"Have you ever thought about the ethical issues that mathematicians and people using mathematics might encounter? Have you ever thought about all those issues that are specific and peculiar to mathematics?"

### Why is it important for universities to integrate ethics in mathematics?

Since ancient times, mathematics has been a vital part of daily life from basic arithmetic to advanced mathematics models. In the 21<sup>st</sup> century, advanced mathematics is embedded in technology and digital life, making it an essential component in shaping our world.

## How is ethics and mathematics integrated in the real-world?



#### • <u>Finance:</u>

The global financial markets are run by computer programs that use mathematical models and mathematical analysis of financial products and markets. Ethical concerns could arise when financial models prioritise profits instead of customer satisfaction.

#### • Aviation:

Airplanes rely on complex mathematical algorithms to keep them flying. Airlines also use these complex mathematical algorithms to optimise fuel consumption, supply and demand of seats, and the logistics of moving aircraft as well as a thousand other things using computer-run optimisation software. Ethical questions arise when airlines need to decide between the fair pricing or safety protocols.



#### <u>Weather forecasting:</u>

Weather predictions and models of global climate change both require mathematical methods and massive multiple-equationsolving techniques that were unimaginable in the 1950s. Even supermarkets adjust their stock based on mathematical weather prediction. Ethical concerns come to play in the accuracy of climate data.

# • <u>Technology:</u>

Smartphones rely heavily on mathematics, from CPU design to data encryption. Mathematics is used in everyday life! The most important ethical issue in technology would be data protection.

By integrating ethical concerns into mathematical exercises (e.g. Problems 1-4), students can develop their intellectual curiosity and further develop their problem-solving skills.

SCHOOL OF ENGINEERING AND MATERIALS SCIENCE Scan QR code for QMUL Ethics in Mathematics Resources

