

General Requirement for NTHU Engineering-oriented Doctoral Students in Nano Science and Technology Program, TIGP, Academia Sinica

*The rules are approved and amended by the Departmental Affairs Meeting on **May 27, 2020***
109年5月27日系務會議修訂

	Doctor Program
Minimum Credits	<ol style="list-style-type: none"> 1. For students enrolled with a master degree, a minimum of 18 credits. (graduate level, course number 5000 above, excluding Seminar), in addition to seminar. 2. For students enrolled with a bachelor degree, a minimum of 30 credits. (5000 level or above, excluding Seminar), in addition to seminar. Credit Exemption: <ol style="list-style-type: none"> 1. A maximum of 6 credits taken in the master program. 2. For students who pursue their second Ph.D. graduate study, a maximum of 12 credits can be exempted (refer to “Credit Exemption Regulations of National Tsing Hua University”). 3. The application for credit exemption should be completed all at once during the first semester of the academic year upon registration.
Grade Requirements	Grades below 70, on basis of 100, will not be accepted toward degree requirements. From 2010 academic year, the passing grade is B-.
Required Courses	<ol style="list-style-type: none"> 1. Introduction to Nanotechnology and Advanced Nanotechnology (3 credits each) 2. Four semesters of Seminar (1 credit each) during the first two years. From the third year, the students may take more semesters as required by the advisor. 3. Colloquium (0 credit) before passing the Doctoral Dissertation Preliminary Examination. Students should retake Colloquium for the semester(s) in which they did not pass it. 4. Four semesters of Thesis (0 credit).
Other Regulations	※ Examinations / Time Constraints <ol style="list-style-type: none"> 1. The PhD Qualification Exam should be taken and passed before the end of second year of Ph.D. graduate study. 2. After passing his/her PhD Qualification Exam, the student should take and pass the Doctoral Dissertation Preliminary Examination before the end of third year of Ph.D. graduate study. 3. Thesis defense should be taken and passed before the end of seventh year of Ph.D. graduate study. 4. Students enrolled with a bachelor degree should apply for advancing to doctoral degree program at the end of their first year of study. After approval, follow the regulations listed above.

For details on PhD Qualification Exam and Doctoral Dissertation Preliminary Examination, please read the two rules on the next pages.

※ Other Assessments / Time Constraints

1. Courses and Research Plan Application Form:

Students must submit the doctoral plan when registering in the first semester of second year of Ph.D. graduate study.

In the plan, students have to list courses (to be taken or already taken) to formulate their Major and 2nd Major of PhD study. The titles of Major and 2nd Major can be found in the “Table of Major and 2nd Major” and the listed courses should follow the suggestion of courses given in the Table.

If there is any change in the courses or majors, students have to submit the application form “Change of Courses and Research Plan” to the Program Committee for re-evaluation.

- (1) Major: at least 12 credits (graduate-level courses, course number 5000 above, either already taken or intend to take).
- (2) 2nd Major: at least 9 credits (graduate-level courses, course number 5000 above, either already taken or intend to take).
- (3) Students can list at most two graduate level courses, which do not appear in the “Suggestion of Courses” but are related to their thesis research and major, approved by their thesis advisor. This rule applies to either the major or the second major field of the student.
- (4) In the plan, students also need to provide thesis title (tentative) and propose five persons to be the committee members in Doctoral Dissertation Preliminary Examination. At least two of them are from outside NTHU.

2. Proof of English proficiency:

Passing either test is required for all students.

- (1) GEPT: passing the first stage of High-intermediate level
- (2) TOEFL: iBT-75
- (3) TOEIC: 700
- (4) Other equivalent English proficiency test. The test must involve, at least, listening and reading subtests. Please provide a creditable comparison chart for the equivalency.
- (5) Students have completed a degree program in an English speaking country.

3. Publication:

Students must publish at least **two research papers* listed as the principal author (i.e. the first author) in the SCI journals** (papers accepted for publication are considered as published. A proof is needed). Published papers should use a full and official affiliation of the department and university (in Chinese: 國立清華大學工程與系統科學系; in English: Department of Engineering and System Science, National Tsing Hua University).

* The papers should be the work completed in the Ph.D. graduate study. Papers publishing the work done in the master graduate study are not accepted.

4. Requirement to become a Ph.D. Candidate:

Students have

- (1) Fulfilled all courses and credits requirement for the Ph.D. graduate study
- (2) Passed the Ph.D. Qualification Exam
- (3) Satisfied the English proficiency

5. Students can submit the application for the Ph.D. degree exam (the final oral defense) six months after becoming a Ph.D. Candidate. Under a special circumstance, the exam could be held earlier by submitting the application, together with an explanation, to the Program Committee.

6. Requirements to hold the Ph.D. degree exam

- (1) Having enrolled in the Ph.D. program for at least 2 years (at least 3 years for students pursuing Ph.D. without Master degree)
- (2) Having become a Ph.D. Candidate
- (3) Possessing the abilities of innovation and independent research, as well as having contributions to their professional field
- (4) Being recommended by the advisor, and approved by the Program Committee and the Chairperson of Department.

