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

\* This checklist is for the BE(Hons) component ONLY for dual programs with Bachelor of Mathematics and Bachelor of 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 <a href="Programs and Courses Website">Programs and Courses Website</a> 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 contact the relevant Faculty for information regarding the other component of your dual program.

For the BE(Hons) component, with a specialisation in Civil 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 Civil Engineering; and
  - III. One of the following:
    - a. 16 units for one Major from Civil Engineering Major Options\*, or
      - \*Majors available in: Environmental Engineering; Geotechnical Engineering; Mining Engineering; Structural Engineering; Transport Engineering; Water and Marine Engineering
    - b. 16 units for Civil Engineering Minor Options\*\*, or
      - \*\*Minors available in: Computing, Data Science, Design
    - c. 16 units for Civil Engineering Specialisation No Major option

√/X compl.	BE(Hons) Core Courses (8 units)	Sem offering	#	First offered	Approved substitution	Last offered
	8 units for all Core Courses					
	ENGG1100 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]	
	ENGG1001 Programming for Engineers or CSSE1001 Introduction to Software Engineering	1,2	2		Course must be completed	
	MATH1051 Calculus & Linear Algebra I or MATH1071 Advanced Calculus & Linear Algebra I	1,2	2		Course must be completed	
	MATH1052 Multivariate Calculus & Ordinary Differential Equations or MATH1072 Advanced Multivariate Calculus & Ordinary Differential Equations	1,2	2		Course must be completed	

# Specialisation in Civil Engineering

Complete 36 units comprising:

- i. 28 units for all Civil Engineering Compulsory Courses, and
- ii. 2 to 4 units from Civil Engineering Research Courses, and
- iii. 2 to 4 units from Civil Engineering Advanced Elective Courses, and
- iv. 2 units from <u>BE(Hons) Program Elective Courses</u>

√/X compl.	Specialisation Civil Engineering (36 units)	Sem offering	#	First offered	Approved substitution	Last offered
	28 units for all Compulsory Courses					
	ENGG1700 Statics & Materials	1,2	2		ENGG1400 Engineering Mechanics: Statics and Dynamics (discontinued)	2/20
	CIVL2131 Environmental Fluid Mechanics	1	2		Course must be completed	
	CIVL2135 Introduction to Environmental Engineers	1	2		CIVL2135 Environmental Issues and Sustainability in Engineering	
	CIVL2210 Soil Mechanics	2	2		Course must be completed	
	CIVL2330 Structural Mechanics	1	2		Course must be completed	
	CIVL2420 Fundamentals of Transport Engineering	2	2		CIVL2410 Sustainable Transport Engineering - Traffic Analysis (discontinued)	1/21
	CIVL2530 Statistics and Data Analysis	1	2		CIVL2530 Probability and Statistics in Engineering	
	CIVL3155 Hydrology and Free Surface Flows	2	2		CIVL3141 Hydrology and Hydrological Risk (discontinued) and CIVL3140 Hydraulics of Engineered and Natural Waterways (discontinued) [Both courses are required to have been completed to exempt students from CIVL3155; therefore 2 units will count as a Compulsory Course and 2 units will count towards Civil Engineering Advanced Electives]	2/21
	CIVL3210 Geotechnical Engineering	1	2		Course must be completed	
	CIVL3360 Reinforced Concrete Design	2	2		CIVL2360 Design of Concrete Structures (discontinued)	2/21
	CIVL3520 Project Management and Professional Practice	2	2		CIVL3510 Project Management with Building Information Modelling (discontinued)	2/22
	CIVL3530 Data Analytics in Civil Engineering	1	2		Course must be completed	
	CIVL4170 Risk Analysis in Civil Engineering	1	2		Course must be completed	
	CIVL4516 Integrated Design for Environmental Management Or CIVL4518 Integrated Design for the Built Environment	2	2	2/24	Course must be completed	

2 to 4 units from Civil Engineering Research Courses				
CIVL4600 Research Project	1,2	2	No substitution	
CIVL4604 Research Thesis	1	4	No substitution	
CIVL4606 Research Thesis	2	4	No substitution	

