

# 國立交通大學物理研究所 104 學年度博士生修業規章

National Chiao Tung University  
Institute of Physics

Academic Regulations for Doctoral Program of Academic Year 2015

本案業經 2015.9.9 所務會議修正通過  
本案業經 2015.5.28 所務會議修正通過  
本案業經 2015.1.22 所務會議修正通過  
本案業經 2014.3.12 所務會議修正通過  
本案業經 2013.4.11 所務會議修正通過  
本案業經 2012.4.26 所務會議修正通過  
本案業經 2012.3.14 所務會議修正通過  
本案業經 2011.11.25 所務會議修正通過  
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本案業經 2009.6.24 所務會議修正通過  
本案業經 2004.12.8 所務會議修正通過  
本案業經 2004.3.3 所務會議修正通過  
本案業經 2003.3.13 所務會議修正通過  
本案業經 2002.11.4 所務會議修正通過  
本案業經 2001.12.4 所務會議修正通過  
本案業經 2001.11.7 所務會議修正通過

Amended at the Committee of Institute Affairs (9 September 2015)

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Amended at the Committee of Institute Affairs (4 November 2002)

Amended at the Committee of Institute Affairs (4 December 2001)

Amended at the Committee of Institute Affairs (7 November 2001)

## 一、入學資格：

經本校博士班招生委員會核定錄取者；或本校碩士班研究生修業一學期以上，具有明顯之研究潛力，且修業期間各學期學業成績均在該碩士班前三分之一以內，或有其他特殊情形（如發表論文），經該班之系（所）評定為成績優異者，得由原就讀或相關之系所教授二人以上推薦，向本所申請逕行修讀博士學位，並經本校研究所逕行修讀學位審查委員會錄取者。

### Article 1. Admission requirements:

The Ph.D. students of Institute of Physics should be approved for enrollment by the Doctoral Admission Committee of National Chiao Tung University. If master students of NCTU have studied for more than one semester, with evident research potential, and their score of each semester belongs to the leading first-third of the master program or they have other special performances (such as publishing papers), after they are evaluated as excellent by their departments (institutes or programs), they can submit the application to Institute of Physics for the direct admission to doctoral program by recommendations of 2 or more professors of their departments (institutes or programs). Students are admitted after being approved for enrollment by the Direct Admission Review Committee of NCTU.

(1) 博士班入學考試：〔請依當年度招生簡章之規定〕

(a) 審查佔 50%；口試佔 50%

(b) 考試科目：量子力學、電動力學、應試者過去研究相關科目。

- (c) 報考時請繳交大學及研究所歷年成績單正本一份、推薦函二封、碩士論文或相當碩士論文著作、自傳及研習計劃各一篇、及其他資料如：大學學力測驗、成績單、專題報告、已發表在學術期刊的論文等有助於審查之文件影本。
- (1) Admission examination of doctoral program (Please refer to the regulations of the admission brochure in the academic year):
- (a) Document review: 50%, interview: 50%
  - (b) Subjects of examination: Quantum Mechanics; Electrodynamics; Related subjects of applicants' previous research.
  - (c) When applying for the examination, please submit original copies of undergraduate and graduate transcripts, 2 letters of recommendation, master dissertation or article equal to master dissertation, one autobiography, one research plan, and copies of other useful supporting documents, such as General Scholastic Ability Test, transcripts of record, project reports, papers published on academic journals, and so on.
- (2) 博士班推薦甄試：〔請依當年度招生簡章之規定〕
- (a) 資料審查 50%；面試 50%
  - (b) 繳交資料：報名表、助理教授以上推薦函二封、自傳及讀書計劃各一篇、大學部及研究所歷年成績單（含名次）正本一份、研習計畫及有助於審查之文件影本。
- (2) Recommendation examination of doctoral program (Please refer to the regulations of the admission brochure in the academic year):
- (a) Document review: 50%, interview: 50%
  - (b) Documents which should be submitted: application form, 2 letters of recommendation by assistant professors or above, one autobiography, one study plan, original copies of undergraduate and graduate transcripts (with ranking), one research plan, and copies of other useful supporting documents.
- (3) 物理所直升博士班辦法：
- (a) 欲申請直升博士班之學生須於規定之截止日期前，提出所有有關資料，包括學業成績及 2 封教授推薦信，否則不予受理。
  - (b) 直升評分〔請參閱當年度選博辦法〕
- (3) Regulation for direct admission to doctoral program of Institute of Physics:
- (a) Before the deadline of regulations, applicants who apply for direct admission of doctoral program should submit all related documents, including academic grades and 2 professors' recommendation letters; otherwise, all applications will NOT be accepted.
  - (b) Examination of direct admission (please consult regulations of direct admission issued in the current year)

