

## CHECKLIST Bachelor of Engineering (Honours) – Chemical Engineering Specialisation: Transition to new program (commencing 2024)

\* This checklist is for the BE(Hons) component ONLY for dual programs with Bachelor of Computer Science

### Important Notes:

- The information contained in this document is intended as general advice only. Students must follow the program rules & requirements listed on the [Programs and Courses Website](#) relevant to the year they commence. This planner must be used in conjunction with your program duration course list and program rules.
- Students need to check future course offerings, prerequisites, incompatibilities and restrictions for all courses as these are subject to change.
- Students cannot take courses that are incompatible with courses already counted towards their program, and cannot count the same course twice.
- Please view the Bachelor of Computer Science transition checklist for the requirements for the BCompSc Core, BCompSc Major and No Major Options

For the BE(Hons) component, with a specialisation in Chemical Engineering:

(a) 60 units from the BE(Hons) component, comprising—

- I. 8 units for all [BE\(Hons\) Core Courses](#); and
- II. 36 units for one [Specialisation in Chemical Engineering](#); and
- III. One of the following:
  - a. 16 units for one Major from Chemical Engineering Major Options\*, or  
\*Majors available in: [Biomedical Engineering](#); [Bioprocess Engineering](#); [Environmental Engineering](#); [Materials Engineering](#); [Metallurgical Engineering](#)
  - b. 16 units for Chemical Engineering Specialisation [No Major option](#)

✓/x compl.	BE(Hons) Core Courses (8 units)	Sem offering	#	First offered	Approved substitution	Last offered
<b>8 units for all Core Courses</b>						
	<b>ENGG1100</b> Professional Engineering	1,2	2		Course must be completed [ENGG1211 (4 units) will count as 2 units towards Part A in lieu of ENGG1100, and 2 units towards program electives]	
	<b>ENGG1001</b> Programming for Engineers or <b>CSSE1001</b> Introduction to Software Engineering	1,2	2		Course must be completed	
	<b>MATH1051</b> Calculus & Linear Algebra I or <b>MATH1071</b> Advanced Calculus & Linear Algebra I	1,2	2		Course must be completed	
	<b>MATH1052</b> Multivariate Calculus & Ordinary Differential Equations or <b>MATH1072</b> Advanced Multivariate Calculus & Ordinary Differential Equations	1,2	2		Course must be completed	

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## Specialisation in Chemical Engineering

Complete 48 units comprising:

- i. 34 units for all [Chemical Engineering Compulsory Courses](#), and
- ii. 2 units from [BE\(Hons\) Program Elective Courses](#)

✓/x compl.	Chemical Engineering Specialisation (36 units)	Sem offering	#	First offered	Approved substitution	Last offered
34 units for all Compulsory Courses						
	CHEM1100 Chemistry 1	1,2	2		Course must be completed	
	ENGG1500 Thermodynamics: Energy and the Environment	1,2	2		ENGG1500 Engineering Thermodynamics	
	CHEE2001 Process Principles	2	2		Course must be completed	
	CHEE2003 Fluid & Particle Mechanics (will change to semester 1 in 2022)	2	2		Course must be completed	
	CHEE2010 Engineering Investigation & Statistical Analysis	1	2		Course must be completed	
	CHEE2020 Process Equipment & Control Systems (NEW)(from 2022)	2	2		CHEE4060 Process & Control System Synthesis (discontinued)	1/23
	CHEE2030 Chemical Thermodynamics	2	2		CHEE3003 Chemical Thermodynamics (discontinued)	1/22
	CHEE2040 Heat & Mass Transfer	2	2		CHEE3002 Heat & Mass Transfer (discontinued)	1/22
	CHEM2056 Physical Chemistry for Engineering	2	2		Course must be completed	
	CHEE3004 Unit Operations (will change to semester 1 in 2023)	2	2		Course must be completed	
	CHEE3005 Reaction Engineering (will change to semester 1 in 2023)	2	2		Course must be completed	
	CHEE3007 Process Modelling & Dynamics	2	2		Course must be completed	
	CHEE3020 Process Systems Analysis (will change to semester 2 in 2023)	1	2		Course must be completed	
	CHEE4001 Process Engineering Design Project	2	4		Course must be completed	
	CHEE4002 Risk in Process Industries	1	2		Course must be completed	
	ENGG4901 Professional Practice and the Business Environment A Or ENGG4902 Professional Practice and the Business Environment B	1,2	2	1/24	ENGG4900 Professional Practice and the Business Environment (discontinued)	2/23

2 units from BE(Hons) Program Elective Courses

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## Chemical Engineering No Major Option

