 2                                      | 1 | Foreign Languages 3 - French      | 2                  |   | 2 |   | 5 |
|  |   | Foreign Languages 3 - English     | 2                  |   | 2 |   | 5 |
| <b>Compulsory subjects</b>             |   |                                   |                    |   |   |   |   |
| 2                                      | 2 | Tolerances Design                 | 2                  |   | 2 |   | 5 |
| 2                                      | 2 | Materials Technology              | 2                  |   | 2 |   | 5 |
| 2                                      | 2 | Economics Lab                     | 3                  | 1 |   |   | 4 |
| 2                                      | 2 | Computer Aided Design             | 3                  |   | 1 | 2 | 6 |
|  |   | Machine Elements                  | 2                  |   | 1 | 2 | 6 |
| <b>Optional Subjects</b>               |   |                                   |                    |   |   |   |   |
| 2                                      | 2 | Modelling and Simulation          | 2                  |   | 1 |   | 4 |
|  |   | Mechanical Vibrations             |                    |   |   |   |   |
| <b>Elective Courses</b>                |   |                                   |                    |   |   |   |   |
| 2                                      | 2 | Sport                             |                    | 1 |   |   | 2 |
| 2                                      | 2 | Practical stage                   | 60 hours / 2 weeks |   |   |   | 2 |
| 2                                      | 2 | Foreign Languages 4 - French      | 2                  |   | 2 |   | 5 |
| 2                                      | 2 | Foreign Languages 4 - Romanian    | 2                  |   | 2 |   | 5 |
| 2                                      | 2 | Volunteering 1                    | 70 hours           |   |   |   | 3 |
| <b>Third Year Compulsory subjects</b>  |   |                                   |                    |   |   |   |   |
| 3                                      | 1 | Mechanical Systems Design         | 2                  |   | 2 |   | 4 |
| 3                                      | 1 | Instrumentation and Measurement   | 2                  |   | 2 |   | 4 |
| 3                                      | 1 | System and Project Management*    | 2                  |   |   | 2 | 6 |
| 3                                      | 1 | Manufacturing Processes 1         | 2                  |   | 2 |   | 6 |
| 3                                      | 1 | Computer Aided Engineering        | 3                  |   | 1 | 2 | 6 |
| <b>Optional Subjects</b>               |   |                                   |                    |   |   |   |   |
| 3                                      | 1 | Biomechanical structures          | 2                  |   | 2 |   | 4 |
|  |   | Finite Element Analysis of Solids |                    |   |   |   |   |
| <b>Elective Courses</b>                |   |                                   |                    |   |   |   |   |
| 3                                      | 1 | Psychology                        | 2                  |   | 2 |   | 5 |
| <b>Compulsory subjects</b>             |   |                                   |                    |   |   |   |   |



