

Awarding Body Learning Outcome Mapping

Unit 1

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Know how an engineering business is structured and how it operates	Understand background information on engineering company profiles	Gain knowledge and understanding of businesses within a specific engineering sector. They will examine the organisation of engineering businesses and the influence of external and internal factors, which include: career pathways, employee and business registration and regulation, contractual arrangements, legislative requirements, and the importance and function of risk assessment
2	Know about internal and external factors that affect the way in which an engineering business operates	Know about the role of project management, and the link between risk analysis and the requirements of current legislation	Develop knowledge and understanding of the role of project management
3	Know about and apply financial and planning concepts, and costing and planning techniques	Understand environmental issues relevant to the Engineering industry	Develop knowledge and understanding of clean manufacturing, including the management of resource depletion, the sources of environmental pollution and the engineering methods used to control them
4	Know the importance of legislation concerning health and safety including a risk assessment for an engineering activity		Develop knowledge and understanding of the management of changes in the environment, methods of land management and water supply and the associated solutions
5			Undertake research activities, collection and mathematical analysis of environmental samples, data collection and analysis and simple chemical analysis

Unit 2

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Know about computer systems and methods of data storage	Be able to design, model and test engineering products	Acquire knowledge and develop understanding of the use of 2D and 3D software
2	Know about the capabilities of design, presentation, testing and analysis software packages and how they are used as tools within engineering	Be able to use 2D and 3D CAD software to produce drawings and models	Acquire knowledge and develop understanding of drawing to industrial standards
3	Be able to use a CAD package to produce 2D drawings		Acquire knowledge and develop understanding of techniques for modifying presentation drawings
4	Be able to use design software to produce 3D models for use as presentation drawings or as data for other software uses		Acquire knowledge and develop understanding of designing for manufacture
5	Be able to use testing and analysis simulation software as a design support tool		Acquire knowledge and develop understanding of the integration of CAD/CAM into combined design/manufacturing systems
6			Acquire knowledge and develop understanding of the use of concurrent engineering systems

Unit 3

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Know about the structure and their effects on the mechanical properties of engineering materials	Understand engineering specifications and be able to plan safe investigations and testing operations	Atomic structures, amount of bonding, periodicity and classification of engineering materials
2	Know about the forms of supply, applications and the selection of engineering materials	Know how to use tools, equipment, engineering materials and components to conduct testing techniques on a range of materials	Mechanical and thermal properties and durability of materials; destructive and non-destructive testing methods
3	Know about the impact of processing on the structure of engineering materials	Be able to gather, record and analyse engineering material information	Effects of processing on structure and behaviour of materials
4	Know about the effects of loading, modes of failure and carry out testing of engineering materials		Factors of safety and modes of failure of engineering materials
5			Using information sources to select materials for engineering applications and research the standard forms in which materials are supplied
6			Key features of new and smart materials and their potential applications

Unit 4

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Understand the difference between analogue and digital signals and the need for various forms of transmission media	Be able to specify engineering control systems	Develop knowledge and understanding of the systems approach to control engineering
2	Know about the use of sensors, transducers and instrumentation displays in instrumentation and control applications	Be able to design and implement engineering control systems	Develop knowledge and understanding of open loop, closed loop, feed forward and feedback control theory
3	Understand the principles and difference between open loop and closed loop systems		Develop knowledge and understanding of data communications and multiplexers
4	Understand the use of programmable logic controllers in instrumentation and control applications		Develop knowledge and understanding of AD/DA converters, operational amplifiers, PID controllers and PLCs
5	Understand applications of control engineering.		Develop knowledge and understanding of Signals and Wave Guides
6			Develop knowledge and understanding of Actuators and Instrumentation Displays
7			Develop knowledge and understanding of industrial and commercial applications of control engineering
8			Develop knowledge and understanding of simulation software

