

### Instrumentation and Automation "D"

hours/week (lc/lectures, pr/practices, lb/laboratory); requirements: re (e/examination, a/assignment); credits (cr)

| Neptun Code                           | Courses   | hours/week | credit | Semesters |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   | Prerequisites |             |   |   |   |   |
|---------------------------------------|---|------------|--------|-----------|----|---|---|----|---|----|----|----|---|---|----|----|---|----|---|----|---|---|---|----|----|---|---|----|---|---|---|---------------|-------------|---|---|---|---|
|                                       |   |            |        | 1.        |    |   |   | 2. |   |    |    | 3. |   |   |    | 4. |   |    |   | 5. |   |   |   | 6. |    |   |   | 7. |   |   |   | Neptun-Code   | Neptun-Code |   |   |   |   |
| Basics of natural science Total:      |   |            |        | 40        | 6  | 3 | 0 | 12 | 2 | 3  | 3  | 10 | 2 | 1 | 0  | 4  | 5 | 1  | 0 | 7  | 2 | 0 | 0 | 3  | 2  | 0 | 0 | 4  | 0 | 0 | 0 | 0             |             |   |   |   |   |
| 1. KMEMA11AND                         | Mathematics I.  | 5          | 6      | 2         | 3  | 0 | e | 6  |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 2. KMEMA21AND                         | Mathematics II.   | 5          | 6      |           |    |   |   | 2  | 3 | 0  | e  | 6  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 3. KMEMA31AND                         | Mathematics III.  | 3          | 3      |           |    |   |   |    |   |    |    |    |   |   | 3  | 0  | 0 | e  | 3 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 4. KMAIA11AND                         | Informatics I.  | 2          | 3      | 2         | 0  | 0 | e | 3  |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 5. KMAIA12AND                         | Informatics laboratory I.   | 2          | 2      |           |    |   |   | 0  | 0 | 2  | a  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 6. KMAIA21AND                         | Informatics II.   | 2          | 3      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 7. KMEF11AND                          | Physics I.  | 3          | 4      |           |    |   |   |    |   |    |    |    |   |   | 2  | 1  | 0 | e  | 4 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 8. KMEF21AND                          | Physics II.   | 3          | 4      |           |    |   |   |    |   |    |    |    |   |   | 2  | 1  | 0 | e  | 4 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 9. KMEVR11AND                         | Materials science   | 2          | 3      | 2         | 0  | 0 | e | 3  |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 10. KMEVR12AND                        | Materials science laboratory (2)  | 1          | 2      |           |    |   |   | 0  | 0 | 1  | a  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 11. KMEMI11AND                        | Basics of safety technology, environment protection and quality assurance | 2          | 4      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    | 2 | 0 | 0  | e | 4 |   |               |             |   |   |   |   |
| Economical and human knowledge Total: |   |            |        | 14        | 16 | 2 | 0 | 0  | 2 | 1  | 1  | 0  | 2 | 0 | 0  | 0  | 0 | 2  | 0 | 0  | 2 | 1 | 1 | 0  | 2  | 6 | 0 | 0  | 8 | 0 | 0 | 0             | 0           |   |   |   |   |
| 12. GGTKG11AND                        | Macroeconomics  | 2          | 2      | 2         | 0  | 0 | a | 2  |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 13. GGTKG21AND                        | Microeconomics  | 2          | 2      |           |    |   |   | 1  | 1 | 0  | a  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 14. GSVVG11AND                        | Enterprise economics I.   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 15. GSVVG21AND                        | Enterprise economics II.  | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 16. GVMME11AND                        | Management  | 2          | 3      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 17. GGTJ11AND                         | Law   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 18. GGTJ11AND                         | Obligatory optional subject (3)   | 2          | 3      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| Basics of Profession Total:           |   |            |        | 64        | 70 | 5 | 3 | 0  | 0 | 12 | 11 | 5  | 4 | 0 | 19 | 12 | 0 | 11 | 0 | 26 | 2 | 0 | 8 | 0  | 10 | 2 | 1 | 0  | 0 | 3 | 0 | 0             | 0           | 0 | 0 | 0 | 0 |