Complete 16 units comprising -

- i. 8 to 16 units from [Chemical Engineering Advanced Elective Courses](#), and
- ii. 0 to 8 units from [Chemical Engineering Research Elective Courses](#), and
- iii. 0 to 8 units from [Chemical Engineering Breadth Elective Courses](#), and
- iv. 0 to 4 units from [BE\(Hons\) Program Elective Courses](#), and
- v. 0 to 4 units from [General Elective Courses](#)

✓/x compl.	Chemical Engineering No Major (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
<b>8 to 16 units from Chemical Engineering Advanced Elective Courses</b>						
	<b>BIOE3001 Quantitative Methods in Biomedical Engineering</b>	2	2		No substitution	
	<b>BIOE4020 Bioprocess Engineering</b>	1	2		No substitution	
	<b>BIOE6028 Metabolic Engineering</b>	2	2		<b>CHEE4028 Metabolic Engineering (discontinued)</b>	<b>2/20</b>
	<b>BIOE6034 Cell and Tissue Engineering</b>	1	2		<b>CHEE4034 Cell &amp; Tissue Engineering (discontinued)</b>	<b>1/20</b>
	<b>BIOE4305 Biomaterials: Materials in Medicine</b>	2	2		<b>CHEE4305 Biomaterials: Materials in Medicine (discontinued)</b>	<b>2/20</b>
	<b>CHEE3008 Special Topics C</b>	1,2	2		No substitution	
	<b>CHEE3301 Polymer Engineering</b>	1	2		No substitution	
	<b>CHEE4003 Special Topics A</b>	2	2		No substitution	
	<b>CHEE4009 Transport Phenomena</b>	1	2		No substitution	
	<b>CHEE4012 Industrial Wastewater &amp; Solid Waste Management</b>	2	2		No substitution	
	<b>CHEE4020 Bioprocess Engineering</b>	1	2		No substitution	
	<b>CHEE4022 Principles of Adsorption</b>	2	2		No substitution	
	<b>CHEE4303 Interface and Colloid Science and Engineering</b>	2	2		No substitution	
	<b>ENGG3500 Reservoir Engineering</b>	2	2		No substitution	
	<b>ENGY4000 Energy Systems</b>	1	2		No substitution	
	<b>ENVE3150 Environmental Systems Dynamics and Modelling</b>	2	2		No substitution	
	<b>ENVE3160 Environmental Phenomena</b>	1	2		No substitution	

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	<b>ENVE4610</b> Engineering the Circular Economy	1	2	<b>1/24</b>	No substitution	
	<b>MATE6301</b> Nanomaterials	2	2		<b>CHEE4301</b> Nanomaterials (discontinued)	<b>2/20</b>
	<b>MATE4302</b> Electrochemistry and Corrosion	2	2		<b>CHEE4302</b> Electrochemistry & Corrosion (discontinued)	<b>2/20</b>
	<b>MECH4304</b> Net Shape Manufacturing	1	2		No substitution	
	<b>METL6204</b> Hydrometallurgy and Electrometallurgy	1	2		No substitution	
	<b>METL6212</b> Pyrometallurgy	1,2	2		No substitution	
	<b>WATR6103</b> Advanced Wastewater and Biosolids Treatment	2	2		No substitution	

0 to 8 units from Chemical Engineering Research Elective Courses						
	<b>CHEE4006</b> Research Project	1	2		No substitution	
	<b>CHEE4007</b> Research Project	2	2		No substitution	
	<b>CHEE4026</b> Research Thesis Or <b>CHEE4027</b> Research Thesis	1 2	4 4		No substitution	

0 to 8 units from Chemical Engineering Breadth Elective Courses						
	<b>ENGG4103</b> Engineering Asset Management	1	2		No substitution	
	<b>CHEM1200</b> Chemistry 2	1,2,S	2		No substitution	
	<b>ERTH1501</b> Earth Processes & Geological Materials for Engineers	1	2		No substitution	
	<b>FIRE3700</b> Introduction to Fire Safety Engineering	2	2		No substitution	
	<b>FOOD2000</b> Food Science	1	2		No substitution	
	<b>FOOD3011</b> Food Product Development	2	2		No substitution	
	<b>FOOD3017</b> Food Policy, Safety & Quality Management	1	2		No substitution	
	<b>MATH2001</b> Calculus & Linear Algebra II	1,2,S	2		<b>MATH2000</b> Calculus & Linear Algebra II (discontinued)	<b>2/20</b>
	<b>METR3100</b> Control System Implementation	2	2		No substitution	
	<b>MICR2000</b> Microbiology & Immunology	2	2		No substitution	
	<b>MICR2001</b> Food Microbiology I	2	2		No substitution	
	<b>MINE3110</b> Integrated Orebody Knowledge	2	2		No substitution	
	<p>Chemical Engineering Breadth Electives can also be chosen from course lists for the following majors:</p> <ul style="list-style-type: none"> <li>○ Biomedical Engineering</li> <li>○ Bioprocess Engineering</li> <li>○ Environmental Engineering</li> <li>○ Materials Engineering</li> <li>○ Metallurgical Engineering</li> </ul>					