2 to 4 units from Civil Engineering Advanced Elective Courses					
CIVL3220 Rock Mechanics	1	2		No substitution	
CIVL3340 Structural Analysis	1	2		No substitution	
CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	2,
CIVL3390 Integrated Structural Design	2	2		No substitution	
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	1,
CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
CIVL4270 Geotechnical Investigation & Testing	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		No substitution	
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112 – not both	2,
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112 – not both	2

CIVL6121 Environmental Hydraulics and Flood Management	1	2	CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)	2/2
CIVL6210 Dam Engineering	2	2	No substitution	
CIVL6215 Ground Improvement	1	2	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/2
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/2
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/2
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

2	units from	m BE	(Hons)	) Program	Elective	Courses

# Civil Engineering No Major Option

Complete 16 units comprising -

- i. 8 to 16 units from <u>Civil Engineering Advanced Elective Courses</u>; and
- ii. 0 to 8 units from any Civil Engineering Breadth Elective Courses; and
- iii. 0 to 4 units from BE(Hons) Program Elective Courses; and
- iv. 0 to 4 units from General Elective Courses.

√/X compl.	Civil Engineering No Major (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	8 to 16 units from Civil Engineering Advanced Elective Courses					
	CIVL3220 Rock Mechanics	1	2		No substitution	
	CIVL3340 Structural Analysis	1	2		No substitution	
	CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	2/22
	CIVL3390 Integrated Structural Design	2	2		No substitution	
	CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
	CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	1/21
	CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
	CIVL4270 Geotechnical Investigation & Testing	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		No substitution	
	CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
	CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22

CIVL6121 Environmental Hydraulics and Flood Management	1	2	CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)	2/
CIVL6210 Dam Engineering	2	2	No substitution	
CIVL6215 Ground Improvement	1	2	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2,
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2,
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

MATH2001 Calculus and Linear Algebra II	1,2,5	2	MATH2000 Calculus and Linear Algebra II (discontinued)	
Civil Engineering Breadth Electives can also be chosen from course lists for the following majors:				
o <u>Environmental Engineering</u>				
o <u>Geotechnical Engineering</u>				
o Mining Engineering				
o <u>Structural Engineering</u>				
o <u>Transport Engineering</u>				
o <u>Water and Marine Engineering</u>				
Courses on this list may require pre-requisites. Please seek academic advice if required.				

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

# 0 to 4 units from General Elective Courses.

#### **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
	8 units for all Environmental Engineering Compulsory Courses	- Circinig				
	ENVE2501 Environmental Systems	1	2		CHEE2501 Environmental Systems Engineering I: Processes (discontinued)	1/20
	ENVE3150 Environmental System Dynamics and Modelling	2	2		CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
	ENVE3160 Environmental Phenomena	1	2		Course must be completed	
	ENVE4610 Engineering the Circular Economy	1	2		Course must be completed	

4 to 8 units from Environmental Engineering Elective Courses					
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	1/21
CIVL4525 Sustainable Infrastructure Design	1	2		No substitution	
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * approved substitution for CIVL6111 OR CIVL6112 – not both	2/22
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * approved substitution for CIVL6111 OR CIVL6112 – not both	2/22
CIVL6121 Environmental Hydraulics and Flood Management	1	2		CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)	2/22
ENGY4000 Energy Systems	1	2		No substitution	
ENVM3103 Regulatory Frameworks for Environmental Management & Planning	1	2		No substitution	
WATR6103 Advanced Wastewater and Biosolids Treatment	2	2			
WATR6105 Integrated Urban Water Management	1	2		WATR7105 Integrated Urban Water Management (discontinued)	1/20

WATR6106 Emerging Issues in the Urban Water Cycle and Public Water	1	2	WATR7106 Emerging Issues in the Urban Water Cycle and Public Water (discontinued)	1/20
WATR6108 Advanced Unit Operations in Water Management	1	2	WATR7108 Advanced Unit Operations in Water Management (discontinued)	1/20
WATR6109 Drinking Water Supply: Source, Treatment and Distribution	1	2	WATR7109 Drinking Water Supply: Source, Treatment and Distribution (discontinued)	1/20

