



# Programme Specification

## ENG-AE-HNC-2022: Engineering (Aeronautical Engineering)

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Pearson Higher National Certificate awarded by Pearson (FHEQ Level 4)

Programme Status: Approved | Version: 1

## Introduction

This programme specification provides a summary of the main features of the Engineering (Aeronautical Engineering) programme and includes the learning outcomes that you as a student are expected to have achieved on successful completion of the programme.

Further detailed information related to this programme and the College can be found in the following resources:

- Programme Handbook
- B&FC Admissions Policy
- Work based and placement learning handbook (for foundation degrees)
- Student guide to assessment and feedback

## Key Programme Information

<b>Programme Code</b>	ENG-AE-HNC-2022
<b>Programme Title</b>	Engineering (Aeronautical Engineering)
<b>Teaching Institution</b>	Blackpool and The Fylde College
<b>Professional, Statutory and Regulatory Body (PSRB) Accreditation</b>	None
<b>UCAS Code</b>	
<b>Language of Study</b>	English
<b>Version</b>	1
<b>Approval Status</b>	Approved
<b>Approval Date</b>	09 September 2022
<b>JACS Code</b>	Other: Other
<b>Programme Leader</b>	Shaunie-Leigh Edge

## Programme Awards

<b>Award</b>	<b>Award Type</b>	<b>Level</b>	<b>Awarding Body</b>
Pearson Higher National Certificate	Higher National Certificate	Level 4	Pearson

## Programme Overview

The HNC in Aeronautical Engineering is built on an agile structure aligned to industry requirements and aims to provide you with a stimulating, challenging, engaging and memorable experience. It will help you gather essential knowledge of aeronautical and aerospace principles alongside foundational engineering principles and core practice. You will undertake a set of common core units as well as specialty-field units, enabling you to build behaviours, knowledge and skills that will help you progress to industry employment or further study.

The programme will provide you with a thorough grounding in general and aeronautical engineering principles at Level 4 that will support you through a range of specialist progression options relating to individual professions within the aeronautical engineering sector. You will work towards gaining the essential qualities of an engineer, including integrity, regard for cost and sustainability, as they apply to a range of roles and responsibilities within the aeronautical sector. You will undertake a range of common core and subject-specialist units, focussing on various aspects of modern aeronautical engineering, including electrical and electronic, mechanical, materials and other essential concepts and considerations that are integrated and a multidisciplinary fashion to design and improve aircraft of the future.

## Admission Criteria

A minimum of 48 UCAS points (excluding Functional Skills) in an appropriate discipline: DD from A levels to include mathematics and a technology, engineering or science-based subject

PPP from Extended Diploma, MP from Diploma, MM from 90 Credit Diploma in a science or technology-based subject, including passes in mathematics

Non-traditional applicants, who do not possess the formal entry qualifications but can demonstrate relevant industry experience, will be considered on merit but would not normally be considered without GCSE Maths and English at grade C or above.

## Career Options and Progression Opportunities

Highly recognised by employers nationwide, the HNC qualifications provides a range of engineering elements and equip students with various opportunities for career progression, as well as enhancing and widening access to higher level study. Those who complete the course can progress to Level 5 BEng (Hons) Aerospace Engineering at Blackpool & The Fylde College.

The programme will enable you to progress to a university degree by supporting the development of academic study skills and the selection of appropriate programme for study at Level 5. It will likewise enable you to progress to further professional qualifications in aeronautical/aerospace engineering disciplines by mapping the units studied to the requirements of the professional bodies applicable to that discipline. You can seek EngTech registration with the IET or other professional organisations of your choice.

## Programme Aims

The educational aims of the Pearson BTEC Higher Nationals in Aeronautical Engineering are as follows:

- To provide students with the core knowledge, skills and techniques that all engineers require, irrespective of future specialism, to achieve high performance in the engineering profession.
- To build a body of specialist knowledge, skills and techniques to be successful in a range of careers in aeronautical engineering at the Associate Engineer or Operational Engineer level.
- To develop the skills necessary to fault-find and problem solve in a timely, professional manner, reflecting on their work and contributing to the development of the process and environment they operate within.
- To understand the responsibilities of the engineer within society and work with integrity, regard for cost, sustainability and the rapid rate of change experienced in world class engineering.
- To provide opportunities for students to enter, or progress in employment within the aeronautical engineering sector, or progress to higher education qualifications such as degrees and honours degree in aeronautical engineering by balancing employability skills with academic attainment.
- To provide opportunities for students to make progress towards achieving internationally recognised registration with a Professional Body regulated by the Engineering Council.
- To allow flexibility of study and to meet local or specialist needs.

## Programme Learning Outcomes

### Level 4

Upon successful completion of this level, students will be able to:

1. Discuss the responsibilities of the engineer within society, and work with integrity, regard for cost, sustainability and the rapid rate of change experienced in world class engineering.

