

## Bachelor of Engineering (Computer Science) and 2<sup>nd</sup> Major in Business Curriculum

For students matriculated in 2018 onwards

### 4-year BEng (CS) Programme and 2<sup>nd</sup> Major in Business (ITP)

### Overview of AUs requirement

#### Option I: 10-week Professional Attachment(PA)

Year of Study	Core (CS)	Major Prescribed Elective (MPE) (CS)	General Education Requirement (GER)	Unrestricted Elective (UE)	Unrestricted Elective (UE) (2 <sup>nd</sup> Major)	Total
			Core			
1	11		3		7	21
	12		3		7	22
2	12		1	2	2	17
	15				2	17
3	10		4		2	16
	11	3	3		4	21
4		9		3	2	14
	8	6			4	18
<b>Total</b>	<b>79</b>	<b>18</b>	<b>14</b>	<b>5</b>	<b>30</b>	<b>146</b>

#### Option II: 20-week Professional Internship(PI)

Year of Study	Core (CS)	Major Prescribed Elective (MPE) (CS)	General Education Requirement (GER)	Unrestricted Elective (UE) (2 <sup>nd</sup> Major)	Total
			Core		
1	11		3	7	21
	12		3	7	22
2	12		1	2	15
	15		3	2	20
3	10	3	4	4	21
	10				10
4	6	6		4	16
	8	9		4	21
<b>Total</b>	<b>84</b>	<b>18</b>	<b>14</b>	<b>30</b>	<b>146</b>

**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 <sup>+</sup>	Total		
<b>YEAR 1 SEMESTER 1</b>							
MH1812 Discrete Mathematics	Core	2	1	1 <sup>+</sup>	4	3	-
CZ1003 Introduction to Computational Thinking	Core	2*	0	2 <sup>+</sup>	4	3	-
CZ1013 Physics for Computing	Core	2	0	2	3	2	-
CZ1005 Digital Logic	Core	2	1	1	4	3	-
HW0188 <sup>^</sup> Effective Communication	GER core	2	-	-	2	2	
HW0001 English Proficiency	GER core					0	
AD1101 Financial Accounting	Unrestricted elective (2 <sup>nd</sup> major)	3	1	-	4	4	-
AB1201 Financial Management	Unrestricted elective (2 <sup>nd</sup> major)	2	1	-	3	3	-
GC0001 Sustainability: Seeing Through The Haze	GER core					1	Online course
<b>TOTAL</b>		<b>13+2*</b>	<b>4</b>	<b>3+3<sup>+</sup></b>	<b>24</b>	<b>21</b>	
<b>YEAR 1 SEMESTER 2</b>							
CZ1011 Engineering Mathematics I	Core	2	1	1 <sup>+</sup>	4	3	-
CZ1012 Engineering Mathematics II	Core	2	1	1 <sup>+</sup>	4	3	CZ1011 (can be taken concurrently)
CZ1006 Computer Organisation and Architecture	Core	2	1	1	4	3	CZ1005 (can be taken concurrently)
CZ1007 Data Structures	Core	2	1	1	4	3	CZ1003
AB1501 Marketing	Unrestricted elective (2 <sup>nd</sup> major)	2	1	-	3	3	-
BE1401 Business Operations and Processes <sup>-</sup>	Unrestricted elective (2 <sup>nd</sup> major)	3	1	-	4	4	-
CZ1015 Introduction to Data Science and Artificial Intelligence	GER Core	2*	0	2	4	3	
<b>TOTAL</b>		<b>13+2*</b>	<b>6</b>	<b>4+2<sup>+</sup></b>	<b>27</b>	<b>22</b>	

