# Major: Sustainable Metals Processing
# Master's Programme in Chemical, Biochemical and Materials Engineering

Course substitution arrangements for students who continue their studies according to the curriculum of 2022-2024 during the transitional period of 1.8.2024 - 31.12.2025, when some of the courses of the curriculum 2022-2024 are no longer taught.

## Common compulsory courses (3–5 cr)

| Code | Course name | ECTS credits | Equivalence in 1.8.2024 - 31.12.2025 |
|---|---|---|---|
| CHEM-E0105 | Academic Learning Community | 3–5 | Please contact the teacher |

## Compulsory core courses (40 cr)

| Code | Course name | ECTS credits | Equivalence in 1.8.2024 - 31.12.2025 |
|---|---|---|---|
| CHEM-E6100 | Fundamentals of Chemical Thermodynamics | 5 | The course continues |
| CHEM-E6130 | Metal Recycling Technologies | 5 | CHEM-E6230 Recycling Technologies D |
| CHEM-E6140 | Fundamentals of Minerals Engineering and Recycling | 5 | The course continues |
| CHEM-E6160 | Fundamentals of Pyrometallurgy | 5 | The course continues |
| CHEM-E6180 | Fundamentals of Hydrometallurgy | 5 | The course continues |
| CHEM-E7130 | Process Modeling | 5 | The course continues |
| CHEM-E6225 | Technical Innovation Project D | 10 | The course continues |

## Specialisation courses (choose a total of 20 cr)

| Code | Course name | ECTS credits | Equivalence in 1.8.2024 - 31.12.2025 |
|---|---|---|---|
| **Thermodynamics of Materials:** | | | |
| CHEM-E6105 | Thermodynamics of Solutions D | 5 | The course continues |
| CHEM-E6115 | Thermodynamics of Modeling and Simulation D | 5 | CHEM-L2180 Thermodynamics of Modeling and Simulation |
| **Sustainability of Metals:** | | | |
| CHEM-E6215 | Circular Economy Design Forum D | 5 | The course continues |
| CHEM-E6235 | Circular Economy for Materials Processing | 5 | The course continues |

**Ore Dressing and Recycling:**

| | | | |
|---|---|---|---|
| CHEM-E6145 | Unit Operations in Mineral Processing and Recycling | 5 | The course continues |
| CHEM-E7170* | Design Project in Chemical Engineering, part A | 5 | CHEM-E7127 Principles of Plant and Process Design D** |
| CHEM-E7180* | Design Project in Chemical Engineering, part B | 5 | CHEM-E7210 Capstone Project for Plant Design D** |

*Students completing *CHEM-E7170 Design Project in Chemical Engineering, part A* also need to complete *CHEM-E7180 Design project in Chemical Engineering, part B*

**Students completing CHEM-E7127 Principles of Plant and Process Design D also need to complete CHEM-E7210 Capstone Project for Plant Design D

**Pyrometallurgy:**

| | | | |
|---|---|---|---|
| CHEM-E6165 | Unit Processes in Pyrometallurgy | 5 | The course continues |
| CHEM-E7170* | Design Project in Chemical Engineering, part A | 5 | CHEM-E7127 Principles of Plant and Process Design D** |
| CHEM-E7180* | Design Project in Chemical Engineering, part B | 5 | CHEM-E7210 Capstone Project for Plant Design D** |

*Students completing *CHEM-E7170 Design Project in Chemical Engineering, part A* also need to complete *CHEM-E7180 Design project in Chemical Engineering, part B*

**Students completing CHEM-E7127 Principles of Plant and Process Design D also need to complete CHEM-E7210 Capstone Project for Plant Design D

**Hydrometallurgy:**

| | | | |
|---|---|---|---|
| CHEM-E6185 | Applied Electrochemistry and Corrosion | 5 | The course continues |
| CHEM-E7170* | Design Project in Chemical Engineering, part A | 5 | CHEM-E7127 Principles of Plant and Process Design D** |
| CHEM-E7180* | Design Project in Chemical Engineering, part B | 5 | CHEM-E7210 Capstone Project for Plant Design D** |

*Students completing *CHEM-E7170 Design Project in Chemical Engineering, part A* also need to complete *CHEM-E7180 Design project in Chemical Engineering, part B*

**Students completing CHEM-E7127 Principles of Plant and Process Design D also need to complete CHEM-E7210 Capstone Project for Plant Design D

**Chemical Engineering:**

| | | | |
|---|---|---|---|
| CHEM-E7150 | Reaction Engineering | 5 | The course continues |
| CHEM-E7120 | Laboratory Project in Chemical Engineering | 5 | The course continues |

For the elective studies to accompany the major, students can choose an individual research project related to their specialization studies:

| Code | Course name | ECTS credits | Equivalence in 1.8.2024 - 31.12.2025 |
|---|---|---|---|
| CHEM-E6210 | Individual Research Project V D | 5 or 10 | The course continues |