

**Faculty of Engineering**  
**Farnborough College of**  
**Technology**

**Pearson BTEC Level 5 HND in**  
**MECHANICAL ENGINEERING**

**PROGRAMME SPECIFICATION**

**JANUARY 2016**

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## **Section 1: Introduction**

### **1.1 The Title of Programme shall be: Higher National Diploma in Mechanical Engineering**

This programme, when successfully undertaken, shall lead to the award of:

#### **Pearson BTEC Level 5 HND Diploma in Mechanical Engineering (QCF)**

Intermediate Exit Awards may be awarded for partial completion of the Programme as follows:

#### **Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering (QCF)** (if a student has achieved 120 credits whilst meeting the specified rules of combination)

### **1.2 Awarding Organisation:** Pearson

### **1.3 Teaching Institution:** Faculty of Engineering, Farnborough College of Technology

### **1.4 Head of Faculty:** Mrs Julie Milburn

### **1.5 Length of study:** 2 years full time or 3 years (minimum) part time

### **1.6 Modes of Learning**

The programme is offered as a full time or part-time programme lasting a minimum of two years or as a flexible learning programme, enabling a progressive modular accrual by a mixture of attendance, virtual learning and APL leading to a full award over an anticipated maximum four year time period.

### **1.7 Entry Requirements**

As specified by Pearsons, applicants will be expected to provide satisfactory evidence of ability to reach the required standards. The applicant's prior qualifications and/ or experience will be reviewed to assess their potential to achieve the qualification.

- (a) Applicants who will not have attained 21 years of age on entry will normally be expected to have: UCAS minimum tariff of 120
- (b) Successful completion of an approved course, i.e. BTEC Extended Diploma in Engineering, C&G Technical Certificate in Engineering or professional certificate.
- (c) Mature applicants without formal qualifications as in a) or b), may provide alternative satisfactory evidence of their ability to pursue successfully the Higher National Diploma in Engineering. Each case will be judged on individual merits. This will usually involve an interview and may involve written tests.

(d) Pass in an access course in Engineering, Technology and Science

(e) Exceptional entry applications will be welcomed and will be judged on individual merits. This will usually involve an interview and may involve written tests.

### **1.8 Recognition of Prior Learning**

Recognition of Prior Learning (RPL) is a method of assessment (leading to the award of credit) that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and so do not need to develop through a course of learning.

Learners' previous achievements and experiences in and outside the workplace, as well as in the classroom will be considered in line with Pearson's policy documentation, *Recognition of Prior Learning Policy and Process*.

**1.9 Proposed date of introduction:** September 2016

**1.10 Proposed date of revision:** September 2018

**1.11 Benchmark statements:** UK Standard for Professional Engineering Competence (UK – SPEC) 2010, QAA Engineering (2010).

## **Section 2: Programme Aims**

The educational aims for the programmes are to:

1. Provide an applied programme of study to produce high quality graduates with intermediate level skills, who are able to work with confidence at a technician level within the specific engineering industry;
2. Provide an employer-led, level 5 programme to develop engineering competence in the field of Mechanical Engineering and enhance career opportunities within this field;
3. Prepare students, for careers in the field of Mechanical Engineering, through the provision of industry related skills and knowledge;
4. Provide graduates with the ability to apply the underlying concepts and principles of engineering to work situations and develop innovative solutions to problems;
5. Equip graduates with the essential communication and critical evaluation skills to prepare them for progression to an Honours degree and further professional qualifications;
6. Provide a method of delivery which is appropriate to students following full-time or part-time delivery programmes.

### **Section 3: Programme Outcomes**

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

- Knowledge & Understanding (A)
- Engineering Analysis (B)
- Design (C)
- Economic, Social and Environmental Context (D)
- Engineering Practice (E)

## Mechanical Engineering Project Specification

### Knowledge and understanding

- K1. (A)
- K2. Engineering Science (A)
- K3. Engineering materials (A,E)
- K4. Project Design Implementation (A, C, E)
- K5. Design for Manufacture (A, C)
- K6. Thermodynamics (A, B, E)
- K7. Fluid Mechanics (A, B)
- K8. Research Project (A, B, C, D, E)
- K9. Application of Machine Tools (A, B, E)
- K10. Strength of Materials (A, B)
- K11. Business Management (A, D)

### Teaching/ learning methods & strategies:

- Lectures
- Small group research
- Problem solving
- Computer simulation
- Laboratory experiment

### Assessment:

#### Summative methods

- Formal examination
- Assessed assignments
- Formal Laboratory Reports
- Oral presentations

#### Formative methods

- Logbooks
- Oral Presentations
- On-line Assessments

### Intellectual abilities

- I1. Use quantitative methods and computer simulation to solve problems (B)
- I2. Analyse the performance of systems and components through modelling methods (B)
- I3. Synthesise a technical specification from a design brief (C)
- I4. Demonstrate creative and innovative skills in design formulation (C)
- I5. Assess validity of experimental results (B)
- I6. Evaluate design outcomes (C)
- I7. Critically evaluate technical literature and information (E)
- I8. Devise Solutions to engineering problems (A, B, D)

