BRC Bachelor of Engineering (Computer Engineering) Curriculum

Applicable to students matriculated in 2019 or later

Polytechnic Exemptions

27 AUs of exemptions and they are:

a. Technical Elective 1 (Major Prescribed elective, to be taken from CE4xxx courses) - 3 AUs
b. Technical Elective 2 (Major Prescribed elective, to be taken from CE4xxx courses) – 3 AUs
c. GER PE (BM, LA) - 6 AUs
d. Unrestricted electives - 15 AUs

e. Additional 3 AUs in Technical Elective 3 (Major Prescribed elective, to be taken from CZ4xxx courses) or other relevant courses on a case-by-case basis subject to the students having participated and done well in NTU research or other projects, or with additional Certificate in Mathematics from Diploma-Plus programmes, or having taken and done well in university level courses.

f. CE1003 Introduction to Computational Thinking (Core)*[#]– 3 AUs

* For students who pass the qualification test. More details on this test will be disseminated to eligible students via their NTU email after matriculation.

[#]Not applicable to all diplomas. Some examples are:

- Diploma in Aerospace Engineering from Temasek Polytechnic
- Diploma in Aerospace Electronics from Temasek Polytechnic
- Diploma in Engineering with Business from Singapore Polytechnic

3-year BEng (CE) Programme with Professional Internship (PI)
For Exempted Polytechnic Students
Applicable to students matriculated in 2019 or later

Overview of AUs requirement

Option I: 3-year Programme including Professional Internship

Note: Students will need to heavily overload to complete the programme within 3 years.

Year of Study		Core	Major Prescribed Elective (MPE)	General Education Requirement (GER)				Unrestricted Elective (UE)	Total
				Core	Prescribed Elective (PE)				
					BM	LA	STS		
Exemptions			6		3	3		15	27
1	Sem 1	14		3			3		20
	Sem 2	12		7					19
2	Sem 1	18		2					20
	Sem 2	10							10
3	Sem 1	16	3	2					21
	Sem 2	14	9						23
Total		84	18	14	3	3	3	15	140
				23					

Option II: 3.5-year Programme including Professional Internship

Year of Study		Core	Major Prescribed Elective (MPE)	General Education Requirement (GER)				Unrestricted Elective (UE)	Total
				Core	Prescribed Elective (PE)				
					BM	LA	STS		
Exemptions			6		3	3		15	27
1	Sem 1	14		3					17
	Sem 2	12		6					18
2	Sem 1	15		1					16
	Sem 2	12		2			3		17
3	Sem 1	10							10
	Sem 2	7	6	2					15
4	Sem 1	14	6						20
Total		84	18	14	3	3	3	15	140
				23					

Suggested Curriculum for Option I (3-year Programme including Professional Internship)

Suggested Curriculum

Course Code and Title	Type *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	No of Hours Per Week				AU	Pre-requisite / Remarks
		Lec / TEL*	Tut	Lab/ Example class+	Total		
EXEMPTIONS							
Technical Elective (CE4xxx)	MPE	2	1	1	4	3	
Technical Elective (CE4xxx)	MPE	2	1	1	4	3	
Business & Management	GER PE – BM	2	1	-	3	3	Business & Management
Liberal Arts	GER PE – LA	2	1	-	3	3	Liberal Arts
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
TOTAL		**18**	**9**	**2**	**29**	**27**	

Course Code and Title	Type *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	No of Hours Per Week				AU	Pre-requisite / Remarks
		Lec / TEL*	Tut	Lab/ Example class+	Total		
YEAR 1 SEMESTER 1							
CE1011 Engineering Mathematics I	Core	2	1	1+	4	3	-
CE1012 Engineering Mathematics II	Core	2	1	1+	4	3	CE1011 (can be taken concurrently)
CE1005 Digital Logic	Core	2	1	1	4	3	-
CE1013 Physics for Computing	Core	2	0	2	3	2	-
Science & Technology	GER PE - STS	2	1	1	4	3	
HW0188^ Engineering Communication I	GER core	-	2	-	2	2	HW0001 (can be taken concurrently)
GC0001 Sustainability: Seeing Through The Haze	GER core					1	online course
HW0001 Introduction to Academic Communication	GER core					0	

TOTAL		**12**	**7**	**5+2⁺**	**25**	**20**	
CE1003 Introduction to Computational Thinking##	Core	2*	0	2⁺	4	3	-
YEAR 1 SEMESTER 2							
MH1812 Discrete Mathematics	Core	2	1	1⁺	4	3	-
CE1006 Computer Organisation and Architecture	Core	2	1	1	4	3	CE1005 (can be taken concurrently)
CE1007 Data Structures	Core	2	1	1	4	3	CE1003
CE2003 Digital Systems Design	Core	2	1	1	4	3	CE1005
CE0001 Engineers and Society#	GER core	2	1	-	3	3	-
CE1015 Introduction to Data Science and Artificial Intelligence	GER core	2*	0	2	4	3	CE1003
HY0001 Ethics & Moral Reasoning	GER core					1	online course
TOTAL		**10+2***	**5**	**5+1⁺**	**23**	**19**	

^ Should there be insufficient vacancies, students will take Eng Comm I & II in the following semester.

