APPROVED

MATH 2832: Calculus II

Module Details

Module Code:	MATH 2832
Module Long Title:	Calculus II APPROVED
Banner Title:	Calculus II
Version:	1
Valid From:	Sept 2020 (September 2020)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0541 - Mathematics
Current Coordinator::	SARAH MORRIS
Module Coordinators:	SARAH MORRIS (09 January 2020 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	The module develops the learner's abilities in advanced calculus by emphasising the methodologies of solving problems in multivariate calculus and integration.
Indicative Syllabus	**Differentiation:** functions of one and several variables; interpretation of the derivative and partial derivatives – extrema and saddle points; higher order derivatives and their interpretation; rules of differentiation; L'Hopital's rule; Chain rule in one and several variables. Taylor's theorem and Taylor series in one and several variables. Examples taken from mechanics, polar coordinates etc.; **Integration:** statement of fundamental theorem of calculus; techniques of integration (substitution: half-angle substitutions, reduction formulae); double integrals and integration over the plane; change of variables and the Jacobian; examples and physical interpretation. **Ordinary Differential Equations:** classification of differential equations (order, linearity, homogeneous); first-order equations: homogeneous, separable, integrating factor, exact; second-order equations: linear, constant coefficients. Examples and applications: e.g. population growth models, compartmental models, electrical circuits, simple and forced harmonic motion and other physical problems. **Cartesian Vector Calculus:** vector valued functions; gradient; directional derivatives; divergence and curl of a vector field; examples and identities.
Learning and Teaching Methods	Lectures supported by tutorials and/or laboratory sessions including use of mathematical software.

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	Differentiate and integrate functions of several variables
MLO2	Use L'Hopital's rule to evaluate limits involving indeterminate forms
MLO3	Determine the Taylor series of the nth order
MLO4	Evaluate double and triple integrals for area and volume.
MLO5	Demonstrate understanding of the Fundamental theorem of calculus.
MLO6	Apply integration techniques, including half-angle substitutions.
MLO7	Solve first-order differential equations that are separable, linear or exact.
MLO8	Solve linear second-order differential equations with constant coefficients.
MLO9	Evaluate gradient, directional derivatives of real valued functions
MLO10	Calculate divergence and curl of vector fields

Requisites	
Assessment Threshold	35% on end of module written exam

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4,5,6,7,8,9,10
Assessment Threshold:	35	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Other Assessment(s)

Assessment Type	Practical/Skills Evaluation	**% of Total Mark for Module**	30
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4,5,6
Assessment Threshold:	None	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
Continuous Assessment

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

APPROVED

MATH 2837: Statistics I: Probability and Statistical Inference

Module Details

Module Code:	MATH 2837
Module Long Title:	Statistics I: Probability and Statistical Inference APPROVED
Banner Title:	MATH 3838 Statistics II: Stat
Version:	1
Indicative NFQ level:	Level 6
Valid From:	Jan 2019 (January 2019)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0542 - Statistics
Current Coordinator::	JOE CONDON
Module Coordinators:	JOE CONDON (23 January 2020 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	

This module introduces probability theory, random variables, probability distributions and statistical inference. The fundamental laws of probability including Bayes' theorem are covered. Motivating random variables as a mapping of experimental results onto subsets of the real numbers, this module covers the mathematics of probability including the standard univariate discrete and continuous distributions. Statistical inference for population means/proportions are also covered.

Indicative Syllabus

Probability Theory

Axioms of probability. Addition rule. Independence. Conditional probability. Multiplication rule. Bayes' Theorem. Counting rules, including permutation and combinations.

Discrete Random Variables

Probability distributions and mass functions. Expected values and variances. Functions of random variables. The Bernoulli, binomial, multinomial, geometric, negative binomial and Poisson distributions; their expectations /variances.

Continuous Random Variables

Probability density functions. Expected values and variances. Functions of a continuous random variable. The uniform, exponential and normal distributions; their means and variances.

Statistical Inference

The Central Limit Theorem. Hypothesis tests for population means/proportions. Confidence intervals for population means/proportions.

Learning and Teaching Methods	Lectures supported by tutorials and computer laboratory sessions.

