BTEC International Level 3 - **Mechanical Engineering** - Content Mapping

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
1	**Health and safety in the workplace**	**Fully covered in:** **Unit 2 Delivery of engineering processes safety as a team** A2 Health and safety requirements C3 Health and safety risk assessment **Unit 41 Manufacturing secondary machining processes** B1 Health and safety requirements when setting up secondary press machines B2 Risk assessment **Unit 5 Specialist engineering project** B2 Risk and issues project management process processes **Unit 46 Manufacturing joining, finishing and assembly processes** A3 Safe working practices when using joining processes	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
2	**Communications for engineering technicians**	**Fully covered in:** **Unit 3 Product design and manufacture in engineering** LA A Explore design triggers, challenges, constraints, opportunities and operational requirements B1 Design proposals B2 Communicating designs **Unit 2 Delivery of engineering processes safety as a team** C4 Preparation activities for batch manufacture or batch service delivery A3 Human factors affecting the performance of engineering processes C1 Principles of effective teams **Unit 5 Specialist engineering project** B4 Design information	
3	**Engineering project**	**Fully covered in:** **Unit 5 A specialist engineering project** A1 Project life cycle A2 Project idea generation and solution development A3 Feasibility study B1 Planning and monitoring project management processes B2 Risk and issue project management processes B3 Technical specification B4 Design information C1 Undertake and test the solution to the problem C2 Demonstrate relevant behaviours C3 Present a solution to the problem	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
4	**Mathematics for engineering technicians**	**Fully covered in:** **Unit 1 Mechanical principles** A1 Algebraic methods A2 Trigonometric methods **Unit 7 Calculus to solve engineering problems** A2 Methods of differentiation B1 Integration as the reverse/inverse of differentiation B2 Integration as a summating tool B3 Numerical integration C4 Solution implementation **Unit 8 Further engineering mathematics** D1 Statistical techniques **Unit 57 Electrical and electronic principles** A1 Algebraic Methods A2 Trigonometric methods A3 Statistical methods **Unit 3 Product design and manufacture in engineering** A9 Statistical methods	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
5	**Mechanical principles and applications**	**Fully covered in:** **Unit 1 Mechanical principles** B1 Static engineering systems B2 Loaded components C1 Kinetic parameters C2 Dynamic parameters D1 Fluid systems D2 Immersed bodies **Unit 28 Dynamic mechanical principles in practice** A1 Dynamics of systems undergoing acceleration A2 Linear systems **Unit 31 Thermodynamic principles and practice** B1 Closed thermodynamic systems B2 Open thermodynamic systems	
6	**Electrical and electronic principles**	**Fully covered in:** **Unit 57 Electrical and electronic principles** B1 Static and direct current electricity principles B2 Direct current circuit theory B3 Direct current networks C1 Magnetism C2 Electromagnetic induction D1 Alternating current waveforms D2 Single-phase alternating current principles	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	Title		
7	**Business operations in engineering**	**Fully covered in:** **Unit 4 Applied commercial and quality principles in engineering** B1 Reasons for cost control and types of costs B2 Activity-based costing method **Unit 2 Delivery of engineering processes safely as team** A1 Common engineering processes **Unit 58 Entrepreneurship and entrepreneurship in practice** A1 Features of the environment A2 Influence of stakeholders on planning and decision making A3 Organisational risks **Unit 41 Manufacturing secondary machining processes** B1 Health and safety requirements when setting up secondary press machines B2 Risk assessment **Unit 5 Specialist engineering project** B2 Risk and issues project management process processes	
8	**Engineering design**	**Fully covered in:** **Unit 3 Product design and manufacture in engineering** A1 Design triggers A4 Designing for a customer A5 Regulatory constraints and opportunities A8 Manufacturing analysis B1 Design proposals B2 Communicating designs B3 Iterative development process	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
9	**Commercial aspects for engineering organisations**	**Fully covered in:** **Unit 4 Applied commercial and quality principles in engineering** A1 Business functions and key activities A2 Trade considerations A3 Competitive advantage C1 Quality systems **Unit 3 Product design and manufacture in engineering** A5 Regulatory constraints and opportunities A6 Market analysis	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	Title		
10	**Properties and applications of engineering materials**	**Fully covered in:** **Unit 25 Mechanical behaviour of metallic materials** A1 Types of ferrous metals and alloys A2 Types of non-ferrous metals and alloys A3 Mechanical properties of metallic materials A4 Grain structure of metallic materials A5 Effects of processing on the mechanical properties of metallic materials A6 Microstructures investigation of metallic materials B2 Destructive test procedures C1 Ductile and brittle fracture C2 Creep failure C3 Fatigue failure **Unit 26 Mechanical behaviour of non-metallic materials** A1 Types of non-metallic materials A2 Structures of non-metallic materials A3 Mechanical properties of non-metallic materials B2 Destructive test procedures to determine mechanical properties B3 Material defects in non-metallic materials B4 Non-destructive tests used to identify material defects C1 Ductile and brittle fracture C2 Creep failure C3 Fatigue failure C4 Degradation processes	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	Title		
		Unit 13 Welding technology B1 The properties and behaviours of metallic materials B2 Unalloyed steel materials B3 Alloyed steel and non-ferrous materials **Unit 3 Product design and manufacture in engineering** A7 Performance analysis	
11	**Further mechanical principles and applications**	**Fully covered in:** **Unit 1 Mechanical principles** B1 Static engineering systems B2 Loaded components C3 Angular parameters C4 Lifting machines **Unit 27 Static mechanical principles in practice** A1 Static parameters A2 Analysis of statically determinate framed structures B1 Beam parameters **Unit 28 Dynamic mechanical principles in practice** A3 Rotational systems B1 System parameters B2 Rotating systems B3 Dynamic balancing C1 Parameters of lift machines C2 Lifting machines	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
12	**Applications of mechanical systems in engineering**	**Fully covered in:** **Unit 24 Maintenance of mechanical systems** A1 Lubrication characteristics A2 Lubrication of mechanical systems B1 Mechanical seal characteristics and common applications B2 Bearing characteristics and common applications B3 Fastener characteristics and common applications C1 Gear train function and operation in power transmission systems C2 Typical function and operation of other power transmission components **Unit 12 Pneumatic and hydraulic systems** A1 Hydraulic and pneumatic power supply components A2 Hydraulic and pneumatic actuator components A3 Hydraulic and pneumatic system control components A4 General system safety and maintenance	
13	**Principles and applications of fluid mechanics**	**Partially covered in:** **Unit 29 Principles and applications of fluid mechanics** A1 Properties and characteristics of fluids A2 Hydrostatic fluid principles and applications A3 Pneumatic fluid principles and applications B1 Dynamic fluid principles B2 Piped internal fluid flows and measuring systems C1 Fluid linear momentum principles C2 Nozzle systems and fluid turbines	**Not covered:** LO4 Understand the use of wind tunnel testing, aerodynamic theory and associated test data to determine the aerodynamic parameters of test models

