COLLYER'S
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Engineering Section
BTEC L3 Extended Certificate in Engineering
Scheme of Learning
(Also, BTEC SOW)

Key: T=Teacher Activity S=Student Activity WS=Worksheet CTB=Course Textbook PS=Pro-Study

1st Year (2021/2022) – Term 1

Week	Lesson 1(unit1)	Lesson 2(unit1)	Lesson 3(unit2)	Lesson 4(unit2)
1 9/9/24	Welcome Introduction to the Course and Unit 2 Mode of Assessment & Grading BTEC Regulations Expectations in class and H/W& PS Workshop Code -PPE Create AutoCAD login T-P/P S- Research books in Lib	Initial Assessment Maths Maths (30min) Written (30min) Library induction – Harvard referencing techniques SI Units S-1-2-1 task	U2-Engineering Drawings Mechanical Drawings Electrical Drawings Hydraulic/Pneumatic Drawings Information on Engineering Drawings, border, lines, text T- WS1 S- Home Task	U2- Workshops Skills Heath and Safety Use of micrometre, vernier, rule Introduction to hand tools names How to use hand tools T-Demonstration S- Use of equipment to measure engineering components, also making sketches
2 16/9/24	U1- Laws of Indices Laws of indices T- PowerPoint CTB- Workbook Page 1 S- see workbook task	U1-Logartihms Laws of Logarithms Change of base Common logs Natural log T- PowerPoint CTB- Workbook Page 2 S- see workbook task	U2-First Angle Projection Third angle projection Isometric sketches BS8888 T-PowerPoint / Demo S- WS1 – Produce sketches and 1st angle drawings	U2—Line types- centre lines / hidden lines/text/ T-PowerPoint / Demo S- WS1 – Produce sketches and 1st angle drawings
3 23/9/24	U1-Equations of Lines & Exponential Functions Point Gradient / slope / y=mx+c T- PowerPoint CTB- Workbook Page 3&4 S- see workbook task	U1-Simultaneous Equations and liner equations. Substitution Elimination T- PowerPoint CTB- Workbook Page 5 S- see workbook task	U2- Practice commands into engineering drawings, grid, snap, line, circle, radius, copy, mirror, other. use of menus T-PowerPoint / Demo S- WS1 – Produce sketches and 1st angle drawings	U2--- Grid, snap, line, circle, radius, copy, mirror, scale, more advance commands, section, use of advance menus. T-PowerPoint / Demo S- WS1 – Produce sketches and 1st angle drawings
4 30/9/24	U1- Quadratic Equations Expanding and Factorizing Expanding brackets Factorizing	U1- Quadratic Equation Formula Factorizing quadratics Completing the square Solution by formula	U2- Use of layers in engineering drawings. Set up layers, name layers, allocate colours. Turn layers on / off	U2-Controlled assessment Students select a component from the workshop and take measurements /sketch

