Bhopal			OUTCOME	E	0	3	4	0	1	1	1	Format No. 4		
COURS	SE NAME	Electronics Meas	urement											
CO Des	cription	Explain charact	eristics of m	easuring instr	uments									
LO Des	cription	Define static and	dynamic cha	aracteristics of r	neasuring instruments.									
					SCHEME OF STUDY									
S. No.	Lea	rning Content		eaching – ning Method	Description of T-L Process	Teach Hrs.			act. t Hrs.	L	.Rs R	equire	ed	Remarks
LO-01	and block Measurer character Precision, Repeatab Resolution Stability, I hysteresis Character response,	gnificance of Measurement d block diagram of easurement System, Static aracteristics- Accuracy, ecision, Sensitivity, Linearity, peatability, Reproducibility, solution, Threshold, Drift, ability, Dead zone, steresis, Dynamic aracteristics- speed of sponse, measuring lag, lelity, dynamic error,		ctive com lecture, nstration, assignments	Teacher will explain the contents and provide handouts to students. Teacher will conduct quiz/ assignments/ tutorial.		9	•		Har boa Vid	ndout ard, cl eos le	ks, PP s, chal narts. ectures others	k 5-	
					SCHEME OF ASSESSMENT	•								
S. No.		ethod of sessment		Descrip	tion of Assessment			aximu Marks		Resources Required		iired	External / Internal	
LO-01	End Se	mester Theory Exam	 Describe Measure Define s 	udent will be asked to(and/or): Describe Significance of Measurement and block diagram Measurement System, Define static and dynamic characteristics of measuring instruments.				10	(Questi	-	aper, F ale	Rating	External

SCHEME FOR LEARNING

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Code

Course Code

Branch Code

LO

Code

Format No. 4

RGPV (Diploma Wing)

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SCHEME FOR LEARNING OUTCOME

4	LO Code	CO Code	Course Code			Branch Code		
Format No. 4	2	1	1	0	4	3	0	Ε

COURSE NAME	Electronics Measurement
CO Description	Explain characteristics of measuring instruments
LO Description	To describe various types of errors and loading effect

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	Types of Errors – Gross error, systematic errors, Random errors, loading effect	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.	6	0	Text Books, PPT, Handouts, chalk board, charts, Numerical Problems Workbook	

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. Describe Types of Errors.2. What is loading effect.	10	Question paper, Rating scale	External

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SCHEME FOR LEARNING OUTCOME

	LO Code	CO Code	de	ourse Co	Co	Branch Code		
Format No. 4	3	1	1	0	4	3	0	Ε

COURSE NAME	Electronics Measurement
CO Description	Explain characteristics of measuring instruments
LO Description	To perform calibration process

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	Calibration -static and dynamic	Lab demonstration, hands on practice, lab assignments, V-Lab.	 Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments. 	0	6	Lab manual, charts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

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. Perform static and dynamic Calibration.	10	Rubrics/Rating scale	Internal

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SCHEME FOR LEARNING OUTCOME

	LO Code	Course Code Code Code			Co	Branch Code			
Format No. 4	4	2	1	0	4	3	0	Ε	

COURSE NAME	Electronics Measurement
CO Description	Explain measuring instruments and range extension
LO Description	Differentiate between moving iron and moving coil type instruments

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	Construction, principle and working of PMMC and MI (moving iron) instruments	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.		0	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	End Semester Theory Exam	 Student will be asked to(and/or): Describe Construction, principle and working of PMMC instruments. Explain Construction, principle and working of MI (moving iron) instruments 	10	Question paper, Rating scale	External

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	CO LO Code Code			urse Co	Co	Branch Code			
Format No	5	2	1	0	4	3	0	E	

COURSE NAME	Electronics Measurement
CO Description	Explain measuring instruments and range extension
LO Description	Extend the measuring range of the meters.

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	DC voltmeter and current meters and their range extension (Shunt and Multiplier) Electronic voltmeter and its block diagram,	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.	7	0	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): Differentiate between DC voltmeter and current meters. Explain range extension methods. Calculate value of SHUNT AND MULTIPLIER. 	10	Question paper + Rating scale.	External

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	LO Code	CO Code	de	ourse Co	Co	Branch Code		
Format No	6	2	1	0	4	3	0	E

	COURSE NAME	Electronics Measurement					
	CO Description	Explain measuring instruments and range extension					
LO Description Measure voltage and current (DC&AC) using analogue/ and digital multimeter							

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	Measurement of voltage, current and Resistance using Analog and Digital Multi Meter (DMM).	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. 	0	7	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	End Semester practical Exam	Student will be asked to Measure electrical parameters using Analog and Digital Multi Meter (DMM).	10	Rubrics, Rating scale	External

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	LO Code	CO Code	se Code		Co	Branch Code		В	
Format No. 2	7	3	1	0	4	3	0	E	

COURSE NAME	Electronics Measurement
CO Description	To measure electrical parameters using Bridges and Analyzers
LO Description	Explain working and application of AC & DC bridges.

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	DC Bridges- Wheatstone bridge, Kelvin's Double Bridge AC Bridges- Maxwell's Bridge, Hay's bridge, Schering bridge and Wien's Bridge.	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	0	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 Exam	 Student will be asked to(and/or): Describe given DC/AC Bridges with its application Compare AC and DC Bridges Explain frequency measurement using Wien's bridge 	10	Question paper, Rating scale	External

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Bhopal	

	LO Code	CO Code	de	urse Co	Co	Branch Code		
Format No	8	3	1	0	4	3	0	E

COURSE NAME	Electronics Measurement
CO Description	To measure electrical parameters using Bridges and Analyzers:.
LO Description	Explain working principle of spectrum analyzer.