Module MATH 2837 - Statistics I: Probability and Statistical Inference v1 (Year/Cycle:1 / Semester:Semester 1 / Delivery Type:Mandatory)

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	Describe, select and apply the fundamental laws of probability including conditional probability and Bayes' Theorem.
MLO2	Demonstrate the use of random variables, probability distributions, probability mass functions and probability density functions.
MLO3	Recognise experiments where standard distributions apply and solve associated problems.
MLO4	Perform hypothesis tests on population means/proportions and be able to report the results of such tests; explain and calculate confidence intervals for population means/proportions.
MLO5	Use a major statistical software package for data analysis (e.g. R or equivalent), applying techniques covered in the module.

Requisites

Assessment Threshold	

End of semester exam: 35%.

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	Week 14	**Learning Outcomes**	1,2,3,4,5
Assessment Threshold:	35	**Assessment Role**	Individual
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description

n/a

Other Assessment(s)

Assessment Type	In Class Test	**% of Total Mark for Module**	30
Indicative Week	Week 8	**Learning Outcomes**	1,2,3
Assessment Threshold:	None	**Assessment Role**	Individual
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description

n/a

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

Module MATH 2838 - Numerical Methods & Algorithms v1 (Year/Cycle:1 / Semester:Semester 2 / Delivery Type: Mandatory)

APPROVED

MATH 2838: Numerical Methods & Algorithms

Module Details

Module Code:	MATH 2838
Module Long Title:	Numerical Methods & Algorithms APPROVED
Banner Title:	Numerical Meth & Algorithms
Version:	1
Valid From:	Jan 2020 (January 2020)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0541 - Mathematics
Current Coordinator::	BRENDAN REDMOND
Module Coordinators:	• DANA MACKEY (07 January 2020 to 06 December 2021) • BRENDAN REDMOND (06 December 2021 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	

This module presents concepts and methods of numerical analysis. It introduces the learner to the idea of finding approximate solutions to mathematical problems by constructing procedures and algorithms and analysing their efficiency.

Indicative Syllabus

1. Introduction: Computer representation of numbers; Computational errors, loss of significance, stability and convergence of algorithms.

2. Root finding techniques for nonlinear equations. The bisection method; Newton's method; The secant method; Fixed-point iteration algorithms and convergence conditions; Error analysis and comparison between different methods.

3. Systems of linear equations. Linear algebra review; Gaussian elimination with different pivoting strategies; The LU and Cholesky factorization; Iterative methods (Jacobi and Gauss-Seidel algorithms) and their convergence properties;

4. Random number generating algorithms. Modular arithmetic, the middle square method and the linear congruential method.

5. Sorting Algorithms. Selection sort, bubble sort, merge sort and quick sort.

Learning and Teaching Methods

Lectures supported by problem-solving tutorials and laboratory sessions using mathematical software packages.

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	Recognise when numerical methods can be employed for solving mathematical problems
MLO2	Analyse computational errors, convergence and stability concepts
MLO3	Use standard methods for finding approximate solutions to nonlinear equations
MLO4	Solve systems of linear equations using various factorisation or iterative methods
MLO5	Compare different algorithms with respect to convergence and error analysis
MLO6	Use basic algorithms for generating random numbers
MLO7	Design and implementation of sorting algorithms
MLO8	Use mathematical software to complement and apply the topics encountered

Requisites

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	Week 28	**Learning Outcomes**	1,2,3,4,5,6,7,8
Assessment Threshold:	35	**Assessment Role**	Individual
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Other Assessment(s)

Assessment Type	In Class Test	**% of Total Mark for Module**	30
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,8
Assessment Threshold:	None	**Assessment Role**	Individual
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

Module MATH 2834 - Real Analysis v1 (Year/Cycle:1 / Semester:Semester 2 / Delivery Type:Mandatory)

