

Introducing Engineering

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www.strath.ac.uk

THE UK Entrepreneurial University
of the Year 2013/14
UK University of the Year
2012/13



Presentation Overview



- What is engineering?
- What types of engineering are there?
- What careers will a degree in engineering give you?



What is Engineering?



An engineer is a professional practitioner of engineering, concerned with **applying scientific knowledge, mathematics and ingenuity** to **develop solutions** for technical and practical problems. Engineers design materials, structures, machines and systems while considering the limitations imposed by practicality, safety and cost. The word engineer is derived from the Latin root *ingenerare*, meaning "**to create**".

<http://en.wikipedia.org/wiki/Engineer>



Best Inventions Ever?



Electricity
Water supplies
& drainage

Electronics &
Computers

Roads, Bridges
& Tunnels

Robots

Health tech

Nuclear Engineering

Smart
Phones
Farming

Internet

Space
Travel

X Rays &
Scans

Petrochemicals

Materials

Cars
Planes
TV and Radio

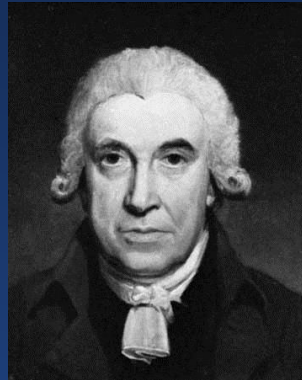
Fridges
& Aircon

Electric
appliances

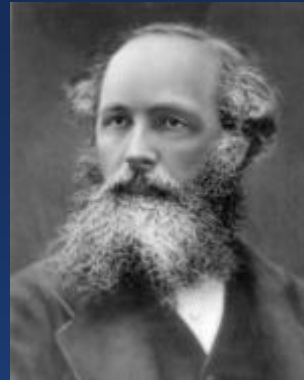
Lasers &
Fibre Optics



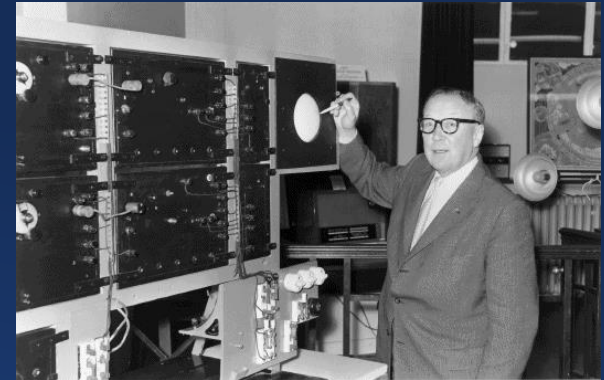
Some Famous Scottish Engineers



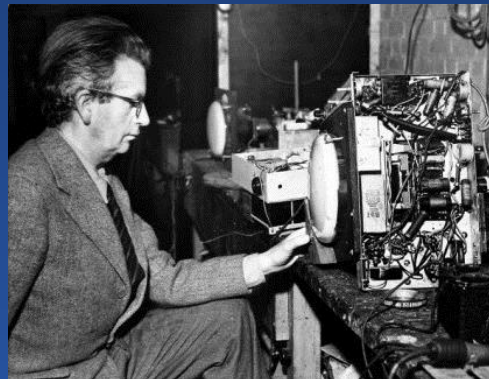
James Watt
(improved steam engine,
unit of power – watts)



James Clerk Maxwell
Electromagnetic Equations



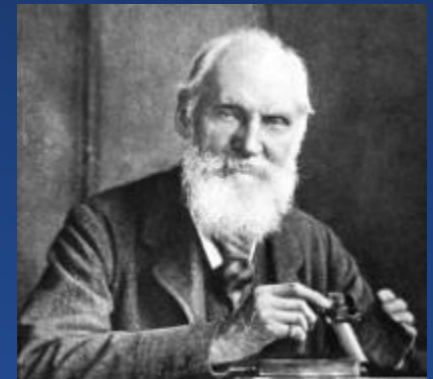
Robert Watson Watt
Radar Development



John Logie Baird
Inventor of TV



Alexander Graham Bell
Inventor of Telephone



Lord Kelvin
Kelvin Temperature



How is Engineering different from Science?



- Science provides the understanding of how the world around us works
- Engineering is the application of this understanding to solve real world problems
- Science and Engineering are not mutually exclusive



Examples



- Science (Physics) leads to the understanding of electromagnetic radiation
- Engineering applies the theory to the development of lasers
- Engineering applies laser technology to the development of the CD player



- Science (Chemistry) provides the understanding of hydrocarbons
- Engineering applies the theory to the oil industry to the mass production of gasoline



Types of Engineering?



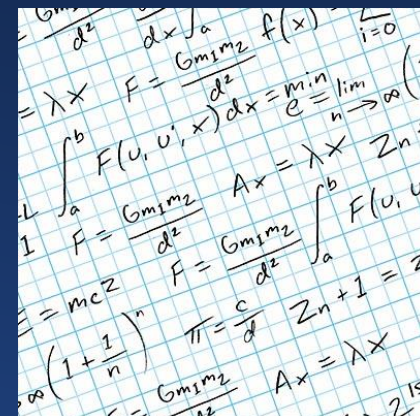
- Many different types of engineering

- Closest school subjects are:

