Government Polytechnic Mumbai

Department of Instrumentation Engineering

P-19R Curriculum

Semester- I

(Course Contents)

GOVERNMENT POLYTECHNIC MUMBAI

(Academically Autonoums Institute, Government of Maharashtra)

Teaching and Examination Scheme (P19R)

With effect from AY 2022-23

Programme: Diploma in Instrumentation Engineering (Sandwich Pattern)

Term / Semester - I

		Teaching Hours/Contact Hours					Examination Scheme (Marks)						
Course	Course Title					Credits	Theory						
Code		L	Р	TU	Total		TH	TS1	TS2	PR	OR	TW	Total
HU19R105	Business Communication	2	2		4	4	60	20	20			50	150
SC19R101	Basic Physics	3	2	-40	5 5 60	5	60	20	20	25*		25	150
SC19R109	Basic Mathematics	4	N./	-	4	4.0	60	20	20				100
IS19R201	Principles of measurement	3	2	-	5	5	60	20	20	50		25	175
IS19R202	Instrumentation Workshop Practice	PE	4		4	4	3					50	50
WS19R201	Workshop Practice	8/	4	S.£	4	4	Τž					50	50
UV19R101	Universal Human Values-I		-			2	-						
IS19R310	Libre office suite writer and draw (Spoken Tutorial)		4#	+ F	4#	4 50	<u>+</u> •						
	Total	12	18		32	32	240	80	80	100		175	675
Student Centered Activity(SCA)					03								
Total Contac	et Hours				35								

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment) * Indicates assessment by External Examiner else internal assessment, # indicates Self, on- line learning Mode, @ indicates on line examination

Note: Duration of Examination--TS1&TS2 -1 hour, TH- 2:30 hours, PR/OR – 3 hours per batch, SCA- Library - 1 hour, Sports- 2 hours, Creative Activity-2 hours Self, on- line learning Mode through MOOCS /Spoken Tutorials / NPTEL / SWAYAM / FOSSEE etc.

Coordinator, Curriculum Development Department of Instrumentation Engg. In-Charge

Head of Department

Principal

Curriculum Development Cell

Department of Instrumentation Engineering

Curriculum Development, Department of Instrumentation Engg.Curriculum Development Cell Department of Instrumentation Engg.

Program	Programme : Diploma in CE/ME/IT/CO/IS/EE/EC/LG/LT/RT (Sandwich Pattern)											
Course Code: HU19R105				Course 7	Course Title: Business Communication							
Compulsory / Optional: Compulsory												
Teaching Scheme and Credits				Examination Scheme								
TH	PR	TU	Total	TH (2 Hrs. 30 Min.)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total		
02	02	-	04	60	20	20	-	-	50	150		

Abbreviations: TH- Theory; PR-Practical; TU-Tutorial; TS1 and TS2- Term Tests; OR-Oral Exam; TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal assessment

Note: For Minimum passing marks under various heads, refer, examination rule AR26.

Rationale: Communication plays a vital and decisive role in career development. It is very important for thesmooth functioning of any business or organization. Effective business communication is how employees & Management interact with each other to reach organizational goals & be more aligned *Government Polytechnic, Mumbai.* with the core company / business values. This course introduces not only basic concepts of communication like types of communication, barriers in communication, group discussion, interview skills, presentation skills but also Business Correspondence which will well equip students to express themselves effectively in all forms of communication especially in written form. It will enhance the skills to communicate effectively and skillfully at workplace. It will guide and direct students to develop a good personality and improve communication skills.

Course Outcomes: Student should be able to

CO1	Apply proper communication technique to cope up with the challenges of the modern world.
CO2	Interpret feedback at various situations by using appropriate body language and avoid the barriers in effective communication.
CO3	Able to participate in Group Discussion and Acquire the practical knowledge of an interview.
CO4	Able to develop PowerPoint Presentation and Business correspondence.
CO5	Write letters, circulars, memos, notices, reports and communicate effectively in written communication.

Course Content Details:

Unit No	Topics / Sub-topics									
	Introduction to Communication									
	1.1 Elements of Communication									
	1.2 Communication Cycle									
	1.3 Types of communication									
	1.4 Definition and Types of Barriers-									
1	a)Mechanical									
-	b)Physical									
	c)Language									
	d)Psychological									
	1.5 Ways to overcome Barriers WOWLEDGE									
	Course Outcome: CO1 Teaching Hours :6 hrs Marks: 14 (R- 2, U-4, A-8)									
	Non- verbal Communication									
	2.1 Meaning and Importance of Non-verbal Communication									
	2.2 Body Language									
2	2.3 Aspects of Body Language									
	2.4 Graphic language									
	Course Outcome: CO2 Teaching Hours :6 hrs Marks: 12 (R- 4, U-4, A-4)									

	Group Discussion And Interview Skills										
	3.1 Need and Importance of Group Discussion										
3	3.2 Use of Knowledge and Logical sequence of ideas in Group Discussion										
	3.3 Types of Interview										
	3.4 Preparing for an Interview										
	Course Outcome: CO3 Teaching Hours :6 hrs Marks: 10 (R-2, U-4, A-4)										
4	Presentation Skills										
-	4.1 Presentation Skills - Tips for effective presentation										
	4.2 Guidelines for developing PowerPoint presentation										
	4.3 Business Etiquette										
	POLYTECHI										
	Course Outcome: CO4 Teaching Hours :4 hrs Marks: 08 (R- 2, U-2, A-4)										
	Business Correspondence										
	5.1 Office Drafting – a) Notice b) Circular c) Memo										
	d) Email-writing – Email etiquette, drafting formal / informal email										
5	5.2 Personal Letter										
	5.3 Job Application with resume.										
	5.4 Business Letters – a) Enquiry b)Order c)Complaint										
	5.5 Report Writing – a) Fall in Production b) Accident Report										
	Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 16 (R- 4, U-4, A-8)										

Suggested Specifications Table (Theory):

Unit		Distribution of Theory Marks							
No	Topic Title	R Level	U Level	A Level	Total Marks				
1	Introduction to Communication	2	4	8	14				
2	Non-verbal Communication	4	4	4	12				
3	Group Discussion And Interview Skills	2	4	4	10				
4	Presentation Skills	2	2	4	8				
5	Business Correspondence	4	4	8	16				
Total		14	18	28	60				

Business Communication(HU19R105)

Government Polytechnic, Mumbai.

List of Assignments Sr No	List of Experiments	COs	Hours
1	Listening Practice	C01	03
2	Reading Practice	CO1	03
3	Writing Practice and E-Note	CO5	03
4	Communication Practice and Impromptu Communication.	CO4	03
5	Introduction to Vocabulary	CO5	03
6	Conversation between students on various situations.	CO2	03
7	Non- Verbal Communication.	CO2	03
8	Group Discussion	CO3	03
9	Mock Interview	CO3	03
10	Grammar • Tenses • Transformation of sentences • Articles • Subject Pronoun - Singular & Plural • Verbs	CO5	03
	Total	100	30

Note: .Students should complete all assignments & activities of Basic & Level 1 of Online course – "Business Communication Excellence" on Infosys Springboard. At the end of term, it is mandatory to submit certificates of Basic and Level 1 of Online course – "Business Communication Excellence", on Infosys Springboard. Only after that their Term Work will be granted.

References / Books:

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN		
1	Communication Skills	Joyeeta Bhattacharya - Reliable Series	9780000176981, 0000176982		
2	Communication Skills	Sanjay Kumar, PushpaLata- Oxford University Press	13: 978-0199488803		
3	Successful presentation Skills	Andrew Brad bury- The Sunday Times	13: 9780749456627		
4	Business Communication Using Computers	Dr.Yogesh T.Malshette Sonali Malshette Nirali Prakashan			

E-References:

- 1. Website: <u>www.mindtools.com/page8.html-99k</u>
- 2. Website:www.inc.com/guides/growth/23032.html-4
- 3. Website: <u>www.khake.com/page66htm/-72k</u>

Business Communication(HU19R105)

Government Polytechnic, Mumbai.