## 二、修業年限、學分：

- (1) 博士班一般生修業年限以二至七年為限；在職生得延長一年。如未能於規定修業期限內通過學位考試或未能完成應修課程者，應令退學。
- (2) 學分數規定：應修 18 學分  
直生博士生：36 學分（含直升前碩士班課程學分）。
- (3) 學期成績以七十分為及格，其論文學分另計。適用畢業學分之應修科目，由本所教學及學生輔導委員會認定。
- (4) 博士生抵免學分辦法：抵免上限為九學分。  
學分之認定或抵免須由指導教授及該課任課教師同意後生效。校方另有規定者(如申請抵免)則按校方規定辦理。

### Article 2. Study period and credit requirements:

- (1) The minimum and maximum study periods for doctoral programs must be two to seven years; Part-time students may extend the study period for one more year. A student who fails to pass the oral defense or to complete all the required courses within the maximum study period is required to drop out of NCTU.
- (2) Total Required Credits: 18 credits.

Total Required Credits for Students with Direct Admission from Master Program: 36 credits (including credits earned during the master program prior to direct admission)

- (3) The passing grade of all semesters is 70, and the credit of dissertation should be calculated separately. All required subjects for graduation credits should be recognized by Teaching and Students Consultation Committee of Institute of Physics.
- (4) Credit transfer regulation of doctoral program: 9 credits can be transferred at most. Credit recognition and transferring are effective after being approved by the adviser, and the teacher of the course, unless otherwise prescribed by regulations stipulated by NCTU (such as Credit transfer application).

### 三、論文指導教授及選課：

#### (1) 論文指導教授

- (a) 博士班研究生需於入學後第四學期註冊前(含註冊日)正式選定指導教授。逾期未辦理者將安排至課程委員會說明理由，必要時得延長一學年。
- (b) 本所學生原則上須由本所專任教師任論文指導老師。若選定講座教授擔任指導教授，必須有本所專任教師共同指導。在特殊情況下，於第四學期開學前提出申請，經所務會議同意，才可至外所找指導教授。
- (c) 學生更換指導教授，需徵得原指導教授及新任指導教授同意。
- (d) 研究生或指導教授任何一方，因故欲取消論文指導關係，經兩方同意後，研究生得再另覓指導教授；若雙方無法達成共識，則由所務會議議決。

#### Article 3. Dissertation adviser and course selection:

##### (1) Dissertation adviser:

- (a) Ph.D students should invite dissertation advisers officially before the registration of the fourth semester after their admissions (including the date of registration). Otherwise, Ph.D. students should be arranged to Curriculum Committee to describe their reasons, and the schedule can be extended for one more academic year when necessary.
- (b) Ph.D. students should invite full-time teachers of Institute of Physics to be their dissertation advisers in principle. If students would like to invite chair professors to be their thesis advisors, they should be co-instructed by at least one full-time teacher of the Institute. Under special circumstances, Ph.D. students can submit application before the beginning of the fourth semester. Only after being approved by Committee of Institute Affairs can they invite external advisers.
- (c) To change advisers, Ph.D. students should acquire both approvals from the original adviser and from the new one.
- (d) Whether it is the adviser or the student who asks to cancel the dissertation instruction, both should first communicate with each other for agreement, and then the student can invite new adviser. If they cannot reach any agreement, Committee of Institute Affairs should hold a meeting to make the final decision.

