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TEACHERS AND LECTURERS

Emerging Technologies careers: a guide for teachers and lecturers

Pioneering the Frontiers

Figures checked from 11 July 2026. Built from the TechSkills Career Matrix.

About this guide

This guide is for teachers and lecturers who advise students on careers in Emerging Technologies.

It is built from the TechSkills Career Matrix and Career Planner. Every pay, hiring and funding figure shows its source and the date it was checked. Where our data has a gap, the guide says so.

Areas of work covered	9
Apprenticeship standards listed	15
Produced by	TechSkills, techskills.org

Emerging Technologies at a glance

No.	Area of work	What it covers	Example roles	Pay range
01	Quantum Computing	Harnessing subatomic physics to solve impossible math problems.	Quantum Engineer, Algorithmist, Cryogenic Specialist	£40,347 to £80,207+
02	Robotics & Automation	Giving machines the ability to move, sense, and react to the physical world.	Robotics Engineer, Vision Specialist, Automation Architect, Controls Engineer	£45,000 to £75,000+
03	Web3 & Ledger Tech	Building the next generation internet on decentralised protocols.	Blockchain Developer, Crypto Architect, Token Economist, Validator Ops	£43,000 to £82,000+
04	Immersive (XR) & Meta	Crafting digital worlds and overlaying data on the physical world.	XR Developer, World Builder, Spatial UI Designer, Interaction Developer	£32,000 to £53,750+
05	Space Tech & Frontier	Technologies for space exploration, asteroid mining, and orbit ops.	Avionics Engineer, Satellite Ops, Mission Architect, Payload Specialist	£43,167 to £80,190+
06	Ethical Innovation	Ensuring futuristic technology is safe, fair, and beneficial.	Ethical Futurist, AI Safety Officer, Privacy Engineer, Impact Auditor	£60,000 to £75,500+
07	Climate & Green Technology Engineering	Applying software, data, and engineering to problems like carbon measurement, renewable energy optimisation, environmental monitoring, and sustainable infrastructure, the environmental technology (EnviroTech) sector.	Climate Tech Engineer, Sustainability Data Analyst, Energy Systems Developer, Carbon Accounting Engineer	£45,000 to £60,000+
08	Synthetic Biology & Bio-Digital Convergence	Applying computational tools, modelling, data analysis, automation, to biological engineering, from lab automation to genomic data.	Bioinformatics Engineer, Computational Biologist, Lab Automation Specialist, Genomics Data Scientist	£20,000 to £76,000+
09	Manufacturing & Production Engineering	Applying engineering and data analysis to keep automated, high-hazard and precision manufacturing processes running to specification, from automotive and aerospace lines to chemical and pharmaceutical plants.	Manufacturing Engineer, Process Engineer, Production Engineer, Quality Engineer	£28,000 to £70,000+

Pay ranges come from job advert data. The source for each range is shown with the area of work in the next section.

The areas of work, one by one

01 Quantum Computing

What it is	Harnessing subatomic physics to solve impossible math problems.
Example roles	Quantum Engineer, Algorithmist, Cryogenic Specialist
Skills used	Quantum Phys; Linear Algebra; Python; Algorithm Des
Who it suits	High-level mathematical thinkers who want to redefine compute.
Example of the work	Designing a quantum circuit to simulate carbon-capture molecules.
What shows someone can do it	Ability to design a quantum algorithm or circuit that solves a problem classical computers can't.
Sectors that hire	Financial Services, Aerospace & Defence, Healthcare & Life Sciences, Energy & Utilities, Government & Public Sector
Pay	£40,347 to £80,207+. Source: 25th–75th percentile, Quantum Computing Engineer, Glassdoor UK.

02 Robotics & Automation

What it is	Giving machines the ability to move, sense, and react to the physical world.
Example roles	Robotics Engineer, Vision Specialist, Automation Architect, Controls Engineer
Skills used	C / C++; ROS 2; Comp Vision; Control Theory
Who it suits	Builders who love the intersection of code and physical hardware.
Example of the work	Orchestrating a fleet of 500 warehouse robots in perfect sync.
What shows someone can do it	Ability to build systems that sense, decide and act reliably in the physical world.
Sectors that hire	Manufacturing & Engineering, Transport & Logistics, Agriculture, Healthcare & Life Sciences, Automotive
Pay	£45,000 to £75,000+. Source: 25th percentile Robotics Engineer to median Senior Robotics Engineer, IT Jobs Watch UK.

Apprenticeship route: Industrial Automation

What it is	Install, maintain and fault-find the automated production lines, industrial robots and control systems that keep factories, warehouses and increasingly farms running. Hands-on shift or site based work, not a design office.
Example roles	Automation & Controls Engineering Technician, Mechatronics Maintenance Technician, Aircraft Maintenance Technician

What suits this route	Comfortable on a factory floor, warehouse or outdoors around moving machinery; Methodical, safety-led fault diagnosis under time pressure; Interested in the electrical, mechanical AND software side of a machine, not just one
Pay	£40,002+. Source: median, Automation Maintenance Technicians.

