

# CAREERS THROUGH MATHS: TELECOMMUNICATIONS ENGINEER



## JOB OVERVIEW

Telecommunications Engineers design, build, and manage systems that transmit data, voice, and video. They work for mobile network operators like BT or Vodafone, equipment manufacturers, and specialist consultancies. Their core responsibilities involve planning network infrastructure, optimising signal quality and bandwidth, and troubleshooting complex system failures. The role is fundamentally mathematical, requiring the application of advanced principles to solve problems related to signal propagation, network capacity, and data compression. They ensure the seamless operation of everything from mobile phone networks and broadband internet to satellite communications and emerging 5G/6G technologies.

## KEY MATHS APPLICATIONS

**Primary Areas:**

## ESSENTIAL SKILLS & TOOLS

SKILL	APPLICATION
<b>**Wireshark**</b>	Protocol analysis and troubleshooting by inspecting data packets traversing a network.
<b>**MATLAB/Python**</b>	Simulating network performance, signal processing algorithms, and analysing large datasets.
<b>**Network Simulators (e.g., OPNET, NS-3)**</b>	Modelling network topology and traffic to predict performance before physical deployment.

## TYPICAL PATHWAY

A bachelor's degree (BEng/MEng) in Electronic Engineering, Telecommunications, or a related field from an accredited institution like the University of Southampton, Imperial College London, or the University of Surrey is typically required. Graduates often start as Network or Field Engineers, progressing to Senior Engineer, Network Architect, or Project Manager roles. Chartered Engineer (CEng) status with the IET is highly valued for career advancement.

## INDUSTRY DEMAND

Demand is strong and growing, driven by the ongoing rollout of 5G infrastructure, the expansion of full-fibre broadband, and the Internet of Things (IoT). The UK government's £5 billion Project Gigabit aims to bring gigabit-capable broadband to hard-to-reach areas, creating sustained demand for skilled engineers. The UK telecommunications sector employs over 220,000 people, with a steady need for engineering talent.

## REAL-WORLD IMPACT

Telecommunications Engineers build the critical infrastructure that connects society, enabling global business, remote healthcare, and instant communication. Their work in developing faster, more reliable networks directly fuels economic growth and digital innovation, bridging the digital divide and forming the backbone of the modern digital economy.

## QUICK FACTS

- **Growth:** Positive industry outlook
- **Career:** Professional role requiring analytical skills
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