Department of Science and Humanities

4. https://www.vedantu.com/ncert-solutions/ncert-solutions-class-12-English

- 5. Website: <u>www.letstak.co.in</u>
- 6. https://infyspringboard.onwingspan.com/

7. <u>http10s://learnenglishteens.britishcouncil.org/skills</u> CO Vs PO and CO Vs PSO Mapping (CIVIL ENGINEERING)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
C O 1	1	1	2	1	2	3	2		2		
C O 2	1	2	2	2	2	3	2		2		
C O 3	2	2	2	2	2	3	2		2		
C O 4	2	3	2	2	2	9 3	2		2		
C O 5	1	1	2	2	3	3	3		2		

CO Vs PO and CO Vs PSO Mapping (MECHANICAL ENGINEERING)

со	PO1	PO2 🧿	РОЗ	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	1	5 1	3	3		
CO2	2	1		STD.	196	3	3		
CO3		1	1	330		2	3		
CO4		2	2			3	2		
CO5		2	2	COMT.	CD G	3	2		

CO Vs PO and CO Vs PSO Mapping (ELECTRONICS ENGINEERING)

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2		2	
CO2	3	3	2	3	2	3	2			2
CO3	3	2	2	1	2	3	2		2	
CO4	3	3	2	1	2	3	2			
CO5	3	3	2	1	2	3	2			

CO Vs PO and CO Vs PSO Mapping (ELECTRICAL ENGINEERING)

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	1	2	2
CO2	3	3	2	3	2	3	2	2	2	2
CO3	3	2	2	1	2	3	2		1	1
CO4	3	3	2	1	2	3	2	1	3	3
CO5	3	3	2	1	2	3	2	2	2	2

Government Polytechnic, Mumbai. Department of Science and Humanities CO Vs PO and CO Vs PSO Mapping (INSTRUMENTATION ENGINEERING)

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	1		2	2	1	1	1
CO2	1	1	1		2	2	1	1	1
CO3	1	SI.	1	A. C. 14	2	2	2	1	1
CO4	1	61	h	8 10	2	2	2	1	1
CO5	1	21	U	-	2	2	2	1	1

CO Vs PO and CO Vs PSO Mapping (COMPUTER ENGINEERING) S TON 960

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	30	2	1	2	1
CO2	3	3	2	3	2	3	2	1	2	1
CO3	3	2	2	1	2	3	2	1	2	1
CO4	3	3	2	1	2	3	2		2	
CO5	3	3	2	1	2	3	2		2	

CO Vs PO and CO Vs PSO Mapping (INFORMATION TECHNOLOGY)

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	2	2	2
CO2	3	3	2	3	2	3	2	1	1	1
CO3	3	2	2	1	2	3	2	1	2	2
CO4	3	3	2	1	2	3	2	2	2	1
CO5	3	3	2	1	2	3	2	1	2	1

CO Vs PO and CO Vs PSO Mapping (LG/LT ENGINEERING)

со	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	1		2
CO2	3	3	2	3	2	3	2	1		2
CO3	3	2	2	1	2	3	2	1	1	2
CO4	3	3	2	1	2	3	2	1		2
CO5	3	3	2	1	2	3	2	1		2

Industry Consultation Committee:

Sr. No Name Designation Institute/Organisation Neelamkumar R. Sawant State Head, Technical Services JSW Cement ltd. Mumbai Head Office Shri. Ritesh Bharambe Manager-Sales JAI Instruments and Systems Pvt.Ltd Shri. Aniket Mhala Global Head – Technology & Innovation Oracle financial services and 2 Hub software Mrs. S. S. Kulkarni Lecturer in English **Government Polytechnic Pune** Mrs. K.S.Pawar 1960 Lecturer in English Government polytechnic Mumbai Ms. N. N. Dhake Lecturer in English Government polytechnic Mumbai

Coordinator,

Curriculum Development,

Head of the Department

Department of Science and Humanities

I/C, Curriculum Development Cell

Principal Government Polytechnic, Mumbai

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Program	Programme : Diploma in EE/IS (Sandwich pattern)										
Course Code: SC19R101				Course Tit	Course Title: Basic Physics						
Compulsory / Optional: Compulsory											
Teaching Scheme and Credits			Examination Scheme								
L	Р	TU	Total	TH (2Hrs.30 minutes)	TS1 (1Hr.)	TS2 (1Hr)	PR	OR	TW	Total	
3	2		5	60	20	20	25*		25	150	

Abbreviations: L- Theory; P-Practical; TU-Tutorial; TS1 and TS2- Term Tests; OR-Oral Exam; TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal assessment

Note: For Minimum passing marks under various heads, refer, examination rule AR26.

Rationale:

The subject is included under the category of science. The special feature of the subject is to develop the laboratory skill using principles of scientific phenomenon. This course will serve to satisfy the need of the technical students for their development in technical field. The course is designed by selecting thetopics which will develop intellectual skills of the students and will guide students to solve broad based engineering problems. Ultimately the focus of the course is to develop psychomotor skills in the Students

Course Outcomes: Student should be able to

CO1	State the different physical quantities, identify the proper unit of it and to estimate error in the measurement of physical quantities.
CO2	Apply laws of motion in various engineering applications.
CO3	Create awareness about the properties and application of light, LASER, Ultrasonic waves, sound waves and nanotechnology in engineering field.
CO4	Identify the physical properties of the various materials such as elasticity, viscosity



Course Content Details:

Unit No	Topics / Sub-topics
110	Units and Measurements
1	 1.1 Fundamental Physical quantities, examples. 1.2 Derived physical quantities, examples. 1.3 Definition and requirements of unit 1.4 System of units, C. G. S., M. K. S. and S. I. units. 1.5 Rules to write the unit and conventions of units and Significant figures, rules to write significant figures. 1.6 Error – Definition, types of errors and estimation of errors. 1.7 Numerical
	Course Outcome: CO1 Teaching Hours : 6 hrs. Marks: 08 (R- 2, U-2, A-4)
	Motions
2	 2.1 Linear motion – Definition – distance, displacement, velocity, acceleration, retardation, equation of motions, acceleration due to gravity and equation motion under gravity, numerical 2.2 Periodic motions: a) Oscillatory motion, b) Vibratory motion, c) S.H.M. d) Circular motion. (only definition and examples), terms related to S.H.M. :Definition: Time period, frequency, amplitude, wavelength, and phase 2.3 Angular motion: a) Definition: angular motion, Uniform circular motion, Radius vector, linear velocity, Angular velocity, Angular acceleration, b) Relation between linear velocity and angular Velocity(derivation), Radial or centripetal acceleration, Three equations of motion (no derivations), Centripetal and Centrifugal force, examples and applications.
	Course Outcome: CO2 Teaching Hours : 10 hrs, Marks: 10 (R-2, U-4, A-4)
3	Modern Physics 3.1 Photo Electricity Concept of quantum theory of light, Einstein's Photoelectric equation, Characteristics of photo electric effect, application of photo electric effect 3.2 LASER 3.2.1 LASER introduction 3.2.2 Properties of laser 3.2.3 Spontaneous and stimulated emission, 3.2.4 Population inversion, Optical pumping. 3.2.5Applications of LASER
	Course Outcome: CO3 Teaching Hours : 8 hrs, Marks: 10 (R-2, U-4, A-4)
4	 4 Optics and Ultrasonic Waves 4.2 Optics : 4.2.1 Revision of reflection and refraction of light. 4.2.2 Laws of refraction, Snell's law. 4.2.3 Determination of refractive index. 4.2.4 Dispersion, dispersive power, Prism formula (derivation) 4.2.5 Numerical 4.3 Ultrasonic Waves 4.3.1 Ultrasonic waves and infrasonic waves. 4.3.2 Audible range of soundwave
	4.3.3 Properties of ultrasonic wave.
	4.3.4 Applications
	Course Outcome: CO3 Teaching Hours :6 hrs Marks: 10 (R-2, U-4, A-4)