7. **Students enrolled in/after Fall 2019 are required to submit a “Turnitin Similarity Report” when they apply for the Ph.D. degree exam. The percentage range for our students is no higher than 25%.**

8. A one-year Mandarin course is also required for foreign students.

	<p>Note: The original rules (國立清華大學工程與系統科學系博士班修課、外語能力及論文發表要求相關規定) are written in Chinese. Should any discrepancy exists between the English translation and the original Chinese version, the Chinese version shall prevail.</p>
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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

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

Amended on March 26, 2014

1. 博士班資格考試選考科目如下：

The subjects covered in the PhD Qualification Exam include:

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 Mechanics (量子力學)、Plasma Engineering (電漿工程)、Electromagnetics (電磁學)、Semiconductor Devices Physics (半導體元件物理)、Electric Circuits (電路學)、Electronic Devices (電子元件)、Electronic Systems (電子系統)

參考用書及範圍，請參考系網頁公佈之內容。

Refer to the Department website for reference books 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 register the Qualification Exam by handing 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 score review within one week after the exam results are announced. Once the department receives the application, the answer sheets of the applicant will be reviewed by examiners. After receiving the review results, the department announces the result of 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 who plan to attend the Qualification Exam must enroll themselves in the semester. Students cannot attend the Qualification Exam during suspended semester of school.

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。修課的課號及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 (修課課號、科目名) specific courses to exempt the exam (course ID and title)
1	核工原理 Principles of Nuclear Engineering	ESS5110 反應器物理一 (ESS5110) Reactor Physics I
2	輻射度量 Nuclear Radiation Measurement	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 反應器工程 (ESS5410) Nuclear Reactor Engineering
4	熱流學 Heat Transfer	ESS5430 高等熱流學 (ESS5430) Advanced 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 (原"奈米科技導論") Advanced Nanotechnology (former "Introduction to Nano-Technology")	TIGP5504 奈米科技進階 (原"奈米科技導論二") (TIGP5504) Advanced Nanotechnology (former "Introduction to Nano-Technology")
8	計算材料科學 Computational Materials Science	TIGP5502 計算材料 (TIGP5502) Computational Materials Science
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	ESS550500 固態熱力學 Thermodynamics of Solid State
11	固態物理導論 Introduction to Solid State Physics	ESS5390 / TIGP5509 固態物理一 (ESS5390/TIGP5509) Solid State Physics I
12	物理化學 Physical Chemistry	ESS5898 軟物質科學導論 或 TIGP5520 有機金屬化學 TIGP 7271 高等物理化學一 (3 選 1) (ESS5898) Introduction to Soft Condensed Matter

編號 No.	選考科目 exam subjects	以修課抵免資格考試 (修課課號、科目名) specific courses to exempt the exam (course ID and title)
		or (TIGP5520) Organometallic Chemistry (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 或 ESS5590 工程電化學 (2 選 1) (ESS5847) Bioanalytical Chemistry : Basic Principles and Lab Projects Or (ESS5590) Electrochemistry for Engineers
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	ESS520000 微電子工程 (ESS520000) Microelectronic Engineering
21	電子系統 Electronic Systems	

國立清華大學工程與系統科學系博士班論文初試辦法

Doctoral Dissertation Preliminary Examination Rules Department of Engineering and System Science, NTHU

101年11月28日系務會議修訂通過

102年1月15日系務會議修訂通過

The rules are approved by the Departmental Affairs Meeting on November 28, 2012

Amended on January 15, 2013

- 第一條 學生經論文指導教授和論文初試委員會各委員簽字同意後，可提出申請，經系主任同意後，得與各委員安排口試時間、地點，於預定口試日期二十天前通知所系辦公室，由系統一發出口試邀請函。
Students can apply for the preliminary exam with the signed approval of thesis advisor and the committee members of the exam. With the approval of the chairman of the department, students should contact the department office 20 days before the oral exam. The department office will issue the letters of invitation.
- 第二條 論文初試委員會應由五位委員組成，指導教授為當然委員，委員需具備相當於助理教授以上資格，校外成員至少二人。
Five members in the dissertation preliminary examination committee should be proposed, and the advisor is ex officio committee member. Qualification of the members has to be equivalent to an assistant professor and at least two of them are from outside NTHU.
- 第三條 論文初試委員會於初試前自行協調推出主席一名，負責主持及協調初試有關事務。
The committee of the dissertation preliminary exam should select a member as the chairman of the committee. The chairman is responsible for hosting and arranging the exam.
- 第四條 應考學生需於預定初試日期前兩週印妥書面論文計劃摘要六份，送所系辦公室。
Students should hand in 6 paper copies of the abstract thesis to the department office 2 weeks before the preliminary exam.
- 第五條 初試時間以兩小時為原則，考生應自行向系辦公室接洽準備初試所需場地及器材。
The preliminary exam usually takes 2 hours. Students should contact the department office to arrange the required equipment and place.
- 第六條 初試方式、初試內容（是否包含次專長）及時間分配由委員會協調自定之，通知考生。
The committee of the preliminary exam will decide the details of the exam and inform every attendant.

- 第七條 初試結果於初試後三天內由各委員署名送系辦公室。
Results of the preliminary exam with signed approval of the committee will be sent to the department office within 3 days after the exam.
- 第八條 初試未通過者，可於兩個月後提出補考申請，但以補考一次為限，補考不及格者即予退學。
Students failed in the preliminary exam can apply for the make-up exam 2 months after knowing the results. There is only 1 chance for the make-up exam. Students failed in the make-up exam have to drop out.
- 第九條 入學後三年內（通常是指7/31以前（即指扣除休學後第三年末）；若只休學一學期，則為1/31）若不能通過論文初試，應予退學。特殊情況經指導教授提出說明後，可以延至第七學期的開學第一天上課前。
After enrollment, students MUST finish the dissertation preliminary exam within 3 years (before July 31 at the end of the third year study. For students with suspension of schooling for 1 semester, it is usually before January 31.). Students failed in achieving this requirement have to drop out.
Under special circumstances and with the advisor's explanation, the exam can be taken one day before the 7th semester starts.
- 第十條 時間：不定期舉行。
No fixed-date for holding the preliminary exam.
- 第十一條 本辦法經系務會議通過後實施，修訂時亦同。
These rules shall be implemented after being approved by the Department Affairs Meeting; the same procedure applies to all amendments.