Aalto University School of Chemical Engineering

Course list, Academic year 2022-2023

- The course code has a link to the course description.
- Level: UG = bachelor, G = master, D = doctoral. Bachelor level students can choose master level courses as long as the prerequisites are fulfilled.
- As an exchange student, you should choose at least 2/3 of the courses from the field of study you are applying for. In the School of Chemical Engineeering, you can choose from all the courses offered in this school, they are considered one field. In addition, you may choose language courses and courses taught by the other schools in the fields of technology and science.
- The courses may have required prerequisites of limited vacancies and priority arrangements, no guarantee on admittance can be offered.
- The extent of the courses is given in ECTS (= European Credit Transfer System) credits. One credit corresponds to 27 hours of work, including lectures and other forms of instruction, exercises, seminars and independent work at home and in the library. The scope of a course can be 1-15 credits depending on the content of the course.
- A full study load is approximately 1600 hours per academic year which equals to 60 ECTS = 60 cr
- Periods I and II refer to teaching periods of the autumn term, and periods III and IV and V refer to the teaching periods of the spring term.
- For some courses, the teacher checks the prerequisites. For all others, students are responsible for checking themselves that the prerequisites are fulfilled.
- Remember to read course descriptions in MyCourses (https://mycourses.aalto.fi/) and Sisu (sisu.aalto.fi).
- There are some changes in the course selection every year. Check the latest information from Sisu (sisu.aalto.fi).
- All students must complete the course CHEM-E0140 Laboratory safety (0 cr)

Ø Not available for exchange students
\# Limited space on course

Bachelor level courses

	Code	Name	Level	Credits	Semester	Period
#	CHEM-A1610	Design Meets Biomaterials	UG	3 - 5	spring	IV-V
	CHEM-C1220	Principles of General and Organic Chemistry	UG	5	autumn	I
	CHEM-C1230	Principles of Physical Chemistry	UG	5	autumn	I
Ø	CHEM-C1240	General Chemistry Laboratory Course	UG	5	autumn	II
	CHEM-C1300	Fundamental Biosciences	UG	5	spring	III-IV
	CHEM-C2140	Process Control and Automation D	UG	5	spring	III-IV
	CHEM-C2150	Process Design	UG	5	spring	III-IV
	CHEM-C2310	Bioprocess Technology	UG	5	spring	IV-V
	CHEM-C2330	Biochemistry	UG	5	autumn	I
	CHEM-C2340	Industrial Biomass Processes	UG	5	spring	III-IV
	CHEM-C2470	Forests, Wood and Carbon	UG	5	autumn, spring	I, V
	CHEM-C2480	Metallurgical Engineering and Technical Analysis of Lifecycle and Sustainability	UG	*Taught for the first time in AY23-24*		
Ø	CHEM-C3000	Research Project in Chemical Engineering	UG	5 - 10	autumn, spring, summer	I - Summer
	CHEM-C3410	Nanomaterials	UG	5	autumn	I-II
#	CHEM-C3420	Basics of Polymer Technology	UG	5	autumn	I-II

Master level courses

	Code	Name	Level	Credits	Semester	Period
	CHEM-E0115	Planning and Execution of a Biorefinery Investment Project	G	5	autumn	I–II
	CHEM-E0140	Laboratory Safety Course D	UG, G, D	0	autumn, spring	I - Summer
Ø	CHEM-E0145	Inno-Mission Internship	G	5	summer	Summer
	CHEM-E0150	Orientation for exchange students in the School of Chemical Engineering	G	1	autumn, spring	I, III
Ø	CHEM-E0155	AMIS Summer school	G	3	Summer	Summer
Ø	CHEM-E0160	Inno-Project I	G	6	autumn, spring	I - V
	CHEM-E0200	Textile Finishing D	G, D	5	autumn	I–II
	CHEM-E0205	Textile Coloration D	G, D	5	spring	IV–V
	CHEM-E0215	Textile Fibres	G	5	autumn	I- II

Biomass Refining

	Code	Name	Level	Credits	Semester	Period
	CHEM-E1100	Plant Biomass	G	5	autumn	I
	CHEM-E1105	Advanced Fibreline Processes D	G, D	5	spring	IV
	CHEM-E1110	Lignocellulose Chemistry	G	5	autumn	II
	CHEM-E1120	Thermochemical Processes	G	5	spring	III–V
	CHEM-E1130	Catalysis	G	5	spring	III
	CHEM-E1150	Biomass Pretreatment and Fractionation – in Class D	G, D	5	spring	III - IV
#	CHEM-E1160	Biomass Pretreatment and Fractionation - in Laboratory	G	5	spring	III–V
	CHEM-E1210	Bioproduct Mill Recovery Processes	G	5	autumn	I
Ø	CHEM-E1220	Sustainability in Bioproduct Industry D	G, D	5	autumn	II

Fibre and Polymer Engineering

Code	Name	Level	Credits	Semester	Period
CHEM-E2100	Polymer Synthesis	G	5	autumn	I