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

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

BIOE3001 Quantitative Methods in Biomedical Engineering	2	2		No substitution	
BIOE4020 Bioprocess Engineering	1	2		No substitution	
BIOE6028 Metabolic Engineering	2	2		CHEE4028 Metabolic Engineering (discontinued)	
BIOE6034 Cell and Tissue Engineering	1	2		CHEE4034 Cell & Tissue Engineering (discontinued)	
BIOE4305 Biomaterials: Materials in Medicine	2	2		CHEE4305 Biomaterials: Materials in Medicine (discontinued)	
CHEE3008 Special Topics C	1,2	2		No substitution	
CHEE3301 Polymer Engineering	1	2		No substitution	
CHEE4003 Special Topics A	2	2		No substitution	
CHEE4009 Transport Phenomena	1	2		No substitution	
CHEE4012 Industrial Wastewater & Solid Waste Management	2	2		No substitution	
CHEE4020 Bioprocess Engineering	1	2		No substitution	
CHEE4022 Principles of Adsorption	2	2		No substitution	
CHEE4303 Interface and Colloid Science and Engineering	2	2		No substitution	
ENGG3500 Reservoir Engineering	2	2		No substitution	
ENGY4000 Energy Systems	1	2		No substitution	
ENVE3150 Environmental Systems Dynamics and Modelling	2	2		No substitution	
ENVE3160 Environmental Phenomena	1	2		No substitution	
ENVE4610 Engineering the Circular Economy	1	2	1/24	No substitution	
MATE6301 Nanomaterials	2	2		CHEE4301 Nanomaterials (discontinued)	
MATE4302 Electrochemistry and Corrosion	2	2		CHEE4302 Electrochemistry & Corrosion (discontinued)	
MECH4304 Net Shape Manufacturing	1	2		No substitution	
METL6204 Hydrometallurgy and Electrometallurgy	1	2		No substitution	

METL6212 Pyrometallurgy	1,2	2	No substitution	
WATR6103 Advanced Wastewater and Biosolids Treatment	2	2	No substitution	

		_			
CIVL3220 Rock Mechanics	1	2		No substitution	
CIVL3340 Structural Analysis	1	2		No substitution	
CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	
CIVL3390 Integrated Structural Design	2	2		No substitution	
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	-
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	
CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
CIVL4270 Geotechnical Investigation & Testing	1	2		No substitution	İ
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	F
CIVL4450 Traffic Flow Theory and Emerging Technologies	2	2		No substitution	<u> </u>
CIVL4460 Highway Geometric Design	2	2		No substitution	ŀ
CIVL4522 Analytical Methods for the Design of Construction Operations	2	2		No substitution	-
CIVL4525 Sustainable Infrastructure Design	1	2		No substitution	-
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	

CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
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	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/22
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

#### **Geotechnical Engineering Major Option**

Complete 16 units comprising:

- i. 8 units for all Geotechnical Engineering Compulsory Courses, and
- ii. 2 to 8 units from Geotechnical Engineering Elective Courses, and
- iii. 0 to 4 units from Geotechnical Engineering Breadth Elective Courses, and
- iv. 0 to 4 units from <u>Civil Engineering Advanced Elective Courses</u>

√/X compl.	Major in Geotechnical Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	8 units for all Geotechnical Engineering Compulsory Courses					
	CIVL3220 Rock Mechanics	1	2		Course must be completed	
	CIVL4230 Advanced Soil Mechanics	2	2		Course must be completed	
	CIVL4270 Geotechnical Investigations	1	2		Course must be completed	
	CIVL6215 Ground Improvement	1	2		CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23

2 to 8 units from Geotechnical Engineering Elective Courses				
CIVL4280 Applied Rock Mechanics	2	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6210 Dam Engineering	2	2	No substitution	
CIVL6220 Tailings Design	1	2	No substitution	