	T- PowerPoint CTB- Workbook Page 6&7 S- see workbook task	T- PowerPoint CTB- Workbook Page 8 S- see workbook task	**Assignment handout date** T-PowerPoint / Demo S- WS1 – Produce sketches and 1st angle drawings	T-observation S-produce sketch and AutoCAD Drawing T-Complete observation on Layers (M grade)
5 7/10 /24	U1-Radians and sectors Convert radians to degrees Degrees to radians Arc length Sectors areas T- PowerPoint CTB- Workbook Page 9 S- see workbook task	U1-Trigonometric – Right Angle & Sine Rule Right angle triangle Sine rule using radians T- PowerPoint CTB- Workbook Page 12 S- see workbook task	U2-Controlled assessment Students select a component from the workshop and take measurements /sketch T-observation S-produce sketch and AutoCAD Drawing T-Complete observation on Layers (M grade)	U2Controlled assessment Students select a component from the workshop and take measurements /sketch T-observation S-produce sketch and AutoCAD Drawing T-Complete observation on Layers (M grade)
6 14/10/24	U1-Cosine Rule Cosine rule T- PowerPoint CTB- Workbook Page 11 S- see workbook task	U1-Surface Area & Volumes Cylinder Sphere Cone T- PowerPoint CTB- Workbook Page 15 S- see workbook task	U2-Controlled assessment Students select a component from the workshop and take measurements /sketch T-observation S-produce sketch and AutoCAD Drawing T-Complete observation on Layers (M grade)	U2-Controlled assessment Students select a component from the workshop and take measurements /sketch T-observation S-produce sketch and AutoCAD Drawing T-Complete observation on Layers (M grade)
7 21/10/24	U1-Vectors and Force Systems Victor diagrams Graphical vector addition Analytical vector addition FBD T- PowerPoint CTB- Workbook Page 15,16, 17 S- see workbook task	U1-Momemnts and Simply Supported Beams in equilibrium Turning Moment Simply supported Beams UDL Beams T- PowerPoint CTB- Workbook Page 17, 18 S- see workbook task	U2-Controlled assessment Students select a component from the workshop and take measurements /sketch T-observation S-produce sketch and AutoCAD Drawing T-Complete observation on Layers (M grade)	U2-Controlled assessment Students select a component from the workshop and take measurements /sketch T-observation S-produce sketch and AutoCAD Drawing T-Complete observation on Layers (M grade) Assignment Due
8	U1-Direct Loading and Shear Loading Direct Stress	U1-Velocity, displacement & acceleration. SUVAT	U2-Primary manufacturing process –	U2-Scondart manufacturing process – Turning / milling/drilling/ punching

4/11 /24	Direct Strain Youngs Modulus Shear stress Shear strain T- PowerPoint CTB- Workbook Page 19,20 S- see workbook task	Constant acceleration formula Laws of motion T- PowerPoint CTB- Workbook Page 21,22 S- see workbook task	casting/forging/injection moulding / die castings T-PowerPoint S-Note taking / discussion H/W – Research and Explain 3 primary manufacturing processes PS-Research and Explain 3 primary in detail- explain / analysis and evaluate	T-PowerPoint S-Note taking / discussion H/W – Research and Explain 3 secondary manufacturing processes PS-Research and Explain 3 secondary in detail- explain / analysis and evaluate
9 11/1 1/24	U1-Force, friction and torque Force, friction, T- PowerPoint CTB- Workbook Page 23 S- see workbook task	U1-Work and power, Energy Mechanical Work Power KE, PE T- PowerPoint CTB- Workbook Page 25 S- see workbook task	U2-Scale of production One-off/batch/mass/continuous production T-PowerPoint S-Note taking / discussion H/W – Research and Explain the use of scales of production PS-Research and Explain 3 scales of production- explain / analysis and evaluate	U2-Scale of production Processes type / skills matrix T-PowerPoint S-Note taking / discussion H/W – Research and Explain the use of scales of production process PS-Research and Explain 3 scales of production- process and machine matrix explain / analysis and evaluate
10 18/1 1/24	U1-Newton's laws of motion, momentum and energy Laws of motion Momentum Conservation of momentum Conservation of energy T- PowerPoint CTB- Workbook Page 26 S- see workbook task	U1-Angular Parameters Angular and liner velocity Centripetal acceleration Power Kinetic rotation energy T- PowerPoint CTB- Workbook Page 27 S- HW1 S- see workbook task	U 2- Rolling hot and cold – microstructure. T-PowerPoint S-Note taking / discussion H/W – Research and Explain the use of Cold and Hot Rolling PS-Research and Explain 3 scales of production- explain / analysis and evaluate	U2-Health and Safety HSAWA / Other regulations applied to mechanical / electrical / aerospace / marine engineering T-PowerPoint S-Note taking / discussion H/W – Explain the Health and Safety at work Act 1975 PS- Select 3 health and regulations
11 25/1 1/24	U1-Mechnical Power and Transmission Mechanical advantage Velocity ratio Efficiency T- PowerPoint CTB- Workbook Page 28 S- see workbook task	U1-Submerged Surfaces Hydrostatic pressure, hydrostatic thrust. Average hydrostatic pressure Centre of pressure T- PowerPoint CTB- Workbook Page 29 S- see workbook task	U2-Health and Safety HSAWA / Other regulations applied to mechanical / electrical / aerospace / marine engineering T-PowerPoint S-Note taking / discussion H/W – Explain the Health and Safety at work Act 1975	U2-Human Factors Applications of HF to engineering sector T-PowerPoint S-Note taking / discussion H/W – Explain 3 HF as applied to engineering workshop while working in groups

