

Artificial Intelligence: Systems and Technologies
Applicable to students admitted in 2020-21

Major Programme Requirement

Students are required to complete a minimum of 75 units of courses as follows:

	Units
1. Faculty Package: ENGG1110/ESTR1002, ENGG1120/ESTR1005, ENGG1130/ESTR1006	9
2. Foundation Courses: AIST1110, ENGG2440/ESTR2004, ENGG2760/ESTR2018, ENGG2780/ESTR2020, MATH1510[a], PHYS1003/1110[b]	16
3. Required Courses:	
(a) AIST1000, 3010, 3020, CSCI2100/ESTR2102, CSCI3160/ESTR3104, CSCI3230/ESTR3108, CSCI3320	18
(b) Research Component Courses[c]: AIST4998, 4999	6
(c) Practicum Courses: AIST2601, 2602	3
4. Elective Courses (Choose any ONE from the following five options):	23
(a) General Artificial Intelligence: Systems and Technologies Choose at least 18 units from the following courses: AIST2010, AIST3510/SEEM3510, BMEG3103, CSCI3130, CSCI3150/ESTR3102, CSCI3170, CSCI4130/IERG4130/ESTR4306, CSCI4160/ESTR4104, CSCI4180/ESTR4106, CSCI4230, CSCI4430/IERG3310/ESTR4120, CSCI5030, 5120, 5150, 5240, 5350, 5550, 5570, 5580, ELEG5491, ENGG1820, 5103, 5105, 5108, 5501, FTEC4002, 4003, 4005, IERG2051/ESTR2302, IERG3050, 4230, IERG4300/ESTR4300, IERG4330/ESTR4316, IERG5130, MAEG3060/ESTR3408, MAEG3080, 5060, SEEM2460/ESTR2540, SEEM4630, 5330, 5680, STAT4001, 4005 Remaining units can be chosen from any courses under items 4(b) to 4(e).	
(b) Stream 1: Biomedical Intelligence Required Courses (7 units): BMEG2001/ESTR2201, BMEG3102, 3105 Elective Courses (Choose at least 12 units from the following): BMEG2300/ESTR2601, BMEG3101/ESTR3601, BMEG3103, 3130, 3320, 3420, 3910, BMEG4010/ESTR4601, BMEG4103, BMEG4320/ESTR4200, BMEG4510/ESTR4204, MAEG3060/ESTR3408 Remaining units can be chosen from any courses under item 4(a) General Artificial Intelligence: Systems and Technologies	
(c) Stream 2: Intelligent Multimedia Processing Required Courses (6 units): CSCI3280, IERG2051/ESTR2302 Elective Courses (Choose at least 12 units from the following): AIST2010, AIST3510/SEEM3510, CSCI3260, ELEG3503, ELEG4511/ESTR4218, ELEG4512/IERG4160/ESTR4104, ELEG5491, ENGG5202, IERG3320/ESTR3306, IERG4190, IERG4300/ESTR4300, IERG5130, LING2003/2004, 2005, 2006, 4201, SEEM5680 Remaining units can be chosen from any courses under item 4(a) General Artificial Intelligence: Systems and Technologies	
(d) Stream 3: Large-scale Artificial Intelligence - Theory and Systems Required Courses (3 units): CSCI3150/ESTR3102 Elective Courses (Choose at least 15 units from the following): CSCI3170, CSCI4160/ESTR4104, CSCI4180/ESTR4106, CSCI4230, 5030, 5120, 5150, 5240, 5350, 5550, 5570, 5580, ENGG5103, 5108, IERG3050, IERG4080/ESTR4312, IERG4230, IERG4300/ESTR4300, IERG4330/ESTR4316, IERG5130, STAT4001, 4005 Remaining units can be chosen from any courses under item 4(a) General Artificial Intelligence: Systems and Technologies	
(e) Stream 4: Intelligent Manufacturing and Robotics Required Courses (8 units): ENGG2720/ESTR2014, MAEG2020/ESTR2400, MAEG3040 Elective Courses (Choose at least 9 units from the following):	

EEEN2040, EEEN3010/ESTR3410, MAEG3020/ESTR3404, MAEG3050/ESTR3406, MAEG3060/ESTR3408, MAEG3080, MAEG4010/ESTR4408, MAEG4020/ESTR4410, MAEG4050, 5060, 5090, SEEM3500

Remaining units can be chosen from any courses under item 4(a) General Artificial Intelligence: Systems and Technologies

Total: 75

In addition to fulfilling the above Major Programme Requirement, students may also challenge themselves by taking the following stream offered by the Faculty:

Engineering Leadership, Innovation, Technology and Entrepreneurship (ELITE) Stream[d]

Elective Courses:

15 units of courses[e]:

- i) 12 units of ESTR courses of which at most 6 units of courses at 1000 or 2000 level and at least 6 units of courses at 3000 or 4000 level[f]
- ii) 3 units of BMEG/CENG/CSCI/ELEG/ENGG/IERG/MAEG/SEEM courses at 5000 level[g]

Explanatory Notes:

1. Students who have fulfilled the Major Programme Requirements of their respective Engineering programmes (or equivalent courses as approved by the Sub-Committee on Education Technologies) will be eligible to apply for exemption of 1 unit of University Core IT Requirement. Students are required to apply for the exemption. When exemption from a particular course is recognized, students can only be exempted from the course but not the units. Please follow the application procedures as announced by the IT Foundation Course Office at <https://engg1000.cse.cuhk.edu.hk>.
 2. All courses at 2000 and above level listed in the Major Programme Requirement will be included in the calculation of Major GPA for honours classification, excluding courses in Faculty Package and Foundation Courses.
 3. Students are not allowed to declare Minor in Data Analytics and Informatics.
- [a] i) Non-JUPAS admittees and JUPAS admittees with HKDSE Mathematics Extended Modules I or II are required to attend a Mathematics Placement Test. Students who fail or are absent from the Placement Test will be required to take MATH1020 in the same term when they take MATH1510.
- ii) JUPAS admittees without HKDSE Mathematics Extended Modules I or II are required to take MATH1020 concurrently with MATH1510.
- iii) Students who fail MATH1510 in Term 1 will have to retake the course in Term 2. The pre-assigned course, ENGG1130, will also be dropped.
- (Subject to Faculty Board's approval.)
- [b] The Physics course shall be taken in accordance with students' HKDSE results or placement test results as follows:
- i) Students who have attained Level 4 or above in HKDSE Mathematics (Compulsory Part) AND Level 4 or above in Physics or Level 5 or above in Combined Science with Physics Component shall take PHYS1110.
- ii) Students with HKDSE results but did not attain the academic levels as stated in (i) shall take PHYS1003.
- iii) Students without HKDSE results shall sit for the placement test arranged by the Department of Physics. Students who pass the placement test shall take PHYS1110. Students who fail or are absent from the placement test shall take PHYS1003.
- (Subject to Faculty Board's approval.)
- [c] Students who have declared to specialize in the ELITE Stream will be required to complete 6 units of ESTR4998 and 4999 to substitute for AIST4998 and 4999.
- [d] Details of the entrance and coursework requirements, and declaration procedures for the ELITE Stream can be found at the ELITE website (www.erg.cuhk.edu.hk/elite). Non-ELITE Engineering students may be allowed to take ESTR courses. Students are required to seek approval from their respective Major Programmes for using ESTR courses taken to fulfill the Major Programme Requirement. Details are available at the ELITE website.
- [e] Students can use up to 9 units of courses which have been taken to fulfill the requirements of items 1 to 4 above to fulfill the elective requirements of the ELITE Stream. Item 3(b) Research Component Courses will not be included in these 9 units. A full list of ESTR courses is available at the ELITE website.
- [f] Students can use BMEG/CENG/CSCI/ELEG/ENGG/IERG/MAEG/SEEM courses at 5000 level to substitute for ESTR courses at 3000 or 4000 level, subject to the approval of the Stream Director and the Associate Dean (Education).
- [g] The requirement of at least 3 units of Engineering courses at 5000 level is a requirement for the ELITE Stream only. It should not be interpreted as a requirement of the Major Programme.

	Recommended Course Pattern	Units
First Year of Attendance	1 st term Faculty Package: ENGG1110/ESTR1002 Major Required: AIST1000, MATH1510, PHYS1003/1110 Major Elective(s):	3 7
	2 nd term Faculty Package: ENGG1120/ESTR1005, ENGG1130/ESTR1006 Major Required: AIST2601, 2602 Major Elective(s):	6 3
Second Year of Attendance	1 st term Major Required: AIST1110, ENGG2440/ESTR2004, ENGG2760/ ESTR2018 Major Elective(s):	8
	2 nd term Major Required: AIST3020, CSCI2100/ESTR2102, ENGG2780/ ESTR2020 Major Elective(s):	8
Third Year of Attendance	1 st term Major Required: AIST3010, CSCI3160/ESTR3104, CSCI3230/ ESTR3108 Major Elective(s): 3-6 units from stream required courses / major electives	8 3-6
	2 nd term Major Required: CSCI3320 Major Elective(s): 9-12 units from stream required courses / major electives	3 9-12
Fourth Year of Attendance	1 st term Major Required: AIST4998 Major Elective(s): 6-9 units from stream required courses / major electives	3 6-9
	2 nd term Major Required: AIST4999 Major Elective(s): 5-9 units from stream required courses / major electives	3 5-9
Total (including Faculty Package):		75

Course List		
<i>Course Code</i>	<i>Course Title</i>	<i>Unit(s)</i>
AIST1000	Introduction to Artificial Intelligence and Machine Learning	1
AIST1110	Introduction to Computing Using Python	3
AIST2010	Introduction to Computer Music: From Analysis to Algorithmic Music	3
AIST2601	Technology, Society and Engineering Practice	2
AIST2602	Engineering Practicum	1
AIST3010	Numerical Optimization	2
AIST3020	Introduction to Computer Systems	3
AIST3510	Human-computer Interaction	3
AIST4998	Final Year Project I	3
AIST4999	Final Year Project II	3
ENGG1820	Engineering Internship	1
ENGG2440	Discrete Mathematics for Engineers	3
ENGG2720	Complex Variables for Engineers	2
ENGG2760	Probability for Engineers	2
ENGG2780	Statistics for Engineers	2
ENGG5103	Techniques for Data Mining	3
ENGG5105	Computer and Network Security	3
ENGG5108	Big Data Analytics	3
ENGG5202	Pattern Recognition	3
ENGG5501	Foundations of Optimization	3
ESTR2004	Discrete Mathematics for Engineers	3
ESTR2014	Complex Variables for Engineers	2
ESTR2018	Probability for Engineers	2
ESTR2020	Statistics for Engineers	2