Branch	Electronics & Tele-communication		Semester	3
Course Code		Course Name	Analog Circuits	

Course Outcome 1	Analyze resistive circuits using circuit Theorems	Teach Hrs	Marks
Learning Outcome 1	Define circuits parameters and network topologies both balanced & unbalanced.*(Cognitive)*	8	
Contents	Definitions (Nodes, Branches, Tree, Co-Tree) **Network Topologies** (Balanced and unbalanced): L-section, T-section, Pi-section, Twin-T, Ladder and Bridge sections.		
Method of Assessment	Internal		
Learning Outcome 2	Apply different circuit theorems to give resistive circuit solution. *(Cognitive)*	10	
Contents	**Circuit Theorems** (only resistive networks without dependent sources) - Superposition Theorem, Reciprocity Theorem, Thevenin's Theorem, Norton's Theorem, Millman's Theorem, Maximum Power transfer theorem (all theorem explanations with suitable examples)		
Method of Assessment	External		
Learning Outcome 3	Setup and verify different circuits theorem on kits / simulation software. *(Psychomotor)*	6	
Contents	Verify Superposition Theorem Verify Thevenin Theorem Verify Maximum Power Transfer theorem		
Method of Assessment	External		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-**3**	Sheet No. 2/5
Branch	Electronics & Tele-communication	**Semester**	**3**
Course Code		**Course Name**	**Analog Circuits**

Course Outcome 2	Examine various transistor biasing circuits	Teach Hrs	Marks
Learning Outcome 4	Explain the significant aspects of transistor characteristics.*(Cognitive)*	8	
Contents	Brief review of transistor characteristics. Need of biasing, Load Line Concept (AC and DC), significance of coupling and bypass capacitor, Operating/quiescent point concept		
Method of Assessment	Internal		
Learning Outcome 5	Compare different BJT and FET biasing circuits. *(Cognitive)*	8	
Contents	**BJT Biasing**- Fixed, Emitter feedback,Collector feedback, Voltage divider biasing. **FET Biasing** – Fixed, Self and Voltage divider biasing		
Method of Assessment	External		
Learning Outcome 6	Plot the characteristics for BJT and FET circuits and place Q-point on load line. *(Psychomotor)*	8	
Contents	Plot input, output and load line characteristics of BJT (CE mode) Plot input and output characteristics of JFET (CS mode)		
Method of Assessment	Internal		

Branch	Electronics & Tele-communication		Semester	3
Course Code		Course Name	Analog Circuits	

Course Outcome 3	Identify different types of transistor amplifiers	Teach Hrs	Marks
Learning Outcome 7	Explain single and multistage amplifiers and state its need *(Cognitive)*	8	
Contents	Transistor as an Amplifier (CE Amplifier) Single stage and two stage transistor amplifiers. Differentiate Cascade and Cascode transistor amplifiers. **Coupled Amplifiers** (only circuit diagrams and working without mathematical derivations)**:**RC coupling, Direct Coupling, Transformer coupling. Darlington Pair		
Method of Assessment	External		
Learning Outcome 8	Classify and compare different types of amplifiers circuits. *(Cognitive)*	8	
Contents	**Classification of Amplifiers:** Class A, class B, class AB & class C amplifier. **Power Amplifiers** (only circuit diagrams and working without mathematical derivations)**:** Audio Power Amplifier, Push-pull Amplifier		
Method of Assessment	External		
Learning Outcome 9	Demonstrate and plot the gain Vs frequency response for different amplifiers. *(Psychomotor)*	8	
Contents	Plot the gain Vs frequency response of single stage transistor amplifier (CE mode) Plot the gain Vs frequency response of single stage class A transistor amplifier (CE mode) Plot the gain Vs frequency response of push pull amplifier.		
Method of Assessment	Internal		

Branch	Electronics & Tele-communication		Semester	3
Course Code		Course Name	Analog Circuits	