### Teaching/ learning methods & strategies:

- Lectures
- Small group research
- Problem solving
- Computer simulation
- Laboratory experiment
- Industrial placement work

### Assessment:

#### Summative methods

- Formal examination
- Assessed assignments
- Formal Laboratory Reports
- Oral presentations

#### Formative methods

- Logbooks
- Oral Presentations
- On-line Assessments

**Practical Skills (Application)**

- P1. Competence in using workshop equipment to manufacture components & systems (C, E)
- P2. Use technical literature, including data sheets (E)
- P3. Competence in using CAD (B)
- P4. Competence in using basic engineering workshop tools and machinery (E)
- P5. Measurement and testing of electronic circuits (E)
- P6. Apply computer software in order to solve problems (B)

**Teaching and learning strategies and methods:**

- Computer simulation
- Workshop practice
- Industrial placement work

**Assessment:**

Summative methods

- Logbooks
- Product
- Witness testimony
- Design Report
- Oral presentation

Formative methods

- Logbooks
- Products

**General Transferable Skills**

- G1. Use evidence and logical thought in the presentation of ideas
- G2. Communication and presentation by effective oral and written skills
- G3. Use of ICT
- G4. Research information to support ideas
- G5. Critical evaluation skills (C)
- G6. Evaluating information from numerical formats
- G7. Teamwork and collaboration
- G8. Improving own learning and performance – CPD
- G9. Time management
- G10. Demonstrate academic integrity

**Teaching/ learning methods & strategies:**

- Lectures
- Small group research
- Problem solving
- Role play
- Industrial placement work

Assessment:

Summative methods

- Assessed assignments
- Formal Laboratory Reports
- Oral presentations
- Seminars

Formative methods

- Logbooks
- Oral Presentations/ Seminars
- Role play



## Section 4: Programme Structure

### 4.1: Full time pathway

<b>Year 1</b>				
<b>Unit Number</b>	<b>Unit</b>	<b>Core (C) or Specialist (S)</b>	<b>Unit Level</b>	<b>Unit Credit</b>
1	Analytical Methods for Engineers	C	4	15
2	Engineering Science	C	4	15
3	Project Design, Implementation and Evaluation	C	5	20
8	Engineering Design	S	5	15
41	Fluid Mechanics	S	4	15
21	Materials Engineering	S	4	15
13	Application of Machine Tools	S	4	15
19	Computer-aided Design and Manufacture	S	5	15
<b>Year 2</b>				
<b>Unit Number</b>	<b>Unit</b>	<b>Core (C) or Specialist (S)</b>	<b>Unit Level</b>	<b>Unit Credit</b>
7	Business Management Techniques for Engineers	S	4	15
35	Further Analytical Methods for Engineers	S	5	15
4	Mechanical Principles	C	5	15
61	Engineering Thermodynamics	S	5	15
62	Strengths of Materials	S	5	15
15	Design for Manufacture	S	5	15
76	Managing the Work of Individuals and Teams	S	5	15
28	Research Project	S	5	20

## 4.2: Part time pathway

<b>Year 1</b>				
<b>Unit Number</b>	<b>Unit</b>	<b>Core (C) or Specialist (S)</b>	<b>Unit Level</b>	<b>Unit Credit</b>
1	Analytical Methods for Engineers	C	4	15
2	Engineering Science	C	4	15
8	Engineering Design	S	5	15
41	Fluid Mechanics	S	4	15
21	Materials Engineering	S	4	15
<b>Year 2</b>				
<b>Unit Number</b>	<b>Unit</b>	<b>Core (C) or Specialist (S)</b>	<b>Unit Level</b>	<b>Unit Credit</b>
3	Project Design, Implementation and Evaluation	C	5	20
13	Application of Machine Tools	S	4	15
19	Computer-aided Design and Manufacture	S	5	15
7	Business Management for Engineers	S	4	15
35	Further Analytical Methods for Engineers	S	5	15
61	Engineering Thermodynamics	S	5	15
<b>Year 3</b>				
<b>Unit Number</b>	<b>Unit</b>	<b>Core (C) or Specialist (S)</b>	<b>Unit Level</b>	<b>Unit Credit</b>
4	Mechanical Principles	C	5	15
62	Strengths of Materials	S	5	15
76	Managing the Work of Individuals and Teams	S	5	15
28	Research Project	S	5	20
15	Design for Manufacture	S	5	15

## **Section 5: Administration, Quality Assurance and Development**

### **5.1 Academic Management and Programme Administration**

#### **5.1.1. Programme Management and Administration**

This will be undertaken by the Faculty of Engineering. Specific areas of responsibility are identified as:

**Head of Faculty:** Assumes overall responsibility for quality assurance and management of the programme. The Head of Faculty reports to the College Vice Principal (Curriculum and learners).

