NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Computer Science and Engineering

Double Degree Programme in
Computer Engineering and Economics Curriculum Structure
Applicable to students matriculated in 2018 or later

The BEng (CE) and BArts (Econs) is a 5-year double degree programme hosted by School of Computer Science and Engineering and the Economics Division of the School of Social Sciences (SSS). Students under this programme can opt to take the 10-week Professional Attachment.

Polytechnic students will be exempted a total of 9 AUs in the following courses:

a. Technical Elective I (Core elective, to be taken from CZ2xxx or CZ3xxx courses) - 3 AUs
b. Technical Elective 2 (Core elective, to be taken from CE4xxx or CZ4xxx) – 3 AUs
c. CE1003 Introduction to Computational Thinking (Core) - 3 AUs

Overview of AUs requirement

Option I: 10-week Professional Attachment (PA)

Year of Study	Core (CE)	Core (ECON)	Major Prescribed Elective (MPE) (CE)	Major Prescribed Elective (MPE) (ECON)	General Education Requirement (GER)	Unrestricted Elective (UE)	Total
					Core		
1	11	6			1		18
	12	6			3		21
2	12	3			3		18
	9	6			3		18
3	12			3	2	3	20
	12		3	3	2		20
4	3	4	6	3			16
	8		6	3		2	19
5			3	12			15
				15			15
Total	79	25	18	39	14	5	180

Option II: 20-week Professional Internship (PI)

Year of Study	Core (CE)	Core (ECON)	Major Prescribed Elective (MPE) (CE)	Major Prescribed Elective (MPE) (ECON)	General Education Requirement (GER)	Total
					Core	
1	14	6			1	21
	12	6			3	21
2	12	3			3	18
	9	6			3	18
3	10			6	1	17
	3		3	12	2	20
4	6	4	6	3	1	20
	10					10
5			3	10		13
	8		6	8		22
Total	84	25	18	39	14	180

Option 1: 10-week Professional Attachment (PA)

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 (CE)	2	1	1^{+}	4	3	-
CE1012 Engineering Mathematics II	Core (CE)	2	1	1^{+}	4	3	CE1011 (can be taken concurrently)
CE1003 Introduction to Computational Thinking$^{\times}$	Core (CE)	2*	0	2^{+}	4	3	-
CE1013 Physics for Computing	Core (CE)	2	0	2	3	2	-
HE1001 Microeconomic Principles	Core (Econ)	2	1	-	3	3	-
HE1002 Macroeconomic Principles	Core (Econ)	2	1	-	3	3	
GC0001 Sustainability: Seeing Through The Haze	GER core					1	online course
TOTAL		**10+2***	**4**	**2+4^{+}**	**21**	**18**	
YEAR 1 SEMESTER 2							
CE1005 Digital Logic	Core (CE)	2	1	1	4	3	

CE1006 Computer Organisation and Architecture	Core (CE)	2	1	1	4	3	CE1005 (can be taken concurrently)
CE1007 Data Structures	Core (CE)	2	1	1	4	3	CE1003
MH1812 Discrete Mathematics	Core (CE)	2	1	1^+	4	3	-
HE1005 Intro to Probability & Statistical Inference	Core (Econ)	2	1	-	4	3	
HE2001 Intermediate Microeconomics	Core (Econ)	2	1	-	3	3	HE1001
CE1015 Introduction to Data Science and Artificial Intelligence	GER core	2*	0	2	4	3	
TOTAL		**12+2***	**6**	**5+1$^+$**	**27**	**21**	
YEAR 2 SEMESTER 1							
CE2001 Algorithms	Core (CE)	2	1	1^+	3	3	CE1007, CE1012, MH1812
CE2002 Object Oriented Design & Programming	Core (CE)	2	1	1	4	3	CE1007
CE2004 Circuits and Signal Analysis	Core (CE)	2	1	1	4	3	CE1012
CE2007 Microprocessor-based Systems Design	Core (CE)	2	1	1	4	3	CE1006, CE2004 (can be taken concurrently)
HW0188^ Engineering Communication I	GER core	-	2	-	2	2	HW0001
HE2005 Principles of Econometrics	Core (Econ)	2	1	-	4	3	HE1005
HY0001 Ethics & Moral Reasoning	GER core					1	online course
TOTAL		**10**	**7**	**3+1$^+$**	**21**	**18**	

