

# **University of Plymouth**

Faculty of Arts, Humanities and Business

School of Art, Design and Architecture

## **Programme Specification**

BSc (Hons) Architectural Engineering  
(5392)

Amended by Minor Change: 28.04.21

## Content list

1. BSc (Hons) Architectural Engineering.....	3
2. Distinctive Features of the Programme and the Student Experience.....	3
2.1 Architectural Engineering at Plymouth University.....	3
2.2 Programme features.....	4
2.3 Enhancing employability in Architectural Engineering.....	6
3. Relevant QAA Subject Benchmark Group(s).....	7
4. Programme Structure.....	7
5. Programme Aims.....	10
6. Programme Intended Learning Outcomes.....	11
6.1 Knowledge and understanding.....	11
6.2 Cognitive and intellectual skills.....	11
6.3 Key and transferable skills.....	12
6.4 Employment related skills.....	12
6.5 Practical skills.....	13
7. Admissions Criteria.....	13
8. Progression criteria for Final and Intermediate Awards.....	14
9. Exceptions to Regulations.....	14
10. Transitional Arrangements.....	14
11. Mapping.....	14

## 1. BSc (Hons) Architectural Engineering

Final award title Level H	BSc (Hons) Architectural Engineering
Intermediate award title(s) Level I	BSc Architectural Engineering ( <i>on satisfactory completion of 80 Stage 3 credits</i> )  Diploma of Higher Education ( <i>on satisfactory completion of Stage 2</i> )
Intermediate award title(s) Level C	Certificate of Higher Education ( <i>on satisfactory completion of Stage 1</i> )
Awarding institution	University of Plymouth
Teaching institution	University of Plymouth
Accrediting body	Chartered Institute of Building (CIOB) Chartered Association of Building Engineers (CABE)
Appropriate benchmark(s)	Built Environment; Building
UCAS code	K236
HECOS code	100150 construction and the built environment

This Programme Specification details how and where the skills and other outcomes are delivered in this programme. A mapping education of key skills is employed by the CIOB.

## 2. Distinctive Features of the Programme and the Student Experience

### 2.1 Architectural Engineering at Plymouth University

Architectural Engineers are key players in any multidisciplinary building project as they have the skills and knowledge to apply engineering principles and technology to building design, construction and management.

Changes to the UK building regulations and a move, globally, towards more energy efficient buildings require professionals with the skills and knowledge to contribute to and lead teams involved with the low carbon buildings of the future.

**Our Architectural Engineering programme focuses on high performance and energy efficient buildings, as well as ensuring that those buildings have comfortable and usable indoor environments. Throughout the course, students develop an awareness of the fundamental interactions between building design, building construction, building management, the environment, and humans.** Students learn about architectural design, including the design of space, computational analysis of buildings, building information modelling,

human aspects of the built environment, integration of renewable energy and building services design.

As architectural engineers, graduates of this course will combine the principles of architectural design and engineering to the analysis and evaluation of complex building designs, construction processes and building operational problems. For example, at the end of the course graduates will be able to:

- Apply building information modelling skills to manage effectively building projects in a multidisciplinary environment
- Predict the energy consumption of buildings and check compliance against energy efficiency targets and rating schemes
- Assess potential problems with building designs and services and modify these into well-functioning integrated solutions
- Design energy management and control solutions for buildings
- Select appropriate renewable energy technologies for buildings
- Manage a multidisciplinary design and construction team

## **2.2 Programme features**

BSc (Hons) Architectural Engineering programme provides students with an inspiring, enriching and professional experience, preparing them for a successful career as graduates in the building industry.

The distinctive features of this programme focuses around the degree's industrial context, optional placement period, multidisciplinary learning environment and its focus on high performance and energy efficient buildings, which will place learners at the forefront of the sector and able to embrace the trend towards stricter environmental and energy based legislation.

Applying engineering principles and technology to building design and construction, the programme enables learners to develop the knowledge and skills necessary for a successful career as an architectural engineer. The combination of lectures, site visits, tutorials with industry partners and an optional year-long paid industry placement, prepares learners for a range of routes in the built environment sector including design engineering, design management, design coordination, project management, architectural consultancy, building control, and planning.

This programme is designed around other Built Environment related programmes in the School of Art, Design and Architecture, including BSc (Hons) Construction Project Management, BSc (Hons) Building Surveying, BSc (Hons) Quantity Surveying and BA (Hons) Architecture, offering a range of common modules with

these other relevant disciplines, as well as specialist modules, projects and tailored dissertations modules.

