

## Filosofian maisteri (FM), ympäristötiede

Maisterin tutkinnon laajuus on 120 opintopistettä. Opinnot koostuvat syventävistä pääaineen opinnoista, pro gradu – tutkielmasta, FM-seminaarista, kieli- ja viestintäopinnoista sekä sivuaine- tai muista opinnoista. Syventävistä opinnoista opiskelija valitsee joko **ympäristöterveyden ja -teknologian tai ympäristönmuutoksen biologian**.

### ***MSc degree, 120 Cp***

|   |                    |
|---|--------------------|
| <b>Language and communication studies</b>                                   | <b>min. 2 Cp*</b>  |
| <b>Methodological studies</b>   | <b>min. 8 Cp*</b>  |
| <b>Advanced level studies</b>   | <b>min. 80 Cp*</b> |
| MSc thesis  | (40 Cp*)           |
| including Maturity test   | (0 Cp*)            |
| <b>Alternative studies</b>  | <b>min. 25 Cp</b>  |
| <b>Select studies so that the overall amount of credit points is 120 Cp</b> |                    |

\*Compulsory studies

Ympäristötieteen opintojaksojen kuvaukset ja tarjontatiedot aikatauluineen löydät WebOodista opintojakson nimellä tai koodilla.

### **General skills studies for international students (given every autumn):**

| <b>CODE</b>    | <b>NAME OF THE COURSE</b>                                   | <b>CP</b> |
|----------------|---|-----------|
| <b>1131003</b> | Orientation for International students                      | 1         |
| <b>8031003</b> | University Study Skills                                     | 1         |
| <b>8031006</b> | University Computing Skills                                 | 2         |
| <b>8020280</b> | Information skills and Sources in Science for Int. Students | 1         |
| <b>8014301</b> | Finnish 1   | 4         |
| <b>3622111</b> | Basic Statistics in English                                 | 5         |
| <b>3710453</b> | Environmental Health for International Students             | 5         |
| <b>3710236</b> | Applied Water Chemistry                                     | 2         |
| <b>3710707</b> | General Microbiological Methods                             | 2         |
| <b>3710463</b> | Home Exam on Basics of Non-ionizing Radiation               | 4         |

## Advanced level studies in Environmental Science (min. 80 Cp), study years 2021-2023

### Compulsory advanced level studies 43 cp

| Koodi   | Opintojakso  |
|---------|--|
| 3710001 | MSc Thesis/Pro Gradu 40 cp                                   |
| 3710004 | Maturity test in MSc 0 cp                                    |
| 3710036 | MSc Thesis Seminar in Environmental Science and Biology 3 cp |

### Methodological studies 8 cp

| Koodi   | Opintojakso   |
|---------|---|
| 3710418 | Design of Ecological and Environmental Experiments * 4 cp                       |
| 3710557 | Environment and Health - Research Seminars 1 cp                                 |
| 3710028 | Personal Study Plan to MSc Degree (PSP MSc)* 1 cp                               |
| 3123101 | Philosophy and History of Biology* 3 cp   |
| 3710487 | Implementation of Teaching or Scientific Events in Environmental Science 1-3 cp |

\*compulsory study

### Advanced level studies, Environmental Health and Technology, 3710 978

#### General courses on Environmental Health and Technology

| Code    | Course  | Cp   | Timing       |
|---------|---|------|--------------|
| 3710465 | Environmental Risk Assessment                                       | 5    | Every autumn |
| 3710435 | Exposure Assessment   | 3    | Every autumn |
| 3710477 | Exposure Measurements and Modelling                                 | 6    | Spring 2022  |
| 3710475 | Chemicals, Environment and Health                                   | 5    | Every spring |
| 3710402 | Advanced Occupational Hygiene                                       | 3    | Autumn, 2022 |
| 4455703 | Environmental Epidemiology  | 3    | Spring, 2023 |
| 3710441 | Sisä- ja työymp. mittaukset ja riskien arviointi (SMR) (in Finnish) | 5    | Spring, 2023 |
| 3710458 | Environmental Data Mining   | 5    | Every autumn |
| 3710459 | Advanced Course on Environmental Data                               | 5    | Every spring |
| 3513028 | Advanced Geographical Information Systems                           | 5    | Spring 2022  |
| 3710713 | Practical Training, advanced studies                                | 3-10 | Continuously |
| 3710712 | Project Work in a Research Group                                    | 3-10 | Continuously |
| 3710302 | Specific Book Exams   | 3-10 | Continuously |

#### Courses on Aerosols and air pollutants

| Code    | Course  | Cp | Timing       |
|---------|---|----|--------------|
| 3710481 | Health Effects of Air Pollutants and Nanomaterials            | 6  | Autumn 2021  |
| 3710472 | Air Pollution Practicals                                      | 5  | Spring, 2023 |
| 3352703 | Climate Change  | 5  | Autumn 2022  |
| 3352707 | Aerosol Physics I   | 5  | Spring 2023  |
| 3352708 | Aerosol physics II  | 5  | Spring 2023  |
| 3352710 | Atmospheric Physics and Meteorology                           | 5  | Autumn 2021  |
| 3352709 | Atmospheric Chemistry   | 5  | Spring 2022  |
| 3710482 | Combustion, Emissions, and Control Technologies               | 5  | Spring 2022  |
| 3710443 | Sisäilman epäpuhtauksien hallinta ja ilmanvaihto (in Finnish) | 5  | Autumn 2021  |

