# Module specification

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

| | |
|---|---|
| Module code | ENG505 |
| Module title | Electrical & Electronic Principles |
| Level | 5 |
| Credit value | 10 |
| Faculty | FAST |
| Module Leader | Dr Y. Vagapov |
| HECoS Code | 100163 |
| 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 |

## Pre-requisites

*ENG429 Electrical Science*

## Breakdown of module hours

| | |
|---|---|
| Learning and teaching hours | 30 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** | **30** hrs |
| Placement / work based learning | 0 hrs |
| Guided independent study | 70 hrs |
| **Module duration (total hours)** | 100 hrs |

| **For office use only** | |
|---|---|
| Initial approval date | August 2016 |
| With effect from date | September 2021 |

| | |
|---|---|
| Date and details of revision | 6 July 2021, revalidated |
| Version number | Version 2 |

## Module aims

To acquaint students with a.c.theory developed from Electrical Engineering Science, circuit theorems; three phase technology including power measurement, complex waves and transients.

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

| | |
|---|---|
| 1 | Solve complex problems relating to series and parallel a.c. circuits |
| 2 | Determine unknown values of current using circuit theorems |
| 3 | Resolve problems associated with star connected and delta connected three phase circuits |
| 4 | Investigate and analyse complex waves using software packages |
| 5 | Investigate and analyse transients in R-L-C circuits |

## Assessment

Indicative Assessment Tasks:

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment 1 is assessed by in-class test. Duration is 1hr 30 mins.

Assessment 2 is assessed by students producing a report based on analysing complex waves and transients in R-L-C circuits using software packages. Approx 2000 words.

| Assessment number | Learning Outcomes to be met | Type of assessment | Weighting (%) |
|---|---|---|---|
| 1 | 1, 2, 3 | In-class test | 50% |
| 2 | 4, 5 | Coursework | 50% |

## Derogations

None

## Learning and Teaching Strategies

Formal lectures backed up with worked examples of the principles in ascending order of complexity.

## Indicative Syllabus Outline

1. Circuit theory: Transformation theorems, energy sources as constant voltage and constant current generators, maximum power transfer theorem. Thevenin's and Norton's theorem. Circuit theory, magnetically coupled circuits, dot notation, and equivalent circuit of transformers. R-L-C circuits, series and parallel resonant circuits, impedance, phase angle, dynamic impedance, Q factor.
2. Two-port networks: Asymmetrical two-port networks, L-networks; Symmetrical two port networks, T and Pi networks; Iterative, image and characteristic impedances; propagation coefficient, Symmetrical attenuators, relationship between Neper and dB.
3. Complex waves: Power factor, RMS value of complex waves, instantaneous current flow in R, RL, RC & RLC ccts including @ resonance. Fourier analysis of complex waves.
4. Transients in R-L-C Circuits: Laplace transforms s-plane analysis. Transient analysis, expressions for RL and RC networks. Simple R-L-C networks. Circuit responses, over, under, zero, critically damped response following step and sinusoidal inputs, zero initial conditions being assumed.

## Indicative Bibliography:

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


**Essential Reads**

Bird, J. (2021) Bird's Electrical Circuit Theory and Technology. 7th ed.Routledge

Hughes, E. (2008) Hughes Electrical and Electronic Technology. 10th ed. Prentice Hall. (https://gctbooks.files.wordpress.com/2015/03/hughes-electrical-and-electronic-technology-10th-edition.pdf)

**Other indicative reading**

Bird J. (2017) Electrical and Electronic principles and Technology. 6th ed.Taylor and Francis


## 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
Creative

**Key Attitudes**
Commitment
Curiosity
Resilience
Confidence
Adaptability

**Practical Skillsets**
Digital Fluency
Critical Thinking
Communication