

# Rules for the qualification examination of doctoral candidates for the Department of Civil and Construction Engineering of National Taiwan University of Science and Technology

1. According to the second section of the implementation of the qualification examination for doctoral candidates of the National Taiwan University of Science and Technology, doctoral students who fail to pass the doctoral candidate qualification examination (hereinafter referred to as qualification examination) within two years after enrollment should be withdrawn from school.
2. The doctoral students of the Department have been able to apply for qualification examinations with an average of 80% (inclusive) or above in their doctoral degree.
3. If a doctoral student withdraws from school due to any reason, he or she must re-enter the Doctoral Programs through the examination. Those who have already passed the qualification examination within five years can apply for credits waiver and transference.
4. In principle, each group has a general qualification examination committee. However, if the doctoral students of the department are studying in a cross-department group, they may apply with the study plan and the course plan during the first semester of enrollment for forming a special qualification examination committee, which will be conducted when being considered necessary by the teaching committee of the department.
5. The teaching committee of the department and the advisor of the students jointly determine the general and special qualification examination committee members. The qualification examination committee has at least five members and the committee members mutually recommend one person as the convener, but the advisor is not allowed to serve as the convener.
6. Students who set up the special qualification examination committee must have the consent of the special qualification examination committee for their course plans and the required or selected subjects. If the students intend to change the course plan, they must also obtain the approval of the special qualifications examination committee.
7. The qualification examination of the department is held twice a year. There are three methods of qualification examinations and students can determine which one to do.

8. The first method is the academic examination: there are three examination subjects, among which one must be required to test and the others are selected; the foreign students of the material group can choose those three subjects selectively, which are agreed by the teaching committee (such as the attached table); the examination time for each subject is two hours.

The qualification examination committee is entrusted to set the questions of the qualification examination subjects, and each committee member has up to two subjects to set the questions as a principle. The passing criteria for examination of the department are as follows:

- A. Those who have written test scores higher than 70% (inclusive) will pass.
- B. If the average score of the written test scores is higher than 70% (inclusive) and the subjects below 70% (failed) are only one subject, the subject of the failed test can be applied for an oral test.

If the qualification examination committee agrees to give an oral examination, the qualification examination committee shall invite the oral examination committee.

The oral examination committee shall decide the passing of the oral examination by secret ballot. If more than half of the oral examination members agree to pass the examination, it shall be deemed as passed; if the oral examination fails, it shall be deemed as failed. However, only the failed subjects were selected for the written test in the second qualification examination.

- C. If the written test scores below 70% on average, it is considered as failed.

9. The second method is the doctoral dissertation research project review and oral examination: the student first submits the doctoral dissertation research proposal to the qualification examination committee, and the oral examination will be conducted after approving the proposal review.

The student reports the doctoral dissertation research proposal to the qualification examination committee, and the qualification examination committee will score the research proposal and the oral test result. The qualification examination is passed at 70% or B-.

10. The third method is the publication of a journal paper: the student submits a paper and the paper must be published in the journal that is included in SCI or SSCI. The student must be the first author of the paper, and the advisor must be the second author; or the advisor must be the first author, and the graduate student must be the second author; and the corresponding author of the published paper must be the student himself or his or her advisor. The journal paper cannot be used as a

qualification examination and as a degree examination at the same time.

11. The doctoral students who fail to pass the doctoral candidate qualification examination within two years after enrollment should be withdrawn from school.
12. These rules are implemented after the departmental council, and the same while being revised.

Division	Compulsory Course	Elective Courses	Note
Construction Management	Construction Management	1. Construction Project Risk Management__ 2. Engineering Investment and Decision Making 3. Cloud-based Construction Management and Decision Support System_ 4. Quality Control in Construction Engineering 5. Construction Project Control 6. Performance Assessment and Project Management 7. Special Topics on Engineering Financial Management 8. Construction MIS and DSS Systems 9. Quantitative Methods in Construction Management 10. Construction Industry Process Re-engineering 11. Construction Automation and E-business 12. Application of Computational Intelligence in Engineering 13. Artificial Intelligence for Project Management 14. Cost Management 15. Computer-aided Decision Simulation and Analysis 16. Contract Management and Disputes Resolution 17. Others (must be approved by the committee)	Select 2 courses from the elective courses

Geotechnical Engineering	Soil Mechanics	<ol style="list-style-type: none"> <li>1. Rock Mechanics</li> <li>2. Soil Dynamics</li> <li>3. Soil Behavior</li> <li>4. Numerical Method on Geotech Engineering.</li> <li>5. Advanced Foundation Engineering</li> <li>6. Deep Excavation</li> <li>7. Special Topics on Soil Improve.</li> <li>8. Special Topics on Geotextiles</li> <li>9. Landslides and Remedial Measures</li> <li>10. Others (must be approved by the committee)</li> </ol>	Select 2 courses from the elective courses
Structural Engineering	Structural Dynamics	<ol style="list-style-type: none"> <li>1. Advanced Structural Analysis</li> <li>2. Earthquake-Resistant Design</li> <li>3. Behavior of RC Members</li> <li>4. Behavior of Steel Members</li> <li>5. Finite Element Method</li> <li>6. Theory of Elasticity</li> <li>7. Reliability Analysis of Struc.</li> <li>8. Others (must be approved by the committee)</li> </ol>	Select 2 courses from the elective courses

<p style="text-align: center;">Construction Material</p>	<p>Engineering Material</p> <p>(the foreign students of the material group can choose those three subjects selectively, which are agreed by the teaching committee)</p>	<ol style="list-style-type: none"> <li>1. Constitutive Law for Engineering Materials</li> <li>2. Behavior of Engineering Materials</li> <li>3. Advanced Concrete Technology</li> <li>4. Deterioration of Engineering Materials</li> <li>5. Hardened Concrete</li> <li>6. The Green and Durability Design of Pozzolanic Concrete</li> <li>7. Micro Mechanism and Macro-Properties of Steels</li> <li>8. Mechanics of Composite Materials</li> <li>9. Theory of Plasticity</li> <li>10. Physical and Chemical Analysis on Materials</li> <li>11. Design and Construction of Building Integrated Photovoltaic</li> <li>12. Pavement Engineering</li> <li>13. Special Topics on Geotextiles</li> <li>14. Intelligent Urban Water Management</li> <li>15. Others (must be approved by the committee)</li> </ol>	<p style="text-align: center;">Select 2 courses from the elective courses</p>
<p style="text-align: center;">Information Technology</p>	<ol style="list-style-type: none"> <li>1. Object-Oriented Programming Design and Analysis</li> <li>2. Database and Information Technologies</li> <li>3. Software Engineering in Construction Information Systems</li> </ol> <p>(Select one from the three courses)</p> <p><u>course title :</u></p> <p><u>Professor :</u></p>	<ol style="list-style-type: none"> <li>1. Computer Graphics and Visualization</li> <li>2. Parallel and Distributed Computing</li> <li>3. Computer-aided Decision Simulation and Analysis</li> <li>4. Application of Computational Intelligence in Engineering</li> <li>5. Human-Computer Interaction</li> <li>6. Intelligent Image Processing and 3D Mapping</li> <li>7. Application Programming Interface Add-in Development for Building Information Modeling</li> <li>8. Others (must be approved by the committee)</li> </ol>	<p style="text-align: center;">Select 2 courses from the elective courses (1 course must be from IT division)</p>
<p style="text-align: center;">Combination of 2 divisions or departments</p>	<p style="text-align: center;">Compulsory course must be decided by committee</p>	<p style="text-align: center;">Elective courses must be decided by committee</p>	