0 to 4 units from BE(Hons) Program Elective Courses

0 to 4 units from General Elective Courses

## Biomedical Engineering Major Option

Complete 16 units comprising:

- i. 4 units for all [Biomedical Engineering Courses for Chemical Engineers](#), and
- ii. 8 units for all [Biomedical Engineering Compulsory Courses](#), and
- iii. 4 units from [Biomedical Engineering Elective Courses](#)

✓/X compl.	Major in Biomedical Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
<b>4 units for Biomedical Engineering courses for Chemical Engineers <u>only</u></b>						
	<b>BIOE4020</b> Bioprocess Engineering	1	2		Course must be completed	
	<b>BIOE6034</b> Cell & Tissue Engineering	1	2		<b>CHEE4034</b> Cell & Tissue Engineering (discontinued)	<b>1/20</b>

<b>8 units for Biomedical Engineering Compulsory Courses</b>						
	<b>BIOE1001</b> Principles of Biomedical & Bioprocess Engineering	1	2		<b>CHEE1001</b> Principles of Biological Engineering (discontinued)	<b>1/20</b>
	<b>BIOE3001</b> Quantitative Methods in Biomedical Engineering	2	2		Course must be completed	
	<b>BIOE4305</b> Biomaterials: Materials in Medicine	2	2		<b>CHEE4305</b> Biomaterials: Materials in Medicine (discontinued)	<b>2/20</b>
	<b>BIOE6901</b> Medical Device Engineering	1	2		<b>ELEC7901</b> Advanced Medical Device Engineering (discontinued)	<b>1/20</b>

<b>4 units from Biomedical Engineering Elective Courses</b>						
	<b>BIOC2000</b> Biochemistry & Molecular Biology	1	2		No substitution	
	<b>BIOC2001</b> Molecular Biophysics	2	2		No substitution	
	<b>BIOE6028</b> Metabolic Engineering	2	2		<b>CHEE4028</b> Metabolic Engineering (discontinued)	<b>2/20</b>
	<b>BIOE6403</b> Biomedical Instrumentation	2	2		<b>ELEC4403/ELEC6403</b> Biomedical Instrumentation (discontinued)	<b>2/20</b>
	<b>BIOE6034</b> Cell and Tissue Engineering	1	2			
	<b>BIOE6601</b> Medical Imaging	2	2		<b>ELEC6601</b> Medical Imaging (discontinued)	<b>2/20</b>
	<b>BIOL1040</b> Cells to Organisms	1,2	2		No substitution	
	<b>BIOL2200</b> Molecular Cell Biology I	1	2		No substitution	
	<b>BIOL2202</b> Genetics	2	2		No substitution	

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	<b>BINF3014</b> Advanced Bioinformatics (discontinued)	2	2		<b>BIOL3014</b> Advanced Bioinformatics (discontinued)	<b>2/20</b>
	<b>BIOM2011</b> Integrative Cell & Tissue Biology	1	2		No substitution	
	<b>BIOM2012</b> Systems Physiology	2	2		No substitution	
	<b>BIOM2020</b> Human Anatomy	1	2		No substitution	
	<b>COMP3820</b> Digital Health Software Project	2	2		No substitution	
	<b>COMP4702</b> Machine Learning	1	2		No substitution	
	<b>COMS4113</b> Photonics	1	2		<b>COMS4103</b> Photonics (discontinued)	<b>1/20</b>
	<b>COMS4104</b> Microwave Engineering	1	2		No substitution	
	<b>CSSE2002</b> Programming in the Large	1,2	2		No substitution	
	<b>CSSE4011</b> Advanced Embedded Systems	1	2		No substitution	
	<b>ELEC4620</b> Digital Signal Processing	2	2		No substitution	
	<b>ELEC4630</b> Image Processing and Computer Vision	1	2		No substitution	
	<b>MATE6301</b> Nanomaterials	2	2		<b>CHEE4301</b> Nanomaterials (discontinued)	<b>2/20</b>
	<b>MECH3301</b> Materials Selection	2	2		No substitution	
	<b>MECH4950</b> Advanced Manufacturing in Practice	2	2		No substitution	
	<b>METR4202</b> Robotics & Automation	2	2		No substitution	
	<b>MICR2000</b> Microbiology & Immunology	2	2		No substitution	
	<b>SCIE2100</b> Bioinformatics 1: Introduction	1	2		No substitution	
	<b>CHEE4026</b> Research Thesis or <b>CHEE4027</b> Research Thesis	1 2	4		<b>CHEE4006</b> Individual Inquiry OR <b>CHEE4007</b> Individual Inquiry (plus 2 units electives)	

