UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Project Management and Six Sigma
Module Code	ENB7009-B
Academic Year	2023/4
Credits	20
School	Department of Chemical Engineering
FHEQ Level	FHEQ Level 7

Contact Hours	
Type	Hours
Tutorials	1. Understand the challenges typically encountered in the implementation of Project Management and Six Sigma in engineering applications and the tools used to address these challenges, including quantitative methods and management systems. 2. Enable students to acquire a deep understanding of the theories and practices of integrated Project Management and Six Sigma, and apply these principles for decision-making, control and management purposes in a variety of challenging engineering applications.
Directed Study	152
Lectures	36
Tutorials	12
Tutorials	Project Management ? Project management framework and lifecycle in large-scale engineering activities ? The project charter and stakeholder analysis. ? Project scope: Work Breakdown Structure (WBS) and Statement of Work (SoW) in engineering projects ? Project time management: scheduling and sequencing, Critical Path Analysis (PERT) ? Engineering project cost management and estimating and cashflow. ? Earned value concepts, project procurement, capital investment appraisal of large engineering projects. ? Advanced case studies of successful and unsuccessful large-scale engineering projects explored in the context of Project Management Knowledge Areas (integration, scope, schedule, cost, Quality, resource, communication and risk management). Six Sigma ? Six Sigma process: Define, Measure, Analyse, Improve and Control (DMAIC) methods. ? Statistical Process Control (SPC). ? Control Charts for Variables: Mean and Range Charts. Process capability indices (Cp and Cpk). Control Charts for Attributes: np, p, c and u Charts. Value Stream Mapping. ? Quality Function Deployment (QFD). Balance Score Cards. ? Quality Management theories (Deming, Juran, Crosby). Leadership and people management. ? Professional responsibility and Ethics. Quality Standards (IS O 9001. ISO/TS 16949) and Benchmarks. ? Continuous Improvement (Kaizen) for business excellence. ? Six Sigma Organisation (Belts). ? Case studies of successful and unsuccessful projects in Engineering.

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

Module Aims

1. Understand the challenges typically encountered in the implementation of Project Management and Six Sigma in engineering applications and the tools used to address these challenges, including quantitative methods and management systems.

2. Enable students to acquire a deep understanding of the theories and practices of integrated Project Management and Six Sigma, and apply these principles for decision-making, control and management purposes in a variety of challenging engineering applications.

Outline Syllabus

Project Management

? Project management framework and lifecycle in large-scale engineering activities

? The project charter and stakeholder analysis.

? Project scope: Work Breakdown Structure (WBS) and Statement of Work (SoW) in engineering projects

? Project time management: scheduling and sequencing, Critical Path Analysis (PERT)

? Engineering project cost management and estimating and cashflow.

? Earned value concepts, project procurement, capital investment appraisal of large engineering projects.

? Advanced case studies of successful and unsuccessful large-scale engineering projects explored in the context of Project Management Knowledge Areas (integration, scope, schedule, cost, Quality, resource, communication and risk management).
Six Sigma

? Six Sigma process: Define, Measure, Analyse, Improve and Control (DMAIC) methods.

? Statistical Process Control (SPC).

? Control Charts for Variables: Mean and Range Charts. Process capability indices (Cp and Cpk). Control Charts for Attributes: np, p, c and u Charts. Value Stream Mapping.

? Quality Function Deployment (QFD). Balance Score Cards.

? Quality Management theories (Deming, Juran, Crosby). Leadership and people management.

? Professional responsibility and Ethics. Quality Standards (IS O 9001. ISO/TS 16949) and Benchmarks.

? Continuous Improvement (Kaizen) for business excellence.

? Six Sigma Organisation (Belts).

? Case studies of successful and unsuccessful projects in Engineering.

Learning Outcomes	
Outcome Number	Description
LO1	Use advanced qualitative and quantitative aspects of Project Management and Six Sigma Management to help make appropriate management decisions in complex situations.
LO2	LO2. Apply complex Project Management and Six Sigma tools including PERT, SPC, DMAIC, QFD, Costing and associated international standards in variety of engineering applications.
LO3	Demonstrate ability to manage, present and analyse complex data (network and SPC) using scientific methods as well as interpret data. Work as part of a team to solve problems systematically and creatively and demonstrate leadership.

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). These 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.

Key lectures will deliver core content, providing students with the opportunity to acquire the information to enhance their knowledge and understanding of the subject (LO 1&2). 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 (LOs 2&3).

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. Both directed and independent studies achieve LOs 1&2&3.

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.

The examination part of the assessment focuses on the quantitative aspects of Project Management and Six Sigma (LOs 2&3). Past exam papers will be practiced in tutorial sessions.

The coursework part of the assessment focuses on the qualitative aspects of integrated Project Management and Six Sigma (LOs 1&3). This will include both group and individual work with peer and tutor assessment. The coursework will relate to a detailed analysis of a case study and the formulation of detailed lessons learned from it. Findings will be presented by each group to all students with the view to further enhancing experiential learning. Presenters will respond to challenging questions from peers and this will enhance critical thinking and enquiry-based learning.

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). These 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/.

? Closed book examination (50%) ? This part of the assessment focuses on the quantitative aspects of Project Management and Six Sigma (LOs 2&3). Past exam papers will be practiced in tutorial sessions.

? Coursework (50%) ? This part of the assessment focuses on the qualitative aspects of integrated Project Management and Six Sigma (LOs 1&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 be 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 - Examination - closed book

Integrated group project management and Six sigma management coursework which covers both the quantitative and qualitative aspects of the module - Coursework

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 project management and six sigma management. 6000 words	50%
Formative		Classroom discussion / presentation with group members for rationale for selecting case study company for application of project management and six sigma concepts, supported by two-page outline.	N/A

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

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.
