MODULE TITLE	**Mathematics: History and Culture**	**CREDIT VALUE**	**15**
MODULE CODE	**MTH3019**	**MODULE CONVENER**	**Prof Peter Ashwin (Coordinator)**

DURATION: TERM	**1**	**2**	**3**
DURATION: WEEKS	**11 weeks**	**0**	**0**

Number of Students Taking Module (anticipated)	**67**

DESCRIPTION - summary of the module content

Over the course of its history, mathematics has been shaped both by the subject's own internal logic, as well as by the nature and needs of the society it which it was developed and transmitted. This module gives you the opportunity to see how the mathematics studied today has evolved over the centuries, and how mathematics relates to wider issues in culture and society. Through a mixture of lectures, student-led presentations and guided study involving the research and writing of essays, you will become familiar with selected aspects of the development of mathematics and its applications throughout history.

AIMS - intentions of the module

The aim of this module is to give you an appreciation of the historical development of mathematics and of its place within the wider culture. By studying a number of specific topics, you will become familiar with the changing nature of mathematics and its role throughout history. This includes how various cultures have been influenced by numbers, geometry, algebra, calculus and the full range of mathematical ideas. Topics will be drawn from particular areas of mathematics, such as numbers, geometry, algebra, calculus, as well as from the philosophy and foundations of mathematics.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed)

On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge:

1 demonstrate a general appreciation of the history and philosophy of mathematics and its role in human history and culture;

2 reveal in-depth knowledge of a selection of topics, and demonstrated knowledge and critical appreciation in these topics.

Discipline Specific Skills and Knowledge:

3 show an understanding of how mathematical ideas have emerged and evolved;

4 appreciate how mathematical thinking has contributed to human history and culture;

5 display an understanding of the original historical context of material found in other modules within the mathematics degree programme.

Personal and Key Transferable/ Employment Skills and Knowledge:

6 exemplify research, self-study, critical thinking and writing skills through essay writing;

7 illustrate oral presentation skills by participation in seminars and oral presentation;

8 demonstrate teamwork skills by researching and presenting one of the topics in a group seminar;

9 show IT skills by research and presentation of your work.

SYLLABUS PLAN - summary of the structure and academic content of the module

In any year a selection of four topics will be taken from the following list:

- the Greek legacy: Pythagoras, Euclid, Apollonius, Archimedes - aspects of geometry and number theory;

- ancient mathematics: a selection of ancient Egyptian, Babylonian, Greek, Chinese, Indian and Arabic/Persian Mathematics;

- geometry: Euclid's fifth postulate, non-Euclidean geometries, the Kleinian view, finite geometries, fractal geometry;

- algebra: from geometric algebra to symbolic algebra, Arabic developments, solution of polynomials by radicals, Gauss and the Fundamental Theorem of Algebra, Galois theory;

- history of numbers: history of the representation, arithmetic and use of numbers, development of number systems;

- the development of calculus: history of the foundations and emergence of calculus. From Newton/Leibniz to rigorous approaches;

- women in mathematics: a study of the experience of women in mathematics;

- what probability is: a history of the development of the ideas of probability and its applications;

- mathematical ideas in western cultural thought and history;

- philosophy and the foundations of mathematics: Frege, Hilbert, Russell, logicism, intuitionism;

- philosophy of science: empiricism, logical positivism, Popper, Kuhn;

- contemporary topics in the philosophy and culture of mathematics.

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning & Teaching Activities	20.00	Guided Independent Study	130.00	Placement / Study Abroad	0.00

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled learning and teaching activities	10	Lectures
Scheduled learning and teaching activities	10	Seminars
Guided independent study	130	Guided independent study

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

Form of Assessment	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Formative essay	500 words	6, 9	Peer feedback

SUMMATIVE ASSESSMENT (% of credit)

Coursework	40	Written Exams	50	Practical Exams	10

DETAILS OF SUMMATIVE ASSESSMENT

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Coursework - essay 1	10	500 words	1,3,4,5,6,9	Written comments
Coursework - essay 2	30	1,500 words	1,2,3.4,5,6,9	Written comments
Practical oral presentation	10	5-10 minutes during one of the seminars	1,2,3,4,6,7,8,9	Emailed feedback
Written examination	50	1 1/2 hours	1,2,3,4,5,6	Feedback sheet

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)

Original Form of Assessment	Form of Re-assessment	ILOs Re-assessed	Time Scale for Re-assessment
As above	Written examination	1,2,3,4,5,6	August Ref/Def period

RE-ASSESSMENT NOTES

If a module is normally assessed entirely by coursework, all referred/deferred assessments will normally be by assignment.

If a module is normally assessed by examination or examination plus coursework, referred and deferred assessment will normally be by examination. For referrals, only the examination will count, a mark of 40% being awarded if the examination is passed. For deferrals, candidates will be awarded the higher of the deferred examination mark or the deferred examination mark combined with the original coursework mark.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type & level of information that you are expected to consult. Further guidance will be provided by the Module Convener

ELE: http://vle.exeter.ac.uk

Reading list for this module:

Type	Author	Title	Edition	Publisher	Year	ISBN	Search
Set	Struik D.J.	A concise history of mathematics		Dover	1987	000-0-486-60255-9	[Library]
Set	Dunham W.	Journey through genius: the great theorems of mathematics		Wiley	1990	000-0-471-50030-5	[Library]
Set	Kline M.	Mathematics in Western Culture		Oxford University Press	1972	000-0-140-21546-8	[Library]
Set	Grattan-Guinness I.	The Fontana History of the Mathematical Sciences		Fontana	2000	978-0006861799	[Library]
Set	Fauvel J. and Gray J.	The History of Mathematics: a reader		Macmillan & Oxford University Press	1987	000-0-333-42791-2	[Library]
Set	Katz V.J.	A History of Mathematics. An Introduction	3rd	Addison-Wesley	2009	978-0321387004	[Library]
Set	Boyer, C.B.	A History of Mathematics	Electronic	Wiley	2011	0471097632	[Library]

CREDIT VALUE	15	ECTS VALUE	7.5
PRE-REQUISITE MODULES	MTH1001		
CO-REQUISITE MODULES			
NQF LEVEL (FHEQ)	6	AVAILABLE AS DISTANCE LEARNING	No
ORIGIN DATE	Tuesday 10 July 2018	LAST REVISION DATE	Thursday 16 December 2021
KEY WORDS SEARCH	History; philosophy; culture of mathematics.		