0 to 4 units from Geotechnical Engineering Breadth Elective Courses										
CIVL4460 Highway Geometric Design	2	2		CIVL4460 Road Design						
ERTH3250 Hydrogeology	2	2		No substitution						
MINE3129 Applied Mining Geomechanics	1	2		No substitution						
CIVL4340 Wind Engineering	1	2		No substitution						
CIVL4525 Sustainable Infrastructure Design	1	2		No substitution						

CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL611  - not both	2/22
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL611  - not both	2/22
CIVL6121 Environmental Hydraulics and Flood Management	1	2	CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)	2/22
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	

0 to 4 units from Civil Engineering Advanced Electives					
CIVL3220 Rock Mechanics	1	2		No substitution	$\Box$
CIVL3340 Structural Analysis	1	2		No substitution	
CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	2/
CIVL3390 Integrated Structural Design	2	2		No substitution	
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	1/
CIVL4230 Advanced Soil Mechanics	2	2		No substitution	+
CIVL4270 Geotechnical Investigation & Testing	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	No substitution	
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
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	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/22
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

# Mining Engineering Major Option

Complete 16 units comprising:

- i. 12 units for all Mining Engineering Compulsory Courses, and
- ii. 4 units from Mining Engineering Courses for Civil Engineers

√/X compl.	Major in Mining Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	12 units for Mining Engineering Compulsory Courses					
	MINE3110 Integrated Orebody Knowledge	1	2		MINE3120 Resource Estimation (discontinued)	1/22
	MINE3122 Mining Systems & Automation	1	2		MINE3122 Mining Systems	
	MINE3123 Mine Planning & Sustainability	2	2		MINE3123 Mine Planning	
	METL3129 Applied Mining Geomechanics	1	2		MINE4120 Mine Geotechnical Engineering (discontinued)	1/22
	MINE4124 Mine Design, Feasibility and Sustainability	2	2		MINE4124 Hard Rock Mine Design & Feasibility	
	MINE4129 Mine Process Optimisation	1	2		MINE3125 Explosives and Blasting Engineering (discontinued)	1/22

CIVL3220 Rock Mechanics	1	2		No substitution	
CIVL3340 Structural Analysis	1	2		No substitution	
CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	
CIVL3390 Integrated Structural Design	2	2		No substitution	
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	
CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
CIVL4270 Geotechnical Investigation & Testing	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	No substitution	
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
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	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/22
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

# Structural Engineering Major Option

Complete 16 units comprising:

- i. 10 units for all <u>Structural Engineering Compulsory Courses</u>, and
- ii. 4 to 6 units from Structural Engineering Elective Courses, and
- iii. 0 to 2 units from Civil Engineering Advanced Elective Courses

√/X compl.	Major in Structural Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	10 units for all Structural Engineering Compulsory Courses					
	CIVL3340 Structural Analysis	1	2		Course must be completed	
	CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	2/23
	CIVL3390 Integrated Structural Design	2	2		Course must be completed	
	CIVL4333 Advanced Concrete Design	1	2		Course must be completed	
	CIVL4334 Design of Timber Structures	2	2		Course must be completed	

4 to 6 units from Structural Engineering Elective Courses				
CIVL4230 Advanced Soil Mechanics	2	2	No substitution	
CIVL4340 Wind Engineering	1	2	No substitution	
CIVL4522 Analytical methods for the Design of Construction Operations	2	2	No substitution	
CIVL4525 Sustainable Infrastructure Design	1	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/22
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

0 to 2 units from Civil Engineering Advanced Elective Courses				
CIVL3220 Rock Mechanics	1	2	No substitution	
CIVL3340 Structural Analysis	1	2	No substitution	
CIVL3380 Structural and Steel Design	1	2	CIVL2340 Design of Steel Structures (discontinued)	2/22

CIVL3390 Integrated Structural Design	2	2		No substitution	
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	1/21
CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
CIVL4270 Geotechnical Investigation & Testing	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		No substitution	
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
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		CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23
CIVL6220 Mine Waste Management	1	2		No substitution	
CIVL6250 Underground Structures	2	2		No substitution	
CIVL6360 Advanced Structural Analysis	2	2		CIVL4332 Advanced Structural Analysis (discontinued)	2/22

CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

# **Transport Engineering Major Option**

Complete 16 units comprising:

- i. 10 units for all Transport Engineering Compulsory Courses, and
- ii. 6 units from Civil Engineering Advanced Elective Courses

√/X compl.	Major in Transport Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	10 units for all Transport Engineering Compulsory Courses					
	CIVL3430 Sustainable Transport Engineering	1	2	1/24	Course must be completed	
	CIVL4450 Traffic Flow Theory and Emerging Technologies	2	2		Course must be completed	
	CIVL4460 Highway Geometric Design	2	2		CIVL4460 Road Design	
	CIVL6410 Transport Network Modelling	1	2		Course must be completed	
	CIVL6415 Traffic Analysis and Simulation	2	2		Course must be completed	

6 units from Civil Engineering Advanced Elective Courses					
CIVL3220 Rock Mechanics	1	2		No substitution	
CIVL3340 Structural Analysis	1	2		No substitution	
CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	
CIVL3390 Integrated Structural Design	2	2		No substitution	
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	
CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
CIVL4270 Geotechnical Investigation & Testing	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	No substitution	
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2	CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	2/22
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	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/22
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

# Water and Marine Engineering Major Option

Complete 16 units comprising:

- i. 8 units for all <u>Water and Marine Engineering Compulsory Courses</u>, and
- ii. 4 to 8 units from Water and Marine Engineering Elective Courses, and
- iii. 0 to 4 units from Civil Engineering Advanced Elective Courses

√/X compl.	Major in Water and Marine Engineering (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	8 units for all Water and Marine Engineering Compulsory Courses					
	CIVL6121 Environmental Hydraulics and Flood Management	1	2		CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)	2/22
	CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)	2/21
	CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2		Course must be completed	
	CIVL4340 Wind Engineering	1	2		Course must be completed	

CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	
CIVL4525 Sustainable Infrastructure Design	1	2		No substitution	
CIVL6210 Dam Engineering	2	2		No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2		CIVL3150 Modelling of Environmental Systems (discontinued)	
ENVE3160 Environmental Phenomena	1	2		No substitution	
ENVM3103 Regulatory Frameworks for Environmental Management & Planning	1	2		No substitution	
ENVM3115 Climate Change & Environmental Management	1	2		No substitution	
ENVM3201 Catchment Processes & Management	1	2		No substitution	
ERTH3250 Groundwater Processes and Resources	2	2		No substitution	
WATR6105 Integrated Urban Water Management	1	2		WATR7105 Integrated Urban Water Management (discontinued)	+

CIVL3220 Rock Mechanics	1	2		No substitution	
CIVL3340 Structural Analysis	1	2		No substitution	_
CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)	_
CIVL3390 Integrated Structural Design	2	2		No substitution	_
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution	_
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)	_
CIVL4230 Advanced Soil Mechanics	2	2		No substitution	
CIVL4270 Geotechnical Investigation & Testing	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		No substitution	_
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	_
CIVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL6112  - not both	_
CIVL6121 Environmental Hydraulics and Flood Management	1	2		CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)	_

CIVL6210 Dam Engineering	2	2	No substitution	
CIVL6215 Ground Improvement	1	2	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/22
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	

# **Computer Minor**

Complete 16 units comprising:

- i. 4 units for all Computing Compulsory Courses, and
- ii. 4 units from Computing Elective Courses, and
- iii. 8 units from Civil Engineering Advanced Electives

√/X compl.	Minor in Computing (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	4 units for all Computing Compulsory Courses					
	CSSE2002 Programming in the Large	1,2	2		Course must be completed	
	COMP3506 Algorithms and Data Structures	2	2		Course must be completed	

4 units from Computing Elective Courses			
COMP4702 Machine Learning	1	2	No substitution
COSC2500 Numerical Methods in Computational Science	2	2	No substitution
COSC3000 Visualization, Computer Graphics & Data Analysis	1	2	No substitution
COSC3500 High Performance Computing	2	2	No substitution
INFS1200 Introduction to Information Systems	1,2	2	No substitution
INFS3208 Cloud Computing	2	2	No substitution
MATH3202 Operations Research & Mathematical Planning	1	2	No substitution