APPROVED

MATH 2834: Real Analysis

Module Details

Module Code:	MATH 2834
Module Long Title:	Real Analysis APPROVED
Banner Title:	Real Analysis
Version:	1
Valid From:	Jan 2021 (January 2021)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0541 - Mathematics
Current Coordinator::	SARAH MORRIS
Module Coordinators:	SARAH MORRIS (09 January 2020 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	The module provides an introduction to real analysis. It develops a rigorous approach to mathematical reason and proof and provides a strong underpinning to the knowledge and skills developed throughout the programme.
Indicative Syllabus	**Sequences:** Definition of a limit of a sequence; upper and lower bounds, supremum/infinum; properties of convergent sequences (e.g. uniqueness, linearity, product of sequences); monotone convergence theorem; subsequences; Bolzano-Weierstrass theorem. **Series:** partial sums; convergence of a series; comparison test; absolute convergence; ratio test; alternating series test. Examples of common convergent and divergent series. **Continuity:** functions; definition of continuity; properties of continuity (e.g. linearity, continuous preserve convergence); intermediate value theorem; continuous functions on bounded intervals. **Differentiation:** differentiability; properties (e.g. linearity; product rule); chain rule; extreme value theorem; Rolle's theorem; mean value theorem; continuous differentiability.
Learning and Teaching Methods	Lectures supported by tutorials and/or laboratory sessions including use of mathematical software

Module MATH 2834 - Real Analysis v1 (Year/Cycle:1 / Semester:Semester 2 / Delivery Type:Mandatory)

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	Apply theorems of analysis to real functions of one variable
MLO2	Rigorously prove results that arise in the context of real analysis
MLO3	Evaluate the limits of a wide class of real sequences
MLO4	Apply the Bolzano-Weierstrass theorem
MLO5	Use the definitions of convergence as they apply to sequences, series, and functions.
MLO6	Determine whether or not real series are convergent by comparison with standard series or using the Ratio Test
MLO7	Distinguish between continuity and uniform continuity
MLO8	Apply differentiation theorems to problems in the context of real analysis

Requisites

Assessment Threshold	35% on end of module written exam

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4,5,6,7,8
Assessment Threshold:	35	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Other Assessment(s)

Assessment Type	In Class Test	**% of Total Mark for Module**	30
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4
Assessment Threshold:	None	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

Module MATH 2835 - Discrete Mathematics I v1 (Year/Cycle:2 / Semester:Semester 1 / Delivery Type:Mandatory)

APPROVED

MATH 2835: Discrete Mathematics I

Module Details

Module Code:	MATH 2835
Module Long Title:	Discrete Mathematics I APPROVED
Banner Title:	Discrete Mathematics I
Version:	1
Valid From:	Sept 2019 (September 2019)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0541 - Mathematics
Current Coordinator::	SARAH MORRIS
Module Coordinators:	SARAH MORRIS (09 January 2020 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	The module introduces the learner to set theory, number systems, logic and Boolean algebra.
Indicative Syllabus	**Set Theory** Algebra of sets, Power sets, Cardinality, Cartesian product, Relations, Equivalence relations, Functions. **Boolean Algebra** Basic laws, Logic circuits, Simplification of expressions, Karnaugh maps. **Number Systems** Binary, Octal, Decimal, Hexadecimal, Arithmetic, One's complement. **Logic** Propositional logic, Truth tables, Logical equivalence; Predicate logic, Proof techniques.
Learning and Teaching Methods	Lectures supported by tutorials and/or laboratory sessions including use of mathematical software.

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	Identify and apply the principles of sets.
MLO2	Utilise concepts and structures of relations.
MLO3	Identify properties of functions.
MLO4	Demonstrate an understanding of different number systems and convert between them.
MLO5	Apply the basic laws of Boolean algebra and use Karnaugh maps to simplify Boolean expressions.
MLO6	Identify and apply laws of propositional logic.