The distinctive features include:

- *Professional Accreditation:* The course is fully accredited by the leading professional bodies recognised by design managers, architectural engineers and construction managers: Chartered Institute of Building (CIOB) and Chartered Association of Building Engineers (CABE).
- *Lead the way in the industry:* our course focuses on high performance and energy efficient buildings, which will place you at the forefront of the sector and able to embrace the trend towards stricter environmental and energy based legislation.
- *Inspiring Teaching:* The programme is taught by staff with both an industry and research background. Teaching is also supported by industry professionals and an extensive programme of UK and international visiting speakers.
- *Industry Links:* The department sustains good links with many architects' practices, engineering consultants, leading building contractors, and energy and regulatory authorities in the UK. Industry professionals play an active role in the programme, by participating in guest lectures, workshops and tutorials. These provide opportunities for work-placements to individual students and future employability opportunities.
- *Industry placement year.* Students of this programme have the opportunity to get experience in the construction industry and increase their future employability in the sector with a paid placement following their second year. The optional year-long placement is with organisations ranging from architects' practices, engineering consultants, building contractors, and energy and regulatory authorities in the UK or abroad and allows the students to experience a professional environment. Students receive advice and guidance to arrange their own placement, and support from the academic staff to ensure that they are receiving a valuable learning opportunity.
- *Site visits:* Off campus, students also enrich their learning through site visits.
- *Research-informed learning:* The academic staff are also researchers, allowing the latest research findings to be delivered directly to the students. The research covers a broad range of specialist areas, including: building performance analysis, energy efficient building design, construction management, thermography and natural materials.

- *Multidisciplinary Learning Environment:* During the degree, students from this programme benefit from working in multidisciplinary groups with students from other programmes in the School of Art, Design and Architecture, replicating a realistic working environment in architecture and construction projects.
- *Real assessments:* The assessments are designed to prepare students for their future career and the majority are designed around real contextual situations. The assessments reflect the varied world of work, a mixture of coursework, project work, site visit reports, examinations, and presentations.

### **2.3 Enhancing employability in Architectural Engineering**

Architectural engineering graduates are in great demand because of the ever increasing importance placed on the design, construction and operation of sustainable buildings.

Graduates of architectural engineering gain employment in a wide range of built environment professions, including design managers, design engineers, design coordinators, building services engineers, consultants, project managers, building control officers and facility managers.

Our Architectural Engineering course provides students with excellent links with future employers as well as opportunities to learn about the cutting edge of industry practice and thinking. Other activities that will enhance students' employability within this course at University of Plymouth include:

- *One year paid industry placement in an architectural practice, engineering consultancy or construction company in the UK or abroad*

Students have the opportunity to undertake an optional paid industry placement year with an architectural practice, engineering consultancy or construction company in the UK or abroad, which occurs between Stage 2 and Stage 3 of the programme. Students seeking to undertake a placement year receive advice and guidance to arrange their own placement, including the preparation for the selection process and the placement itself. The academic staff (on the role of placement tutor) provide students with support on their placement to ensure that they are receiving a valuable learning opportunity. The Employability Service organises pre-placement sessions timetabled in Stage 1 and Stage 2.

- *Careers events, where you will be able to meet and discuss career opportunities with future employers*

Once a year the Faculty organises a Careers event, where several companies from the building industry take part and students have the opportunity to meet and discuss career opportunities with future employers.

- *“Preparing for industry” talks by possible employers*
- *Workshops with industry professionals and guest lectures with industry specialists*

In every stage of the degree, students work on industry led group projects with real project briefs and clients, and they benefit from guidance from industrial advisers, which help them to develop the professional skills and networking necessary to successfully progress in the sector.

- *Advice with the preparation of the CV and interviews*

The Employability Service, Placement Support, delivers pre-placement modules as part of the course, offering support on preparing CV and Covering Letter and managing the cycle for Placement/Work Based Learning activities, providing support and guidance to the students’ individual needs. In addition to the general support provided by the University, students have access to academic staff who, through their professional and academic experience, have insights in to the particular nature of future career development within the built environment industries. This is further supplemented by links maintained with practices, and a register of potential job opportunities.

- *Invitation to talks and social events by professional organisations*

Students are invited to attend to events organised by professional organisations such as Royal Institution of Chartered Surveyors (RICS), Chartered Institute of Building (CIOB) and Chartered Institution of Building Services Engineers South West (CIBSE). These events are always an excellent opportunity for networking with professionals as well to broaden the students’ knowledge.

### **3. Relevant QAA Subject Benchmark Group(s)**

QAA Benchmark statements for Architectural Technology

QAA Benchmark statements for Construction, Property and Surveying

### **4. Programme Structure**

The duration of the programme is either 6 semesters (3 years), or 8 semesters (4 years) if students undertake an optional industry placement year of 48 weeks, which occurs between Stage 2 and Stage 3 of the programme.

A Stage is equivalent to one year of study for a full time student. Each Stage consists of two semesters. Students are required to complete modules amounting 60 credits per semester, thus 120 credits in total. An outline programme structure is presented in Figure 1 and more details in Table 1-4.