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5.1 5.2 5.3 5.4 a) el e) co Cou 6.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1	 Introduction to nanotechnology. Definition of nanoscale, nanometer and nanoparticles, nanotechnology. Definition and examples of nanostructured materials. Applications of nanotechnology in different fields - ectronics, b) automobile, c) medical, d) textile, osmetics, f) environmental, g) space and defense Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching force, internal restoring force, Elastic, plastic and rigid tances, their examples. Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) Interse Versus Strain diagram, yield point, breaking point Interse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4)
5 5.3 5 5.4 a) el e) co Cou Gen 6.1 6.1.	 Definition of nanoscale, nanometer and nanoparticles, nanotechnology. Definition and examples of nanostructured materials. Applications of nanotechnology in different fields - ectronics, b) automobile, c) medical, d) textile, osmetics, f) environmental, g) space and defense rese Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) eral Properties of Matter Elasticity: I Deformation, deforming force, internal restoring force, Elastic, plastic and rigid tances, their examples. 2 Definition of elasticity, stress, strain and its types. 3 Hooke's Law and elastic limit. 4 Stress versus Strain diagram, yield point, breaking point 5 Definition Young's Modulus, bulk modulus and modulus of rigidity relation among
5 5.3 1 5.4 1 a) el e) co Cou Gen 6.1 1 6.1 2 6.1 2 6.	 Definition and examples of nanostructured materials. Applications of nanotechnology in different fields - ectronics, b) automobile, c) medical, d) textile, osmetics, f) environmental, g) space and defense arse Outcome: CO3 Teaching Hours :4 hrs Marks: 8 (R-2, U-2, A-4) eral Properties of Matter Elasticity: Deformation, deforming force, internal restoring force, Elastic, plastic and rigid tances, their examples. Definition of elasticity, stress, strain and its types. Hooke's Law and elastic limit. Stress versus Strain diagram, yield point, breaking point
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Gen 6.1 5.1 6.1. 6.	 eral Properties of Matter Elasticity: I Deformation, deforming force, internal restoring force, Elastic, plastic and rigid tances, their examples. 2 Definition of elasticity, stress, strain and its types. 3 Hooke's Law and elastic limit. 4 Stress versus Strain diagram, yield point, breaking point 5 Definition Young's Modulus, bulk modulus and modulus of rigidity relation among
6.1. 5.1. 5.1. 6.1.	Elasticity: 1 Deformation, deforming force, internal restoring force, Elastic, plastic and rigid tances, their examples. 2 Definition of elasticity, stress, strain and its types. 3 Hooke's Law and elastic limit. 4 Stress versus Strain diagram, yield point, breaking point 5 Definition Young's Modulus, bulk modulus and modulus of rigidity relation among
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6.1.4 6.1.4	4 Stress versus Strain diagram, yield point, breaking point 5 Definition Young's Modulus, bulk modulus and modulus of rigidity relation among
6.1.3 6 6.1.4 6.1.	5 Definition Young's Modulus, bulk modulus and modulus of rigidity relation among
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6 6.1.0 6 6.1.7 61.8 6 2	them.
6 6.1. ⁷ 61.8 6 2	5 Factor of safety.
61.8 6 2	7 Applications of elasticity.
62	Numerical
0.2	Viscosity:
6.2.	Concept and Definition of viscosity, velocity gradient.
6.2.1	2 Newton's law of viscosity, Co-efficient of viscosity, unit of viscosity
6.2.	3 Stoke's law, terminal velocity, derivation of Stoke's formula.
6.2.4	4 Streamline flow, turbulent flow, critical velocity, examples.
6.2.	Reynold's number and its significance.
6.2.0	5 Applications of viscosity
6.2.	/ Numerical
Cou	

Suggested Specifications Table (Theory):

Unit		Distribution of Theory Marks						
No	Topic Title	R Level	U Level	A Level	Total Marks			
1	Units and Measurements	2	2	4	8			
2	Motion	2	4	4	10			
3	Modern Physics	2	4	4	10			
4	Optics and Ultrasonic	2	4	4	10			
5	Nanotechnology	2	2	4	8			
6	General Properties of Matter	4	4	6	14			
	Total	14	20	26	60			



Sr. No.	Unit No	CO	List of Experiments	Hours
1	1	CO 1	To know your Physics laboratory and Use of Scientific Calculator	2
2	1	CO 1	To measure the dimensions of given objects and to determine their volume using Vernier caliper.	2
3	2	CO 2	To determine Acceleration due to gravity by simple pendulum	2
4	3	CO 3	To study photoelectric effect by using photo cell	2
5	4	CO 3	To determine refractive index by pin method	2
6	6	CO4	To determine coefficient of viscosity of liquid by Stokes' method	2
7	3	CO1	To measure the dimensions of given objects and to determine their volume using micrometer screw gauge.	2
8	2	CO 2	To determine stiffness constant by using helical spring	2
9	3	CO 3	To study projectile motion	2
10	4	CO 3	To plot the characteristics of photo cell.	2
11	4	CO 3	Experiments on LASER	2
12	3	CO 3	Demonstration on spectrometer	2
13	5	CO 4	To study Engineering applications of Nanotechnology	2
14	6	CO 4	To determine Young's modulus of elasticity of wire using Young's apparatus.	2
15	ALL	CO 1	Showing Video on different applications related to units,	2
			Total	30

List of experiments: Total 10 experiments (or turns) out of 15 experiments (or turns)

Note: Experiments No. 1 to 5 (or 6) are compulsory and should map all units and Cos. Remaining 4 experiments are to be perform on the importance of topic.

References/ Books:

Sr.	Title	Author, Publisher, Edition and	ISBN
No.		Year Of publication	
1	Applied Physics	Manikpure&Deshpande ,S.Chand& Company	10:8121919541 13:9788121919548
2	Applied Physics	B.G.Bhandarkar, Vrinda Publication	0071779795
3	Optics & Optical Fibers	Brijlal Subhramanyan	978-3-662-52764-1
4	Engineering Physics	Gaur and S.L.Gupta S.Chand& Company	0-07-058502
5	Physics	Resnick and Halliday Tata McGraw Hills	978-0-07-1755487- 3
6	Physics part I & II	H.C.Varma	9788177091878
7	Properties of Matter	D.S.Mathur	13: 978- 8121908153

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5.http;//hperphysics.phastr.gsu.edu/hbase/hph.htm

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CO Vs PO and CO Vs PSO Mapping (ELECTRICAL ENGINEERING)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		1
CO2	3						1			
CO3	3				1		1		1	1
CO4	3			2	1		1	1	1	1

CO Vs PO and CO Vs PSO Mapping (INSTRUMENTATION)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3			2			1	2	
CO2	3						1	1	
CO3	3				1		1	2	
CO4	3			2	1		1	1	



Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Rajesh Masane	Sr. Engineer	L&T Mumbai
2	Mrs. B. J. Choudhary	Lecturer in Physics	Govt. Polytechnic Thane
3	Mrs S.A. Thorat	Lecturer in Physics	Govt. Polytechnic Mumbai
4	Dr. D.S. Nikam	Lecturer in Physics	Govt. Polytechnic Mumbai

Coordinator,

Curriculum Development,

Department of Sci. & Humanities

I/C, Curriculum Development Cell

Head of Departments Department of Sci. & Humanities

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n Development Cell Principal

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Programme : Diploma in CE/ME/IT/CO/EC/IS/EE(Sandwich Pattern)										
Course	Course Code: SC19R109 Course Title: Basic Mathematics									
Compulsory / Optional: Compulsory										
Teaching Scheme and Credits						Examina	tion Sch	eme		
L	Р	TU	Total	TH (2:30 Hrs)	TS1 (1Hr)	TS2 (1Hr)	PR	OR	TW	Total
04	-	-	04	60	20	20	-	-	-	100

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1&TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment),* Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination. Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term.

Rationale:

This subject is kept under the branch of sciences. This subject intends to teach student basic facts ,concepts, principles, and procedure of mathematics as a tool to analyze engineering problems and as such lays down foundation for understanding the engineering and core technology subject.

Course Outcomes: Student should be able to

CO1	Identify the basic principles of mathematics about the field analysis of any engineering problem.
CO2	Apply rules, concept and properties to solve the basic problems.
CO3	Establish relation between two variables.

