

Curriculum for BSc in Physics starting from September 2018 and beyond

Legend:

Course type: O - obligatory, OP - optional (a given number of credits must be completed), E - elective, C - criteria.

Requirement: e - exam, m - mid-term mark, s - signature, c - comprehensive exam.

The notation for the hours/credits (e.g. 4/2/0/e/7) has the following structure: the first three numbers give the hours of lectures/practices/laboratories per week, the letter is the course requirement, and the last number is the ETCS credit score for the course.

| Subject, Code, Type | | | | Semester | | | | | | Hours/Credit | | |
|----------------------|--|-------------|----|----------|---|---|---|---|---|--------------|------------|-----------|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | | | |
| Core Subjects | | | | | | | | | | | 171 | |
| 1 | Mathematical Methods in Physics 1 | BMETE92AF51 | O | 7 | | | | | | | 4/2/0/e/7 | |
| 2 | Mathematical Methods in Physics 2 | BMETE15AF52 | O | | 7 | | | | | | 4/2/0/e/7 | |
| 3 | Modern Mathematical Methods in Physics | BMETE15AF53 | O | | | 5 | | | | | 2/2/0/m/5 | |
| 4 | Programming | BMEVIEEA024 | O | 4 | | | | | | | 2/0/2/m/4 | |
| 5 | Programming 2 | BMEVIEEA026 | O | | 4 | | | | | | 2/0/2/m/4 | |
| | Economy and Communication Skills* | | | | | | | 4 | | | | |
| 6 | Management and Business Economics | BMEGT20A003 | OP | | | | | | | | 2/0/0/m/2 | |
| 7 | Economics | BMEGT30A002 | OP | | | | | | | | 2/0/0/m/2 | |
| 8 | English for University Studies, English B2+ | BMEGT60W68A | KV | | | | | | | | 0/2/0/f/2 | |
| 9 | Communication Skills, English B2 | BMEGT60W60A | KV | | | | | | | | 0/2/0/f/2 | |
| 10 | English for Engineering, English B2 | BMEGT60W64A | KV | | | | | | | | 0/2/0/f/2 | |
| 11 | Professional Writing, English C1 | BMEGT60W71A | KV | | | | | | | | 0/2/0/f/2 | |
| 12 | English for Professional Success, English C1 | BMEGT60W70A | KV | | | | | | | | 0/2/0/f/2 | |
| | <i>*: From this list a total of 4 credits of subjects must be completed.</i> | | | | | | | | | | | |
| Base subjects | | | | | | | | | | | | 60 |
| 13 | Experimental Physics 1 | BMETE11AF42 | O | 5 | | | | | | | 4/0/0/e/5 | |
| 14 | Practical Course in Experimental Physics 1 | BMETE11AF43 | O | 3 | | | | | | | 0/2/0/m/3 | |
| 15 | Experimental Physics 2 | BMETE12AF46 | O | | 5 | | | | | | 4/0/0/e/5 | |
| 16 | Practical Course in Experimental Physics 2 | BMETE12AF47 | O | | 3 | | | | | | 0/2/0/m/3 | |
| 17 | Experimental Physics 3 | BMETE11AF46 | O | | | 5 | | | | | 2/2/0/e/5 | |
| 18 | Experimental Nuclear Physics | BMETE80AF43 | O | | | | 3 | | | | 2/1/0/m/3 | |

