Innovation & Design Programme
Faculty of Engineering

Bachelor of Engineering (Chemical Engineering) with Second Major in Innovation & Design

Cohort 2020/2021

Modular Requirements	Modular Credits (MCs)
University Level Requirements	
General education modules:	
• Quantitative Reasoning (GER1000)	4
• Thinking & Expression (GET)	4
• Human Cultures (GEH)	4
• Singapore Studies (GES)	4
• Asking Questions (GEQ1000)	4
Sub-total for University Level Requirements	**20**
Programme Requirements	
Faculty requirements:	
• ES2531 Critical Thinking & Writing [1]	4
• EG2401A Engineering Professionalism	2
• ES1xxxx English [2]	-
Foundation requirements (common core):	
• CN1101A Chemical Engineering Principles & Practice I	4
• CN2102 Chemical Engineering Principles & Practice II	4
• MA1511 Engineering Calculus	2
• MA1512 Differential Equations for Engineering	2
• MA1513 Linear Algebra with Differential Equations	2
• CS1010E Programming Methodology	4
• EE2211 Introduction to Machine Learning	4
• EG1311 Design & Make	4
• IE2141 Systems Thinking & Dynamics	4
• MLE1010 Materials Engineering Principles & Practice	4
CHE core modules:	
• CN2101 Material & Energy Balances	3
• CN2116 Chemical Kinetics & Reactor Design	4
• CN2121 Chemical Engineering Thermodynamics	4
• CN2122 Fluid Mechanics	4
• CN2125 Heat & Mass Transfer	4
• CN3101A Chemical Engineering Lab	4
• CN3121 Process Dynamics & Control	4
• CN3124 Fluid-Particle Systems	4
• CN3132 Separation Processes	4
• CN3135 Process Safety, Health & Environment	3
• CN3421A Process Modelling & Numerical Simulation	3
• CN4122 Process Synthesis & Simulation	3
CHE technical electives [3]	0
CHE design and project modules:	
• CN4123R Final Year Design Project	6
• EG3301R DCP Project (over 2 consecutive semesters) *(Double-counted for Second Major in Innovation & Design)*	12
EG3612 Vacation Internship Programme (VIP) [3, 4]	6
Sub-total for Programme Requirements	**108**

(updated 14 October 2021)

Unrestricted Elective Modules (UEM)	
• Group A module for Second Major • Group B module for Second Major • Group C modules for Second Major – Innovation & Enterprise electives • EG4301 DCP Dissertation or EG4301A Ideas to Start-up (over 2 consecutive semesters)	4 4 8 12
Other unrestricted electives	4
Sub-total for Unrestricted Elective Modules	**32**
Total	**160**

Notes:

[1] Students in USP, UTCP, and RVRC may read an equivalent module (e.g. UWC2101%, UTW1001%, ES1601, ES1501%) in lieu of ES2531.

[2] Students who have not passed or been exempted from the Qualifying English Test at the point of admission will have to read ES1000 and/or ES1103. ES1103 carries 4 MCs which may be counted as UEM.

[3] Students in this Second Major are allowed to complete EG3612 (6 MCs) in lieu of EG3611A (10 MCs).

The 12 MCs for EG3301R are mapped by 4 MCs from the replacement of EG3611A (10 MCs) with EG3612 (6 MCs) and 8 MCs from technical electives.

Students may also opt to do EG3611A (10 MCs) in lieu of EG3612 (6 MCs).

[4] EG3612 (VIP) is optional for poly-intake students and those in the following special programmes: double degree programmes (DDP), concurrent degree programmes (CDP), Chemical Sciences Programme (CSP), and E-Scholars. The 6 MCs for EG3612 may be replaced by other modules.