Standard	Reference	Level	Typical length	Checked
Aircraft Maintenance Technician	ST1315	Level 3	36 months	30 July 2026
Space Engineering Technician	ST0855	Level 4	48 months	30 July 2026
Automation and Controls Engineering Technician	ST0662	Level 4	48 months	30 July 2026
Mechatronics Maintenance Technician	ST1326	Level 3	42 months	30 July 2026
Engineering and Manufacturing Support Technician	ST1395	Level 3	Not given	31 July 2026

03 Web3 & Ledger Tech

What it is	Building the next generation internet on decentralised protocols.
Example roles	Blockchain Developer, Crypto Architect, Token Economist, Validator Ops
Skills used	Solidity/Rust; Cryptography; Distributed Systems; Game Theory
Who it suits	System thinkers interested in trust and transparency.
Example of the work	Designing a decentralised voting system for a local council.
What shows someone can do it	Ability to design a decentralised system that is secure and trustworthy without a central authority.
Sectors that hire	Financial Services, Government & Public Sector, Media & Entertainment, Transport & Logistics, Legal Services
Pay	£43,000 to £82,000+. Source: Blockchain Developer range, Glassdoor UK, proxy; no direct UK data for Token Economist/Validator Ops.

04 Immersive (XR) & Meta

What it is	Crafting digital worlds and overlaying data on the physical world.
Example roles	XR Developer, World Builder, Spatial UI Designer, Interaction Developer
Skills used	Unity/Unreal; C# / C++; 3D Design; Spatial Audio
Who it suits	Visual creatives who want to build the future of interaction.
Example of the work	Designing an AR training system for heart surgeons.
What shows someone can do it	Ability to design an immersive experience that feels natural in 3D space, not just a flat screen in a headset.

Sectors that hire	Healthcare & Life Sciences, Media & Entertainment, Higher Education, Retail & E-commerce, Aerospace & Defence
Pay	£32,000 to £53,750+. Source: 25th–75th percentile, Virtual Reality job postings, IT Jobs Watch UK excl. London.

05 Space Tech & Frontier

What it is	Technologies for space exploration, asteroid mining, and orbit ops.
Example roles	Avionics Engineer, Satellite Ops, Mission Architect, Payload Specialist
Skills used	Orbital Mechanics; Embedded Systems; Radiation Hardening; AI
Who it suits	Adventurers who want to help humanity reach the stars.
Example of the work	Coding the autonomous docking for a resupply satellite.
What shows someone can do it	Ability to build systems that keep working reliably in extreme, hard-to-reach environments.
Sectors that hire	Aerospace & Defence, Telecommunications, Government & Public Sector, Energy & Utilities, Insurance
Pay	£43,167 to £80,190+. Source: 25th–90th percentile, Satellite Operations Engineer, Glassdoor UK, proxy; no direct UK data for Mission Architect/Payload Specialist.

06 Ethical Innovation

What it is	Ensuring futuristic technology is safe, fair, and beneficial.
Example roles	Ethical Futurist, AI Safety Officer, Privacy Engineer, Impact Auditor
Skills used	AI Policy; Sociology; Philosophy; Risk Modelling
Who it suits	Thinkers who want to be the conscience of high-tech progress.
Example of the work	Auditing a new neural-link tech for cognitive privacy risks.
What shows someone can do it	Ability to identify and mitigate the real-world risks of a new technology before it ships.
Sectors that hire	Government & Public Sector, Technology & Software, Financial Services, Healthcare & Life Sciences, Legal Services
Pay	£60,000 to £75,500+. Source: median Data Protection Officer to Privacy Engineer, IT Jobs Watch UK/England, proxy; no direct UK data for Ethical Futurist/AI Safety Officer.

07 Climate & Green Technology Engineering

What it is	Applying software, data, and engineering to problems like carbon measurement, renewable energy optimisation, environmental monitoring, and sustainable infrastructure, the environmental technology (EnviroTech) sector.
Example roles	Climate Tech Engineer, Sustainability Data Analyst, Energy Systems Developer, Carbon Accounting Engineer
Skills used	Environmental Data Modelling; Energy Systems; Carbon Accounting; IoT for Sustainability
Who it suits	Purpose-driven builders who want their technical skills to matter for the planet.
Example of the work	Accelerates the UK's transition to net zero through applied technology.
What shows someone can do it	Ability to apply software and data skills to measurably reduce carbon impact or energy waste.
Sectors that hire	Energy & Utilities, Government & Public Sector, Manufacturing & Engineering, Financial Services, Agriculture
Pay	£45,000 to £60,000+. Source: median Sustainability Analyst to Sustainability Manager, IT Jobs Watch UK.

