

National Yang Ming Chiao Tung University
Department of Applied Mathematics

Ph.D. Program Course and Qualifying Exam Regulations
for Graduate Students

April 2011, May 2014, October and December 2017

January 2018, January and March 2019

Revised in November 2023 (applicable to old students), Revised in April 2024

(applicable to old students)

I. Course Requirements

1. Ph.D. students must complete 18 credits during their study period (students directly admitted to the Ph.D. program from a master's program must complete 30 credits, and students directly admitted to the Ph.D. program from a bachelor's program must complete 36 credits), with at least 12 credits from courses offered by the department.
2. Common required courses: Colloquium (four semesters), and complete the academic research ethics education course by the end of the first semester.
3. Individual required courses:
 - (1) Analysis and Geometry Group: Real Analysis (I), and one of the following: Real Analysis (II), Ordinary Differential Equations (I), Ordinary Differential Equations (II), Partial Differential Equations (I), Partial Differential Equations (II), Modern Algebra (I), Modern Algebra (II), Advanced Probability.
 - (2) Combinatorial Mathematics Group: Special Topics in Discrete Mathematics (two semesters), Graph Theory, Introduction to Combinatorics.
 - (3) Mathematical Modeling and Scientific Computing Group: Introduction to Scientific Computing, Methods of Applied Mathematics.
4. Language Proficiency Requirement: Must pass one of the following:
 - (1) TOEFL ITP (Paper-based Test) with a score of 530 or above.
 - (2) TOEFL iBT (Internet-based Test) with a score of 71 or above.
 - (3) TOEIC with a score of 730 or above.
 - (4) Passing the high-intermediate level of the GEPT (General English Proficiency Test) initial test or higher.
 - (5) Receive the NSTC (National Science and Technology Council) Chien Lee Ma Award to study abroad in a non-Chinese speaking country for six months or more.
 - (6) Complete 2 credits in technical English or English writing courses at the university, with a score of 70 or above.
 - (7) Hold a bachelor's degree or higher from a foreign institution where the language of instruction is English; eligible for exemption upon application.

II. Qualifying Exam Regulations

1. Qualifying Exam Subjects:
 - (1) Algebra. (2) Geometry. (3) Analysis. (4) Ordinary Differential Equations. (5) Partial Differential Equations. (6) Probability. (7) Numerical Analysis. (8) Discrete Mathematics. (9) Methods of Applied Mathematics.

Note: Each Ph.D. student may choose at most one of "Ordinary Differential Equations" or "Partial Differential Equations" as a qualifying exam subject; a maximum of three

attempts combined for both exams.

2. Qualifying Exam Timeframe and Schedule:

(1) Each student must pass two subjects, with a maximum of one subject being waived by course substitution.

(2) Within five semesters of study (excluding periods of leave, seven semesters for students directly admitted from a bachelor's program), at least one subject must be passed. Within seven semesters (excluding periods of leave, nine semesters for students directly admitted from a bachelor's program), two different subjects must be passed. Each subject may be attempted a maximum of three times. Failure to meet these requirements will result in expulsion from the university.

(3) The qualification exam is held during the first week of each semester (eligible for students who were not on leave in the previous semester). Subjects must be selected and applied for by the end of the previous semester. The department chair, based on recommendations from the curriculum committee, appoints the examiners. The final decision is made by the curriculum committee.

Note: Students with retained enrollment status are considered new students upon official enrollment; new students must apply for subjects by the end of the previous semester. Participation in the qualifying exam during the first semester of enrollment does not count towards the three-attempt limit per subject.

3. Ph.D. students may apply for 'course substitution for qualifying exams' with the following regulations:

(1) Substitutable Subjects:

1 - Analysis and Geometry Group: 'Graph Theory' and 'Introduction to Combinatorics' offered by the department can substitute 'Discrete Mathematics'; 'Methods of Applied Mathematics' and 'Introduction to Scientific Computing' can substitute 'Numerical Analysis' or 'Methods of Applied Mathematics.'

2 - Combinatorial Mathematics Group: 'Real Analysis (I)' and 'Real Analysis (II)' offered by the department can substitute 'Analysis'; 'Methods of Applied Mathematics' and 'Introduction to Scientific Computing' can substitute 'Numerical Analysis' or 'Methods of Applied Mathematics.'

3 - Mathematical Modeling and Scientific Computing Group: 'Real Analysis (I)' and 'Real Analysis (II)' offered by the department can substitute 'Analysis'; 'Graph Theory' and 'Introduction to Combinatorics' can substitute 'Discrete Mathematics'; additionally, two relevant courses from other departments in the university can substitute any non-'Numerical Analysis' and non-'Methods of Applied Mathematics' subject. This must be approved by the curriculum committee and, if applicable, the advisor before starting the courses.

(2) Courses taken during undergraduate or master's studies in the department can also be used for substitution.

(3) Courses used for substitution must be completed with a grade of A or above.

4. Master's students in the department interested in pursuing a Ph.D. may take the Ph.D. qualifying exam during their master's study period. Passing records will be retained for three years; if failed, no records are retained. If the student enters the Ph.D. program within the validity period, the passed subjects will count towards the Ph.D. qualifying exam requirements. Note: Each qualifying exam must have at least one Ph.D. student participating to be conducted."