|  |   |   |                      |   |   |   |   |
|--|---|---|----------------------|---|---|---|---|
| 3                                      | 2   | Production and Operation Management   | 2                    |   | 1 | 2 | 5 |
| 3                                      | 2   | Machine Tools   | 2                    |   | 1 | 1 | 4 |
| 3                                      | 2   | Robotics  | 2                    |   | 2 |   | 4 |
| 3                                      | 2   | Manufacturing Processes 2   | 3                    |   | 1 |   | 2 |
| 3                                      | 2   | Manufacturing Processes 2 - Project   |                      |   |   | 2 | 2 |
| 3                                      | 2   | Engineering Economics   | 2                    |   | 2 |   | 4 |
| 3                                      | 2   | Practical Internship  | (300 hours/10 weeks) |   |   |   | 6 |
| <b>Optional Subjects</b>               |   |   |                      |   |   |   |   |
| 3                                      | 2   | Supply Chain Management   | 2                    |   |   | 2 | 3 |
|  |   | Industrial Management   |                      |   |   |   |   |
| Elective Courses                       |   |   |                      |   |   |   |   |
| 3                                      | 2   | Volunteering 1  | 70 hours             |   |   |   | 3 |
| <b>Fourth Year Compulsory subjects</b> |   |   |                      |   |   |   |   |
| 4                                      | 1   | Computer Aided Manufacturing  | 3                    |   | 1 | 2 | 6 |
| 4                                      | 1   | Industrial Logistics  | 3                    | 0 | 1 | 2 | 7 |
| 4                                      | 1   | Product Design and Development  | 2                    |   | 2 |   | 5 |
| 4                                      | 1   | Product Design and Development - Project  |                      |   |   | 2 | 2 |
| 4                                      | 1   | Integrated Production Systems   | 3                    |   | 1 | 2 | 7 |
| <b>Optional Subjects</b>               |   |   |                      |   |   |   |   |
| 4                                      | 1   | Leadership Lab  | 1                    |   | 1 |   | 3 |
|  |   | Internship Lab  |                      |   |   |   |   |
| Elective Courses                       |   |   |                      |   |   |   |   |
| 4                                      | 1   | Intercultural cooperation   | 2                    | 2 |   |   | 5 |
| <b>Compulsory subjects</b>             |   |   |                      |   |   |   |   |
| 4                                      | 2   | Entrepreneurship and Innovation*  | 4                    |   |   | 2 | 6 |
| 4                                      | 2   | Technology Strategy   | 3                    |   |   | 3 | 7 |
| 4                                      | 2   | Quality Assurance   | 3                    |   | 1 | 2 | 7 |
| 4                                      | 2   | Graduate project  |                      |   |   | 4 | 4 |
| 4                                      | 2   | Practical stage for Graduate Project/Interdisciplinary project<br>European Project Semester |                      |   |   | 4 | 6 |
| <b>Elective Courses</b>                |   |   |                      |   |   |   |   |
| 4                                      | 2   | Organizational Management   | 2                    | 2 |   |   | 5 |
| 4                                      | 2   | Volunteering 4  | 70 hours             |   |   |   | 3 |
| NB                                     | <i>* courses to be selected by Erasmus Incoming students, as part of the European Project Semester; other courses may be selected upon request</i><br><i>**Two SPORT semesters will be mandatory for all four years</i> |   |                      |   |   |   |   |



## 7.2 Applied informatics in industrial engineering / Angewandte Informatik im Wirtschaftsingenieurwesen (taught in German)

### **Faculty of Engineering in Foreign Languages**

#### **a) Short description and main objectives:**

According to specialist studies carried out at European and global level regarding the (fourth) industrial revolution that is currently taking place, at the end of this transformation process, successful industrial companies will truly become digital enterprises, having physical products at the base, supplemented of digital interfaces and innovative data services and will collaborate with customers and suppliers in digital industrial ecosystems. The understanding and use of concepts and techniques offered by computational technology is pursued by disciplines such as Applied Computer Science, Computer Programming and Programming Languages, Computer Aided Graphics, Finite Element Method, Technical Drawing and Computer Aided Design, which provide the necessary knowledge and skills their application in mechanical engineering, electronics, telecommunications, automation, robotics, energy and technological technology, environmental technology, etc.

The technical skills are complemented by those of management, communication, of culture and last but not least teamwork in projects .

The specialization ensures, through its Education Plan, all the knowledge and practical skills necessary for the integration of graduates on the labor market in the field for which they have been trained.

#### **b) Other information**

- All the courses of the program are open for Erasmus incoming students and the program has incoming and outgoing Erasmus students for one or two semesters each year.
- The bachelor program is carried out in cooperation with reputed companies: Stein & Partner Management Consulting, Bosch Romania, Selgros Cash and Carry Romania, Honeywell Garret Romania, IBM Romania, Microsoft Romania, Hewlett-Packard Enterprise und APT Resources and Services.
- The Bachelor Thesis can be carried out in cooperation with enterprises or foreign universities.

