Department of Industrial Engineering and Engineering Management (IEEM)

National Tsing Hua University

Academic Requirements for International PhD Students Fall 2021

Revised on 24th September, 2021

The IEEM Ph.D. degree program is conferred upon demonstration of high achievement in independent research and profession in industrial engineering and engineering management. Students have to meet department and university requirements of Ph.D. program at most 7 years to acquire the doctor's degree. They must complete at least 30 course credits (including 4 credits of thesis) and meet the qualifying requirements, publish at least 2 SCI/SSCI papers, and submit an approved dissertation proposal at least 3 months before formally applying for the final oral examination, which is a defense of the dissertation.

For more detailed information on the academic requirements of IEEM's Ph.D. program, please refer to the following instructions.

Academic Advisor

Students of Ph.D. program must find an academic advisor from the IEEM full-time faculty before the second semester of their registration and hand over *Certificate of Advisor and Research form* to the IEEM office. The form can be downloaded from the website http://www.ie.nthu.edu.tw/app/index.php?Lang=en (student information→PhD students→Forms). If students want to have their advisors from the IEEM part-time faculty or other departments, they have to submit application and obtain the approval of the IEEM Chairman.

Students may request a change of advisor. The process of changing advisor requires the approval of the original advisor, the new advisor, and the Chairman of the IEEM department.

Course credits Requirement of the Course Credits

Students in the Ph.D. program are required to complete at least 26 credits which can be divided into 14 credits of mandatory courses and a minimum of 12 credits of elective courses.

For mandatory courses, the list is as follows:

IEEM 5105 Statistics Methods (3 credits)

IEEM 5108 Linear Programming (3 credits) IEEM 5367 Intelligent Manufacturing and Automation (3 credits) IEEM 5237 Human Information Processing (3 credits) IEEM 5380 Production and Operations Management (3 credits)	Choose 3 out of 4

IEEM7101 Special Topics of Ph.D. program (1 credit*2 semester)

Please take notice that students have to take and pass IEEM 5105, and 3 courses from IEEM 5108/5367/5237/5380 in 3 years after enrolling in IEEM Ph.D. program. These courses can be chose mostly twice, which means students have two opportunities to pass the course. If one fails to gain a minimum score of B- in 3 years, he/she will be suspended from the school.

For elective courses, students can choose courses which course number begins with 5 or above. And in order to meet credit requirements of elective courses, students must choose at least 4 courses. For passing the courses, students have to gain a minimum score of B-.

Suggestion: Students should discuss their course selection with academic advisor. In general, students are advised to take four courses in the first year and two courses in the second year.

Survey of Fumdamental Courses Background

Ph.D. Students must submit a *form of Survey of Fundamental Background* to the IEEM office which they should provide when applying to the IEEM Ph.D. program. Students who did not submit this form when applying the program should hand in this form to the IEEM office after entering the school. The IEEM office will examine the submitted froms and inform the students if they should provide additional documents or have to take some additional courses in order to satisfy the requirements of fundamental course for IEEM Ph.D. students. Students should complete this survey of fundamental courses background in 3 years after enrolling in IEEM Ph.D. program, or he/she will be suspended from the school.

Academic Research Ethics Education Course

Students who are enrolled in the graduate or doctorate programs must complete National Tsing Hua University Academic Research Ethics Education Course before the end of the first year of his/her enrollment. This course is conducted through online teaching, and it is a 0 credit, mandatory course. Each student who has taken this course must obtain at least a passing grade for the course's test. The students who have not completed this course are not allowed to apply for their Oral Defense. Please refer to the website of Division of Registration for further information regarding the course (http://registra.site.nthu.edu.tw/index.php?Lang=en).

Complete the First Foreign Language Appraisal Form

Ph.D. Students must submit the *First Foreign Language Appraisal Form* to the IEEM office before apply for dissertation proposal, which can be downloaded from http://www.ie.nthu.edu.tw/app/index.php?Lang=en (student information→PhD students→ Forms).

Mandarin Course Requirements for NTHU International Students (New requirement since 109 academic year/ 2020 Fall)

According to NTHU Academic Regulations, ALL international students registered since 109 academic year/2020 Fall need to complete the NTHU Mandain course requirements. Please visit

the website of NTHU Chinese Language Certer to get the latest information (https://clc-cc.vm.nthu.edu.tw/home/index.php/course/chinese_language_page/13).

Qualification of the doctoral candidacy

Ph.D. students who satisfy the following requirements can apply for qualification of the doctoral candidacy:

- Complete the form of survey of fundamental courses background.
- Take and pass the course IEEM 5105, IEEM 5108, IEEM 5366, IEEM 5237, and IEEM 5380 in 3 years (students can choose 3 courses from IEEM 5108/IEEM 5366/IEEM 5237/IEEM 5380 to take).
- Complete the first foreign language appraisal form.
- Satisfy the requirements of course credits (complete at least 26 credits).

Students who want to apply for qualification of doctoral candidacy can contact with IEEM office and download the application form from http://www.ie.nthu.edu.tw/app/index.php?Lang=en (student information→PhD students→Forms)

Dissertation proposal

Concentrating on dissertation proposal usually begins in the second or third year of Ph. D. program when students are supposed to meet the Ph.D. qualifying requirements which are the prerequisites of presenting dissertation proposal. Once Ph.D. candidates have already confirmed their dissertation proposals with their advisors, they need to arrange an proposal oral defense and submit the *Dissertation Proposal Oral Defense Announcement* form to the IEEM office which can be downloaded from http://www.ie.nthu.edu.tw/app/index.php?Lang=en (student information→ PhD students→Forms).

