

**METU MECHANICAL ENGINEERING DEPARTMENT**  
**PHD QUALIFIER EXAM**

The Ph.D. Qualifier exam is implemented in the three stages 1) *Written Exam*, 2) *Oral Exam*, and 3) *Ph.D. Qualifier Jury Evaluation* to determine the student's skill in the scientific area, level of knowledge, competency in synthesis, success level in accessing information, and ability to perform independent research. The exams are conducted in English.

The Ph.D. Qualifying Exam is graded out of **400** points, with the written and oral parts worth **300** points and **100** points, respectively.

**a) Written Exam**

Ph.D. Qualifier Written Exam has two parts. Each part of this exam is evaluated out of 150 points.

**(i) First Part of the Written Exam**

The date of the First Part of the Written Exam is set and announced by the Department Ph.D. Qualifying Committee. The First Part of the Written Exam is implemented by the Ph.D. Qualifying Exam Juries in *written* form *with closed books and notes*. Each student must take the exam in four areas, and answer one of the two questions in each of these four areas.

The mathematics area is compulsory for all students and consists of content from "ME 210 Applied Mathematics for Mechanical Engineers" and "ME 521 Analytical Methods in Engineering I".

The student chooses the remaining three areas from nine basic mechanical engineering areas (3 major subjects). These mechanical engineering areas and their content are grouped under Mechanics and Thermo-fluids Subjects as follows:

**Mechanics**

1. Mechanics of Solids: "ME 206 Strength of Materials";
2. Dynamics: "ME 208 Dynamics";
3. Control Systems: "ME 304 Control Systems";
4. Theory of Machines: "ME 301 Theory of Machines I" and "ME 302 Theory of Machines II";

5. Machine Elements: “ME 307 Machine Elements I” and “ME 308 Machine Elements II”;
6. Production Engineering: “ME 303 Manufacturing Engineering”;

#### Thermofluids

7. Thermodynamics: “ME 203 Thermodynamics I” and “ME 204 Thermodynamics II”;
8. Fluid Mechanics: “ME 305 Fluid Mechanics I” and “ME 306 Fluid Mechanics II”;
9. Heat Transfer: “ME 311 Heat Transfer” and “ME 312 Thermal Engineering”.

#### **(ii) Second Part of the Written Exam**

The date of the Second Part of the Written Exam is set and announced by the Department Ph.D. Qualifying Committee. The Second Part of the Written Exam is implemented by the Ph.D. Qualifying Exam Jury, and is used to evaluate students’ level of knowledge, ability, skill and tendency for research in the related scientific area.

Students are required to answer one of the two questions in four courses, one of which is “ME 540 Analytical Methods in Engineering II” and the other three are the **pool courses related to the students’ Ph.D. thesis topic** that the students should take during their graduate studies (*even if they might not have taken these courses during their graduate studies*) as follows:

Mechanics: “ME 502 Advanced Dynamics”, “ME 511 Modern Control”, “ME 526 Vibration of Continuous Systems with Computational Methods”, “ME 541 Plasticity and Computer Aided Metal Forming”, “ME 543 Theory of Elasticity” and “ME 547 Introduction to Continuum Mechanics”;

Thermofluids: “ME 503 Advanced Gas Dynamics”, ME 504 Advanced Heat Transfer I”, “ME 505 Advanced Heat Transfer II”, “ME 517 Advanced Fluid Mechanics”, “ME 537 Advanced Engineering Thermodynamics I” and “ME 547 Introduction to Continuum Mechanics”.

Ph.D. students, who are studying in an interdisciplinary area may choose two topics from their major area and one topic from their minor area, instead of choosing three topics from their major area, **by the proposal of their supervisor subject to the approval of the Department Ph.D. Qualifying Committee.**

Each student must meet the following requirements to be eligible for the oral exam: 1) score at least **75** points out of 150 from the First Part of the Written Exam; 2) score at least **75** points out of 150 from the Second Part of the Written Exam; 3) the sum of the scores from the First and Second parts of the Written Exam must be at least **165** points out of 300.

#### **b) Oral Exam**

The oral exam is given to eligible students at the date, time and location announced by the Ph.D. Qualifying Committee. In the oral exam, questions can assess the students' ability to access information and follow scientific publications related to their thesis topic, and follow-up on questions on the written exam. At the end of the oral exam, each member of the Ph.D. Qualifying Jury evaluates the student's performance out of 20 points and report their grades to the Chair of the Ph.D. Qualifying Jury. The sum of the grades given by each jury member out of 20 points make up the students' Oral Exam grade.

Students who score at least **50** points out of 100 in the oral exam and **240** points out of 400 on the overall exam are eligible to be evaluated by the Ph.D. Qualifying Exam Jury.

#### **c) Evaluation of the Ph.D. Qualifier Exam Jury**

The success of the eligible students is evaluated by the PhD Qualifying Exam Jury by simple majority.