Programme Specification

1	**Awarding Institution/Body**	Pearson – Edexcel
2	**Delivery Location(s)**	Leeds City College
3	**Programme Externally Accredited by (e.g. PSRB)**	N/A
4	**Award Title(s)**	Pearson BTEC Level 4 Higher National Certificate in Engineering (Manufacturing Engineering)[1] Pearson BTEC Level 5 Higher National Diploma in Engineering (Manufacturing Engineering)[2]
5	**FHEQ Level**	HNC (Man E): 4 HND (Man E): 5
6	**Bologna Cycle**	HND (Man E): Short cycle (within or linked to the first cycle) qualifications [3]
7	**JACS Code and JACS Description**	H700
8	**Mode of Attendance**	Full time and part time
9	**Relevant QAA Subject Benchmarking Group(s)**	Engineering Subject Benchmark Statement (2015)[4]
10	**Relevant Additional External Reference Points**	UK standard for professional engineering competence (Level 3 and 6)

[1] Hereafter called HNC (Man E)
[2] Hereafter called HND (Man E)
[3] See QAA. (2014). *The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies*. Available online [http://www.qaa.ac.uk/en/Publications/Documents/qualifications-frameworks.pdf], accessed: 09/08/17
[4] Although QAA subject benchmarking groups do not apply to HNC/D qualifications

11	**Date of Approval/ Revision**	June 2019
12	**Criteria for Admission to the Programme**	• A* to C grade in GCSE Maths, relevant A-levels, relevant BTEC Level 3/National Certificate at MM or above, also industrial experience will also be considered. • English: Level B2 (CEFR), PTE 51, IELTS 6 or equivalent. • Suitable reference (e.g. from line manager or tutor)

13 Educational Aims of the Programme

The purpose of these programmes are to develop students as professional, self-reflecting individuals who are able to meet the demands of employers in the rapidly evolving engineering sector and adapt to a constantly changing world. The qualifications also aim to widen access to higher education and enhance the career prospects of those who undertake them.

The overall aims of the programme are to:

- Provide a thorough grounding in engineering principles at Level 4, which leads the student to the progression pathway to Level 5 relating to individual professions within the manufacturing engineering sector.
- Equip individuals with 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 sector.
- Enable progression to a higher level studies such as a university degree by supporting the development of academic study skills and the selection of appropriate optional units.
- Enable progression to further professional qualifications in specific engineering disciplines by mapping the units studied to the requirements of the Professional Bodies applicable to that discipline.

14 Learning Outcomes

The programme will enable students to develop the knowledge and skills listed below. On successful completion of the programme, the student will be able to (demonstrate):

Knowledge and Understanding	
KU1	Knowledge and understanding of the fundamentals principles and practices of the contemporary global engineering industry.
KU2	Knowledge and understanding of the external engineering environment and its impact upon local, national and global levels of strategy, behaviour, management and sustainability.
KU3	Understanding and insight into different engineering practices, their diverse nature, purposes, structures and operations and their influence upon the external environment.
KU4	A critical understanding of the ethical, environmental, legal, regulatory, professional and operational frameworks within which engineering operates.

	KU5	A critical understanding of process, practices and techniques for effective management of products, processes, services and people.
	KU6	A critical understanding of the evolving concepts, theories and models within the study of engineering across the range of operational alternatives.
	KU7	An ability to evaluate and analyse a range of concepts and theories, models and techniques to make appropriate engineering operational and management decisions.
	KU8	An appreciation of the concepts and principles of CPD, staff development, team dynamics, leadership and reflective practice as strategies for personal and people development.
	KU9	Knowledge and understanding of how the key areas of engineering and the environment it operates within influence the development of people and businesses.
	KU10	An understanding of the skills, techniques and methodologies used to resolve problems in the workplace.
	KU11	Knowledge and understanding of the human-machine interaction to inform the development of good design and fitness for purpose.
	Cognitive/Intellectual Skills *(insert additional rows as necessary)*	
	CS1	Apply knowledge and understanding of essential concepts, principles and models within the contemporary global engineering industry
	CS2	Develop different strategies and methods to show how resources (human, financial, environmental and information) are integrated and effectively managed to successfully meet objectives.
	CS3	Critically evaluate current principles and operational practices used within the engineering industry as applied to problem-solving.
	CS4	Apply project management skills and techniques for reporting, planning, control and problem-solving.
	CS5	Recognise and critically evaluate the professional, economic, social, environmental and ethical issues that influence the sustainable exploitation of people, resources and businesses.
	CS6	Critique a range of engineering information technology systems and operations and their application to maximise and successfully meet strategic objectives.
	CS7	Interpret, analyse and evaluate a range of engineering data, sources and information to inform evidence-based decision-making.
	CS8	Synthesise knowledge and critically evaluate strategies and plans to understand the relationship between theory and actual world engineering situations.
	CS9	Evaluate the changing needs of the engineering industry and have the confidence to self-evaluate and undertake additional CPD as necessary.
	Applied Skills	
	AS1	Evidence the ability to show customer relationship management skills and develop appropriate policies and strategies to meet stakeholder expectations.
	AS2	Apply innovative engineering ideas to design and develop new products or services that respond to the changing nature of the engineering industry and the global market.
	AS3	Integrate theory and practice through the investigation, evaluation and development of practices and products in the workplace.
	AS4	Develop outcomes for customers using appropriate practices and data to make justified recommendations.
	Key Transferable Skills	

