

## Computer Science MSc (Cybersecurity specialization 2024)

### Compulsory subjects

| Code            | Subject   | Lecture (L) | Practice (Pr) | Labor | Consultation | Requirement | Credit | Semester | Subject requirement                         | 1st Semester | 2nd Semester | 3rd Semester | 4th Semester |
|-----------------|---|-------------|---------------|-------|--------------|-------------|--------|----------|---|--------------|--------------|--------------|--------------|
| IPM-22fRMEG     | Research methodology L+Pr.                                | 1           | 2             | 0     | 2            | XPG         | 5      | 1        |   | 1+2+0+2      |              |              |              |
| IPM-22fASTE     | Advanced Software Technology L.                           | 2           | 0             | 0     | 2            | E           | 4      | 2        |   |              | 2+0+0+2      |              |              |
| IPM-22fDAAE     | Design and analysis of algorithms L.                      | 2           | 0             | 0     | 2            | E           | 4      | 2        |   |              | 2+0+0+2      |              |              |
| IPM-22fPRG      | Internship  |             |               |       |              |             | 0      | 2-4      |   |              |              |              | 240 hours    |
| IPM-24fkbIMCSG  | Introductory mathematics for Cybersecurity Specialisation | 0           | 1             | 0     | 0            | PG          | 1      | 1        |   | 0+1+0+0      |              |              |              |
| IPM-24fkbIOS1EG | Introduction to Offensive Security I.                     | 1           | 1             | 0     | 2            | XPG         | 4      | 1        |   | 1+1+0+2      |              |              |              |
| IPM-24fkbPETEG  | Privacy enhancing technologies                            | 1           | 1             | 0     | 2            | XE          | 4      | 1        |   | 1+1+0+2      |              |              |              |
| IPM-24fkbSKCE   | Symmetric key cryptography                                | 2           | 0             | 0     | 1            | E           | 2      | 1        | IPM-24fkbSKCG (weak), IPM-24fkbIMCSG (weak) | 2+0+0+1      |              |              |              |
| IPM-24fkbSKCG   | Symmetric key cryptography                                | 0           | 2             | 0     | 0            | PG          | 2      | 1        |   | 0+2+0+0      |              |              |              |
| IPM-24fkbIDSE   | Introduction to Data Security                             | 2           | 0             | 0     | 2            | E           | 4      | 2        |   |              | 2+0+0+2      |              |              |
| IPM-24fkbIOS2EG | Introduction to Offensive Security II.                    | 1           | 1             | 0     | 2            | XPG         | 4      | 2        | IPM-24fkbIOS1EG                             |              | 1+1+0+2      |              |              |
| IPM-24fkbNSE    | Network security  | 2           | 0             | 0     | 0            | E           | 2      | 2        |   |              | 2+0+0+0      |              |              |
| IPM-24fkbPKCE   | Public key cryptography                                   | 2           | 0             | 0     | 0            | E           | 2      | 2        | IPM-24fkbPKCG (weak)                        |              | 2+0+0+0      |              |              |
| IPM-24fkbPKCG   | Public key cryptography                                   | 0           | 2             | 0     | 0            | PG          | 2      | 2        | IPM-24fkbSKCE (strong)                      |              | 0+2+0+0      |              |              |
| IPM-24fkbPTE    | Penetration testing                                       | 2           | 0             | 0     | 1            | E           | 3      | 3        | IPM-24fkbPTG (weak)                         |              |              | 2+0+0+1      |              |