Course Outcome 4	Examine feedback amplifiers and Oscillators	Teach Hrs	Marks
Learning Outcome 10	Describe the concept & importance of feedback amplifier. *(Cognitive)*	8	
Contents	**Feed Back Amplifier** - Importance & concept of Feed Back - Advantage of negative feedback, block diagram of a feedback amplifier		
Method of Assessment	Internal		
Learning Outcome 11	Explain the principal of oscillators and classify it. *(Cognitive)*	8	
Contents	**Oscillators:** Principle of Oscillator - positive feedback, Barkhausen circuit criteria for oscillation Types of sinusoidal Oscillators (BJT and FET based circuits)- Phase shift, Wein-Bridge, Hartley, Colpitts, Clapp, and Crystal Oscillator		
Method of Assessment	External		
Learning Outcome 12	Assemble circuits of various oscillator and verify output waveform. *(Psychomotor)*	8	
Contents	Verify the output waveform for sinusoidal oscillators (at least two oscillator circuits from- RC Phase Shift, Wein Bridge, Hartley, Colpitts, Clapp, Crystal are expected)		
Method of Assessment	External		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/5

Branch	Electronics & Tele-communication	Semester	

Course Code		Course Name	Analog Circuits

Course Outcome 5	Construct and Analyze various signal generators and Multivibrator	Teach Hrs.	Marks
Learning Outcome 13	Classify different type of transistor based Multivibrator. *(Cognitive)*	8	
Contents	**Multivibrators**: transistor based circuit diagram and Working of - Astable (free running) multivibrator, Monostable (Single shot) multivibrator, Bistable (Trigger) multivibrator		
Method of Assessment	External		
Learning Outcome 14	Construct various waveform generators using diodes & transistors *(Cognitive)*	8	
Contents	**Waveform Generators**: Sine wave, Square wave, rectangular and saw-tooth waveform generators using diodes and transistors, significance of duty cycle for various waveforms.		
Method of Assessment	External		
Learning Outcome 15	Operate different type of Multivibrator circuits and generate waveforms. *(Psychomotor)*	8	
Contents	Verify the non-sinusoidal output waveforms (at least two from-square, rectangular, triangular, saw-tooth) of transistor based multi-vibrator circuits.		
Method of Assessment	Internal		

Suggested List of Experiments*:

S.N.	Experiment	CO
1.	Verify Superposition Theorem	CO301.1
2.	Verify Thevenin Theorem	CO301.1
3.	Verify Maximum Power Transfer theorem	CO301.1
4.	Plot input, output and load line characteristics of BJT (CE mode)	CO301.2
5.	Plot input and output characteristics of JFET (CS mode)	CO301.2
6.	Plot the gain Vs frequency response of single stage transistor amplifier (CE mode)	CO301.3
7.	Plot the gain Vs frequency response of single stage class A transistor amplifier (CE mode)	CO301.3
8.	Plot the gain Vs frequency response of push pull amplifier.	CO301.3
9.	Plot the gain Vs frequency response of audio power amplifier.	CO301.3
10	Verify the output waveform for sinusoidal oscillators (at least two oscillator circuits from- RC Phase Shift, Wein Bridge, Hartley, Colpitts, Clapp, Crystal are expected)	CO301.4
11	Verify the non sinusoidal output waveforms (at least two from-square, rectangular, triangular, sawtooth) of transistor based multivibrator circuits.	CO301.5

Ten experiments in a semester as per the discretion of the subject teacher.

Major Equipment/Materials:

1.	Cathode Ray Oscilloscope(CRO)/Digital Storage Oscilloscope(DSO)
2.	Dual Power Supply
3.	Function generator
4.	Spectrum analyser
5.	Breadboard, discrete components, wires
6.	Multimeter/Ammeter/Voltmeter
7.	LCR Meter

Suggestions for Practicals:

Experiments are expected to be performed
1. Using breadboard/trainer kits.
2. on simulation software (vizPSpice, TINA, Multisim, KiCAD, LTSpice, LabView, Simulink, Proteus, CircuitMaker etc.)
3. on virtual lab platforms available online (like: vlab.co.in, falstad.com/circuit etc.)

