

# THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

## Notes of Meetings between National Tsinghua University (NTHU) and The Hong Kong University of Science and Technology (HKUST) at HKUST Clear Water Bay Campus, Hong Kong, on 9-10 January, 2018

Meetings were organized into 3 sessions on 9 January 2018, to be followed by parallel departmental sessions on 10 January 2018. The first 2 sessions on 9 January were devoted to discussion of university-level matters, while the 3<sup>rd</sup> session was focused on School-level matters that are specific to the School/College of Engineering and School/College of Science respectively. On 10 January, parallel meetings of representatives from corresponding Departments were held to discuss issues specific to individual degree programs. Detailed rundown of the 2-day full program and names of staff present can be found in Appendix 1.

The following were discussed and agreed upon during the meetings.

### Action

#### 1. Opening Remarks

HKUST Dean of Engineering Prof. Tim Cheng, and Dean of Science Prof. Yang Wang welcomed the NTHU Delegation to HKUST. Both parties expressed appreciation of the new opportunities extended to their undergraduates through the dual degree program between NTHU and HKUST. It was reconfirmed that, as per the signed MOU, the numbers of students to participate in the program was 10 from each of NTHU and HKUST, to be equally shared between Science and Engineering.

#### 2. Admission

To meet HKUST's English Language Admission Requirement, NTHU students applying to HKUST are expected to produce English test scores recognized by HKUST for undergraduate admission, for instance, 6.0 or above in the overall band of IELTS or a score within the top 13% (i.e. 頂標) in the English subject of Taiwan GSAT (學測) for that intake cohort. NTHU will advise their students on the requirements and screen applicants for eligibility in the light of this.

Regarding the application procedure, NTHU students will submit application to NTHU for the dual degree program by the end of the third semester, which is usually over by end of January. As NTHU students already has a major as soon as they start Year 1 study at NTHU, they will apply for the relevant programs at HKUST instead of the Schools. The NTHU Committee will review the applicants' academic performance, select eligible applicants and make recommendations to HKUST around mid-February. Applications will be reviewed for endorsement by HKUST. Reciprocal arrangements will be made for students from HKUST to study at NTHU.

After confirming the endorsed student list, successful applicants will be notified and will be asked to submit admission applications on HKUST's on-line UG admission system before the end of April each year. Admission offer letters will be issued to students who have been approved by HKUST for admission. Upon their acceptance of the admission offer, NTHU students will be required to submit their student visa application to HKUST by mid-June. According to the practice of Hong Kong Immigration Department, it usually takes 6-8 weeks to process the visa applications. NTHU students are expected to arrive in HK in mid-August for registration and orientation.

NTHU confirmed that the first intake for the dual-degree program has started their studies at NTHU in September 2017. NTHU would recommend the first batch of

students to HKUST by mid-February 2019. It is expected that the first batch of dual degree students will be admitted to HKUST in September 2019.

**3. Financial Arrangement**

According to the signed MOU, students in the dual degree program will pay tuition fee to their home institution for the first 2 years. For the latter 2 years that they study at the host institution, they will pay the normative tuition fee chargeable to non-local students to the host institution. For NTHU students going to HKUST, the tuition fee payable to HKUST would be HK\$140,000 per annum, while for HKUST students going to NTHU, the tuition fee payable to NTHU would be roughly HK\$30,000 per annum.

**4. Common Core Courses**

The HKUST structure and requirement for Common Core courses, which are equivalent to general education courses at NTHU, was explained to the NTHU delegation. Common core courses are graduation requirements for all HKUST undergraduates. NTHU students can satisfy the requirements through credit transfer of relevant courses to HKUST.

Under HKUST's current credit transfer system, students who attain (i) an overall band of 7.0 or above in IELTS or (ii) the score of 100 or above in TOEFL Internet-based test, and meet the sub-score requirements in these tests, will be able to apply for credit transfer to fulfill HKUST's Common Core requirement in the area of English Communication. Students who attain a certain score in the Chinese subject of Taiwan GSAT and pass the Putonghua oral assessment conducted by HKUST will be eligible to apply for credit transfer to fulfill the Common Core requirement in the area of Chinese Communication. Detailed requirements will be sent to NTHU.

HKUST

Other Common Core requirements will follow the regular credit transfer process. To enable students to clearly understand the requirements, a mapping table between HKUST Common Core requirements and NTHU's general education requirements should be established. The UG Core Education team will continue to work with NTHU on this.

HKUST Core Education Team and NTHU

The handling of School-sponsored courses (SSC) was brought up in the discussion. HKUST's Academic Director of UG Core Education explained that SSC are specially-developed Common Core courses and are thus quite unique. Credit transfer can be done only if equivalent courses can be identified, the chance of which may not be high.

Apart from the Common Core language requirements at the University level, HKUST's engineering and science programs also require additional school-based and/or department-based English courses for graduation. Such tailor-made courses were offered by the Center for Language Education of HKUST and students from NTHU are expected to take relevant courses during their studies in HK. According to NTHU representatives, NTHU offers a course in English for Science and Technology, which may be able to fulfill HKUST's School-level English language requirement. In order that NTHU students can meet HKUST's requirements, NTHU would consider making this course mandatory for this dual degree program.

NTHU

**5. Academic Matters**

It is noted that HKUST adopts a school-based admission system, meaning that most students follow a common curriculum on engineering or science fundamentals during their first year at HKUST. Courses specific to major programs are taken mainly from the 2<sup>nd</sup> Year onwards. At NTHU, on the other hand, students are admitted to a major program as early as the first year and start following major program requirements, though most of the major requirements are taken in Year 2 and Year 3. Nevertheless,

NTHU does offer a few courses such as Engineering Mathematics and Introduction to Engineering, which may be equivalent to courses usually taken by engineering students in the first 2 years.

There are 2 ground rules on graduation at HKUST that need to be considered in working out the curriculum –

- a. That students must obtain a minimum of 60 credits from HKUST courses (meaning that no more than 60 credits obtained elsewhere can be used to fulfill the degree requirement of 120 credits); and
- b. That students must complete at least 2 years of full-time study at HKUST.

As grades obtained outside HKUST will not be transferred, HKUST would need to see to the approach in deriving the Class of Honours for this group of students to ensure that they will not be disadvantaged.

HKUST

#### 6. Engineering-specific Matters

According to Hong Kong Institution of Engineers (HKIE) which is in charge of accrediting HK's engineering programs, HKUST engineering students are required to complete the final year project, which should be completed in English. According to NTHU, their engineering students are also required to complete a Final Year Project, but it lasts for 1 semester only. Thus, the number of credits would be less than that required by HKUST. In order to meet HKUST's requirements, NTHU proposed to offer some research-oriented projects and special courses as alternative to HKUST students.

NTHU

It is also noted that most courses offered at NTHU are conducted in Chinese. HKUST would check with HKIE on the possible impact on accreditation. It would also be necessary to liaise with HKIE to see how programs that have half of the curriculum completed outside HKUST should be handled with regards to accreditation. NTHU advised that required courses in its Department of Chemical Engineering are conducted in English.

HKUST School of Engineering

In view of the FYP issue, it was proposed if a 1+2+1 model might work better. After discussion, it was concluded that the 2+2 model should be maintained as the 1+2+1 model would not work well for the following reasons –

- a. Workload at NTHU is heavier than that of HKUST. Students who return to NTHU in the final year might have adjustment issues after spending 2 years at HKUST.
- b. HKUST students do not have a major yet in the first year. They need to be very determined in pursuing a particular major in order to proceed smoothly to the 2nd year of the program.

#### 7. Science-specific Matters

It is noted that Science students are required to fulfill the School Requirements in addition to the requirements of their major programs, inclusive of a Science School Induction course, a Computer Science course, an English language course and 8 Science Foundations Courses. These courses can be taken at any years of study before graduation except for those who serve as pre-requisite of senior level courses. While NTHU students will be waived from taking the Science School Induction course, HKUST School of Science will work with NTHU on the course equivalency of other courses. It is also noted that some courses serve to fulfill the School/Major requirements are also listed as Common Core courses. A maximum of 9 credits of these courses can be double-counted to fulfill both the School/Major and Common Core requirements.

Degree requirements mapping of the following science programs are attached in Appendix 2a-c.

- Chemistry
- Mathematics
- Physics

8. **Discussion on Engineering Program Requirements**

Breakout meetings between representatives from engineering departments were held on 10 January 2018 with the aim to work out a detailed mapping of the requirements of the respective programs, and identify issues that need to be further resolved. The degree requirement mapping worked out for the following engineering programs are attached in Appendix 3a-c –

- Chemical Engineering, and Chemical & Environmental Engineering
- Industrial Engineering and Engineering Management (Engineering Management Area)
- Mechanical Engineering

Where there are outstanding issues to be further resolved, the Schools/Colleges and the Departments involved will continue to work closely to finalise the mapping.