|                       |   |   |          |   |           |           |                       |          |                         |  |           |           |                       |                  |
|-----------------------|---|---|----------|---|-----------|-----------|-----------------------|----------|-------------------------|--|-----------|-----------|-----------------------|------------------|
| IPM-24fkbPTG          | Penetration testing                         | 0 | 2        | 0 | 1         | PG        | 3                     | 3        | IPM-24fkbIOS1EG         |  |           | 0+2+0+1   |                       |                  |
| IPM-24fkbTCG          | Topics in cryptography seminar              | 0 | 2        | 0 | 2         | PG        | 4                     | 3        |                         |  |           | 0+2+0+2   |                       |                  |
| IPM-22fkbCRPE         | Cryptographic protocols                     | 2 | 0        | 0 | 1         | E         | 3                     | 3        | IPM-22fkbCRPG<br>(weak) |  |           | 2+0+0+1   |                       |                  |
| IPM-22fkbCRPG         | Cryptographic protocols                     | 0 | 0        | 2 | 1         | PG        | 3                     | 3        |                         |  |           | 0+0+2+1   |                       |                  |
|                       | <b>Compulsory subjects credits</b>          |   |          |   |           |           | <b>56</b>             |          |                         |  | <b>18</b> | <b>22</b> | <b>16</b>             |                  |
|                       | <b>Compulsory elective subjects credits</b> |   |          |   |           |           | <b>28</b>             |          |                         |  | <b>12</b> | <b>8</b>  | <b>8</b>              |                  |
|                       | <b>Elective subjects</b>                    |   |          |   |           |           | <b>6</b>              | <b>3</b> |                         |  |           |           | <b>6+0+0</b>          |                  |
| <b>IPM-22fERASMUS</b> | <b>Erasmus mobility</b>                     |   |          |   |           |           | <b>max 24 credits</b> |          |                         |  |           |           | <b>max 24 credits</b> |                  |
| <b>IPM-24fTHCONS</b>  | <b>Thesis consultation</b>                  |   | <b>5</b> |   | <b>10</b> | <b>PG</b> | <b>30</b>             | <b>4</b> |                         |  |           |           |                       | <b>signature</b> |
|                       | <b>Summa credit in semester</b>             |   |          |   |           |           |                       |          |                         |  | <b>30</b> | <b>30</b> | <b>30</b>             | <b>30</b>        |
|                       | <b>Summa credit</b>                         |   |          |   |           |           | <b>120</b>            |          |                         |  |           |           |                       |                  |

| Compulsory elective subjects |   |             |               |       |              |             |        |          |                          |              |              |              |              |
|------------------------------|---|-------------|---------------|-------|--------------|-------------|--------|----------|--------------------------|--------------|--------------|--------------|--------------|
| Code                         | Subject   | Lecture (L) | Practice (Pr) | Labor | Consultation | Requirement | Credit | Semester | Subject requirement      | 1st Semester | 2nd Semester | 3rd Semester | 4th Semester |
| IPM-22fkbPCMSG               | Preparation course for master studies and developing learning skills. | 0           | 3             | 0     | 0            | PG          | 2      | 1        |                          | 0+3+0+0      |              |              |              |
| IPM-24fkbMFCE                | Mathematical foundation of cryptocurrencies                           | 2           | 0             | 0     | 2            | E           | 4      | 1        |                          | 2+0+0+2      |              |              |              |
| IPM-22fkbDFISE               | <i>Development of Financial IT Systems</i>                            | 2           | 0             | 0     | 1            | E           | 3      | 1,3      | IPM-22fkbDFISG<br>(weak) | 2+0+0+1      |              | 2+0+0+1      |              |
| IPM-22fkbDFISG               | <i>Development of Financial IT Systems</i>                            | 0           | 0             | 2     | 1            | PG          | 3      | 1,3      |                          | 0+0+2+1      |              | 0+0+2+1      |              |
| IPM-24fkbIQIE                | <i>Introduction to Quantum Information</i>                            | 2           | 0             | 0     | 0            | E           | 2      | 1,3      | IPM-24fkbIQIG<br>(weak)  | 2+0+0+0      |              | 2+0+0+0      |              |
| IPM-24fkbIQIG                | <i>Introduction to Quantum information</i>                            | 0           | 2             | 0     | 0            | PG          | 2      | 1,3      |                          | 0+2+0+0      |              | 0+2+0+0      |              |
| IPM-24fkbSCSE                | Side-channel security   | 2           | 0             | 0     | 0            | E           | 2      | 1,3      | IPM-24fkbSCSG<br>(weak)  | 2+0+0+0      |              | 2+0+0+0      |              |
| IPM-24fkbSCSG                | Side-channel security   | 0           | 2             | 0     | 0            | PG          | 2      | 1,3      |                          | 0+2+0+0      |              | 0+2+0+0      |              |