Reference Books/Web Portals:

S.N.	Title	Author
1	A Text book of Applied Electronics	R.S. Sedha, S. Chand &Co.NewDelh
2	Principals of Electronics	Latest ,V.K.Mehta , S.Chand Publication
3	Basic Electronics	B. L. Thareja
4	Electronic Devices & Circuits	Robert Boylestad
5	Electronic Devices and Circuits	Millman&Halkias
6	Electronics Principles	Malvino TMH
7	Electronic Devices & CKTs	Mottershead
8.	nptel.ac.in	
9.	swayam.gov.in	

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME		Branch Code		Course Code		CO Code	LO Code	Format No. 4
			E	0	3	3	0	1	1	1	

COURSE NAME	Analog Circuit
CO Description	Analyze resistive circuits using circuit Theorems
LO Description	Define circuits parameters and network topologies both balanced & unbalanced.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-01	Definitions (Nodes, Branches, Tree, Co-Tree) **Network Topologies** (Balanced and unbalanced): L-section, T-section, Pi-section, Twin-T, Ladder and Bridge sections.	Interactive classroom lecture, PPT, demonstration, quiz, assignments	Teacher will explain the contents and provide handouts to students. Teacher will conduct quiz/ assignments/ tutorial.	6	2	Text Books, PPT, Handouts, chalk board, charts.Videos lectures- NPTEL& others	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-01	Mid Semester Theory Exam	**Student will be asked to**(and/or): 1. Identify and list out various parts of circuits. 2. Draw circuit according to given parameters. 3. Draw and Identify type of topologies of given network	10	Question paper, Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

COURSE NAME	Analog Circuit
CO Description	Analyze resistive circuits using circuit Theorems
LO Description	Apply different circuit theorems to give resistive circuit solution.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-02	**Circuit Theorems** (only resistive networks without dependent sources) - Superposition Theorem, Reciprocity Theorem, Thevenin's Theorem, Norton's Theorem, Millman's Theorem, Maximum Power transfer theorem (all theorem explanations with suitable examples)	Interactive classroom lecture, PPT, demonstration, quiz,assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct quiz/assignments/ tutorial to make students practice their knowledge.	8	2	Text Books, PPT, Handouts, chalk board, charts, Numerical Problems Workbook	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-02	End Semester Theory Exam	**Student will be asked to**(and/or): 1. State and explain the given theorem. 2. Solve simple numerical for different theorems 3. Compare different theorems.	10	Question paper, Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

	OUTCOME	E	0	3	3	0	1	1	3	

COURSE NAME	**Analog Circuit**
CO Description	Analyze resistive circuits using circuit Theorems
LO Description	Setup and verify different circuits theorem on kits / simulation software.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-03	Verify Superposition Theorem Verify Thevenin Theorem Verify Maximum Power Transfer theorem	Lab demonstration, hands on practice, lab assignments, V-Lab.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	--	6	Lab manual, charts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-03	Practical test in laboratory	**Student will be asked to** 1. Verify the given network theorem for circuit on instruments/ kits or/& simulation software	10	Rubrics/Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING**	Branch Code	Course Code	CO Code	LO Code	Format No. **4**

| | | OUTCOME | E | 0 | 3 | 3 | 0 | 1 | 2 | 4 | |

COURSE NAME	Analog Circuit
CO Description	Examine various transistor biasing circuits
LO Description	Explain the significant aspects of transistor characteristics.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-04	Brief review of transistor characteristics.Need of biasing, Load Line Concept (AC and DC), significance of coupling and bypass capacitor, Operating/quiescent point concept.	Interactive classroom lecture, PPT, demonstration, quiz,assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	2	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-04	Mid Semester Theory Exam	**Student will be asked to**(and/or): 1. Calculate and locate Q-point on load line for given circuit. 2. Explain various concept of biasing and significance of various.	10	Question paper, Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code		CO Code	LO Code	Format No. **4**
		E	*0*	*3*	*3*	*0*		
						2	*5*	

