Access to H.E.
National Programme Unit

Unit Title:	AC Circuit Analysis		
Graded Unit Code:	GA33EEE03	Ungraded Unit Code:	UA33EEE03
Pathway(s):	Construction and the Built Environment Science and Engineering		
Module(s):	Electrical and Electronic Engineering		
Level:	3	Credit Value:	3
Valid from:	1st August 2021	Valid to:	31st July 2026

The following QAA grade descriptors must be applied if you are delivering the graded version of this unit:

1	Understanding of the subject
3	Application of skills
7	Quality

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	**The learner can:**
1. Use A.C. circuit theory to solve simple series A.C. circuit problems	1.1 Draw the phasor diagrams and related voltage and current waveforms for simple A.C. circuits
	1.2 Describe inductive reactance and capacitive reactance and use basic relationships to solve simple problems
	1.3 Derive the impendence triangle from the voltage triangle and show that $Z^2 = R^2 + X^2$ Z and that $tan\varphi = X/R$, $sin\varphi = X/Z$ and that $cos\varphi = R/Z$
	1.4 Apply equations to the solution of single branch L-R and C-R series circuits at power and radio frequencies

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The learner will:	**The learner can:**
	1.5 Derive the power triangle from the voltage triangle and identify true power, *P,* apparent power, *S,* and reactive power *Q*
	1.6 Define $power\ factor$ and show that, where *V* and *I* are sinusoidal, $power\ factor = cos\varphi$
2. Use A.C. circuit theory to solve complex series A.C. circuit problems	2.1 Use phasor diagrams and calculations to solve A.C. series R-L-C circuit problems
	2.2 Define series resonance and sketch a phasor diagram showing that when $V = V_R$ at resonance, V_L and V_C may be much greater than the supply voltage
	2.3 Derive and apply the formula for the frequency of series resonance
	2.4 Define Q factor
3. Apply A.C. circuit theory to the solution of parallel network problems including resonant conditions	3.1 Draw the phasor diagram for a 2-branch parallel circuit with C in one branch and: L only; L and R; or R only in the other branch
	3.2 State the conditions for resonance in a parallel circuit with L and R in one branch and C only in the other
	3.3 Apply the exact and approximate formulae for the parallel resonance frequency
	3.4 Solve problems to correct the power factor for a given circuit and explain why this might be desirable in practice
	3.5 Explain the use of resonant circuits to select and amplify signals