Apprenticeship route: Utilities Technology

What it is	Build, maintain and upgrade the power, water and smart-metering networks the net-zero transition depends on, and manufacture the batteries that store the energy it runs on: substations, water networks, smart meters and battery production lines.
Example roles	Water Industry Network Technician, Dual Fuel Smart Meter Installer, Overhead Linesperson / Substation Fitter, Battery Manufacturing Technician
What suits this route	Comfortable working outdoors in all weather, at height, or below ground, or on a factory production line; Safety-led approach to high-voltage and pressurised-network work; Interested in the infrastructure side of the net-zero transition, not just the software/data side
Pay	£39,057 to £48,171. Source: median, water network operative to electrical trades.

Standard	Reference	Level	Typical length	Checked
Water Industry Network Technician	ST1292	Level 3	Not given	30 July 2026
Water Network Operative	ST0898	Level 2	Not given	30 July 2026
Dual Fuel Smart Meter Installer	ST0158	Level 2	Not given	30 July 2026
Battery Manufacturing Technician	ST1338	Level 3	Not given	30 July 2026
Power Industry Overhead Linesperson	ST1330	Level 3	Not given	30 July 2026
Power Industry Substation Fitter	ST1331	Level 3	Not given	30 July 2026

08 Synthetic Biology & Bio-Digital Convergence

What it is	Applying computational tools, modelling, data analysis, automation, to biological engineering, from lab automation to genomic data.
Example roles	Bioinformatics Engineer, Computational Biologist, Lab Automation Specialist, Genomics Data Scientist
Skills used	Bioinformatics; Genomic Data Analysis; Lab Automation; Computational Modelling
Who it suits	Interdisciplinary thinkers comfortable at the boundary of biology and code.
Example of the work	Speeds up breakthroughs in medicine, agriculture, and materials science.
What shows someone can do it	Ability to apply computational tools to accelerate real biological research and discovery.
Sectors that hire	Healthcare & Life Sciences, Agriculture, Government & Public Sector, Technology & Software, Aerospace & Defence
Pay	£20,000 to £76,000+. Source: range, Bioinformatics Scientist, Payscale UK.

09 Manufacturing & Production Engineering

What it is	Applying engineering and data analysis to keep automated, high-hazard and precision manufacturing processes running to specification, from automotive and aerospace lines to chemical and pharmaceutical plants.
Example roles	Manufacturing Engineer, Process Engineer, Production Engineer, Quality Engineer
Skills used	Process and production engineering; Root-cause quality problem solving; CAD and technical documentation; Continuous improvement (Lean/Six Sigma); Safe operation of high-hazard, continuous processes
Who it suits	Practical problem-solvers who want to see their engineering fix a real production line, not just a diagram.
Example of the work	Keeps UK production lines running safely, efficiently and to specification, and drives the continuous improvement that keeps them competitive.
What shows someone can do it	Ability to keep a real production line or process running safely, to specification, and measurably improving over time.
Sectors that hire	Manufacturing & Engineering, Automotive, Aerospace & Defence, Energy & Utilities, Mining & Quarrying
Pay	£28,000 to £70,000+. Source: technician entry to senior manufacturing/process engineer, Glassdoor/Indeed/Experteer UK benchmarks.

Apprenticeship route: Manufacturing & Production Engineering

What it is	Work on a real factory floor or process plant from day one: gathering production data, solving quality and reliability problems, and keeping high-hazard, continuous processes running to specification, under supervision and structured off-the-job training rather than a standalone engineering degree.
Example roles	Engineering Manufacturing Technician Apprentice, Process Industry Technician Apprentice, Production Support Technician
What suits this route	Comfortable on a factory floor or process plant, often shift-based; Methodical, safety-led approach to high-hazard or continuous processes; Interested in how a production process actually runs day to day, not just how it's designed on paper
Pay	£24,000 to £55,000+. Source: technician apprentice to experienced production/process technician.

Standard	Reference	Level	Typical length	Checked
Engineering Manufacturing Technician	ST0841	Level 4	42 months	31 July 2026
Process Industry Manufacturing Technician	ST1407	Level 3	36 months	31 July 2026
Mineral Products Technician	ST0605	Level 5	36 months	31 July 2026
Material Processing Plant Operator	ST0144	Level 2	18 months	31 July 2026

Routes into the field

Route	What it is	Cost and pay
Apprenticeships	Earn while they train through structured learning that combines workplace experience with recognised development.	their employer (or the government, via the apprenticeship levy and co-investment) pays for all their training and assessment costs directly to the provider, they are never billed for tuition, and they don't take out a loan for it. Apprentices are paid at least the apprentice minimum wage of £8.00 an hour.
Degrees	Build strong technical foundations through longer-form study with opportunities to specialise and progress academically.	Covers their tuition fees in full, paid directly to their university or college, not means-tested, so every eligible student can borrow the same amount regardless of household income. Repayments under Plan 5 are 9% of income above £25,000 a year, and the loan is written off after 40 years.
Bootcamps & Intensive Training	We don't currently have any Tech Industry Gold accredited bootcamp providers - accelerate their move into tech via the government's own Skills Bootcamps programme instead: free, flexible courses up to 16 weeks, built around employability.	Free to the learner. Up to 16 weeks. Available across England.
Flexible Learning (Apprenticeship Units)	Build relevant tech skills through shorter, flexible learning without committing to a full programme from the start.	Shorter, flexible training. Focused, in-demand skills. Aligned to employer needs. Can build toward larger qualifications.

