FP052-30 Inquiry and Research Skills for Mathematics

20/21

Department
>   Warwick Foundation Studies

Level
>   Foundation

Module leader

Credit value
>   30

Module duration
>   24 weeks

Assessment
>   100% coursework

Study location
>   University of Warwick main campus, Coventry

Description

Introductory description

The IRS for Mathematics module aims to ensure that students develop the necessary competencies and skills to succeed in Mathematics, Economics, Computer Science and related courses in the United Kingdom. It will provide bespoke skills training and support for students aiming at progressing to an undergraduate degree in the United Kingdom. It will provide competency training in reflective and critical thinking, team-working, and raising the awareness of self to develop greater ability in learners to engage with academic debate and take responsibility to critically inquire and evaluate issues in Mathematics. The module aims to ensure that students become independent learners and researchers who are equipped to think for themselves.

[Module web page](#)

Module aims

1. To develop students independent learning skills and confidence through inquiry based learning
2. Introduce students to, and raise their understanding of, university style of research within Mathematics- including the language and methods used.
3. Develop students research skills through undertaking a self-led, extended research project

linked to Mathematics
4. Introduce students to a variety of digital tools and skills that are used in research in Mathematics

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

1. What is research? learning about what research is and the information literacy skills that support research including asking relevant questions, evaluating sources, using data/ statistics, formulating search strategies, effective searching, reflection and developing coherent lines of argument.
2. Introduction to Problem Based learning – taking part in group based tasks in which students utilise, develop and practise research skills whilst investigating interdisciplinary issues in Mathematics e.g. use of statistics.
3. Research Project – students will be taught about different research methods, including quantitative methods and analysis, hypothesis testing, use of excel, research ethics. They will propose, design, plan and carry out their own research study which involves the use of mathematical hypothesis testing leading to a presentation in which they will answer questions about their research.

Learning outcomes

By the end of the module, students should be able to:

- Analyse and evaluate research undertaken by others within the field, drawing comparisons with research done in Mathematics/ Economics/ Computer Science in other countries.
- Investigate and analyse academic debates that arise in Mathematics, Economics and Computer Science
- Engage effectively in reflective and critical thinking .
- Propose, design, manage and carry out an independent Mathematics based research project .
- Utilise relevant digital and information literacy skills as applicable to research in Mathematics.

Indicative reading list

Cottrell S (2008) The Study Skills Handbook (3rd edition) Palgrave Macmillan
Cottrell S (2011) Critical Thinking Skills: Developing Effective Analysis and Argument (2nd edition) Palgrave Macmillan
Cottrell S (2014) Dissertations and project reports : a step by step guide Palgrave MacMillan
Dane, C (2018) Evaluating research : methodology for people who need to read research (2nd edition) SAGE
Hackley C. (2003). Doing Research Projects in Marketing, Management and Consumer Research. Routledge.
Financial Times

Houston, K (2009). How to think like a Mathematician. Cambridge University Press

ONS Data sets

Probst D et al (2016) Concepts of proof in mathematics, philosophy, and computer science De Gruyter

[View reading list on Talis Aspire](#)

Research element

Culmination of the project is a research project.

Interdisciplinary

Using mathematical skills to analyse issues in Economics/ Computer Science where relevant

International

An assessment includes the requirement for students to look at research undertaken in Mathematics/ Economics/ Computer science globally.

Subject specific skills

- Information literacy skills - library skills, effective internet searching, use of databases.
- Using Excel
- Hypothesis Testing and understanding hypotheses.
- Inquiry Skills - asking questions, seeking and analysing different answers, coming to your own conclusion
- Group work skills
- Independent learning skills - planning, time management
- Research skills - e.g. how to conduct mathematical hypothesis testing, writing about data, drawing a researched based conclusion.
- Reflective thinking/ writing

Transferable skills

- Information literacy skills - library skills, effective internet searching, use of databases.
- Inquiry Skills - asking questions, seeking and analysing different answers, coming to your own conclusion
- Group work skills
- Independent learning skills - planning, time management
- Research skills - e.g. how to undertake questionnaires, interviews
- Reflective thinking/ writing
- Critical thinking

Study

Study time

Type	Required
Seminars	72 sessions of 1 hour (24%)
Online learning (independent)	6 sessions of 45 minutes (1%)
Private study	133 hours 30 minutes (44%)
Assessment	90 hours (30%)
Total	300 hours

Private study description

Reading, practising of ideas taught in class. Preparation for seminars.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time
Foundations of Research - online learning	10%	10 hours
Selection of information literacy moodle modules and research ethics module.		
Annotated Bibliography	20%	20 hours
Annotated bibliography of key research, including global research, on the research topic area.		
Research Log book	30%	20 hours
log book of progress in research. Students will be given the option of a vlog, blog or written.		
Mathematics Research Project	40%	40 hours
Presentation of Research Project to include both an academic poster AND discussion of the research.		

Feedback on assessment

Written comments via tabula; tutorials for students who wish to have further guidance

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Availability

Courses

This module is Core for:

- FIOE Warwick International Foundation Programme
  - Year 1 of FP18 Warwick International Foundation Programme - Computer Science
  - Year 1 of FP17 Warwick International Foundation Programme - Economics
  - Year 1 of FP16 Warwick International Foundation Programme - Mathematics and Statistics