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

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 2 SEMESTER 2							
CE2003 Digital Systems Design	Core (CE)	2	1	1	4	3	CE1005
CE2005 Operating Systems	Core (CE)	2	1	1	4	3	CE1006, CE1007
CE2006 Software Engineering	Core (CE)	2	1	1	4	3	CE2002 (can be taken concurrently)
CE0001 Engineers and Society#	GER core	2	1	-	3	3	
HE2002 Intermediate Macroeconomics	Core (Econ)	2	1	-	3	3	HE1002
HE3021 Intermediate Econometrics	Core (Econ)	2	1	-	3	3	HE2005 or at least an A grade in HE2004
TOTAL		**12**	**6**	**3**	**21**	**18**	

YEAR 3 SEMESTER 1							
CE3001 Advanced Computer Architecture	Core (CE)	2	1	1	4	3	CE1006
CE3002 Sensors, Interfacing and Control	Core (CE)	2	1	1	4	3	CE2004
CE3005 Computer Networks	Core (CE)	2	1	1	4	3	CE1011, CE1012
CE3007 Digital Signal Processing	Core (CE)	2	1	1	4	3	CE2004
Unrestricted Elective	Unrestricted Elective	2	1	-	3	3	
Econs PE 1	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
ET0001 Enterprise & Innovation	GER core					1	online course
ML0003 Professional Development Course	GER core					1	online course
TOTAL		**12**	**6**	**4**	**22**	**20**	
YEAR 3 SEMESTER 2							
CE3003 Microcontroller Programming	Core (CE)	2	1	1	4	3	CE2005
CE3004 Multidisciplinary Design Project	Core (CE)	1	-	3	4	4	Year 3 standing
Technical Elective 1[×] (CZ200x or CZ300x)	MPE (CE)	2	1	1	4	3	
HW0288^ Engineering Communication II	GER core	-	2	-	2	2	HW0188, Year 3 standing
Econs PE 2	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
CE3026 Professional Attachment (Special Semester)	Core (CE)	-	-	-	-	5	ML0003
TOTAL		**7**	**5**	**5**	**17**	**20**	

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

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 4 SEMESTER 1							
CE4079 Final Year Project	Core (CE)	-	-	-	-	-	Final year standing
CE3006 Digital Communications	Core (CE)	2	1	1	4	3	CE1011, CE2004
CE4xxx Technical Elective 2[×]	MPE (CE)	2	1	1	4	3	
CE4xxx Technical Elective 3	MPE (CE)	2	1	1	4	3	
HE4010 Singapore Economy in a Globalised World	Core (Econ)	2	2	-	4	4	HE2001, HE2002
Econs PE 3	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
TOTAL		**10**	**6**	**3**	**19**	**16**	
YEAR 4 SEMESTER 2							
CE4079 Final Year Project	Core (CE)	-	-	-	-	8	

CE4xxx Technical Elective 4	MPE (CE)	2	1	1	4	3	
CE4xxx Technical Elective 5	MPE (CE)	2	1	1	4	3	
Econs PE 4	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Unrestricted Elective	Unrestricted Elective	1	-	-	1	2	
TOTAL		**7**	**3**	**2**	**12**	**19**	
YEAR 5 SEMESTER 1							
CE4xxx Technical Elective 6	MPE (CE)	2	1	1	4	3	
Econs PE 5	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 6	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 7	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 8	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
TOTAL		**10**	**5**	**1**	**16**	**15**	
YEAR 5 SEMESTER 2							
Econs PE 9	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 10	MPE (Econ)	2	2	-	4	4	HE1005, HE2005
Econs PE 11	MPE (Econ)	2	2	-	4	4	HE1005, HE2005
Econs PE 12	MPE (Econ)	2	2	-	4	4	HE1005, HE2005
TOTAL		**8**	**7**	**-**	**15**	**15**	
GRAND TOTAL (Year 1 to 5)							**180**

[×] Exempted AUs for Polytechnic students with relevant diplomas

[+]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.

