

# ES382-15 Quality Techniques

**22/23**

**Department**

School of Engineering

**Level**

Undergraduate Level 3

**Module leader**

Magdalena Rybak

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

40% coursework, 60% exam

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

ES382-15 Quality Techniques

[Module web page](#)

### Module aims

The module aims to enable participants to understand how organizations manage and improve products and processes to generate value for customers and contribute to organizational performance goals. In particular it focuses on how organizations clarify customer requirements, design and develop products and processes which deliver those requirements reliably over time and minimise risk, waste, variation and cost.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Customer value.

Customer focus.

Financial impact of quality performance.

Lean Six Sigma.  
Design for Six Sigma  
Risk Management.  
Reliability.  
Statistical Process Control.  
Process Capability.  
Quality Function Deployment.  
Taguchi Methods.  
Failure Modes, Effects and Criticality Analysis.  
Value Stream Mapping.  
Fault Tree Analysis  
Weibull analysis  
Reliability block diagrams  
Reliability prediction  
Reliability testing concepts

## **Learning outcomes**

By the end of the module, students should be able to:

- Communicate the principles and practice of customer focus and the concept of value.
- Assess levels of variability and waste within a process.
- Evaluate risk and assess reliability in complex engineering situations.
- Quantify the impact of these issues on organizational performance.
- Apply appropriate combinations of tools to improve customer value and organizational performance.
- Interpret the outputs of analyses to determine critical causes of poor performance, and present the data effectively to drive action.

## **Indicative reading list**

Quality Management e-book (2011); Graeme Knowles; <http://bookboon.com/en/quality-management-ebook> ISBN: 0-945320-45-0 (free downloadable PDF written specifically to support the course)

Six Sigma e-book (2011); Graeme Knowles; <http://bookboon.com/en/six-sigma-ebook> ISBN: 0-945320-45-0 (free downloadable PDF written specifically to support the course)

Practical Reliability Engineering (2012); P.D.T. O'Connor & A. Kleyner; John Wiley ISBN: 978-0-470-97981-5

Design for Six Sigma (2009); K. Yang and B. El-Haik; McGraw Hill: ISBN: 0-07-141208-5

Advanced Topics in Statistical Process Control (1995); D.J. Wheeler; SPC Press ISBN: 0-945320-45-0

Quality management for Organizational Excellence: Introduction to Total Quality 8th Edition (2016); D.L. Goetsch & S. Davis; Pearson; ISBN-13: 9780133791853

## **Subject specific skills**

Knowledge and understanding of the need for a high level of professional and ethical conduct in

engineering and the use of technical literature, other information sources including appropriate codes of practice and industry standards  
Ability to conceive, make and realise a component, product, system or process  
Ability to be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality  
Ability to be risk, cost and value-conscious, and aware of their ethical, social, cultural, environmental, health and safety, and wider professional engineering responsibilities

## **Transferable skills**

Numeracy: apply mathematical and computational methods to communicate parameters, model and optimize solutions  
Communicate (written and oral; to technical and non-technical audiences) and work with others  
Exercise initiative and personal responsibility, including time management, which may be as a team member or leader  
Awareness of the nature of business and enterprise in the creation of economic and social value  
Be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches.

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## **Study**

### **Study time**

| <b>Type</b>       | <b>Required</b>             |
|-------------------|-----------------------------|
| Lectures          | 20 sessions of 1 hour (13%) |
| Seminars          | 3 sessions of 1 hour (2%)   |
| Practical classes | 3 sessions of 3 hours (6%)  |
| Other activity    | 2 hours (1%)                |
| Private study     | 116 hours (77%)             |
| Total             | 150 hours                   |

### **Private study description**

Guided independent learning 116 hours

### **Other activity description**

2 x 1 hours examples classes

## **Costs**

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

### Assessment group D2

|   | Weighting | Study time |
|---|-----------|------------|
| Individual Assignment                   | 40%       |            |
| Individual Assignment 2000 words report |           |            |
| Examination                             | 60%       |            |
| 2 hour Examination                      |           |            |

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- Answerbook Pink (12 page)
  - Students may use a calculator
  - Engineering Data Book 8th Edition
  - Graph paper
  - Chartwell Graph Paper - 6572 and 5922
  - Cambridge Statistical Tables (blue)

### Feedback on assessment

Guided self-assessment supported by written feedback and, by request, further verbal feedback.  
Cohort level feedback on examinations

[Past exam papers for ES382](#)

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## Availability

### Courses

This module is Core for:

- Year 3 of UESA-H335 BEng Automotive Engineering
- Year 4 of UESA-H334 BEng Automotive Engineering with Intercalated Year
- Year 3 of UESA-HN12 BEng Engineering Business Management
- Year 3 of UESA-HN15 BEng Engineering Business Management
- Year 4 of UESA-HN13 BEng Engineering Business Management with Intercalated Year
- Year 3 of UESA-HH73 BEng Manufacturing and Mechanical Engineering
- Year 3 of UESA-HH75 BEng Manufacturing and Mechanical Engineering

- Year 4 of UESA-HH74 BEng Manufacturing and Mechanical Engineering with Intercalated Year
- Year 3 of UESA-HH36 BEng Systems Engineering
- Year 3 of UESA-H336 MEng Automotive Engineering
- Year 3 of UESA-HH76 MEng Manufacturing and Mechanical Engineering
- UESA-HH38 MEng Manufacturing and Mechanical Engineering with Intercalated Year
  - Year 3 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng
  - Year 4 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng

This module is Core optional for:

- Year 4 of UESA-H334 BEng Automotive Engineering with Intercalated Year
- Year 4 of UESA-H337 MEng Automotive Engineering with Intercalated Year
- Year 3 of UESA-H115 MEng Engineering with Intercalated Year
- UESA-HH38 MEng Manufacturing and Mechanical Engineering with Intercalated Year
  - Year 3 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng
  - Year 4 of HH38 Manufacturing and Mechanical Engineering with Intercalated Year MEng
- UESA-HH77 MEng Manufacturing and Mechanical Engineering with Intercalated Year
  - Year 3 of HH77 Manufacturing and Mechanical Engineering MEng with Intercalated Year
  - Year 4 of HH77 Manufacturing and Mechanical Engineering MEng with Intercalated Year

This module is Optional for:

- Year 3 of UESA-H113 BEng Engineering
- Year 3 of UESA-H114 MEng Engineering
- Year 4 of UESA-H115 MEng Engineering with Intercalated Year
- UESA-H11L Undergraduate Engineering (with Intercalated Year)
  - Year 3 of H11L Engineering (with Intercalated Year)
  - Year 4 of H11L Engineering (with Intercalated Year)

This module is Option list A for:

- Year 4 of UESA-H111 BEng Engineering with Intercalated Year
- UESA-H112 BSc Engineering
  - Year 3 of H112 Engineering
  - Year 3 of H112 Engineering