Requisites

Assessment Threshold	35% on end of module written exam

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4,5,6
Assessment Threshold:	35	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Other Assessment(s)

Assessment Type	In Class Test	**% of Total Mark for Module**	30
Indicative Week	See Student Handbook	**Learning Outcomes**	1,3
Assessment Threshold:	None	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

Module MATH 2831 - Linear Algebra II v1 (Year/Cycle:2 / Semester:Semester 1 / Delivery Type:Mandatory)

APPROVED

MATH 2831: Linear Algebra II

Module Details

Module Code:	MATH 2831
Module Long Title:	Linear Algebra II APPROVED
Banner Title:	Linear Algebra II
Version:	1
Indicative NFQ level:	Level 6
Valid From:	Sept 2019 (September 2019)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0541 - Mathematics
Current Coordinator::	JOE CONDON
Module Coordinators:	• CORMAC BREEN (06 January 2020 to 06 December 2021) • JOE CONDON (06 December 2021 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	This module builds on the material covered in a first year Linear Algebra module. It introduces the learner to the concepts of vector spaces, linear transformations and eigenvalues and eigenvectors.
Indicative Syllabus	**Review** Linear systems, matrix algebra, determinants including use of mathematical software **Vectors & Vector Spaces** Vectors in n-space, norm of a vector, Euclidean inner product, orthogonality, general vector spaces, subspaces, linear combination of vectors, linear dependence, spanning sets, basis, dimension of a vector space. **Linear Transformations** Standard matrix for a linear transformation, reflections, rotations and projection operators, row and column space of a matrix, rank and nullity of a matrix, The Rank Nullity Theorem. **Eigenvalues and Eigenvectors**

	Characteristic equation of a matrix, eigenvalues and eigenvectors of a matrix, eigenspace of a matrix, diagonalization of a matrix.
Learning and Teaching Methods	Lectures supported by tutorials and laboratory sessions

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	Carry out calculations using vector arithmetic and the scalar and vector product and determine if pairs of vectors are orthogonal or not.
MLO2	Determine if a given subset is a subspace of a vector space.
MLO3	Determine if a given set of vectors is a basis for a vector space and determine the dimension of a vector space.
MLO4	Find the coordinates of a vector with respect to a given basis.
MLO5	Determine whether or not a transformation is linear and find the standard matrix for a linear transformation.
MLO6	Find the vector form of the general solution of a given linear system
MLO7	Find bases for the row space and the column space of a matrix.
MLO8	Compute the rank and nullity of a matrix.
MLO9	Find the eigenvalues and eigenvectors of a matrix.

Requisites

Assessment Threshold	35% on end of module written exam

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4,5,6,7,8,9
Assessment Threshold:	35	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Other Assessment(s)

Assessment Type	In Class Test	**% of Total Mark for Module**	30
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4
Assessment Threshold:	None	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

Module MATH 2836 - Discrete Mathematics II v1 (Year/Cycle:2 / Semester:Semester 2 / Delivery Type:Mandatory)

OLLSCOIL TEICNEOLAÍOCHTA BHAILE ÁTHA CLIATH
DUBLIN
TECHNOLOGICAL UNIVERSITY DUBLIN

APPROVED

MATH 2836: Discrete Mathematics II

Module Details

Module Code:	MATH 2836
Module Long Title:	Discrete Mathematics II APPROVED
Banner Title:	Discrete Mathematics II
Version:	1
Valid From:	Jan 2020 (January 2020)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0541 - Mathematics
Current Coordinator::	SARAH MORRIS
Module Coordinators:	SARAH MORRIS (09 January 2020 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	The module introduces the leaner to concepts and algorithms of recursion, graph theory and trees.
Indicative Syllabus	**Review** Linear systems, matrix algebra, determinants. **Vectors & Vector Spaces** Vectors in n-space, norm of a vector, Euclidean inner product, orthogonality, general vector spaces, subspaces, linear combination of vectors, linear independence and dependence, spanning sets, basis, dimension of a vector space. **Linear Transformations** Standard matrix for a linear transformation, reflections, rotations and projection operators, row and column space of a matrix, rank and nullity of a matrix, The Rank Nullity Theorem. **Eigenvalues and Eigenvectors** Characteristic equation of a matrix, eigenvalues and eigenvectors of a matrix, eigenspace of a matrix, diagonalization of a matrix.
Learning and Teaching Methods	Lectures supported by tutorials and/or laboratory sessions including use of mathematical software

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	Define sequences recursively.
MLO2	Solve and analyse problems using recursion.
MLO3	Identify and apply planar and isomorphic graphs.
MLO4	Understand and utilise Euler and Hamiltonian paths.
MLO5	Identify properties of trees and their applications.
MLO6	Solve tree traversal algorithms