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Recommended semester schedule for Cohort 2020/2021 – JC-intake students or equivalent
(for students who opt for vacation internship)

Semester 1	MCs	Semester 2	MCs
CN1101A Chemical Engineering Principles & Practice I	4	CN2101 Material & Energy Balances	3
MA1511 Engineering Calculus	2	CN2102 Chemical Engineering Principles & Practice II	4
MA1512 Differential Equations for Engineering	2	MA1513 Linear Algebra with Differential Equations	2
EG1311 Design & Make	4	CS1010E Programming Methodology	4
GER1000 Quantitative Reasoning	4	MLE1010 Materials Engineering Principles & Practice	4
GET	4	Group A module for Second Major (UEM)	4
Sub-total	**20**	**Sub-total**	**21**

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
CN2121 Chemical Engineering Thermodynamics	4	CN2116 Chemical Kinetics & Reactor Design	4
CN2122 Fluid Mechanics	4	CN2125 Heat & Mass Transfer	4
GEQ1000 Asking Questions	4	CN3124 Fluid-Particle Systems	4
ES2531 Critical Thinking & Writing	4	EG2401A Engineering Professionalism	2
Group B module for Second Major (UEM)	4	EG3301R DCP Project	6
Sub-total	**24**	**Sub-total**	**24**

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Programme	6
Sub-total	**6**

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	Innovation & Enterprise Elective 1 (UEM)	4
CN3101A Chemical Engineering Lab	4	Innovation & Enterprise Elective 2 (UEM)	4
CN3121 Process Dynamics & Control	4	CN4122 Process Synthesis & Simulation	3
CN3132 Separation Processes	4	GES	4
		GEH	4
Sub-total	**18**	**Sub-total**	**19**

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
CN3135 Process Safety, Health & Environment	3	CN4123R Final Year Design Project	6
CN3421A Process Modelling & Numerical Simulation	3		
UEM	4		
Sub-total	**16**	**Sub-total**	**12**

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Recommended semester schedule for Cohort 2020/2021 – JC-intake students or equivalent
(for students who opt for industrial attachment in lieu of vacation internship)

Semester 1	MCs	Semester 2	MCs
CN1101A Chemical Engineering Principles & Practice I	4	CN2101 Material & Energy Balances	3
MA1511 Engineering Calculus	2	CN2102 Chemical Engineering Principles & Practice II	4
MA1512 Differential Equations for Engineering	2	MA1513 Linear Algebra with Differential Equations	2
EG1311 Design & Make	4	CS1010E Programming Methodology	4
GER1000 Quantitative Reasoning	4	MLE1010 Materials Engineering Principles & Practice	4
GET	4	Group A module for Second Major (UEM)	4
Sub-total	**20**	**Sub-total**	**21**

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
CN2121 Chemical Engineering Thermodynamics	4	CN2116 Chemical Kinetics & Reactor Design	4
CN2122 Fluid Mechanics	4	CN2125 Heat & Mass Transfer	4
GEQ1000 Asking Questions	4	CN3124 Fluid-Particle Systems	4
ES2531 Critical Thinking & Writing	4	EG2401A Engineering Professionalism	2
Group B module for Second Major (UEM)	4	EG3301R DCP Project	6
Sub-total	**24**	**Sub-total**	**24**

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	EG3611A Industrial Attachment	10
CN3101A Chemical Engineering Lab	4		
CN3121 Process Dynamics & Control	4		
CN3132 Separation Processes	4		
GEH	4		
Sub-total	**22**	**Sub-total**	**10**

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Innovation & Enterprise Elective 1 (UEM)	4	Innovation & Enterprise Elective 2 (UEM)	4
CN3135 Process Safety, Health & Environment	3	CN4123R Final Year Design Project	6
CN3421A Process Modelling & Numerical Simulation	3	UEM	4
CN4122 Process Synthesis & Simulation	3		
GES	4		
Sub-total	**23**	**Sub-total**	**20**

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Recommended semester schedule for Cohort 2020/2021 – JC-intake students or equivalent
(for students in year-long NOC programmes)

Semester 1	MCs	Semester 2	MCs
CN1101A Chemical Engineering Principles & Practice I	4	CN2101 Material & Energy Balances	3
MA1511 Engineering Calculus	2	CN2102 Chemical Engineering Principles & Practice II	4
MA1512 Differential Equations for Engineering	2	MA1513 Linear Algebra with Differential Equations	2
EG1311 Design & Make	4	CS1010E Programming Methodology	4
GER1000 Quantitative Reasoning	4	MLE1010 Materials Engineering Principles & Practice	4
GET	4	Group A module for Second Major (UEM)	4
Sub-total	**20**	**Sub-total**	**21**