List of Courses which contribute to BEng (CE) degree

List of courses that contribute towards BEng (Computer Engineering)				AU Load	
Discipline Requirement	**Core**	MH1812	Discrete Mathematics	3	79 AUs (PA)
		CE1011	Engineering Mathematics I	3	
		CE1012	Engineering Mathematics II	3	
		CE1003	Introduction to Computational Thinking	3	
		CE1005	Digital Logic	3	
		CE1006	Computer Organisation and Architecture	3	
		CE1007	Data Structures	3	
		CE1013	Physics for Computing	2	
		CE2001	Algorithms	3	
		CE2002	Object Oriented Design & Programming	3	
		CE2003	Digital Systems Design	3	
		CE2004	Circuits and Signal Analysis	3	
		CE2005	Operating Systems	3	
		CE2006	Software Engineering	3	
		CE2007	Microprocessor-based Systems Design	3	
		CE3001	Advanced Computer Architecture	3	
		CE3002	Sensors and Control Systems	3	
		CE3003	Microcontroller Programming	3	
		CE3005	Computer Networks	3	
		CE3006	Digital Communications	3	
		CE3007	Digital Signal Processing	3	
		CE3004	Multidisciplinary Design Project	4	
		CE3026	Industrial Orientation	5	
		CE4079	Final Year Project	8	
	Core Elective	CE4xxx	CE Technical Elective 1	3	18 AUs
		CE4xxx	CE Technical Elective 2	3	
		CE4xxx	CE Technical Elective 3	3	
		CE4xxx	CE Technical Elective 4	3	
		CE4xxx	CE Technical Elective 5	3	
		CE4xxx	CE Technical Elective 6	3	
General Education Requirements (GER)	**GER (Core)**	HW0188	Engineering Communication I	2	14 AUs
		HW0288	Engineering Communication II	2	
		ML0003	Professional Development Course	1	
		CE0001	Engineers and Society	3	
		GC0001	Introduction to Sustainability: Multidisciplinary Approaches and Solutions	1	
		HY0001	Ethics and Moral Reasoning	1	
		ET0001	Enterprise and Innovation	1	
		CE1015	Introduction to Data Science and Artificial Intelligence	3	
	GER(BM) GER(LA) GER(STS) GER	HE1001	Microeconomic Principles	3	12 AUs
		HE1002	Macroeconomic Principles	3	
		HE1005	Introduction to Probability & Statistical Inference	3	
		HE2005	Principles of Econometrics*	3	
	UE		UE	5	

			Any of HE2001, HE2002, HE2005, HE4010, Econs Major PEs	12	17 AUs
				TOTAL	**140 AUs**

Option 2: 20-week Professional Internship (PI)