c) **Website:** <http://ing.pub.ro/de/education/licence/>

d) **Contact person:** Mr. Cristian- George DRAGOMIRESCU, [c.dragomirescu@upb.ro](mailto:c.dragomirescu@upb.ro)

e) **Curriculum:**



| Year                                  | Sem | Subject name   | Weekly number of hours |          |         |         | Practice | ECTS |
|---------------------------------------|-----|--|------------------------|----------|---------|---------|----------|------|
|                                       |     |  | Lecture                | Tutorial | Labwork | Project |          |      |
| <b>First Year Compulsory subjects</b> |     |  |                        |          |         |         |          |      |
| 1                                     | 1   | Analysis I für Ingenieure (Mathematik I)                       | 2                      | 2        | -       | -       |          | 4    |
| 1                                     | 1   | Lineare Algebra für Ingenieure                                 | 2                      | 2        | -       | -       |          | 4    |
| 1                                     | 1   | Physik   | 2                      | -        | 2       | -       |          | 4    |
| 1                                     | 1   | Grundlagen der Elektrotechnik                                  | 3                      | -        | 1       | -       |          | 4    |
| 1                                     | 1   | Angewandte Informatik I  | 2                      | -        | 1       | -       |          | 4    |
| 1                                     | 1   | Computergrafik I   | 1                      | -        | 2       | -       |          | 4    |
| 1                                     | 1   | Fachkommunikation I  | 2                      | -        | -       | -       |          | 2    |
| 1                                     | 1   | Sport I  | -                      | 2        | -       | -       |          | 2    |
| 1                                     | 2   | Analysis II für Ingenieure (Mathematik II)                     | 3                      | 2        | -       | -       |          | 6    |
| 1                                     | 2   | Angewandte Informatik II                                       | 2                      | -        | 3       | -       |          | 5    |
| 1                                     | 2   | Mechanik   | 3                      | 2        | -       | -       |          | 6    |
| 1                                     | 2   | Elemente der Elektronik I                                      | 2                      | -        | 3       | -       |          | 5    |
| 1                                     | 2   | Sport II   | -                      | 2        | -       | -       |          | 3    |
| 1                                     | 2   | Fachkommunikation II   | 2                      | -        | -       | -       |          | 3    |
| <b>Elective subjects</b>              |     |  |                        |          |         |         |          |      |
| 1                                     | 1   | Landeskunde I  | -                      | 2        | -       | -       |          | 2    |
| 1                                     | 1   | Expression et communication I                                  | -                      | 2        | -       | -       |          | 2    |
| 1                                     | 2   | Deutsch Interkulturell   | -                      | 2        | -       | -       |          | 2    |
| 1                                     | 2   | Expression et communication II                                 | -                      | 2        | -       | -       |          | 2    |
| <b>Facultative subjects</b>           |     |  |                        |          |         |         |          |      |
| 1                                     | 1   | Fremdsprache I   | 2                      | 2        | -       | -       |          | 4    |
| 1                                     | 1   | Wirtschaftslehre   | 2                      | 2        | -       | -       |          | 4    |
| 1                                     | 1   | Rumänische Sprache und Kultur für internationale Studierende I | -                      | 2        | -       | -       |          | 2    |
| 1                                     | 1   | Pädagogische Psychologie (Ro)                                  | 2                      | 2        | -       | -       |          | 5    |
| 1                                     | 2   | Europäische Studien  | -                      | 2        | -       | -       |          | 2    |
| 1                                     | 2   | Fremdsprache II  | 2                      | 2        | -       | -       |          | 4    |



