

TERM 1 (45 days)	1: 27-29 Jan (3)	2: 01-05 Feb (5)	3: 08-12 Feb (5)	4: 15-19 Feb (5)	5: 22-26 Feb (5)	6: 1-5 March (5)	7: 8- 12 March Feb (5)	8: 15-19 Mar (5)	9: 23-26 Mar (4)	10: 29-31 Mar (3)
CAPS topic	Occupational Health and Safety	Waveforms	Waveforms	Waveforms	Waveforms	RLC	RLC	RLC	PAT Consolidation	Revision
Concepts, skills and values	<ul style="list-style-type: none"> <li>Basic introduction to regulations</li> <li>General Machinery Regulations 1988</li> <li>Electrical Machinery Regulations 1988</li> <li><b>Safety</b></li> <li>What is Ergonomics?</li> <li>Unsafe actions</li> <li>Unsafe conditions</li> <li>Dangerous practices</li> <li>Housekeeping principles</li> <li>Signs in the workshop etc....</li> <li><b>Personal Safety</b></li> <li>Protective gear for machinery</li> <li>Personal protection equipment</li> <li>Eye protection</li> <li>Coveralls / Overalls</li> <li>Hearing protection</li> </ul> <p><b>Practical:</b> Use personal protection equipment (During practical sessions)</p> <p><b>Chemical Safety</b> (Printed Circuit Board manufacturing)</p> <ul style="list-style-type: none"> <li>Revision of Grade 10 PCB methods and safety</li> </ul> <p><b>Practical:</b> Etch a PCB (Part of PAT completion)</p>	<p>Introduction to Waveforms</p> <ul style="list-style-type: none"> <li>Uses of waveforms</li> <li>Different types of waves</li> <li>Waveforms and their applications</li> <li>Square Wave</li> <li>Saw tooth Wave</li> <li>Triangular Wave</li> <li>Rectangular Wave</li> <li>Radio Wave</li> </ul> <p>Definition, Symbol &amp; Unit of:</p> <ul style="list-style-type: none"> <li>The Sinusoidal Wave</li> <li>Instantaneous value</li> <li>Maximum value / Minimum value</li> <li>Peak to peak value</li> <li>RMS value <math>V_{rms} = 0.707 \times E_m</math></li> <li>Average value over half cycle (<math>V_{avg} = V_{max} \times 0.637</math>)</li> <li>Time period</li> <li>Frequency</li> <li>Duty cycle</li> <li>Form factor</li> <li>Concept of Phase and Phase difference</li> <li>Harmonic frequencies (Concept only)</li> <li>Difference between a sound wave and an electromagnetic wave (Concept only – self propagating vs. medium needed)</li> <li>Electromagnetic waves (Concept only – combination of</li> </ul>	<p>Pulse Technique</p> <ul style="list-style-type: none"> <li>Pulse polarity</li> <li>Pulse time</li> <li>Rise time / Fall time</li> <li>What is a clock pulse, leading edge, trailing edge?</li> </ul> <p>Calculations</p> <ul style="list-style-type: none"> <li>Pulse time</li> <li>Pulse frequency</li> <li>Rise time</li> <li>Fall time</li> <li>Period and frequency</li> <li><math>\lambda</math> (wavelength) &amp; frequency</li> </ul> <p><b>Practical:</b> Set up and measure different waveforms generated by the function generator on the Oscilloscope</p>	<p>Wave Shaping Circuits</p> <ul style="list-style-type: none"> <li>Diode using discrete components only</li> <li>Clipping Circuits (Positive Clipping only)</li> <li>Simple Series</li> <li>Series Biased</li> <li>Simple Parallel</li> <li>Biased Parallel</li> </ul>	<ul style="list-style-type: none"> <li>Clamping Circuits (Positive clamping only)</li> <li>Clamping Circuit – Diode</li> <li>Clamping Circuit – Zener Diode</li> <li>Integrator &amp; Differentiator</li> <li>No calculations</li> <li>Input and output waveforms on oscilloscope</li> <li>Construction on breadboard</li> <li>Measurement of output waveform</li> </ul> <p><b>Practical:</b> Construct each type of clipping and clamping circuit on breadboard using diodes</p>	<p><b>Effect of Alternating Current on Resistors, Inductors and Capacitors (RLC)</b></p> <ul style="list-style-type: none"> <li>Components in series circuits only</li> <li>All applicable calculations relevant to the theory to be completed</li> <li>Emphasis will be on circuits containing ONE resistor, ONE capacitor and ONE inductor</li> <li>Wave representation</li> <li>Phasor diagram</li> <li>Inductive Reactance <math>X_L = 2\pi fL (\Omega)</math></li> <li>Capacitive Reactance <math>X_C = \frac{1}{2\pi fC} (\Omega)</math></li> <li>Effect of frequency changes on <math>X_L</math> and <math>X_C</math></li> </ul> <p><b>Demonstration:</b> Show phase difference between RL and RC</p>	<ul style="list-style-type: none"> <li>Impedance <math>Z = \sqrt{R^2 + (X_L - X_C)^2} (\Omega)</math></li> <li>Scalar: Representation of the Impedance Triangle</li> <li>Power <math>P = V \times I \cos \theta (Watt)</math></li> <li>Power Factor <math>\cos \theta = \frac{R}{Z}</math></li> <li>Phase Angle <math>\theta = \cos^{-1} \frac{R}{Z} (Deg)</math></li> <li><math>\theta = \cos^{-1} \frac{V_R}{V_Z} (Deg)</math></li> </ul>	<ul style="list-style-type: none"> <li>Natural Resonance</li> <li>Effect of frequency changes on the impedance and current flow</li> <li>Resonance with its characteristic curves</li> <li>Q Factor</li> <li>Bandwidth</li> <li>Frequency changes</li> </ul> <p><b>Calculations</b></p> <ul style="list-style-type: none"> <li>Series combination circuits containing ONE resistor, ONE capacitor and ONE inductor</li> <li>Phasor and wave representation</li> <li>Resonance</li> <li>Bandwidth</li> <li>Q Factor</li> </ul>		

