Module specification

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Refer to the module guidance notes for completion of each section of the specification.

Module code	ENG427
Module title	Engineering Mathematics
Level	4
Credit value	20
Faculty	FAST
Module Leader	Ms M Kochneva
HECoS Code	100089
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
HNC Electrical & Electronic Technology	Core
HNC Mechanical Technology	Core

Pre-requisites

L3 Mathematics for Engineering Technicians (or similar).

Breakdown of module hours

Learning and teaching hours	60 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**60** hrs
Placement / work based learning	0 hrs
Guided independent study	140 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	August 2016

For office use only	
With effect from date	September 2021
Date and details of revision	6 July 2021, revalidated
Version number	Version 2

Module aims

To provide fundamental mathematical knowledge and techniques to successfully solve problems encountered in a work situation. It will also enable successful completion of Higher National programme and progress to further studies.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Apply complex numbers to the solution of engineering problems.
2	Apply algebra and trigonometry to solve engineering problems.
3	Solve basic engineering problems using mathematical models employing calculus.

Assessment

Indicative Assessment Tasks:
Assessment is 100% in-course.

Assessment One: Outcomes 1, 2 will be assessed using an in-class test based on the learned methods appropriate to complex numbers, algebra and trigonometry (1hr 30 mins).

Assessment Two: Outcome 3 will be assessed using an in-class test based on the application of calculus to real life engineering problems (1 hr 30 mins).

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1, 2	In-class test	50%
2	3	In-class test	50%

Derogations

None.

Learning and Teaching Strategies

The module will be presented to students through a specified series of lectures and tutorials assisted by notes via VLE platform. It will be underpinned by use of computer assisted packages, the learning element will be evaluated by a set of assignments on computer element and tests to ensure outcomes are achieved. This will be a progressive set of worked examples throughout the module.

Innovative use of a computer-based multi-choice questions package – is expected to form a key part in the development of this module.

Indicative Syllabus Outline

1. **Complex Numbers:** Application of complex numbers in a variety of engineering problems.
2. **Algebraic and trigonometric methods:** Algebraic methods: rules of order for partial fractions including – linear, repeated, and quadratic factors, reduction of algebraic fractions to partial fractions. Exponential and hyperbolic functions: relationship between exponential and logarithmic functions, solution of equations involving exponential and logarithmic expressions. Trigonometric identities: relationship between trigonometric and hyperbolic identities, double angle and compound angle formulae and the conversion of products to sums and differences.
3. **Calculus**: Introduction to calculus: the concept of the limit and continuity, definition or derivative, derivates of standard functions, notion of the derivative and rates of change, differentiation of functions using the product, quotient, and function of a function rules, introduction to the integral calculus as the calculation of area and the inverse of differentiation, the indefinite integral and the constant of integration, standard integrals, and the application of algebraic and trigonometric functions, the definite integral and area under curves. Further integration: second order and higher derivatives, implicit functions, introduction to differential equations both first order and second order, partial derivatives, and partial differentiation. Further integration: integration by parts, integration by substitution, integration using partial fractions.
4. **Computational Packages:** Introduction to the major computer-based packages available at present. Use of packages to solve problems already encountered in the course and for graphical presentations.

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

Bird, J. (2017) Higher Engineering Mathematics 8th ed. Routledge.

Other indicative reading

Booth, Stroud (2002) Engineering Mathematics. 8th ed.Palgrave.
Bird, May (2002) Technician Mathematic 4 & 5. Longman.

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas. Click here to read more about the Glyndwr Graduate attributes

Core Attributes

Engaged
Ethical

Key Attitudes
Resilience
Confidence
Adaptability

Practical Skillsets
Digital Fluency
Critical Thinking
Communication