Course Content Details:

Unit No	Topics / Sub-topics
1	Trigonometry: 1.1 Trigonometric ratios of allied angles, compound angles, multiple. angles (2A, 3A), Sub multiple angles 1.2 Factorization and De-factorization Formulae 1.3 Inverse Circular function (definition and simple problems). Course Outcome: CO1 Teaching Hours : 10 hrs Marks: 10 (R- 4, U-4, A-2)
2	Vectors: 2.1 Definition of vector , position vector 2.2 Algebra of vectors(Equality, addition, subtraction and scalar multiplication) 2.3 Dot (Scalar) product & Vector (Cross) product with properties. Course Outcome: CO3 Teaching Hours : 10 hrs Marks: 10 (R-2, U-4, A-4)



	Logarithms:											
2	3.1 Definition of logarithm											
3	3.2 Laws of logarithm											
	3.3 simple examples based on laws.											
	Course Outcome:CO2 Teaching Hours : 10hrs Marks:10(R-4 , U-4 , A-2)											
4	 Probability : 4.1 Definition of random experiment, sample space, event, occurance of event and types of event (Impossible, mutually exclusive, exhaustive, equally likely) 4.2 Definition of Probability 											
	4.3 Addition & Multiplication Theorems of probability without proof, simple examples											
	Course Outcome: CO1 Teaching Hours :10hrs Marks:10 (R-4, U-4, A-2)											
	Determinants:-											
5	5.1 Definition of Determinant											
5	5.2 Expansion of Determinant of order 2X3											
	5.3 Crammer's rule to solve simultaneous equations in 3 unknowns											
	Course Outcome: CO2 Teaching Hours :10 hrs Marks:10 (R-2, U-4, A-4)											
	Matrices:											
	6.1 Definition of a matrix of order m x n											
	6.2 Types of matrices											
	6.3 Algebra of matrices - equality, addition, subtraction, multiplication & scalar multiplication.											
6	6.4 Transpose of matrix.											
	6.5 Minor, co-factor of an element.											
	6.6 Adjoint & inverse of a matrix by adjoint method.											
	6.7 Solution of a simultaneous equations by matrix inversion method.											
	Course Outcome: CO3 Teaching Hours : 10 hrs Marks: 10 (R-2, U-4, A-4)											

Suggested Specifications Table (Theory):

∐nit		Distribution of Theory Marks					
No	Topic Title	R Level	U Level	A Level	Tot al		
1	Trigonometry	04	04	02	10		
2	Vectors	02	04	04	10		
3	Logarithms	04	04	02	10		
4	Probability	04	04	02	10		
5	Determinants	02	04	04	10		
6	Matrices	02	04	04	10		
	Total	18	24	18	60		

References/ Books:

Sr. No.	Title	Author, Publisher, EditionTitleand Year Of publication				
1	Mathematics for Polytechnic Students	S.P.Deshpande, Pune Vidyavardhini Graha Prakashan	-			
2	Mathematics for Polytechnic Students (Volume I)	H.K.Dass, S.Chand Prakashan	9788121935241			
3	Companions to Basic Maths	G.V.Kumbhojkar, Phadke Prakashan	10-B07951HJDQ 13-B07951HJDQ			
4	Applied Mathematics	N.Raghvendra Bhatt late, Tata McGraw Hill Publication Shri R Mohan Singh	9789339219567, 9339219562			

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- 3. www.mathworks.com/Products/Matlab/-MATLAB
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- 7. www.allmathcad.com/-Math CAD
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CO Vs PO and CO Vs PSO Mapping (CIVIL ENGINEERING)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		1
CO2	3	2					1	1		1
CO3	3			2			1	1		1

CO Vs PO and CO Vs PSO Mapping (MECHANICAL ENGINEERING)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3			2			1	1	
CO2	3	2					1	1	
CO3	3			2			1	1	

CO Vs PO and CO Vs PSO Mapping (COMPUTER ENGINEERING)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		
CO2	3	2					1	1		
CO3	3			2			1	1		

CO Vs PO and CO Vs PSO Mapping (INFORMATION TECHNOLOGY)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2	NIN	12	1	1		1
CO2	3	2	1	1743	d dual		1	1		1
CO3	3		A	2		3mg	1	1		1

CO Vs PO and CO Vs PSO Mapping (ELECTRONICS ENGINEERING)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	1	11-	2	1	10	1	1	1	1
CO2	3	2	34	ES	TD.	196	1°	1	1	1
CO3	3		100	2	N. N.	1	1		1	1

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CO Vs PO and CO Vs PSO Mapping (ELECTRICAL ENGINEERING)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1		1	
CO2	3	2					1		1	
CO3	3			2			1		1	

CO Vs PO and CO Vs PSO Mapping (INSTRUMENTATION ENGINEERING)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3			2			1	1	1
CO2	3	2					1	1	1
CO3	3			2			1	1	1

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Neelamkumar R. Sawant	State Head Technical Services for (Maharashtra	JSW Cement ltd. Mumbai Head Office
2	Mrs. Deepawali S. kaware	Lecturer in Mathematics	Government polytechnic Vikaramgad
3	Mr. A.S.Patil	Lecturer in Mathematics	Government polytechnic Mumbai
4	Mr.V.S.Patil	Lecturer in Mathematics	Government polytechnic Mumbai

Head of Department Coordinator, Curriculum Development, Department of Science and Humanities Department of Science and Humanities 960 I/C, Curriculum Development Cell Principal OWLED

Program	Programme : Diploma in Instrumentation Engineering (Sandwich Pattern)										
Course Code: IS19R201 Course Title: Principles of Measurement											
Compul	Compulsory / Optional: Compulsory										
Teachi	ng Sche	eme and	Credits			Examina	tion Scł	neme			
L	Р	TU	Total	THTS1TS2(2:30 Hrs)(1 Hr)(1 Hr)							
3	2	-	5	60	20	20	50		25	175	

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale:

Instrumentation is defined as the art and science of measurement and control of physical variables within a production or manufacturing area. The physical variables like temperature, pressure, flow rate, level, displacement, force, pH, humidity, and etc. are measured in industries to monitor and control the overall operation of plant. For conversion of these physical quantities into electrical forms, various types of transducers are used. Hence it is essential to study the conversion/ transduction principles. This course mainly deals with study of various transduction principles as well as characteristics of measuring instruments.

Student	should	be able to
	Student	Student should

CO1	Define the performance characteristics of measuring instruments.
CO2	Demonstrate the transduction principles of different transducers.
CO3	Explain principles of measurement of pressure, flow, and temperature transducers.
CO4	Understand the concept of advance sensors.
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Course Content Details:

UnitNo	Topics / Sub-topics
	Fundamental of Measurement and Metrology-
	1.1 Definition of Measurement, Instrumentation
	1.2 Define Metrology, types of Metrology.
1	1.3 Significance of Measurement, Methods of Measurements,
	Generalized Block diagram of Instrumentation System, Applications of Measurement system.
	1.4 Classification of Instruments -
	Active and Passive instruments, Null-type and Deflection-type instruments, Analogue and Digital
	instruments, , Smart instruments & non smart instruments
	Types of Performance Characteristics-
	1.4 Definitions-Static Characteristics of Instruments: Accuracy, Precision, calibration, Range and
	span, Linearity, Sensitivity, Repeatability & Reproducibility, Resolution & Threshold,
	1.5 Drift, Hysteresis band, Dead zone. (Definition only)
	1.6 Definitions-Dynamic Characteristics of Instruments: Speed of Response, Dynamic Error,
	Fidelity.