2. Attain core interdisciplinary knowledge, skills and techniques that aeronautical engineers require to achieve high performance in the engineering profession.
3. Interpret a body of specialist knowledge, skills, and techniques in order to be successful in a range of careers in Aeronautical Engineering.
4. Discuss the results of their work accurately and reliably, with structured coherent arguments in accordance with basic theories and concepts of engineering.
5. Demonstrate the skills necessary to fault find and problem solve in a timely, professional manner, reflecting on their work and contributing to the development of the process and environment they operate within.

## Programme Structure

Module	Level	Credits	%	Category	Description	Length/Word Count	Grading Method
<b>Stage 1</b>							
ENG/UNIT/1: Engineering Design (Mandatory)	4	15	-	Coursework: Other	Product Design Report and Presentation	3000	Pass/Fail
ENG/UNIT/2: Engineering Maths (Mandatory)	4	15	-	Coursework: Other	Geometric Progressions, Statistical Analysis and Sinusoidal Waves	1500	Pass/Fail
			-	Written Exam: Formal Written Examination	Vector Functions and Calculus	60	Pass/Fail
ENG/UNIT/24: Aircraft Aerodynamics (Mandatory)	4	15	-	Coursework: Report	A written report presenting theoretical work, investigating, and analysing principles and applications of aerodynamics	3000	Pass/Fail
			-	Practical: Presentation	Individual lab report and presentation of practical work based on experiments conducted testing wing prototypes against a baseline model.	15	Pass/Fail
ENG/UNIT/4: Managing a Professional Engineering Project (Mandatory)	4	15	-	Coursework: Other	Professional Engineering Project	3500	Pass/Fail
<b>Stage 2</b>							
ENG/UNIT/25: Aircraft Electrical Power and Distribution Systems (Mandatory)	4	15	-	Coursework: Report	a written report presenting theoretical work, investigating, and analysing principles and applications of electronic power and distribution systems.	3000	Pass/Fail
			-	Practical: Presentation	Illustrating the function and operation of the components and sub-systems used in aircraft electrical power distribution systems	15	Pass/Fail

ENG/UNIT/26: Airframe Mechanical Systems (Mandatory)	4	15	-	Coursework: Report	A written report presenting theoretical work, investigating, and analysing principles and applications of Hydraulic and fuel systems with regards to contributing to safe and efficient flight.	1500	Pass/Fail
			-	Coursework: Report	a written report investigating and identifying the contribution of cabin and protection systems to safe and efficient flight.	1500	Pass/Fail
ENG/UNIT/27: Composite Materials for Aerospace Applications (Mandatory)	4	15	-	Coursework: Report	A written report presenting theoretical work, investigating, and analysing principles and applications of Aircraft composite materials.	1500	Pass/Fail
			-	Practical: Presentation	A presentation of practical work completed, the presentation should discuss health and safety standards followed and regulations and procedures completed in line with aircraft maintenance manuals.	20	Pass/Fail
ENG/UNIT/3: Engineering Science (Mandatory)	4	15	-	Coursework: Other	Mechanical Systems	1500	Pass/Fail
			-	Coursework: Other	Mechanical & Electrical and Electronic Systems	1500	Pass/Fail

## Study Workload

This HNC programme is equivalent to 120 credits and takes one year of full-time study or two years if studying part time. All students should be committed to attend all lectures, workshops, and tutorials according to the given timetable to ensure successful completion.

On the full-time programme of study, you are expected to attend the college between 2.5 to 3 days a week. The part-time programme will require your attendance for one full day over 2 years. Depending on the modules you are studying, your time in campus will be divided between lectures, practical workshops, labs and progress meetings. For each hour of classroom delivery, you are expected to undertake additional 2-3 hours of independent study to complete this course successfully.

## Programme Delivery: Learning and Teaching

Aeronautical Engineering is a flourishing discipline with exciting opportunities for working in industry or engaging in research and scholarship. The teaching and learning on programme therefore draw on both these aspects, integrating industry links and scholarship opportunities. All units in this programme will be taught in line with the B&FC teaching, learning and assessment strategy. The HN team will ensure that all delivery will be aligned to current industry practices. A wide range of teaching methods will be employed including lectures, seminars, practical laboratory sessions and tutorials. The course is designed to allow students to take responsibility for the content and direction of their work, and to become gradually independent in their studies as the course progresses.

### Lectures and Seminars

These are the most common method used by tutors which is normally face to face. Due to the effects of the pandemic, a blended approach may also be utilised for modules like Engineering Maths, Engineering Science and Managing a Professional Engineering Project. Guest lecturers will also be invited where specific areas of expertise are required.

### Practical/Laboratory Sessions

These sessions will allow you to practically apply the theoretical elements of the course, for example mathematical and physical science that has been introduced in formal lectures.

Modules that will typically include these types of sessions are Engineering Science, Mechanical and Electrical Principles.

### Tutorials

Group tutorials are used throughout the programme. This allows for one-to-one support and teaching is led by the students' requirements.

### Offsite

Although the main delivery is face to face, a blended approach may also be utilised for some modules and the use of the virtual learning environment (VLE) will be central to online delivery.

The VLE used is Canvas which is now in place and successfully used within the engineering department. Canvas is used as a main resource hub for you along with hosting Big Blue Button conferences on an open, and easily accessible platform, this works in a similar way to teams which is also currently utilised as a main communication and teaching platform by staff and students. Having both options available for staff and students increases accessibility options and preferred best practice approaches to offsite delivery.

