

Mathematics and Sustainability: Realigning Curricula for the Future Agenda



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Mathematics and Sustainability

- Energy numeracy
- Carbon numeracy
- Climate numeracy
- Thermodynamics
- Atmospheric fluid mechanics
- Statistics
- Optimisation of energy systems
- Conceptualisation: e.g. what is bio-diversity?



Modelling and computation: numerical mathematics





How many heat pump installers does it take to decarbonise UK domestic heating by 2050?



Numeracy





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There are currently 1200 heat pump installers in the UK.....





What surface area of the Sahara desert would need to be covered with solar PV panels to generate electricity for Africa and Europe?

What is the carbon footprint of international students coming to the UK for their education?



Numeracy

By how much will ocean levels rise due to thermal expansion of water if the Earth's temperature increases by 2 C?







The power and wisdom of `order of magnitude' calculations:



Sustainable Energy -without the hot air David JC MacKay



Physics, chemistry and maths drove the industrial revolution







1776

- - commercially
- Adam Smith publishes `The Wealth of

Nations'



Watt's steam engine design introduced





Lord Kelvin 1824-1907 J C Maxwell 1831-1879 Max Born 1882-1970













... and will underpin the transition to net-zero:

- Thermodynamics: the science of work, energy, temperature and entropy
- Atmospheric fluid mechanics: the science of continuum motion





SCHOOL OF MATHEMATICS

School of Mathematics home	Home > School of Mathematics > About U
About Us	
Sustainability	Sustainability
Our Researchers School Strategy Impact in Society Our Curriculum	The School of Mathematics are co sustainability. We are aiming to do as through our curriculum to insp our own research and teaching as
	<i>G</i> The climate emergency is prob address its own environmental sus travel we take. Because we are ma this we advocate for improvement

- Maths in Action (Y4): climate change and impact modelling
- Operational Research in the Energy Industry (MSc)
- UG projects
- MSc projects



Sustainability Contact us

ommitted to making positive change in areas surrounding climate and lo this via our world-leading research and our engagement with industry, as well pire the next generation of mathematicians. We are also committed to conducting sustainably as possible.

bably the greatest threat that humanity faces. The School of Mathematics is acting to stainability, reducing the carbon in the energy we use for heating, for food we eat, and the athematical scientists we are doing this led by the data and the numbers, and based on t within the University and beyond.

Facets of Mathematics (Y2): statistics, modelling of energy systems





Go Global: EUROPEAN EXCHANGE NON-EUROPEAN EXCHANGE

The course

UCAS code: G100 Duration: 4 years Location: Edinburgh Delivery type: Full-time

Heriot-Watt is a leading university in applying mathematics to solve real-world problems

FIND OUT HOW TO APPLY

MORE ABOUT THIS SUBJECT AREA

- Thermodynamics
- Fluid Mechanics
- UG projects
- MSc projects

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African Institute for Mathematical Sciences





- Climate modelling
- Atmospheric fluid mechanics
- MSc projects



Who We Are 🔻 What We Do 🔻

Research 🔻





We believe the next Einstein will be African



Mathematics and Sustainability

- Embed energy + climate numeracy in the School's community life
- Offer at least one specialist course related to sustainability in each year of the syllabus
- Develop partnership with **AIMS**



Involve students & staff in decarbonising the School's operation

Work with University/College to create interdisciplinary courses

Images taken from Wikimedia