HKUST and  
NTHU

9. **Visit Concluded**

To move on, the School of Engineering and School of Science at HKUST will prepare an umbrella proposal on the dual degree program framework for submission to the University's Undergraduate Studies Committee (CUS) for approval. The proposal should be on the overall framework only so as to allow room for adding other programs in the future.

HKUST

**Endorsement of the Meeting Notes**

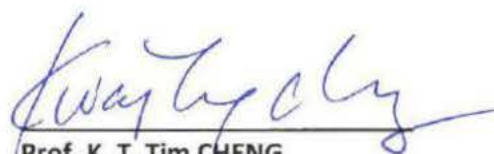
Endorsed by NTHU

Endorsed by HKUST



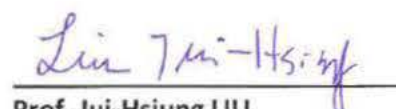
Prof. Chih-Huang LAI  
Dean, College of Engineering

Date: 04-20-2018



Prof. K. T. Tim CHENG  
Dean, School of Engineering

Date: 04 APR 2018



Prof. Jui-Hsiung LIU  
Dean, College of Science

Date: 04-12-2018



Prof. Yang WANG  
Dean, School of Science

Date: 04 APR 2018



## Visit Program for Delegation from National Tsinghua University 9-10 January 2018

9 Jan 2018 (Tuesday)

Time	Activity	Venue
12:05pm	Arrive in HK Airport	
1:00pm	Airport Pick up ( <i>coach to be arranged by HKUST</i> )	
1:45pm	Arrive at Conference Lodge and check in to guest rooms ( <i>accompanied by HKUST staff</i> )	Conference Lodge at HKUST
2:15-2:30pm	Transit to Academic Building	
2:30-3:15pm	<b>Meeting with HKUST Senior Management and School Representatives, and Presentation by Prof. Nyan-Hwa Tai, Vice-President for Academic Affairs/NTHU</b> <ul style="list-style-type: none"> <li>- Prof. Wei Shyy, Executive Vice-President and Provost</li> <li>- Prof. Roger Cheng, Associate Provost (Teaching and Learning)</li> <li>- Prof. Yang Wang, Dean of Science</li> <li>- Prof. Pak Wo Leung, Associate Dean of Science (Undergraduate Studies and Student Affairs)</li> <li>- Ms. Wella Yu, Administrative Assistant, School of Science</li> <li>- Prof. Tim Cheng, Dean of Engineering</li> <li>- Prof. C. Y. Tsui, Associate Dean of Engineering (UG Studies)</li> <li>- Prof. Siu Wing Cheng, Associate Dean of Engineering (UG Studies)</li> <li>- Ms. Patricia Lai, Assistant Director for UG Affairs Administration, School of Engineering</li> </ul>	Room 6581-82, Lifts 27/28, Academic Building, HKUST
3:15-3:30pm	Break	
3:30-4:30pm	<b>Discussion of Admission, Undergraduate Core Education and other University-level matters</b> <p><u>UG Recruitment and Admissions Office (URAO)</u></p> <ul style="list-style-type: none"> <li>- Ms. Samantha Leung, Head of Undergraduate Admissions</li> <li>- Mr. Thomas Chan, Manager, Undergraduate Admissions</li> <li>- Ms. Janice Cheung, Manager, Undergraduate Admissions</li> </ul> <p><u>Undergraduate Core Education Team (Common Core)</u></p> <ul style="list-style-type: none"> <li>- Prof. C. C. Chang, Director for Center for Education Innovation (CEI) and Academic Director of Undergraduate Core Education</li> <li>- Ms. Yvonne Ho, Head of Undergraduate Core Education</li> </ul> <p><u>School of Science</u></p> <ul style="list-style-type: none"> <li>- Prof. Pak Wo Leung, Associate Dean of Science (Undergraduate Studies and Student Affairs)</li> <li>- Prof. Emily Tsang, UG Programs Coordinator, Department of Chemistry</li> <li>- Prof. Nian Lin, UG Programs Coordinator, Department of Physics</li> </ul>	Room 6581-82, Lifts 27/28, Academic Building, HKUST

	<ul style="list-style-type: none"> <li>- Prof. Jeffrey Chasnov, UG Programs Coordinator, Department of Mathematics</li> <li>- Ms. Wella Yu, Administrative Assistant, School of Science</li> </ul> <p><u>School of Engineering</u></p> <ul style="list-style-type: none"> <li>- Prof. C. Y. Tsui, Associate Dean of Engineering (UG Studies)</li> <li>- Prof. Siu Wing Cheng, Associate Dean of Engineering (UG Studies)</li> <li>- Prof. Henry Lam, Associate Head, Department of Chemical and Biological Engineering</li> <li>- Prof. Shuhuai Yao, Undergraduate Programs Coordinator, Department of Mechanical and Aerospace Engineering</li> <li>- Ms. Patricia Lai, Assistant Director for UG Affairs Administration, School of Engineering</li> </ul>	
4:30-4:45pm	Break	
4:45-5:45pm	<p><b>Discussion of School-level matters</b></p> <p><u>School of Science</u></p> <ul style="list-style-type: none"> <li>- Prof. Pak Wo Leung, Associate Dean of Science (Undergraduate Studies and Student Affairs)</li> <li>- Prof. Emily Tsang, UG Programs Coordinator, Department of Chemistry</li> <li>- Prof. Nian Lin, UG Programs Coordinator, Department of Physics</li> <li>- Prof. Jeffrey Chasnov, UG Programs Coordinator, Department of Mathematics</li> <li>- Ms. Wella Yu, Administrative Assistant, School of Science</li> </ul> <p><u>School of Engineering</u></p> <ul style="list-style-type: none"> <li>- Prof. C. Y. Tsui, Associate Dean of Engineering (UG Studies)</li> <li>- Prof. I-Ming Hsing, Head, Department of Chemical and Biological Engineering</li> <li>- Prof. Henry Lam, Associate Head, Department of Chemical and Biological Engineering</li> <li>- Prof. Ajay Joneja, Undergraduate Programs Coordinator, Department of Industrial Engineering and Decision Analytics</li> <li>- Prof. Shuhuai Yao, Undergraduate Programs Coordinator, Department of Mechanical and Aerospace Engineering</li> <li>- Ms. Patricia Lai, Assistant Director for UG Affairs Administration, School of Engineering</li> </ul>	<p>Room 6581-82, Lifts 27/28, Academic Building, HKUST</p> <p>Room 6538, Lifts 27/28, Academic Building, HKUST</p>
5:45-6:00pm	Break	
6:00pm	<p>Dinner to be hosted by the Dean of Engineering</p> <ul style="list-style-type: none"> <li>- Prof. Tim Cheng, Dean of Engineering</li> <li>- Prof. C. Y. Tsui, Associate Dean of Engineering (Undergraduate Studies)</li> <li>- Prof. I-Ming Hsing, Head, Department of Chemical and Biological Engineering</li> <li>- Prof. Pak Wo Leung, Associate Dean of Science (Undergraduate Studies and Student Affairs)</li> </ul>	G/F Chinese Restaurant at HKUST

**10 January 2018 (Wednesday)**

Time	Activity	Venue
	<i>(Breakfast at Conference Lodge)</i>	
9:15am	To be picked up at Conference Lodge	
9:15-9:30am	Transfer to Academic Building	
9:30-11:30am	<b>Breakout Meetings with individual Departments</b>  <u>School of Science</u> - Prof. Nian Lin, UG Programs Coordinator, Department of Physics - Prof. Jeffrey Chasnov, UG Programs Coordinator, Department of Mathematics  <u>School of Engineering</u> - Prof. Henry Lam, Associate Head, Department of Chemical and Biological Engineering - Prof. Ajay Joneja, UG Programs Coordinator, Department of Industrial Engineering and Decision Analytics - Prof. Shuhuai Yao, UG Programs Coordinator, Department of Mechanical and Aerospace Engineering	Academic Building   Room 4419 Room 3464   Room 4589 Room 5538 Room 2570
11:30am	Return to Conference Lodge and check out	
12:00nn	Transfer to Airport <i>(Coach to be arranged by HKUST)</i>	

## HKUST 課程抵免規劃表(台生取得港科大學位)

清華大學化學系：一、二年級在清大；三、四年級在香港科大

Students from Department of Chemistry, NTHU spend the first two years in NTHU and the last two years in HKUST