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
14	**Applications of Thermodynamic principles**	**Fully covered in:** **Unit 31 Thermodynamic principles and practice** A1 Thermodynamic parameters A2 Polytropic processes B2 Closed thermodynamic systems B2 Open dynamic systems C2 Combustion processes C3 Calorific values **Unit 2 Delivery of engineering processes safely as a team** A2 Health and safety requirements **Unit 3 Product design and manufacture in engineering** A2 Design challenges	
15	**Electro, pneumatic and hydraulic systems and devices**	**Fully covered in:** **Unit 12 Pneumatic and hydraulic systems** A1 Hydraulic and pneumatic power supply components A2 Hydraulic and pneumatic actuator components A3 Hydraulic and pneumatic system control components A4 General system safety and maintenance B1 Creating hydraulic and pneumatic power circuit diagrams B2 Simulating the operation of hydraulic and pneumatic power circuits C1 Health and safety requirements for the age operation of hydraulic and pneumatic power systems C2 System assembly C3 Testing and fault finding hydraulic and pneumatic powered systems	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
16	**Engineering drawing for technicians**	**Fully covered in:** **Unit 2 Delivery of engineering processes safely as a team** B1 Principles of engineering drawing B2 2D computer aided drawing C4 Preparation activities for batch manufacture or batch service delivery **Unit 3 Product design and manufacture in engineering** B2 Communicating designs **Unit 5 A specialist engineering project** B4 Design information **Unit 40 Computer aided manufacturing and planning** B1 Model a component in preparation for manufacture C3 Product and/or component specification for manufacture **Unit 19 Electronic devices and circuits** A5 Schematic capture and simulation of analogue circuits B4 Schematic capture and simulation of digital circuits	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
17	**Computer aided drafting in engineering**	**Partially covered in:** **Unit 10 Computer aided design in engineering** A1 3D parametric modelling A2 Develop 3D components A3 Develop a 3D model A4 Output of drawings form a model B1 2D drawing commands B2 Development of 2D engineering drawings B3 Output of 2D drawings C1 3D modelling commands C2 Develop 3D components C3 Developments of a 3D model C4 Output of product drawings **Unit 2 Delivery of engineering processes safely as a team** B1 Principles of engineering drawing B2 2D computer aided drawing	**Not covered:** LO2 Know about the software and hardware required to produce CAD drawings