## Bioprocess Engineering Major Option

Complete 16 units comprising:

- i. 12 units for all [Bioprocess Engineering Compulsory Courses](#), and
- ii. 0 to 4 units from [Bioprocess Engineering Breadth Electives](#), and
- iii. 0 to 4 units from [Chemical Engineering Advanced or Research Elective Courses](#)

✓/X compl.	Major in Bioprocess Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
<b>12 units for all Bioprocess Engineering Compulsory Courses</b>						
	<b>BIOE1001</b> Principles of Biomedical & Bioprocess Engineering or <b>BIOL1020</b> Genes, Cells & Evolution	1 1,2	2		<b>CHEE1001</b> Principles of Biological Engineering (discontinued)	<b>1/20</b>
	<b>BIOC2000</b> Biochemistry & Molecular Biology	1	2		Course must be completed	
	<b>BIOE4020</b> Bioprocess Engineering	1	2		Course must be completed	
	<b>BIOL2202</b> Genetics	2	2		Course must be completed	
	<b>BIOT3009</b> Quality Management Systems in Biotechnology	1	2		Course must be completed	
	<b>BIOE6028</b> Metabolic Engineering	2	2		<b>CHEE4028</b> Metabolic Engineering (discontinued)	<b>2/20</b>

<b>0 to 4 units from Bioprocess Engineering Elective Courses</b>						
<b>Selected courses must include at least 2 units at level 3 or higher.</b>						
	<b>BIOC3005</b> Molecular Systems Biology	2	2		No substitution	
	<b>BIOE3001</b> Quantitative Methods in Biomedical Engineering	2	2		No substitution	
	<b>BIOL3213</b> Plant Biology and Biotechnology	1	2		No substitution	
	<b>BIOE4305</b> Biomaterials: Materials in Medicine	2	2		<b>CHEE4305</b> Biomaterials: Materials in Medicine (discontinued)	<b>2/20</b>
	<b>BIOE6034</b> Cell & Tissue Engineering	1	2		<b>CHEE4034</b> Cell & Tissue Engineering (discontinued)	<b>1/20</b>
	<b>BIOL3303</b> Genomics	1	2		<b>BIOL3004</b> Genomics & Bioinformatics (discontinued)	<b>1/20</b>
	<b>BIOM2402</b> Principles of Pharmacology	2	2		No substitution	
	<b>BIOT3002</b> Drug Design & Development	1	2		No substitution	
	<b>BIOT3004</b> Commercialisation of Biotechnology Products	2	2		No substitution	
	<b>FOOD1001</b> Principles of Food Preservation	1	2		No substitution	

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	<b>FOOD3008</b> Food Process Engineering II	2	2		No substitution	
	<b>SCIE2100</b> Introduction to Bioinformatics	1	2		No substitution	

	<b>0 to 4 units from Chemical Engineering Advanced or Research Elective Courses</b>					
	<b>BIOE3001</b> Quantitative Methods in Biomedical Engineering	2	2		No substitution	
	<b>BIOE4020</b> Bioprocess Engineering	1	2		No substitution	
	<b>BIOE4305</b> Biomaterials: Materials in Medicine	2	2		<b>CHEE4028</b> Metabolic Engineering (discontinued)	<b>2/20</b>
	<b>BIOE6028</b> Metabolic Engineering	1	2		<b>CHEE4034</b> Cell & Tissue Engineering (discontinued)	<b>1/20</b>
	<b>BIOE6034</b> Cell and Tissue Engineering	2	2		<b>CHEE4305</b> Biomaterials: Materials in Medicine (discontinued)	<b>2/20</b>
	<b>CHEE3008</b> Special Topics C	1,2	2		No substitution	
	<b>CHEE3301</b> Polymer Engineering	1	2		No substitution	
	<b>CHEE4003</b> Special Topics A	2	2		No substitution	
	<b>CHEE4009</b> Transport Phenomena	1	2		No substitution	
	<b>ENGY4000</b> Energy Systems	2	2		No substitution	
	<b>ENVE3150</b> Environmental Systems Dynamics & Modelling	1	2		No substitution	
	<b>ENVE3160</b> Environmental Phenomena	2	2		No substitution	
	<b>ENVE4610</b> Engineering the Circular Economy	2	2		No substitution	
	<b>MATE4302</b> Electrochemistry and Corrosion	2	2		No substitution	
	<b>MATE6301</b> Nanomaterials	1	2		No substitution	
	<b>MECH4304</b> Net Shape Manufacturing	2	2		No substitution	
	<b>METL3219</b> Process Mineralogy and Comminution	1	2		No substitution	
	<b>METL3220</b> Physical Separations and Interfacial Engineering	1	2	<b>1/24</b>	No substitution	
	<b>METL6204</b> Hydrometallurgy and Electrometallurgy	2	2	<b>2/21</b>	<b>CHEE4301</b> Nanomaterials (discontinued)	<b>2/20</b>