| 19. KHTVL11AND                        | Electricity I.  | 3          | 4      | 3         | 0  | 0 | e | 4  |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 20. KHTVL12AND                        | Electricity I. practice   | 3          | 4      | 0         | 3  | 0 | a | 4  |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 21. KHTVL21AND                        | Electricity II.   | 3          | 3      |           |    |   |   | 3  | 0 | 0  | e  | 3  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 22. KHTVL22AND                        | Electricity II. practice  | 4          | 3      |           |    |   |   | 0  | 3 | 1  | a  | 3  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 23. KMAPR11AND                        | Programming I.  | 2          | 2      |           |    |   |   | 2  | 0 | 0  | a  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 24. KMAPR21AND                        | Programming II.   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 25. KMAPR22AND                        | Programming II. laboratory  | 3          | 3      |           |    |   |   |    |   |    |    |    |   |   | 0  | 0  | 3 | a  | 3 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 26. KMAMD11AND                        | Technical documentation (2)   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 27. KMAMT11AND                        | Measurements I.   | 2          | 2      |           |    |   |   | 2  | 0 | 0  | e  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 28. KMAMT12AND                        | Measurements I. laboratory  | 2          | 2      |           |    |   |   | 0  | 0 | 2  | a  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 29. KMAMT21AND                        | Measurements II.  | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 30. KMAMT22AND                        | Measurements II. laboratory   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 0  | 0  | 2 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 31. KMEDG11AND                        | Digital technics I.   | 2          | 4      | 2         | 0  | 0 | e | 4  |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 32. KMEDG21AND                        | Digital technics II.  | 3          | 3      |           |    |   |   | 2  | 1 | 0  | e  | 3  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 33. KMEDG31AND                        | Digital technics II. laboratory   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 0  | 0  | 2 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 34. KMEEL11AND                        | Electronics I.  | 2          | 2      |           |    |   |   | 2  | 0 | 0  | e  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 35. KMEEL12AND                        | Electronics I. practice   | 2          | 2      |           |    |   |   | 0  | 1 | 1  | a  | 2  |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 36. KMEEL21AND                        | Electronics II.   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | e  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 37. KMEEL22AND                        | Electronics II. laboratory  | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 0  | 0  | 2 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 38. KMAAT11AND                        | Automation I.   | 2          | 3      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | e  | 3 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 39. KMAAT21AND                        | Automation I. laboratory  | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 0  | 0  | 2 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 40. KHTH11AND                         | Communication technics I. (2)   | 2          | 3      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | e  | 3 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 41. KHTH12AND                         | Communication technics I. laboratory (2)                                  | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 42. KVEEE11AND                        | Electrical energetics I. (2)  | 2          | 3      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | e  | 3 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 43. KVEEE12AND                        | Electrical energetics I. laboratory (2)                                   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 44. KMEET11AND                        | Electronic technology (2)   | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 2  | 0  | 0 | e  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 45. KMEET12AND                        | Electronic technology laboratory (2)                                      | 2          | 2      |           |    |   |   |    |   |    |    |    |   |   | 0  | 0  | 2 | a  | 2 |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |
| 46. KMAMT11AND                        | General engineering studies   | 3          | 3      |           |    |   |   |    |   |    |    |    |   |   |    |    |   |    |   |    |   |   |   |    |    |   |   |    |   |   |   |               |             |   |   |   |   |