			PS- Select 3 health and regulations	PS-Research other HF and explain 3 more
12 2/12 /24	U1-Immersed Bodies and Archimedes Principle Density and relative density Suspended body submerged in a fluid Floating bodies T- PowerPoint CTB- Workbook Page 30 S- see workbook task	U1-Fluid Flow in Tapering Pipes Volumetric flow rate Mass Flow rate Continuity flow equation T- PowerPoint CTB- Workbook Page 31 S- see workbook task	U2-Controled Assignment Manufacturing process/H&S/HF T-Assignment hand out date S- Start assignment **Assignment 2 Hand out date**	U2-Controled Assignment Manufacturing process/H&S/HF T-Assignment hand out date S- Start assignment
	Christmas Break			
13 9/12 /24	U1-Ohms laws and current Flow Revision on ohms law Static electricity Current flow and atomic structure Conventional current flow T- PowerPoint CTB- Workbook Page 32 S- see workbook task	U1-Coulomb's law and electrostatic force. Coulomb's law Charged particles Permittivity of free space – uniform field T- PowerPoint CTB- Workbook Page 33 S- see workbook task	U2-Production Planning Stepped shaft T-PowerPoint S- Making notes / produce a production plan. Process/machine/tooling PS-Researching machining speed and feeds	U2 – Production Plan for milled component T-PowerPoint S-Produce production plan for milled and drilled component PS-complete production plan
14 16/1 2/24	U1-Types of resistors, Resistance, conductance and temperature Resistance Conductance Temperature coefficient of resistance T- PowerPoint CTB- Workbook Page 34, 35 S- see workbook task	U1-Field Strength and uniform electrical strength Field strength Uniform electrical field Non-uniform electrical field T- PowerPoint CTB- Workbook Page 36 S- see workbook task	U2-Working as teams / leadership roles/individual roles/accountability T-PowerPoint S- Work in groups about team building PS-Research leadership styles	U2-How to conduct meetings Agenda/recoding making. Format of recording notes T-PowerPoint S-Mock Meeting roleplay PS-Research how to conduct meetings
15 6/1/ 25	Unit 1- Types of capacitors, Capacitance, Permittivity. Charge between parallel plates Capacitance Permittivity T- PowerPoint CTB- Workbook Page 37, 38 S- see workbook task	U1-Capacitors – Polarised and non-polarised. Dielectric strength Capacitor construction-polarised Supercapacitor Electrolytic Dielectric strength T- PowerPoint CTB- Workbook Page 138,39 S- see workbook task	U2-Workshop assessment in conjunction with code of HSE Assignment 3 T-Complete course assignment in workshop S-Working on RA and application within assignment PS-Research case studies on accidents and RA	U2-Conduct workshop Assignment 3 T-Demonstrate process of their on secondary process. S-Complete course assignment in workshop PS-Compare with peers other RA conducted in workshop