- Mathematics
- Science, particularly Physics
- Technological Studies

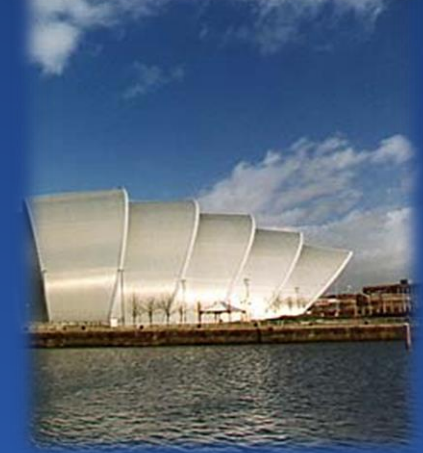
- Often has a creative element

- Art and Design
- Graphic Communication





Architecture



- Design buildings and spaces
- Conserve old buildings, redevelop parts of towns, new ways of using buildings
- Extremely influential and admired



Chemical Engineering



- Changing raw materials into valuable products
- Oil and gas, Pharmaceuticals, Energy, Food and drink, Materials
- Tissue engineering



Civil Engineering



- Creating, improving, protecting the environment we live in
- Supply of clean water, transport networks, urban life, sustainable energy
- Disaster aid



Design Engineering



- Creative Engineering
- Telecommunications, automobile, computer industries, design consultancy
- Invention and innovation
- Product design



Electrical & Electronic Engineering



- Electrical – harnessing electrical power
- Electronic – designing and developing devices
 - Often includes computing
- Power stations, satellites, cashpoint machines, heart monitors, mp3 players, games consoles
- Smaller, faster, smarter



Marine Engineering & Naval Architecture



- Design, construction, repair and operation
- Supertankers, sailing yachts, fast ferries, offshore wind turbines, oil platforms
- 98% of international cargo is carried by ships



Mechanical Engineering



- Designing machines and mechanised systems
- Medical, automotive, railway, renewable energy, sports
- Aerospace – rockets, planes, moon residences??



Biomedical Engineering



- Rehabilitation team
- Prosthetics-replacement limbs
- Orthotics-provide support to parts of patient's body
- Enhance or maintain a patient's quality of life



More Engineering!



- Structural, bio, medical, nuclear, manufacturing, aerospace, automotive, sports...





Engineering as a profession



■ NOT

- An electrician
- A car mechanic
- A builder



■ These are trades

- School → (College) → Apprenticeship → Employment

■ Many professional bodies which recognise engineering



- School → Accredited University Degree → Work Experience → (Professional exams) → Accreditations



Engineering Career Pathways



- Traditional University Route
 - Good Highers in Maths, Physics (Chemistry, Art & Design etc.)
 - Bachelors or Masters degree
 - Job
- Strathclyde Engineering Academy
 - Recruited by University
 - Partner FE College in year 1 (HNC award)
 - Move to University in Year 2
 - <http://www.strath.ac.uk/engineering-academy/>
- Apprenticeships
 - Employed by company
 - Monitored professional and skills training



Engineering Scholarships



- Benefit for student
 - Work experience in industry
 - Mentor
 - Cash!
- Benefit for Industry
 - Inside track to the best students
- No obligation to work for company at end of degree...
- ... but no obligation to offer you a job at the end (though the vast majority do)



Top 15 average graduate starting salaries by degree 2014



1	Dentistry	£30,143
2	Medicine	£29,146
3	Chemical Engineering	£27,151
4	Vetinary	£25,807
5	Economics	£25,673
6	Engineering	£24,937
7	Social Work	£24,630
8	Mechanical Engineering	£24,337
9	Civil Engineering	£23,720
10	Maths	£23,160
11	Physics	£22,964
12	Nursing	£21,910
13	Religious Studies	£21,794
14	Computer and Science	£21,712
15	Accounting and Finance	£21,551

Source: <http://www.graduates.co.uk/starting-salaries-by-subject-degree/>



Careers



- $\frac{3}{4}$ of engineering graduates find work in their preferred field
- 8 out of 10 employed within 6 months of graduating

■ Source: Engineering Technology Board



Engineering



- Creative and intellectual challenges

- **HUGE** choice of careers

- Valuable skills

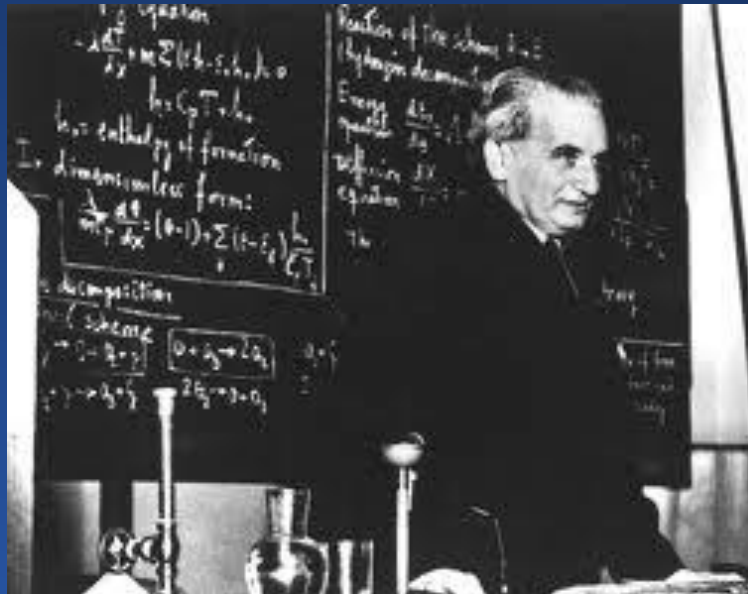
- Transferable skills



Final thought...



*“Scientists study the world as it is,
engineers create the world that has never
been.”*



Theodore Von Karman



University of **Strathclyde** **Glasgow**