MODULE SPECIFICATION

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

Module Code:	ENG4AC

Module Title:	Supplementary Maths for Engineers

Level:	4	**Credit Value:**	20

Cost Centre(s):	GAME	JACS3 **code**: HECoS code:	G160 101028

Faculty	FAST	**Module Leader:**	Martyn Jones

Scheduled learning and teaching hours	30 hrs
Placement tutor support	0hrs
Supervised learning eg practical classes, workshops	10 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total contact hours	**40** hrs
Placement / work-based learning	
Guided independent study	160 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
Standalone module aligned to BEng(Hons) Production Engineering	☐	✓

Pre-requisites
N/A

Office use only

Initial approval: 28/05/2020 Version no:1

With effect from: 01/08/2020

Date and details of revision: Version no:

Module Aims
• To provide a foundation of mathematical knowledge covering a wide range of basic topics. • To develop an analytical approach to derivation of mathematical functions and expressions; • To develop the application of mathematical principles in the solution of engineering problems including by means of computer modelling software.

Module Learning Outcomes - at the end of this module, students will be able to	
1	Use differentiation and integration processes including second order differential equations.
2	Select and apply appropriate mathematical techniques to the solution of problems.
3	Demonstrate how to manipulate a range of appropriate numerical data
4	Use mathematical modelling software to apply mathematical techniques in solving engineering problems.

Employability Skills **The Wrexham Glyndŵr Graduate**	**I = included in module content** **A = included in module assessment** **N/A = not applicable**
Guidance: complete the matrix to indicate which of the following are included in the module content and/or assessment in alignment with the matrix provided in the programme specification.	
CORE ATTRIBUTES	
Engaged	I
Creative	I
Enterprising	I
Ethical	I
KEY ATTITUDES	
Commitment	I
Curiosity	I
Resilient	IA
Confidence	I
Adaptability	I
PRACTICAL SKILLSETS	
Digital fluency	IA
Organisation	IA
Leadership and team working	N/A
Critical thinking	IA
Emotional intelligence	A
Communication	I

Derogations

None

Assessment:

Indicative Assessment Tasks:

The student will build a portfolio of materials that demonstrate the learning outcomes. These will include: a number of in-class tests to assess their understanding of mathematical process and a short assessment on mathematical modelling software (such as Matlab)

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-4	Portfolio	100

Learning and Teaching Strategies:

- The module will be delivered through a combination of formal lectures, tutorials, practical demonstrations and student workshops. All of the material delivered formally will be available through MOODLE.

- Please note: The student will be expected to have a device capable of using Mathematical modelling software (such as Matlab) and a scientific calculator for the lecture series (A phone with relevant App will suffice).

Syllabus outline:

This module will introduce students to calculus topics such as:

- Integration (Methods of substitution, partial fractions and by parts. Definite indefinite integrals, applications)
- First order differentiation (Linear first order differential equations; separation of variables, use of integrating factor. Second order with zero input - three types of solutions)
- Second order differentiation (Method of undetermined coefficients for finding particular integrals.)
- Complex numbers: (Different forms and arithmetic, DeMoivre's theorem, powers and roots relation between trig and hyperbolic functions)
- Matrix Algebra (Vectors, Laws, Determinants, Inversion, Solving simultaneous equations)
- Software: (Mathematical modelling software to support other elements of this module, emphasising potential as an analytical tool.)

Indicative Bibliography:

Essential reading:

Glyn, J. (2015) Modern Engineering Mathematics, 5th Edn, Prentice-Hall.

Other indicative reading

Bird, J. (2010) Engineering Mathematics, 6th Edn, Newnes.
Singh, K. (2011) Engineering Mathematics through Applications, 2nd Edn, Palgrave Macmillan.
Stroud, K. (2007) Engineering Mathematics, 6th Edn., Palgrave Macmillan

Websites and Publications:

www.khanacademy.org/
www.mathsisfun.com/
www.mathworks.co.uk
www.mathcentre.ac.uk