Available only in semester 2. Should there be insufficient vacancies, students will take Engrs and Society in the next semester 2.

##Applicable to students who a. Did not opt for OR pass the qualification test and b. Admitted with non-exempted Diplomas. E.g. Diploma in Aerospace Engineering & Diploma in Aerospace Electronics from Temasek Polytechnic, Diploma in Engineering with Business from Singapore Polytechnic.

Course Code and Title	**Type** *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	**No of Hours Per Week**				**AU**	**Pre-requisite / Remarks**
		Lec	**Tut**	**Lab/ Example class⁺**	**Total**		
YEAR 2 SEMESTER 1							
CE2001 Algorithms	Core	2	1	1⁺	4	3	CE1007, CE1012, MH1812
CE2002 Object Oriented Design & Programming	Core	2	1	1	4	3	CE1007
CE2004 Circuits and Signal Analysis	Core	2	1	1	4	3	CE1012
CE2005 Operating Systems	Core	2	1	1	4	3	CE1006, CE1007
CE2006 Software Engineering	Core	2	1	1	4	3	CE2002 (can be taken concurrently)
CE2007 Microprocessor-based Systems Design	Core	2	1	1	4	3	CE1006, CE2004 (can be taken concurrently)
ET0001 Enterprise & Innovation	GER core					1	online course

ML0003 Kickstart your Career Success	GER core					1	online course
TOTAL		**12**	**6**	**5+1⁺**	**24**	**20**	
YEAR 2 SEMESTER 2							
CE3179 Professional Internship	Core	-	-	-	-	10	ML0003, Year 3 standing
TOTAL		**-**	**-**	**-**	**-**	**10**	

Course Code and Title	**Type** *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	**No of Hours Per Week**				**AU**	**Pre-requisite / Remarks**
		Lec	**Tut**	**Lab**	**Total**		
YEAR 3 SEMESTER 1							
CE4079 Final Year Project	Core	-	-	-	-	-	Final year standing
CE3001 Advanced Computer Architecture	Core	2	1	1	4	3	CE1006
CE3002 Sensors, Interfacing and Control	Core	2	1	1	4	3	CE2004
CE3004 Multidisciplinary Design Project	Core	1	-	3	4	4	Year 3 standing
CE3005 Computer Networks	Core	2	1	1	4	3	CE1011, CE1012
CE3006 Digital Communications	Core	2	1	1	4	3	CE1011, CE2004
CE4xxx Technical Elective 1	MPE	2	1	1	4	3	
HW0288^ Engineering Communication II	GER core	-	2	-	2	2	HW0188, Year 3 standing
TOTAL		**11**	**7**	**8**	**26**	**21**	
YEAR 3 SEMESTER 2							
CE4079 Final Year Project	Core	-	-	-	-	8	
CE3003 Microcontroller Programming	Core	2	1	1	4	3	CE2005
CE3007 Digital Signal Processing	Core	2	1	1	4	3	CE2004
CE4xxx Technical Elective 2	MPE	2	1	1	4	3	
CE4xxx Technical Elective 3	MPE	2	1	1	4	3	
CE4xxx Technical Elective 4	MPE	2	1	1	4	3	
TOTAL		**10**	**5**	**5**	**20**	**23**	

GRAND TOTAL (Years 1 to 3)	**140**

[+]Instead of normal tutorial/laboratory classes, Faculty can use Example Class for their pedagogical needs such as group discussion team based learning (TBL), seminar to review and reinforce concepts, provide additional coaching, give more worked examples, allow students to do practice exercises or do research or work on the computers etc.

3.5-year BEng (CE) Programme with Professional Internship (PI) for Exempted Polytechnic Students

Applicable to students matriculated in 2019 or later

Suggested Curriculum for Option II (3.5-year Programme including Professional Internship)

Course Code and Title	Type *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	No of Hours Per Week				AU	Pre-requisite / Remarks
		Lec / TEL*	Tut	Lab/ Example class+	Total		
EXEMPTIONS							
Technical Elective (CE4xxx)	MPE	2	1	1	4	3	
Technical Elective (CE4xxx)	MPE	2	1	1	4	3	
Business & Management	GER PE – BM	2	1	-	3	3	Business & Management
Liberal Arts	GER PE – LA	2	1	-	3	3	Liberal Arts
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
Unrestricted elective	Unrestricted elective	2	1	-	3	3	
TOTAL		**18**	**9**	**2**	**29**	**27**	