| | | | | | | | | | | |
|-------------------------------------|---|-------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| 19 | Introductory Laboratory Exercises | BMETE11AF44 | O | 3 | | | | | | 0/0/2/m/3 |
| 20 | Laboratory Exercises in Physics 1 | BMETE11AF28 | O | | 4 | | | | | 0/0/3/m/4 |
| 21 | Laboratory Exercises in Physics 2 | BMETE11AF45 | O | | | 5 | | | | 0/0/3/m/5 |
| 22 | Calculus for Physicists | BMETE93AF20 | O | 7 | | | | | | 4/2/0/e/7 |
| 23 | Multivariable Calculus for Physicists | BMETE93AF21 | O | | 5 | | | | | 2/2/0/e/5 |
| 24 | Probability Theory for Physicists | BMETE95AF00 | O | | | 4 | | | | 2/2/0/e/4 |
| 23 | Numerical Methods for Physicists | BMETE92AF01 | O | | 2 | | | | | 0/0/2/m/2 |
| 24 | Measurement Techniques | BMETE11AF30 | O | | | 2 | | | | 2/0/0/e/2 |
| 25 | Electronics | BMETE12AF27 | O | | | 2 | | | | 2/0/0/m/2 |
| 26 | Electronics Laboratory | BMETE80AF03 | O | | | | 2 | | | 0/0/2/m/2 |
| Differentiated base subjects | | | | 80 | | | | | | |
| 27 | Mechanics 1 | BMETE15AF23 | O | | | 2 | | | | 2/0/0/e/2 |
| 28 | Practical Course in Mechanics 1 | BMETE15AF24 | O | | | 3 | | | | 0/2/0/m/3 |
| 29 | Quantum Mechanics 1 | BMETE15AF49 | O | | | | 3 | | | 3/0/0/e/3 |
| 30 | Practical Course in Quantum Mechanics 1 | BMETE15AF28 | O | | | | 3 | | | 0/2/0/m/3 |
| 31 | Electrodynamics 1 | BMETE15AF25 | O | | | | | 2 | | 2/0/0/e/2 |
| 32 | Practical Course in Electrodynamics 1 | BMETE15AF26 | O | | | | | 3 | | 0/2/0/m/3 |
| 33 | Optics | BMETE12AF35 | O | | | | | 4 | | 2/2/0/e/4 |
| 34 | Introduction to Solid State Physics | BMETE11AF05 | O | | | | | 2 | | 2/0/0/e/2 |
| 35 | Practical Course in Solid State Physics | BMETE11AF06 | O | | | | | 2 | | 0/2/0/m/2 |
| 36 | Statistical Physics 1 | BMETE15AF29 | O | | | | | | 2 | 2/0/0/e/2 |
| 37 | Practical Course in Statistical Physics 1 | BMETE15AF30 | O | | | | | | 3 | 0/2/0/m/3 |
| 38 | Specialization Subjects (see the program of the physics and applied physics specializations bellow) | | O/O P | | | | | 16 | 13 | 12 |
| 39 | Thesis Work | BMETE15AF11 | O | | | | | | 10 | 0/0/10/m/10 |
| Elective Courses | | | | 9 | | | | | | |
| 40 | Elective courses | | E | | | 2 | 4 | | | 3 |
| | Total Credits: | | | 29 | 30 | 30 | 31 | 30 | 30 | 180 |
| | Contact Hours** | | | 24 | 25 | 26 | 24 | 25 | 16 | |
| | Exams** | | | 3 | 3 | 4 | 3 | 4 | 2 | |

**** Estimated value with typical choice.**

Criterion Courses

Physicist Specialization

| Subject, Code, Type | | 1 | 2 | 3 | 4 | 5 | 6 | |
|---------------------|---|-------------|----|---|---|---|---|-----------|
| 53 | Advanced Laboratory Exercises in Physics 1 | BMETE11AF32 | O | | | 5 | | 0/0/4/m/5 |
| 54 | Advanced Laboratory Exercises in Physics 2 | BMETE11AF33 | O | | | | 5 | 0/0/4/m/5 |
| 55 | Chemistry | BMEVEFKA146 | O | | | 2 | | 2/0/0/e/2 |
| | Advanced Solid State Physics: Chosable from these two subjects | | O | | | | 2 | |
| 56 | Theoretical Solid State Physics | BMETE11AF34 | OP | | | | | 2/0/0/e/2 |
| 57 | Applied Solid State Physics | BMETE11AF11 | OP | | | | | 2/0/0/e/2 |
| 58 | Seminar | BMETE15AF40 | O | | | | 2 | 0/2/0/m/2 |
| 59 | Optional Courses | | OP | | | 9 | 8 | 8 |

