

國立清華大學工程與系統科學系
博士班資格考試辦法
Department of Engineering and System Science
National Tsing Hua University
PhD Qualification Exam Rules

The rules are approved by the Departmental Affairs Meeting on December 28, 2011
Amended on February 22, 2012
Amended on November 28, 2012
Amended on December 26, 2012
Amended on March 26, 2014
Amended on August 26, 2015
Amended on September 30, 2015
Amended on November 8, 2016
Amended on March 17, 2021
100年12月28日系務會議修正
101年2月22日系務會議修正
101年11月28日系務會議修正
101年12月26日系務會議修正
103年3月26日系務會議修正
104年8月26日系務會議修正
104年9月30日系務會議修正
105年11月8日系務會議修正
110年3月17日系務會議修正

1. 博士班資格考試選考科目如下：

The subjects covered in the PhD Qualification Exam include:

- (1) Principles of Nuclear Engineering (核工原理)、Nuclear Radiation Measurement (輻射度量)、Engineering Thermodynamics (工程熱力學)、Heat Transfer (熱流學)、Fluid Mechanics (流體力學)、Principles of Microsystem Engineering (奈微米系統工程原理)、Advanced Nanotechnology (奈米科技進階)、Computational Materials Science (計算材料科學)、Physical Metallurgy (物理冶金)、Thermodynamics of Materials (材料熱力學)、Introduction to Solid State Physics (固態物理導論)、Physical Chemistry (物理化學)、Principles of Electrochemistry (電化學原理)、Modern Physics (近代物理)、Quantum Mechanism (量子力學)、Plasma Engineering (電漿工程)、Electromagnetics (電磁學)、Semiconductor Devices Physics (半導體元件物理)、Circuits Analysis (電路學)、Electronic Devices (電子元件)、Electronic Systems (電子系統)

- (2) 參考用書及範圍，請參考系網頁公佈之內容。

Refer to the Department website for references and scopes.

2. 學生應自上述科目選考其中二科，且繳交考試申請單。一旦向系辦公室登記參加，便不可以要求退出，如未參加考試，便以零分計。

All students are required to take 2 subjects listed above as their Exam subjects and hand in the exam application form. Once completing the registration, students cannot cancel the exam. Students absent from the exam will get a score of 0.

3. 資格考試各科通過成績不得低於七十分，學生對成績有疑議者，可於成績公告後一週內，書面提出複查申請送交系辦。系上收到申請後，調閱試卷送交命題老師再次審閱並回覆結果，最後將複查結果書面通知學生。

The minimum requirement of score for each subject in the Qualification Exam is 70 out of 100. If students have any doubt about their scores, they can apply for their score review to the Department within one week after the exam results are announced. When the Department receives the application, the answer sheets of the applicant will be sent to examiners for reviewing. After receiving the review results from the examiners, the Department will reply the result of score review to the applicant.

4. 擬參加資格考試的學期，務必要註冊。休學中不可以參加資格考試。

Students attending the Qualification Exam must register in the same semester. Students cannot attend the Qualification Exam during suspension of schooling.

5. 學生可申請以修習特定課程（請見第8條規定）抵免資格考試科目。流程如下：需於每學期開學加選截止日前提出申請，至多登記兩門當學期所修習課程為擬抵免科目，一旦登記之後就不可以變動。學期末所登記課程的學期成績達A-以上(含)，則該課程通過抵免申請。

Students can apply for exempting from the Qualification Exam by taking specific courses (see Rule 8).

The procedure is as follows:

- (1) Apply for the exemption before the deadline of the course add-and-drop period of the semester.
Register maximum two specific courses to be taken in the semester for the exemption.
- (2) Once registered, students cannot request to change the courses.
- (3) A registered course passes the exemption application if the score is equal to or higher than A-.

6. 入學前5年內(特殊情況可提例外申請)已修習過可抵免資格考試的科目(成績需達A-以上(含))，可於入學時提出直接抵免申請。提出此申請的時程比照學校入學學分抵免申請時程，逾期不予辦理。

The specific courses, taken within the past 5 years (exceptional allowed under special circumstances) before entering the Ph.D. program, with a minimum score A- can be applied for the exemption. But the application must be done at the same moment for the credit transferring application. Late application is not accepted.

7. 入學後至多只能提出兩次資格考試申請。以修課抵免資格考試申請則無次數限制。學生需於入學後二年內(休學不計入年限)合計完成通過兩門科目的要求，未符合此規定者，應予退學。

Students can register for Qualification Exam, at most two times, after entering to the Ph.D. program.

There is no number limit for the registration of exemption application. Students have to totally pass two subjects (the exam subjects plus the courses of exemption) within 2 years after the enrollment of the program (not including suspended year). Students who failed to achieve this requirement are dropped out.

8. 選考科目與以修課抵免資格考試之關係，請見附表一。修課的科號及科目名稱需與表中資訊完全一致。

The correspondence between the exam subjects and the specific courses to exempt the exam is given in

Table 1. Both the course title and the course ID must be strictly respected in an exemption application.