Comments: (1) Sign of course makes necessary to fulfill prerequisites

(2) Semester of the course is determined by the institute responsible for the speciality, according to the amount of students.

Courses signed by character # can be started paralelly, if necessary.

\* List of obligatory optional courses is included on last page of the table



| Neptun Code | Courses                | hours /week | credit | Semesters |    |    |    |    |    |    |  |  |
|-------------|------------------------|-------------|--------|-----------|----|----|----|----|----|----|--|--|
|             |                        |             |        | 1.        | 2. | 3. | 4. | 5. | 6. | 7. |  |  |
| 77.         | Physical education I.  | 2           | 0      |           | 2  | e  |    |    |    |    |  |  |
| 78.         | Physical education II. | 2           | 0      |           |    | 2  | e  |    |    |    |  |  |

| Obligatory optional courses of branch economical and human knowledge |   |   |   |   |   |   |   |   |   |   |   |             |
|--|---|---|---|---|---|---|---|---|---|---|---|-------------|
| GGTUK11AND   | Business communication                        | 2 | 3 |   |   |   |   |   |   |   | 2 | 0 0   a   3 |
| GGTSZ11AND   | Sociology                                     | 2 | 3 |   |   |   |   |   |   |   | 2 | 0 0   a   3 |
| Free optional courses  |   |   |   |   |   |   |   |   |   |   |   |             |
| KMETT11AND   | Basics of natural science                     | 2 | 3 | 2 | 0 | 0 | a | 3 |   |   |   |             |
| KMAAF11AND   | Basics of engineering (physics)               | 2 | 3 | 2 | 0 | 0 | a | 3 |   |   |   |             |
| KMAIR11AND   | Intelligent robotic systems                   | 2 | 3 |   |   |   |   |   | 2 | 0 | 0 | a   3       |
| KMAKT11AND   | Clinical engineering                          | 2 | 3 |   |   |   |   |   | 2 | 0 | 0 | a   3       |
| KMAMA11AND   | Instrumentation circuits                      | 2 | 3 |   |   |   |   |   | 2 | 0 | 0 | a   3       |
| KMAOR11AND   | Methodology of object orientation             | 2 | 3 |   |   |   |   |   | 2 | 0 | 0 | a   3       |
| KMAVF11AND   | Video surveillance systems                    | 2 | 3 |   |   |   |   |   | 2 | 0 | 0 | a   3       |
| KMAEA11AND   | Building automation                           | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |
| KMAKR11AND   | Biomedical imaging systems                    | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |
| KMALK11AND   | Automation of buildings and public utilities  | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |
| KMAMQ11AND   | Metrology                                     | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |
| KMARO11AND   | Real-time operating systems                   | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |
| KAUTE11AND   | Power electronics                             | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |
| KAUVG11AND   | Electrical machines                           | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |
| KAUMK11AND   | Microcontroller based software engineering I. | 2 | 4 |   |   |   |   |   |   |   | 2 | 0 0   a   4 |

Plan of practical (cooperative) Education

hours/week (lc/lectures, pr/practices, lb/laboratory); requirements: re (examination, a/assignment); credits

| Neptun Code           | Courses                      | hours /week | credit    | Semester (2) |    |    |    | Semester  |          |          |          |          |           |
|-----------------------|------------------------------|-------------|-----------|--------------|----|----|----|-----------|----------|----------|----------|----------|-----------|
|                       |                              |             |           | 7.           |    |    |    | 8.        |          |          |          |          |           |
| Cooperative education |                              |             |           | lc           | pr | lb | re | cr        | lc       | pr       | lb       | re       | cr        |
| KMASG11AND            | Practice in profession I.    | (1)         | 12        |              |    |    |    | 12        |          |          |          |          |           |
| KMASG12AND            | Practice in profession II.   |             |           |              |    |    |    |           |          |          |          |          | 12        |
|                       | Optional special subject I.  | 4           | 5         |              |    |    |    | 4         |          |          | v        |          | 5         |
|                       | Optional special subject II. | 4           | 4         |              |    |    |    | 4         |          |          | v        |          | 4         |
| KMASD12AND            | Final essay I.               |             | 6         |              |    |    |    | 6         |          |          |          |          |           |
| KMASD13AND            | Final essay II.              |             | 9         |              |    |    |    |           |          |          |          |          | 9         |
| <b>Total:</b>         |                              | <b>8</b>    | <b>36</b> |              |    |    |    | <b>18</b> | <b>8</b> | <b>0</b> | <b>0</b> | <b>2</b> | <b>30</b> |

Comment: (1) Weekly hours of practice in profession is given by the cooperative contract.

Conditions of cooperative education at Electrical Engineering Faculty:

- Students have to fulfill minimum 170 credits before starting cooperative education. (2)
- Maximum 4 credits can be missing from optional group of subjects, depending on credits of module subjects.

Courses of Practical (cooperative) Education are fixed by Council of the Faculty year by year.

Subjects at closing examination:

At obligatory optional group of subjects No. 4:  
 Subject 1: topics, compiled from basics of profession  
 KMAAU11AND Automation I.  
 KMAAZ11AND Automatics  
 KMEDT11AND Digital technics I.  
 KMEDT21AND Digital technics II.  
 Subject 2: topics, compiled from the compulsory theoretical subjects, listed at optional group of subjects No. 4.