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	Principle andworking of Signal Analyzers: Frequency Selective and Heterodyne Wave Analyzers, Spectrum Analyzers.	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.	6	0	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	Mid semester Exam Assignment, Quiz	Student will be asked to (and/or): 1. Explain working of given signal analyzer.	10	Question paper, Rating scale	Internal

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1	CO LO Code Code		Course Code			Branch Code		
Format No. 4	9	3	1	0	4	3	0	E

COURSE NAME	Electronics Measurement
CO Description	To measure electrical parameters using Bridges and Analyzers.
LO Description	To analyze signal waveforms using spectrum analyzers

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	Analysis of various waveforms using Spectrum Analyzers.	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. 	0	6	Lab manual, charts, Handouts, experimental trainer instruments /kit with measuring instruments, computer with relevant simulation software and high speed internet.	

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-09	End Semester practical Exam	Student will be asked to 1. Perform analysis of given waveforms using spectrum analyzers.	10	Rubrics, Rating scale	External

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SCHEME FOR LEARNING OUTCOME

	LO Code	CO Code	de	ourse Co	Co	Branch Code		
Format No	10	4	1	0	4	3	0	E

COURSE NAME	Electronics Measurement
CO Description	Classify different Oscilloscopes and their application.
LO Description	Describe function of basic building blocks of CRO

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	Cathode Ray Tube (CRT), Electrostatic Deflection, Post Deflection and Acceleration of Electron Beam, Screens for CRT's. Block diagram of CRO- Time-Base Generator, Delay line, Attenuators, probes.	PPT, Video,	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	0	Tut Hrs. LRs Required	

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-10	End Semester Theory Exam	Student will be asked to (and/or): 1. Explain need of CRO. 2. Describe Block diagram of CRO.	10	Question paper , Rating scale.	External

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SCHEME FOR LEARNING OUTCOME

Format N	LO Code	CO Code	Course Code			Branch Code		
Format N	11	4	1	0	4	3	0	E

COURSE NAME	Electronics Measurement
CO Description	Classify different Oscilloscopes and their application.
LO Description	Explain working principle of digital storage oscilloscope.

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	Digital Storage Oscilloscope (DSO): block diagram, principle, working and its application	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.	6	0	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	Mid semester Exam,Assignment, Quiz	 Student will be asked to(and/or): 1. Describe principle and working of Digital Storage Oscilloscope (DSO) 2. Describe applications of Digital Storage Oscilloscope (DSO). 	10	Question paper, Rating scale.	Internal

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SCHEME FOR LEARNING OUTCOME

	LO Code	CO Code	de	urse Co	Co	е	ranch Cod	В
Format No. 4	12	4	1	0	4	3	0	Ε

COURSE NAME	Electronics Measurement
CO Description	Classify different Oscilloscopes and their application.
LO Description	Measure various parameters like Amplitude, frequency and time period using CRO.

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	Dual trace oscilloscope, Applications of CRO, Measure various parameters like Amplitude, frequency and time period using CRO and Lissajous Pattern.	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. 	0	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. Measure various parameters like Amplitude, frequency and time period using CRO.	10	Rubrics, Rating scale	Internal

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	LO Code	CO Code	de	urse Co	Co	e	ranch Cod	В
Format No	13	5	1	0	4	3	0	E

	•						
COURSE NAME	Electronics Measurement						
CO Description	To measure physical quantities using Transducers .						
LO Description	Differentiate between active and passive, primary and secondary transduc	ers.					

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	Requirements of Ideal Transducer Transducer and its classification: primary and secondary transducers	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.	6	0	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	Mid semester Exam , Assignment , Quiz	Student will be asked to(and/or): 1.Explain Requirements of Ideal Transducer 2. Compare primary and secondary transducers.	10	Question paper, Rating scale.	External

RGPV (Diploma Wing)) SCHEM	Branch C	Branch Code Co		Course Code		CO LO Code Code	LO Code		
Bhopal COURSE NAME Electronics Measurement			OUTCOME			4	0	1	5	14	Format No. 2	
		ment										
CO Des	cription	To measure physical o	re physical quantities using Transducers .									
LO Desc	cription	Describe working of v	arious transducers.									
				SCHEME OF STUDY								
S. No.	Learning Content		Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut H		L	LRs Required		ed	Remarks
Resistive Transducer: Potentiometric type, Strain Gauge type (Gauge factor derivation, Bonded and unbounded strain gauges), Capacitive Transducers - Variable gap type, variable area type and dielectric type, LVDT, Temperature and Piezo Electric, Proximity sensor and touch screen sensor.		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 0		0	Text Boo Handout board, cl Video le		narts,			
				SCHEME OF ASSESSMEN	Т							
S. No.	Metho	d of Assessment	Descriptio	n of Assessment	Maxim	um Ma	ırks	Res	ource	es Rec	uired	External Interna

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SCHEME FOR LEARNING OUTCOME

	LO Code	CO Code	de	urse Co	Co	e	ranch Cod	В
Format No. 4	15	5	1	0	4	3	0	Ε

COURSE NAME	COURSE NAME Electronics Measurement							
CO Description	cription To measure physical quantities using Transducers .							
LO Description	Measure various physical quantities using transducers.							

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	Measure the given parameter using resistive, capacitive and other types of transducer.	Lab demonstration, PPT , hands on practice, lab assignments.	 Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments. 	0	7	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

		SCHEME OF A	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.Measure various physical quantities using transducers.	10	Rubrics, Rating scale	Internal
		ADDITIONAL INSTRUCTIONS FO	OR THE HOD/ FACULTY (I	F ANY)	