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
CN2121 Chemical Engineering Thermodynamics	4	CN2116 Chemical Kinetics & Reactor Design	4
CN2122 Fluid Mechanics	4	CN2125 Heat & Mass Transfer	4
GEQ1000 Asking Questions	4	CN3124 Fluid-Particle Systems	4
ES2531 Critical Thinking & Writing	4	EG3301R DCP Project	6
Group B module for Second Major (UEM)	4		
Sub-total	**24**	**Sub-total**	**22**

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	NOC	
CN3101A Chemical Engineering Lab	4		
CN3121 Process Dynamics & Control	4		
CN3132 Separation Processes	4		
CN4122 Process Synthesis & Simulation	3		
Sub-total	**21**	**Sub-total**	

Semester 7	MCs	Semester 8	MCs
NOC		CN3135 Process Safety, Health & Environment	3
		CN3421A Process Modelling & Numerical Simulation	3
		CN4123R Final Year Design Project	6
		GEH	4
		GES	4
Sub-total		**Sub-total**	**20**

Mapping of year-long NOC programmes:

NOC modules	*i*DP / Engineering modules
TR3201 Entrepreneurship Practicum (8 MCs)	EG2401A Engineering Professionalism (2 MCs) + UEM (6 MCs)
TR3202 Start-up Internship Programme (12 MCs)	EG3612 Vacation Internship Programme (6 MCs) + EG4301 DCP Dissertation (4 MCs out of 12 MCs)
TR3203N Start-up Case Study & Analysis (8 MCs)	EG4301 DCP Dissertation (8 MCs out of 12 MCs)
Entrepreneurship courses (up to 12 MCs)	Innovation & Enterprise electives (8 MCs – UEM)

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Recommended semester schedule for Cohort 2020/2021 – poly-intake students
(for students who intend to complete in 6 semesters and are exempted from Group A module for Second Major)

Semester 1	MCs	Semester 2	MCs
MA1301 Introductory Mathematics (UEM in lieu of EG3612)	4	EG3301R DCP Project	6
GER1000 Quantitative Reasoning	4	MA1511 Engineering Calculus	2
GET	4	MA1512 Differential Equations for Engineering	2
GEH	4	CS1010E Programming Methodology	4
Group B module for Second Major (UEM)	4	GEQ1000 Asking Questions	4
		GES	4
Sub-total	**20**	**Sub-total**	**22**

Semester 3	MCs	Semester 4	MCs
EG3301R DCP Project	6	Innovation & Enterprise Elective 1 (UEM)	4
MA1513 Linear Algebra with Differential Equations	2	EE2211 Introduction to Machine Learning	4
IE2141 Systems Thinking & Dynamics	4	CN2116 Chemical Kinetics & Reactor Design	4
CN2121 Chemical Engineering Thermodynamics	4	CN2125 Heat & Mass Transfer	4
CN2122 Fluid Mechanics	4	CN3124 Fluid-Particle Systems	4
ES2531 Critical Thinking & Writing	4	CN3135 Process Safety, Health & Environment	3
		EG2401A Engineering Professionalism	2
Sub-total	**24**	**Sub-total**	**25**

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
CN3101A Chemical Engineering Lab	4	Innovation & Enterprise Elective 2 (UEM)	4
CN3121 Process Dynamics & Control	4	CN3421A Process Modelling & Numerical Simulation	3
CN3132 Separation Processes	4	CN4123R Final Year Design Project	6
CN4122 Process Synthesis & Simulation	3	UEM (in lieu of EG3612)	2
Sub-total	**21**	**Sub-total**	**21**

Notes:

1. Poly-intake students may receive the following exemptions depending on their Diploma qualification:
   - CN1101A Chemical Engineering Principles & Practice I (4 MCs)
   - CN2101 Material & Energy Balances (3 MCs)
   - CN2102 Chemical Engineering Principles & Practice II (4 MCs)
   - MLE1010 Materials Engineering Principles & Practice (4 MCs)
   - EG1311 Design & Make (4 MCs)
   - Unrestricted elective modules (20 MCs)

2. Poly-intake students may be exempted from Group A module for Second Major (4 MCs) and/or one Innovation & Enterprise elective (4 MCs) depending on their Diploma qualification. These would be included as part of the 20 MCs of exemptions for unrestricted elective modules.

3. EG3612 (VIP) is not compulsory for poly-intake students. The 6 MCs for VIP may be fulfilled by MA1301 (4 MCs) and/or other modules.

(updated 14 October 2021)