<sup>^</sup>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		
<b>YEAR 2 SEMESTER 1</b>							
CZ2001 Algorithms	Core	2	1	1 <sup>+</sup>	4	3	CZ1007, CZ1012, MH1812
CZ2002 Object Oriented Design & Programming	Core	2	1	1	4	3	CZ1007
CZ2004 Human Computer Interaction	Core	2	1	1	4	3	-
CZ2007 Introduction to Databases	Core	2	1	1	4	3	CZ2001 (can be taken concurrently)
Unrestricted Elective	Unrestricted elective	2	-	-	2	2	
BF2301 International Tax and Trading Law	Unrestricted elective (2 <sup>nd</sup> major)	3	1	-	4	2	
HY0001 Ethics & Moral Reasoning	GER core					1	Online course
<b>TOTAL</b>		<b>13</b>	<b>5</b>	<b>3+1<sup>+</sup></b>	<b>22</b>	<b>17</b>	
<b>YEAR 2 SEMESTER 2</b>							
CZ2003 Computer Graphics and Visualisation	Core	2	1	1	4	3	CZ1011
CZ2005 Operating Systems	Core	2	1	1	4	3	CZ1006, CZ1007
CZ2006 Software Engineering	Core	2	1	1	4	3	CZ2002 (can be taken concurrently)
CZ3001 Advanced Computer Architecture	Core	2	1	1	4	3	CZ2006 (can be taken concurrently)
CZ3003 Software Systems Analysis and Design	Core	2	1	1	4	3	CZ2004
Enterprise Risk Management	Unrestricted Elective (2 <sup>nd</sup> major)	3	1	-	4	2	TBD
<b>TOTAL</b>		<b>13</b>	<b>6</b>	<b>5</b>	<b>24</b>	<b>17</b>	

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		
<b>YEAR 3 SEMESTER 1</b>							
CZ3002 Advanced Software Engineering	Core	2	1	1	4	3	CZ2006
CZ3004 Multidisciplinary Design Project	Core	1	-	3	4	4	Year standing 3

CZ3006 Net Centric Computing	Core	2	1	1	4	3	CZ1006, CZ2002
Commodities Finance	Unrestricted Elective (2 <sup>nd</sup> major)	3	1	-	4	2	TBD
ET0001 Enterprise & Innovation	GER core					1	
HW0288 Engineering Communication II	GER core	2	-	-	2	2	HW0188, Year 3 standing
ML0003 Professional Development Course	GER core					1	online course
<b>TOTAL</b>		<b>12</b>	<b>4</b>	<b>5</b>	<b>21</b>	<b>16</b>	
<b>YEAR 3 SEMESTER 2</b>							
CZ3005 Artificial Intelligence	Core	2	1	1	4	3	CZ1003, CZ2001
CZ3007 Compiler Techniques	Core	2	1	1	4	3	CZ2001, CZ2006
Technical Elective 1 (CE200x or CE300x)	MPE	2	1	1	4	3	
Introduction to Ship Chartering and Trade Practice	Unrestricted Elective (2 <sup>nd</sup> major)	3	1	-	4	4	TBD
CZ0001 Engineers & Society <sup>#</sup>	GER core	2	1	-	3	3	
CZ3126 Professional Attachment	Core	-	-	-	-	5	
<b>TOTAL</b>		<b>9</b>	<b>5</b>	<b>3</b>	<b>19</b>	<b>21</b>	

<sup>#</sup> 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		
<b>YEAR 4 SEMESTER 1</b>							
CZ4079 Final Year Project	Core	-	-	-	-	-	Final year standing
CZ4xxx Technical Elective 2	MPE	2	1	1	4	3	
CZ4xxx Technical Elective 3	MPE	2	1	1	4	3	
CZ4xxx Technical Elective 4	MPE	2	1	1	4	3	
Unrestricted Elective	Unrestricted elective	3	-	-	3	3	
BF3211 Commodities Trading and Risk Management	Unrestricted elective (2 <sup>nd</sup> major)	2	1	-	3	2	
<b>TOTAL</b>		<b>11</b>	<b>4</b>	<b>3</b>	<b>18</b>	<b>14</b>	