Apprenticeships: Explore Apprenticeships

Degrees: Find Degrees

Bootcamps & Intensive Training: Find a Skills Bootcamp (gov.uk)

Flexible Learning (Apprenticeship Units): Explore Flexible Learning

Who pays for an apprenticeship	Employers with an annual pay bill over £3 million pay into the apprenticeship levy, topped up by government, to fund training. Smaller employers get most of the cost covered through government co-investment, and from the 2026/27 funding year, training for under-25s at these smaller, non-levy-paying employers is fully funded.
Apprentice minimum wage	£8.00 an hour: the National Minimum Wage apprentice rate, which applies if they're under 19, or 19+ and in the first year of their apprenticeship (from 1 April 2026). Once they're 19+ and past their first year, they move to the normal age-based National Minimum Wage (up to £12.71/hour for ages 21+ from April 2026), many employers pay well above the legal minimum.

Funding sources: gov.uk: Apprenticeship funding rules and assessment plan guidance, 2026 to 2027 (checked 20 July 2026); gov.uk: Student finance for undergraduates, gov.uk: Repaying your student loan; gov.uk: How interest is calculated, Plan 5 (checked 20 July 2026). Rates change each year, so confirm current figures on gov.uk before quoting them.

Apprenticeship standards in this career family

Reference	Standard	Level	Typical length
ST0144	Material Processing Plant Operator	Level 2	18 months
ST0158	Dual Fuel Smart Meter Installer	Level 2	Not given
ST0898	Water Network Operative	Level 2	Not given
ST1292	Water Industry Network Technician	Level 3	Not given
ST1315	Aircraft Maintenance Technician	Level 3	36 months
ST1326	Mechatronics Maintenance Technician	Level 3	42 months
ST1330	Power Industry Overhead Linesperson	Level 3	Not given
ST1331	Power Industry Substation Fitter	Level 3	Not given
ST1338	Battery Manufacturing Technician	Level 3	Not given
ST1395	Engineering and Manufacturing Support Technician	Level 3	Not given
ST1407	Process Industry Manufacturing Technician	Level 3	36 months
ST0662	Automation and Controls Engineering Technician	Level 4	48 months
ST0841	Engineering Manufacturing Technician	Level 4	42 months
ST0855	Space Engineering Technician	Level 4	48 months
ST0605	Mineral Products Technician	Level 5	36 months

ST0144 Material Processing Plant Operator Operates mobile or static heavy plant equipment producing quarried and processed materials: aggregates, ready-mixed concrete, mortar, asphalt, cement and precast concrete products. Live version 1.1 (v1.0 retired April 2024).

ST0158 Dual Fuel Smart Meter Installer Installs, configures and maintains gas and electric smart meters and related energy monitoring systems.

ST0898 Water Network Operative Entry-level route with clean water and waste water network options.

ST1292 Water Industry Network Technician Options include water distribution network technician, water leakage technician and wastewater network technician.

ST1315 Aircraft Maintenance Technician Maintains and certifies civil and military aircraft, including the electronic and avionics systems alongside mechanical and electrical work. The same diagnose and fix mindset as factory automation, applied to aircraft.

ST1326 Mechatronics Maintenance Technician Installation, testing, fault-finding and planned maintenance of complex automated equipment across electrical, mechanical and control-systems disciplines. Leads to a Level 3 BTEC Diploma and EngTech recognition.

ST1330 Power Industry Overhead Linesperson Installs and maintains the overhead power lines carrying electricity across the transmission and distribution networks. Replaced the retired Power Network Craftsperson standard.

ST1331 Power Industry Substation Fitter Installs, maintains and fault-finds the switchgear, transformers and protection equipment inside electricity substations. Replaced the retired Power Network Craftsperson standard.

ST1338 Battery Manufacturing Technician Operates and maintains the automated production equipment that manufactures battery cells and packs for electric vehicles and large scale grid energy storage. Options include electrode, cell assembly, and module and pack technician.

ST1395 Engineering and Manufacturing Support Technician Supports engineering and manufacturing operations on the shop floor: CAD, CNC programming, robotics and additive manufacturing, alongside general production engineering software.