	First Semester	Second Semester
Level-4, First Year	BLDG406 Fundamentals of Construction	BLDG407 Building Physics
	BLDG402 Principles of Economics and Management	BLDG409 Digital Built Environment
	BLDG408 Architectural Design	BLDG405 Built Environment Project 1
Level-5, Second Year	BLDG512 Construction technology	BLDG515 Common challenge: Built Environment
	BLDG510 Property development and refurbishment	BLDG511 Building Services Engineering
	BLDG507 Low Energy Building Design	BLDG506 Contract Procedures
Optional Sandwich Year	Optional Placement Year / Optional International exchange	
Level-6, Third Year	ADA600 Common Dissertation: Critical Practices	BLDG612 Dissertation Project
	BLDG603 Sustainable and Safe Construction	BLDG609 Built Environment Project 3
	BLDG604 Building and Property Law	BLDG608 Building Control and Commissioning

Figure 1. Programme structure

Table 1. Stage 1 (Level 4)

Module Code	Module Title	Credit	Semester	Status	Assessment
BLDG406	Fundamentals of Construction	20	Semester 1	Core Compensatable	100% Coursework
BLDG408	Architectural Design	20	Semester 1	Core Compensatable	100% Coursework
BLDG402	Principles of Economics and Management	20	Semester 1	Core Compensatable	100% Coursework
BLDG409	Digital Built Environment	20	Semester 2	Core Compensatable	100% Coursework
BLDG407	Building Physics	20	Semester 2	Core Compensatable	50% Examination 50% Coursework
BLDG405	Built Environment Project 1	20	Semester 2	Core Compensatable	100% Coursework
FAPY100	Stage 1 Placement Preparation	0	Semester 2	N/A	N/A

Table 2. Stage 2 (Level 5)

Module Code	Module Title	Credit	Semester	Status	Assessment
BLDG512	Construction technology	20	Semester 1	Core Compensatable	50% Examination 50% Coursework
BLDG510	Property development and refurbishment	20	Semester 1	Core Compensatable	50% Examination 50% Coursework
BLDG507	Low Energy Building Design	20	Semester 1	Core Non-compensatable	50% Examination 50% Coursework
BLDG511	Building Services Engineering	20	Semester 2	Core Compensatable	50% Examination 50% Coursework
BLDG506	Contract Procedures	20	Semester 2	Core Compensatable	50% Examination 50% Coursework
BLDG515	Common challenge: Built Environment	20	Semester 2	Core Compensatable	100% Coursework
FAPY200	Stage 2 Placement Preparation	0	Semester 1	N/A	N/A

Table 3. Optional Industry Placement

Module Code	Module Title	Credit
FAPY602	Industry Placement	N/A

Table 4. Stage 3 (Level 6)

Module Code	Module Title	Credit	Semester	Status	Assessment
ADA600*	Common Dissertation: Critical Practices	20	Semester 1	Core Compensatable	100% Coursework
BLDG612*	Dissertation Project	20	Semester 2	Core Compensatable	100% Coursework
BLDG603	Sustainable and Safe Construction	20	Semester 1	Core Compensatable	50% Examination 50% Coursework
BLDG604	Building and Property Law	20	Semester 1	Core Compensatable	50% Examination 50% Coursework
BLDG609	Built Environment Project 3	20	Semester 2	Core Compensatable	100% Coursework
BLDG608	Building Control and Commissioning	20	Semester 2	Core Non-Compensatable	50% Examination 50% Coursework

\* The 40 credits Research Dissertation is undertaken in two parts, involving both ADA600 and BLDG612 modules. ADA600 is a module shared amongst undergraduate courses in the School of Art, Design and Architecture and it offers different Dissertation formats. Students from this course will be expected to do the Research proposal option (Part 1 of the Dissertation) in ADA600 in Semester 1 and they will progress to complete Part 2 of the dissertation in BLDG612 in Semester 2, achieving a full Research dissertation in completion of both ADA600 and BLDG612 modules.

Students are expected to pass all modules in order to progress. No optional modules exist, with the exception of the industrial placement.

Pass requirement for each module:  $\geq 40\%$ . Compensation is permitted in accordance with University of Plymouth regulations. Please note that some modules are non compensatable. See tables 1-4 above.

### **Degree Classifications**

There are a number of degree classifications which can be granted on undergraduate awards:

- Honours Degree – divided into the following categories: First Class Honours; Second Class Honours, Upper Division; Second Class Honours, Lower Division; Third Class Honours
- Degree with or without Distinction or Commendation.

Details of how your final degree classification is calculated are given in the University of Plymouth Student Handbook. In summary: the best 80 credits from Level 4 (Stage 1) are given a weighting of 0.1 (10%); Level 5 (Stage 2) marks are given a 0.3 (30%) weighting; and Level 6 (Stage 3) marks are given a weighting of 0.6 (60%).