## Programme Delivery: Assessment

You will receive many opportunities for formative assessments on all the HNC programmes where you will be able to demonstrate the necessary knowledge and skills required for undertaking the summative assessment. Formative assessments will take the form of a short quiz, short exercises, a short written or verbal task, group work, practical observation or a simple question and answer activity. Through these activities, the tutors will be able to identify the different learning needs of each learner, and make corrective interventions early on the programme through verbal or written feedback. The formative assessment results can also be used by tutors to gauge the effectiveness of their planned teaching and learning.

The summative assessment on this programme varies and depends on the requirements of each unit. Some of the assessment tools that will be used are written assignments including reports, research and essays, presentations, group project, exams, calculations and problem solving and practical laboratory-based assessment. Assessment can also be 'time-constrained' and take place under open book examination conditions or set by Pearson Edexcel. These assessment methods should allow the student to demonstrate understanding, knowledge and critical thinking skills required to pass and awarded high grades based on the assessment criteria.

## Programme Delivery: Work Based and Placement Learning

There is no formal work placement within this qualification; however, those of you who are not employed within the industry are encouraged to engage in work experience. The college has excellent relationships with local employers and opportunities for work experience frequently arise.

The programme is highly vocational in nature and employers have been consulted during the selection of units, therefore, you will be studying units which are relevant in the industry. Assignment briefs include industry specific scenarios to ensure that employability and work-related skills are developed continually.

## Programme Delivery: Graduate Skill Development

Our HNC engineering programme provides a nationally recognised qualification which offers professional development, career progression and opportunities to progress to an engineering honours degree programme. The programme is aligned to the range of knowledge and skills necessary for obtaining an EngTech and to the required elements as outlined by the Engineering Council. This includes the ability to solve engineering problems, consider design solutions, outcomes and options, evaluate and analyse the impact of engineering decisions, and reflect on engineering products and services from a technical point of view.

In addition, the following soft skills for graduates have been identified for the programme:

**Collaborative teamwork and leadership:** Managing a Professional Engineering Project and Engineering Design will require you to work within a team and practice leadership skills. Class activities including formative assessments will assist in developing these skills.

**Communication, information, and digital literacies:** Most of the units, particularly Engineering Design, Managing a Professional Engineering Project and Computer Aided Design, will help you develop your communication skills. These modules will require you to undertake research based on a given brief which will help you learn to gather and analyse the information and determine which are relevant. You will also enhance your public speaking skills and learn to communicate effectively.

**Personal and intellectual autonomy:** During class activities and projects, you will be



encouraged to think independently and take initiatives to maximise your potential. Modules such as Computer Aided Design and Engineering Design will enable you to apply creative and inventive thinking to develop suitable solutions to the given brief. In Managing a Professional Engineering Project, you will be able to practice collaborating and debating effectively to test and strengthen your own opinion. There are many opportunities for you to enhance independent learning with units such as Engineering Maths, Engineering Science, Mechanical Principles. Through progress meetings, you will be encouraged to be self-reflective and be receptive to feedback to help self-awareness. You will be tasked to establish personal goals and vision to help maximise your potential.

**Ethical, social and professional understanding:** With units such as Professional Engineering Project, and Quality and Process Improvement, you will gain understanding of the social responsibilities of an engineer. Through the lectures and project research, you should be able to recognise and address ethical dilemmas, sustainability issues and apply ethical values to your design choices or engineering solutions.

**Global Citizenship:** One of our aims to help prepare you to succeed in a fast-paced and fundamentally diverse work environment. The HN team having a very diverse professional and cultural background will help embrace inclusivity. All modules will help you develop an understanding of the global issues relating to engineering advances, sustainability and discovering appropriate solutions.

**Enterprise and Entrepreneurial awareness and capabilities:** The Materials, Properties and Testing, Engineering Design and Management of Professional Engineering Project units support and allow you to design and manage your chosen project. Through your research and the use of design and management tools, you are able to produce a proposal detailing not just the viability but also the factors that will affect the profitability.

**Research scholarship and enquiry skills:** Most assessments include research and report writing tasks which encourages your autonomous research. Encouragement to join a national engineering design competition is desirable as this leads to further enquiry on the subject matter you are interested in.

**A commitment to lifelong learning and career development:** Through progress meetings and tutorials, you will develop your personal development plan where the focus is to identify the skills you need develop to achieve your goals. The specialist modules will expand your existing knowledge, professional and employability skills and will also help determine the direction of your own lifelong learning and development.

### **Study Costs: Equipment Requirements**

You will have access to all the necessary software and hardware, library, and scholarly works that you will need to complete your assignments whilst you are in college. However, we encourage you to invest in a computer or laptop for your studies as well as a scientific calculator.

### **Study Costs: Additional Costs**

You may encounter some additional costs during your studies, which could include non-mandatory field trips and workshop PPE.

## Related Courses

- HNC General Engineering
- HNC Mechanical Engineering
- HNC Electrical and Electronics Engineering
- HNC Manufacturing Engineering