Ø	CHEM-E2110	Polymer Technology Laboratory Exercises	G	5	autumn	I–II
	CHEM-E2120	Fibres and Fibre Products	G	5	autumn	I
	CHEM-E2125	Web-Based Natural Fiber Products	G	5	spring	III-IV
#	CHEM-E2130	Polymer Properties	G	5	autumn	II
	CHEM-E2135	Converting of Web-Based Products	G	5	spring	IV–V
	CHEM-E2140	Cellulose-Based Fibres D	G, D	5	autumn	I–II
#	CHEM-E2145	Polymer Reaction Engineering D	G, D	5	spring	III–V
	CHEM-E2150	Interfacial Phenomena in Biobased Systems D	G, D	5	spring	III
	CHEM-E2155	Biopolymers D	G, D	5	spring	III–IV
	CHEM-E2160	Product Development Practices	G	5	spring	III–V
	CHEM-E2165	Computer Aided Visualization and Scientific Presentation D *NOTE! Not organized in AY22-23*	G, D	3–5	spring	IV-V
	CHEM-E2170	Advanced Wood Science D *NOTE! Not organized in AY22-23*	G, D	5	autum	I
	CHEM-E2195	Interfacial Phenomena in Renewable Materials Research Project V D	G, D	5–10	autumn, spring	I, II, III, IV, V
#	CHEM-E2200	Polymer Blends and Composites	G	5	autumn	I
#	CHEM-E2205	Materials for a World in Transition D	G, D	5	spring	III
	CHEM-E2215	Coatings	G	5	autumn	II
	CHEM-E2220	Product Development Project Course	G	5	autumn	I–II
	CHEM-E2225	Wood Materials Science	G	5	spring	III
	CHEM-E2235	Wood Product and Processes	G	5	spring	IV

Biotechnology

	Code	Name	Level	Credits	Semester	Period
#	CHEM-E3110	Biolab I	G	5	autumn	I
	CHEM-E3121	Microbial Physiology D	G, D	5	autumn	I
Ø	CHEM-E3130	Biolab II	G	5	autumn	II
#	CHEM-E3140	Bioprocess Technology II	G	5	autumn	II
	CHEM-E3150	Biophysical Chemistry D	G, D	5	spring	III
#	CHEM-E3160	Biolab III	G	5	spring	IV–V
	CHEM-E3170	Systems Biology	G	5	spring	IV–V
	CHEM-E3190	Metabolism D	G, D	5	autumn	I
#	CHEM-E3205	Bioprocess Optimization and Simulation	G	5	autumn	I

Chemistry

	Code	Name	Level	Credits	Semester	Period
#	CHEM-E4101	Laboratory Work in Inorganic Chemistry	G	5	autumn	I - II
#	CHEM-E4102	Laboratory Work in Organic Chemistry	G	5	spring	III
#	CHEM-E4103	Laboratory Work in Physical Chemistry	G	5	spring	IV - V
	CHEM-E4105	Nanochemistry and Nanoengineering	G	5	spring	IV
	CHEM-E4106	Electrochemistry D	G, D	5	spring	III
#	CHEM-E4107	Laboratory work in Electrochemistry D	G, D	3-5	spring	IV - V
	CHEM-E4108	Modern Methods in Metal Catalysis D	G, D	5	spring	III
	CHEM-E4110	Quantum mechanics and Spectroscopy	G	5	autumn	I
	CHEM-E4115	Computational Chemistry I D	G, D	5	spring	IV-V
	CHEM-E4116	Synthesis strategies and design D	G, D	5	spring	III
	CHEM-E4120	Quantitative Instrumental Analysis	G (no UG students)	5	autumn	II
	CHEM-E4130	Chemistry of the Elements	G	5	autumn	I
	CHEM-E4135	Advanced Analytical Chemistry *Note, organized every other year, next time AY2023-24*	G (no UG students)	5	spring	III
	CHEM-E4155	Solid State Chemistry	G	5	spring	III-IV
	CHEM-E4165	Chemical Instrumentation and Electroanalytical Methods *Note! Every other year,no teaching in AY23-24*	G (no UG students)	5	spring	IV-V
	CHEM-E4170	Advanced Organic Chemistry D	G, D	5	autumn	II
	CHEM-E4205	Crystallography Basics and Structural Characterization	G	5	spring	IV-V
	CHEM-E4206	Organic Chemistry Literature Club D	G,D	5	spring	III
	CHEM-E4210	Molecular Thermodynamics D	G, D	5	autumn	II
	CHEM-E4215	Functional Inorganic Materials	G	5	autumn	I
	CHEM-E4225	Computational Chemistry II D	G, D	5	autumn	II
	CHEM-E4230	Physical Organic Chemistry D	G, D	5	autumn	II
	CHEM-E4235	Transport Processes at Electrodes and Membranes D	G, D	5	autumn	I
#	CHEM-E4255	Electrochemical Energy Conversion D	G, D	5	autumn	II
	CHEM-E4275	Research project in chemistry I	G	5	autumn,spring	I - II, III - V
	CHEM-E4285	Research project in chemistry II	G	5	autumn,spring	I - II, III - V