類別 Type	科目類別/名稱 Course Name	學分 Credit		清華大學 NTHU (1 <sup>st</sup> Year/2 <sup>nd</sup> Year)	香港科大 HKUST (3 <sup>rd</sup> Year/4 <sup>th</sup> Year)
		上 Fall	下 Spring		
系定必修 (67 學分) Department Mandatory Courses (67 credits)	普通化學一、二 General Chemistry I, II	3	3	建議在清大完成 Course is recommended for completion in NTHU	
	普通化學實驗一、二 General Chemistry Laboratory I, II	1	1	建議在清大完成 Course is recommended for completion in NTHU	
	普通物理一、二 General Physics I, II	4	4	在清大完成 Course must be completed in NTHU	
	普通物理實驗一、二 General Physics Laboratory I, II	1	1	在清大完成 Course must be completed in NTHU	
	微積分一、二 Calculus I, II	4	4	建議在清大完成 Course is recommended for completion in NTHU	
	有機化學一、二 Organic Chemistry I, II	3	3	建議在清大完成 Course is recommended for completion in NTHU	
	有機化學實驗一、二 Organic Chemistry Laboratory I, II	2	2	在清大完成 Course must be completed in NTHU	
	物理化學一、二 Physical Chemistry I, II	3	3	建議在清大完成 Course is recommended for completion in NTHU	Alternatively, HKUST (CHEM 2410, 3420)
	物理化學實驗一、二 Physical Chemistry Laboratory I, II	2	2	可於清大或香港科大完成 Course must be completed in NTHU or HKUST (CHEM2450(1), 3555(2))	
	分析化學一、二 Analytical Chemistry I, II	3	3	可於清大或香港科大完成 Course must be completed in NTHU or HKUST (CHEM 2310, 3320)	
	分析化學實驗一、二 Analytical Chemistry Laboratory I, II	2	2	無對應課程，以指定課程取代 HKUST (CHEM 2350(1), 3555(2))，學分數不同	
	無機化學一、二 Inorganic Chemistry I, II	3	3		在港科大完成 Course must be completed in HKUST (CHEM2210, 3220)
應用數學(或工程數學) Applied Mathematics (Or Engineering Mathematics)	3	1	建議在清大完成 Course is recommended for completion in NTHU		
書報討論一、二 Seminar	1	1	無對應課程，以指定課程取代(LANG 3012; CHEM3555, 4012)，學分數不同(LANG 3012 is a co-requisite of CHEM 3555)		
專業選修(12 學分)		12		化學系所開的課程 (倘選修光譜分析 3 學分，亦需選修光譜分析實驗 2 學分)	可在港科大完成 (CHEM > 3xxx)
其餘選修(21 學分) Free Electives (21 credits)		28		其中必需選修生命科學導論 3 學分或以右列課程取代	生科導論(either of CHEM 4110, 4120, 4130, 4340)
最低畢業總學分 Minimum credits required for graduation		128			
備註 Remarks		1. 修讀本系為雙主修之學生需修足本系專業選修學分。			

Signature: Date: Jan 12<sup>th</sup>, 2018

Dr. Emily MW Tsang, Dept of Chemistry, HKUST

Signature: Date: Jan 15<sup>th</sup>, 2018

Prof. Yi-Chou Tsai, Dept of Chemistry, NTHU



			HKUST				NTHU				Remarks
CHEM Major Requirement			Year 1		Year 2		Year 3		Year 4		
Course Code	Course Title	Credits	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	
CHEM 1010	General Chemistry I	2-3	2-3								
CHEM 1020	General Chemistry II	2		3							
CHEM 1050	Laboratory for General Chemistry I	1		1							
CHEM 1055	Laboratory for General Chemistry II	1		1							
CHEM 2110	Organic Chemistry I	3			3						
CHEM 2150	Organic Chemistry Laboratory	1			1						
CHEM 2160	Organic Chemistry II	3				3					
CHEM 2210	Inorganic Chemistry I	3			3						
CHEM 2250	Inorganic Chemistry Laboratory	1			1						
CHEM 2220	Inorganic Chemistry II	3				3					
CHEM 2350	Synthesis Chemistry Laboratory	2				2					
CHEM 2410	Fundamentals of Analytical Chemistry	3					3				NTHU: 分析化學一
CHEM 2300	Analytical Chemistry Laboratory	1					1				NTHU: 分析化學實驗一
CHEM 2410	Physical Chemistry I	3					3				NTHU: 物理化學一
CHEM 2450	Physical Chemistry Laboratory	1					1				NTHU: 物理化學實驗一
CHEM 3400	Intermediates Analysis	3						3			NTHU: 分析化學二
CHEM 3420	Physical Chemistry II	3						3			NTHU: 物理化學二
CHEM 3550	Molecular Characterization Laboratory	2						2			NTHU: 分析化學實驗二
CHEM 4680/4691	Capstone Project/Research	3							3		NTHU: 物理化學實驗二
MATH 1XXX	Calculus I	3		3							NTHU: 算學研究一
MATH 1XXX	Calculus II	3			3						
MATH 2351	Introduction to Differential Equations	3				3					
LANG 3012	Laboratory Report Writing for Chemistry Students	1							1		(In-level) Language course (focusing on laboratory report and thesis writing)
LANG 4012	English for Chemistry Capstone Project	2								2	
CHEM	Chemistry 300 level or above Elective (for students without a Chemistry Option)	3								3	NTHU: any course with CHEM 3xxx or above.

## Chemistry Option Requirements

CHEM	Option Required Lab Courses	2								2	NTHU: relevant courses with CHEM 3xxx or above.
CHEM	Option Elective CHEM Courses	12							3	3	NTHU: relevant courses with CHEM 3xxx or above.

## School Requirements


SCIE	1000 Science School Introduction	0	0								
CSSE	1XXX	1					3				
LANG	2100 English for Science I	1				3					
SCIE	Science Foundation Courses (LIFS/PHYS)	9	3	3							Introductory level (LIFS/PHYS) course at NTHU.

## University Common Core

U CORE	Required and Electives	22				3	6	6	3	2	6 NTHU: relevant courses
LANG	1XXX English	6	1	3							
LANG	1XXX Chinese	3		3							
HLTH	1010 Healthy Lifestyle	0	0	0							

Total Term Credits	Students with a Chemistry Option	12-13	16	17	17	17	17	17	17	17
	Total Credit					119-120				
	Students without a Chemistry Option	22-13	16	17	17	17	17	17	17	17
	Total Credit					108-109				

\*To graduate, students should complete at least 120 credits in approved courses. They may need to take courses additional to the required and elective courses as specified above to meet this.

Signature:   
 Dr. Emily MW Tsang  
 Department of Chemistry  
 The Hong Kong University of Science and Technology

Date: Jan 12th, 2018

Signature:   
 Prof. Peichun Tsai  
 Department of Chemistry  
 National Tsing Hua University

Date: Jan 15th, 2018

Course mapping for HKUST students pursuing dual degree in HKUST General MATH and NTHU Pure Math

1st and 2nd Year							
Course taken in HKUST				Equivalent course in NTHU			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
MATH1013	Calculus IB *, ***	3		MATH1010	Calculus I †	4	
MATH1014	Calculus II *, ***	3		MATH1020	Calculus II †	4	
MATH2023	Multivariable Calculus *, ***	4		MATH2010	Advanced Calculus I †	4	
MATH2033	Mathematical Analysis *	4		MATH1410	Linear Algebra I †	3	
MATH2121	Linear Algebra *	4		MATH1420	Linear Algebra II †	3	
COMP1012	Introduction to Computer Science *, ***	3					
COMP1022P	Introduction to Computing with Java *, ***	3	Pick 1	MATH1700	Introduction to Programming Design	3	
COMP1022Q	Introduction to Computing with Excel VBA *, ***	3					
PHYS1112	General Physics I ***	3		PHYS1134	General Physics I †	4	
PHYS1114	General Physics II ***	3		PHYS1144	General Physics II †	4	
PHYS1113	Laboratory for General Physics I ***	1		PHYS1010	General Physics Laboratory I †	1	
LIFS1030	Environmental Science ***	3					
LIFS1901	General Biology I ***	3	Pick 1				
LIFS1902	General Biology II ***	3					
LIFS1930	Nature of Life Sciences ***	3					
CHEM1004	Chemistry in Everyday Life ***	3					
CHEM1010	General Chemistry IA ***	3	Pick 1				
CHEM1020	General Chemistry IB ***	2					
LANG2010	English for Science I ***	3					