|  |   |  |   |   |   |   |   |
|--|---|--|---|---|---|---|---|
| 1                                      | 2 | Rumänische Sprache und Kultur für internationale Studierende II  | - | 2 | - | - | 2 |
| 1                                      | 2 | Pädagogik I (RO)   | 2 | 2 | - | - | 5 |
| <b>Second Year Compulsory subjects</b> |   |  |   |   |   |   |   |
| 2                                      | 1 | Spezielle Mathematik (Mathematik III)                            | 2 | 2 | - | - | 4 |
| 2                                      | 1 | Programmierung von Computern und Programmiersprachen I           | 2 | - | 2 | - | 5 |
| 2                                      | 1 | Wahrscheinlichkeitstheorie und mathematische Statistik           | 2 | 2 | - | - | 4 |
| 2                                      | 1 | Festigkeitslehre   | 2 | 1 | - | - | 4 |
| 2                                      | 1 | Technisches Zeichnen und rechnerunterstütztes Konstruieren       | 1 | - | 2 | - | 4 |
| 2                                      | 1 | Werkstoffkunde   | 2 | - | 1 | - | 3 |
| 2                                      | 1 | Unternehmenskommunikation I                                      | 2 | - | - | - | 2 |
| 2                                      | 2 | Numerische Berechnungsverfahren                                  | 1 | 2 | - | - | 3 |
| 2                                      | 2 | Programmierung von Computern und Programmiersprachen II          | 2 | - | 2 | - | 4 |
| 2                                      | 2 | Grundlagen des Wirtschaftsingenieurwesens                        | 1 | - | - | 2 | 4 |
| 2                                      | 2 | Thermotechnik und thermische Maschinen                           | 2 | - | 2 | - | 5 |
| 2                                      | 2 | Finite-Elemente-Methode  | 1 | - | 2 | - | 4 |
| 2                                      | 2 | Werkstofftechnik   | 1 | - | 2 | - | 4 |
| 2                                      | 2 | Unternehmenskommunikation II                                     | - | 2 | - | - | 2 |
| <b>Elective subjects</b>               |   |  |   |   |   |   |   |
| 2                                      | 1 | Ökologie und Umweltschutz I                                      | 2 | - | - | 1 | 4 |
| 2                                      | 1 | Industriemanagement  | 2 | - | - | 1 | 4 |
| 2                                      | 2 | Elemente der Elektronik II                                       | 2 | - | 2 | - | 4 |
| 2                                      | 2 | Fertigungsverfahren  | 2 | - | 2 | - | 4 |
| <b>Facultative subjects</b>            |   |  |   |   |   |   |   |
| 2                                      | 1 | Ethik  | - | 2 | - | - | 2 |
| 2                                      | 1 | Rumänische Sprache und Kultur für internationale Studierende III | - | 2 | - | - | 2 |
| 2                                      | 1 | Pädagogik II (RO)  | 2 | 2 | - | - | 5 |
| 2                                      | 2 | Rumänische Sprache und Kultur für internationale Studierende IV  | - | 2 | - | - | 2 |



|  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| 2                                      | 2 | Landeskunde II  | - | 2 | - | - | 2 |
| 2                                      | 2 | Fachdidaktik (RO)   | 2 | 2 | - | - | 5 |
| <b>Third Year Compulsory subjects</b>  |   |   |   |   |   |   |   |
| 3                                      | 1 | Regelungstechnik  | 3 | 2 | - | - | 6 |
| 3                                      | 1 | Mechanische Schwingungen                                    | 3 | 2 | 1 | - | 6 |
| 3                                      | 1 | Elektrische Antriebe  | 2 | - | 2 | - | 5 |
| 3                                      | 1 | Maschinenelemente   | 3 | 1 | - | 2 | 6 |
| 3                                      | 1 | Qualitätsmanagement I                                       | 2 | - | 1 | - | 5 |
| 3                                      | 2 | Produkt Design Projekt                                      | 2 | - | - | 2 | 3 |
| 3                                      | 2 | Sensoren und Aktuatoren                                     | 2 | - | 2 | - | 3 |
| 3                                      | 2 | Werkzeugmaschinen   | 2 | - | 1 | - | 3 |
| 3                                      | 2 | Die Grundlagen des computergestützten<br>Technologiedesigns | 3 | - | 2 | - | 3 |
| 3                                      | 2 | Kommunikationstechnik                                       | 2 | - | 1 | - | 3 |
| 3                                      | 2 | Steuerung und Kontrolle mobiler<br>Systeme                  | 2 | - | 1 | - | 3 |
| 3                                      | 2 | Praktikum (360 Stunden)                                     | - | - | - | - | 8 |
| <b>Elective Subjects</b>               |   |   |   |   |   |   |   |
| 3                                      | 1 | Moderieren und Präsentieren                                 | - | 2 | - | - | 2 |
| 3                                      | 1 | Wirtschaftsenglisch I                                       | - | 2 | - | - | 2 |
| 3                                      | 2 | Ökologie und Umweltschutz II                                | 2 | - | - | 1 | 4 |
| 3                                      | 2 | Tribologie  | 2 | - | - | 1 | 4 |
| <b>Facultative subjects</b>            |   |   |   |   |   |   |   |
| 3                                      | 1 | Pädagogik-Praktikum im Gymnasium<br>I(RO)                   | - | - | - | - | 3 |
| 3                                      | 2 | Classroom-Management (RO)                                   | 1 | 1 | - | - | 3 |
| 3                                      | 2 | Pädagogik-Praktikum im Gymnasium II                         | - | - | - | - | 2 |
| 3                                      | 2 | Abschlussprüfung: Stufe I                                   | - | - | - | - | 5 |
| <b>Fourth Year Compulsory subjects</b> |   |   |   |   |   |   |   |
| 4                                      | 1 | Wirtschaftliche Analyse I                                   | 2 | 2 | - | - | 4 |
| 4                                      | 1 | WEB-Schnittstellen und -Dienste I                           | 2 | - | 2 | 2 | 6 |
| 4                                      | 1 | Virtual-Reality-Systeme I                                   | 2 | - | 2 | - | 5 |