##### (2) 選課

- (a) 研究生選修任何課程均需指導教授同意，新生尚未擇定指導教授者由本所學生事務負責人指導選課。

##### (2) Course selection:

- (a) All course selection should be approved by the advisers. 1st-year students who have not invited advisers should be instructed by the staff in charge of student affairs to select courses.

##### (b) 必修課程

- a. 量子力學(一、二): 6學分
- b. 電動力學(一、二): 6學分
- c. 統計力學(一): 3學分
- d. 書報討論須修滿四學期: 4學分
- e. 在以下四項類別中，擇不同類別裏的兩個科目修習：
  - (i) 固態物理(一)(二)或高等固態物理(一)
  - (ii) 量子場論(一)或粒子物理(一)

- (iii) 原子分子物理 (一)
- (iv) 本所同意之物理子領域課程

(b) Required courses:

- a. Quantum Mechanics (I, II): 6 credits
- b. Electrodynamics (I, II): 6 credits
- c. Statistical Mechanics (I): 3 credits.
- d. Seminar should be selected for four semesters: 4 credits.
- e. Choose two subjects from four different categories as follows:
  - (i) Solid State Physics (I) (II) or Advanced Solid State Physics (I)
  - (ii) Quantum Field Theory (I) or Particle Physics (I)
  - (iii) Atomic and Molecular Physics (I)
  - (iv) Institute courses in a subfield of Physics that are approved by the Institute of Physics.

備註一：進入本所博士班前所修之必修課程，申請後經本所核可者得免修之。(如欲申請抵免則按校方規定辦理)

Remark 1: Students can apply for course transfer for courses taken before admission to the PhD program (Course transfer application must conform to related NCTU regulations).

備註二：本所經常開課之核心課程有

- a. 高能組：1. 量子場論 (一、二)
  - 2. 粒子與場導論
  - 3. 粒子物理 (一、二)
  - 4. 廣義相對論
  - 5. 宇宙學簡介
- b. 凝態組：1. 統計力學 (二)
  - 2. 固態物理 (一、二)
  - 3. 高等固態物理 (一、二)
  - 4. 量子多體理論
- c. 原子分子組：1. 原子分子物理 (一、二)
  - 2. 計算物理
  - 3. 數值分析

Remark 2: The core courses usually offered by Institute of Physics are:

- a. High Energy Group
  - 1. Quantum Field Theory (I, II)
  - 2. Introduction to Particle and Field
  - 3. Particle Physics (I, II)
  - 4. General Relativity
  - 5. Introduction to Cosmology
- b. Condensed Matter Group
  - 1. Statistical Mechanics (II)
  - 2. Solid State Physics (I, II)
  - 3. Advanced Solid State Physics (I, II)
  - 4. Quantum Multiple-Body Theory
- c. Atomic and Molecular
  - 1. Atomic and Molecular Physics (I, II)
  - 2. Computational Physics
  - 3. Numerical Methods for Physics

(3) 研究生選修教育學程應知會指導教授。

(3) Graduate students should inform their advisers if they select the Education Program.

#### 四、資格考試：

資格考（含筆試與口試兩部份）須於入學後二年內通過，若無法通過則予以退學。

Article 4. PhD candidate qualification examination:

Ph.D. students should pass the PhD candidate qualification examination (consisting of written and oral examinations) within two years after admission. Otherwise, they are required to drop out of NCTU

(1) 筆試：滿足以下 (a) (b) 其中一項。

(a) 含量子力學與電動力學兩科。

1、選修本所開授之量子力學（一及二），而兩學期成績均及格且在全部學生前40%（含）以內。

2、選修本所開授之電動力學（一），而學期成績及格且在全部學生前40%以內（含）。

3、博士生申請學分抵免或免修時，可同時申請資格考鑑定。申請時需繳交申請表及原修課成績已達到該科修課學生前40%之證明。循序經任課老師初審同意後向課程委員會申請複審。課程委員會複審後，決定申請者該科資格考筆試是否可視為通過。

4、若修課未達前40%、或未及格、或抵免免修學分未通過資格考鑑定者，則應選擇旁聽本所相同課程（含交作業及參加考試），以取得達標準之成績，惟需徵得任課教師同意並向課程委員報備。

(b) 指導教授亦可要求學生參加GRE physics（advanced）考試，以成績高（含）於70%為通過。（若在60%~70%之間則需指導教授強力推薦且經所務會議通過）

(1) Written examination: Ph.D. students should fulfill one of the following (a) and (b):

(a) Consisting two subjects, Quantum Mechanics and Electrodynamics.

