

Certificate: Quality Engineering

This certificate program is concerned with developing advanced skills in the application of quality engineering controls in the design and analysis of experiments, reliability and testing, developing robust designs, quality function deployment in product design, diagnostics and the use of total quality control in production and service.
(12 credit hours)

IMSE 511 Design and Analysis of Experiments

3 credits

One-factor, two-factor and multi-factor experiments. Fixed random and mixed models. Blocked confounding, incomplete blocks, factorial experiments, fractional factorial experiments. Introduction to response surface analysis.

IMSE 513 Robust Design

3 credits

Students will learn models and methods in the context of overall strategies to empirically study the design of products and manufacturing processes to reduce variability and to reduce sensitivity to parameter variation. Topics include: process capability studies and measures, basic DOE concepts, factorial experiments, evaluating sources of variation, evolutionary operation and adaptive statistical process control.

IMSE 536 Machinery Diagnostics

3 credits

Introduction to diagnostic system design. Fundamentals of mechanical vibration and noise. Vibration generating sources in machinery. Sensing and data acquisition methods. Data interpretation by statistical and spectral analysis methods. Fault classification methods. Computer implementation.

IMSE 561 Total Quality Management

3 credits

The concepts of total quality control (TQC) for planning in production and service are introduced within a framework of quality, cost, and delivery (QCD). Various interpretations and practices of TQC are discussed. Quality function deployment (QFD) is treated as a system tool for quality development, maintenance, and improvement over the life cycle of a product. The roles and functions of statistical quality control (SQC) and QC Circles are defined and studied. A graduate level research paper is required.

IMSE 567 Reliability Analysis

3 credits

Statistics of reliability and life testing. Application of stochastic models for failure based on Poisson and related processes. Use of exponential and extreme value distribution in reliability. Use of Markov process in the areas of equipment reliability, maintenance and availability.

Updated 3/05

*Other courses are available for all certificate topic areas with approval of department advisor.