|                 |  |   |   |   |   |     |   |       |                           |         |         |         |  |
|-----------------|--|---|---|---|---|-----|---|-------|---------------------------|---------|---------|---------|--|
| IPM-25fkbDSEG   | Introduction to Data Science                                     | 2 | 0 | 2 | 2 | XE  | 6 | 2     | IPM-22fkbMLEG<br>(weak)   |         | 2+0+2+2 |         |  |
| IPM-22fkbMLEG   | Machine Learning   | 2 | 0 | 2 | 2 | XE  | 6 | 2     |                           |         | 2+0+2+2 |         |  |
| IPM-22fkbODSEG  | Numerical Methods for Optimization                               | 2 | 0 | 2 | 2 | XPG | 6 | 2     |                           |         | 2+0+2+2 |         |  |
| IPM-22fkbSQTE   | Software quality and testing                                     | 2 | 0 | 0 | 1 | E   | 3 | 2     | IPM-22fkbSQTG<br>(weak)   |         | 2+0+0+1 |         |  |
| IPM-22fkbSQTG   | Software quality and testing                                     | 0 | 0 | 2 | 1 | PG  | 3 | 2     |                           |         | 0+0+2+1 |         |  |
| IPM-24fkbQCRE   | Quantum Cryptography   | 2 | 0 | 0 | 0 | E   | 2 | 2     | IPM-24fkbQCRG<br>(weak)   |         | 2+0+0+0 |         |  |
| IPM-24fkbQCRG   | Quantum Cryptography   | 0 | 2 | 0 | 0 | PG  | 2 | 2     | IPM-24fkbIQIE             |         | 0+2+0+0 |         |  |
| IPM-24fkbVASG   | Vulnerability analysis seminar                                   | 0 | 2 | 0 | 2 | PG  | 4 | 2     |                           |         | 0+2+0+2 |         |  |
| IPM-24fkbIDSG   | Introduction to Data Security                                    | 0 | 2 | 0 | 0 | PG  | 2 | 2     |                           |         | 0+2+0+0 |         |  |
| IPM-22fkbSCLAB1 | Cyber Security Lab I.  | 0 | 0 | 0 | 4 | PG  | 4 | 1,2,3 |                           | 0+0+0+4 | 0+0+0+4 | 0+0+0+4 |  |
| IPM-22fkbSCLAB2 | Cyber Security Lab II.   | 0 | 0 | 0 | 4 | PG  | 6 | 1,2,3 | IPM-22fkbSCLAB1<br>(weak) | 0+0+0+4 | 0+0+0+4 | 0+0+0+4 |  |
| IPM-24fkbCRAE   | <i>Provably secure modular design of cryptographic protocols</i> | 2 | 0 | 0 | 0 | E   | 2 | 3     | IPM-24fkbCRAG<br>(weak)   |         |         | 2+0+0+0 |  |
| IPM-24fkbCRAG   | <i>Provably secure modular design of cryptographic protocols</i> | 0 | 2 | 0 | 0 | PG  | 2 | 3     |                           |         |         | 0+2+0+0 |  |
| IPM-24fkbPQCE   | <i>Post-quantum cryptography</i>                                 | 2 | 0 | 0 | 2 | E   | 4 | 3     | IPM-24fkbSKCE             |         |         | 2+0+0+2 |  |
| IPM-24fkbSMCE   | <i>Secure multiparty computation</i>                             | 2 | 0 | 0 | 2 | E   | 4 | 3     | IPM-24fkbSKCE             |         |         | 2+0+0+2 |  |
| IPM-24fkbZKPAE  | Zero-knowledge proofs and applications                           | 2 | 0 | 0 | 2 | E   | 4 | 3     | IPM-24fkbSKCE             |         |         | 2+0+0+2 |  |

**PG: Practice Grade E: Exam Grade XPG: Lecture+Practice with Practical Grade XE: Lecture+Practice with Exam**