9. 本辦法經系務會議通過後實施，修正時亦同。

The rules come in force after approved in Departmental Affairs Meeting, likewise for revision of the rules.

附表一：選考科目與以修課抵免資格考試關係表

Table 1: The corresponding table between the exam subjects and the specific courses to exempt the exam

編號 No.	選考科目 exam subjects	以修課抵免資格考試(修課科號、科目名) specific courses to exempt the exam (course ID and title)
1	核工原理 Principles of Nuclear Engineering	ESS5110 / NES5010 反應器物理一 (ESS5110/NES5010) Reactor Physics I
2	輻射度量 Nuclear Radiation Measurement	NES5211 輻射度量 (104 學年以前 ESS4050 光子與粒子度量原理) (NES5211) Radiation Detection Measurement (before academic year 2015: ESS4050 光子與粒子度量原理 (ESS4050) Principles in Photon & Particle Measurements)
3	工程熱力學 Engineering Thermodynamics	ESS5410 / NES5410 反應器工程 (ESS5410/NES5410) Nuclear Reactor Engineering
4	熱流學 Heat Transfer	ESS5430 高等熱流學 (ESS5430) Advanced Heat Transfer ESS5490 計算熱流學 (ESS5490) Computational Fluid Dynamics and Heat Transfer
5	流體力學 Fluid Mechanics	ESS6430 雙相流與沸騰熱傳 (ESS6430) Two-Phase Flow & Boiling Heat Transfer
6	奈微米系統工程原理 Principles of Microsystem Engineering	ESS5850 微系統設計 (ESS5850) Micro System Design
7	奈米科技進階 Advanced Nanotechnology	TIGP7402 奈米科技進階 (103 學年以前科號 TIGP5504) (TIGP7402) Advanced Nanotechnology (course ID before academic year 2014: TIGP5504)
8	計算材料科學	TIGP7483 計算材料 (103 學年以前科號

編號 No.	選考科目 exam subjects	以修課抵免資格考試(修課科號、科目名) specific courses to exempt the exam (course ID and title)
	Computational Materials Science	TIGP5502) (TIGP7483) Computational Materials Science (course ID before academic year 2014: TIGP5502)
9	物理冶金 Physical Metallurgy	ESS5520 高等物理冶金 (ESS5520) Advanced Physical Metallurgy
10	材料熱力學 Thermodynamics of Materials	ESS5505 固態熱力學 (ESS5505) Thermodynamics of Solid State
11	固態物理導論 Introduction to Solid State Physics	ESS5390 / TIGP7441 固態物理一 (103 學年以 前科號 TIGP5509) (ESS5390/TIGP7441) Solid State Physics I (course ID before academic year 2014: TIGP5509)
12	物理化學 Physical Chemistry	ESS5898 軟物質科學導論 或 TIGP7476 有機金屬化學 (103 學年以前科號 TIGP5520) TIGP7271 高等物理化學一 (3 選 1) (ESS5898) Introduction to Soft Condensed Matter or (TIGP7476) Organometallic Chemistry (course ID before academic year 2014: TIGP5520) (Select one from two) or (TIGP7271) Advanced Physical Chemistry (I) (Select one from three)
13	電化學原理 Principles of Electrochemistry	ESS5847 生化分析與實驗 (TIGP 奈米學程學 生不可以此科目抵免資格考筆試) 或 ESS5590 工程電化學 (2 選 1) (ESS5847) Bioanalytical Chemistry : Basic Principles and Lab Projects (TIGP Nano Program students are not eligible for this subject to exempt from the written qualification examination) or

編號 No.	選考科目 exam subjects	以修課抵免資格考試(修課科號、科目名) specific courses to exempt the exam (course ID and title)
		(ESS5590) Electrochemistry for Engineers (Select one from two)
14	近代物理 Modern Physics	ESS5620 中子與 X 光小角度散射 或 PHYS4670 同步加速器光源應用 (2 選 1) (ESS5620) Neutron and X-Ray Small Angle Scattering or (PHYS4670) Applications of Synchrotron Accelerator Light Source (Select one from two)
15	量子力學 Quantum Mechanics	ESS5822 分子動力學模擬 (ESS5822) Molecular Dynamics Simulations
16	電漿工程 Plasma Engineering	ESS5340 電漿工程應用 (ESS5340) Plasma Engineering and Applications
17	電磁學 Electromagnetics	ESS5271 微波工程 (ESS5271) Microwave Engineering
18	半導體元件物理 Semiconductor Devices Physics	ESS5230 半導體元件物理 (ESS5230) Semiconductor Devices Physics
19	電路學 Electric Circuits	ESS5290 混合訊號積體電路設計 (ESS5290) Mixed-Signal Integrated Circuit Design
20	電子元件 Electronic Devices	ESS5200 微電子工程 Microelectronic Engineering
21	電子系統 Electronic Systems	N/A
22	訊號與系統 Signals and Systems	ESS5267 高等系統與訊號分析 (ESS5267) Advanced System and Signal Analysis
23	機率與統計 Probability and Statistics	N/A