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	<b>METL6212</b> Pyrometallurgy	2	2	<b>2/21</b>	<b>CHEE4302</b> Electrochemistry & Corrosion (discontinued)	<b>2/20</b>
	<b>WATR6103</b> Advanced Wastewater and Biosolids Treatment	1	2		No substitution	
	<b>CHEE4006</b> Research Project	1	2		No substitution	
	<b>CHEE4007</b> Research Project	2	2		No substitution	
	<b>CHEE4026</b> Thesis Project or <b>CHEE4027</b> Thesis Project	1 2	4		No substitution	

## Environmental Engineering Major Option

Complete 16 units comprising:

- i. 8 units for all [Environmental Engineering Compulsory Courses](#), and
- ii. 4 to 8 units from [Environmental Engineering Elective Courses](#), and
- iii. 0 to 4 units from [Environmental Engineering Research Elective Courses](#), and
- iv. 0 to 4 units from [Environmental Engineering Breadth Elective Courses](#), and
- v. 0 to 4 units from [Chemical Engineering Advanced Elective Courses](#), and
- vi. 0 to 4 units from [Civil Engineering Advanced Elective Courses](#)

✓/X compl.	Major in Environmental Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
<b>8 units for all Environmental Engineering Compulsory Courses</b>						
	<b>ENVE2501</b> Environmental Systems	2	2		<b>CHEE2501</b> Environmental Systems Engineering I: Processes (discontinued)	<b>2/20</b>
	<b>ENVE3150</b> Environmental System Dynamics and Modelling	2	2		<b>CIVL3150</b> Modelling of Environmental Systems (discontinued)	<b>2/20</b>
	<b>ENVE3160</b> Environmental Phenomena	1	2		Course must be completed	
	<b>ENVE4610</b> Engineering the Circular Economy	1	2		Course must be completed	

<b>4 to 8 units from Environmental Engineering Elective Courses</b>						
	<b>CIVL3430</b> Sustainable Transport Engineering	1	2	<b>1/24</b>	No substitution	
	<b>CIVL4525</b> Sustainable Infrastructure Design	1	2		<b>CIVL4180</b> Sustainable Built Environment (discontinued)	<b>1/20</b>
	<b>CIVL4145</b> Groundwater Modelling and Management	1	2		<b>CIVL4140</b> Contaminant Transport Modelling (discontinued)	<b>1/21</b>
	<b>CIVL6111</b> Ocean, Coastal & Estuarine Engineering	2	2		<b>CIVL4110</b> Coastal & Estuarine Engineering (discontinued)	<b>2/22</b>
	<b>CIVL6112</b> Hydro- and Marine Power Renewable Energy Systems	2	2		No substitution	
	<b>CIVL6121</b> Environmental Hydraulics and Flood Management	1	2		<b>CIVL4120</b> Advanced Hydraulic Engineering and Structures (discontinued)	<b>2/22</b>
	<b>ENGY4000</b> Energy Systems	1	2		No substitution	
	<b>ENVM3103</b> Regulatory Frameworks for Environmental Management & Planning	1	2		No substitution	
	<b>WATR6103</b> Advanced Wastewater and Biosolids Treatment	2	2		No substitution	
	<b>WATR6105</b> Integrated Urban Water Management	1	2		<b>WATR7105</b> Integrated Urban Water Management (discontinued)	<b>1/20</b>
	<b>WATR6106</b> Emerging Issues in the Urban Water Cycle and Public Water	1	2		<b>WATR7106</b> Emerging Issues in the Urban Water Cycle and Public Water (discontinued)	<b>1/20</b>

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	<b>WATR6108</b> Advanced Unit Operations in Water Management	1	2		<b>WATR7108</b> Advanced Unit Operations in Water Management (discontinued)	<b>1/20</b>
	<b>WATR6109</b> Drinking Water Supply: Source, Treatment and Distribution	1	2		<b>WATR7109</b> Drinking Water Supply: Source, Treatment and Distribution (discontinued)	<b>1/20</b>

