# Master degree programme Physics
Appendices to the Teaching and Exam Regulations

## Appendix I Teaching outcomes of the degree programme (art. 1.3)
The degree programme aims to train the students in such a way that they acquire the insight, skills and knowledge that allows the recipient of the degree to establish a professional career in the field of Physics.

## Appendix II Specializations of degree programme (art. 2.2)
The degree programme has the following tracks:
- Advanced Materials
- Quantum Universe
- Science, Business and Policy

## Appendix III Content of degree programme (art. 2.3)

### Specialization Advanced Materials

| Module | ECTS | Assessment | Practical | Prerequisites |
|---|---|---|---|---|
| Computational Physics | 5 | Assignments, reports | x | |
| Statistical Mechanics | 5 | Oral exam, assignments | | |
| Mathematical Methods of Physics | 5 | Assignments | | |
| Advanced Quantum Mechanics | 5 | Written exam | | |
| Cross-disciplinary Materials Science | 5 | Report | | |
| Structure at Macro, Micro and Nano Scale | 5 | Written exam, report/assignment | | |
| Functional Properties | 5 | Written exam, mandatory homework | | |
| Characterisation of Materials | 5 | Written exam | | |
| Elective specializing courses | 20 | See appendix IV | See app. IV | See appendix IV |
| Research | 60 | Assessment of performance, report, presentation, attendance general physics colloquium | x | Passed 35 ECTS of the masters's degree programme |

### Specialization Quantum Universe

| Module | ECTS | Assessment | Practical | Prerequisites |
|---|---|---|---|---|
| Computational Physics | 5 | Assignments, reports | x | |
| Statistical Mechanics | 5 | Oral exam, assignments | | |
| Mathematical Methods of Physics | 5 | Assignments | | |
| Advanced Quantum Mechanics | 5 | Written exam | | |
| General Relativity | 5 | Assignments, written exam | | |
| Particle Physics Phenomenology | 5 | Written exam | | |
| Electrodynamics of Radiation Processes | 5 | Written exam | | |
| Student Seminar Quantum Universe | 5 | Presentations | | |
| Elective specializing courses | 20 | See appendix IV | See app. IV | See appendix IV |
| Research | 60 | Assessment of performance, report, presentation, attendance general physics colloquium | x | Passed 35 ECTS of the masters's degree programme |

### Specialization Science, Business and Policy

| Module | ECTS | Assessment | Practical |
|---|---|---|---|
| Computational Physics | 5 | Assignments, reports | x |
| Statistical Mechanics | 5 | Oral exam, assignments | |
| Mathematical Methods of Physics | 5 | Assignments | |
| Advanced Quantum Mechanics | 5 | Written exam | |
| Courses in Advanced Materials, Applied Physics or Quantum Universe or Optional courses in Physics | 10 | See appendix III and IV | See app. |
| Course Science, Business and Policy | 20 | Assignment, exam | |
| Internship Science, Business and Policy | 40 | Assessment of performance, reports | x |
| Physics Research / Thesis | 30 | Assessment of performance, report, presentation , attendance general physics colloquium | x |

## Appendix IV Optional Modules (art. 2.4)

### Optional Courses in Advanced Materials

| Module | ECTS | Assessment | Practical |
|---|---|---|---|
| Many Particle Systems | 5 | Written exam | |
| Atomic and Molecular Interactions | 5 | Oral or written exam | |
| Mesoscopic Physics | 5 | written exam, presentation, report | |
| Mechanical Properties | 5 | Assignments | |
| Modern Laser Microscopy | 5 | Written exam | |
| Micromechanics | 5 | Oral exam, assignments and/or paper | |
| Non Linear Optics | 5 | Written exam | |
| Physics of Lasers | 5 | Written or Oral exam | |
| Polymer Physics | 5 | Written exam | |
| Statistical Methods in Physics | 5 | Written exam | |
| Surfaces and Interfaces | 5 | Written exam | |
| Theoretical Condensed Matter Physics | 5 | Written exam, assignments | |
| Ultrafast Time-Resolved Spectroscopy | 5 | Written exam, report | x |
| Courses in Applied Physics or Quantum Universe, on individual approval of the Board of Examiners (max. of 10 ECTS) | | As indicated in appendix III or IV of the corresponding programme | See app. III or IV of the corresponding programme |

### Optional Courses in Quantum Universe

| Module | ECTS | Assessment | Practical |
|---|---|---|---|
| Big Experiments | 5 | Written exam, presentation | |
| Elementary Particle Physics | 5 | Oral exam | |
| Formation and Evolution of Galaxies | 5 | Written exam | |
| Fundamental Constants | 5 | report, presentation | |
| Geometry and Topology | 5 | Assignments, oral presentation, report | |
| Cosmic Structure Formation (14/15) | 5 | Assignments, oral presentation | |
| Lie groups in Physics | 5 | Oral or written exam | |
| Stellar Structure and Evolution (14/15) | 5 | Written exam or presentation | |
| Plasma Physics | 5 | Written exam | |
| Quantum Field Theory | 5 | Oral Exam | |
| Statistical Methods in Physics | 5 | Written exam | |
| Nuclear Astrophysics | 5 | Written Exam | |
| Courses in Astronomy, Advanced Materials, Applied Physics or Mathematics, on individual approval of the Board of Examiners (max. of 10 ECTS) | | As indicated in appendix III or IV of the corresponding programme | See app. III or IV of the corresponding programme |

## Appendix V Entry requirements (art. 3.2)

For students admitted to the programme there are no entry requirements for the individual Modules.

## Appendix VI Admission to the degree programme and different specializations (art. 4.1.1 and 4.2)

Holders of the following Bachelor's degrees from the University of Groningen are considered to have sufficient knowledge and skills and will be admitted to the Master's degree programme in Physics on that basis:

- BSc Physics