

HACETTEPE UNIVERSITY

Department of Mechanical Engineering

Information on PhD Qualification Exam

(2017-2018 Fall Semester)

The qualification exam has two parts. The first part is a general written exam (3 hours) covering the topics of undergraduate curriculum. Each student selects one of the following four fields for the general exam and receives 5 equally weighted questions from each topic listed under that field:

FIELD A. Thermal-Fluids Systems and Energy

Mathematics (Analytical and Numerical)

Thermodynamics

Heat Transfer

Fluid Mechanics

Any course from fields B, C and D except Mathematics.

FIELD B. Dynamics, Control and Mechatronics

Mathematics (Analytical and Numerical)

System Dynamics and Control

Dynamics

Theory of Machines

Any course from fields A, C and D except Mathematics.

FIELD C. Solid Mechanics and Design

Mathematics (Analytical and Numerical)

Statics

Mechanics of Materials

Machine Design

Any course from fields A, B and D except Mathematics and Mechanics of Materials.

FIELD D. Materials and Manufacturing

Mathematics (Analytical and Numerical)

Materials Science

Manufacturing

Mechanics of Materials

Any course from fields A, B and C except Mathematic and Mechanics of Materials.

- In the examination, there will be 2 questions from each of the courses under the field that has been chosen. Students should choose one question from each course to solve. Additionally, there will be 1 question from Analytical part

and 1 question from Numerical part of the Mathematics. Students also have to choose either the Analytical or the Numerical question. If they attempt to solve both questions from each topic, only one of them will be randomly graded. Therefore, please be sure to solve only one question from each course.

- Students who will write the comprehensive exam this semester should register for MMÜ797 Preparation for the Ph.D. Qualifying Exam course and should submit a written petition to the Department of Mechanical Engineering indicating their major field and the course subject for taking a question from the field other than their major field.

The student must receive a minimum of 60/100 to advance to the 2nd part of the qualification process. The general exams are held twice a year, one in the Fall and one in the Spring semester. If a student fails the general exam, he/she will receive F from MMÜ797 Preparation for the Ph.D. Qualifying Exam course and will be allowed to write the qualification exam next term, the earliest. A student who fails the qualification exam twice is dismissed from the program.

In the 2nd part, a formal qualification exam committee is formed and the committee administers a written and an oral exam according to the regulations of Graduate School of Science and Engineering (Fen Bilimleri Enstitüsü). If the 1st part of the qualification exam is successfully passed, Ph.D. supervisors of the students will announce the details of the second part.

Important Dates for 2017-2018 Fall Semester Ph. D Qualification Exam

The Exam Date: 20th of November 2017, 10:00 am (The venue of the examination will be announced from the Department's website)

Last Day to Submit the Petition to the Department : 6th of November 2017

Below, the subjects and the undergraduate course information from each field are given as guidance to prepare for the qualification exam.

Mathematics (For all students)

The contents which are covered in MMÜ218 Applied Mathematics for Engineers and MMÜ202 Numerical Analysis courses.

FIELD A. Thermal-Fluids Systems and Energy

Thermodynamics

- Energy and the First Law of Thermodynamics
- The Second Law of Thermodynamics
- Using Entropy
- Vapor and Gas Power Cycles
- Refrigeration and Heat Pump Cycles
- Gas Mixtures and Psychrometry

Heat Transfer:

- 1D and 2D Steady-State Conduction
 - Transient Conduction
- Convection, External and Internal Flows
- Radiation Heat Transfer

Fluid Mechanics:

- Fluid Statics
- Elementary Fluid Dynamics – The Bernoulli Equation
- Fluid Kinematics
- Finite Control Volume Analysis
 - Differential Analysis of Fluid Flow
- Dimensional Analysis, Similitude, and Modelling
- Viscous Flow in Pipes
- Flow Over Immersed Bodies

FIELD B. Dynamics, Control and Mechatronics

- System Dynamics and Control : MMÜ324 course contents
- Dynamics : MMÜ204 course contents
- Theory of Machines : MMÜ309 course contents

Note: The contents and the textbooks of the courses can be accessed from the link under the program of automotive engineering:

<http://akts.hacettepe.edu.tr/>

FIELD C. Solid Mechanics and Design

- MMÜ 203 Statics course contents
- Mechanics of Materials: MMÜ 208 course contents.
- MMÜ 307 Design of Machine Elements course contents.

Note: The contents and the textbooks of the courses can be accessed from the link under the program of automotive engineering:

<http://akts.hacettepe.edu.tr/>

FIELD D. Materials and Manufacturing

- Materials Science: MMÜ 209 course contents.
- Manufacturing: MMÜ 204 course contents.
- Mechanics of Materials: MMÜ 208 course contents.

Note: The contents and the textbooks of the courses can be accessed from the link under the program of automotive engineering:

<http://akts.hacettepe.edu.tr/>