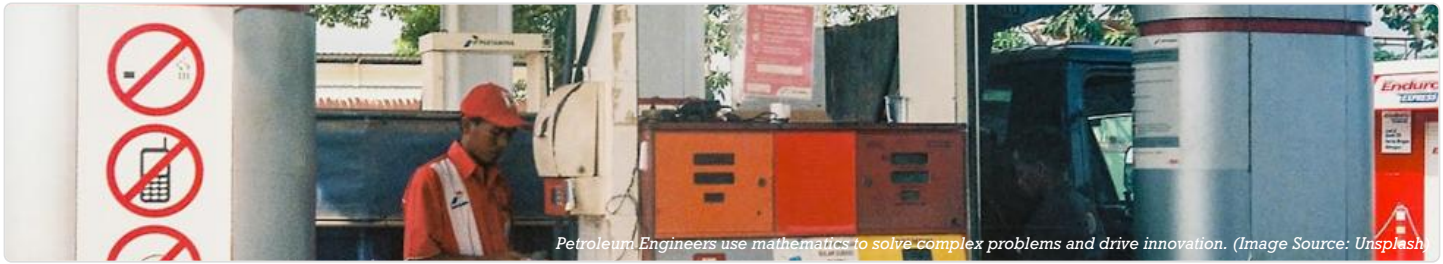


CAREERS THROUGH MATHS: PETROLEUM ENGINEER



JOB OVERVIEW

Petroleum Engineers are responsible for designing and developing methods for extracting oil and gas from deposits beneath the earth's surface. In the UK context, this work is predominantly focused on maximising recovery from mature fields in the North Sea, a technically challenging and capital-intensive environment. A typical day might involve analysing well data from platforms operated by companies like Harbour Energy or Shell UK, creating computer models to simulate reservoir behaviour, and planning the trajectory for a new well to access previously untapped reserves. Their work is crucial for ensuring the UK's energy security and managing the transition towards net-zero, often involving projects that integrate carbon capture and storage (CCS) into former oil and gas fields.

KEY MATHS APPLICATIONS

Primary Areas:

- **Calculus (Differential Equations):** This is fundamental for modelling dynamic subsurface processes. Petroleum engineers use differential equations to describe how fluids (oil, gas, water) move...
- **Linear Algebra & Numerical Methods:** Real-world reservoirs are too complex for simple analytical solutions. Engineers discretise the reservoir into thousands or millions of grid blocks and use...
- **Probability and Statistics:** There is significant uncertainty in subsurface data. Engineers use statistical methods and probabilistic modelling to quantify risks.

ESSENTIAL SKILLS & TOOLS

SKILL	APPLICATION
Calculus (Differential Equations)	This is fundamental for modelling dynamic subsurface processes. Petroleum engineers use...
Linear Algebra & Numerical Methods	Real-world reservoirs are too complex for simple analytical solutions.
Probability and Statistics	There is significant uncertainty in subsurface data.
Fluid Mechanics	The mathematical principles governing fluid flow are applied to design the entire...

TYPICAL PATHWAY

The standard route begins with strong GCSEs and A-levels in Mathematics and Physics, often followed by a Master of Engineering (MEng) degree in Petroleum Engineering accredited by the Institution of Mechanical Engineers (IMechE) or the Energy Institute (EI) from a university...

INDUSTRY DEMAND

The UK oil and gas industry is mature, with demand centred on experienced engineers who can extend the life of existing fields and manage complex decommissioning projects.

REAL-WORLD IMPACT

Petroleum Engineers have been central to the UK's energy economy for decades, ensuring the safe and efficient production of the oil and gas that heats homes and powers industry.

QUICK FACTS

- **Education:** GCSEs and A-levels in Mathematics and Physics, often followed by a Master of Engineering (MEng)
- **Growth:** The UK oil and gas industry is mature, with demand centred on experienced engineers who can extend the life of existing fields and manage complex decommissioning projects. However...