Module Specifications..

Current Academic Year 2020 - 2021

Please note that this information is subject to change.

Module Title	Differential Calculus		
Module Code	MS112		
School	School of Mathematical Sciences		
	Online Module Resources		
Module Co-ordinator	Semester 1: Jacobus Sanders Semester 2: Jacobus Sanders Autumn: Jacobus Sanders		
Module Teachers	Jacobus Sanders		
NFQ level	8	**Credit Rating**	5
Pre-requisite	None		
Co-requisite	None		
Compatibles	None		
Incompatibles	None		

Description

This module covers the differential calculus of functions of one real variable. Main topics are limits, continuity and derivatives of functions. The module aims to balance theoretical foundations (definitions and theorems), computational skills (practising the rules of calculus) and applications (optimisation and systematic approximation using Taylor polynomials).

Learning Outcomes

1. State and use the definitions of limit and continuity.
2. Compute a variety of limits and determine the continuity of a variety of functions.
3. Apply theorems for continuous functions in a variety of settings.
4. Differentiate a variety of functions
5. Apply derivatives in a variety of settings

Workload	Full-time hours per semester	
Type	***Hours***	***Description***
Lecture	24	Lectures on course content
Tutorial	12	Weekly tutorials
Independent Study	89	No Description
		Total Workload: 125

All module information is indicative and subject to change. For further information,students are advised to refer to the University's Marks and Standards and Programme Specific Regulations at: http://www.dcu.ie/registry/examinations/index.shtml

Indicative Content and Learning Activities

FUNCTIONS
Polynomials, rational functions, power functions, exponential functions, cos, sin and log. General concepts, including natural domain, even and odd functions, multiples, sums, products and compositions.

LIMITS
Definition, computational rules, Squeeze Theorem.

CONTINUITY
Definition. Determining the continuity of a function. Boundedness Theorem, Extreme Value Theorem and Intermediate Value Theorem.

DERIVATIVES
Definition and relation to increasing/decreasing functions. Computational rules (including product rule, chain rule, quotient rule and Inverse Function Theorem).

APPLICATIONS OF DERIVATIVES
Local and global extreme values. Taylor's Theorem and systematic approximation.

Assessment Breakdown			
Continuous Assessment	25%	Examination Weight	75%

Course Work Breakdown			
Type	**Description**	**% of total**	**Assessment Date**
Assignment	Continuous assessment	25%	n/a

Reassessment Requirement Type

Resit arrangements are explained by the following categories;
1 = A resit is available for all components of the module
2 = No resit is available for 100% continuous assessment module
3 = No resit is available for the continuous assessment component

This module is category 1

Indicative Reading List

Other Resources

None

Array

Programme or List of Programmes

ACM	BSc in Actuarial Mathematics
BSSA	Study Abroad (DCU Business School)
BSSAO	Study Abroad (DCU Business School)
CAFM	Common Entry, Actuarial, Financial Maths
ECSA	Study Abroad (Engineering & Computing)
ECSAO	Study Abroad (Engineering & Computing)
HMSA	Study Abroad (Humanities & Soc Science)
HMSAO	Study Abroad (Humanities & Soc Science)
IESA	Study Abroad (Institute of Education)
IESAO	Study Abroad (Institute of Education)
IFCMS	Int Foundation Cert (Mathematics)
SHSA	Study Abroad (Science & Health)
SHSAO	Study Abroad (Science & Health)

Timetable this semester: Timetable for MS112

Archives:

- See the module specification for MS112 in 2003 - 2004
- See the module specification for MS112 in 2004 - 2005
- See the module specification for MS112 in 2005 - 2006
- See the module specification for MS112 in 2006 - 2007
- See the module specification for MS112 in 2007 - 2008
- See the module specification for MS112 in 2008 - 2009
- See the module specification for MS112 in 2009 - 2010
- See the module specification for MS112 in 2010 - 2011

- See the module specification for MS112 in 2011 - 2012
- See the module specification for MS112 in 2012 - 2013
- See the module specification for MS112 in 2013 - 2014
- See the module specification for MS112 in 2014 - 2015
- See the module specification for MS112 in 2015 - 2016
- See the module specification for MS112 in 2016 - 2017
- See the module specification for MS112 in 2017 - 2018
- See the module specification for MS112 in 2018 - 2019
- See the module specification for MS112 in 2019 - 2020
- See the module specification for the current year