Requisites	
Assessment Threshold	35% on end of module written exam

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3,4,5,6
Assessment Threshold:	35	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Other Assessment(s)

Assessment Type	In Class Test	**% of Total Mark for Module**	30
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3
Assessment Threshold:	None	**Assessment Role**	Not yet determined
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

Module MATH 2833 - Geometry v1 (Year/Cycle:2 / Semester:Semester 2 / Delivery Type:Mandatory)

OLLSCOIL TEICNEOLAÍOCHTA BHAILE ÁTHA CLIATH
DUBLIN
TECHNOLOGICAL UNIVERSITY DUBLIN

APPROVED

MATH 2833: Geometry

Module Details

Module Code:	MATH 2833
Module Long Title:	Geometry APPROVED
Banner Title:	Geometry
Version:	1
Indicative NFQ level:	Level 6
Valid From:	Jan 2020 (January 2020)
Language of Instruction:	English
ECTS Credits::	7.5
ISCED Code:	0541 - Mathematics
Current Coordinator::	Richard Ellard
Module Coordinators:	• MILENA VENKOVA-MCGARRAGHY (14 January 2020 to 06 December 2021) • Richard Ellard (06 December 2021 to ---)
School Responsible:	School of Mathematical Sciences (CC)
Campus:	City Campus
Module Overview	This module develops a deep understanding of Euclidean Geometry and introduces the student to non-Euclidean Geometry.
Learning and Teaching Methods	Lectures supported by tutorials and/or laboratory sessions including use of mathematical software

Indicative Syllabus
1. Geometry and the Euclidean Plane 1.1) The axiomatic approach to geometry, angle and area, triangles, circles and quadrilaterals. Trigonometry. Similarity and congruence. Ceva's Theorem.
2. Geometry of the Complex plane 2.1) Lines and circles in the complex plane. Mobius transformations. Stereographic projection and the Riemann sphere.
3. Non-Euclidean Geometry 3.1) Geodesics and distance on the sphere, spherical distance, spherical trigonometry, sum of the angles of a spherical triangle. Spherical version of Pythagoras' Theorem, area in spherical geometry.

Module MATH 2833 - Geometry v1 (Year/Cycle:2 / Semester:Semester 2 / Delivery Type:Mandatory)

Learning Outcomes	
Upon successful completion of this module the learner will be able to	
#	
MLO1	state and prove a variety of results in Euclidean Geometry;
MLO2	solve problems based on the geometry of the Euclidean plane;
MLO3	demonstrate an understanding of the relationship between area and Ceva's Theorem;
MLO4	solve problems based on the geometry of the complex plane;
MLO5	demonstrate an understanding of the idea of infinity and the extended complex plane;
MLO6	prove some basic results of Spherical Geometry;
MLO7	demonstrate an understanding of spherical geometry by solving relevant problems.

Requisites	
Assessment Threshold	End of module written exam: 35%

Module Content & Assessment

Assessment Breakdown	%
Formal Examination	70.00%
Other Assessment(s)	30.00%

Assessments

Formal Examination

Assessment Type	Written Examination	**% of Total Mark for Module**	70
Indicative Week	Week 28	**Learning Outcomes**	1,2,3,4,5,6,7
Assessment Threshold:	35	**Assessment Role**	Individual
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Other Assessment(s)

Assessment Type	In Class Test	**% of Total Mark for Module**	30
Indicative Week	See Student Handbook	**Learning Outcomes**	1,2,3
Assessment Threshold:	None	**Assessment Role**	Individual
Assessment Authenticity	Not Online	**Pass/Fail**	No

Assessment Description
n/a

Module Activity

Full Time hours per semester	
Activity Type	*Duration (Hours)*
Lecture	39
Self Directed	111
Hours (up to 100 for 5 ECTS credits)	150.00

Recommended Reading List

Recommended Book Resources

Roger Fenn. (2007), Geometry, Springer Science & Business Media, p.313, [ISBN: 9781852330583].

Supplementary Book Resources

Patrick D Barry. (2001), Geometry with Trigonometry, ISBS, p.256, [ISBN: 1898563691].