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
18	**Advanced mechanical principles and applications**	**Fully covered in:** **Unit 27 Static mechanical principles in practice** C1 Axial loading C2 Bending loading C3 Shear loading C4 Design considerations **Unit 13 Welding technology** B1 The properties and behaviours of metallic materials **Unit 1 Mechanical principles** B1 Static engineering systems B2 Loaded components C1 Kinetic parameters C2 Dynamic parameters C3 Angular parameters	
19	**Mechanical measurements and inspection techniques**	**Fully covered in:** **Unit 30 Mechanical measurement and inspection technology** A1 Limits and fits A2 Tolerances B2 Types of mechanical measurement B3 Comparators B4 Gauging system B5 Component features, types and manufacturing processes C1 Principles of statistics C2 SPC procedure	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
20	**Engineering primary forming processes**	**Fully covered in:** **Unit 42 Manufacturing primary forming processes** A1 Metal moulding processes A2 Ceramic moulding processes A3 Polymer moulding processes B1 Metal deformation processes B Polymer deformation processes C1 Safe working practices for primary forming processes **Unit 47 Composites manufacture and repair processes** A1 Characteristics of fibre materials A2 Characteristics of polymer resin materials A4 Applications of FRP composites B2 Characteristics of wet and dry lay-up manufacturing processes C1 Applying wet and dry lay-up manufacturing processes **Unit 3 Product design and manufacture in engineering** A8 Manufacturing analysis B6 Manufacturing processes **Unit 2 Delivery of engineering processes safety as a team** A2 Health and safety requirements C3 Health and safety risk assessment	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
21	**Engineering secondary and finishing techniques**	**Partially covered in:** **Unit 41 Manufacturing secondary machine processes** A1 Traditional secondary machining processes A2 Specialist secondary machine processes B1 Health and safety requirements when setting up secondary process machines **Unit 2 Delivery of engineering processes safely as a team** A1 Common engineering processes A2 Health and safety requirements **Unit 46 Manufacturing joining, finishing and assembly processes** B1 Hot finishing processes B2 Anodising finishing processes B3 Plating finishing processes	**Not covered:** LO3 Know how heat treatment processes and assembly techniques are used