0 to 4 units from Environmental Engineering Research Elective Courses						
	<b>CHEE4006</b> Research Project	1	2		No substitution	
	<b>CHEE4007</b> Research Project	2	2		No substitution	
	<b>CHEE4026</b> Research Thesis or <b>CHEE4027</b> Research Thesis	1 2	4 4		No substitution	

0 to 4 units from Environmental Engineering Breadth Elective Courses						
	<b>CIVL2135</b> Introduction to Environmental Engineering	1	2			
	<b>ENVM2100</b> Foundations of Sustainable Development	2	2		No substitution	
	<b>ENVM3201</b> Catchment Processes & Management	1	2		No substitution	
	<b>ERTH1501</b> Earth Processes & Geological Materials for Engineers	1	2		No substitution	
	<b>ERTH2004</b> Structural & Metamorphic Geology	2	2		No substitution	
	<b>ERTH3250</b> Hydrogeology	2	2		No substitution	
	<b>GEOM1000</b> Fundamentals of Geographic Information & Technologies	2	2		No substitution	
	<b>GEOM2001</b> Geographical Information Systems	1	2		No substitution	
	<b>GEOS1100</b> Environment & Society	1,2	2		No substitution	
	<b>GEOS2100</b> Environmental Systems	1	2		No substitution	
	<b>GEOS3102</b> Global Change: Problems & Prospects	2	2		No substitution	

0 to 4 units from Chemical Engineering Advanced Elective Courses						
	<b>BIOE3001</b> Quantitative Methods in Biomedical Engineering	2	2		No substitution	
	<b>BIOE4020</b> Bioprocess Engineering	1	2		No substitution	

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	<b>BIOE6028</b> Metabolic Engineering	2	2		<b>CHEE4028</b> Metabolic Engineering (discontinued)	<b>2/20</b>
	<b>BIOE6034</b> Cell and Tissue Engineering	1	2		<b>CHEE4034</b> Cell & Tissue Engineering (discontinued)	<b>1/20</b>
	<b>BIOE4305</b> Biomaterials: Materials in Medicine	2	2		<b>CHEE4305</b> Biomaterials: Materials in Medicine (discontinued)	<b>2/20</b>
	<b>CHEE3008</b> Special Topics C	1,2	2		No substitution	
	<b>CHEE3301</b> Polymer Engineering	1	2		No substitution	
	<b>CHEE4003</b> Special Topics A	2	2		No substitution	
	<b>CHEE4009</b> Transport Phenomena	1	2		No substitution	
	<b>CHEE4012</b> Industrial Wastewater & Solid Waste Management	2	2		No substitution	
	<b>CHEE4020</b> Bioprocess Engineering	1	2		No substitution	
	<b>CHEE4022</b> Principles of Adsorption	2	2		No substitution	
	<b>CHEE4303</b> Interface and Colloid Science and Engineering	2	2		No substitution	
	<b>ENGG3500</b> Reservoir Engineering	2	2		No substitution	
	<b>ENGY4000</b> Energy Systems	1	2		No substitution	
	<b>ENVE3150</b> Environmental Systems Dynamics and Modelling	2	2		No substitution	
	<b>ENVE3160</b> Environmental Phenomena	1	2		No substitution	
	<b>ENVE4610</b> Engineering the Circular Economy	1	2	<b>1/24</b>	No substitution	
	<b>MATE6301</b> Nanomaterials	2	2		<b>CHEE4301</b> Nanomaterials (discontinued)	<b>2/20</b>
	<b>MATE4302</b> Electrochemistry and Corrosion	2	2		<b>CHEE4302</b> Electrochemistry & Corrosion (discontinued)	<b>2/20</b>
	<b>MECH4304</b> Net Shape Manufacturing	1	2		No substitution	
	<b>METL6204</b> Hydrometallurgy and Electrometallurgy	1	2		No substitution	
	<b>METL6212</b> Pyrometallurgy	1,2	2		No substitution	
	<b>WATR6103</b> Advanced Wastewater and Biosolids Treatment	2	2		No substitution	

