Download more resources like this on ECOLEBOOKS.COM TERM 1 (45 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) 10: 29-31 Mar (3) 9: 23-26 Mar (4) days) Occupational **CAPS** topic **RLC RLC** RLC Waveforms Waveforms Waveforms Waveforms **PAT Consolidation** Revision **Health and Safety** Pulse Technique Wave Shaping Clamping Circuits Effect of Alternating Natural Resonance Basic Introduction to Impedance Waveforms Pulse polarity (Positive clamping Circuits Current on  $Z = \sqrt{R^2 + (X_L - X_C)^2} (\Omega)$  Effect of frequency introduction to Uses of Pulse time changes on the impedance regulations Diode using only) Resistors, Inductors •Rise time / Fall Clamping Circuit and Capacitors and current flow waveforms discrete General Different types of components only Diode (RLC) Scalar: Representation of · Resonance with its Machinery time Regulations 1988 waves •What is a clock Clipping Circuits Clamping Circuit - Components in the Impedance Triangle characteristic curves Electrical Waveforms and pulse, leading (Positive Clipping Zener Diode series circuits only Power their applications edge, trailing Integrator & All applicable o  $P = V \times$ Machinery only) Square Wave Differentiator Q Factor Regulations 1988 edge? calculations relevant  $I\cos\theta$  (Watt) ➤ Simple Series ·Saw tooth Wave to the theory to be Bandwidth Safety No calculations Power Factor ➤ Series Biased Triangular Wave Calculations completed Frequency changes What is ➤ Input and output  $O \quad \cos \theta = \frac{R}{Z}$ ➤ Simple Parallel •Rectangular Wave Pulse time •Emphasis will be on Ergonomics? waveforms on ➤ Biased Parallel •Radio Wave Pulse frequency circuits containing Unsafe actions Calculations oscilloscope  $\cos \theta = \frac{V_R}{V_Z}$  Rise time ONE resistor, ONE Series combination Unsafe conditions ➤ Construction on Dangerous Definition, Symbol •Fall time capacitor and ONE circuits containing ONE breadboard & Unit of: resistor. ONE capacitor Period and inductor practices ➤ Measurement of The Sinusoidal and ONE inductor frequency Wave Housekeeping output waveform • Phase Angle 0  $\theta = \cos^{-1} \frac{R}{Z} (Deg)$ 0  $\theta = \cos^{-1} \frac{V_R}{V_Z} (Deg)$ principles Wave •λ (wavelength) & representation Phasor and wave Phasor diagram •Signs in the frequency representation ➤ Instantaneous Practical: Inductive Reactance Resonance workshop etc.... value Construct each Bandwidth Personal Safety Practical: Set up o  $X_L = 2\pi f L(\Omega)$ ➤ Maximum value type of clipping and Q Factor and measure Capacitive Protective gear for Minimum value clamping circuit on Reactance  $X_C = \frac{1}{2\pi fC} (\Omega)$  coleBooks different machinery breadboard using ➤ Peak to peak waveforms Personal value diodes generated by the protection ➤ RMS value Vrms function generator Effect of frequency equipment Concepts. = 0.707 x Emon the changes on XL and Eye protection skills and ➤ Average value Oscilloscope XC Coveralls / values over half cycle Overalls (Vavg = Vmax x **Demonstration:** Show Hearing protection 0.637) phase difference ➤ Time period between RL and RC Practical: Use personal protection ➤ Frequency equipment (During ➤ Duty cycle practical sessions) ➤ Form factor ➤ Concept of Chemical Safety Phase and Phase (Printed Circuit difference Board **≻**Harmonic manufacturing) frequencies Revision of Grade (Concept only) 10 PCB methods Difference and safety between a sound wave and an Practical: Etch a electromagnetic PCB (Part of PAT wave (Concept completion) only - self propagating vs. medium needed) Electromagnetic