### **5. Programme Aims**

- To provide students with the knowledge and skills to apply science and engineering principles to the design of buildings.
- To provide students with appropriate knowledge of the building performance, building construction and project process and management.
- To equip students with the skills required to work in multidisciplinary teams delivering buildings of the future.

- To equip students with information and communication technologies (ICT) skills, including modelling. This will include training in the use of leading software tools used widely in architecture and building engineering practices.
- To provide students with a range of transferable skills relevant for employment and further research.
- To give students the experience of undertaking a research project, including the ability to synthesise and evaluate data and formulate solutions.

## **6. Programme Intended Learning Outcomes**

### **6.1 Knowledge and understanding**

On successful completion, graduates should be able to demonstrate knowledge and understanding in the following areas:

- Context of construction industry, design and construction projects and the stakeholders involved.
- The fundamental concepts, principles and theories of building design, building technologies and construction processes of both new and existing buildings.
- Science and engineering principles of materials, building services, structural engineering and building components related to the building performance.
- Project and design management principles and methods.
- Computer-aided design, computer simulation and modelling, and building information modelling as integrated tools within the building design process.
- Building regulations and directives.
- The role of the architectural engineer in building design and its professional and ethical responsibilities.
- The research methods applicable to the architectural engineering.

### **6.2 Cognitive and intellectual skills**

On successful completion, graduates should be able to:

- Apply appropriate knowledge and skills to solve problems.
- Recognise and analyse criteria and specifications appropriate to specific problems, and plan strategies for their solution.
- Generate, collect, and interpret numerical and/or qualitative data.

- Act independently, or in a group, and be able to adapt to dynamically changing situations that arise from the solution of multi-faceted and evolving design problems.
- Identify their own learning needs, plan to meet these needs, and evaluate the learning outcomes.
- Interpret and categorise building elements, components, systems and methods used for different building typologies and identify appropriate methodologies for dealing with complex problems.
- Evaluate a range of possible built environment related issues and evidence to support conclusions and recommendations.

### **6.3 Key and transferable skills**

On successful completion, graduates should be able to:

- To communicate effectively, graphically, in writing and orally.
- To manage resources and time effectively.
- Undertake a critical appraisal of their work.
- Undertake a critical appraisal of the work of their peers.
- Work both autonomously and as part of a team.
- Solve, discuss and debate architectural engineering related problems.
- Demonstrate numeracy, mathematical skills, and computational skills.
- Use Information Communication Technologies.
- Learn effectively for the purpose of continuing professional development and in a wider context throughout their career.

### **6.4 Employment related skills**

On successful completion, graduates should be able to demonstrate:

- Initiative and personal responsibility.
- Effective communication and debating skills.
- The ability to make decisions based on in-complete information.

## 6.5 Practical skills

On successful completion, graduates should be able to:

- Apply scientific and engineering principles to the design of buildings.
- Working from an architect's brief, produce an initial concept design for the layout and form of a building.
- Analyse and select building technologies and design solutions to meet design briefs and building performance requirements.
- Use advanced computer simulation tools effectively and appropriately for modelling the performance of buildings.
- Take a leading role in design teams concerned with the technical aspects of the building design and the assessment of the design solutions.
- Apply legal and regulatory requirements to achieve inclusive and sustainable buildings using building regulations, health and safety, quality assurance and control systems.
- Develop procedures for the commissioning of buildings.
- Use communication skills effectively to describe and discuss design options and the analysis of results from computer simulations and building performance data.
- Perform research projects in the field of architectural engineering.

## 7. Admissions Criteria

Entry requirements
UCAS tariff: 96 - 112
A levels: A minimum of two A levels, General Studies accepted.
International Baccalaureate: 26-28 points.
18 Unit BTEC National Diploma/QCF Extended Diploma: MMM-DMM.
BTEC National Diploma modules: If you hold a BTEC qualification it is vital that you provide our Admissions team with details of the exact modules you have studied as part of the BTEC.
GCSE: Mathematics and English language grade C.
All relevant international qualifications will be considered

Other combinations and non-A level qualifications also considered.

Second year and Final year entry possible, with a Foundation degree/HNC/HND or equivalent, or an equivalent stage in a similar undergraduate course.

Equivalent qualifications and industry experience can be considered.

## **8. Progression criteria for Final and Intermediate Awards**

The University of Plymouth's "Assessment Regulations for Undergraduate Programmes of Study", e.g. Foundation and Vocational Certificates and Diplomas will apply.

## **9. Exceptions to Regulations**

N/A at the time of writing.

## **10. Transitional Arrangements**

N/A at the time of writing.

## **11. Mapping**

Find specific LOs in module MRs.