COMM H2612: Electronic Communications 1

Module Title:	Electronic Communications 1
Language of Instruction:	English

Credits:	5

NFQ Level:	6

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	Teaching will be conducted through lectures, practicals and problem-based learning. The practical sessions will be used to reinforce the concepts learned throughout the course

Module Aim:	To give the students the ability to describe, build and analyse circuits for electronic communications.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Analyse the behaviour of resistor, capacitor and inductor circuits when excited by an AC source.
LO2	Understand how resistive, inductive, and capacitive circuits are used in communications systems.
LO3	Use computer-based engineering tools to analyse electronic circuits and calculate parameters associated with their operation and performance.
LO4	Design, assemble, test and debug electronic circuits associated with communication systems

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
“Principles of Electricity” or equivalent; “Introduction to Electronics” or equivalent

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Module Content & Assessment

Indicative Content
Capacitors in AC circuits: Draw a phasor diagram showing the phase relationship between the current and the voltage. Define and calculate capacitive reactance. Sketch a graph of capacitive reactance versus frequency. Calculate true power and reactive power. Describe some applications of a capacitor (AC coupling, power line decoupling, bypassing
Inductors: Describe the basic construction and characteristics of an inductor, Show how an inductor stores energy. Calculate the inductance of a coil. Use a lumped model to indicate the winding resistance. Measure the inductance of an inductor using an inductance meter. Draw the symbol for a fixed, variable, air core, iron core and ferrite core inductor. Calculate the total inductance when inductors are connected in series. Calculate the total inductance when inductors are connected in parallel.
Inductors in AC circuits: Draw a phasor diagram showing the phase relationship between the current and the voltage. Define inductive reactance. Calculate inductive reactance. Sketch a graph of inductive reactance versus frequency. Calculate true power and reactive power. Calculate the Q factor. Describe the operation of an RF choke.
Series RC and RL circuits: Express the voltages and current as phasor quantities. Define impedance. Express capacitive reactance in complex form. Express total impedance in complex form. Draw an impedance triangle. Calculate impedance magnitude and phase. Calculate the power factor.
Parallel RC and RL circuits: Express the voltage and currents as phasor quantities. Express total impedance in complex form. Draw an impedance triangle. Define conductance and admittance.
RC and RL filters: Explain the operation of a low pass filter. Explain the operation of a high pass filter. Calculate the cut off frequency. Define the –3dB point, roll-off rate, and the bandwidth. Use an oscilloscope to plot the phase difference between input and output. Use log-linear graph paper to plot the frequency response. State where such filters may be used.
Series and parallel RCL circuits: Express the voltages and current as phasor quantities. Calculate the total reactance. Calculate the phase angle. Define resonance. Calculate the resonant frequency. Plot impedance versus frequency. Plot phase angle versus frequency. Define Q factor.
Filter response Describe the operation of a bandpass filter. Explain the operation of a series resonant bandpass filter. Explain the operation of a parallel resonant bandpass filter. Describe the operation of a band stop filter. Explain the operation of a series resonant bandstop filter. Explain the operation of a parallel resonant bandstop filter. Calculate the bandwidth for each type of filter. Define selectivity. List applications where such filters may be used

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	20.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Students will sit a number of class tests.	1,2,3	20.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Students will complete a number of practical tasks during the module. Students will write a report or produce a portfolio of their work. Students may also complete a practical test during the module.	3,4	20.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	The final written examination will evaluate the extent of the student's knowledge of the learning outcomes	1,2,3	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	Every Week	2.00
Tutorial	Every Week	1.00
Practicals	Every Week	2.00
Independent Learning Time	Every Week	2.00
	Total Hours	7.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EESYS_B	Bachelor of Engineering (Honours) in Electronic Engineering	3	Mandatory