	TS1	Develop a skill-set to enable the evaluation of appropriate actions taken for problem-solving in specific engineering contexts
	TS2	Develop self-reflection, including self-awareness, to become an effective self-managing student, appreciating the value and importance of the self-reflection process.
	TS3	Undertake independent learning to expand on own skills and delivered content.
	TS4	Competently use digital literacy to access a broad range of research sources, data and information.
	TS5	Communicate confidently and effectively, both orally and in writing both internally and externally with engineering professionals and other stakeholders.
	TS6	Demonstrate strong interpersonal skills, including effective listening and oral communication skills, as well as the associated ability to persuade, present, pitch and negotiate.
	TS7	Identify personal and professional goals for continuing professional development in order to enhance competence to practice within a chosen engineering field.
	TS8	Take advantage of available pathways for continuing professional development through Higher Education and Professional Body Qualifications.
	TS9	Develop a range of skills to ensure effective team working, project and time management, independent initiatives, organisational competence and problem-solving strategies.
	TS10	Reflect adaptability and flexibility in approach to engineering; showing resilience under pressure and meeting challenging targets within given deadlines.
	TS11	Use quantitative skills to manipulate data, evaluate and verify existing theory.
	T12	Apply their subject-related and transferable skills in contexts where the scope of the task and the criteria for decisions are generally well defined but where some personal responsibility and initiative is required.

15 Key Learning & Teaching Strategy Methods

The teaching methods used in the sessions of this study programme include lectures, tutorials, seminars and laboratory classes, and aim to offer an interactive, high quality learning experience. For instance, the unit Engineering Science uses a mixture of short lectures, to impart the necessary engineering principles and concepts, tutor-led worked examples and tutorials in order to solve problems interactively. This will allow students to climb Blooms taxonomy from recall to application in a short space of time. Other units, e.g. Lean Manufacturing, will not only used lectures and theoretical problems, but also more practical tasks such as programming or software simulation to make the programme relevant to the workplace. Student-led tutorials consisting of action learning activities, discussion groups and report-back sessions are used in units discussing current topics, such as Sustainability. This allows students to develop their research, communication and teamwork skills.

Apart from class based delivery modes, the programme employs a modern VLE to make teaching material, assignments and further information available on a more

	flexible basis. The VLE is also used for revision and preparation purposes so that the part time students are able to have a more rounded out learning experience
16	**Key Assessment Strategy/Methods** Assessments relate directly to learning outcomes and one assessment covers one or more than one learning outcome. Students are assessed in taught modules which are specifically designed to enable students to practise and develop their acquired skills and knowledge and students are assessed in accordance with the assessment schedule identified for the Programme. Outcomes are assessed through a variety of assessment mechanisms including: • Assignments (tasks include maths problems, presentations, essays or reports, see also assessment matrix) • Project work • With a minimal amount of exams

17 Programme Modules

Level 4 (HNC Level)

Code	Title	Credits	Core/ Option	Non-Compensatable	Compensatable
1	Engineering Design	15	Core		X
2	Engineering Maths	15	Core		X
3	Engineering Science	15	Core		X
4	Managing a Professional Engineering Project	15	Core		X
7	Machining and Processing of Engineering Materials	15	Option		X
12	Engineering Managements	15	Option		X
14	Production Engineering for Manufacture	15	Core		X
17	Quality and Process Improvement	15	Option		X