COURSE NAME	Analog Circuit
CO Description	Examine various transistor biasing circuits
LO Description	Compare different BJT and FET biasing circuits

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-05	**BJT Biasing**- Fixed, Emitter feedback,Collector feedback, Voltage divider biasing. **FET Biasing** – Fixed, Self and Voltage divider biasing	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-05	End Semester Theory Exam	**Student will be asked to**(and/or): 1. Explain the different type of BJT and FET biasing circuits. 2. Compare different biasing circuits. 3. List out advantages, disadvantages and application of different biasing circuit. 4. Solve simple numerical on biasing circuit.	10	Question paper + Rating scale.	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

		SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
RGPV (Diploma Wing) Bhopal			*E*	*0*	*3*	*3*	*0*	*2*	*6*	

COURSE NAME	**Analog Circuit**
CO Description	Examine various transistor biasing circuits
LO Description	Plot the characteristics for BJT and FET circuits and place Q-point on load line

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-06	Plot input, output and load line characteristics of BJT (CE mode) Plot input and output characteristics of JFET (CS mode)	Lab demonstration, PPT , hands on practice, lab assignments.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	--	6	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-06	Practical test in laboratory	**Student will be asked to** 1. Plot the characteristic and locate Q-points for given circuit manually or/& on simulation software.	10	Rubrics, Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		E	*0*	*3*	*3*	*0*	*1*	*3*	*7*	

COURSE NAME	Analog Circuit
CO Description	Identify different types of transistor amplifiers
LO Description	Explain single and multistage amplifiers and state its need

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-07	Transistor as an Amplifier (CE Amplifier) Single stage and two stage transistor amplifiers. Differentiate Cascade and Cascode transistor amplifiers. **Coupled Amplifiers** (only circuit diagrams and working without mathematical derivations)**:**RC coupling, Direct Coupling, Transformer coupling. Darlington Pair	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
Lo-07	End Semester Theory Exam	**Student will be asked to**(and/or): 1. Explain working of transistor as an amplifier. 2. Classify the amplifier circuits and their comparison. 3. Draw circuit and explain working ofdifferent coupled amplifier.	10	Question paper , Rating scale	External

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
		E	0	3	3	0	1	3	8	

COURSE NAME	Analog Circuit
CO Description	Identify different types of transistor amplifiers
LO Description	Classify and compare different types of amplifiers circuits.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-08	**Classification of Amplifiers:** Class A, class B, class AB & class C amplifier. **Power Amplifiers** (only circuit diagrams and working without mathematical derivations)**:** Audio Power Amplifier, Push-pull Amplifier	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-08	End Semester Theory Exam	**Student will be asked to** (and/or): 1. Classify different types of amplifier 2. Draw and explain working of different class amplifier circuits. 3. Draw and explain working of power amplifier circuits	10	Question paper , Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		E	0	3	3	0	1	3	9	

COURSE NAME	Analog Circuit
CO Description	Identify different types of transistor amplifiers
LO Description	Demonstrate and plot the gain Vs frequency response for different amplifiers.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-09	Plot the gain Vs frequency response of single stage transistor amplifier (CE mode) Plot the gain Vs frequency response of single stage class A transistor amplifier (CE mode) Plot the gain Vs frequency response of push pull amplifier.	Lab demonstration, PPT , hands on practice, lab assignments.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	--	8	Lab manual, charts, Handouts, experimental trainer instruments /kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

LO-09	Practical test in laboratory	**Student will be asked to** 1. Plot the gain Vs frequency graph for given amplifier on instrument/kit or/& simulation software.	10	Rubrics, Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		E	0	3	3	0	1	4	10	

COURSE NAME	**Analog Circuit**
CO Description	Examine feedback amplifiers and Oscillators
LO Description	Describe the concept & importance of feedback amplifier.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-10	**Feed Back Amplifier** - Importance & concept of Feed Back - Advantage of negative feedback, block diagram of a feedback amplifier	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