The oral defense usually takes the form of 20-30 minutes of presentation by students, followed by 30-60 minutes of questioning by the dissertation supervisory committee which is comprised of at least five members(including advisor) from the faculty or other institutes (note that at least one third of the committee memebers should come from outside the NTHU).

Thesis Simillarity Checking and Similarity Report (New requirement since 108 academic year/ 2019 Fall)

According to NTHU Academic Regulations, students registered since 108 academic year/2019 Fall semester need to submit “similarity report” of their dessirtations as references to the dessiertion committee.

When applying for final dissertation defense, students need to upload thesis to the Turnitin system (https://www.turnitin.com/) to check the thesis similarity/originality, downlad the simalarity report and fill in the *Checking Form for Thesis Similarity*, then submit the form to the IEEM office with the downloaded similarity report. Students can download the instructions of how to use the Turnitin system and the checking form from http://www.ie.nthu.edu.tw/app/index.php?Lang=en (student information→PhD students→Forms)

Final Dissertation Defense

After Ph.D. candidates pass the proposal oral defense, they still need to fulfill the following requirements to apply for their final dissertation defense:

1. At least three months after the date of passing the proposal oral defense.
2. Publish at least 2 SCI/SSCI journal papers.
3. Submit the *Dissertation Oral Inspection Form* which can also be downloaded from http://www.ie.nthu.edu.tw/app/index.php?Lang=en (student information→PhD students→ Forms)
4. Written reply to the questions of the Proposal.

Requirement 2 can be conducted without any time limitation and students can prepare for this requirement from their first year in the Ph.D. program. Requirement 3 is asked to be completed and submitted to the IEEM office 1 month before Ph.D. candidates formally submit their final dissertation oral examination.

Candidates who complete all the requirements above should log in the NTHU's Academic Information System (https://www.ccxp.nthu.edu.tw/ccxp/INQUIRE/index.php?lang=english) to apply for final dissertation oral examination and go to the IEEM office on the date of examination to get some necessary documents. The oral examination committee consists of five members including the advisor and notice that all the members need to possess a doctoral degree. And the same, at least one third of the committee memebers should come from outside the NTHU.

Checklist for Submitting Final Dissertation Examination

- Meet the qualifying requirements of Ph.D. candidacy
- Complete course credits requirements
- Pass the dissertation proposal oral defense for at least 3 months
- Publish 2 SCI/SSCI journal papers
- Reply to the questions of the Proposal.

After passing the oral examination, then the candidates can prepare for graduation process.

Course List of IEEM's Graduate Program

Group	Information and Operations Research		Intelligence Manufacturing and Operations Management		Ergonomics and Design		Engineering Management	
Course	**Core Courses**							
	IEEM5108	Linear Programming	IEEM5367	Intelligent Manufacturing and Automation	IEEM5237	Human Information Processing	IEEM5401	Innovation and R&D Management
	IEEM5105	Statistic Methods	IEEM5353	Intelligent Integration of Enterprise	IEEM5239	Biomechanics	IEEM5523	Decision Analysis
	IEEM5103	Stochastic Processes	IEEM5380	Production and Operations Management	IEEM5249	Safety and Health Management	IEEM5451	Project Management
	IEEM5311	System Simulation	IEEM5430	Total Quality Management	IEEM5105	Statistic Methods	IEEM5430	Total Quality Management
					IEEM5371	Collaborative Product Development		
	IEEM5000 Seminar							
	Elective Courses (To see whether the course is offered in Chinese or English in specific semester, please inquire the curriculum system of NTHU)							
	IEEM5800	Green Product Life Cycle Assessment	IEEM5371	Collaborative Product Development	IEEM5246	Human Factors Testing and Evaluation	IEEM6307	Data Analysis in Health Care
	IEEM5118	Fuzzy Set Theory & Applications	IEEM5357	Computer Aided Design and Manufacturing	IEEM5231	Man-Machine System Design	IEEM6308	Innovation & Design of Service
	IEEM5109	Design and Analysis of Algorithms	IEEM5381	Patent Analysis and Intellectual Property Management	IEEM5250	Human-Computer Interaction	IEEM5606	Lean Management
	IEEM5104	Stochastic Optimization	IEEM5361	Knowledge Engineering	IEEM5235	Work Physiology	IEEM5390	Design for X Perspectives
	IEEM5132	Integer Programming and Network Analysis	IEEM6124	Big Data Analytics &Data Mining	IEEM5390	Design for X Perspectives	IEEM5551	TRIZ-The Theory of Inventive Problem Solving
	IEEM5141	Simulation Analysis	IEEM5390	Design for X Perspectives				
	IEEM5127	Reliability Engineering	IEEM5369	Quality Engineering				
	IEEM5190	Combinatorial Optimization	IEEM5363	Supply Chain Management				
	IEEM5126	Risk Analysis	IEEM5606	Lean Management				
	IEEM5544	Smart Data Analytics in Artificial Intelligence	IEEM5544	Smart Data Analytics in Artificial Intelligence				
	IEEM5545	Data Science and Knowledge Base Techniques	IEEM5373	Neural Networks and Applications				
	IEEM5373	Neural Networks and Applications	IEEM5545	Data Science and Knowledge Base Techniques				
	IEEM5191	Nonlinear Programming						
	IEEM5192	Game Theory						
	IEEM5142	Soft Computing						

Note1: Core courses are basically offered in English. While the instrutor has the right to decide whether the course should be offered in English or not depending on the actual lecturing sitiation of the class.

Note2: This form has listed all the IEEM courses. Students should inquire the curriculum system of NTHU to see which courses are offered in specific semester.