Optional Courses

| | | | | | | | | |
|----|---|--------------------|-----------|--|--|---|---|------------------|
| 60 | Mechanics 2 | BMETE15AF32 | OP | | | 2 | | 2/0/0/e/2 |
| 61 | Practical Course in Mechanics 2 | BMETE15AF44 | OP | | | 3 | | 0/2/0/m/3 |
| 62 | Quantum Mechanics 2 | BMETE15AF36 | OP | | | | 2 | 2/0/0/e/2 |
| 63 | Practical Course in Quantum Mechanics 2 | BMETE15AF43 | OP | | | | 3 | 0/2/0/m/3 |
| 64 | Electrodynamics 2 | BMETE15AF48 | OP | | | | 5 | 2/2/0/m/5 |
| 65 | Group Theory for Physicists | BMETE11AF40 | OP | | | | 5 | 2/2/0/e/5 |
| 66 | Theory of Relativity | BMETE15AF55 | OP | | | | 3 | 2/0/0/m/3 |
| 67 | Classical and Quantum Chaos | BMETE15AF45 | OP | | | | 3 | 2/0/0/e/3 |
| 68 | Physical Chemistry | BMEVEFKA147 | OP | | | | 3 | 2/0/0/e/3 |
| 69 | Fluid Mechanics | BMEGEÁTAF11 | OP | | | 3 | | 2/0/0/m/3 |
| 70 | Introduction to Experimental Data Handling | BMETE80AF38 | OP | | | 3 | | 2/0/0/e/3 |
| 71 | Computer Solution of Technical and Physical Problems | BMETE11AF41 | OP | | | | 3 | 0/0/2/m/3 |
| 72 | Computer Controlled Measurements | BMETE11AF38 | OP | | | 3 | | 0/0/2/m/3 |
| 73 | Measurement Control Project Work in LabVIEW Environment | BMETE11AF39 | OP | | | | 3 | 0/0/2/m/3 |
| 74 | Advanced Laboratory Exercises in Physics 3 | BMETE12AF21 | OP | | | | 5 | 0/0/4/m/5 |
| 75 | <i>Quantum Information Processing</i> [#] | <i>BMETE11MF42</i> | <i>OP</i> | | | | 3 | <i>2/0/0/e/3</i> |
| 76 | Scientific Programming | BMETE15AF54 | OP | | | 4 | | 1/0/2/m/4 |

#: Subject of MSc training, it can be chosen in BSc.

Applied Physics Specialization

| Subject, Code, Type | | 1 | 2 | 3 | 4 | 5 | 6 | |
|---------------------|---|-------------|----|---|---|---|---|-----------|
| 77 | Advanced Laboratory Exercises in Physics 1 | BMETE11AF32 | O | | | 5 | | 0/0/4/m/5 |
| 78 | Advanced Laboratory Exercises in Physics 2 | BMETE11AF33 | O | | | | 5 | 0/0/4/m/5 |
| 79 | Advanced Laboratory Exercises in Physics 3 | BMETE12AF21 | O | | | | | 0/0/4/m/5 |
| | Advanced Solid State Physics: Chosable from these two subjects | | O | | | | | 2 |
| 80 | Theoretical Solid State Physics | BMETE11AF34 | OP | | | | | 2/0/0/e/2 |
| 81 | Applied Solid State Physics | BMETE11AF11 | OP | | | | | 2/0/0/e/2 |
| 82 | Introduction to Experimental Data Handling | BMETE80AF38 | O | | | 3 | | 2/0/0/e/3 |
| 83 | Chemistry | BMEVEFKA146 | O | | | 2 | | 2/0/0/e/2 |
| 84 | Optional Courses | | OP | | | 6 | 8 | 5 |

Optional Courses

Materials Science

| | | | | | | | | | |
|----|--|--------------------|-----------|--|--|--|---|---|-----------|
| 85 | Spectroscopy | BMETE12AF48 | OP | | | | 3 | | 2/0/0/e/3 |
| 86 | <i>Advanced Semiconductor Devices</i> [#] | <i>BMETE11MF52</i> | <i>OP</i> | | | | | 3 | 2/0/0/e/3 |
| 87 | Microtechnology and Nanotechnology | BMETE12AF33 | OP | | | | | 3 | 2/0/0/m/3 |
| 88 | Physics of Vacuum | BMETE12AF43 | OP | | | | 3 | | 2/0/0/m/3 |
| 89 | Fundamentals and Applications of Materials Science | BMETE12AF31 | OP | | | | 3 | | 2/0/0/e/3 |
| 90 | Introduction to Surface Physics | BMETE12AF32 | OP | | | | 3 | | 2/0/0/m/3 |
| 91 | Physical Chemistry | BMEVEFKA147 | OP | | | | 3 | | 2/0/0/e/3 |

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Theoretical Physics

| | | | | | | | | | |
|----|---|-------------|----|--|--|---|---|---|-----------|
| 92 | Quantum Mechanics 2 | BMETE15AF36 | OP | | | | 2 | | 2/0/0/e/2 |
| 93 | Practical Course in Quantum Mechanics 2 | BMETE15AF43 | OP | | | | 3 | | 0/2/0/m/3 |
| 94 | Electrodynamics 2 | BMETE15AF48 | OP | | | | | 5 | 2/2/0/m/5 |
| 95 | Fluid Mechanics | BMEGEÁTAF11 | OP | | | 3 | | | 2/0/0/m/3 |