3rd and 4th Year							
Equivalent course in HKUST				Course taken in NTHU			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
LANG3011	English for Mathematics *	3					
MATH3033	Real Analysis *	4		MATH2020	Advanced Calculus II †	4	
MATH3121	Abstract Algebra **	3		MATH2410	Algebra I †	3	
	(MATH3000 level course) **			MATH2420	Algebra II †	3	
MATH4221	Euclidean and Non-Euclidean Geometries **	3		MATH3610	Geometry I †	3	
MATH2352	Differential Equations **	4		MATH3010	Differential Equations †	3	
MATH4023	Complex Analysis **	3		MATH3050	Complex Analysis †	4	
MATH2421	Probability **	4	Pick 1	MATH2810	Probability Theory ††	3	Pick 1
MATH3343	Combinatorial Analysis **	3		MATH2870	Discrete Mathematics ††	3	
MATH4223	Differential Geometry **	3	Pick 1	MATH3620	Geometry II ††	3	Pick 1
MATH4225	Topology **	3		MATH3510	Introduction to Topology ††	3	
	(MATH4000 level course) **			MATH3310	Advanced Linear Algebra ††	3	
MATH4999	Independent Capstone Project *	3		MATH4001	Undergraduate Research	3	
				IAS5805 (NCTU)	Topical Mathematical Modelling and Computing I	3	Pick 1
				IAS5806 (NCTU)	Topical Mathematical Modeling and Computing II	3	

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Course mapping for HKUST students pursuing dual degree in HKUST General MATH and NTHU Applied Math

1st and 2nd Year							
Course taken in HKUST				Equivalent course in NTHU			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
MATH1013	Calculus IB *, ***	3		MATH1010	Calculus I *	4	
MATH1014	Calculus II *, ***	3		MATH1020	Calculus II *	4	
MATH2023	Multivariable Calculus *, ***	4		MATH2010	Advanced Calculus I *	4	
MATH2033	Mathematical Analysis *	4		MATH1410	Linear Algebra I *	3	
MATH2121	Linear Algebra *	4		MATH1420	Linear Algebra II *	3	
COMP1012	Introduction to Computer Science *, ***	3					
COMP1022P	Introduction to Computing with Java *, ***	3	Pick 1	MATH1700	Introduction to Programming Design *	3	
COMP1022Q	Introduction to Computing with Excel VBA *, ***	3					
PHYS1112	General Physics I ***	3		PHYS1134	General Physics I *	4	
PHYS1114	General Physics II ***	3		PHYS1144	General Physics II *	4	
PHYS1113	Laboratory for General Physics I ***	1		PHYS1010	General Physics Laboratory I *	1	
LIFS1030	Environmental Science ***	3					
LIFS1901	General Biology I ***	3	Pick 1		*		
LIFS1902	General Biology II ***	3					
LIFS1930	Nature of Life Sciences ***	3					
CHEM1004	Chemistry in Everyday Life ***	3					
CHEM1010	General Chemistry IA ***	3	Pick 1		*		
CHEM1020	General Chemistry IB ***	2					
LANG2010	English for Science I ***	3			⊗		

3rd and 4th Year							
Equivalent course in HKUST				Course taken in NTHU			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
LANG3011	English for Mathematics *	3			⊗		
MATH3033	Real Analysis *	4		MATH2020	Advanced Calculus II *	4	
MATH3121	Abstract Algebra **	3		MATH2410	Algebra I *	3	
MATH3312	Numerical Analysis **	3		MATH4010	Numerical Analysis *	3	
MATH2352	Differential Equations **	4		MATH3010	Differential Equations *	3	
MATH2421	Probability **	4		MATH2010	Probability Theory *	3	
MATH2411	Applied Statistics **	4		MATH2020	Statistics *	3	
MATH4023	Complex Analysis **	3		MATH3050	Complex Analysis *	4	
MATH4052	Partial Differential Equations **	3		MATH4200	Introduction to Partial Differential Equations **	3	
				MATH4001	Undergraduate Research	3	
MATH4999	Independent Capstone Project *	3		IAMS805 (NCTU)	Topical Mathematical Modeling and Computing I	3	Pick 1
				IAMS806 (NCTU)	Topical Mathematical Modeling and Computing II	3	

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3

Course mapping for NTHU students pursuing dual degree in HKUST General MATH and NTHU Pure Math

1st and 2nd Year							
Course taken in NTHU				Equivalent course in HKUST			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
MATH1010	Calculus I †	4		MATH1013	Calculus IB *, ***	3	
MATH1020	Calculus II †	4		MATH1014	Calculus II *, ***	3	
MATH1410	Linear Algebra I †	3		MATH2023	Multivariable Calculus *, ***	4	
MATH1420	Linear Algebra II †	3		MATH2033	Mathematical Analysis *	4	
MATH2010	Advanced Calculus I †	4		MATH2121	Linear Algebra *	4	
MATH1700	Introduction to Programming Design	3		COMP1012	Introduction to Computer Science *, ***	3	Pick 1
				COMP1022P	Introduction to Computing with Java *, ***	3	
				COMP1022Q	Introduction to Computing with Excel VBA *, ***	3	
PHYS1134	General Physics I †	4		PHYS1112	General Physics I ***	3	
PHYS1144	General Physics II †	4		PHYS1114	General Physics II ***	3	
PHYS1010	General Physics Laboratory I †	1		PHYS1113	Laboratory for General Physics I ***	1	
PHYS1020	General Physics Laboratory II †	1		PHYS1115	Laboratory for General Physics II	1	
MATH2020	Advanced Calculus II †	4		MATH3033	Real Analysis *	4	
MATH2410	Algebra I †	3		MATH3121	Abstract Algebra **	3	
MATH2420	Algebra II †	3			(MATH3000 level course) **		

3rd and 4th Year							
Equivalent course in NTHU				Course taken in HKUST			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
	⊙			LANG2010	English for Science I ***	3	
	⊙			LANG3011	English for Mathematics *	3	
MATH3610	Geometry I †	3		MATH4221	Euclidean and Non-Euclidean Geometries **	3	
MATH3010	Differential Equations †	3		MATH2352	Differential Equations **	4	
MATH3050	Complex Analysis †	4		MATH4023	Complex Analysis **	3	
MATH2810	Probability Theory ††	3	Pick 1	MATH2421	Probability **	4	Pick 1
MATH2870	Discrete Mathematics ††	3		MATH3343	Combinatorial Analysis **	3	
MATH3620	Geometry II ††	3	Pick 1	MATH4223	Differential Geometry **	3	Pick 1
MATH3510	Introduction to Topology ††	3		MATH4225	Topology **	3	
MATH3310	Advanced Linear Algebra ††	3			(MATH4000 level course) **		
MATH4001	Undergraduate Research	3			Capstone Project *: MATH4991 OR MATH4992 OR MATH4993 OR MATH4999	3	

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④

Course mapping for NTHU students pursuing dual degree in HKUST General MATH and NTHU Applied Math

1st and 2nd Year							
Course taken in NTHU				Equivalent course in HKUST			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
MATH1010	Calculus I *	4		MATH1013	Calculus IB *, ***	3	
MATH1020	Calculus II *	4		MATH1014	Calculus II *, ***	3	
MATH1410	Linear Algebra I *	3		MATH2023	Multivariable Calculus *, ***	4	
MATH1420	Linear Algebra II *	3		MATH2033	Mathematical Analysis *	4	
MATH2010	Advanced Calculus I *	4		MATH2121	Linear Algebra *	4	
MATH1700	Introduction to Programming Design *	3		COMP1012	Introduction to Computer Science *, ***	3	Pick 1
				COMP1022P	Introduction to Computing with Java *, ***	3	
				COMP1022Q	Introduction to Computing with Excel VBA *, ***	3	
PHYS1134	General Physics I *	4		PHYS1112	General Physics I ***	3	
PHYS1144	General Physics II *	4		PHYS1114	General Physics II ***	3	
PHYS1010	General Physics Laboratory I *	1		PHYS1113	Laboratory for General Physics I ***	1	
PHYS1020	General Physics Laboratory II *	1		PHYS1115	Laboratory for General Physics II	1	
MATH2020	Advanced Calculus II *	4		MATH3033	Real Analysis *	4	
MATH2410	Algebra I *	3		MATH3121	Abstract Algebra **	3	

3rd and 4th Year							
Equivalent course in NTHU				Course taken in HKUST			
Course No.	Course Title	Credit	Note	Course No.	Course Title	Credit	Note
	⊙			LANG2010	English for Science I ***	3	
	⊙			LANG3011	English for Mathematics *	3	
MATH4810	Numerical Analysis *	3		MATH3312	Numerical Analysis **	3	
MATH3010	Differential Equations *	3		MATH2352	Differential Equations **	4	
MATH2010	Probability Theory *	3		MATH2421	Probability **	4	
MATH2820	Statistics *	3		MATH2411	Applied Statistics **	4	
MATH3050	Complex Analysis *	4		MATH4023	Complex Analysis **	3	
MATH4200	Introduction to Partial Differential Equations **	3		MATH4052	Partial Differential Equations **	3	
MATH4001	Undergraduate Research	3			Capstone Project *: MATH4991 OR MATH4992 OR MATH4993 OR MATH4999	3	