**Programme Manager:** Assumes the overall responsibility for the effective and efficient delivery of the programmes. He/ she is responsible for the design of the programmes and their quality assurance. He/ she is also responsible for the operation of the programmes including the admission, progression and academic welfare of the students. He/she also has responsibilities for the day-to-day administration of the programmes. The Programme Manager is responsible to the Head of Faculty.

#### **5.1.2. Student Support**

**Personal Tutors:** in accordance with College policy, each student is allocated a personal tutor at the commencement of the programme. The role of the tutor is to provide individual support and an element of pastoral care. Personal Tutors are selected from the teaching staff that delivers the modules on the programme.

**Tutorials:** a programme of tutorials is scheduled throughout the programme. This includes group activities as well as individual tutorials to discuss academic progress and issues of individual concern. In addition to scheduled meetings, students in the Faculty are encouraged, through an 'open door' policy, to seek guidance from their personal tutors. Tutors' e-mail addresses are provided in the Course Handbook to facilitate contact. Details about additional (College) support services including the counselling service and the Skills Development Centre (housed in the College Learning Resource Centre) are included in the College Handbook for Higher Education, which is provided electronically to each student, together with a Personal Development Plan.

A variety of resources are also available to all students, via the web. These include:

**College Intranet:** a source of information, with access to the learning resource centre (LRC) on-line and the College Handbook for Higher Education.

**MOODLE:** the College's virtual learning environment (VLE). MOODLE offers learners the facility to continue their learning outside of the college campus by providing a gateway through which learners can complete all manner of tasks including downloading of lecture notes and case studies, taking part in

interactive “Test your Learning” and revision exercises, submitting assignments and keeping a blog so that both they and their lecturer can track their progress on design projects and industrial placements.

## **5.2 Programme Review and Evaluation**

The management of the HND Engineering Programme is designed to:

- monitor and review the programme operation
- assess student progress
- evaluate the relevance of material provided in the programme
- liaise with relevant external organisations

Formal pathways to achieve the above objectives are given in the following section. Also, it is recognised that staff and student interaction is encouraged. Informal discussions can often facilitate the feedback of information that can be acted upon promptly and effectively.

Standard College procedures for Programme Review and Evaluation (PRAE), Self Assessment Report (SAR), Quality Improvement Plan (QIP) and Internal Verification (assessment) are undertaken and reported to the College Academic Standards Committee.

### **5.2.1 Board of Examiners**

The Board of Examiners meets at intervals during the programme. Its constitution is:

Head of Faculty of Engineering (Chairperson)  
Programme Manager  
Module Tutors  
Director of Higher Education  
Academic Registrar (or nominee)

The terms of reference of the Board of Examiners are to:

- ensure that all relevant information, including extenuating circumstances, is presented before making recommendations
- review and ratify assessment results

### **5.2.2 Programme Board**

The Programme Board undertakes formal programme monitoring, review, and the development of programme policy. The Board meets twice during the year and at other times when deemed necessary.

The members of the Board comprise:

Chairman (nominated by the Head of Faculty – usually the Programme Manager)  
Module Tutors  
Student Representatives (elected by the student body)

The terms of reference of the Programme Board are to:

- review the aims and learning outcomes of the programme
- assess the recruitment and marketing of the programme

- assess the retention rate and general progress of students
- enable students and staff to report on operation and delivery of the programme
- review and facilitate the development of course content, teaching methods and assessment procedures
- review the programme and School resources

Thus, matters arising from Programme Boards are reported via the Programme Review and Evaluation Process (PRAE), and so contribute to the Faculty's annual Self Assessment Reports and Quality Improvement Plan.

### **5.3 Role of the Awarding Body**

Pearson's will ensure that centres have effective quality assurance processes to review programme delivery. It will also ensure that the outcomes of assessment are to national standards.

This comprises three key components:

#### 1) Approval Process

The College will be required to demonstrate that they:

- Have the human and physical resources required for effective delivery and assessment
- Understand the implications for independent assessment and agree to abide by these
- Have a robust internal assessment system supported by 'fit for purpose' assessment documentation
- Have a system to internally verify assessment decisions, to ensure standardised assessment decisions are made across all assessors and sites

#### 2) Monitoring of internal centre systems

The College will be required to demonstrate ongoing fulfilment of the centre approval criteria over time. The process that assures this is external examination, which is undertaken by Pearson's appointed External Examiners. The College will be given the opportunity to present evidence of the ongoing suitability and deployment of systems to carry out the required functions.

Pearson will affirm, or not, the ongoing effectiveness of such systems. Where system failures are identified, sanctions (appropriate to the nature of the problem) will be applied in order to assist the centre in correcting the problem.

#### 3) Independent assessment review

The internal assessment outcomes reached are subject to an independent assessment review by a Pearson- appointed External Examiner.

The outcomes of this process will be to:

- confirm that internal assessment is to national standards and allow certification
- or
- make recommendations to improve the quality of assessment outcomes before certification is released
- or
- make recommendations about the centre's ability to continue to be approved for the qualifications in question

Pearson reserves the right to withdraw either qualification or centre approval when it deems there is an irreversible breakdown in the centre's ability either to quality assure its programme delivery or its assessment standards.

