BIC4027-A module descriptor	
Module Title	Engineering Materials and Mechanics
Credit Level	10 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 BIC4027-A 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.

BIC4027-A module aims

This module aims to provide students with an introduction to materials in respect of selection, structure, processing and properties in a range of engineering applications. Students will be asked to describe the concepts of stress, strain, equilibrium and deformation, and apply them in the analysis and understanding of simple engineering frames and structures. This will be achieved through lectures, tutorials and practical laboratory sessions.

BIC4027-A module learning outcomes

No.	Students completing the module will be able to:
01	Analyse simple engineering frames and structures using concepts of equilibrium, stress, strain, tension, compression, and bending.
02	Demonstrate an understanding of material properties, processing technologies, and their applications, considering durability, sustainability, and environmental impact.
03	Work independently to apply appropriate problem-solving methods to both descriptive and quantitative challenges.

BIC4027-A module outline syllabus

Forces: definition, resultant force, components of force, moment, equivalent force.
Stress and strain: elastic modulus, shear force and bending moment.
Tension and compression: Tensile testing, elastic behaviour of bar in tension/compression.
Materials properties: metals-polymer and ceramics: structures, properties and applications, Ferrous and non-ferrous alloys
Bonding - types and effects
Mechanical properties: metals, polymers and ceramics - yield and bend strengths
Structures: support reactions for statically determinate structures.
Pin-jointed frames: external and internal forces.
Bending moment and shear force diagrams: statically determinate beams subject to point and distributed loads.
First and second moments of area: Bending stress due to bending moment.
Beam deflections: Macaulay's method for integrating the expression for bending moment.
Sustainability - energy intensive production, waste products, re-usability, UK and European standards

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.

BIC4027-A module notional learning hours

- 50 hours Directed Study
- 40 hours Lectures
- 10 hours Laboratories

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".

BIC4027-A module learning, teaching and assessment

Students are taught this course in a group of up to 18. Delivery is divided between tutor-led seminars which are classroom-based and focus on theory, and laboratory or workshop based sessions, where theory can be illustrated and tested through practical work. The teaching approach places considerable emphasis on
interactivity between teacher and students and between individual students within the group. This is facilitated by the range of activities introduced into classes, the use of group and pair work, particularly in practical work, and of the further opportunities for interactivity provided by Smart Board technology.

Students are encouraged throughout to reflect on their own performance and skills development.

Within the practical element of the course students are able to learn about the laboratory/workshop environment and the importance of following appropriate rules and procedures so that everyone can work safely.

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, lab reports are submitted after two practical sessions. At the end of the course students sit an unseen examination covering all aspects of the course.

The lab reports and final examination are spread through the term of study and supplemented by a range of shorter-term preparatory exercises. These do not contribute to the final course assessment but are marked and used to provide detailed feedback to assist the students to prepare for the lab reports and examination which contribute to the summative assessment.

During the course students are encouraged to reflect on their own progress in the theoretical and practical elements of their studies, and the level of formative assessment with which they are provided is intended to support them in this. It also gives the information required by tutors to provide the students with additional support in areas of weakness and to signpost them towards more challenging tasks in stronger areas.

BIC4027-A mode of assessment

Type	Mode	Assessment description	Weight
Summative	Coursework - Written	Lab reports, testing LOs 1 and 3	40%
Summative	Examination - Closed Book	Unseen Examination, covering all topics in the module and testing LOs 1, 2 and 4	60%

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