ST1407 Process Industry Manufacturing Technician Runs and maintains high-hazard, continuous manufacturing processes (chemical, pharmaceutical, oil & gas) to specification. Typical job titles include Plant Technician, Process Technician and Production Technician. Developed with employers including GSK, AstraZeneca and Fujifilm.

ST0662 Automation and Controls Engineering Technician Installs, maintains, fault-finds and optimises hardware/software for automation systems in manufacturing, logistics or utilities.

ST0841 Engineering Manufacturing Technician Provides specialist technical support to engineers across quality, reliability, production and costing. Typical job titles include Manufacturing Production Engineer, Manufacturing Quality Engineer and Process Engineer. Live, version 1.4 (10 Dec 2025).

ST0855 Space Engineering Technician Assembles, wires and tests satellites and other high value space hardware, including precision electronics and mechanisms, in cleanroom and specialist testing environments.

ST0605 Mineral Products Technician Supervises extraction, processing and production across the mineral extractive industries: quarrying, deep mining, concrete, cement, asphalt and clay production. A £495bn UK sector employing around 78,000 people.

Pay and hiring

Level	Median pay	25th to 75th percentile	Salaries in sample	Source	Period
Mid-level	£87,500	£65,000 to £99,063	34	IT Jobs Watch: Machine Learning Engineer (UK)	6 months to 11 Jul 2026

A small sample makes a figure indicative only. The hiring note below says where that applies.

Hiring	12,000-18,000 live UK AI vacancies were estimated in mid-2026, up 20-30% year-on-year, as organisations shift from experimental AI projects toward production systems, real hiring commentary describes this as an 'infusion phase' with growing demand for ML engineers, MLOps specialists and AI platform engineers specifically. Entry-level competition is real too: demand for junior roles is strong but so is the number of applicants, and no reliable junior-specific UK salary sample was found during this research pass.
Remote working	No reliable UK-wide remote/hybrid percentage was found specifically for machine learning roles during this research pass, London alone is estimated to hold 45-55% of UK AI vacancies, suggesting geographic concentration is a bigger factor here than in the other families covered in this system.
Fastest growing skill	MLOps (model deployment and monitoring in production, 36.67% of postings) is the clearest growth area, reflecting the shift from experimental model-building toward running AI systems reliably in production.

Skills and certifications

Skills employers ask for

Skill	Importance	Demand	Time to learn	Route
Python for Machine Learning	Critical	Very High, in 68% of postings	4-6 weeks	All routes
Machine Learning & AI Fundamentals	Critical	Very High, in 100% of postings	4-6 weeks	All routes
MLOps (Machine Learning Operations) & Model Deployment	High	High, in 37% of postings	3-4 weeks	All routes
Fault-Find on Automated Production Systems	Critical	Very High	Ongoing, deepens throughout an apprenticeship as equipment exposure grows	Apprenticeship
Install, Maintain and Fault-Find on Water, Power & Smart-Metering Infrastructure	Critical	Very High	On-the-job over the first 12-24 months of an apprenticeship	Apprenticeship
Operate Automated Battery Cell & Pack Manufacturing Equipment	High	High	Entry-level Production Operator: on-the-job induction over a few weeks. The Level 3 Battery Manufacturing Technician (ST1338) apprenticeship route is longer (exact typical duration not published by IfATE at time of writing).	Apprenticeship
Root-Cause Quality Problem Solving	Critical	High	On-the-job over the first 12 months of an apprenticeship	Apprenticeship
High-Hazard Continuous Process Monitoring	Critical	High	On-the-job, building over the full apprenticeship (typically 36 months for ST1407)	Apprenticeship

Python for Machine Learning: Python documentation Python.org

Python for Machine Learning: Machine Learning Crash Course Google

Machine Learning & AI Fundamentals: Embark on your AI journey with free AI tools Microsoft Learn

MLOps (Machine Learning Operations) & Model Deployment: MLOps documentation AWS Skill Builder

Fault-Find on Automated Production Systems: PLC Troubleshooting 101: Basic Tips and Tricks RealPars

Fault-Find on Automated Production Systems: PLC Fiddle (browser ladder logic simulator) PLC Fiddle

Install, Maintain and Fault-Find on Water, Power & Smart-Metering Infrastructure: Basics of Smart Meter Installation Alison

Operate Automated Battery Cell & Pack Manufacturing Equipment: Battery Technologies (specialisation, free to audit) Coursera / Arizona State University

Root-Cause Quality Problem Solving: Root Cause Analysis: Cause, Effect and 5 Whys' Diagram Alison