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	1.7 Errors in Measuring Inst	ruments		0 0			
	• Tyj	pes of Errors					
	• Sou	urces of Errors					
	• Red	duction of Errors					
	Course Outcome: CO1,	Teaching Hours : 1	2 hrs Marks: 1	2 (R-4, U-4, A-4)			
	Transduction Principles o	f Sensors & Transducers		0			
	2.1 Different Physical Varia	bles Measured in Industries, I	Definitions of Sensor	& Transducer			
	andtheir difference, Classific	ation of Transducers.					
	2.2 Principle of operation						
	Resistive transducers						
	Capacitive transducers						
	Inductive transducers-			1			
2	2.3 Self-generating type- El	ectromagnetic type, Electrody	mamics type, and Ed	ay current type			
	Passive type- Variable Induc	ctance type, Mutual Inductance	e type				
	2.4 Hall-effect sensors, Piez	oelectric transducers		24			
	2.5 Photoelectric sensors - F	Photo emissive, Photo conduc	tive and Photovoltaic	26			
	D Ultrasonic transducers, Ra	dar sensors.					
		THE OLYTERAL					
	Course Outcome: CO2	Teaching Hours : 08 h	rs Marks:10	(R-2, U-4, A-4)			
	Principles of Pressure Me	asurement	VG A				
	Absolute Gauge Atmos	phoric Vacuum and Differen	tial Prossuras				
	3 2 Principles of Operation	and Applications of	inal i lessures.				
3	S.2 Finciples of Operation	ranu Applications of –	12				
	Manamatara Diazomatan	II tube monomotor Single l	mh manamatan				
	Rourdon tuba. C tupa. Ro	, O-tube manometer, Single in	mo manometer				
	Bourdon tube- C type, Be						
	Course Outcome: CO3	Teaching Hours :6 h	s Marks:8	8 (R-0 , U-4 , A-4)			
	Principles of Flow Measu	rement	0/8				
	4.1 Types of fluid flows, Ra	te of flow or discharge(Q), Co	ontinuity equation				
4	Bernoulli's equation for 1	deal and real fluids and applic	ations				
	4.2 Principle of Operation an	nd Applications of –					
	venturimeter, Orifice Me	eter, Kotameter					
	Course Outcome:CO3	Teaching Hours :06h	rs Marks:12	(R-2 , U-6 , A-4)			
	Principle of Temperature	Measurement					
	5.1 Difference between heat	and temperature, temperature	Scale. Different unit	s of temperature			
	measurement and their conversion, Modes of heat transfer, Thermal conductivity						
5	5.2 Principle of Operation	of –					
	Thermal expansion therm	nometers (liquid thermometer	Bimetallic Strip)				
	Thermoelectric thermome	eters – (Seebeck, Peltier, and	Thomson effects)- Pri	nciple of			
	Inermocouple						
	Course Outcome CO3	Teaching Hours • & hrs	Marks· 10	$(\mathbf{R} \cdot 2 \cdot \mathbf{U} \cdot 4 \cdot \mathbf{A} \cdot 4)$			
	Course Outcome. COJ	reaching mould . 0 mb	171611130 IV	$(\mathbf{M}^{-2}, \mathbf{U}^{-1}, \mathbf{M}^{-1})$			

6

Advance Sensors6.1 IOT Smart sensors – working principle, construction6.2 MEMS sensors- working principle, construction, block diagram & applications in area.

6.3 Analytical sensors –working principle, construction, diagram & applications in area of PH electrode & gas electrode.

 Course Outcome:CO4
 Teaching Hours : 5 hrs
 Marks: 8
 (R- 2. U-4. A-2.)

 Suggested Specifications Table (Theory):

Unit		Distribution of Theory Marks					
No	Topic Title	R Level	U Level	A Level	Total Marks		
1	Fundamentals of Measurement & Metrology	04	04	04	12		
2	Transduction Principles of Sensors & Transducers	02	04	04	10		
3	Principles of Pressure Measurement		04	04	08		
4	Principles of Flow Measurement	02	06	04	12		
5	Principles of Temperature Measurement	02	04	04	10		
6	Advance Sensors	02	04	02	08		
	Total	12	26	22	60		

List of experiments: Total 10 experiments (or turns) out of 15 experiments (or turns)

Sr. No.	Unit No	COs	ESTDTitle of the Experiments	Hours
1	1	CO1	To identify direct and indirect measuring instruments in the given lab	2
2	2	CO2	To verify the resistive transduction principle of transducer.	2
3	3	CO3	To measure gauge pressure and differential pressure using U- tube manometer.	2
4	6	CO4	To study MEMS sensor	2
5	1	CO1	To find an accuracy, precision, range and span of mechanical instruments (e.g. Level indicator).	2
6	2	CO2	To verify the inductive transduction principle by converting displacement / velocity into voltage.	2
7	4	CO3	To measure liquid flow rate using rotameter.	2
8	6	CO4	To study IOT sensor	2
9	1	CO1	To find an accuracy, precision, range and span of electrical instruments (e.g. DMM-voltage, current and resistance)	
10	2	CO2	To verify the capacitive transduction principle by converting liquid level into change in capacitance.	2



11	5	CO3	Measurement of temperature by using temperature sensor.	2
12	2	CO2	To verify the Resistive transduction Principle (RTD,	2
			Thermistor) converting temperature in to change in	
			Resistance.	
13	4	CO3	To measure liquid flow rate using orifice & venturi meter.	2
14	2	CO2	To verify the piezoelectric transduction principle applicable	2
			for only dynamic measurement.	
15	3	CO3	Identify different pressure mechanical pressure transducerin	2
			lab.	

Note: Experiments Sr. No. No. 1 to 6 are compulsory and should map all units and Cos. Remaining 4 experiments are to be performing on he importance of topic.

References/ Books:

Sr.	Title	Author, Publisher, Edition	ISBN
No.		and	
		Year Of publication	
1	A Course in Electrical and	A.K. <u>Sawhney</u>	9788177001006
	Electronic Measurements and	Dhanpat Rai and co,	
	Instrumentation	New Delhi.2015	
2	Measurement-And-	Alan S. Morris	9780750650816
	Instrumentation-Principles-	Butterworth-Heinemann,	
	3rd-Edition1	Oxford. 2001	
3	A TextBook of Fluid	Dr. R. K. Bansal	9788131808153
	Mechanics and Hydraulic	Laxmi Publication, New	
	Machines (in S.I. Units)	Delhi. 2018	
4	A Textbook on Heat Transfer	Dr. S.P. Sukhatme	9788173715440
	5/1	Universities Press (India)	
	8 /	Fourth edition (2005)	
5	Instrumentation System and	Rangan Mani Sharma	9780074633502
	devices	Tata McGraw Hill	
6	Industrial instrumentation and	S.K. Singh Tata McGraw Hill,	9780070262225
	controls	New Delhi	
7		Tai Ran Hsu Mc Graw Hill	978-0072393910
	MEMS and Microsystems:		
		10	
	Design and Manufacture	WOWLEDGE	
0		Nidhisin dhunani Dahit Amand	0704000400544
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	things	Purnimal Iala Mehta Editors	
		Springer	



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- 3. https://www.electronics-tutorials.ws/io/io_3.html
- 4. https://nptel.ac.in/course.html
- 5. https://www.slideshare.net/nsihag/transducers-17950953
- 6. https://en.wikipedia.org/wiki/Transducer
- 7. http://doi.org/10.1016/j.future.2016.06.003
- 14. https://doi.org/10.1016/S09244247(99)00368-4

CO Vs PO and CO Vs PSO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	-	2	1	-
CO2	3	-	-	-	-	-	3	2	-
CO3	-	-	2	2	-	-	2	3	-
CO4	1	-	2	2	2	1	2	3	2

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Mr B.B.Sul	HOD IS	Govt. Polytechnic Mumbai
2	Mr. M.K.Kulkarni	Lecturer in Instrumentation	Govt. Polytechnic Mumbai
3	Mr. Santosh Kamble	Director	Saitronics Pvt. Ltd. Kamothe
4	Mr. Shakti Kumar Shiledar	Assistant Professor Instrumentation	Government Engg College Jalgaon

Coordinator,

Head of Department

Curriculum Development, Engineering

Department of Instrumentation

Department of Instrumentation Engineering



I/C, Curriculum Development Cell

Principal

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Programme : Diploma in Instrumentation Engineering (Sandwich Pattern)										
Course	Code:]	IS19R2	02	Course Title	e: Instru	mentation	Works	hop Prac	tice	
Compul	Compulsory / Optional: Compulsory									
Teaching Scheme and Credits						Examin	ation Sc	cheme		
L	Р	TU	Total	TH (2:30 Hrs)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
	4		4						50	50

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale:

Instrumentation workshop practice will provide real industrial environment which helps students to develop technician skills related to instrumentation field. The course is designed to impart handson-skills in the field of electronics & instrumentation such as testing of electronic components, cables, connectors, soldering and de-soldering techniques, PCB making etc. This course is useful for students to build, test, maintain and troubleshoot simple electronic circuits on PCB.

Course Outcomes: Student should be able to					
CO1	Select appropriate tools, components and instrument.				
CO2	Test the given electronic components.				
CO3	Perform the soldering and de-soldering with utmost safety.				
CO4	Develop PCB, assemble components and test the circuit.				