1. Students select the Quantum Mechanics (I & II) offered by Institute of Physics, and both grades of two semesters should be higher than the passing grade, and higher than (or equal to) the leading 40% of all students' scores.

2. Students select the Electrodynamics (I), and the grades of the semester should be higher than the passing grade, and higher than (or equal to) the leading 40% of all students' scores.

3. When applying for course transfer, PhD students may simultaneously apply for qualification examination by submitting the application form and grades certificate of being the leading 40%. The primal review by the course instructor and then the second review by the course committee determine whether the applicants pass their qualification examination.

4. If a Ph.D. student's grades of selecting courses are not higher than (or equal to) the leading 40% of all students', or are less than the passing grade, or if the course allowed to be transferred has not reached the level of qualification examination, he/she should audit the same courses offered by Institute of Physics (including submitting homework and joining examinations) to acquire the grades with the "pass" criteria. The Ph.D. student should acquire the approval of the course instructor in advance and report the situation to the Curriculum Committee.

(b) Adviser can also request Ph.D. students to join GRE physics (advanced) examination. The pass criteria is higher than (or equal to) 70% of all (if the Ph.D. student's grade is between 60% and 70%, the student should be strongly recommended by the adviser and approved by the Committee of Institute Affairs.)

(2) 口試：測驗學生對即將研究之主題與領域是否準備完全。

(a) 申請者請就研究領域與主題準備論文計劃書2-5頁英文書面資料，於口試日期二週前持計畫書向所辦提出申請。考試時間為60-90分鐘，口試委員依其報告內容提相關問題，經由口試委員投票，同意票數超過一半（含）為口試通過標準。

(b) 由指導教授召集口試委員3-5人（限所內教師），指導教授列席但不參與投票。

(c) 口試申請至多二次。

(2) Oral examination: to test if the Ph.D. student is fully prepared for his/her research topics and fields.

(a) Applicants should prepare 2-5 pages of English documents of dissertation proposal according to their research topics and fields, and submit the proposal to Institute Office two weeks before the oral examination for application. Time of oral examination is 60-90 minutes. The members of oral examination will raise related issues according to the documents. The pass criteria of oral examination is winning over half of the members' agreement through voting.

(b) Three to five members of oral examination will be invited by the adviser (all members should be

teachers of Institute of Physics), who should attend the oral examination but cannot join the voting.

(c) The oral examination should be applied for at most twice.

(3) 論文與口試形式依學校規定辦理。

(3) The format of dissertation and oral examination should be conducted according to the NCTU regulations.

(4) 若筆試至第四學期已全數通過，為期學生充分準備研究方向，在指導教授的同意下，口試期限得延至第五學期結束前舉行。

(4) If a Ph.D. student has passed all written examinations in the fourth semester, in order that the student can fully prepare the research direction, under the adviser's approval, the deadline of oral examination can be extended to the end of the fifth semester.

(5) 博士班學生通過資格考後，即成為本所博士學位候選人。

(5) Ph.D. students who pass the PhD candidate qualification examination are Ph.D. candidates.

## 五、博士學位考試

### Article 5. Doctoral degree defense

(1) 學位考試規定依本校博士學位授予作業規章之規定，但所內另行規定者，則依本所之規定。

(1) The Ph.D. degree defense should follow the "Regulations for Master and Doctoral Degrees Conferment" of NCTU, unless otherwise prescribed by regulations stipulated by Institute of Physics.