Courses on Radiation

| <b>Koodi</b> | <b>Opintojakso</b>                                   | <b>Op</b> | <b>Ajoitus</b> |
|--------------|--|-----------|----------------|
| 3710404      | Radiation Biology                                    | 5         | spring 2023    |
| 3710470      | Radiation Biology Practicals                         | 5         | spring 2022    |
| 3710410      | Dosimetry of Ionising Radiation                      | 3         | spring 2023    |
| 3710446      | Radioecology and toxicology                          | 5         | autumn 2021    |
| 3710483      | Measurements and Dosimetry of Non-ionising Radiation | 6         | autumn 2022    |
| 3710464      | Radiation Biology Journal Club                       | 2         | continuously   |

Courses on Sustainable Water Quality and Technology

| <b>Koodi</b> | <b>Opintojakso</b>                        | <b>Op</b> | <b>Ajoitus</b>                                      |
|--------------|---|-----------|---|
| 3710460      | Advanced Water Hygiene                    | 5         | spring 2022   |
| 3710401      | Health-related Environmental Microbiology | 4         | autumn 2022   |
| 3710223      | Water Chemistry and Treatment Practicals  | 3         | every autumn,<br>continues to<br>spring<br>semester |
| 3123195      | Sustainable Water Management              | 5         | spring 2022   |

## Advanced level studies, Biology of Environmental Change, 3710979

### General courses on Biology of Environmental Change

| Code    | Course  | Cp   | Timing       |
|---------|---|------|--------------|
| 3710475 | Chemicals, Environment and Health                           | 5    | Every spring |
| 3710458 | Environmental Data Mining                                   | 5    | Every autumn |
| 3710459 | Advanced Course on Environmental Data                       | 5    | Every spring |
| 3513028 | Advanced Geographical Information Systems                   | 5    | Every spring |
| 3710713 | Practical Training, advanced studies                        | 3-10 | Continuously |
| 3710712 | Project Work in a Research Group                            | 3-10 | Continuously |
| 3710302 | Specific Book Exams   | 3-10 | Continuously |
| 3123196 | Genetic Modification of Organisms                           | 5    | Spring 2022  |
| 3123186 | Optical Methods in Plant Biology and Environmental Research | 5    | Every autumn |

### Courses on Environmental ecology

| Code     | Course  | Cp  | Timing       |
|----------|---|-----|--------------|
| 3123172  | Advanced Taxonomic Collection                       | 2-6 | Continuously |
| 3710486  | Chemical Ecology                                    | 5   | Autumn 2021  |
| 3123190  | Community Ecology                                   | 4   | Autumn 2022  |
| 3123175  | Current Issues in Aquatic Ecotoxicology             | 2   | Autumn 2021  |
| 3710462  | Ecological Risk Assessment                          | 5   | Every spring |
| 3123198  | Function of Plants in Changing Environment          | 8   | Spring 2023  |
| 3710485  | Entomology  | 4   | Autumn 2022  |
| 23123194 | Global Peatland Ecology                             | 3   | Autumn 2021  |
| 3123169  | Literature Report in Hydrobiology, Advanced studies | 3   | Continuously |
| 3123247  | Environmental Adaptation of Animals                 | 6   | Spring 2023  |

### Courses on Biogeochemistry

| Code     | Course  | Cp  | Timing       |
|----------|---|-----|--------------|
| 3710419  | Biogeochemistry                                     | 6   | Spring 2023  |
| 3710451  | Bioprocesses in Removal of Environmental Pollutants | 3   | Autumn 2021  |
| 3710469  | Journal Club in Biosphere-Atmosphere Interactions   | 2-4 | Continuously |
| 3710473  | Methods in Soil Ecology                             | 5   | Spring 2022  |
| 3710474  | Soil Ecology  | 6   | Spring 2022  |
| 3710455  | Stable Isotopes in Environmental Research           | 5   | Autumn 2021  |
| 3710468  | Methods in Microbial Biogeochemistry                | 5   | Spring 2023  |
| 3513125A | Carbon Dynamics in Forest Soils                     | 3   | Autumn 2021  |
| 3513125B | Carbon Dynamics of Forest Soils, Book Examination   | 2-4 |              |

### Kieli- ja viestintäopinnot (min. 2 cp)

| Code    | Course  | Cp | Timing       |
|---------|---|----|--------------|
| 8313300 | Advanced English Academic and Professional Communication for Applied Physics, Computer Science and Environmental Science          | 2  | Every spring |
| 8015017 | Advanced English Academic and Professional Communication for the International Master's Degree Programmes of Science and Forestry | 2  | Every spring |

### Sivuaineopinnot tai muut opinnot (väh. 25 op)

Maisterin tutkinnossa sivuaineopintoja suositellaan täydennettäväksi niin, että kandidaatin ja maisterin tutkinnot sisältävät yhteensä kaksi perusopintojen (2\*25 op) laajuista sivuainetta tai yhden aineopintojen (25+35 op) laajuisen sivuaineen. Sivuainekokonaisuuden voi valita niin Itä-Suomen yliopiston tai Avoimen yliopiston kuin muiden kotimaisten tai ulkomaisten yliopistojen opinnoista (katso esim. Asiantuntijuutta tukevat sivuainekokonaisuudet s. 7; maisteriopintoihin tarjolla myös toksikologian sivuaine, 4219801). FM-tutkintoon voi sisällyttää myös ulkomaisessa yliopistossa suoritettuja opintoja. Kv-opinnot kirjataan tutkintotodistukseen "Ulkomaisessa yliopistossa suoritettut opinnot" - kokonaisuutena (3710012), jos opintoja on vähintään 20 op.