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 (CE)	2	1	1+	4	3	-
CE1012 Engineering Mathematics II	Core (CE)	2	1	1+	4	3	CE1011 (can be taken concurrently)
CE1003 Introduction to Computational Thinking×	Core (CE)	2*	0	2+	4	3	-
CE1005 Digital Logic	Core (CE)	2	1	1	4	3	
CE1013 Physics for Computing	Core (CE)	2	0	2	3	2	-
HE1001 Microeconomic Principles	Core (Econ)	2	1	-	3	3	-
HE1005 Intro to Probability & Statistical Inference	Core (Econ)	2	1	-	4	3	
GC0001 Sustainability: Seeing Through The Haze	GER core					1	online course
TOTAL		**12+2***	**5**	**3+4+**	**26**	**21**	
YEAR 1 SEMESTER 2							
CE1006 Computer Organisation and Architecture	Core (CE)	2	1	1	4	3	CE1005 (can be taken concurrently)
CE1007 Data Structures	Core (CE)	2	1	1	4	3	CE1003
MH1812 Discrete Mathematics	Core (CE)	2	1	1+	4	3	-
CE2003 Digital Systems Design	Core (CE)	2	1	1	4	3	CE1005
HE1002 Macroeconomic Principles	Core (Econ)	2	1	-	3	3	
HE2001 Intermediate Microeconomics	Core (Econ)	2	1	-	3	3	HE1001
CE1015 Introduction to Data Science and Artificial Intelligence	GER core	2*	0	2	4	3	
TOTAL		**12+2***	**6**	**5+1+**	**26**	**21**	
YEAR 2 SEMESTER 1							
CE2001 Algorithms	Core (CE)	2	1	1+	3	3	CE1007, CE1012, MH1812
CE2002 Object Oriented Design & Programming	Core (CE)	2	1	1	4	3	CE1007
CE2004 Circuits and Signal Analysis	Core (CE)	2	1	1	4	3	CE1012
CE2007 Microprocessor-based Systems Design	Core (CE)	2	1	1	4	3	CE1006, CE2004 (can be taken concurrently)

HW0188^ Engineering Communication I	GER core	-	2	-	2	2	HW0001
HE2005 Principles of Econometrics	Core (Econ)	2	1	-	4	3	HE1005
HY0001 Ethics & Moral Reasoning	GER core					1	online course
TOTAL		**10**	**7**	**3+1+**	**21**	**18**	

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

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 2 SEMESTER 2							
CE2005 Operating Systems	Core (CE)	2	1	1	4	3	CE1006, CE1007
CE2006 Software Engineering	Core (CE)	2	1	1	4	3	CE2002 (can be taken concurrently)
CE3005 Computer Networks	Core (CE)	2	1	1	4	3	CE1011, CE1012
HE2002 Intermediate Macroeconomics	Core (Econ)	2	1	-	3	3	HE1002
HE3021 Intermediate Econometrics	Core (Econ)	2	1	-	3	3	HE2005 or at least an A grade in HE2004
CE0001 Engineers and Society#	GER core	2	1	-	3	3	
TOTAL		**12**	**6**	**3**	**21**	**18**	
YEAR 3 SEMESTER 1							
CE3001 Advanced Computer Architecture	Core (CE)	2	1	1	4	3	CE1006
CE3002 Sensors, Interfacing and Control	Core (CE)	2	1	1	4	3	CE2004
CE3004 Multidisciplinary Design Project	Core (CE)	1	-	3	4	4	Year 3 standing
Econs PE 1	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 2	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
ET0001 Enterprise & Innovation	GER core					1	online course
TOTAL		**9**	**4**	**5**	**18**	**17**	
YEAR 3 SEMESTER 2							
CE3003 Microcontroller Programming	Core (CE)	2	1	1	4	3	CE2005
Technical Elective 1× (CZ200x or CZ300x)	MPE (CE)	2	1	1	4	3	
HW0288^ Engineering Communication II	GER core	-	2	-	2	2	HW0188, Year 3 standing
Econs PE 3	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 4	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 5	MPE (Econ)	2	1	-	3	3	HE1005, HE2005

Econs PE 6	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
TOTAL		**12**	**8**	**2**	**22**	**20**	