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
22	**Fabrication processes and technology**	**Fully covered in:** **Unit 2 Delivery of engineering processes safety as a team** A2 Health and safety requirements **Unit 44 Fabrication manufacturing processes** A1 Fabricated products A2 Sheets materials A3 Cutting processes A4 Forming processes A5 Joining processes A6 Finishing processes B3 Interpreting design specifications C1 Using fabrication manufacturing processes C2 Alignment and clamping C3 Quality control procedures **Unit 46 Manufacturing joining, finishing and assembly processes** A3 Safe working practices when using joining processes	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
23	**Welding technology**	**Fully covered in:** **Unit 13 Welding technology** A1 Welding terminology for processes and equipment A2 Gas-shielded arc welding - shielding gases A3 Common welding processes A4 Welding electrotechnics B1 The properties and behaviours of metallic materials B2 Unalloyed steel materials B3 Alloyed steel and non-ferrous materials B4 Defects and irregularities in welded joints C1 Prepare for welding operations C2 Welding parameters and settings C3 Welding of joints safely **Unit 2 Delivery of engineering processes safely as a team** A2 Health and safety requirements C3 Health and safety risk assessment **Unit 33 Fabrication manufacturing processes** C3 Quality control procedures	
24	**Industrial process measurement**	None	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
25	**Selecting and using programmable controllers**	**Fully covered in:** **Unit 6 Microcontroller systems** A1 Control hardware A2 Input devices A3 Output devices A4 Selecting hardware devices and system design B1 Assembling and operating a microcontroller system B2 Programming techniques B3 Coding constructs B4 Structured program design B5 Number systems **Unit 14 Electrical installation of hardware and cables** C1 Cables C2 Connectors C3 Wiring enclosures	
26	**Applications of computer numerical control in engineering**	**Fully covered in:** **Unit 26 Applications of computer numerical control in engineering** A1 CNC machine tool control systems A2 Open and closed loop feedback systems B1 CNC Processes for milling and turning B2 Tooling parameters B3 Component parameters B4 Machine set-up parameters B5 Development of CNC part program C1 Manufacture a component using a CNC machine	

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No.	Title		
27	**Welding principles**	**Fully covered in:** **Unit 13 Welding technology** A1 Welding terminology for processes and equipment A2 Gas-shielded arc welding - shielding gases A3 Common welding processes A4 Welding electrotechnics B2 Unalloyed steel materials B3 Alloyed steel and non-ferrous materials B4 Defects and irregularities in welded joints C1 Prepare for welding operations **Unit 2 Delivery of engineering processes safely as a team** A2 Health and safety requirements C3 Health and safety risk assessment **Unit 33 Fabrication manufacturing processes** C3 Quality control procedures	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
28	**Further mathematics of engineering technicians (issue 2)**	**Fully covered in:** **Unit 1 Mechanical principles** A1 Algebraic methods A2 Trigonometric methods **Unit 7 Calculus to solve engineering problems** A2 Methods of differentiation B1 Integration as the reverse/inverse of differentiation B2 Integration as a summating tool B3 Numerical integration **Unit 8 Further engineering mathematics** A1 Arithmetic and geometric progressions C1 Complex numbers D1 Statistical techniques D2 Probability distributions D3 Statistical investigation	
29	**Manufacturing planning**	**Fully covered in:** **Unit 39 Modern manufacturing systems** A2 Performance objectives in manufacturing operations B1 Process types and typical industrial applications B3 Characteristics of effective system layout B4 Manufacturing documentation **Unit 40 Computer aided manufacturing and planning** C1 Manufacture planning C2 Schedule for manufacture C3 Product and/or component specification for manufacture	

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	**Title**		
29	**Mathematics for engineering technicians (Level 2 unit)**	**Fully covered in:** **Unit 1 Mechanical principles** A1 Algebraic methods A2 Trigonometric methods **Unit 3 Product design and manufacture in engineering** A9 Statistical methods **Unit 57 Electrical and electronic principles** A3 Statistical methods **Unit 7 Calculus to solve engineering problems** A2 Methods of differentiation B1 Integration as the reverse/inverse of differentiation	

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No.	**Title**		
30	**Applied electrical and mechanical science for engineering (Level 2 unit)**	**Fully covered in:** **Unit 15 Electrical machines** B2 Operation of DC motors and generators **Unit 57 Electrical and electronic principles** A3 Statistical methods B1 Static and direct current electricity principles B2 Direct current circuit theory C1 Magnetism C2 Electromagnetic induction **Unit 27 Static mechanical principles in practice** A1 Static parameters A1 Dynamics of systems undergoing acceleration A2 Linear systems **Unit 29 Principles and applications of fluid mechanics** A1 Properties and characteristics of fluids	

BTEC International Level 3 units not mappable to QCF qualification

International Unit Number	International Unit Name
33	**Computer systems security**
34	**Computer systems support and performance**
37	**Computer networks**
38	**Website production to control devices**
58	**Entrepreneurship and intrapreneurship in practice**