

What is engineering?

Sample viewpoints from the literature

[The application of] scientific and technical knowledge to the design, creation and use of structures and functional artefacts.

The Open University

Engineering uses maths and science (especially physics) to improve the world around you.

'Tomorrow's engineers' (The Royal Academy of Engineering and Engineering UK)

Though today engineering artifacts draw extensively on scientific knowledge, it has not always been so, and up to the end of the nineteenth century the methods of manufacture and natural science were quite distinct. Indeed the development of the steam engine, often quoted as a 'product of science', was the work of men like James Watt and George Stephenson who were predominantly skilled craftsmen and certainly not knowledgeable in scientific matters. Thus engineering can be said to predate science, which is still relatively young, and man's development has been, and still is, determined essentially by his capacity to make artifacts and improve upon his environment rather than the systematic accumulation of knowledge

Douglas Lewin (Professor of Computer Science and Software Engineering at the University of Sheffield, until his death in 1988)

[Engineering is] the practice of organising the design and construction of any artifice which transforms the physical world around us to meet some recognised need

Gordon Rogers (Emeritus Professor of Thermodynamic Engineering at Bristol University, died 2004)

The following five-point description of engineering gives a synthesis [of existing definitions]:

- Engineering is applying scientific knowledge and mathematical analysis to the solution of practical problems.
- It usually involves designing and building artifacts.
- It seeks good, and if possible, optimum solutions according to well-defined criteria.
- It uses abstract and physical models to represent, understand, and interpret the world and its artifacts.
- It applies well-established principles and methods, and uses proven components and tools.

None of these definitions says how engineers think. What can be added to express the intellectual root of engineering? I suggest the following: Engineering is explaining why a particular solution to a problem is the best.

John Robinson (Professor of Electronics, University of York)

ICT Technicians are employed in a range of jobs that involve supporting or facilitating the use of ICT equipment and applications by others. They work in areas such as ICT hardware, software or system installation, operation, maintenance, incident/change/problem management, administration, security, fault diagnosis and fixing.

Engineering Technicians [with the title Eng Tech] solve practical engineering problems. They are professionals with supervisory or technical responsibility, and apply safe systems of working. They contribute to the design, development, manufacture, commissioning, decommissioning, operation or maintenance of products, equipment, processes or services.

Chartered Engineers develop appropriate solutions to engineering problems. They may develop and apply new technologies, promote advanced designs and design methods and introduce new and more efficient production techniques, or pioneer new engineering services and management methods. The title CEng is protected by civil law and is one of the most recognisable international engineering qualifications.

(The Engineering Council)

Engineering is the link between a need or a problem and the solution

(Try Engineering, IEEE)

The job of a recording engineer or producer is to support the creative process of the artists as well as contributing their own creativity

(APRS/MPG JAMES)

The creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behaviour under specific operating conditions; all as respects an intended function, economics of operation or safety to life and property

(The American Engineers Council for Professional Development)