Python for Machine Learning: Share of UK Machine Learning Engineer job postings mentioning Python. Machine Learning & AI Fundamentals: Every UK Machine Learning Engineer job posting analysed mentioned machine learning as a core requirement (by definition of the role); AI more broadly appears in 56.67% of postings. MLOps (Machine Learning Operations) & Model Deployment: Share of UK Machine Learning Engineer job postings mentioning MLOps. Fault-Find on Automated Production Systems: Named typical work on the SSC's live occupation page for 'Automation maintenance technicians' (skillsclassification.org), and the core occupational profile of the Automation and Controls Engineering Technician (ST0662) standard. Install, Maintain and Fault-Find on Water, Power & Smart-Metering Infrastructure: Named typical work of the Water Industry Network Technician (ST1292), Water Network Operative (ST0898), Power Industry Overhead Linesperson (ST1330), Power Industry Substation Fitter (ST1331) and Dual Fuel Smart Meter Installer (ST0158) apprenticeship standards. Operate Automated Battery Cell & Pack Manufacturing Equipment: Named typical work of the Battery Manufacturing Technician (ST1338) apprenticeship standard, which covers electrode, cell assembly, and module and pack technician options. AESC's own careers site is explicit that no previous experience is required for entry-level Production Operator roles, trained on the job. Root-Cause Quality Problem Solving: Named typical work in the Engineering Manufacturing Technician (ST0841) occupational profile; a core requirement across manufacturing quality/process engineer job postings generally, though no single UK keyword-percentage source was found for this specific title. High-Hazard Continuous Process Monitoring: Core occupational purpose of the Process Industry Manufacturing Technician (ST1407) standard, developed with employers including GSK, AstraZeneca and Fujifilm.

Certifications

Certification	Provider	Cost	Time	Level	Recognised	Best stage
Microsoft Certified: Azure AI Fundamentals (AI-900)	Microsoft	$99 / approx. £80 (exam fee, correct at time of writing, Microsoft periodically runs free-voucher 'Cloud Skills Challenges', worth checking before paying), check learn.microsoft.com for current pricing	2-3 weeks part-time	Beginner	Medium	Before you apply
EUSR National Water Hygiene (Blue Card)	Energy & Utility Skills Register (EUSR)	£99-£140 + VAT depending on training provider, plus around £30 + VAT for card registration (correct at time of writing, prices vary by provider, e.g. GS Water £140, Hills Safety Training from £99+VAT)	Half a day (around 3 hours)	Beginner	High	Before you apply
Level 2 Award in Introduction to Battery Manufacturing and Working with Batteries	EAL (authored by UKBIC, the UK Battery Industrialisation Centre)	Not publicly published, contact EAL or an approved training centre directly (typical for a brand-new occupation this early; genuine gap in public pricing, not omitted by oversight)	Not publicly published	Beginner	Niche	Before you apply

For teachers and lecturers

Area of work	Who it suits	Example roles	Apprenticeship standards
Quantum Computing	High-level mathematical thinkers who want to redefine compute.	Quantum Engineer, Algorithmist, Cryogenic Specialist	None listed in the Matrix yet
Robotics & Automation	Builders who love the intersection of code and physical hardware.	Robotics Engineer, Vision Specialist, Automation Architect, Controls Engineer	ST1315 Level 3, ST0855 Level 4, ST0662 Level 4, ST1326 Level 3, ST1395 Level 3
Web3 & Ledger Tech	System thinkers interested in trust and transparency.	Blockchain Developer, Crypto Architect, Token Economist, Validator Ops	None listed in the Matrix yet
Immersive (XR) & Meta	Visual creatives who want to build the future of interaction.	XR Developer, World Builder, Spatial UI Designer, Interaction Developer	None listed in the Matrix yet
Space Tech & Frontier	Adventurers who want to help humanity reach the stars.	Avionics Engineer, Satellite Ops, Mission Architect, Payload Specialist	None listed in the Matrix yet
Ethical Innovation	Thinkers who want to be the conscience of high-tech progress.	Ethical Futurist, AI Safety Officer, Privacy Engineer, Impact Auditor	None listed in the Matrix yet
Climate & Green Technology Engineering	Purpose-driven builders who want their technical skills to matter for the planet.	Climate Tech Engineer, Sustainability Data Analyst, Energy Systems Developer, Carbon Accounting Engineer	ST1292 Level 3, ST0898 Level 2, ST0158 Level 2, ST1338 Level 3, ST1330 Level 3, ST1331 Level 3
Synthetic Biology & Bio-Digital Convergence	Interdisciplinary thinkers comfortable at the boundary of biology and code.	Bioinformatics Engineer, Computational Biologist, Lab Automation Specialist, Genomics Data Scientist	None listed in the Matrix yet
Manufacturing & Production Engineering	Practical problem-solvers who want to see their engineering fix a real production line, not just a diagram.	Manufacturing Engineer, Process Engineer, Production Engineer, Quality Engineer	ST0841 Level 4, ST1407 Level 3, ST0605 Level 5, ST0144 Level 2

The Who it suits column comes from the Career Matrix. It is a starting point for a conversation, not an assessment.