Unit 5

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Know about the cost of maintenance and the consequences of plant, equipment or system failure including the effects on production	Be able to manage and organise maintenance operations for engineering systems and products	Understand the use of statistical methods in engineering maintenance
2	Be able to deploy effective maintenance strategies when planning a maintenance activity	Know how to conduct maintenance procedures for engineering systems and products	Understand failure modes of engineering systems
3	Know how the data gathered from monitoring the performance and condition of engineering plant, equipment or system can be used		Understand the importance of appropriate maintenance strategies
4	Be able to carry out a risk assessment and follow a maintenance plan using documentation for a maintenance activity on a closed loop engineering system		

Unit 6

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Understand the differences between traditional and modern manufacturing production systems used within engineering industries	Know the types, uses and importance of engineering manufacturing systems	Different types of manufacturing processes and systems
2	Understand how different types of manufacturing processes utilise computer aided manufacturing systems	Understand quality control and quality assurance within the Engineering sector	Assembly systems and techniques
3	Be able to plan for the production of an engineered product for industry	Know about and be able to carry out engineering production planning	Quality control and quality assurance requirements in manufacturing and production, including statistical process control
4	Be able to work in a team and apply quality control and quality assurance systems		Production planning considerations
5			Project planning and scheduling, communication and computer skills

Unit 7

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Know how a successful new product evolves	Be able to analyse engineering innovation and new technologies	Why engineered products are successful and are able to relate their understanding to an engineering entrepreneur and associated product
2	Know about individuals who have become successful engineering entrepreneurs	Understand engineering opportunities, commercial issues, and how to protect new ideas	What is meant by entrepreneurship, particularly in engineering and the relationship to innovative designs and new technologies
3	Understand how engineering activities impact on society and the environment	Be able to develop engineering ideas, demonstrating design skills whilst recognising constraints	The principles of developing, marketing and selling a new product or idea
4	Be able to produce or improve designs in an innovative way	Know how to evaluate environmental issues in relation to engineering designs	The environmental and social impact of engineering locally and globally
5	Know about opportunities for success when bringing a new product to market		What is meant by sustainable engineering

Unit 8

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Know how to use algebraic methods to solve engineering problems	Be able to apply mathematics and mathematical modelling to solve engineering problems	Algebra
2	Be able to use trigonometric methods to solve engineering problems	Know how to use trigonometry and co-ordinate geometry to solve engineering problems	Geometry and trigonometry
3	Be able to use statistical methods to display engineering data	Know how to use algebra to solve engineering problems	Calculus
4	Know how to apply elementary calculus techniques to solve engineering problems	Know how to use statistics to solve engineering problems	Statistics
5		Know how to use calculus to solve engineering problems	

Unit 9

Learning Outcome	Edexcel	AQA/CGLI	OCR
1	Be able to apply mechanical principles to determine the effects of forces in engineering systems	Be able to apply scientific knowledge to real engineering systems	Forces and Motion
2	Be able to apply mechanical principles to determine the effects of motion, work and energy transfer in engineering systems	Be able to demonstrate analytical and problem-solving skills in engineering	Kinematics
3	Be able to apply electrical principles to determine the effects of electric charge and current and determine the voltage, current, resistance and power in electrical circuits	Know how to use mathematical methods to solve engineering problems	Dynamics
4	Be able to apply the principles of heat and thermodynamics to determine the effects of expansion and compression of gases and energy transfer in engineering systems	Be able to construct engineering science experiments and record data	Force, Work and Power
5	Know about the principles of chemistry and the effects of chemical processes and reactions		Deformation of Solids
6	Be able to apply the principles of fluid dynamics to determine the effects of viscosity and the forces acting in hydrostatic systems		Electricity
7			Quantum Physics
8			Electromagnetic Waves
9			Waves
10			Gravitational Fields

Learning Outcome	Edexcel	AQA/CGLI	OCR
11			Electric Fields
12			Capacitors
13			Electromagnetism
14			Electromagnetic Induction
15			Thermal Physics
16			Nuclear Atom and Radioactivity
17			Properties of materials
18			Electronics
19			Chemical Reactions
20			Organic Compounds and Functional Groups
21			Health and Safety