

FP052-30 Inquiry and Research Skills for Mathematics

24/25

Department

Warwick Foundation Studies

Level

Foundation

Module leader

Amy Stickels

Credit value

30

Module duration

25 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, 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 and explicitly acknowledge, develop and apply a range of highly transferable skills to support both their progress to Undergraduate level study in the UK and beyond into employment.

[Module web page](#)

Module aims

1. To develop students independent learning skills and confidence through inquiry based learning

2. To Introduce students to, and raise their understanding of, university style of research within Mathematics- including the language and methods used.
3. To develop students' research skills through undertaking a self-led, extended research project linked to Mathematics
4. To introduce students to a range of digital tools to support their Research Project
5. To develop a range of highly transferable skills throughout this module and raise awareness of their relevance and application

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.
3. Research Project – students will be taught about different research methods, including quantitative methods and statistical analysis, use of excel, research ethics. They will propose, design, plan and carry out their own research study which involves the use of statistics 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:

- Identify and select relevant academic sources relating to a range of issues facing mathematical and other related fields today.
- Demonstrate a range of transferable skills including project planning, data analysis, relevant digital literacy skills and presentation skills as applicable to research in related fields.
- Plan, undertake and reflect on self-directed research using methodologies appropriate to Mathematics and other related fields.
- Present analysis, evaluate and draw conclusions based on a self-directed research project.

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 module is a research project.

Interdisciplinary

Using mathematical skills to analyse issues in Computer Science where relevant

International

An assessment allows for students to look at research undertaken in Mathematics/ Computer science globally.

Subject specific skills

- Information literacy skills - library skills, effective internet searching, use of databases.
- Using Excel, SPSS and the python libraries including: pandas and seaborn
- Inquiry Skills - asking questions, seeking and analysing different answers, coming to your own conclusion
- Digital Skills development
- Group work skills
- Independent learning skills - planning, time management
- Research skills - e.g. analysing and 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
 - Digital data analysis tools
 - Independent learning skills - planning, time management
 - Research skills - e.g. how to undertake questionnaires, interviews
 - Reflective thinking/ writing
 - Critical thinking
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Study

Study time

Type	Required
Seminars	64 sessions of 1 hour (21%)
Online learning (independent)	6 sessions of 1 hour (2%)
Private study	170 hours (57%)
Assessment	60 hours (20%)
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 must pass all assessment components to pass the module.

Assessment group A5

	Weighting	Study time	Eligible for self-certification
Academic Poster Conference Presentation	40%	24 hours	No
This presentation of academic poster with Research Project outcomes at an academic conference.			
IRS Project Proposal	25%	15 hours	Yes (extension)
1150 word project proposal to include: proposed question with detailed rationale on the back of reading that has been conducted; methodology explanation and project plan. Students will also be asked to explain how they plan to make use of digital tools (including AI) as part of their project.			
Academic Poster	35%	21 hours	Yes (extension)
Creation of academic poster of research project undertaken.			

Feedback on assessment

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

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 FP16 Warwick International Foundation Programme - Mathematics and Statistics