Notes on your students

Activities for lessons and clubs

Activity	What students do	Level	Time	Skills shown
Public Dataset Classifier	Train a machine learning model (e.g. using scikit-learn) on a well-known public dataset to solve a genuine classification problem, and write up your evaluation methodology and results honestly, including where the model performs poorly.	Intermediate	10-15 hours	Python for Machine Learning, Machine Learning & AI Fundamentals
Chatbot Using a Free LLM (Large Language Model) API	Build a simple chatbot or Q&A tool using a real, currently-available free-tier LLM (Large Language Model, the type of AI model behind tools like ChatGPT) API (Application Programming Interface, the way your code sends a request to the model and gets a response back), with basic prompt engineering and a genuine use case (not just 'talk to an AI').	Beginner	8-12 hours	Python for Machine Learning
Deployed Model API	Take a trained model and deploy it behind a simple API (Application Programming Interface, a way for other software to send it data and get a prediction back), e.g. using FastAPI, so it can be queried by another application, documenting the deployment process and any monitoring you added.	Advanced	12-18 hours	MLOps & Model Deployment
Fault Finding Log for a Production or Training Rig	Keep a structured fault log for a real or training rig automated production line, recording the symptom, the diagnostic steps taken (checking I/O, the equipment's inputs and outputs, e.g. sensor signals in and motor commands out, forcing signals, reviewing ladder logic, sensor and actuator checks), root cause and fix, across a series of faults over several weeks.	Intermediate	Ongoing over several weeks	Fault-Find on Automated Production Systems

Activity	What students do	Level	Time	Skills shown
SCADA (Supervisory Control and Data Acquisition) Alarm and Fault Response Project	Configure a small SCADA or HMI (Human-Machine Interface, the screen or control panel an operator uses to interact with the equipment) screen to monitor a simple process such as a conveyor or tank fill rig, then introduce realistic faults (a sensor open circuit, a valve failure, a comms dropout) and produce a short written report showing how the SCADA alarms and trend data were used to diagnose and resolve each one.	Advanced	8-12 hours	Fault-Find on Automated Production Systems
Utility Network Installation & Fault-Finding Log	Keep a structured log over several weeks of real or training installation, maintenance and fault-finding tasks carried out on water, power or smart-metering infrastructure, e.g. a smart meter installation completed and signed off against the CoMCoP (the industry code of practice that sets the safety and quality standard for installing gas and electricity meters) commissioning code, or a water-network leak investigation following the same structure as the real LD-2 leak-detection qualification (a risk assessment, a metered-area configuration check, then pipe-route tracing to the fault), recording the symptom, diagnostic steps, root cause and fix for each one, with mentor sign-off.	Intermediate	Ongoing over several weeks	Install, Maintain and Fault-Find on Water, Power & Smart-Metering Infrastructure
Battery Production Line Quality Control Report	Under supervision, monitor or operate a stage of a real or simulated battery cell or pack manufacturing line, covering one of the four real ST1338 specialisms (electrode, cell assembly, formation/ageing/testing, or module & pack), recording a specification deviation you found, its root cause, and the corrective action taken, in the same format the industry's own quality inspection roles use.	Intermediate	6-10 hours	Operate Automated Battery Cell & Pack Manufacturing Equipment
Production Line Root-Cause Investigation Report	Under supervision, investigate a real or simulated quality, reliability or cost problem on a production line using a structured technique (5 Whys or fishbone/Ishikawa diagram), then write up the root cause found and the corrective action taken or recommended, with your mentor's sign-off.	Beginner	6-10 hours	Root-Cause Quality Problem Solving
Continuous Process Monitoring Shift Log	Shadow and log a shift on a monitored production or process line, recording the key operating parameters, control limits and any escalation points encountered, then get your mentor to review your log against what actually happened on shift.	Beginner	4-8 hours	High-Hazard Continuous Process Monitoring

These are the portfolio projects used in the TechSkills Career Planner. Each is meant to produce work a learner can show an employer.

Where to find out more

National Careers Service Careers advice, job profiles, information and resources. (Department for Education. Checked 1 November 2026.)

Find an apprenticeship Register a profile, search vacancies and apply for an apprenticeship. Applicants must be 16 or over. (GOV.UK. Checked 1 November 2026.)

Skills Bootcamps For people updating their skills to progress in their current job or move into a different role. (JobHelp, GOV.UK. Checked 1 November 2026.)

Skills England: apprenticeship search Skills England's apprenticeship search. (Skills England. Checked 1 November 2026.)

General notes

Sources and checking

The figures in this guide were checked on dates from 11 July 2026 to 1 November 2026. Each source below shows its own date.