|                             |   |  |   |   |   |   |  |           |
|-----------------------------|---|--|---|---|---|---|--|-----------|
| 4                           | 1 | Produktion und Supply Chain Management     | 3 | - | - | 1 |  | 5         |
| 4                           | 1 | Logischer Entwurf                          | 2 | - | 2 | - |  | 5         |
| 4                           | 2 | Bildverarbeitung                           | 3 | - | 3 | - |  | 6         |
| 4                           | 2 | Produktdesign und Herstellung – Projekt    | - | - | - | 4 |  | 5         |
| 4                           | 2 | Datenbanken                                | 3 | - | - | 3 |  | 5         |
| 4                           | 2 | Vorbereitung der Bachelor-Thesis (8PL)     | - | - | - | - |  | 4         |
| 4                           | 2 | Praktikum für die Bachelor-Thesis (56+4)   | - | - | - | - |  | 5         |
| <b>Elective Subjects</b>    |   |  |   |   |   |   |  |           |
| 4                           | 1 | Roboterfertigungssysteme                   | 2 | - | 2 | - |  | 5         |
| 4                           | 1 | Numerische Werkzeugmaschinenprogrammierung | 2 | - | 2 | - |  | 5         |
| 4                           | 2 | Wirtschaftliche Analyse II                 | 3 | - | 3 | - |  | 5         |
| 4                           | 2 | WEB-Schnittstellen und -Dienste II         | 3 | - | 3 | - |  | 5         |
| <b>Facultative subjects</b> |   |  |   |   |   |   |  |           |
| 4                           | 1 | Öffentlichkeitsarbeit                      | - | 2 | - | - |  | 2         |
| 4                           | 1 | General Management                         | 2 | - | 1 | - |  | 3         |
| 4                           | 2 | Technische Dokumentation                   | 2 | - | - | - |  | 2         |
| 4                           | 2 | Bionik                                     | 2 | - | 2 | - |  | 4         |
| 4                           | 2 | Bussiness Plan                             | 2 | - | 1 | - |  | 3         |
| <b>Diplomprüfung</b>        |   |  |   |   |   |   |  | <b>10</b> |



## Field of Study: Electrical Engineering

### 8.1 Electrical Engineering and Computers

#### Faculty of Electrical Engineering

##### 1. a. Short description and Main Objectives

The "Electrical and Computer Engineering" degree programme is in line with the teaching mission to prepare graduates with a bachelor's degree who have a basic background in electrical engineering, specific knowledge of industrial hardware and software applications in the field, as well as the basic knowledge to initiate research activities.