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0 to 4 units from Civil Engineering Advanced Elective Courses						
	CIVL3220 Rock Mechanics	2	2		No substitution	
	CIVL3340 Structural Analysis	1	2		No substitution	
	CIVL3380 Structural Steel Design	1	2		No substitution	
	CIVL3390 Integrated Structural Design	2	2		No substitution	
	CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
	CIVL4145 Groundwater Modelling and Management	1	2		CIVL4140 Contaminant Transport Modelling (discontinued)	1/21
	CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
	CIVL4270 Geotechnical Investigation	1	2		No substitution	
	CIVL4280 Applied Rock Mechanics	2	2		No substitution	
	CIVL4333 Advanced Concrete Design	1	2		No substitution	
	CIVL4334 Design of Timber Structures	2	2		No substitution	
	CIVL4340 Wind Engineering	1	2		No substitution	
	CIVL4450 Traffic Flow Theory and Emerging Technologies	2	2		No substitution	
	CIVL4460 Highway Geometric Design	2	2		No substitution	
	CIVL4522 Analytical Methods for the Design of Construction Operations	2	2		No substitution	
	CIVL4525 Sustainable Infrastructure Design	1	2		CIVL4180 Sustainable Built Environment (discontinued)	1/20
	CIVL6111 Ocean, Coastal and Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)	2/22
	CIVL6112 Hydro and Marine Power Renewable Energy Systems	2	2		No substitution	
	CIVL6121 Environmental Hydraulics and Flood Management	1	2		CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)	2/22
	CIVL6210 Dam Engineering	2	2		No substitution	
	CIVL6215 Ground Improvement	1	2		No substitution	
	CIVL6220 Mine Waste Management	1	2		No substitution	
	CIVL6250 Underground Structures	2	2	1/24	No substitution	
	CIVL6360 Advanced Structural Analysis	2	2		No substitution	

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	<b>CIVL6410</b> Transport Network Modelling	1	2		No substitution	
	<b>CIVL6415</b> Traffic Analysis and Simulation	2	2		No substitution	
	<b>ENVE3150</b> Environmental Systems Dynamics & Modelling	2	2		No substitution	
	<b>ENVE3160</b> Environmental Phenomena	1	2		No substitution	
	<b>ENVE4610</b> Engineering the Circular Economy	1	2	<b>1/24</b>	No substitution	
	<b>FIRE3700</b> Introduction to Fire Safety Engineering	2	2		No substitution	
	<b>FIRE4610</b> Fire Engineering Design: Solutions for Implicit Safety	1	2		No substitution	

## Materials Engineering Major Option

Complete 16 units comprising:

- i. 4 units for all [Materials Engineering Courses for Chemical Engineers](#)
- ii. 8 units for all [Materials Engineering Compulsory Courses](#), and
- iii. 4 units from [Materials Engineering Elective Courses](#)

✓/X compl.	Major in Materials Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
<b>4 units for Materials Engineering Courses for Chemical Engineers only</b>						
	<b>ENGG1700</b> Statics & Materials	1,2	2		Course must be completed	
	<b>MECH2300</b> Structures and Materials	1	2		Course must be completed	

<b>8 units for Materials Engineering Compulsory Courses</b>						
	<b>MECH2310</b> Science and Engineering of Metals	2	2		Course must be completed	
	<b>CHEE3301</b> Polymer Engineering	1	2		Course must be completed	
	<b>MECH3301</b> Materials Selection	2	2		Course must be completed	
	<b>MATE4302</b> Electrochemistry and Corrosion	2	2		<b>CHEE4302</b> Electrochemistry & Corrosion (discontinued)	<b>2/20</b>

<b>4 units from Materials Engineering Elective Courses</b>						
	<b>AERO4300</b> Aerospace Composites	2	2		No substitution	
	<b>BIOE4305</b> Biomaterials: Materials in Medicine	2	2		<b>CHEE4305</b> Biomaterials: Materials in Medicine (discontinued)	<b>2/20</b>
	<b>CHEE4006</b> Research Project	1	2		No substitution	
	<b>CHEE4007</b> Research Project	2	2		No substitution	
	<b>CHEE4026</b> Research Thesis or <b>CHEE4027</b> Research Thesis	1 2	4 4		No substitution	
	<b>MATE6301</b> Nanomaterials	2	2		<b>CHEE4301</b> Nanomaterials (discontinued)	<b>2/20</b>
	<b>MECH2305</b> Introduction to Engineering Design and Manufacturing	1	2		No substitution	
	<b>MECH4304</b> Net Shape Manufacturing	1	2		No substitution	

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## Metallurgical Engineering Major Option

Complete 16 units comprising:

- i. 10 units for all [Metallurgical Engineering Compulsory Courses](#), and
- ii. 4 to 6 units from [Chemical Engineering Advanced or Research Elective Courses](#), and
- iii. 0 to 2 units from [Chemical Engineering Breadth Elective Courses](#)