<b>YEAR 4 SEMESTER 2</b>								
CZ4079 Final Year Project	Core	-	-	-	-	8		
CZ4xxx Technical Elective 5	MPE	2	1	1	4	3		
CZ4xxx Technical Elective 6	MPE	2	1	1	4	3		
MS4670 Commodities' Geology and Metallurgy	Unrestricted elective (2 <sup>nd</sup> major)	2	1	-	3	3		
BF4001 Industry Seminar	Unrestricted elective(2 <sup>nd</sup> major)					1		
<b>TOTAL</b>		<b>6</b>	<b>3</b>	<b>2</b>	<b>11</b>	<b>18</b>		
<b>GRAND TOTAL (Years 1 to 4)</b>							<b>148</b>	

\*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.

\*OR AB1401 Information Technology (3AU) AND AB1402 Foundational Excel (1AU)

**Option 2: 20-week Professional Internship (PI)**

Type	Total No. of AUs
Depth (Core)	102
Breadth (GER-Core)	12
Business Major (Unrestricted Elective)	39
<b>Grand Total</b>	<b>153</b>

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 <sup>+</sup>	Total		
<b>YEAR 1 SEMESTER 1</b>							
MH1812 Discrete Mathematics	Core	2	1	1 <sup>+</sup>	4	3	-
CZ1003 Introduction to Computational Thinking	Core	2*	0	2 <sup>+</sup>	4	3	-
CZ1013 Physics for Computing	Core	2	0	2	3	2	-
CZ1005 Digital Logic	Core	2	1	1	4	3	-
HW0188 <sup>^</sup> Effective Communication	GER core	2	-	-	2	2	
HW0001 English Proficiency	GER core					0	
AD1101 Financial Accounting	Unrestricted Elective (2 <sup>nd</sup> major)	3	1	-	4	4	-
AB1201 Financial Management	Unrestricted Elective (2 <sup>nd</sup> major)	2	1	-	3	3	-
GC0001 Sustainability: Seeing Through the Haze	GER core					1	Online course
<b>TOTAL</b>		<b>13+2*</b>	<b>4</b>	<b>3+3<sup>+</sup></b>	<b>24</b>	<b>21</b>	
<b>YEAR 1 SEMESTER 2</b>							
CZ1011 Engineering Mathematics I	Core	2	1	1 <sup>+</sup>	4	3	-
CZ1012 Engineering Mathematics II	Core	2	1	1 <sup>+</sup>	4	3	CZ1011 (can be taken concurrently)
CZ1006 Computer Organisation and Architecture	Core	2	1	1	4	3	CZ1005 (can be taken concurrently)
CZ1007 Data Structures	Core	2	1	1	4	3	CZ1003
AB1501 Marketing	Unrestricted Elective (2 <sup>nd</sup> major)	2	1	-	3	3	-
BE1401 Business Operations and Processes <sup>-</sup>	Unrestricted Elective	3	1	-	4	4	-
CZ1015 Introduction to Data Science and Artificial Intelligence	GER Core	2*	0	2	4	3	
<b>TOTAL</b>		<b>13+2*</b>	<b>6</b>	<b>4+2<sup>+</sup></b>	<b>27</b>	<b>22</b>	

