

| Module Details |                                    |
|----------------|------------------------------------|
| Module Title   | Project Management and Six Sigma   |
| Module Code    | ENB7009-B                          |
| Academic Year  | 2022/3                             |
| Credits        | 20                                 |
| School         | Department of Chemical Engineering |
| FHEQ Level     | FHEQ Level 7                       |

| Contact Hours     |       |
|-------------------|-------|
| Type              | Hours |
| Independent Study | 60    |
| Lectures          | 20    |
| Seminars          | 10    |
| Tutorials         | 10    |
| Directed Study    | 100   |

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

| Module Aims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>This module explores 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.</p> <p>This module will 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.</p> |

## Outline Syllabus

Project management framework and lifecycle, The project charter and stakeholder analysis. Project scope: Work Breakdown Structure (WBS) and Statement of Work (SoW). Project time management: scheduling and sequencing, Critical Path Analysis, PERT, Project cost management and estimating Methods, Cost budgeting and cashflow, Earned value concepts, Project procurement, Capital investment appraisal, PRINCE2 fundamentals. ISO 21500, 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 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                                                                                                                                                                                                                              |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01             | Use advanced qualitative and quantitative aspects of Project Management and Six Sigma Management to help make appropriate management decisions in complex situations.                                                                    |
| 02             | Apply complex Project Management and Six Sigma tools including PERT, SPC, DMAIC, QFD, Costing and associated international standards in variety of engineering applications.                                                             |
| 03             | 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 (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/>.

### Mode of Assessment

| Type      | Method                    | Description                                                                                             | Weighting |
|-----------|---------------------------|---------------------------------------------------------------------------------------------------------|-----------|
| Summative | Examination - Closed Book | Closed book examination focussing on quantitative aspects of Project Management and Six Sigma (2.5 Hrs) | 50%       |
| Summative | Coursework - Written      | Integrated Group Project Management and Six Sigma Management. Work assessed by peers and academic staff | 40%       |
| Summative | Presentation              | Group Presentation                                                                                      | 10%       |
| Formative | Coursework - Written      | Integrated Project Management and Six Sigma Management (Formative) (0-2000 words)                       | 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.*

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