✓/X compl.	Major in Metallurgical Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
<b>10 units for all Metallurgical Engineering Compulsory Courses</b>						
	<b>METL2201</b> Metal Production and Recycling	2	2		Course must be completed	
	<b>METL6212</b> Pyrometallurgy	2	2		<b>MINE3212</b> Pyrometallurgy (discontinued)	<b>2/21</b>
	<b>METL3219</b> Process Mineralogy and Comminution	1	2		<b>MINE3219</b> Process Mineralogy and Comminution (discontinued)	<b>1/21</b>
	<b>METL3220</b> Physical Separations and Interfacial Engineering	2	2		Course must be completed	
	<b>METL6204</b> Hydrometallurgy and Electrometallurgy	1	2		Course must be completed	

<b>4 to 6 units from Chemical Engineering Advanced or Research Elective Courses</b>						
	<b>BIOE3001</b> Quantitative Methods in Biomedical Engineering	2	2		No substitution	
	<b>BIOE4020</b> Bioprocess Engineering	1	2		No substitution	
	<b>BIOE4305</b> Biomaterials: Materials in Medicine	2	2		<b>CHEE4028</b> Metabolic Engineering (discontinued)	<b>2/20</b>
	<b>BIOE6028</b> Metabolic Engineering	1	2		<b>CHEE4034</b> Cell & Tissue Engineering (discontinued)	<b>1/20</b>
	<b>BIOE6034</b> Cell and Tissue Engineering	2	2		<b>CHEE4305</b> Biomaterials: Materials in Medicine (discontinued)	<b>2/20</b>
	<b>CHEE3008</b> Special Topics C	1,2	2		No substitution	
	<b>CHEE3301</b> Polymer Engineering	1	2		No substitution	
	<b>CHEE4003</b> Special Topics A	2	2		No substitution	
	<b>CHEE4009</b> Transport Phenomena	1	2		No substitution	
	<b>ENGY4000</b> Energy Systems	2	2		No substitution	
	<b>ENVE3150</b> Environmental Systems Dynamics & Modelling	1	2		No substitution	

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	<b>ENVE3160</b> Environmental Phenomena	2	2		No substitution	
	<b>ENVE4610</b> Engineering the Circular Economy	2	2		No substitution	
	<b>MATE4302</b> Electrochemistry and Corrosion	2	2		No substitution	
	<b>MATE6301</b> Nanomaterials	1	2		No substitution	
	<b>MECH4304</b> Net Shape Manufacturing	2	2		No substitution	
	<b>METL3219</b> Process Mineralogy and Comminution	1	2		No substitution	
	<b>METL3220</b> Physical Separations and Interfacial Engineering	1	2	<b>1/24</b>	No substitution	
	<b>METL6204</b> Hydrometallurgy and Electrometallurgy	2	2		CHEE4301 Nanomaterials (discontinued)	<b>2/20</b>
	<b>METL6212</b> Pyrometallurgy	2	2		CHEE4302 Electrochemistry & Corrosion (discontinued)	<b>2/20</b>
	<b>WATR6103</b> Advanced Wastewater and Biosolids Treatment	1	2		No substitution	
	<b>CHEE4006</b> Research Project	1	2		No substitution	
	<b>CHEE4007</b> Research Project	2	2		No substitution	
	<b>CHEE4026</b> Thesis Project or <b>CHEE4027</b> Thesis Project	1 2	4		No substitution	

0 to 2 units from Chemical Engineering Breadth Elective Courses						
	<b>ENGG4103</b> Engineering Asset Management	1	2		No substitution	
	<b>CHEM1200</b> Chemistry 2	1,2,S	2		No substitution	
	<b>ERTH1501</b> Earth Processes & Geological Materials for Engineers	1	2		No substitution	
	<b>FIRE3700</b> Introduction to Fire Safety Engineering	2	2		No substitution	
	<b>FOOD2000</b> Food Science	1	2		No substitution	
	<b>FOOD3011</b> Food Product Development	2	2		No substitution	
	<b>FOOD3017</b> Food Policy, Safety & Quality Management	1	2		No substitution	

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	<b>MATH2001</b> Calculus & Linear Algebra II	1,2,S	2		MATH2000 Calculus & Linear Algebra II (discontinued)	<b>2/20</b>
	<b>METR3100</b> Control System Implementation	2	2		No substitution	
	<b>MICR2000</b> Microbiology & Immunology	2	2		No substitution	
	<b>MICR2001</b> Food Microbiology I	2	2		No substitution	
	<b>MINE3110</b> Integrated Orebody Knowledge	2	2		No substitution	
	<p><b>Chemical Engineering Breadth Electives can also be chosen from course lists for the following majors:</b></p> <ul style="list-style-type: none"> <li>○ Biomedical Engineering</li> <li>○ Bioprocess Engineering</li> <li>○ Environmental Engineering</li> <li>○ Materials Engineering</li> <li>○ Metallurgical Engineering</li> </ul>					