\*: HKUST MATH major and General MATH Track required

\*\*: HKUST General MATH track elective

\*\*\*: HKUST school of Science required

†: NTHU Pure Math required

††: NTHU Pure Math required elective

\*: NTHU Applied Math required

\*\*: NTHU Applied Math required elective

⊙: Equivalent course to be approved by LANG center; can be taken in NTHU or in HKUST

⊗: Equivalent course to be approved by HKUST school of Science; can be taken in HKUST or in NTHU

Prof. Wei-Cheng Wang  
Chairman  
Department of Mathematics  
National Tsing Hua University

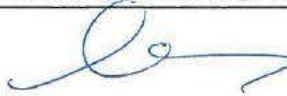
*Wei-Cheng Wang*  
2018, 2, 27

Prof. Jeffery R. Chasnov  
Undergraduate coordinator  
Department of Mathematics  
Hong Kong University of Science and Technology

*Jeffery R. Chasnov*  
2018 Feb 27

## NTHU-HKUST Dual-Degree Program for NTHU Physics Majors (物理組)

Year	Course	Note
NTHU Year 1	PHYS1130 General Physics I 普通物理一 PHYS1140 General Physics II 普通物理二 PHYS1010 General Physics Laboratory I 普通物理實驗一 PHYS1020 General Physics Laboratory II 普通物理實驗二 PHYS2110 Applied Mathematics I 應用數學一 MATH1010 Calculus I 微積分一 MATH1020 Calculus II 微積分二 CHEM1010 General Chemistry I 普通化學一 CHEM1020 General Chemistry II 普通化學二 CHEM1030 General Chemistry Laboratory I 普通化學實驗一 CHEM1040 General Chemistry Laboratory II 普通化學實驗二	
NTHU Year 2	PHYS2010 Experimental Physics 實驗物理 PHYS2120 Applied Mathematics II 應用數學二 PHYS2210 Theoretical Mechanics I 理論力學一 PHYS2220 Theoretical Mechanics II 理論力學二 PHYS2310 Electromagnetism I 電磁學一 PHYS2320 Electromagnetism II 電磁學二 PHYS3010 Experimental Technique in Physics 物理實驗技術	
HKUST Year 3 & Year 4	PHYS2023 Modern Physics Laboratory (1 credit) PHYS2022 Modern Physics (3 credits) PHYS3036 Quantum Mechanics I (3 credits) PHYS3142 Computational Methods in Physics (3 credits) PHYS3152 Methods of Experimental Physics I (3 credits) PHYS3153 Methods of Experimental Physics II (3 credits) PHYS4050 Thermodynamics and Statistical Physics (3 credits) PHYS4080 Physics Seminar and Tutorial II (1 credit) PHYS[4291 or 4191] Capstone Research (6 credits) or Capstone Project (4 credits) LIFS[1901, 1902, 1930, or 2210] [General Biology I, General Biology II, Nature of Life Sciences, or Biochemistry I] (3 credits) COMP[1021, 1022P, or 1022Q] Introduction to [Computer Science, Computing with Java, or Computing with Excel VBA] (3 credits) LANG3013 Laboratory Report Writing for Physics Students (1 credit) LANG4013 English for Physics Capstone Projects (2 credits)	PHYS3030 近代物理實驗 PHYS3450 量子物理一 PHYS3460 量子物理二 PHYS3170 數值分析 PHYS3XXX PHYS3XXX PHYS3250 熱統計物理一 PHYS 3130 廣義物理專題演講 PHYS3XXX, PHYS3XXX

Approved  2018/1/10.

同意 余怡寧 2018.1.10.



	course (3 credits) (Optional) [ELEC3600, PHYS3XXX, or PHYS4XXX] Electromagnetics: From Wireless to Photonic Applications , or any PHYS3XXX or PHYS4XXX course (3 credits)	PHYS4650 電磁物理學
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Approved  2018/1/10

同意 余治平 2018.1.10



## Pathway for BSc PHYS (HKUST students to NTHU )

	Fall	spring
Year 1	PHYS1111, 1112 or 1312 (3) PHYS1113 (General phys lab I)(1) MATH1013, 1023, or 1020 (single var. calculus)(3) Sci Req: CHEM or LIFS(3) U Core English (3) U Core Others (3)	PHYS1114 or 1314 (EM)(3) PHYS1115 (General phys lab II)(1) MATH1014, 1024 (single var. calculus) (3) Sci Req: LIFS or CHEM (3) U Core English (3) U Core Others (3)
Year 2	PHYS2022 (modern phys)(3) PHYS2023 (general phys lab III) (1) PHYS2080 (1) MATH2023 (multivar. calculus) (4) MATH 2121 (linear algebra)(4) COMP1021 (3)	PHYS3032 (CM) (3), PHYS2124 (math methods I) (3) LANG2010 (English for Science I)(3) U Core Others (6)
Year 3	PHYS2310 (EM I) (3) PHYS3450 (QM I) (3) PHYS3250 (Stat mech) (3) PHYS3020 (Optical Lab) (2) PHYS3080 (Applied Electronics Lab) (2) PHYS2900 or 3170 (Computational methods) (3) LANG400002 or 400004 (Scientific Writing) (3) PHYS 4910 and 4920 (Research) (2) PHYS5930 or 5940 (Tutorial) (1) Two Electives PHYS3XXXX or 4XXXX (6)	
Year 4		

同意此課程之安排  
 李怡雲

2018. 1. 10.

Approved



HKUST Requirements for		NTHU				HKUST			
Chemical Engineering and		1st Year		2nd Year		3rd Year		4th Year	
Chemical and Environmental Engineering	Credits	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Common Core Courses		36	According to mapping worked out by HKUST Common Core Team and NTHU Center for General Education						
Engineering Fundamentals									
COMP 1021/1022P/1022Q/2011	3-4		Computer Systems and Applications						
ENGG 1010	0	Waived							
CHEM 1010/1020	2-3	General Chemistry with Labs I							
MATH 1012/1013 AND 1014	6-7	Calculus I	Calculus II						
MATH 2011	3			Engineering Math I					
MATH 2350	3				Engineering Math II				
PHY 1112	3	Gen Phys with Lab I							
SENG Intro Courses	3-4	(Satisfied using CENG1000)							
LANG 2030	3					LANG2030			
Major Courses									
LIFS1901/1902/2210/2040	3		Intro to Biotech (may need LIFS concurrence)						
CHEM 1050	1	General Chemistry with Labs I							
CHEM 2111	3			Organic Chemistry I with Lab					
CHEM 2155/2355	1						CHEM 2355		
CHEM 2311	3						CHEM 2311		
ENGG 2010	0						ENGG 2010		
LANG 403x (to be developed)	3							LANG 403x	
CENG 1000	3	Intro to Eng (2) / Intro to Chem Eng (1)							
CENG 1010	0					CENG 1010			
CENG1500 (for CENG)	3		Materials Science (3)						
CENG1700 (for CEEV)	3		Introduction to Energy Technology and Environment (2)						
CENG 1980 (Industrial Training)	0						Take modules as available, waive if justified		
CENG 2110	3		Material & Energy Balance						
CENG 2210	3	Pre-take in NTHU or in HKUST Year 3 (waive prereqs of subsequent courses if necessary)					(CENG 2210)		
CENG 2220	3						CENG 2200		
CENG 3220	3								CENG 3220
CENG 3230	3					CENG 3230			
CENG 3210	3					CENG 3210			
CENG 3120	3						CENG 3120		
CENG 3910	3					CENG 3910			
CENG 3920/3927	3						CENG 3920/3927		
CENG 4120	3							CENG 4120	
CENG 4130	3								CENG 4130
CENG 4911/4912	7							CENG 4911/4912	
CEEV only: CENG 4710 and 4720	6							CENG 4710	CENG 4720
CEEV only: CEEV Restricted Elective	3							Choose from a list, take anytime in HKUST	