16 13/1 /25	U1-Ohm's law Power efficiency 1 & 2 Graphical and non-graphical form Graphical form Variation on power equations Efficiency T- PowerPoint CTB- Workbook Page 40.41 S- see workbook task	U1-Kirchoff's Voltage and Current laws. Kirchoff's voltage law Kirchoff's current law Combining Kirchoff's and Ohms law T- PowerPoint CTB- Workbook Page 42 S- see workbook task	U2-Setting up machining process Lathe /Mill/Drill T-Demo in the workshop S- Conduct setting up a machine PS-Compare with peers other setting up procedures	U2-Setting up machining process Lathe /Mill/Drill T-Demo in the workshop S- Conduct setting up a machine PS-Compare with peers other setting up procedures
17 20/1 /25	U1- Capacitors Networks, Capacitors charging and discharging. Capacitors Networks Charging capacitors Energy stored in a capacitor Capacitor parallel and series network T- PowerPoint CTB- Workbook Page 43,44 S- see workbook task	U1 -Capacitors in circuits – RC transients and capacitor time constant. RC transient Capacitor charging Capacitor discharging T- PowerPoint CTB- Workbook Page 45, 46 S- see workbook task	U2-Quality Plan – use of quality plans in manufacturing T- Demo on how to check quality features using verniers and micrometres S-Complete quality checks PS-Research how quality plans are used in engineering	U2-HF and working as Teams, performance. T-PowerPoint / Role play S-Role play analysis PS- Compare with other peers, performance factors
18 27/1 /25	U1-Diodes – bias and applications. DC power sources Forward bias Reverse bias Batteries Cells T- PowerPoint CTB- Workbook Page 47,48 S- see workbook task	U1-Resistors in series or parallel. Resistors in series and parallel combinations T- PowerPoint CTB- Workbook Page 49,50 S- see workbook task	U2-HF and working as Teams, performance. T-PowerPoint / Role play S-Role play analysis PS- Compare with other peers, performance factors	U2- Cut raw material for assignments and produce machine rotos S-cut raw materials, base and pegs. Produce a team schedule
19 3/2/ 25	U1- Resistors and diodes in series T- PowerPoint CTB- Workbook Page 51 S- see workbook task	U1-Capacitors in series or parallel. Capacitors in series and parallel combination T- PowerPoint CTB- Workbook Page 52,53 S- see workbook task	U2-Control Assignment S-working as teams to complete gameboard and pegs	U2-Control Assignment S-working as teams to complete gameboard and pegs
20 10/2 /25	U1-Magnetism and magnetic fields Magnetic fields, magnetic flux density, ferromagnetic materials, solenoids, magnetic field strength T- PowerPoint	U1-Permeability, B/H Curves, loop and hysteresis. Relative permeability B/H curves in ferromagnetic materials T- PowerPoint	U2-Control Assignment	U2-Control Assignment

	CTB- Workbook Page 54 S- see workbook task	CTB- Workbook Page 55, 56 S- see workbook task	S-working as teams to complete gameboard and pegs	S-working as teams to complete gameboard and pegs
21 24/2 /25	U1-Relutance and magnetic screening. Analogy of reluctance and resistance Reluctance Magnetic screening T- PowerPoint CTB- Workbook Page 57 S- see workbook task	U1-Electromagnetic induction Basic DC motor operations Induction DC motor T- PowerPoint CTB- Workbook Page 1 S- HW1 S- see workbook task	U2-Control Assignment S-working as teams to complete gameboard and pegs	U2-Control Assignment S-working as teams to complete gameboard and pegs
22 3/3/ 25	U1--Electromagnetic induction Basic DC motor operations Induction DC motor T- PowerPoint CTB- Workbook Page 58 S- see workbook task	U1-DC Motors Basic design and operations of a DC motor Industrial DC motor T- PowerPoint CTB- Workbook Page 59 S- see workbook task	U2-Control Assignment S-working as teams to complete gameboard and pegs	U2-Control Assignment S-working as teams to complete gameboard and pegs
23 10/3 /25	U1-Electrical Generators Operation of an electrical generator Factors effecting induced EMF Sinusoidal Output of generator T- PowerPoint CTB- Workbook Page 60 S- see workbook task	U1-Inductors and self-induction Induction, electromotive force emf (e) self-inductance in a coil (L), Energy stored in an inductor (W) T- PowerPoint CTB- Workbook Page 61 S- see workbook task	U2-Control Assignment S-working as teams to complete gameboard and pegs	U2-Control Assignment S-working as teams to complete gameboard and pegs
24 17/3 /24	U1-Transfomers and mutual inductance Mutual induction (M), transformers Transformer calculations. T- PowerPoint CTB- Workbook Page 62 S- see workbook task	U1- AC Waveforms Sinusoidal waveform Square waveform Triangular waveform Sawtooth waveform T- PowerPoint CTB- Workbook Page 63 S- see workbook task	U2-Assignment 3 Presentation S-Team Presentations Employer input	U2-Assignment 3 Presentation S-Team Presentations Employer input
25 21/3 /25	U1-Single phase AC parameters AC Parameters. Peak-to-Peak, Root-Mean Square, Average Voltage and Form Factor T- PowerPoint CTB- Workbook Page 64	U1-Analysing AC voltage using phasors. Graphical addition, Phasor addition T- PowerPoint CTB- Workbook Page 65 S- see workbook task	U3-Introduction to unit 3 Design trigger and design cycle T-PowerPoint S-Case study a past exam study PS-Complete case study	U2/3 – Workshop Practise S-Produce engineering component (Job 1)