LO-10	Mid Semester Theory Exam	**Student will be asked to** (and/or): 1. Explain concept and importance of feedback. 2. Describe the advantages of negative feedback. 3. Draw and explain block diagram of feedback amplifier.	10	Question paper , Rating scale.	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
		E	0	3	3	0	1	4	11	

COURSE NAME	**Analog Circuit**
CO Description	Examine feedback amplifiers and Oscillators
LO Description	Explain the principal of oscillators and classify it.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-11	**Oscillators:** Principle of Oscillator - positive feedback, Barkhausen circuit criteria for oscillation Types of sinusoidal Oscillators (BJT and FET based circuits)- Phase shift, Wein-Bridge, Hartley, Colpitts, Clapp, and Crystal Oscillator	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

LO-11	End Semester Theory Exam	**Student will be asked to**(and/or): 1. Explain the principle of oscillator. 2. State the Barkhausen criteria for oscillation 3. Compare positive and negative feedback. 4. List out the different sinusoidal oscillators 5. Draw and explain circuit of various sinusoidal oscillators.	10	Question paper , Rating scale.	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
		E	0	3	3	0	1	4 12	

COURSE NAME	**Analog Circuit**
CO Description	Examine feedback amplifiers and Oscillators
LO Description	Assemble circuits of various oscillator and verify output waveform

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-12	Verify the output waveform for sinusoidal oscillators (at least two oscillator circuits from- RC Phase Shift, Wein Bridge, Hartley, Colpitts, Clapp, Crystal are expected)	Lab demonstration, PPT , hands on practice, lab assignments.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	--	8	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-12	Practical test in laboratory	**Student will be asked to** 1. Verify the output waveform for given sinusoidal oscillator on instruments/kits or/& simulation software	10	Rubrics, Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code		CO Code	LO Code	Format No. **4**
		E	0 3	3 0	1	5	13	

COURSE NAME	Analog Circuit
CO Description	Construct and Analyze various signal generators and Multivibrator
LO Description	Classify different type of transistor based Multivibrator.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-13	**Multivibrators**: transistor based circuit diagram and Working of - Astable (free running) multivibrator, Monostable (Single shot) multivibrator, Bistable (Trigger) multivibrator	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

| LO-13 | End Semester Theory Exam | **Student will be asked to**(and/or):
1. Draw circuit diagram and waveform of Astable, Monostable and Bistable Multivibrator
2. Explain working of Astable, Monostable and Bistable Multivibrator | 10 | Question paper , Rating scale. | External |

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code		Course Code			CO Code	LO Code	**Format No. 4**
		E	*0*	*3*	*3*	*0*	*1*	*5*	*14*	

COURSE NAME	Analog Circuit
CO Description	Construct and Analyze various signal generators and Multivibrator
LO Description	Construct various waveform generators using diodes & transistors

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-14	**Waveform Generators**: Sine wave, Square wave, rectangular and saw-tooth waveform generators using diodes and transistors, significance of duty cycle for various waveforms.	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

LO-14	End Semester Theory Exam	**Student will be asked to** (and/or): 1. Draw and explain circuit diagram of various waveform generator using diode and transistor- Sine wave, Square wave, rectangular and saw-tooth waveform 2. Explain the significance of duty cycle for different waveform.	10	Question paper , Rating scale.	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
		E	0	3	3	0	1	5	15	

COURSE NAME	**Analog Circuit**
CO Description	Construct and Analyze various signal generators and Multivibrator
LO Description	Operate different type of Multivibrator circuits and generate waveforms.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-15	Verify the non-sinusoidal output waveforms (at least two from-square, rectangular, triangular, saw-tooth) of transistor based multi-vibrator circuits.	Lab demonstration, PPT , hands on practice, lab assignments.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	--	8	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT					
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-15	Practical test in laboratory	**Student will be asked to** 1. Verify the non-sinusoidal output waveform for given transistor based multivibrator on instruments/kits or/& simulation software	10	Rubrics, Rating scale	Internal
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)					