(2) 博士班研究生申請學位考試，應於口試前一個半月經指導教授推薦提出擬於該學期申請學位考試（申請口試相關資料請洽詢助理）。為符合現行學制規定，研究所博士生論文考試，須依照本校行事曆，於每學期學位考試日程內舉行，如需延期，第一學期至遲須於元月三十一日前，第二學期至遲須於七月三十一日前舉行。

(2) A Ph.D. student who applies for doctoral degree defense in the semester should submit the application recommended by the adviser before one and a half months before the oral defense (the applicant can contact the assistant for related documents of oral defense application). In order to meet the requirement of current educational system, Ph.D. students' degree defense should be conducted within degree defense schedule of every semester according to the school calendar. If an extension is needed, the degree defense should be conducted before January 31st in the first semester, before July 31st in the second semester.

(3) 口試以公開舉行為原則，須於事前公佈口試時間、地點及論文題目。

(3) All oral defenses must be conducted openly. The time and place of the oral defense and the title of dissertation/dissertation must be announced in advance.

(4) 博士學位考試委員會置委員五至九人，其資格由所教評會審核之，並由單位主管簽請校長核發考試委員暨召集人聘函，校內外委員須三分之一（含）以上。

(4) The committee for the doctor degree oral defense is made up of five to nine members. Their qualifications are verified by Institute Teacher Evaluation Committee. The director of the Institute should submit recommendations by petition to the principal of NCTU for approval to issue appointment letters to committee members and the chairperson. Internal and external members should account for one-third or above.

(5) 學位考試委員應親自出席委員會，不得委託他人為代表，至少應有委員五人出席，始得舉行。

(5) All members of an oral defense committee must attend the oral defense in person. Stand-ins are not permitted. An oral defense for doctoral degree should be attended by at least five committee members.

- (6) 博士論文考試成績以七十分及格，滿分為一百分。出席委員如有逾三分之一以上委員評定不及格者即以不及格論；論文考試成績以出席口試委員記名評定分數平均決定之。
- (6) The passing grade and full marks of the oral defense are 70 and 100. An oral defense is deemed failed when over one-third of present committee members evaluate the performance as failed. The score of oral defense is determined by the average signed scores given by present members.
- (7) 博士學位考試不及格，而其延長修業年限尚未屆滿者，得於次學期至修業年限內，申請重考，重考以一次為限，重考不及格者，即令退學。凡逕行直攻修讀博士學位之研究生，其博士學位考試不及格而合於碩士學位標準者，得由博士學位考試委員會之決議改授碩士學位。
- (7) Students who fail to pass the oral defense and whose extended study period hasn't reach its limit may apply for the retrial from the next semester to the limit of their study period. Retrial is limited to be once only. Students who fail to pass the retrial of degree defense are required to drop out of NCTU. NCTU will confer a master degree upon a doctoral student who passes the Ph.D. candidate qualification examination (COM) but fails the Ph.D. oral defense if the dissertation is approved by the oral defense committee as qualified for a master degree.
- (8) 學位論文(含摘要)以中文撰寫為原則，並須符合「國立交通大學學位論文格式規範」。學位考試通過後一個月內應將論文摘要及全文電子檔上網建檔(依照「國立交通大學圖書館學位論文摘要及全文電子檔建檔規範」辦理)，並繳交論文四冊(精裝平裝各一冊本所收藏，精裝一冊本校圖書館陳列，平裝一冊由教務處彙轉教育部指定之度藏單位收藏)。
- (8) Doctoral dissertation (including abstracts) must be written primarily in Chinese and comply with the NCTU Format for Dissertation/Dissertation. Students are required to post electronic versions of the abstract and the entire thesis on the university website within one month after passing the oral defense (practiced according to NCTU Library Abstract, Thesis and Dissertation Electronization Specification). Students must also submit four hardcopies of their dissertation (one hardback copy and one paperback copy submitted to Institute of Physics for collection, one hardback copy displayed in NCTU library, and one paperback copy submitted by the Office of Academic Affairs to the unit of archive appointed by MOE for collection).

六、本修業規章乃依據本校作業規章第二條，各研究生修業規章，應循序經所屬學院課程委員會及校級課程委員會審查，再送教務會議核備後實施。

Article 6. The Regulation is based on the Article 2 of Regulation of NCTU. Regulations of graduate students' study should be reviewed in order by the Curriculum Committee of College and by Curriculum Committee of University, and then submitted to Academic Affairs Meetings for approval before practice.