	S- S- see workbook task			
26 31/3 /25	U1-Reactance and impedance Capacitive Reactance (Xc) Inductive Reactance (X_L) Resistor/capacitor series circuit Resistor/inductor series circuit Total impedance of a resistor/capacitor series circuit Total impedance of resistor inductor series circuit T- PowerPoint CTB- Workbook Page 66 S- see workbook task	U1- Reactance and impedance Capacitive Reactance (Xc) Inductive Reactance (X_L) Resistor/capacitor series circuit Resistor/inductor series circuit Total impedance of a resistor/capacitor series circuit Total impedance of resistor inductor series circuit T- PowerPoint CTB- Workbook Page 66 S- see workbook task	U3 Design Process – Customer needs. Opportunities and constraint. T-Past exam papers question on client needs S-Produce a list of opportunities and constraints.	U2/3 – Workshop Practise S-Produce engineering component (Job 1)
27 21/4 /25	U1-Rectifiction Simple half wave rectifier Full wave bridge rectifier Smoothed full bridge rectifier T- PowerPoint CTB- Workbook Page 67 S- HW1 End of learning for Unit 1	**U1-Revision – Past Papers**	U3 – Customer data analysis T-Past exam paper on client data Develop analysis for data given S- Produce bar charts /line graphs/pie charts. Evaluate outputs PS-Past Papers	U2/3 – Workshop Practise S-Produce engineering component (Job 1)
28 28/4 /25	**U1- Revision – Past Papers**	**U1- Revision – Past Papers**	U3- Scheduling techniques – Gantt chart / CPA T-Past exam papers question S-Produce Gantt chart for exam question PS-Past Papers	U2/3 – Workshop Practise S-Produce engineering component (Job 1)
29 5/5/ 25	**U1- Revision – Past Papers**	**U1 Revision – Past Papers -**	U3 – Product Design Specification T-Past exam papers question S-Produce PDS for exam question PS-Past Papers – produce PDS	U2/3 – Workshop Practise S-Produce engineering component (Job 1)
30 12/5 /25	**U1- Revision – Past Papers**	**U1- Revision – Past Papers**	U3 – Design concepts – movement / levers /links T-Engineering design case study	U2/3 – Workshop Practise S-Produce engineering component (Job 1)

