جامعة الملك عبدالعزيز
King Abdulaziz University

DEPARTMENT OF
INDUSTRIAL ENGINEERING
قسم الهندسة الصناعية

Guide for the Written Exam
"Ph.D. PROGRAM"

2026/2027

Prepared by
Graduate Studies Affairs Committee
in Industrial Engineering Department

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KINGDOM OF SAUDI ARABIA

Guidelines for the PhD Written Exam

The test at King Abdulaziz University in the doctoral program is equivalent to **30%** of the acceptance points.

The objective of the written exam is to evaluate the Industrial Engineering Ph.D. program candidates in some of the basic skills needed by the Ph.D. student in the Industrial Engineering such as, understand and write abstracts for scientific papers, and analyze and critique the results of studies.

The test consists of three parts (all of them are in English):

Part One:

It is a multiple-choice questions that measures the understanding of the doctoral student in five areas of industrial engineering, which are:

1. **Engineering economy.**
    a. Discounted cash flows (e.g., PW, AW, IRR)
    b. Cost analysis (e.g., benefit-cost, breakeven, minimum cost)
2. **Probability and engineering statistics.**
    a. Combinatorics (e.g., combinations, permutations)
    b. Probability distribution (e.g., normal, binomial, exponential)
    c. Sampling distribution, sample sizes and statistics
    d. Estimation (e.g., confidence interval)
    e. Hypothesis testing
    f. Regression analysis
3. **Operations research and modeling.**
    a. Optimization modeling
    b. Linear programming (e.g., formulation, graphical solution)
    c. Mathematical programming (e.g., network, integer, dynamic, transportation)
    d. Stochastic modeling (e.g., queuing, Markov, reliability)
4. **Industrial management.**
    a. Project management (e.g., scheduling, PERT, CPM)
    b. Inventory analysis (e.g., EOQ, safety stock)
    c. Production planning (e.g., JIT, MRP, ERP)

d. Forecasting (e.g., moving average, exponential smoothing)
e. Requirement analysis
f. System design

5. **Human factors.**
   a. Hazard identification and risk assessment
   b. Environmental stress assessment (e.g., noise, vibration, heat)
   c. Design for usability
   d. Methods analysis (e.g., Charting, workstation design, motion economy)
   e. Time study
   f. System safety

This Part Assesses: the student's understanding of the basics fundamental concepts of Industrial Engineering.

Available Time: 60 minutes.

Score: 10% of the 30% assigned to the test.

Requirements: pens and a calculator.

References:

- Leland Blank, A., & Anthony Tarquin, P. E. (2017). *Engineering economy*. McGraw-Hill.
- Walpole, R. E., Myers, R. H., Myers, S. L., & Ye, K. (2016). *Probability and statistics for engineers and scientists*. Pearson.
- Lieberman, G. J., & Hillier, F. S. (2020). *Introduction to operations research*. New York, NY, USA: McGraw-Hill.
- Heizer, J., Render, B., Munson, C., & Sachan, A. (2017). *Operations management: sustainability and supply chain management*. Pearson Education.
- Giachetti, R. (2016). *Design of enterprise systems: Theory, architecture, and methods*. CRC Press.
- Guastello, S. J. (2014). *Human Factors Engineering and Ergonomics*. Florida: Taylor & Francis Group.

Part Two:

Writing an abstract of a scientific paper. The scientific paper is selected by the examining committee, and the scientific paper is in one of the modern topics related to Industrial Engineering or Engineering Management.

In this part, the following points will be considered as criteria for a well-written abstract:

1- The abstract text should contain no more than 400 words.
2- A brief introduction to the topic (Explanation of why the topic is important).
3- Statement about what the gap is in the research.
4- Research question/s and/or aim/s.
5- The implemented research methods/techniques.
6- A summary of key findings and an explanation of how findings contribute to the field.

Available time: 75 minutes.

Score: 10% of the 30% assigned to the test.

Requirements: Use the Microsoft Word program available in the computer lab.

References:

Yeong, F. M. (2014). How to read and critique a scientific research article: Notes to guide students reading primary literature (with teaching tips for faculty members). World Scientific Publishing Company.

Part Three:

Writing an explanation of the results and conclusions of a research study presented to the applicant in the test. The research study shall be in a general topic that does not require a deep prior knowledge of the topic.

In this part, the following are evaluated:

1- The ability to write a **comprehensive description** of the results in a clear and understandable manner for the reader.

2- The ability to **compare the results** obtained in the research study with the results of other attached research studies

3- The ability to write **inferences/judgment** to explain the results of the research study

Available Time: 75 minutes.

Score: 10% of the 30% assigned to the test.

Requirements: Use the Microsoft Word program available in the computer lab.

References:

- Khattar, D. (2008). *The Pearson Guide to Quantitative Aptitude for Competitive Examination*. Pearson Education.

Test Date:

The test will be held on **Thursday 20 Dhul-Qi'dah 1447 H** corresponding to **7 May 2026**.

Test Place:

Faculty of Engineering - Industrial Engineering Department - Fourth Floor - Computer Lab.

Test Instructions:

The test starts at 10 am and ends at 2:15 pm (there is a break between each two parts of the test) as shown in **Table 1**.

WARNING: The applicants are advised to be in the exam location 15 min before the exam. The applicants are not allowed to be late longer than 10 minutes after the start of the exam.

A break room has been prepared on the second floor, allowing applicants to spend their rest time between the examination parts.

Table 1: Time distribution for testing activities

Time	10 – 11 am	11 – 11:15 am	11:15 – 12: 30 pm	12:30 – 1:00 pm	1:00 – 2:15 pm
Activity	Multiple choice test	Break	Writing ability test	Break	Analytical ability test

Test Results:

The test will be graded by a specialized committee and the results of evaluation will be sent to the Deanship of Graduate Studies according to the planned schedule.

The Department of Industrial Engineering wishes you all the best!