Skills England: ST0144 Material Processing Plant Operator Checked 31 July 2026

Skills England: ST0158 Dual Fuel Smart Meter Installer Checked 30 July 2026

Skills England: ST0898 Water Network Operative Checked 30 July 2026

Skills England: ST1292 Water Industry Network Technician Checked 30 July 2026

Skills England: ST1315 Aircraft Maintenance Technician Checked 30 July 2026

Skills England: ST1326 Mechatronics Maintenance Technician Checked 30 July 2026

Skills England: ST1330 Power Industry Overhead Linesperson Checked 30 July 2026

Skills England: ST1331 Power Industry Substation Fitter Checked 30 July 2026

Skills England: ST1338 Battery Manufacturing Technician Checked 30 July 2026

Skills England: ST1395 Engineering and Manufacturing Support Technician Checked 31 July 2026

Skills England: ST1407 Process Industry Manufacturing Technician Checked 31 July 2026

Skills England: ST0662 Automation and Controls Engineering Technician Checked 30 July 2026

Skills England: ST0841 Engineering Manufacturing Technician Checked 31 July 2026

Skills England: ST0855 Space Engineering Technician Checked 30 July 2026

Skills England: ST0605 Mineral Products Technician Checked 31 July 2026

National Careers Service, Department for Education Checked 1 November 2026

Find an apprenticeship, GOV.UK Checked 1 November 2026

Skills Bootcamps, JobHelp, GOV.UK Checked 1 November 2026

Skills England: apprenticeship search, Skills England Checked 1 November 2026

- gov.uk: Apprenticeship funding rules and assessment plan guidance, 2026 to 2027 (checked 20 July 2026)
- gov.uk: National Minimum Wage and National Living Wage rates (checked 20 July 2026)
- gov.uk: Student finance for undergraduates (checked 20 July 2026)
- gov.uk: Repaying your student loan; gov.uk: How interest is calculated, Plan 5 (checked 20 July 2026)
- IT Jobs Watch: Machine Learning Engineer (UK) (checked 11 July 2026)
- Acceler8 Talent: AI & Machine Learning Hiring Trends Q1 2026 (UK vs US) (checked 11 July 2026)
- VIQU IT: AI Engineer Salaries & Hiring Trends in the UK (checked 11 July 2026)
- IT Jobs Watch: Machine Learning Engineer skills (UK), 6 months to 11 Jul 2026 (checked 11 July 2026)
- UK Standard Skills Classification (skillsclassification.org): Automation maintenance technicians (checked 29 July 2026)
- IfATE/Skills England: Automation and Controls Engineering Technician (ST0662), Mechatronics Maintenance Technician (ST1326) (checked 29 July 2026)
- RealPars: PLC Troubleshooting 101 (checked 29 July 2026)
- IfATE/Skills England: Water Industry Network Technician (ST1292), Water Network Operative (ST0898), Power Industry Overhead Linesperson (ST1330), Power Industry Substation Fitter (ST1331), Dual Fuel Smart Meter Installer (ST0158) (checked 31 July 2026)
- Energy & Utility Skills: Workforce demand estimates 2024 to 2030 (checked 31 July 2026)
- DESNZ: Smart Meters in Great Britain, Q1 2026 Statistics Report (checked 31 July 2026)
- WaterTrain: Level 2 Water Network Operative (checked 31 July 2026)
- EA Technology: Power Industry Overhead Linesperson – Level 3 (checked 31 July 2026)

- Merit Skills: LD-2 Leakage Detection NVQ Level 2 (checked 31 July 2026)
- Alison: Basics of Smart Meter Installation (checked 31 July 2026)
- IfATE/Skills England: Battery Manufacturing Technician (ST1338) (checked 31 July 2026)
- Faraday Institution: UK Gigafactory Outlook, September 2024 (checked 31 July 2026)
- electrive.com: AESC opens gigafactory in Sunderland, December 2025 (checked 31 July 2026)
- Advanced Propulsion Centre UK / BusinessGreen: UK government £380 million grant to Agratas gigafactory, April 2026 (checked 31 July 2026)
- EAL: Level 2 Award in Introduction to Battery Manufacturing and Working with Batteries (via UKBIC collaboration) (checked 31 July 2026)
- IfATE/Skills England: Engineering Manufacturing Technician (ST0841), Process Industry Manufacturing Technician (ST1407) (checked 31 July 2026)
- Alison: Root Cause Analysis course (checked 31 July 2026)
- IfATE/Skills England: Process Industry Manufacturing Technician (ST1407) (checked 31 July 2026)
- Microsoft Learn certification documentation (checked 11 July 2026)
- PassItExams: 'Is AI-900 Worth It? Exam Cost Vs. Career Benefits' (checked 11 July 2026)
- EUSR: National Water Hygiene training documentation (checked 31 July 2026)
- GS Water / Hills Safety Training / Four Storey Training: National Water Hygiene (Blue Card) course pages (checked 31 July 2026)
- EAL: Level 2 Award in Introduction to Battery Manufacturing and Working with Batteries qualification page (checked 31 July 2026)
- EAL: UKBIC collaboration news release (checked 31 July 2026)