Prof. I-Ming HSING  
Head

Department of Chemical & Biological Engineering, HKUST

Date: 19 MAR 2018

Prof. Rong-Ming Ho  
Chairman

Department of Chemical Engineering, NTHU

Date: 19 APR 2018



## 課程學分抵免一覽表 Credits and Courses waiver guidelines

Course correspondences for dual-degree major between NTHU IEEM and IEEM major in EM area, IEDA, HKUST	
A1. NTHU/IEEM	A2. HKUST/IEEM
<b>Engineering Fundamental Courses</b>	
<b>COMP (3/4)</b>	
<ul style="list-style-type: none"> <li>Introduction to Programming Languages (3)</li> </ul>	<ul style="list-style-type: none"> <li>COMP1021 Introduction to Computer Science (3) <b>OR</b> COMP1022P Introduction to Computing with Java (3) <b>OR</b> COMP1022Q Introduction to Computing with Excel VBA (3) <b>OR</b> COMP2011 Introduction to Object-oriented Programming (4)</li> </ul>
<b>CHEM/PHYS (3)</b>	
<ul style="list-style-type: none"> <li>General Physics I (3)</li> </ul>	<ul style="list-style-type: none"> <li>CHEM1010 General Chemistry IA (3) <b>OR</b> CHEM1020 General Chemistry IB (2) <b>OR</b> PHYS1112 General Physics I with Calculus (3) <b>OR</b> PHYS1312 Honors General Physics I (3)</li> </ul>
<b>MATH (12)</b>	
<ul style="list-style-type: none"> <li>Calculus I (3)</li> <li>Calculus II (3)</li> </ul>	<ul style="list-style-type: none"> <li>(MATH1012 Calculus IA (4) <b>OR</b> MATH1013 Calculus IB (3) <b>OR</b> MATH1023 Honors Calculus I (3)), <b>AND</b>  <ul style="list-style-type: none"> <li>(MATH1014 Calculus II (3) <b>OR</b> MATH1024 Honors Calculus II (3))  <b>OR</b> (Calc I+ Calc II) = MATH1020 Accelerated Calculus (4)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Linear Algebra (3)</li> </ul>	<ul style="list-style-type: none"> <li>MATH2111 Matrix Algebra and Applications(3)</li> </ul>
<ul style="list-style-type: none"> <li>STAT5191 Applied Multivariate Analysis (3) OR Calculus II (3)</li> </ul>	<ul style="list-style-type: none"> <li>MATH2011 Introduction to Multivariable Calculus (3)</li> </ul>
<b>SENG (Engineering Introduction Courses) (3/4)</b>	
<ul style="list-style-type: none"> <li>Introduction to Engineering (2)</li> </ul>	<ul style="list-style-type: none"> <li>SENG Intro course (3)</li> </ul>

	IEDA 2010 <u>OR</u> IEDA 2200 <u>OR</u> CENG 1000 <u>OR</u> CIVL 1100 <u>OR</u> COMP 1021 <u>OR</u> ELEC 1100 <u>OR</u> ELEC 1200 <u>OR</u> ENGG 1100 <u>OR</u> MECH 1901 <u>OR</u> MECH 1902 <u>OR</u> MECH 1905 <u>OR</u> MECH 1906
<b>LANG (3)</b>	
To be taken at HKUST	<ul style="list-style-type: none"> <li>• LANG2030 Technical Communications I (3)</li> </ul>
<b>Courses required for HKUST IEEM (EM area) (36)</b>	
<ul style="list-style-type: none"> <li>• Work Shop Practice (1) (additional training at HKUST when necessary)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA1990 Industrial Training (0) <u>OR</u> IEDA1991 Industrial Experience (0)</li> </ul>
<ul style="list-style-type: none"> <li>• Probability Theory (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA2520 Probability for Engineers (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Principles of Economics I (3)</li> </ul>	<ul style="list-style-type: none"> <li>• ECON 2103 Principles of microeconomics (3) <u>OR</u> ECON 2113 Microeconomics (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Engineering Economics (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA3230 Engineering Economics and Accounting (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Engineering Statistics (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA2540 Statistics for Engineers (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Operations Research I (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA3010 Prescriptive Analytics [OR I] (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Operations Research II (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA3250 Stochastic Models [OR II] (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Data Base Management System (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA3300 Industrial Data Systems (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Production Planning and Control (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA4100 Integrated Production systems(3)</li> </ul>
<ul style="list-style-type: none"> <li>• Probability and Statistics Applications Simulation (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA4130 Systems Simulation (3)</li> </ul>
To be taken at HKUST	<ul style="list-style-type: none"> <li>• LANG4032 Technical Communications II (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Topics in Industrial Engineering (2) x 3 (single industry project, total 6 credits, min 1 year)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA4960 Final Year Project (6) <u>OR</u> IEDA4901 Final Year Thesis (6) (must be completed in English)</li> </ul>
<b>B: Elective in HKUST/IEEM with match in NTHU (21)</b> with at least 15 credits taken from the area of EM or LM ; and at least 6 credits from B2 outside the chosen area	
<b>Group 1: Engineering Management (EM) Area</b>	
<b>B1. NTHU/IEEM</b>	<b>B2. HKUST/IEEM (15)</b>
<ul style="list-style-type: none"> <li>• Programming Design and Applications (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA2100 Computing in Industrial Applications (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Introduction to Engineering Design (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA2150 Product Design (3)</li> </ul>
<ul style="list-style-type: none"> <li>• Human Factors I (3)</li> </ul>	<ul style="list-style-type: none"> <li>• IEDA3130 Ergonomics and Safety Management (3)</li> </ul>

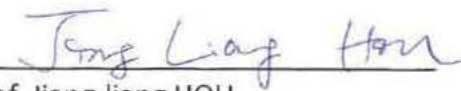


<ul style="list-style-type: none"> <li>Manufacturing Process (3)</li> <li>Quality Control (3)</li> </ul>	<ul style="list-style-type: none"> <li>IEDA3150 Manufacturing Processes (3)</li> <li>IEDA3270 Quality Engineering (3)</li> </ul>
<b>Group 2: Logistics Management (LM) Area</b>	
<b>B1. NTHU/IEEM</b>	<b>B2. HKUST/IEEM (15)</b>
<ul style="list-style-type: none"> <li>Fundamental of Logistics (3)</li> </ul>	<ul style="list-style-type: none"> <li>IEDA2410 Logistics and Freight Transportation Operations (3)</li> </ul>
	<ul style="list-style-type: none"> <li>IEDA3410 Routing &amp; Fleet Management (3)</li> </ul>
	<ul style="list-style-type: none"> <li>IEDA3450 Logistics Planning &amp; Service management (3)</li> </ul>
	<ul style="list-style-type: none"> <li>IEDA3901 Transportation Systems (3)</li> </ul>
	<ul style="list-style-type: none"> <li>IEDA4410 Global Supply Chain Management (3)</li> </ul>
<b>Group 3: Others</b>	
<b>B1. NTHU/IEEM</b>	<b>B2. HKUST/IEEM</b>
<ul style="list-style-type: none"> <li>Product Design and Development (3)</li> </ul>	<ul style="list-style-type: none"> <li>IEDA4170 Product Design &amp; Lifecycle Management (3)</li> </ul>
	<ul style="list-style-type: none"> <li>IEDA4180 Services Engineering and Management (3)</li> </ul>
<ul style="list-style-type: none"> <li>Facilities Planning (3)</li> </ul>	<ul style="list-style-type: none"> <li>IEDA4200 Design of Logistics and Manufacturing Systems (3)</li> </ul>
	<ul style="list-style-type: none"> <li>IEDA4320 Design thinking (3)</li> </ul>
<ul style="list-style-type: none"> <li>Human Factors II (3)</li> </ul>	<ul style="list-style-type: none"> <li>IEDA4650 Engineering Psychology (3)</li> </ul>
<ul style="list-style-type: none"> <li>Discrete Mathematics (3) <u>OR</u></li> <li>Lean Production and Management (3) <u>OR</u></li> <li>Electronic Commerce (3) <u>OR</u></li> <li>Quality Management (3)</li> </ul>	<ul style="list-style-type: none"> <li>Free electives (3)</li> </ul>
<b>C: Other required course in HKUST/IEEM</b>	
Waived	<ul style="list-style-type: none"> <li>ENGG1010 Academic Orientation (0)</li> <li>IEDA1010 Academic and Professional Development I (0)</li> </ul>
To be taken at HKUST	<ul style="list-style-type: none"> <li>IEDA1020 Academic and Professional Development II (0)</li> </ul>
To be taken at HKUST	<ul style="list-style-type: none"> <li>ENGG2010 Engineering Seminar Series (0)</li> </ul>
<b>D: University Common Courses</b>	
(Please refer to NTHU-HKUST University Common Core Requirements Mapping for details)	

NTHU/IEEM	HKUST/IEEM
<ul style="list-style-type: none"> <li>• College Chinese (2)</li> <li>• English (6)</li> <li>• General Education (20)</li> <li>• Physical Education (0)</li> <li>• Student Service (0)</li> </ul>	<ul style="list-style-type: none"> <li>• Chinese (3)</li> <li>• English (6)</li> <li>• Arts and Humanities (9)</li> <li>• Quantitative Reasoning (3)</li> <li>• Science and Technology (6)</li> <li>• Social Analysis (9)</li> </ul>