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

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 4 SEMESTER 1							
CE3006 Digital Communications	Core (CE)	2	1	1	4	3	CE1011, CE2004
CE3007 Digital Signal Processing	Core (CE)	2	1	1	4	3	CE2004
CE4xxx Technical Elective 2[×]	MPE (CE)	2	1	1	4	3	
CE4xxx Technical Elective 3	MPE (CE)	2	1	1	4	3	
HE4010 Singapore Economy in a Globalised World	Core (Econ)	2	2	-	4	4	HE2001, HE2002
Econs PE 7	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
ML0003 Career Preparatory Course	GER core					1	online course
TOTAL		**12**	**7**	**4**	**23**	**20**	
YEAR 4 SEMESTER 2							
CE3079 Professional Internship	Core (CE)	-	-	-	-	10	
TOTAL		**-**	**-**	**-**	**-**	**10**	
YEAR 5 SEMESTER 1							
CE4079 Final Year Project	Core (CE)	-	-	-	-	-	Final year standing
CE4xxx Technical Elective 4	MPE (CE)	2	1	1	4	3	
Econs PE 8	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 9	MPE (Econ)	2	1	-	3	3	HE1005, HE2005
Econs PE 10	MPE (Econ)	2	2	-	4	4	HE1005, HE2005
TOTAL		**8**	**5**	**1**	**14**	**13**	
YEAR 5 SEMESTER 2							
CE4079 Final Year Project	Core	-	-	-	-	8	
CE4xxx Technical Elective 5	MPE (CE)	2	1	1	4	3	
CE4xxx Technical Elective 6	MPE (CE)	2	1	1	4	3	
Econs PE 11	MPE (Econ)	2	2	-	4	4	HE1005, HE2005
Econs PE 12	MPE (Econ)	2	2	-	4	4	HE1005, HE2005
TOTAL		**8**	**6**	**2**	**16**	**22**	
GRAND TOTAL (Year 1 to 5)							**180**

[×] Exempted AUs for Polytechnic students with relevant diplomas

[+]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.

List of Courses which contribute to BEng (CE) degree

List of courses that contribute towards BEng (Computer Engineering)				AU Load	
Discipline Requirement	**Core**	MH1812	Discrete Mathematics	3	84 AUs
		CE1011	Engineering Mathematics I	3	
		CE1012	Engineering Mathematics II	3	
		CE1003	Introduction to Computational Thinking	3	
		CE1005	Digital Logic	3	
		CE1006	Computer Organisation and Architecture	3	
		CE1007	Data Structures	3	
		CE1013	Physics for Computing	2	
		CE2001	Algorithms	3	
		CE2002	Object Oriented Design & Programming	3	
		CE2003	Digital Systems Design	3	
		CE2004	Circuits and Signal Analysis	3	
		CE2005	Operating Systems	3	
		CE2006	Software Engineering	3	
		CE2007	Microprocessor-based Systems Design	3	
		CE3001	Advanced Computer Architecture	3	
		CE3002	Sensors and Control Systems	3	
		CE3003	Microcontroller Programming	3	
		CE3005	Computer Networks	3	
		CE3006	Digital Communications	3	
		CE3007	Digital Signal Processing	3	
		CE3004	Multidisciplinary Design Project	4	
		CE3079	Industrial Orientation	10	
		CE4079	Final Year Project	8	
	Core Elective	CE4xxx	CE Technical Elective 1	3	18 AUs
		CE4xxx	CE Technical Elective 2	3	
		CE4xxx	CE Technical Elective 3	3	
		CE4xxx	CE Technical Elective 4	3	
		CE4xxx	CE Technical Elective 5	3	
		CE4xxx	CE Technical Elective 6	3	
General Education Requirements (GER)	**GER (Core)**	HW0188	Engineering Communication I	2	14 AUs
		HW0288	Engineering Communication II	2	
		ML0003	Professional Development Course	1	
		CE0001	Engineers and Society	3	
		GC0001	Introduction to Sustainability: Multidisciplinary Approaches and Solutions	1	
		HY0001	Ethics and Moral Reasoning	1	
		ET0001	Enterprise and Innovation	1	
		CE1015	Introduction to Data Science and Artificial Intelligence	3	

	GER(BM) **GER(LA)** **GER(STS)**	HE1001 HE1002 HE1003	Microeconomic Principles Macroeconomic Principles Basic Mathematics for Economists	3 3 3	9 AUs
	UE		Any of HE2001, HE2002, HE2005, HE4010, Econs Major PEs		15 AUs
			TOTAL	**140 AUs**	