The study programme is in line with the policy of POLITEHNICA University of Bucharest and the Faculty of Electrical Engineering, through the curriculum developed and the entire training of students within it, with the following main objectives:

- ensuring a high quality of training of students in the field through a teaching staff made up of teachers (in the vast majority) with doctoral degrees, through the efficient organization of the teaching process, through the quality and modernization of the laboratories where students work and through the study conditions created;
- maintaining a high level of knowledge acquired by students so that they can meet the most demanding requirements of the labour market.

The curriculum developed for the study programme "Electrical and Computer Engineering" is in line with the curricula of the same specialisation in European universities and will provide graduates with the necessary skills to easily find a job.

2. b. The curriculum developed for this specialization will provide students with a coherent professional training with a broad spectrum of knowledge by harmoniously combining the study of fundamental disciplines, engineering disciplines and specialized disciplines, in accordance with the policy of the University POLITEHNICA of Bucharest and the Faculty of Electrical Engineering. As a result, students will have at the end of the 4 years of study both general cognitive skills, as well as specialist skills and abilities to the specialization, Electrical and Computer Engineering".

3. c. website <http://www.electro.upb.ro/en/home-english/>

4. d. contact person Phd Prof Octavian Ghita: [octavian.ghita@upb.ro](mailto:octavian.ghita@upb.ro)

5. e: Curriculum

| Year                                  | Sem | Subject name   | Weekly number of hours |          |         |         | ECTS |
|---------------------------------------|-----|--|------------------------|----------|---------|---------|------|
|                                       |     |  | Lecture                | Tutorial | Labwork | Project |      |
| <b>First Year Compulsory subjects</b> |     |  |                        |          |         |         |      |
| 1                                     | 1   | Linear algebra, analytical and differential geometry | 3                      | 2        | -       | -       | 6    |



|   |   |  |   |   |   |   |   |
|---|---|--|---|---|---|---|---|
| 1 | 1 | Calculus   | 3 | 2 | - | - | 6 |
| 1 | 1 | Chemistry  | 2 | - | 1 | - | 3 |
| 1 | 1 | Computer aided graphics                                    | 2 | 1 | 1 | - | 4 |
| 1 | 1 | Computers programming and programming languages I          | 2 | - | 2 | - | 4 |
| 1 | 1 | Physical education and sport                               | - | 2 | - | - | 3 |
| 1 | 1 | Foreign language I   | 2 | 1 | - | - | 4 |
| 1 | 2 | Special mathematics  | 3 | 2 | - | - | 6 |
| 1 | 2 | Physics  | 3 | 2 | 1 | - | 6 |
| 1 | 2 | Fundamentals of electrotechnics                            | 3 | 2 | 1 | - | 6 |
| 1 | 2 | Computers programming and programming languages II         | 2 | - | 2 | - | 5 |
| 1 | 2 | Physical education and sport II                            | - | 2 | - | - | 3 |
| 1 | 2 | Foreign language II  | 2 | 1 | - | - | 4 |
| 1 | 1 | Psychology of education (optional)                         | 2 | 2 |   |   | 5 |
| 1 | 2 | Pedagogy I (optional)                                      | 2 | 2 |   |   | 5 |
| 2 | 1 | Computer architecture                                      | 2 | - | 1 | - | 4 |
| 2 | 1 | Digital systems  | 2 | - | 2 | - | 4 |
| 2 | 1 | Electrical circuit theory                                  | 3 | 1 | 1 | - | 6 |
| 2 | 1 | Electronics I  | 2 | 1 | 1 | - | 4 |
| 2 | 1 | Numerical methods  | 2 | - | 2 | - | 5 |
| 2 | 1 | Database   | 2 | - | 2 | - | 4 |
| 2 | 1 | Computer interfaces and peripherals (optional)             | 2 | 1 |   |   | 3 |
| 2 | 1 | Data transmissions and protocols (optional)                | 2 | 1 |   |   | 3 |
| 2 | 2 | Signal theory and automatic adjustment                     | 2 | - | 1 | - | 6 |
| 2 | 2 | CAD for electrical engineering                             | 2 | - | 1 | 1 | 6 |
| 2 | 2 | Electrical circuits simulation                             | 2 | - | 2 | - | 3 |
| 2 | 2 | Electronics II   | 2 | 1 | 1 | - | 3 |
| 2 | 2 | Electromagnetic field theory                               | 3 | 1 | 1 | 1 | 6 |
| 2 | 2 | Electrical and electronic measurements                     | 3 | - | 2 | - | 6 |
| 3 | 1 | Electric equipment   | 3 | - | 2 | 1 | 6 |
| 3 | 1 | Static power converters                                    | 2 | - | 1 | - | 4 |
| 3 | 1 | Electrical motors  | 3 | - | 2 | 1 | 6 |
| 3 | 1 | Computer networks  | 1 | - | 1 | - | 3 |
| 3 | 1 | Electrotechnical materials                                 | 3 | - | 2 | - | 6 |
| 3 | 1 | Finite element method in electrical engineering (optional) | 2 | - | 1 | - | 3 |
| 3 | 2 | Numerical modeling of the electromagnetic field (optional) | 2 | - | 1 | - | 3 |
| 3 | 2 | Object oriented programming                                | 2 | - | 2 | - | 3 |
| 3 | 2 | Numerical signal processing                                | 2 | - | 2 | 1 | 4 |
| 3 | 2 | Electric drives  | 3 | - | 2 | 1 | 5 |
| 3 | 2 | Programmable logic controllers                             | 2 | - | 2 | - | 3 |
| 3 | 2 | Microprocessor systems                                     | 2 | 1 | 1 | - | 4 |
| 3 | 2 | Advanced production systems                                | 2 | - | 1 | - | 3 |



