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

Module Code:	ENG4AD
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Module Title:	Electronic Workshop Handskills
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Level:	4	Credit Value:	20
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Cost Centre(s):	GAME	JACS3 code:	H690
		HECoS code:	100163

Faculty	Art Science and Technology	Module Leader:	Andrew Sharp
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Scheduled learning and teaching hours	0 hrs
Placement tutor support	0 hrs
Supervised learning eg practical classes, workshops	36 hrs
Total contact hours	36 hrs
Guided independent study	164 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
Standalone module affiliated to BEng Electrical and Electronic Engineering for QAA purposes	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Pre-requisites
N/A

Office use only

Initial approval: 09/07/2020
 With effect from: 01/09/2020
 Date and details of revision:

Version no: 1
 Version no:

Module Aims

This short course aims to:

- Introduction to principles of electronics, digital and analogue
- Identify different components and their symbols
- Enable learners to use circuit diagrams
- Use circuit simulation software for circuit design
- Prototype circuits on breadboard
- Build circuits on Printed Circuit Board using both through hole and surface mount components
- Use crimped terminations for wiring applications
- Understand how to use the different test pieces of equipment commonly found in an electronics workshop
- Build and test electronic circuits
- Introduce the concepts of commonly used fault finding techniques

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

1	Build and test a basic electronic circuit from a circuit diagram
2	Select and use appropriate test equipment to confirm the functionality of a circuit
3	State the underpinning theoretical principles of working safely and effectively in an electronic workshop environment

Employability Skills The Wrexham Glyndŵr Graduate	I = included in module content A = included in module assessment N/A = not applicable
<i>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.</i>	
CORE ATTRIBUTES	
Engaged	I
Creative	A
Enterprising	N/A
Ethical	I
KEY ATTITUDES	
Commitment	A
Curiosity	A
Resilient	N/A
Confidence	I
Adaptability	A
PRACTICAL SKILLSETS	
Digital fluency	A
Organisation	A
Leadership and team working	N/A

Critical thinking	A
Emotional intelligence	N/A
Communication	A

Derogations

None

Assessment:

Indicative Assessment Tasks:

Guidance: please ensure you add indicative word count and durations within the narrative body of this section

Assessment One:

Complete a practical task such as to build and test an electronic circuit from a given circuit diagram.

Assessment Two:

Complete a multiple choice quiz, this could be conducted via VLE (30 minutes).

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1 & 2	Practical	50%
2	3	Multiple Choice Questions	50%

Learning and Teaching Strategies:

Teaching will be a combination of supervised practical classes and workshops to develop practical skills and guided independent study via VLE to facilitate and enable learning of underlying concepts.

Syllabus outline:

Good Workshop Practice

- Getting familiar with the workshop
- General housekeeping
- Roles and responsibilities in the workshop
- Importance of personal protective equipment (PPE)
- An introduction to risk assessment
- Identifying Hazards
- Lifting, Moving and Working at Heights
- Reporting accidents and injuries

Electrostatic Discharge (ESD) Precautions

- What ESD is and how it can affect electronic components and products
- The types of components that can be affected by an electro-static charge
- What an ESD protected area is
- What precautions must be taken to help eliminate the risk of damage from ESD

Electronic Test Equipment

- Recap on the basics – what is current voltage, resistance, frequency etc.
- Selecting appropriate test equipment
- Introduction to using power supplies, signal generators, digital multimeters and oscilloscopes

Introduction to through hole soldering

- Soldering skills and workshop practices
- Soldering irons and methods
- Solder composition types and fluxes
- Electrostatic discharge (ESD) precautions
- PCB Types and Construction
- Practical reworking and repair skills and techniques
- Vacuum de-soldering, de-solder pumps and solder wick

Introduction to surface mount devices (SMDs)

- Introduction to surface mount devices (SMDs)
- Component recognition
- Fundamentals of soldering SMDs
- Types of printed circuit boards (PCBs) and related practices
- Tools and equipment
- Practical soldering skills
- Identification of typical faults by reference to quality standards

Introduction to crimping

- Correct tool and terminal selection
- Wire stripping techniques
- Operation & maintenance of crimping tools
- Practical application of crimping tools
- Gauging & calibration
- Evaluation of crimp joint standards
- Health & Safety overview

Using Circuit Simulation Software

- Why is circuit simulation software useful?

- Multisim Basics
- Introduction to Ultiboard
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Introduction to fault finding techniques

- Visual Examination
- Module and component Isolation
- Unit substitution
- Input to Output and Output/Input signal tracing
- Half – split method
- Use of fault finding aids such as circuit diagrams and trouble-shooting guides

Indicative Bibliography:

Essential reading

All the course material for this module will be provided and published on the VLE

Other indicative reading

Bird, J. (2017) *Electrical Circuit Theory and Technology*, 6th Edn., Newnes.