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Course Content Details:

Unit No	Topics / Sub-topics
1	 Tools 1.1 Tools: Nose pliers, wire stripper, screwdrivers, allen keys, cutter, hand hacksaw, soldering iron, de-soldering pump, crimping tools (for RJ-45, RJ-11), and cable testers. (Free hand constructional sketches may be drawn on drawing sheet) 1.2 Multimeters: Need of Multimeter, Analog and digital Multimeter, Measurement of parameter using multimeter. Course Outcome: CO1
2	 Switches, Cables and Connectors 2.1 Types of switches: SPST, SPDT, Toggle, thumbwheel, rotary, slide, micro switch, membrane switch. 2.2 Cable: Flat, Ribbon, Co-axial, twisted pair, UTP, Fiber optic. 2.3 Connector Types: PCB edge connector, Berg (strip) connector, FRC connector, D-type, BNC, TNC, MCB, RJ-45, RJ-11, USB (A, B, mini, micro). Course Outcome: CO1

	Component Testing
	3.1 Identification and testing of following components. Resistors, Capacitors, Inductors,
	Transformers, PN Junction Diode, Bipolar Junction Transistors (BJT), Filed Effect
3	Iransistors (FEI), Unijunction Iransistor (UJI), Metal Oxide Semiconductor FEI (MOSEET) LED 7 Segment Dignlave SCP DIAC TRIAC
	3.2 Terminal identification and major specifications of component from its data sheet
	5.2 Terminar dentification and major specifications of component from its data sheet.
	Course Outcome: CO2
	Soldering and De-soldering
	4.1 Soldering Basics: Solder joint: Dry solder joint, cold solder joint, Good and Bad solder joint,
4	Soldering material, Soldering tools: Soldering Iron, soldering station.
	4.2 De-soldering Technique. Tools used for de-soldering, De-solder wick, De-solder Pump
	4.5 Treeauton during soldening and de-soldening.
	Course Outcome: CO3
	PCB Making
	5.1 Types of PCB's: Glass Epoxy, paper phenolic, Single Sided, double sided, Selection and
	application of PCB's. Drawing electronic circuit, designing PCB layout and artwork. Use of
5	paint, Templates, Pen.
	machine, dryer (oven) and scanner with lens. Drilling machine, Shearing machine, Developing
	negative film and making PCB.
	Course Outcome: CO4
	Mini Project
	6.1 Selection and testing of components to be used in the mini project.
(6.2 PCB layout and artwork design: Transfer the artwork on copper clad, Etching and drilling,
0	6.3 Testing and fault finding of circuit. Wire harpessing and final assembly along with enclosure
	0.5 results and fault finding of circuit, which are solid and final assentory along with circlosure.
	Course Outcome: CO4

Suggested Specifications Table (Theory): --NA---

List of experiments: Total 10 experiments (or turns) out of 15 experiments (or turns)

Sr. No.	Unit No	COs	Title of the Experiments	Hours
1	1	CO1	To know Instrumentation Workshop Lab: A) Demonstration for identification and use of tools. (Nose pliers, wire stripper, screwdrivers, allen keys, allen screw, cutter, hand hacksaw, soldering iron, de-soldering pump, crimping tools (for RJ-45, RJ-11), and cable testers.(4 Hours) B) Prepare the sheet of free hand sketch of various tools used in Instrumentation Workshop and write their uses. (4 Hours)	8
2	1	C01	 Multimeters: (A) To identify analog and digital multimeters and to identify different range selection for AC/DC voltage/Current, Resistance, continuity, diode, transistor. (B) To measure resistance, voltage and current using analog and digital multimeter. 	4
3	2	CO1	To identify and test various types of switches, cables and connectors (Lead identification, testing, uses).	8

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Total									
15	5	CO4	To identify different instruments/ equipments used in making PCB.	2					
14	5	CO4	To search information on different PCB making equipments.	2					
13	5	CO4	To identify different types of PCB. Teacher shall explain artwork design rules, types of PCB's: Glass Epoxy, Selection of PCB's, PCB layout and artwork design, Use of paint, Templates, Pen etc paper phenolic, Single Sided, double sided, Selection of PCB's, PCB layout and artwork design, Use of paint, Templates, Pen etc.	4					
12	5	CO4	Draw circuit schematic, layout and artwork using one of the PCB making software mentioned below. (Express PCB, Free PCB, EAGLE PCB, workbench etc).	4					
11	4	CO3	To perform De-soldering by De-solder Wick, De-solder Pump. Precaution to be taken during de-soldering	2					
10	4	CO3	To perform soldering by soldering material & soldering tools. Precaution to be taken during de-soldering	2					
9	4	CO3	To identity Solder joint, Dry and cold solder joint, good and bad solder joint, soldering material, soldering tools	2					
8	3	CO2	To identity and test DIAC, SCR and TRIAC using multimeter.	2					
7	3	CO2	To identify and test Diode, LED, BJT, FET, UJT, MOSFET and 7- Segment display using multimeter.	4					
6	5&6	CO4	Mini project: To prepare PCB (with layout, artwork designed by the student) for small electronic circuits. <u>Note</u> : Mini project group may consist of 3-4 students. Student has to demonstrate the project and submit the project report.	8					
5	4	CO3	Demonstration and practice of soldering and de-soldering technique.	4					
4	3	CO2	 Prepare the chart for symbols with terminal identification, uses and testing procedures. (2 Hours) To identity and test passive components available in your lab: Resistors: Thick film and Thin film resistors, Network and Surface Mount Resistors, Variable Resistors, Special resistors e.g. thermistor, LDR. Capacitors: Dielectric, Variable, Electrolytic: aluminium/tantalum, Film: radial/axial lead, Ceramic. Inductors: Iron core, Ferrite core, Air core, bobbin based, torroidal, multilayer, film, variable, coupled. (by color codes and with multimeter/LCR meter) 	4					
			 micro switch, membrane switch. (2 Hours) (B) PCB edge connector, FRC connector, D-type, BNC, TNC, MCB, RJ-45, RS-232, USB connectors. (2 Hours) (C) Flat, Ribbon, Co-axial, twisted pair, UTP. (2 Hours) 						
			(A) SPST, SPDT, Toggle, thumbwheel, rotary, slide,						

Page1

References/ Books:

Sr.	Title	Author, Publisher, Edition and	ISBN
No.		Year Of publication	
1	Electronic Devices and	Mottershead Allen	9788120301245
	Circuit: An Introduction	PHI Learning, New Delhi	
2	Electronic Devices and	Boylestead Robert, Louis	9788131727003
	Circuit Theory	Neshelsky Pearson Education,	
		10 th edition	
3	The Art of Electronics	Paul Horowitz Winfield Hill	9780521370950
		Cambridge University Press,	
		New Delhi	
4	Electronics Principles	Malvino, Albert Paul, David	9780073222776
		McGraw Hill Education	
5	Principles of Electronics	Mehta V.K., Mehta Rohit	9788121924504
		S. Chand and Company	
6	Basic Electronic Engineering	Baru V., Kaduskar R., Gaikwad	9789350040126
		S.T. Dreamtech Press	
7	Fundamentals of Electronic	David A. Bell Oxford	9780195425239
	Devices and Circuits	University Press	
8	A text book of Applied	Sedha R.S.	9788121904209
	Electronics 6	S. Chand	

E-References:

- 1. http://www.alldatasheet.com
- 2. <u>http://www.allelectronics.com</u>
- 3. http://www.techniks.com
- 4. http://www.aplab.com
- 5. https://electronicsclub.info

CO Vs PO and CO Vs PSO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	1	-	1	2	3	-
CO2	3	-	1	3	-	-	2	2	-
CO3	1	-	-	-	-	-	3	1	-
CO4	-	2	3	-	-	-	2	2	-

D.

FNOWLEDGE

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1960

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Santosh Kamble	Proprietor	Saitronics, Kamothe Navi Mumbai
2	Mr. C.S.Tamkhane	Lecturer in Instrumentation Engineering	Govt. Polytechnic Pen
3	Mr. U.B.Shinde	Lecturer in Instrumentation Engineering	Govt. Polytechnic Mumbai
4	Mr. K.U.Dawane	Lecturer in Instrumentation Engineering	Govt. Polytechnic Mumbai



Program	Programme : ME/CE/IS (Sandwich Pattern)										
Course Code: WS19R201 Course Title: Workshop Practice											
Compul	Compulsory / Optional: Compulsory										
Teachi	ng Sche	me and	Credits			Examin	ation Sch	neme			
L	Р	TU	Total	TH (2:30Hrs)	THTS1TS2(2:30Hrs)(1 Hr)(1 Hr)						
0	4	0	4	0	0	0	0	0	50	50	

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26.