Level 5 (HND Level)

Code	Title	Credits	Core/ Option	Non-Compensatable	Compensatable
34	Research Project	30	Core		X
35	Professional Engineering Management (Pearson-set)	15	Core		X
39	Further Mathematics	15	Core		X
48	Manufacturing Systems Engineering	15	Core		X
49	Lean Manufacturing	15	Core		X
50	Advanced Manufacturing Technology	15	Option		X
54	Further Control Systems Engineering	15	Option		X

18 **Programme Structure**

The programme structure of the full time programme separates the levels and years of the programme clearly. However, part-time programme teaches level 5 units together with level 4 units in the first two years. Thus, the year of programme in levels 4 and 5 relates to the same academic year.

Programme structure: Full time
The first year two will be delivered of two full of teaching. The second year will be delivered over three days so that part time students can fill in.

Level 4 – 1st year of programme			
N/A	Full year	Unit 2: Engineering Maths	1st Semester
		Unit 7: Machining and Processing of Engineering Materials	
		Unit 12: Engineering Management	
		Unit 17: Quality and Process Improvement	
		Unit 1: Engineering Design	2nd Semester
		Unit 3: Engineering Science	
		Unit 4: Managing a Professional Engineering Project	
		Unit 14: Production Engineering for Manufacture	
Level 5 – 2nd year of programme			
Unit 34: Research Project	Full year	Unit 48: Manufacturing Systems Engineering	1st Semester
		Unit 54: Further Control Systems Engineering	
		Unit 35: Professional Engineering Management (Pearson-set)	2nd Semester
		Unit 39: Further Mathematics	
		Unit 49: Lean Manufacturing	
		Unit 50: Advanced Manufacturing Technology	

Programme structure: Part time
As this mode is aimed at student in employment, all units will be delivered in one day per week.

Level 4 – 1st year of programme			
N/A	Full year	Unit 2: Engineering Maths	1st Semester
		Unit 12: Engineering Management	
		Unit 1: Engineering Design	2nd Semester
		Unit 3: Engineering Science	
Level 4 – 2nd year of programme			
N/A	Full year	Unit 7: Machining and Processing of Engineering Materials	1st Semester

			Unit 17: Quality and Process Improvement	
			Unit 4: Managing a Professional Engineering Project	2nd Semester
			Unit 14: Production Engineering for Manufacture	
Level 5 – 1st year of programme				
N/A		Full year	N/A (Studying HNC units)	1st Semester
			N/A (Studying HNC units)	2nd Semester
Level 5 – 2nd year of programme				
N/A		Full year	N/A (Studying HNC units)	1st Semester
			(HNC unit 4: Managing a Professional Engineering Project)	2nd Semester
			Unit 39: Further Mathematics	
			Unit 49: Lean Manufacturing	
Level 5 – 3rd year of programme				
Unit 34: Research Project		Full year	Unit 48: Manufacturing Systems Engineering	1st Semester
			Unit 54: Further Control Systems Engineering	
			Unit 35: Professional Engineering Management (Pearson-set)	2nd Semester
			Unit 50: Advanced Manufacturing Technology	

19 **Support for Students and Their Learning**

The award adopts the following approach to student learning support:

- Tailored induction support begins before students arrive with the admissions team, and is reinforced at the detailed induction programme.
- The programme will include study skills/group tutorial to develop the soft skills of the students.
- Each full-tine student is allocated a tutor for regular tutorials and personal development planning. This is implemented in the first term and continued throughout the two years of study. Part-time students can also request personal tutorials, but, because of other commitments (i.e. work) this is not a requirement.
- A robust communications system functions to give students access to lecturers and management; this includes e-mail, VLE and notice boards.
- All necessary information about the programme is provided by means of the student handbook, module handbooks and the VLE.
- The College provides an extensive range of services for students, including support for those with special needs
- Access to Student Services, which provide assistance and guidance e.g. counselling, dyslexia support.
- Staff student ratios for teaching typically 15:1.
- Well-equipped laboratory facilities
- Dedicated technical support
- Industrial support, where possible

	• Visiting speakers from industry
20	**Distinctive Features** The HND has been designed to enable students to develop a variety of skills and techniques essential for a range of technical and management careers in the electrical and electronic engineering industry. In particular, this award focuses on the needs identified in the Leeds City Region Skills Audit that highlights a requirement for engineering graduates. The fulltime programme does not only cover the units detailed above, but includes EAL level 2 units to teach students practical engineering competencies. During the summer break, the students are expected to have a (full-time) work placement. This should be continued during the second year on a part-time basis (probably 2 days/week). The part-time provision is designed for students on a day release basis. Thus, they are likely to have worked in the industry in some capacity before, as well as during the programme. In some of the units students are expected to draw heavily on their industrial experience. The main area of work-based learning is within the project/research modules, where students are encouraged to pursue work related projects, which tends to be set by their employer/work experience placement. The College is able to provide additional support to students on Higher Education programmes through its robust links with industry, and through approaches to learning such as collaborative group work.

