## BIC4014-B module descriptor

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| **Module Title** | Principles of Computer Aided Engineering |
| **Credit Level** | 20 credits (FHEQ Level 4) |
| **Session** | 2026/7 academic year |
| **BDA occurrence** | Non Standard Year available at University of Bradford |
| **BDA occurrence** | Semester 3 available at University of Bradford |

## Transparency notice

This specification for module code BIC4014-B has been generated automatically in advance of the academic year 2026/7. Every effort has been made to ensure that the information is accurate at the time of publication, but changes permitted by our Student Contract Terms and Conditions could be made in the interval between publishing and commencement of teaching; where changes impact the terms and conditions of an applicant's or student's offer, these are communicated to them as soon as possible.

## BIC4014-B module aims

The course teaches the key elements of the design process and shows how design is an integrative subject that encompasses all disciplines of engineering. In research, designing and realisation students from various engineering disciplines are introduced to industry standard software tools that are specific to the design needs and requirements of their own discipline. The student will experience collaborative and individual design from problem formulation through to manufacture of a product. The module will show how any modern engineer has to tackle a range of issues and produce cost-effective solutions while keeping a weather-eye on product life cycle with a view to maintaining sustainability and avoiding irreversible environmental damage.

## BIC4014-B module learning outcomes

| No. | Students completing the module will be able to: |
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| 01 | Produce a structured project management plan, considering time and budgetary constraints to ensure efficient realization of a design. |
| 02 | Show the ability to utilise specialised CAD software to create technical sketches and blueprints, working as a group to visualise the final product while applying knowledge of material properties and manufacturing feasibility. |
| 03 | Demonstrate an understanding of the importance of teamwork and managing the legal, ethical, safety and quality issues in the design and manufacturing context. |

## BIC4014-B module outline syllabus

* Problem-solving skills - producing viable solutions to a design problem. Students develop an appreciation of the nature of the materials they will select to realise the product that they have been called upon to design and visualise.
* Preliminary 2D sketches and 3D simulations utilising specialised CAD software, such as AutoCAD and SolidWorks to design and visualise a product relevant to their own particular engineering discipline.
* Project manage the design and realisation process, working within set parameters including timescale and budgetary considerations. While engaged in this process they will need to work collaboratively with a group of their fellow students.
* Suitability of their product - its sustainability over time and its impact on the environment in production and use all need to be taken into account.
* Legal, ethical, safety and quality control issues - managing risk and ensuring compliance.
* Product visualisation

For more information, visit the VLE (**Canvas**) page, go to our **Reading Lists webpage for this module** or search **https://bradford.rl.talis.com** for this module.

## BIC4014-B module notional learning hours

- 20 hours Lectures
- 30 hours Practical Classes or Workshops
- 150 hours Directed Study

The overall expected hours may include contact time, scheduled learning activity, directed and independent study and any minimum expectations for placement learning. Most learning at the University of Bradford has some online content and sessions which are delivered fully by virtual means are labelled as "online".

## BIC4014-B module learning, teaching and assessment

Students are taught this course in a group of up to 18. Delivery is divided equally between tutor-led seminars and workshop-based activity with considerable emphasis on interactivity between teacher and students and between individual students within the groups they will form to undertake their coursework task. Smart Board technology will help facilitate the briefing and planning process and industry standard specialised CAD technology to aid in the design and manufacturing process. Students used MATLAB to develop their computational skills in resolving the mathematical problems that their design and visualisation project may entail.

This course provides students with multiple opportunities for developing a range of skills and they are encouraged throughout to reflect on their own performance and how well this skills development is proceeding.

The focus of the course is squarely on the range of activities that the students need to undertake in their groups to tackle the problem set, research and evaluate potential solutions, select the one which they prefer and design their product. Within this scenario the tutor takes on the roles of guide and facilitator, supporting the students as they consider and tackle the various stages of the task they have been given.

Student progress is closely monitored by both subject staff and each student's Personal Tutor. Tutors hold one to one sessions with students during which they are encouraged to reflect on their own progress in meeting their objectives which is particularly valuable in the context of this particular course. Out of this monitoring comes the provision, as necessary, of learner support in specific, identified weaker areas or where students are making limited, unsatisfactory progress.

In terms of summative assessment, the students identify a problem within their specialised engineering discipline and project manage a design solution which proffers a resolution through a practical solution. The first element in the summative assessment is the planning, research and design stages and the second the visualisation of the design.

‘The assessment strategy is designed to provide students with an authentic introduction to engineering design practice through the completion of a discipline-specific design project. Assessment reflects the iterative nature of engineering design, requiring students to identify a problem, develop and evaluate potential solutions, create professional CAD models and consider the practical, ethical and environmental implications of their design decisions.
The assessment adopts a project-based approach that integrates technical, professional and transferable skills. Students will demonstrate their ability to plan and manage a design project, apply computer-aided engineering tools, and evaluate the feasibility and sustainability of engineering solutions. Formative activities throughout the module provide opportunities for feedback on project proposals, sketches, CAD models and design reviews before submission of summative assessments.
Teaching activities are closely aligned to assessment tasks through workshops, CAD laboratory sessions and collaborative design exercises. Students receive regular feedback from tutors and peers during design review sessions, enabling them to refine their work and develop reflective engineering practice.’

| BIC4014-B mode of assessment | | | |
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| **Type** | **Mode** | **Assessment description** | **Weight** |
| **Summative** | Coursework - Portfolio/e-portfolio | Solving a problem scenario, LO 1,2 and 3 | 100% |

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