		electrical and magnetic wave – unique characteristics) •Speed of Radio waves •Frequency and wavelength  <b>Demonstration:</b> Function Generator and the Oscilloscope used to measure and display waveforms								
<b>Resources</b> (other than textbook) to enhance learning	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources		
<b>Informal assessm; remediation</b>	Classwork / Case studies / Worksheets / Homework / Theory and Practical etc.)									
<b>SBA (Formal Assessment)</b>	<p style="text-align: center;"><b>Assignment</b> <b>PAT simulation 1 completed</b></p> <p>The legislation governing workplaces in relation to COVID – 19 is the Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993,</p> <p>Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SARS-CoV-2 include. Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times.</p>									

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# National Revised ATP: Term 2 Grade 11 Electrical Technology: Electronics 2021

TERM 3 (52 days)	1: 13-16 Jul (4)	2: 19-23 Jul (5)	3: 26-30 Jul (5)	4: 02-06 Aug (5)	5: 10-13 Aug (4)	6: 16-20 Aug (5)	7: 23-27 Aug (5)	8: 30 Aug- 3 Sept (5)	9: 06-10 Sept (5)	10-11: 13-23 Sept (9)
CAPS topic	Power Supplies	Power Supplies	Power Supplies	Power Supplies	Amplifiers	Amplifiers	PAT (project)Consolidation	PAT (project)Consolidation	Revision	Test
Concepts, skills and values	<b>DC Power Supplies</b> <ul style="list-style-type: none"> <li>• Concept of transformation</li> <li>• Rectification (half wave and full wave)</li> <li>➢ Waveforms</li> <li>➢ Circuit construction (Practical)</li> <li>➢ Representation of waves on Oscilloscope</li> </ul>	<b>Filtering (Ripple Factor, C, LC) and waveforms</b> <ul style="list-style-type: none"> <li>• Block diagram</li> <li>• Circuit diagram and construction of a filter on breadboard</li> <li>• Representation of waves on Oscilloscope</li> <li>• Ripple factor</li> </ul>	<b>Voltage Regulation</b> (Series & shunt regulation using Zener Diode and transistor) <ul style="list-style-type: none"> <li>• Circuit diagram</li> <li>• Waveforms</li> <li>• Measurement with multimeter</li> <li>• Zener calculations of the series resistor</li> </ul>	<b>Practical:</b> Connect a series regulator circuit on the breadboard <b>Practical:</b> Connect a shunt regulator circuit on the breadboard	<b>Introduction to Amplifiers</b> <ul style="list-style-type: none"> <li>• Definition of an amplifier</li> <li>• Types of amplifiers (Class A, B, AB and C) using transistors</li> <li>• Principle of operation of a transistor amplifier</li> <li>• Connection</li> <li>• Characteristics</li> <li>• Circuit diagrams</li> </ul> <b>Input and output signals of:</b> <ul style="list-style-type: none"> <li>• Common Base (no biasing)</li> <li>• Common Collector (no biasing)</li> <li>• Common Emitter (with different types of biasing)</li> </ul>	<b>Biasing of transistor amplifiers</b> <ul style="list-style-type: none"> <li>• Types of biasing applied to the Common Emitter amplifier</li> <li>➢ Fixed Base Biasing</li> <li>• Simple circuit diagram</li> <li>• Advantages &amp; disadvantages</li> <li>➢ Collector feedback biasing</li> <li>• Basic circuit diagram</li> <li>• Advantages &amp; disadvantages</li> </ul>				
Resources (other than textbook) to enhance learning	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources	Educational videos and IT related resources				
Informal assessm; remediation	Classwork / Case studies / Worksheets / Homework / Theory and Practical etc.)									
SBA (Formal Assessment)	<p style="text-align: center;">Term Test PAT Simulation 3 completed</p> <p>The legislation governing workplaces in relation to COVID – 19 is the Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993,</p> <p>Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SARS-CoV-2 include. Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times.</p>									

# Examination