Rationale:

Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. The knowledge of basic shops like Wood working, Fitting, Welding, Plumbing and Sheet Metal shop is essential for technicians to perform their duties in industries. Irrespective of engineering stream, the use of workshop practices in day to day industrial as well domestic life helps to solve various minor but critical problems. Working in workshop develops the attitude of working in a group and the basis for safety awareness is created. This foundation course intends to impart basic knowhow of various hand tools and their use in different sections of manufacturing. The students are advised to undergo each skill experience with remembrance, understanding and application with special emphasis on attitude of enquiry to know why and how for the various instructions and practices imparted to them in each hop. Furthermore, the demonstration of CNC Machine will give feel of advancement in industry.

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Course Outcomes: Student should be able to

CO1	Lay-outing of shop & Sketching of jobs, tools & equipment.
CO2	Select appropriate tools, machinery, equipment and consumables for given application.
CO3	Use & Operate hand tools, equipment and machinery in different shops.
CO4	Prepare the simple jobs as per specification & drawing.
CO5	Maintain workshop related tools, equipment and machineries.

D.

Course Content Details:

Unit No	Topics / Sub-topics
	Introduction to workshop: -
	1.1 Workshop layout, Importance of various sections/shop of workshop, Types of jobs done in each
1	shop.
	1.2 Causes of accidents, general safety rules and work procedure in workshop, Safety signs and symbols, First Aid.
	1.3 Fire, Causes of Fire, Basic ways of extinguishing the fire. Classification of fire, Firefighting

	environment fine Entirennichens and their terres
	equipment, fire Extinguishers and their types.
	1.5 Issue and return system of tools, equipment and consumables.
	Course Outcome: CO1,CO2 Teaching Hours : 06
	Smithy and Forging:-
	2.1 Sketching, understanding the specifications, materials, various applications and methods used in
	Smithy and Forging shop along with use of tools like anvil, hammers, Swage block, tongs,
	chisels, flatters etc;
	2.2 Demonstration of Smithy and Forging operations like bending, setting down, bulging,
2	Upsetting etc;
	2.3 Preparation of smithy & forging, job.
	2.4 Safety precautions & Personal Protective Equipments.
	Course Outcome: CO1,CO2,CO3,CO4,CO5 Teaching Hours :10
	Carpentry Section :-
	3.1 Types of wood and their applications.
	3.2 Types of carpentry hardware's and their uses.
	3.3 Sketching, understanding the specifications, materials, various applications and Methods used in
	Carpentry shop along with use of tools like saws, planner, chisels, Hammers, mallet, marking
3	3.4 Demonstration of carpentry operations such as marking, sawing, planning, chiseling,
0	gauge, Vice, try square, rule, etc; Grooving, boring, joining, etc;
	3.5 Preparation of wooden joints.
	3.6 Safety precautions & Personal Protective Equipments.
	E Barrier
	Course Outcome: CO1,CO2,CO3,CO4,CO5 Teaching Hours: 10
	Welding Section: -
	4.1 Types, sketching, understanding the specifications, materials and applications of arc & Gas
	welding, Accessories and consumables.
	4.2 Demonstration of metal joining operations like arc welding, soldering and brazing. Show effect of
4	Current and speed. Also demonstrate various welding positions.
	4.3 Demonstrate gas cutting operation.
	4.4 Preparation of metal joints.
	4.5 Safety precautions & Personal Protective Equipments.
	WOWNEDGE
	Course Outcome: CO1,CO2,CO3,CO4,CO5 Teaching Hours: 10
	Fitting Section
	5.1 Sketching, understanding the specifications, materials, various applications and methods used in
	fitting, Marking, measuring, work holding, cutting & finishing tools.
5	5.2 Demonstration of various fitting operations such as chipping, filing, scraping, grinding, Sawing,
	marking, Drilling, tapping, etc;
	5.3 Preparation of male, female joint.
	5.4 Safety precautions & Personal Protective Equipments
L	Course Outcome: CO1,CO2,CO3,CO4,CO5 Teaching Hours :12
	Plumbing Section
	6.1 Types, specification, material, applications and demonstration of pipe fitting tools
	6.2 Demonstration of pipe fitting operations such as marking, cutting, bending, threading,
	assembling, Dismantling etc.
6	6.3 Types and application of various spanners such as flat, fix, ring, box, adjustable etc.
	0.4 Preparation of pipe fitting jobs.
	0.5 Concept and conversions of SWG and other gauges in use. Use of wire gauge.
	o.o Safety precautions & Personal Protective Equipments
	Course Outcome: CO1 CO2 CO3 CO4 CO5 Teaching Hours • 06

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Government

	Lathe and CNC Operations :-
	7.1 Working principle of lathe along with sketch and procedure for its general maintenance.
	7.2 Demonstration of Lathe machine operation like plain turning, taper turning, threading,
7	Chamfering, etc.
	7.3 Simple job demonstration for a group on CNC Machine.
	Course Outcome:CO5 Teaching Hours : 06

List of experiments:

Sr. No.	Unit No	СО	List of Experiments	Hours
1	1	CO1	Causes of accidents, general safety rules and work procedure in workshop, Safety signs and symbols, First Aid. Perform mock drill session in group of minimum 10 students for Extinguishing fire.	06
2	2	CO1,CO2,C O3,CO4,CO5	Prepare job involving operations like bending, setting down, bulging, upsetting etc; e.g. Pegs (Square/round), Hook, Hammer tongue, Agro equipment etc. (Individually)	10
3	3	CO1,CO2,C O3,CO4,CO5	Prepare two wooden joints as per given drawings. (Individually)	10
4	4	CO1,CO2,C O3,CO4,CO5	Prepare lap joint/butt joint using either arc / gas welding as per given drawing.(Individually)	10
5	5	CO1,CO2,C O3,CO4,CO5	Prepare one Male- Female type fitting job as per given drawing. (Individually)	12
6	6	CO1,CO2,C O3,CO4,CO5	Prepare two pipe joints as per given drawings. (Individually)	06
7	7	CO5	Demonstration of Lathe machine & CNC machine operations.	06
		Total	3 ESTD. 1960	60

References/ Books:

Sr.	Title	Author, Publisher, Edition and	ISBN		
No.		Year Of publication			
1	Workshop Technology - 1	Hazra and Chaudhary	9788185099149		
		Media promoters & Publisher private			
		limited.			
2	Workshop Technology - l	W.A.J.Chapmam	9780713132694		
		Taylor & francis.			
3	Workshop Practice Manual	Hegde.R .K	9798128005830		
	for Engineering Diploma &	Sapna Book House, 2012,			
	ITI Students				
4	Workshop familiarization.	E. Wilkinson	978 0273 3167 56		
		Pitman engineering craft series. 1972			
5	Mechanical workshop	K.C.John	978 812 03416 61		
	practice.	PHI. 2010			
6	Workshop practice manual	K. Venkata Reddy, B. S. Publications.	978 8178 0030 78		
		6 th ed ,2015			

E-References:

1. http://www.asnu.com.nu b.c.

2. http://wwwabmtools.com/downioads/Woodworking%20Carpentry%20Tools.pdf d.

3. http://www.weldingtechnology.org e.http://www.newagepublishers.com

4. http://www.youtube.com/watch?v=TeBX6cKKHWY g

5. http://www.youtube.com/watch?v=QHF0sNHnttw&feature=related h

6. http://www.youtube.com/watch?v= K v l zo9CAxt4&feature=relmfu i.