|   |   |  |                    |   |   |   |   |
|---|---|--|--------------------|---|---|---|---|
| 3 | 2 | Internship   | 360 hours in total |   |   |   | 8 |
| 3 | 1 | Computer aided training  | 1                  | - | 1 | - | 2 |
| 3 | 1 | Pedagogical practice in pre-university education system(1)             | -                  | - | 3 | - | 3 |
| 3 | 2 | Pedagogical practice in pre-university education system(2)             | -                  | - | 3 | - | 3 |
| 3 | 2 | Student class management   | 1                  | 1 | - | - | 2 |
| 3 | 2 | Graduation exam  | -                  | - | - | - | 5 |
| 4 | 1 | Energy sources   | 2                  | 1 | 1 | - | 5 |
| 4 | 1 | Virtual instrumentation in electrical engineering (optional)           | 2                  | 2 | - | - | 4 |
| 4 | 1 | Monitoring and diagnosis of electrical equipment (optional)            | 2                  | 2 | - | - | 4 |
| 4 | 1 | Electrical installations   | 2                  | - | 2 | - | 4 |
| 4 | 1 | Optimization techniques in electrical engineering                      | 2                  | - | 1 | 1 | 4 |
| 4 | 1 | Robotics (optional)  | 1                  | 1 | 1 | - | 4 |
| 4 | 1 | Electricity quality (optional)   |                    |   |   |   | 4 |
| 4 | 1 | Soft architectures and programming on integrated systems II (optional) | 2                  | - | 1 | - | 4 |
| 4 | 2 | Quality and reliability  | 2                  | - | 2 | - | 4 |
| 4 | 2 | Electromagnetic compatibility  | 2                  | - | 2 | - | 4 |
| 4 | 2 | Electric and electronic equipment for vehicles                         | 2                  | - | 1 | - | 4 |
| 4 | 2 | Neural networks (optional)   | 2                  | - | 2 | 1 | 5 |
| 4 | 2 | Artificial intelligence (optional)                                     |                    |   |   |   |   |
| 4 | 2 | Management   | 2                  | - | - | 1 | 3 |
| 4 | 2 | Production, transmission and distribution of electricity               | 2                  | 1 | 1 | - | 4 |
| 4 | 2 | Elaboration of licence project   | 56 hours           |   |   |   | 4 |
| 4 | 2 | License project stage  | 60 hours           |   |   |   | 2 |