waves (Concept

combination of

only –

	<b>,</b>	<del>,</del>	·	<del>,</del>	T		<u>,                                      </u>			
		electrical and								
		magnetic wave –								
		unique characteristics)								
		•Speed of Radio								
		waves								
		•Frequency and								
		wavelength								
		Demonstration:								
		Function Generator								
		and the								
		Oscilloscope used								
		to measure and display waveforms								
Resources	Educational videos	Educational videos	Educational videos	Educational videos	Educational videos	Educational videos and	Educational videos and IT	Educational videos and IT		
(other than	and IT related	and IT related	and IT related	and IT related	and IT related	IT related resources	related resources	related resources		
textbook) to	resources	resources	resources	resources	resources					
enhance										
learning			Oleany	rade / Casa atrodica / M	/aukahaata / Hawaawa	/ Theory and Drestical of	- \			
Informal assessm;			Classy	vork / Case studies / v	vorksneets / nomewor	k / Theory and Practical et	C.)			
remediatio										
n										
						Assignment				
SBA	PAT simulation 1 completed									
(Formal	The legislation go	verning workplaces in	relation to COVID - 19	is the Occupational F	Health and Safety Act	Act 85 of 1993 as amend	ed, read with the Hazardous Bi	ological Agents Regulations 9	Section 8 (1) of the Occupa	ational Health and
Assessmen	The legislation go	verning workplaces in	relation to OOVID — Is	o is the Occupational i		ty (OHS) Act, Act 85 of 19		ological Agents Negulations. C	bection o (1) of the occupa	itional Health and
t)					fe and proper work us	ed to reduce the duration,	frequency, or intensity of expos			
	Requiring reg	ular hand washing or ເ	using of alcohol-based	hand rubs. Learners	and teachers should al	ways wash hands when th	ley are visibly soiled and after r	emoving any PPE. Keep safe	distances and wear a mas	k at all times.

Downlo	ad more reso	ources like t	his on ECOL	EBOOKS.COM						
TERM 2 (51 days)	<b>1</b> : 13-16 Apr (4)	<b>2</b> : 19-23 Apr (5)	<b>3</b> : 26-30 Apr (4)	<b>4</b> : 03-07 May (5)	<b>5</b> : 10-14 May (5)	<b>6</b> : 17-21 May (5)	7: 24-28May (5)	8: 31 May -4 June (5)	<b>9</b> : 07-11 June (5)	<b>10-11</b> : 14-25 June (9 day)
CAPS topic	Semiconductor devices	Semiconductor devices	Semiconductor devices	Semiconductor devices	Semiconductor devices	Semiconductor devices	Semiconductor devices	Semiconductor devices	PAT Consolidation	Revision
Concepts, skills and values	Introduction to Semiconductor Devices  •Component data •Where to source data on all types of electronic components •How to read a data sheet •Pin configuration •Typical operating values •Working temperature •Equivalent components •Packages (Dual In Line, TO 92, basic packages) •Through-hole components vs. surface mount devices  Semiconductors •Electron flow vs. Conventional flow •Semiconductors & solid state •Silicon vs. Germanium •Doping •P & N material •Majority carriers / Minority carriers	PN Diode     Construction of a PN Diode     Depletion layers     Biasing – Forward and reverse     Characteristics curve & symbol     Calculation of Diode Load Line  Zener Diode     Construction     Principle of operation     Forward Biasing     Reverse Biasing     Avalanche breakthrough vs. controlled breakthrough     Zener as a voltage regulator     Characteristics curve & symbol     Zener calculations  Practical: Determine the value of the series resistor for a Zener diode	The NPN Transistor  Construction Principle of operation Purpose of Biasing & Thermal Runaway Forward Biasing Reverse Biasing Base Curve Emitter Output curve Regions of operations (saturation, active and off) The transistor DC Load Line Transistor power related to the load line (Vcc and Vce) Influence of the DC Load Line on the characteristics of the transistor Symbol	Application of Transistors  Transistor as a switch  Transistor as an amplifier  Transistor gains  Current & Voltage gain  Practical: Determine the DC Load line of the transistor  Practical: Built a circuit using the transistor as a switch	The PNP Transistor Construction Principle of operation Relation to NPN Symbol Application – simple circuits only Practical: Built a circuit using the transistor as a switch		Practical: Construct a Relaxation Oscillator and show waveform on oscilloscope Practical: Construct a light dimmer circuit	<ul> <li>TRIAC</li> <li>Construction</li> <li>Principle of operation</li> <li>Purpose of Biasing</li> <li>Symbol</li> <li>Characteristics curve</li> <li>Application (Relaxation Oscillator, Phase Control, Switch mode application, DC-DC Converter (buck/boost)</li> <li>Circuit diagram DIAC</li> <li>Construction</li> <li>Principle of operation</li> <li>Purpose of Biasing</li> <li>Symbol</li> <li>Characteristics curve</li> <li>Application (Relaxation Oscillator, Phase Control, Switch mode application, DC-DC Converter (buck/boost)</li> <li>Circuit diagram application</li> <li>Circuit diagram application</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	Educational videos and IT related resources	Educational videos and IT related resources		
Informal 3ssess; remediation		1	Classwork / Ca	ase studies / Worksheets	•	•	1	•		
SBA (Formal Assessment	Safe work practice	es are types of administra	ative controls that includ	Occupational Health and see procedures for safe and teamers and te	Safety (OHS) Ac proper work used to red	93, as amended, read wi t, Act 85 of 1993, duce the duration, freque	ency, or intensity of expo	osure to a hazard. Examp	les of safe work practice	s for SARS-CoV-2