			S-Produce design solution / produce sketches	
31 19/5 /25	**U1-** **Exam 22nd May 2025**	**U1-** **Exam 22nd May 2025**	U3-Engineering Materials T-PowerPoint S-Select engineering materials for given exam questions from past papers PS-Research engineering materials and applications	U3-Production Process – Primary T-PowerPoint S-Select production process from past exams papers PS-List and explain primary processes
32 2/6/ 25	U3-	U3-	U3	U2/3 – Workshop Practise S-Produce engineering component (Job 1/2)
33 9/6/ 25	Work Experience	Work Experience	Work Experience	Work Experience
34 23/6 /25	U3- Material External finish Power coating / spay painting/other surface finish T-PowerPoint S-Select engineering materials and external finish for given exam questions from past papers PS-Research external finish applications	U-3 Proactive coating Zine coat / aluminium anodising/ Coating sheets T-PowerPoint S-Select engineering materials and coating for given exam questions from past papers PS-Research engineering materials coatingand applications	U3- Design solution gears/bearing/bushes T-PowerPoint S-Select design solutions for given exam questions from past papers PS-Research engineering design that use gears/bearing/bushes materials and applications	U2/3 – Workshop Practise S-Produce engineering component (Job 1/2)
35 30/6 /25	U3- Orthographic projection 1st and 3rd T-PowerPoint S-Select engineering materials for given exam questions from past papers PS-Research engineering materials and applications	U3 -Initial idea generation/mindmaps T-PowerPoint S-Select initial ideas questions from past papers T-PowerPoint PS- Develop a mind map for a go-kart	U3-Case study – stool redesign T-PowerPoint S-Read case makes notes on what can be changes and why PS-produce a list of constraints and opportunity	U2/3 – Workshop Practise S-Produce engineering component (Job 1/2/3)
36	U3-Case study – stool redesign	U3-Case study – stool redesign	U3-Case study – stool redesign	U2/3 – Workshop Practise

7/7/25	T-PowerPoint S-Select engineering materials for the stool PS-Research engineering materials and applications	T-PowerPoint S-Select engineering processes for the stool PS-Research engineering processes and applications	T-PowerPoint S-Select assembly procedures PS-Research engineering assembly	S-Produce engineering component (Job 1/2/3)
37 14/7/25		**Summer Break**		

2nd Year (2022/2023)

Week	Lesson 1	Lesson 2	Lesson 3	Lesson 4
1	U1-Mechnical	U1-Electrical	U3	U3
2	U1-Mechnical	U2	U2	U2
3	U1-Mechnical	U2	U2	U2
4	U1-Mechnical	U2	U2	U2
5	U1-Mechnical	U2	U2	U2
6	U1-Mechnical	U2	U2	U2
7	U1-Mechnical	U2	U2	U2
8	U1-Mechnical	U2	U2	U2
9	U1-Mechnical	U2	U2	U2

10	U1-Mechnical	U2	U2	U2
11	U1-Mechnical	U2	U2	U2
12	U1-Mechnical	U2	U2	U2
13	U1-Revision Week	U1-Revision Week	U3-Revision Week	U3-Revision Week
14	U1-Mock Exam	U1-Mock Exam	U3-Mock Exam	U2-Mock Exam
15	U1-Mock Exam	U1-Mock Exam	U3-Mock Exam	U2-Mock Exam
16	U1-EXAM		U3-EXAM	
17	Unit10	U10	U10	U10
18	U10	U10	U10	U10
19	U10	U10	U10	U10
20	U10	U10	U10	U10
21	U10	U10	U10	U10
22	U10	U10	U10	U10
23	U10	U10	U10	U10
24	U10	U10	U10	U10
25	U10	U10	U10	U10

26	U10	U10	U10	U10
27	U10	U10	U10	U10
28	U10	U10	U10	U10
29	U1- Revision Week	U1-Revision Week	U3-Revision Week	U3-Revison Week
30	U1-Mock Exam	U1-Mock Exam	U3-Mock Exam	U3-Mock Exam
31	U1-Mock Exam	U1-Mock Exam	U3-Mock Exam	U3-Mock Exam
32	U1-EXAM (Retake Only)		U3-EXAM (Retake only)	
33				
34				
35				
36				