Informatics-Physics

| | | | | | | | | | |
|----|---|-------------|----|--|--|---|---|--|-----------|
| 96 | Computer Controlled Measurements | BMETE11AF38 | OP | | | 3 | | | 0/0/2/m/3 |
| 97 | Measurement Control Project Work in LabVIEW Environment | BMETE11AF39 | OP | | | | 3 | | 0/0/2/m/3 |

| | | | | | | | | | |
|-----|--|--------------------|-----------|--|--|--|---|---|------------------|
| 98 | Scientific Programming | BMETE15AF54 | OP | | | | 4 | | 1/0/2/m/4 |
| 99 | Monte Carlo Methods | BMETE80AF45 | OP | | | | | 4 | 2/1/0/e/4 |
| 100 | The Fundamentals and Applications of Finite Element Modeling | BMETE12AF42 | OP | | | | 3 | | 2/0/0/m/3 |
| 101 | <i>Quantum Information Processing[#]</i> | <i>BMETE11MF42</i> | <i>OP</i> | | | | | 3 | <i>2/0/0/e/3</i> |

#: Subject of MSc training, it can be chosen in BSc.

Nuclear Technology

| | | | | | | | | | |
|-----|--|-------------|----|--|--|--|---|---|-----------|
| 102 | Nuclear Measurement Techniques | BMETE80AF42 | OP | | | | 3 | | 2/0/0/e/3 |
| 103 | Sustainable Development and Energetics | BMETE80AF06 | OP | | | | 3 | | 2/0/0/m/3 |
| 104 | Radiation Protection and its Regulatory Issues | BMETE80AF24 | OP | | | | | 2 | 2/0/0/m/2 |
| 105 | Thermo-hydraulics of Nuclear Power Plants | BMETE80AF31 | OP | | | | | 5 | 3/1/0/m/5 |
| 106 | Introduction to CFD Methods | BMETE80AF37 | OP | | | | | 4 | 1/0/2/m/4 |
| 107 | Reactor Physics | BMETE80AF33 | OP | | | | | 5 | 3/1/0/e/5 |
| 108 | Introduction to Fusion Plasma Physics | BMETE80AF36 | OP | | | | | 3 | 2/0/0/e/3 |
| 109 | Nuclear Safety | BMETE80AF30 | OP | | | | | 3 | 2/0/0/m/3 |
| 110 | Introduction to Geophysics | BMETE80AF44 | OP | | | | | 3 | 2/0/0/m/3 |
| 111 | Radiochemistry and Nuclear Chemistry | BMETE80AF32 | OP | | | | | 4 | 3/0/0/m/4 |
| 112 | Radioactive Waste Management | BMETE80AF10 | OP | | | | | 2 | 2/0/0/e/2 |
| 113 | Measurement and Diagnostics in Industry | BMETE80AF11 | OP | | | | | 2 | 2/0/0/m/2 |

Optics and Laser Physics

| | | | | | | | | | |
|-----|---|-------------|----|--|--|--|--|---|-----------|
| 114 | Laser Technique | BMETE12AF37 | OP | | | | | 3 | 2/0/0/m/3 |
| 115 | Planning and Construction of Physical Experiments | BMETE12AF41 | OP | | | | | 3 | 2/0/0/m/3 |
| 116 | Microscopy | BMETE12AF34 | OP | | | | | 3 | 2/0/0/m/3 |
| 117 | Introduction to the Physics of Ultrafast Pulses | BMETE12AF40 | OP | | | | | 3 | 2/0/0/m/3 |

Medical and Biophysics

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|-----|--|-------------|----|--|--|--|---|---|-----------|
| 118 | Medical Imaging Systems | BMETE80AF35 | OP | | | | | 3 | 2/0/0/m/3 |
| 119 | Foundations of Biophysics | BMETE12AF38 | OP | | | | 3 | | 2/0/0/m/3 |
| 120 | Chemical and Biomedical Measurement Techniques | BMETE14AF07 | OP | | | | 5 | | 2/0/2/m/5 |

Elective Courses

| | | | | | | | | | |
|--|--|-------------|---|--|--|--|---|---|-----------|
| | Applied Plasma Physics | BMETE12AF39 | E | | | | | 3 | 2/0/0/m/3 |
| | Selected Topics in the Modern Technologies | BMETE12AF14 | E | | | | | 2 | 2/0/0/m/2 |
| | Introduction to Analog and Digital Electronics | BMETE80AF28 | E | | | | 2 | | 1/0/1/m/2 |

| | | | | | | | | | |
|--|-------------|---|--|--|--|--|--|---|-----------|
| Mathematical Foundations of Quantum Theory | BMETE92AF55 | E | | | | | | 4 | 2/1/0/e/4 |
|--|-------------|---|--|--|--|--|--|---|-----------|