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Course Code and Title	Type ( i.e. Core/ MPE/ GER core/ GER PE/ Unrestricted elective)	No of Hours Per Week					AU	Pre-requisite / Remarks
<b>YEAR 2 SEMESTER 1</b>								
CZ2001 Algorithms	Core	2	1	1 <sup>+</sup>	4	3	CZ1007, CZ1012, MH1812	
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Enterprise Risk Management	Unrestricted Elective (2 <sup>nd</sup> major)	3	1	-	4	2	TBD	
HY0001 Ethics & Moral Reasoning	GER core					1	Online course	
<b>TOTAL</b>		<b>11</b>	<b>5</b>	<b>3+1<sup>+</sup></b>	<b>20</b>	<b>15</b>		
<b>YEAR 2 SEMESTER 2</b>								
CZ2003 Computer Graphics and Visualisation	Core	2	1	1	4	3	CZ1011	
CZ2005 Operating Systems	Core	2	1	1	4	3	CZ1006, CZ1007	
CZ2006 Software Engineering	Core	2	1	1	4	3	CZ2002 (can be taken concurrently)	
CZ3001 Advanced Computer Architecture	Core	2	1	1	4	3	CZ2006 (can be taken concurrently)	
CZ3003 Software Systems Analysis and Design	Core	2	1	1	4	3	CZ2004	
Commodities Finance	Unrestricted Elective (2 <sup>nd</sup> major)	3	1	-	4	2	TBD	
CZ0001 Engineers & Society <sup>#</sup>	GER core	2	1	-	3	3		
<b>TOTAL</b>		<b>15</b>	<b>7</b>	<b>5</b>	<b>27</b>	<b>20</b>		

<sup>#</sup> 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		
<b>YEAR 3 SEMESTER 1</b>							
CZ3002 Advanced Software Engineering	Core	2	1	1	4	3	CZ2006
CZ3004 Multidisciplinary Design Project	Core	1	-	3	4	4	Year 3 standing
CZ3006 Net Centric Computing	Core	2	1	1	4	3	CZ1006, CZ2002
Technical Elective 1 (CE200x or CE300x)	MPE	2	1	1	4	3	
Introduction to Ship Chartering and Trade Practice	Unrestricted Elective (2 <sup>nd</sup> major)	3	1	-	4	4	TBD
ET0001 Enterprise & Innovation	GER core					1	
HW0288 Engineering Communication II	GER core	2	-	-	2	2	HW0188, Year 3 standing
ML0003 Professional Development Course	GER core					1	online course
<b>TOTAL</b>		<b>12</b>	<b>4</b>	<b>6</b>	<b>22</b>	<b>21</b>	
<b>YEAR 3 SEMESTER 2</b>							
CZ3179 Professional Internship	Core	-	-	-	-	10	Year 3 standing
<b>TOTAL</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10</b>	



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		
<b>YEAR 4 SEMESTER 1</b>							
CZ4079 Final Year Project	Core	-	-	-	-	-	
CZ3005 Artificial Intelligence	Core	2	1	1	4	3	CZ1003, CZ2001
CZ3007 Compiler Techniques	Core	2	1	1	4	3	CZ2001, CZ2006
CZ4xxx Technical Elective 2	MPE	2	1	1	4	3	
CZ4xxx Technical Elective 3	MPE	2	1	1	4	3	
BF2301 International Tax and Trading Law	Unrestricted Elective (2 <sup>nd</sup> major)	2	1	-	3	2	
BF3211 Commodities Trading and Risk Management	Unrestricted Elective (2 <sup>nd</sup> major)	2	1	-	3	2	
<b>TOTAL</b>		<b>12</b>	<b>6</b>	<b>4</b>	<b>22</b>	<b>16</b>	
<b>YEAR 4 SEMESTER 2</b>							
CZ4079 Final Year Project	Core	-	-	-	-	8	
CZ4xxx Technical Elective 4	MPE	2	1	1	4	3	
CZ4xxx Technical Elective 5	MPE	2	1	1	4	3	
CZ4xxx Technical Elective 6	MPE	2	1	1	4	3	
MS4670 Commodities' Geology and Metallurgy	Unrestricted Elective (2 <sup>nd</sup> major)	2	1	-	3	3	
BF4001 Industry Seminar	Unrestricted Elective (2 <sup>nd</sup> major)					1	
<b>TOTAL</b>		<b>8</b>	<b>4</b>	<b>3</b>	<b>15</b>	<b>21</b>	
<b>GRAND TOTAL (Years 1 to 4)</b>						<b>146</b>	

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