  
 Prof. Guillermo GALLEGO  
 Head  
 Department of Industrial Engineering and  
 Decision Analytics  
 HKUST

Date: 4-4-2018

  
 Prof. Jiang-liang HOU  
 Chairman  
 Department of Industrial Engineering and  
 Engineering Management  
 NTHU

Date: 4-20-2018

課程學分抵免對照表

Corresponding courses in NTHU/PME and HKUST/MAE

NTHU/PME	HKUST/MAE_ME program	備註
<b>Mandatory Courses (28)</b>	<b>University Common Core (36 credits)</b>	
College Chinese (2) English (6) General Education (20) Physical Education (0) Student Service (0)	Chinese (3) English (6) Arts and Humanities (9) Quantitative reasoning (3) Science and Technology (6) Social Analysis (9)	參照「國立清華大學與香港科技大學雙聯學士學位校定必修備忘錄」 Please refer to NTHU-HKUST University Common Core Requirements Mapping for details
<b>Major Requirement (67 credits)</b>	<b>Engineering Foundation (22-25 credits)</b>	
	<b>PHYS (3 credits)</b>	
YZ 9833 General Physics B (I), with Labs (4) YZ 9710 General Physics B (II), with Labs (4) PME 4021 Introduction to Modern Physics (3) PME 3212 Electromagnetics (3) PME 4031 Engineering Optics (3) <b>select 2 out of 5 courses (6)</b>	PHYS 1112 General Physics I with Calculus (3) or PHYS 1312 Honors General Physics I (3)	HKUST 學生可抵 NTHU 物理五選二課程一門 3 學分，須再另外加修一門物理五選二 HKUST students may waive a 3 credit physics course from the 2 out of 5 which students must take at NTHU. However, they must pick an additional physics courses, pick 1 out of 5 in NTHU. For a total of having taken 2 physics courses out of 5 (1 waived, 1 taken)
	<b>Science(CHEM/LIFS/PHYS) (3 credits)</b>	
CHEM1010 + CHEM1030 General Chemistry I with Labs (4)	Science 1000-level course (3)	HKUST 學生若選 PHYS 課程，可抵 NTHU 物理五選二，但須加修 General Chemistry I with Labs(4) If HKUST students take a PHYS course, they may waive a 3 credit NTHU's physics pick 2 out of 5 courses. However, they must take General Chemistry I with Labs (4) at NTHU. If they have taken a chemistry course at HKUST, they would need to take CHEM1030 only at NTHU.
	<b>MATH (10-13 credits)</b>	

MATH1030/MATH1040 Calculus I,II (6)	MATH 1012 Calculus IA (4) or MATH 1013 Calculus IB (3) or MATH 1023 Honors Calculus I (3) AND MATH 1014 Calculus II (3) or MATH 1024 Honors Calculus II (3) OR MATH 1020 Accelerated Calculus (4)	
PME 2001/PME 2002 Engineering mathematics I,II(6)	MATH 2011 Introduction to Multivariable Calculus (3)	
	MATH 2111 Matrix Algebra and Applications (3) or MATH 2350 Applied Linear Algebra and Differential Equations (3) or MATH 2351 Introduction to Differential Equations (3)	
	<b>COMP (3-4 credits)</b>	
PME 3001 Programming Design (3)	COMP 1021 Introduction to Computer Science (3) or COMP 1022P Introduction to Computing with Java (3) or COMP 1022Q Introduction to Computing with Excel VBA (3) or COMP 2011 Introduction to Object-oriented Programming (4)	
	<b>ENGG INTRO (0 credits)</b>	
	ENGG1010 Academic Orientation (0)	waived
	<b>LANG (3 credits)</b>	
	LANG 2030 Technical Communication I (3)	NTHU 學生須加修 HKUST 課程 NTHU students must take this course at HKUST
	<b>ME Major Requirement (51)</b>	
PME 1016 Work Shop Practices (1)	MECH 1990 Industrial Training (0)	NTHU students may need to take additional training at HKUST
PME 1341/PME 2342 Applied Mechanics I, II (4)	MECH 2020 Statics & Dynamics (3)	
PME 2350 Mechanics of Materials (3)	MECH 2040 Solid Mechanics I (3)	



PME 2103/PME 2104 Thermal and fluid Science I, II (6)	MECH 2210 Fluid Mechanics (3)	
	MECH 2310 Thermodynamics (3)	
PME 3006 Introduction to Materials Science (3)	MECH 2410 Engineering Materials I (3)	
PME 2431 Manufacturing Processes (3)		<p>HKUST 學生可由 Engineering Design Option 課程中的 MECH 3710 Manufacturing Processes and Systems(3) 抵免; 若是未修習 Manufacturing Processes and Systems(3)則須加修該課程(PME 2431)</p> <p>HKUST students may waive this course by taking MECH 3710 Manufacturing Process and Systems (3) at HKUST. If they have not taken Manufacturing Process and Systems (3), then they must take PME 2431 Manufacturing Processes (3) at NTHU.</p>
PME 3433 Machine Design (3)		<p>HKUST 學生可由 Engineering Design Option 課程中 MECH 3520 Design and Manufacturing II (3) 抵免; 若是未修習 Design and Manufacturing II (3)則須加修該課程(PME 3433)</p> <p>HKUST students may waive this course by taking MECH 3520 Design and Manufacturing II (3) at HKUST. If they have not taken Design and Manufacturing II (3), then they must take PME 3433 Machine Design (3) at NTHU.</p>
PME 2425 Kinematics of Machinery (3)	MECH 3030 Mechanisms of Machinery (3)	
PME 2201 Electric Circuits (3)	MECH 3630 Electrical Technology (3)	
PME 3203 Microelectronics Labs. I (1) PME 3011 Solid Mechanics and Nanomaterials Laboratory (1) PME 4013 Thermo-fluid and Power System Lab (1)	MECH 3830 Laboratory I (3)	
PME 4003/ PME 4002 Undergraduate Research I, II (3)	MECH 4900 Final Year Design Project (6)	For HKUST students, thesis need to be written in English, and may subject to the assessment of HKUST supervisors.
PME 3201 Electronics I (3)	ELEC 2420 Basic Electronics (3)	
PME 1013 Engineering Drawing (2)	MECH 2520 Design and Manufacturing I	

	(3)	
	<p>ENG 2010 Engineering Seminar Series (0)</p>	<p>NTHU 學生須加修 HKUST 課程 (ENG 2010)</p> <p>HKUST 學生須先在 HKUST 修習</p> <p>NTHU students must take this course (ENG 2010) in HKUST.</p> <p>HKUST students should take this course at HKUST.</p>
	<p>LANG 4034 Technical Communication II (3)</p>	<p>NTHU 學生須加修 HKUST 課程 (LANG 4034)</p> <p>HKUST 學生可先在 HKUST 修習，或在 NTHU 修習科技論文寫作相關課程抵免</p> <p>NTHU students must take this course (LANG 4034) in HKUST. HKUST students may choose to take this course at HKUST, or pick a course related to Scientific and Technical Writing at NTHU to waive LANG 4034 Technical Communication II (3).</p>
	<p>MECH 2907 Mechatronic Design and Prototyping (3)</p>	<p>NTHU 學生可由電控學程之 PME 3208 Control System II (3) 抵免；若是未修習 Control System II (3) 則須加修該課程</p> <p>HKUST 學生可先在 HKUST 修習 (MECH 2907)，或修習 NTHU 電控學程之 PME 3208 Control System II (3) 抵免</p> <p>NTHU students may take PME 3208 Control System II (3) from the Electrical and Control program at NTHU to waive this course. If the student has not taken Control System II (3) before, they are required to take MECH 2907 Mechatronic Design and Prototyping (3) at HKUST.</p> <p>HKUST students may take this course at HKUST, or take PME 3208 Control System II (3) in NTHU to waive MECH 2907 Mechatronic Design and Prototyping (3).</p>
	<p>MECH 3310 Heat Transfer (3)</p>	<p>NTHU 學生可由能源學程之 PME 3120 Heat and Mass Transfer(3)抵免；若是未修習 PME 3120 Heat and Mass Transfer(3)則須加修該課程(MECH 3310)</p> <p>HKUST 學生可先在 HKUST 修習，或修習 NTHU 能源學程之 PME 3120 Heat and Mass Transfer(3) 抵免</p>