Functional Materials

	Code	Name	Level	Credits	Semester	Period
	CHEM-E5105	Powder Metallurgy and Composites D	G, D	5	autumn	I
#	CHEM-E5115	Microfabrication D	G, D	5	spring	IV-V
#	CHEM-E5125	Thin Film Technology D	G, D	5	spring	III
#	CHEM-E5140	Materials Characterization, laboratory course	G	5	autumn	I–II
#	CHEM-E5150	Surfaces and Films	G (no UG students)	5	autumn	I–II
#	CHEM-E5160	Functional Soft Materials D	G, D (no UG students)	5	autumn	I
Ø	CHEM-E5200	Personal Research Assignment in Functional Materials, V	G	5 or 10	autumn, spring, summer	I - Summer
Ø	CHEM-E5220	Group Research Assignment in Functional Materials, V	G	5	autumn	I-II
	CHEM-E5230	Advanced Micro- and Nanotechnology D	G, D	8	autumn	I-II
#	CHEM-E5240	Advanced Materials Characterization D	G, D	5	autumn	I-II

Sustainable Metals Processing

	Code	Name	Level	Credits	Semester	Period
	CHEM-E6100	Fundamentals of Chemical Thermodynamics	G	5	autumn	II
	CHEM-E6105	Thermodynamics of Solutions D	G, D	5	spring	III
	CHEM-E6115	Thermodynamics of Modeling and Simulation D	G, D	5	spring	IV–V
	CHEM-E6130	Metal Recycling Technologies	G	5	autumn	II
	CHEM-E6140	Fundamentals of Minerals Engineering and Recycling	G	5	autumn	I
	CHEM-E6145	Unit Operations in Mineral Processing and Recycling	G	5	spring	III–IV
	CHEM-E6160	Fundamentals of Pyrometallurgy	G	5	autumn	II
	CHEM-E6165	Unit Processes in Pyrometallurgy	G	5	spring	III–IV
	CHEM-E6180	Fundamentals of Hydrometallurgy	G	5	autumn	I -II
	CHEM-E6185	Applied Electrochemistry and Corrosion	G	5	spring	III–IV
	CHEM-E6210	Individual Research Project V D	G, D	5 or 10	spring	III–V
#	CHEM-E6215	Circular Economy Design Forum D	G, D	5	spring	IV–V
	CHEM-E6225	Technical Innovation Project D	G, D (2nd year masters onwards)	10	autumn	I–II
#	CHEM-E6235	Circular Economy for Materials Processing	G	5	spring	IV

Chemical and Process Engineering

	Code	Name	Level	Credits	Semester	Period
#	CHEM-E7100	Engineering Thermodynamics, Separation Processes, part I D	G, D	5	autumn	I
	CHEM-E7105	Process Development	G	5	autumn	I-II
#	CHEM-E7110	Engineering Thermodynamics, Separation Processes, part II D	G, D	5	autumn	II
Ø	CHEM-E7115	Experimental Assignments in Chemical Engineering	G	5	autumn, spring	I–V
Ø	CHEM-E7120	Laboratory Project in Chemical Engineering	G	5	spring	III–V
	CHEM-E7130	Process Modeling	G	5	autumn	I
	CHEM-E7135	Reactor Design	G	5	spring	III–IV
	CHEM-E7150	Reaction Engineering	G	5	autumn	II
	CHEM-E7151	Production Planning and Optimization	G (no UG students)	5	autumn	I
	CHEM-E7160	Fluid Flow in Process Units	G	5	spring	IV–V
Ø	CHEM-E7170	Design Project in Chemical Engineering, part A	G	5	autumn	I–II
	CHEM-E7175	Process Safety and Sustainability D	G, D	5	autumn	I–II
Ø	CHEM-E7180	Design Project in Chemical Engineering, part B	G	5	autumn	I-II
	CHEM-E7185	Plant/Process Design and Business Management	G	5	spring	III–V
	CHEM-E7190	Process Dynamics and Control D	G, D	5	autumn	II
	CHEM-E7215	Special Course in Process Systems Engineering D	G, D (no UG students)	5	spring	IV
	CHEM-E7225	Advanced Process Control D	G, D (no UG students)	5	spring	III

Biosystems and Biomaterials Engineering

	Code	Name	Level	Credits	Semester	Period
	CHEM-E8100	Organic Structural Analysis	G	5	autumn	I
#	CHEM-E8110	Laboratory Course in Biosystems and Biomaterials Engineering	G	5	autumn	I-II
	CHEM-E8115	Cell Factory D	G, D	5	spring	III
	CHEM-E8120	Cell Biology	G	5	autumn	II
	CHEM-E8125	Synthetic Biology	G	5	spring	IV-V
	CHEM-E8135	Microfluidics and BioMEMS D	G, D	5	spring	III-IV