M4CPD

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M4CPD

IIoT Electric Power and Amplifier Circuits

Contents

Programme Award

Award Title	Electronics
Award Code	QQI 6N5374
Award Body	QQI
Award Level	Level 6

Programme Aim

The aim of this programme is to enable learners to design and build complex electronic circuits.

The programme deals with electrical components such as semiconductors, diodes, triodes, transistors and amplifiers. It also addresses waveform characteristics, the impact of modifiers and the use of oscilloscopes in waveform analysis.

Learner will construct and test devices such as Operational Amplifier Circuits, Logic gates using FET's and Linear Power Supplies.

Programme Delivery Mode

The delivery mode of the programme as laid out in this document is 5 x 8-hour days. It is recommended for this course that the delivery be 1 day a week over 5 weeks, this will allow the students time to complete the project work.

Learner effort hours breakdown

Instructor lead learning hours	40
Self-Directed learning hours	110

Target Learner Profile

M4CPD IIoT Electronic Power and Amplifier Circuits is targeted at employees that are working in industry and are looking to upskill in Electronics

Learners wishing to participate in this programme should have some knowledge of electrical fundamentals

Pre-requisites

Learners should complete the following programmes before enrolling in this programme:

- Electrical Systems Introduction for Advance Manufacturing

Programme Learning Objectives

Programme Learning Outcomes	LO 1. Describe the atomic structure of semiconductors, to include diodes and transistors LO 2. Research how semiconductors are manufactured LO 3. Define gain, attenuation, decibel, bandwidth, input and output impedances. LO 4. Describe the operation of common emitter (CE) and common source (CS) amplifier circuits. LO 5. Sketch typical response curves for an amplifier to include identifying reasons for the fall in gain at low and high frequencies LO 6. Assess the mean output voltage and ripple amplitude for a rectifier LO 7. Evaluate the feedback factor to include calculating the gain of an amplifier having a negative feedback loop with a feedback factor. LO 8. Assess the characteristics of operational amplifiers (op-amps) to include detailing the assumptions made in op-amp analysis LO 9. Appraise the parameters hfe and hie and the relationship between them. LO 10. Define bandwidth in terms of the frequency response curve. LO 11. Analysis the direct current (DC) and alternating current (AC) conditions of CE and CS amplifiers. LO 12. Compare the operating parameters of the field effect transistor (FET) and the bipolar transistor. LO 13. Illustrate the circuit for a range of amplifier circuits to include an inverting amplifier, a non-inverting amplifier, and integrator, a summing amplifier and a comparator. LO 14. Use an oscilloscope to measure voltages, display waveforms and to measure the period and frequency of a repeating waveform. LO 15. Use a multimeter to measure resistance, AC and DC voltages and currents to include checking for faulty diodes, transistors, capacitors and joints. LO 16. Calculate input and outputs for a range of operational amplifier types. LO 17. Use a virtual instrument as an oscilloscope. LO 18. Construct amplifiers from design to operation at certain frequencies and gains. LO 19. Construct power supplies from design to operation. LO 20. IIoT Sustainability.

Certification Details

Certification:	**QQI Level 6**	
Assessment	**Percentage**	**Assessment Description**
Assignment	60%	The assignment will see students examined on their ability to build
Theory Exam	40%	The Theory exam is a written exam where learners will be examined on a broad spectrum of the course objectives

Assessment Map

Learning objective	Theory Exam	Assignment
LO 1	X	
LO 2	X	
LO 3	X	
LO 4	X	
LO 5	X	
LO 6	X	X
LO 7	X	X
LO 8	X	X
LO 9	X	
LO 10	X	
LO 11	X	
LO 12	X	
LO 13		X
LO 14		X
LO 15		X
LO 16		X
LO 17		X
LO 18		X
LO 19		X
LO 20	X	