		<p>NTHU students may take PME 3120 Heat and Mass Transfer (3) in NTHU to waive this course, otherwise, they are required to take MECH 3310 Heat Transfer (3) in HKUST.</p> <p>HKUST students may take this course at HKUST, or take PME 3120 Heat and Mass Transfer (3) at NTHU to waive Heat Transfer (3).</p>
	MECH 3610 Control Principles (3)	<p>NTHU 學生可由電控或精密機械學程之 PME 3207 Control System I(3) 抵免；若是未修習 Control System I(3)則須加修該課程(MECH 3610)</p> <p>HKUST 學生可先在 HKUST 修習，或修習 NTHU 電控或精密機械學程之 PME 3207 Control System I(3) 抵免</p> <p>NTHU students may take PME 3207 Control System I (3) from the Electrical and Control program or Precision Machine Design and Manufacturing program in NTHU to waive this course(MECH 3610) . If the student has not taken PME 3207 Control System I (3) before, they are required to take MECH 3610 Control Principles (3) at HKUST.</p> <p>HKUST students may choose to take this course in HKUST, or take PME 3207 Control System I (3) from the Electrical and Control or Precision Machine Design and Manufacturing courses in NTHU to waive MECH 3610 Control Principles (3).</p>
	MECH 3300 Energy Conversion (3) or MECH 3420 Engineering Materials II (3) or MECH 3520 Design and Manufacturing II (3)	<p>NTHU 學生可以 PME 3433 Machine Design (3) 抵免 MECH 3520 Design and Manufacturing II，或是能源學程之 PME 4103 Energy Engineering (3) 抵免 MECH 3300 Energy Conversion (3)，或是奈微米學程之 PME 4351 Advanced Strength of Materials (3) 抵免 MECH 3420 Engineering Materials II (3)。若是未修習以上課程，則須 3 選 1 加修課程。</p> <p>HKUST 學生可先在 HKUST 修習，或在 NTHU 修習 PME 3433 Machine Design</p>

		<p>或 PME 4103 Energy Engineering 或 PME 4351 Advanced Strength of Materials 課程抵免</p> <p>NTHU students may waive MECH 3520 Design and Manufacturing II if they have taken PME 3433 Machine Design (3) at NTHU. Or, waive MECH 3300 Energy Conversion if they have taken PME 4103 Energy Engineering (3) at NTHU. Or waive MECH 3420 Engineering Materials II if they have taken PME 4351 Advanced Strength of Materials (3) at NTHU.</p> <p>If they have taken neither of those courses, then they must take 1 out of the 3 courses at HKUST.</p> <p>HKUST students may take this course at HKUST, or pick 1 out of the following courses at NTHU in order to waive the courses from HKUST: PME 3433 Machine Design, PME 4103 Energy Engineering or PME 4351 Advanced Strength of Materials. Pick 1 out of 3.</p>
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#### Others with Credits

<i>Minimum credit(s) required 15 (select 1 out of 4 programs)</i>	<i>Minimum credit(s) required 9 (select 1 out of 4 programs)</i>	<p>兩邊學程任選其中一個學程，修滿 15 學分即可。</p> <p>Pick one program from HKUST or NTHU, and complete 15 credits from that program.</p>
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Energy Systems	Energy Option	
<p>Required Course(s) for Energy System program:</p> <p>PME 4103 Energy Engineering (3)</p> <p>PME 3113 Advanced Fluid Dynamics (3)</p> <p>PME 3120 Heat and Mass Transfer (3)</p> <p>Elective Course(s) for Energy System program:</p> <p>PME 4144 The design of the wind turbine system (3) (Elective)</p> <p>PME 4105 Numerical Dynamic Simulation (3) (Elective)</p> <p>PME 4141 Air Pollution and It's Control (3) (Elective)</p> <p>PME 4160 Fuel Cells (3) (Elective)</p> <p>PME 4021 Introduction to Modern</p>	<p>3 courses from the specified elective list below</p> <p>MECH 1902 Energy Systems in a Sustainable World (3)</p> <p>MECH 3300 Energy Conversion (3)</p> <p>MECH 4350 Indoor Air Quality in Buildings (3)</p>	

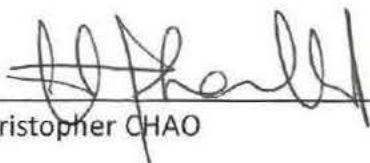


Physics (3) (Elective) PME 3007 Linear Algebra (3) (Elective) PME 4146 Unmanned Aerial Vehicle (3) (Elective) PME 4145 Vehicle Power System Design (3) (Elective) PME 4005 Numerical Analysis (3) (Elective)	MECH 3110 Materials for Energy Technologies (3) MECH 4010 Materials Failure in Mechanical Applications (3) MECH 4340 Air Conditioning Systems (3) MECH 4360 Introduction to Intelligent Building Systems (3) MECH 3420 Engineering Materials II MECH 4430 Materials Characterization (3)	
<b>Precision Machine Design and Manufacturing</b>	<b>Engineering Design Option</b>	
<i>Required Course(s) for Precision Machine Design and Manufacturing program:</i> PME 3207 Control System I (3) PME 3436 Opto-Mechatronic Systems Design (3)  PME 4432 Computer Aided Design and Manufacturing (3)	<i>3 courses from the specified elective list below</i>  MECH 3520 Design and Manufacturing II (3)  MECH 3510 CAD/CAM (3) MECH 3710 Manufacturing Processes and Systems (3)	
<i>Elective Course(s) for Precision Machine Design and Manufacturing program:</i> PME 4031 Engineering Optics (3) (Elective) Cam Mechanisms (3) (Elective) Introduction to Finite Element Methods (3) (Elective) PME 4352 Introduction to Microelectromechanical Systems (3) (Elective) PME 4342 Mechanical Vibrations (3) (Elective)	MECH 4740 Numerical Methods in Engineering (3)  MECH 4710 Introduction to Robotics (3)	

PME 4433 Program design for mechatronic control system (3) (Elective) PME 3437 Innovations in Engineering Design (3) (Elective)	MECH 4720 Introduction to Precision Engineering (3) MECH 1901 Automotive Engineering (3)	
<b>Micro/Nano and Solid Mechanics</b>	<b>Materials Option</b>	
<i>Required Course(s) for Micro/Nano and Solid Mechanics program:</i> PME 4352 Introduction to Microelectromechanical Systems (3) PME 3349 Nanotechnology and its applications (3) PME 4342 Mechanical Vibrations (3)	3 courses from the specified elective list below       MECH 4750 Mechanical Vibration (3)	
<i>Elective Course(s) for Micro/Nano and Solid Mechanics program:</i> PME 3010 Introduction to Microsystem Technology (I) (3) (Elective) PME 4351 Advanced Strength of Materials (3) (Elective) Introduction to Solid and Nano/Micro Mechanics (2) (Elective) Solid State Materials (3) (Elective) Biomechanics (3) (Elective) PME 3436 Opto-Mechatronic Systems Design (3) (Elective) Introduction to Finite Element Methods (3) (Elective) PME 4021 Introduction to Modern Physics (3) (Elective)	MECH 4010 Materials Failure in Mechanical Applications (3) MECH 3020 Solid Mechanics II (3)       MECH 4450 Introduction to Finite Element Analysis (3) MECH 3420 Engineering Materials II (3) MECH 4430 Materials Characterization (3) MECH 3110 Materials for Energy Technologies (3)	
<b>Electrical and Control</b>		
<i>Required Course(s) for Electrical and Control program:</i> PME 3207 , PME 3208 Control System I, II (6) PME 3202 Electronics II (3)		



<p><i>Elective Course(s) for Electrical and Control program:</i></p> <p>Electrical Machinery (I) (3) (Elective)</p> <p>PME 3212 Electromagnetism (3) (Elective)</p> <p>PME 3209 Logic Design and Applications (3) (Elective)</p> <p>PME 4209 Introduction to Microcomputer (3) (Elective)</p> <p>PME 4342 Mechanical Vibrations (3) (Elective)</p> <p>PME 4433 Program design for mechatronic control system (3) (Elective)</p> <p>OptoElectronic Systems for BioMedical Applications (3) (Elective)</p> <p>PME 3005 System Dynamics Analysis (3) (Elective)</p> <p>PME 4005 Numerical Analysis (3) (Elective)</p>		
	<p><b>Research Option</b></p> <p><i>Minimum credit(s) required 6</i></p>	
	<p>MECH 4995 Research Project (6)</p>	



Prof. Christopher CHAO

Head

Department of Mechanical and Aerospace Engineering, HKUST

Date: 19 MAR 2018



Prof. Hung-Yin TSAI

Chairman

Department of Power Mechanical Engineering, NTHU

Date: 20 APR 2018