

Module Details	
Module Title	Risk Assessment and Management
Module Code	ENB7007-B
Academic Year	2023/4
Credits	20
School	Department of Mechanical and Energy Systems Engineering
FHEQ Level	FHEQ Level 7

Contact Hours	
Type	Hours
Lectures	36
Tutorials	12
Directed Study	152

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2

Module Aims
<p>1. Understand the challenges typically encountered in the implementation of Risk Assessment and Management in engineering applications and the tools used to address these challenges, including quantitative methods and management systems.</p> <p>2. Enable students to acquire a deep understanding of the theories and practices of integrated Risk Assessment and Management, and apply these principles for decision-making, control and management purposes in a variety of challenging engineering applications.</p>

## Outline Syllabus

? Risk, Uncertainty and Opportunity. Risk Analysis: Qualitative, Quantitative, Quasi-probabilistic. Risk Assessment Attributes and Models.

? Risk Assessment Tools: Delphi, Checklists, PHA, HAZOP, HACCP, What-If, Scenario Analysis, BIA, RCA, RCM, FMECA, FTA, ETA, CCA, LOPA, Decision Tree Analysis, Analytic Hierarchy Process (AHP), Human Reliability Analysis.

? Risk/Deviation Assessment and Control: Lambda-Tau methodology. Risk Control: Protective Systems and devices. Risk strategies with online and offline repair.

? Risk Prediction and Total Productive Maintenance (TPM). Corporate Risk Management: Governance, Ethical Leadership, Integrity, Risk Appetite, Risk Portfolios, Risk Tolerances. Turnbull. COSO: Enterprise Risk Management. Risk Analysis and Management for Projects (RAMP). Project Portfolio Risk Management.

? Construction Design Management (CDM) and Risk Management. Asset Risk Management. Risk Communication. Business Continuity Management (BCM). Disaster Management. Contractual Risk Management (indemnification, limitation of liability and subrogation).

? RAM Standards: Management Principles (ISO-31000), Information Security Management (ISO-27001,

? Case studies of the application to risk analysis and management to individual industrial sectors and organisations.

## Learning Outcomes

Outcome Number	Description
LO1	Critically evaluate and apply the tools and methodologies of Risk Assessment and Management respectively and appraise the conditions for their successful implementation for managing complex situations in a variety of engineering applications.
LO2	Apply Risk Assessment and Management tools in complex engineering environments to manage Corporate, Project, Information and Asset Risk, and Business Continuity Management.
LO3	Demonstrate ability to manage, present and analyse data using scientific methods as well as interpret data relevant to activities in the risk management process. Demonstrate leadership in teamwork activities to solve problems systematically and creatively.

## Learning, Teaching and Assessment Strategy

? Key lectures will deliver core content, providing students with the opportunity to acquire the information to enhance their knowledge and understanding of the subject. This will be complemented by tutorials and video presentations. Tutorials will consist of questions requiring quantitative analyses including past examination papers. Industrial speakers will be invited to enhance experiential learning.

? Practical, cognitive, personal and discipline skills will be developed in open-ended problem-solving seminars consisting of case studies discussed in small groups supported by members of academic staff, allowing students to apply learning to specific issues.

? Directed study (case studies on project management and six sigma applications) provides students with the opportunity to undertake guided reading and develop their own portfolio of learning to enhance transferable skills and knowledge. Whereas independent study (wider reading on the subject areas required for the coursework) enables students to pursue and research the subjects in more depth and in an independent way..

? Oral feedback is given during tutorials and seminars and in a dedicated formative assessment session. The directed study required for the coursework and associated group work will provide further opportunities for critical thinking and collaborative learning. Students will be encouraged to explore online resources and software suites available.

? This module satisfies the below Learning Outcomes as specified by the Accreditation of Higher Education Programmes: Third Edition (AHEP3) as published by The Engineering Council in-line with the UK Standard for Professional Engineering Competence (UK-SPEC).

? UK-Spec outcomes specify six key areas of learning: Science and Mathematics (SM), Engineering Analysis (EA), Design (D), Economic, Legal, Social, Ethical and Environmental Context (EL), Engineering Practice (P) and Additional General Skills (G). SM2b, EA1b, EA2, D1, D2, D3b, D4, D6, EL1, EL2, EL3b, EL5, EL6b, P1, P5, P6, P7, P8, P11b, G2, G3b, SM2m, SM4m, SM6m, EA1m, EA6m, EL1m, EL3m, EL6m, EL7m, P11m, G3m.

? Further details of these learning outcomes can be found at <https://www.engc.org.uk/>.

? The module is aligned with the ?Conceive, Design, Implement, Operate? (CDIO) innovative educational philosophy which is embedded throughout all Bradford engineering programmes. This enables students to develop new and unique solutions to real-world problems and to reflect upon the issues in implementing them in practice.

Closed book examination (50%) ? This part of the assessment focuses on the quantitative aspects of Risk Assessment and Management (LOs 1 & 2). Past exam papers will be practiced in tutorial sessions.

Group coursework (50% ? This part of the assessment focuses on the qualitative aspects of integrated Risk Assess and Management (LOs 2 & 3). The coursework will relate to a detailed analysis of a case study and the formulation of detailed lessons learned from it. This will include both group and individual work with peer and tutor assessment. Supplementary assessment will involve an individual submission.

The coursework by requiring the linked use of several different qualitative and qualitative techniques will help to ensure the academic integrity of the student work submitted.

Closed book examination which covers both quantitative and qualitative aspects of the module.

Integrated group risk assessment and management coursework which covers both the quantitative and qualitative aspects of the module

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Examination - Closed Book	Closed book examination which covers both quantitative and qualitative aspects of the module	50%
Summative	Coursework	Integrated group risk assessment and management (6000 words).	50%
Formative	Coursework - Written	Classroom discussion / presentation with group members for rationale for selecting case study company for application of risk assessment and management concepts, supported by two-page outline.	N/A

Reading List
To access the reading list for this module, please visit <a href="https://bradford.rl.talis.com/index.html">https://bradford.rl.talis.com/index.html</a>

*Please note:*

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*

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