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

<b>TERM 3 (</b> 52 days)	<b>1</b> : 13-16 Jul (4)	<b>2</b> : 19-23 Jul (5)	<b>3</b> : 26-30 Jul (5)	<b>4</b> : 02-06 Aug (5)	<b>5</b> : 10-13 Aug (4)	<b>6</b> : 16-20 Aug (5)	<b>7</b> : 23-27 Aug (5)	8: 30 Aug- 3 Sept (5)	<b>9</b> : 06-10 Sept (5)	<b>10-11</b> : 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	Concept of transformation     Rectification (half wave and full wave)     Waveforms     Circuit construction (Practical)     Representation of waves on Oscilloscope	Filtering (Ripple Factor, C, LC) and waveforms  Block diagram Circuit diagram and construction of a filter on breadboard  Representation of waves on Oscilloscope  Ripple factor	Voltage Regulation (Series & shunt regulation using Zener Diode and transistor) • Circuit diagram • Waveforms • Measurement with multimeter • Zener calculations of the series resistor	Practical: Connect a series regulator circuit on the breadboard Practical: Connect a shunt regulator circuit on the breadboard	Introduction to Amplifiers  Definition of an amplifier Types of amplifiers (Class A, B, AB and C) using transistors Principle of operation of a transistor amplifier Connection Characteristics Circuit diagrams Input and output signals of: Common Base (no biasing) Common Collector (no biasing) Common Emitter (with different types of biasing) ole Book	Biasing of transistor amplifiers  Types of biasing applied to the Common Emitter amplifier  Fixed Base Biasing  Simple circuit diagram  Advantages & disadvantages  Collector feedback biasing  Basic circuit diagram  Advantages & disadvantages  Advantages				
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 / Worksh	eets / Homework / Theory a	nd Practical etc.)	•	•		
SBA (Formal Assessment	Safe work practice	Term Test PAT Simulation 3 completed  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, 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.								

## Download more resources like this on ECOLEBOOKS.COM National Revised ATP: Term 4 Grade 11 Electrical Technology: Electronics 2021

TERM 4 (47 days)	1: 05-08 Oct (4)	2: 11-15 Oct (5)	3: 18-22 Oct (5)	<b>4</b> : 25-29 Oct (5)	5: 01-05 Nov (5)	6: 08-12 November (5)	7: 15-19 Nov (5)	8: 22-26 Nov (5)	9: 29 Nov – 3 Dec (5)	10- 06-08 Dec (3)
CAPS topic	Amplifiers	Amplifiers	Amplifiers	Sensors and transducers	Sensors and transducers	Communication Systems	Consolidation and Revision	PATmoderation	Exams	Exams
Concepts, skills and values	<ul> <li>Voltage Divider Biasing</li> <li>➢ Circuit diagram</li> <li>➢ Function of components in the circuit</li> <li>➢ Advantages &amp; disadvantages</li> <li>Calculation of:         <ul> <li>Transistor DC</li> <li>Load line (Common Emitter amplifier with fixed current biasing)</li> </ul> </li> <li>Reference to regions of operation as well as Vcc and Vce</li> <li>The interpretation of a load line in conjunction with an AC signal (active region) to determine the values of the base and collector current, using emitter output curve to derive amplification classes.</li> <li>Influence of DC biasing on the load line and Q point</li> </ul>	Feedback in Amplifiers  What is feedback? (Applications & purpose)  Negative feedback (Basic Introduction only – block diagram  Advantages and disadvantages  Reasons for using negative feedback  Applications of negative feedback  Positive feedback  Advantages and disadvantages  Reasons for using positive feedback  Advantages  Applications of negative feedback  Applications of negative feedback	The Common Emitter Amplifier Input waveform Output waveform Breadboard construction Representation of waves on Oscilloscope Practical: Class A Audio amplifier (Construction, testing & measurements)	Introduction to Sensors and Transducers  Definition of sensors and transducers Piezo Electric Effect Wheatstone bridge principles of resistance measurement	Functional operation of Sensors and Transducers:  Sound Dynamic Microphone Electret Microphone Light The LDR Photodiode Phototransistor Opto-coupler Temperature The Thermistor Thermocouple – Working principle and special conditions for use. (Not a linear resistive output – to be used with lookup table)	Transmitters and Receivers  • Basic principle of operation  • What is modulation?  • Waveforms  • Block diagrams  • Principle of operation  • Types of modulation & related devices  ➤ Continuous Wave modulation (CW)  ➤ CW (Morse Code) Transmitter  ➤ Regenerative Receiver  ➤ Amplitude Modulation (AM)  The AM  Transmitter  ➤ The AM Receiver				
Resources (other than textbook) to enhance	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			
Informal assessm; remediation		Cl	l asswork / Case studies	/ Worksheets / Homewo	l ork / Theory and Practical	l etc.)				
SBA (Formal Assessment							Examir	nation		