Map of Outcomes to Modules

Unit	Knowledge and Understanding											Cognitive skills									Applied skills				Transferable skills											
No	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	1	2	3	4	1	2	3	4	5	6	7	8	9	10	11	12
1	x			x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x
2	x											x						x					x		x			x							
3	x											x						x					x		x			x							
4	x	x	x	x	x	x	x	x	x	x													x	x	x		x				x	x	x	x	x	x
7	x									x								x					x		x				x						
12	x									x													x		x										
14	x											x						x				x			x		x								
17	x																	x				x		x	x	x		x				x				x
34	x	x	x	x	x	x	x						x																				x		x
35	x	x	x	x	x	x	x	x		x	x		x	x	x	x	x	x	x	x	x	x		x	x	x	x		x		x	x	x	x	x	x
39	x											x						x					x		x			x					x		
48	x											x																x					x		
49	x	x	x		x	x	x												x		x	x	x	x							x		x		x
50	x	x	x	x	x	x	x	x		x	x		x		x				x		x	x	x	x					x	x		x		x		x
54	x	x	x		x	x	x																x		x								x		

Map of Teaching and Learning Methods

Level 4

	Lectures	Seminars	Tutorials	Practical	Demonstrations	Case studies	Group activities	Independent Study	Problem class
Unit 1: Engineering Design	*		*					*	
Unit 2: Engineering Maths	*		*		*	*		*	*
Unit 3: Engineering Science	*	*	*		*			*	*
Unit 4: Managing a Professional Engineering Project	*		*			*		*	
Unit 12: Engineering Management	*	*	*	*		*	*	*	
Unit 7: Machining and Processing of Engineering Materials	*		*	*	*			*	*
Unit 14: Production Engineering for Manufacture	*	*	*	*			*	*	
Unit 17: Quality and Process Improvement	*	*	*	*			*	*	

Level 5

	Lectures	Seminars	Tutorials	Practical	Demonstrations	Case studies	Group activities	Independent Study	Problem class
Unit 34: Research Project	*		*				*	*	
Unit 35: Professional Engineering Management (Pearson-set)	*	*	*			*		*	
Unit 39: Further Mathematics	*							*	
Unit 48: Manufacturing Systems Engineering	*							*	
Unit 49: Lean Manufacturing	*							*	

Unit 50: Advanced Manufacturing Technology	*			*	*	*		*	
Unit 54: Further Control Systems Engineering	*		*			*		*	

Map of Assessment Methods

Level 4

	Software simulation	Report\essay	Assignments	WRL project	Reflective learning statement	Experiments	Case study	Self evaluation	Peer assessment	Portfolio	Presentation
Unit 1: Engineering Design		*	*				*			*	
Unit 2: Engineering Maths			*								
Unit 3: Engineering Science	*		*			*					
Unit 4: Managing a Professional Engineering Project		*		*				*	*	*	*
Unit 7: Machining and Processing of Engineering Materials		*					*				*
Unit 12: Engineering Management		*	*				*				*
Unit 14: Production Engineering for Manufacture	*	*	*			*					
Unit 17: Quality and Process Improvement	*		*			*					

Level 5

	Software simulation	Report\essay	Assignments	WRL project	Reflective learning statement	Experiments	Case study	Self evaluation	Peer assessment	Portfolio	Presentation
Unit 34: Managing a Professional Engineering Project		*	*		*				*	*	*
Unit 35: Professional Engineering Management (Pearson-set)		*		*				*	*	*	*
Unit 39: Further Mathematics			*								
Unit 48: Manufacturing Systems Engineering		*	*				*				*
Unit 49: Lean Manufacturing		*	*				*				*
Unit 50: Advanced Manufacturing Technology		*	*				*				*
Unit 54: Further Control Systems Engineering	*	*	*			*				*	*