Course Code and Title	Type *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	No of Hours Per Week				AU	Pre-requisite / Remarks
		Lec / TEL*	Tut	Lab/ Example class+	Total		
YEAR 1 SEMESTER 1							
CE1011 Engineering Mathematics I	Core	2	1	1+	4	3	-
CE1012 Engineering Mathematics II	Core	2	1	1+	4	3	CE1011 (can be taken concurrently)
CE1005 Digital Logic	Core	2	1	1	4	3	-
CE1013 Physics for Computing	Core	2	0	2	3	2	-
HW0188^ Engineering Communication I	GER core	-	2	-	2	2	HW0001 (can be taken concurrently)
GC0001 Sustainability: Seeing Through The Haze	GER core					1	online course
HW0001 Introduction to Academic Communication	GER core					0	
TOTAL		**8**	**5**	**3+2+**	**17**	**14**	
CE1003 Introduction to Computational Thinking##	Core	2*	0	2	4	3	-
YEAR 1 SEMESTER 2							
MH1812 Discrete Mathematics	Core	2	1	1+	4	3	-
CE1006 Computer Organisation and Architecture	Core	2	1	1	4	3	CE1005 (can be taken concurrently)
CE1007 Data Structures	Core	2	1	1	4	3	CE1003
CE2003 Digital Systems Design	Core	2	1	1	4	3	CE1005
CE0001 Engineers and Society#	GER core	2	1	-	3	3	-
CE1015 Introduction to Data Science and Artificial Intelligence	GER core	2*	0	2	4	3	CE1003
TOTAL		**10+2***	**5**	**5+1+**	**23**	**18**	

^ Should there be insufficient vacancies, students will take Eng Comm I & II in the following semester.

Available only in semester 2. Should there be insufficient vacancies, students will take Engrs and Society in the next semester 2.

##Applicable to students who a. Did not opt for OR pass the qualification test and b. Admitted with non-exempted Diplomas. E.g. Diploma in Aerospace Engineering & Diploma in Aerospace Electronics from Temasek Polytechnic, Diploma in Engineering with Business from Singapore Polytechnic.

Course Code and Title	Type *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	No of Hours Per Week				AU	Pre-requisite / Remarks
		Lec	Tut	Lab/ Example class+	Total		
YEAR 2 SEMESTER 1							
CE2001 Algorithms	Core	2	1	1+	4	3	CE1007, CE1012, MH1812
CE2002 Object Oriented Design & Programming	Core	2	1	1	4	3	CE1007
CE2004 Circuits and Signal Analysis	Core	2	1	1	4	3	CE1012
CE2005 Operating Systems	Core	2	1	1	4	3	CE1006, CE1007
CE2007 Microprocessor-based Systems Design	Core	2	1	1	4	3	CE1006, CE2004 (can be taken concurrently)
HY0001 Ethics & Moral Reasoning	GER core					1	online course
TOTAL		**10**	**5**	**4+1+**	**20**	**16**	
YEAR 2 SEMESTER 2							
CE2006 Software Engineering	Core	2	1	1	4	3	CE2002 (can be taken concurrently)
CE3001 Advanced Computer Architecture	Core	2	1	1	4	3	CE1006
CE3003 Microcontroller Programming	Core	2	1	1	4	3	CE2005
CE3005 Computer Networks	Core	2	1	1	4	3	CE1011, CE1012
ET0001 Enterprise & Innovation	GER core					1	online course
Science & Technology	GER PE - STS	2	1	1	4	3	
ML0003 Kickstart your Career Success	GER core					1	online course
TOTAL		**10**	**5**	**5**	**20**	**17**	

Course Code and Title	Type *(i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)*	No of Hours Per Week				AU	Pre-requisite / Remarks
		Lec	Tut	Lab	Total		
YEAR 3 SEMESTER 1							
CE3179 Professional Internship	Core	-	-	-	-	10	ML0003, Year 3 standing
TOTAL		**-**	**-**	**-**	**-**	**10**	
YEAR 3 SEMESTER 2							
CE4079 Final Year Project	Core	-	-	-	-	-	Final year standing
CE3004 Multidisciplinary Design Project	Core	1	-	3	4	4	Year 3 standing
CE3007 Digital Signal Processing	Core	2	1	1	4	3	CE2004
CE4xxx Technical Elective 1	MPE	2	1	1	4	3	
CE4xxx Technical Elective 2	MPE	2	1	1	4	3	
HW0288^ Engineering Communication II	GER core	-	2	-	2	2	HW0188, Year 3 standing
TOTAL		**7**	**5**	**5**	**18**	**15**	
YEAR 4 SEMESTER 1							
CE4079 Final Year Project	Core	-	-	-	-	8	
CE3002 Sensors, Interfacing and Control	Core	2	1	1	4	3	CE2004
CE3006 Digital Communications	Core	2	1	1	4	3	CE1011, CE2004
CE4xxx Technical Elective 3	MPE	2	1	1	4	3	
CE4xxx Technical Elective 4	MPE	2	1	1	4	3	
TOTAL		**8**	**4**	**4**	**16**	**20**	
GRAND TOTAL (Years 1 to 3.5)							**140**

[+]Instead of normal tutorial/laboratory classes, Faculty can use Example Class for their pedagogical needs such as group discussion team based learning (TBL), seminar to review and reinforce concepts, provide additional coaching, give more worked examples, allow students to do practice exercises or do research or work on the computers etc.