Developing an authentic coursework assessment for first-year Actuarial Science and Mathematics students

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Context

Foundations of Finance: Investments and the time-value of money

- Introduction to basic financial concepts (interest rates, discounting, accumulating, profits, tax, inflation, ...)
- Year 1 BSc Actuarial Science & Mathematics students
- Optional for Year 2 Maths students
- 2024/25 ~35 students, 2025/26 ~80 students

Aims

- Develop a new, more authentic, coursework assessment (30% of module).
- Input from students, industry experts, pedagogic literature.
- **ILO:** Identify and discuss practical and ethical factors that may impact financial practices and financial decisions, such as regulations and social responsibility factors.

Planning

Funding application
Ethics application
Lay out timeline

Student intern

Started June 2025
8 week project

Info gathering I

Student Survey
Industry survey
Focus group

Develop and implement assessment

Semester 1 2025/26

Info gathering II

Second student survey

Review outcomes

Adjust assessment for 2026/27

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Student Survey (Summer 2025)

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Aims

Understand current students' expectations and experiences of the BSc Actuarial Science and Mathematics (**AS&M**) degree at the University of Manchester

Response

- Most (**16/20**) probably/ definitely want to become actuaries but…
- **15/20** said they had 'little' or 'some' understanding of what an actuary does day-to-day.
- Most expected they would learn this from university but…
- **14/20** said they had learnt 'little' or 'nothing' so far.

Want: more collaborative/ group work, project work, solving 'real' actuarial problems and more experience with software (Excel & R)

"I recognize there's often a gap between academic knowledge and real-world practice."

Industry Survey and Focus Group

In collaboration with our student intern Rayna Chinnappa (Summer 2025)

Aims

- Collect input from AS industry professionals about important graduate skills
- Identify skill gaps between students/new graduates and industry professionals

Response

Important skills

- Critical analysis and problem solving.
- Digital literacy – frequently use Excel.
- Communicating technical ideas in a concise way for a non-technical audience.

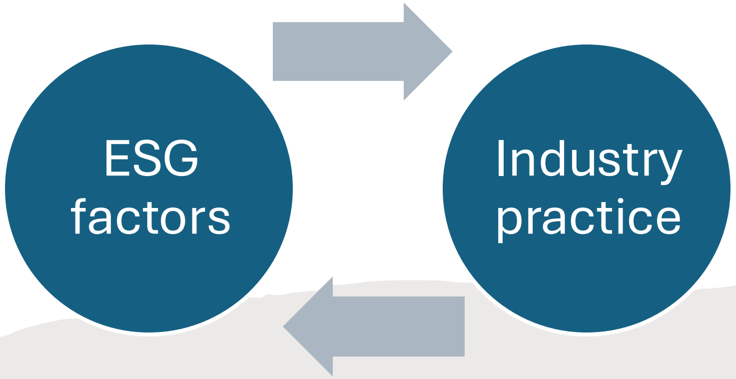
Possible coursework formats

- Written reports
- Presentations
- Group works

Use of AI

- Generally for writing, not calculations.

Social Responsibility



Coursework Assessment

Invigilated in-person individual test on Excel (worth 15%)

1. Excel skills
2. Calculations without using AI
3. Audit trails (self-explanation and justification)

Written work group task (worth 15%)

1. Teamwork, verbal communication and collaborative work (with group)
2. Written communication (technical and non-technical audiences)
3. Time management

Written work group task

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Choose Two Clients

Each client has a fixed amount to invest over a fixed horizon — your portfolio must suit their needs.

Client A	Client B	Client C	Client D	Client E
Animal Charity Trustee	**Social Media Influencer**	**Eco-Conscious Vegan**	**The Risk-Taker**	**New Grandparent**
£350,000	**£60,000**	**£80,000**	**£150,000**	**£80,000**
20 yrs	30 yrs	15 yrs	25 yrs	18 yrs
Ethical constraints	Reputation risk	ESG focus	High risk appetite	Low risk
Must comply with charity investment law. Avoid conflicts with animal welfare.	Reputation matters. Interested in business investment. Has no ISA yet.	No animal products. Cares about environment. Already uses £10k/yr ISA allowance.	Wants stock market exposure. ISA maxed out. Must comply with TAS100 risk disclosure.	Investing for grandchild. Max 10% in shares. All must be withdrawable at t=18.

Written work group task

CLIENT A

Animal Charity Trustee

£350,000	20 years	Charity law	Animal welfare
Amount to invest	Investment horizon	Legal constraint	Ethical screen

Client brief

- Wants to invest in PLAIY (brother's company) — but trustee rules may override personal preferences.
- Must avoid investments that conflict with animal welfare.
- Must comply with government guidance on investing charity money (CC14).

Legal note

As a charity trustee, Client A must act in the charity's best interests. The CC14 guidance restricts:

- Investments that conflict with the charity's purpose
- Excessive risk-taking with charity funds

Written work group task

CLIENT D

The Risk-Taker

£150,000	25 years	ISA maxed	High
Amount to invest	Investment horizon	£20k/yr already used	Risk appetite

Client brief

- Interested in stock market — no prior experience.
- Does not need extra income on top of salary.
- ISA allowance is fully used — no ISA investments available.
- Willing to take significant risks, but does not want to lose everything.
- TAS100 requires all significant risks to be identified and explained.