**8 units from Civil Engineering Advanced Elective Courses** 

#### **Data Science Minor**

Complete 16 units comprising:

- i. 4 units for all <u>Data Science Compulsory Courses</u>, and
- ii. 4 units from <u>Data Science Elective Courses</u>, and
- iii. 8 units from Civil Engineering Advanced Electives

√/X compl.	Minor in Data Science (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	4 units for all Data Science Minor Compulsory Courses					
	DATA2001 Fundamentals of Data Science	2	2	2/22	Course must be completed	
	INFS1200 Introduction to Information Systems	1,2	2		Course must be completed	

4 units from Data Science Elective Courses			
COMP4702 Machine Learning	1	2	No substitution
INFS2200 Relational Database Systems	2	2	No substitution
INFS3208 Cloud Computing	2	2	No substitution
INFS4203 Data Mining	2	2	No substitution
STAT2003 Mathematical Probability	1	2	No substitution
STAT2004 Statistical Modelling & Analysis	2	2	No substitution

**8 units from Civil Engineering Advanced Elective Courses** 

Where courses are compulsory in both the specialisation and minor, the compulsory course in the minor must be substituted by courses from Data Science Minor Electives.

# Design Minor

Complete 16 units comprising:

- i. 8 units for all <u>Design Minor Compulsory Courses</u>, and
- ii. 8 units from <u>Civil Engineering Advanced Electives</u>

√/X compl.	Minor in Design (16 units)	Sem offering	#	First offered	Approved substitution	Last offered
	8 units for all Design Minor Compulsory Courses					
	DSGN1100 Design: Interaction	1	2		Course must be completed	
	DSGN1200 Design: Experience	2	2		Course must be completed	
	DSGN2100 Design: Organisation	1	2		Course must be completed	
	DSGN2200 Design: Environment	2	2		Course must be completed	

**8 units from Civil Engineering Advanced Elective Courses** 

CIVL3220 Rock Mechanics	1	2	1	No substitution
CIVL3340 Structural Analysis	1	2		No substitution
CIVL3380 Structural and Steel Design	1	2		CIVL2340 Design of Steel Structures (discontinued)
CIVL3390 Integrated Structural Design	2	2		No substitution
CIVL3430 Sustainable Transport Engineering	1	2	1/24	No substitution
CIVL4145 Groundwater Modelling and Management	2	2		CIVL4140 Contaminant Transport Modelling (discontinued)
CIVL4230 Advanced Soil Mechanics	2	2		No substitution
CIVL4270 Geotechnical Investigation & Testing	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		No substitution
CIVL6111 Ocean, Coastal & Estuarine Engineering	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL612  - not both
IVL6112 Hydro- and Marine Power Renewable Energy Systems	2	2		CIVL4110 Coastal & Estuarine Engineering (discontinued)  * CIVL4110 may only be used as approved substitution for CIVL6111 OR CIVL612  - not both
CIVL6121 Environmental Hydraulics and Flood Management	1	2		CIVL4120 Advanced Hydraulic Engineering and Structures (discontinued)
CIVL6210 Dam Engineering	2	2		No substitution

CIVL6215 Ground Improvement	1	2	CIVL7215 Ground Improvement & Remediation Technologies (discontinued)	1/23
CIVL6220 Mine Waste Management	1	2	No substitution	
CIVL6250 Underground Structures	2	2	No substitution	
CIVL6360 Advanced Structural Analysis	2	2	CIVL4332 Advanced Structural Analysis (discontinued)	2/22
CIVL6410 Transport Network Modelling	1	2	No substitution	
CIVL6415 Traffic Analysis and Simulation	2	2	No substitution	
ENVE3150 Environmental System Dynamics and Modelling	2	2	CIVL3150 Modelling of Environmental Systems (discontinued)	2/20
ENVE3160 Environmental Phenomena	1	2	No substitution	
ENVE4610 Engineering the Circular Economy	1	2	No substitution	
FIRE3700 Introduction to Fire Safety Engineering	1	2	No substitution	
FIRE4610 Fire Engineering Design: Solutions for Implicit Safety	1	2	No substitution	