Legal note

TAS100 (A7.2): actuaries must identify ALL significant risks, communicate them clearly, and explain their importance — even if the client says they don't care.

Written work group task

The Task

Profitability

Compare NPV and yield across investments

Risk

Assess volatility, failure risk, liquidity

Client Priorities & Ethics

Align with client values and social responsibility

Legal & Logistical

Comply with regulations (charity law, TAS100, ISA limits)

For each client:
Recommend an investment portfolio using only Investments 1–9. Write a 1-page client summary + a detailed report for your manager. Submit as PDF by 5pm, Friday 5th December.

Written work group task

Grouping students
- Groups of 4-5 students
- Selected by us: mix of Y1/ Y2 students
- Students with ‘group work’ mentioned on DASS plan approached separately

Group dynamics
- Group contract signed in the first session
- Two compulsory in-person group work sessions
- Group mark with BuddyCheck peer-marking moderation on top

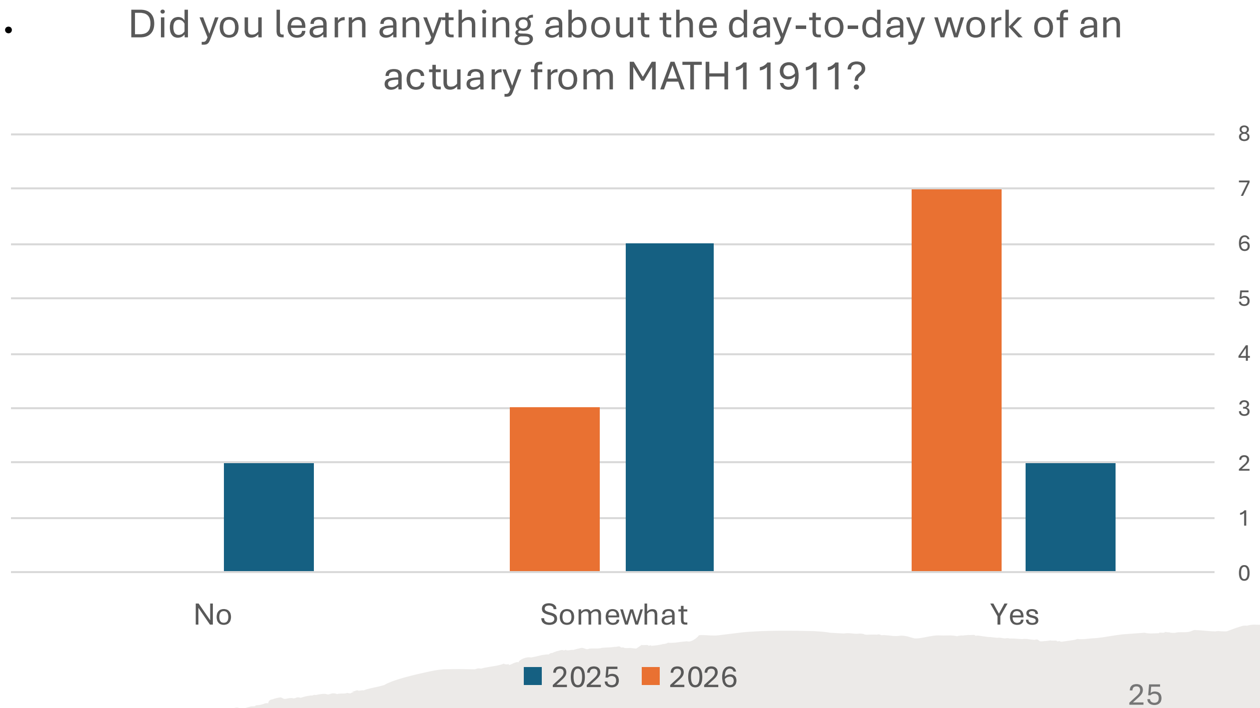
So… how did it go?

Student survey (Spring 2026)

Response

Some outcomes so far...

- 12 responses from each Year 1 cohort
- 4-7 students explicitly mentioned the MATH11911 module has helped them understand what actuaries do (vs 0-1 last year).
- Later when asked directly...



Student Survey (Spring 2026)

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Response

Quotes linking skills to the actuarial profession, e.g:

*"… the **excel and audit trails materials** which has given me an idea of **how excel is used to perform calculations as an actuary**. Also, the **investment portfolio group work** also gives me insight of **investment and risk managing** in general."*

What do you want to see more of?

- More group work and communication
- 'Real' applications
- Know how the skills will apply to careers

Plan to do qualitative analysis

Reflection and iteration

Students enjoyed the group work!

Focus on formative assessment in Excel

Excel teaching done asynchronously due to varied prior knowledge

Engagement issues → performance issues

Add new intended learning outcome

ILO7	Demonstrate professional skills including using Microsoft Excel to perform calculations and conveying subject-specific information through clear written and verbal communication.

Assess verbal communication

Address comments about ‘real’ applications

Thank you

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Any Questions?

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