7. http://sourcing.indiamart.com/engineerig/articles/materials-used-hand-tools/

CO Vs PO and CO Vs PSO Mapping(Mechanical)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	2	1	2	2	1	2	2
CO2	2	2	2	2	2	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2
CO4	3	3	3	5 3PC)LY3TE	3	3	2	2
CO5	2	2	25	2	2	2	2	2	2

CO Vs PO and CO Vs PSO Mapping(Civil Engineering)

			- 10	1 1 1		111 1	10.11	100		
СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	2	1	2	2	1	2	1	
CO2	2	2	32	E257	D ² .	1926	p/2	2	1	
CO3	2	2	25	2	2	2	30	2	1	
CO4	3	3	3	RNO		DGE T	3	2	1	
CO5	2	2	2	2	2	2	2	2	1	

CO Vs PO and CO Vs PSO Mapping(Instrumentation)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	2	1	2	2	1	2	1
CO2	2	2	2	2	2	2	2	2	1
CO3	2	2	2	2	2	2	2	2	1
CO4	3	3	3	3	3	3	3	2	1
CO5	2	2	2	2	2	2	2	2	1

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Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Shri S. V. Joshi	Lecturer	G. P. Mumbai
2	Shri N. M. Ambadekar	Workshop Superintendent,	G. P. Thane
3	Shri D. B. Jadhav	Senior Manager	Auto. Division, Mahindra and Mahindra Ltd., Kandivali



Progran	Programme : Diploma in ME/CE/EE/CO/IF/IS/EC/RT/LT/LG (Sandwich Pattern), AIML											
Course Code: UV19R101 Course Title: Universal Human Values-I												
Compul	Compulsory / Optional: Compulsory											
Teaching Scheme and Credits Examination Scheme												
L	Р	TU	Total (Credit)	THTS1TS2(2 Hrs(1TS2(130min)Hr)(1Hr)								
		-	02	-	-	-						

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26.Two practical skill tests are to be conducted. First skill test at mid-term and second skill test at the end of the term.

Rationale:

Human beings have materially developed to a great extent through technological development. Still the scarcity of happiness and satisfaction result in personal and social conflicts. The value system develops the frame of reference of the individual to benchmark his/ her behavioral pattern respecting the righteousness during life. The appreciation and inculcation of a value system can develop a person as a creative contributor for society, nation and by-large the world.

By inculcating universal values, not only can a person resolve the personal, social and professional situations positively but also can lead toward an enriched life. Once these values are inculcated in a student's personality, it will result in the sustainable development of a student.

This course is designed to make the student think that by observing the universally accepted human values, it is easy to become a good human being, a good citizen and make their own life goaloriented, cladded with happiness and satisfaction. The core universal values to be inculcated: personal values, social values and professional values. The aspirations and concerns to be explored at the level of individual, at the level of family, at the level of society and at the level of nature.

Course	Outcomes:	On	completion of	this	course,	student	should	be able to
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CO1	Appreciate universal human values to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
CO2	Develop a holistic approach to environment, family and society.
CO3	Develop more confidence in self.
CO4	Derive joy of giving .
CO5	Improve understanding and perform acts of kindness.

Sr. No	Activity	Related Value/s	Methodology of	Student's Role	Mentor's role	Resource
•		v anuc/s	Implementatio n	KOR	TOIC	Required
01	 Prepare a self- introduction sheet i)Name, School passed from, achieveme nts upto 10th standard What are your goals in your life What are your expectations from institute ,Family ,Society Information of family members Most happy moments and difficult moments in your life, Special trips, Hobbies , Sports, Music , etc 	Honesty, Self- exploration	Preparing a note and presenting in front of peers	Thoughtfu lly answer the questions in an honest manner.	Provide informatio n about the institute and motivate students to honestly express themselves.	Official website of the institute
02	List behavioral characteristics and analyse self, friend, family members, • Do you like these characters yes/no – why	Self- exploration, Honesty	Preparing a presentation	Honestly and sincerely analyse self and others	Create a stress-free environme nt and see that there will be no conflict of expression.	Provide a list of character traits by referring to various resources like internet, books, etc. For e.g. https://w ww.teach ervision.c om/writin g/charact er-traits- list- examples

Government Polytechnic Mumbai

Non-Examination, Credit Course

					~	
03	Identify your needs	Honesty	Making a list of	Reflect	Stay wary	list of
	and desires	Self-	needs and	and	of	historical
		exploration	desires	identify	controversi	personalit
				needs and	al subjects	ies who
				desires.		set the
						example.
04	Singing a patriotic		Forming group	Diligently	Manage the	Music
• -	song in group	Patriotism	of interested	practice	logistics of	system
	Make group		students	and	creating	list of
	e make group,		Students will	cooperate	groups and	notriotic
	select solig,		students will	cooperate	gioups and	patriotic
	explain		renearse the	with	assigning	songs.
	meaning, use		activity and will	others.	roles.	
	music/karaoke		perform in			
	and		groups			
	demonstrate to					
	class					
05	Eccov writing	Salf	Solocting	Thoughtfu	Display the	notico
03	Essay writing	overlage tion	tonic from the	1 noughtiu	bast assaus	hoard
	• My dreams as	Detrietier		ily write	Dest essays	board,
	an Engineer	Patriousin	list and writing	the essay	on the	panel of
	 India a Super 	Accountability	an essay on it	on a	notice	Judges
	power in my	S. All	1	selected	board.	
	views	3/ 2/	The Mark	topic.		
	Society & I	OI Sit		21		
	• Indian culture	RI Amt	The way			
	• Indian culture					
	and values					
	My role models		5 4 7. Wall			
	in life		- 18 DB			
		2 EST	0 1000/	2		
06	Play Music	Derive the joy	Present to	Pursue	Identify	logistical
	instruments/ Singing/	The second	peers (Two	your	and	support
	Drawing/Any stage	VG .	days	creative	categorize	
	performance/	KNOI	competition)	interest	students.	
	photography/any		VLEDO		Create	
	creative art				groups	
					according	
					v	
07	Visit a nature park	Environment	Students to	Study		https://m
07	identify the flore b	Conservation	arrange visit	Various	rasourc safety of	abarasht
	found apolo size	Conservation	arrange visit	flore e	salety OI	analaSill
	faulta, ecological		under		students	ranature
	factors & their role in		supervision of	tauna in a	and	park.org/
	our lite. (e.g		mentor	discipline	manage	
	Maharashtra nature			d manner.	activities.	
	park society, Dharavi,					
	Mumbai)					

Non-Examination, Credit Course

08	Tree plantation and	Environment	Students to	Plant the	Assure	saplings,
	caring for it.	Conservation	arrange activity	appropriat	safety of	soil,
			under	e saplings	students	shovels,
			supervision of	according	and	fertilizer
			mentor	to	provide	
				instruction	adequate	
				s.	instructions	
					•	
09	List the distracters	Integrity,	Observation and	Identify	Provide	Case
	which are responsible	Righteousness	identification of	distracters	historical	studies
	to deviate you from		common	like TV	case	
	integrity and find out		distracters.	shows,	studies of	
	the solution			movies	previous	
				and bad	students.	
				habits		
10	Prepare the chart DOs	Conscientious	Preparing the	Identify	Create	Official
	and DONTs for	ness, honesty,	chart	DOs and	groups and	websites
	different situations like	social		DONTs	assign	of
	local trains, travel,	gratitude		and	topics.	respectiv
	public place,	· DC	TECH	prepare		e
	classroom,		- NI	various		administr
	examination, etc.	N	C.	charts		ations
		SIN	The second	2		like
		ST/ dit	and a little	91		railways,
		S Cant	1000	12		Municipa
		PIANA		18		1
			E A V			corporati
			The Public			on, etc.,
11	Beach cleaning,	Environment	Organizing a	Clean the	Assure	https://w
	institute cleaning	conservation,	visit to clean the	venue as	safety and	<u>ww.unite</u>
		Health	venue.	per	aid in	<u>dwaymu</u>
		consciousness	5	instruction	organizatio	mbai.org
		GKAL	10	S.	n.	<u>/cleansho</u>
		ANO1	VLEDGE	5		res
			C. P. WARDER			

Methodology:

- 1. The course is Non Examination, Credit Course.
- 2. The course will be introduced during the student induction programme (orientation programme). Most of the activities are to be completed during induction programme and to be continued throughout the term under the guidance of mentor.
- 3. The mentor will be assigned to the student for a group of 20 students each.
- 4. In consultation and under supervision of a mentor, the student/ Group of students has to complete the activity.
- 5. The mentor will work as a facilitator/ advisor.
- 6. The strategies to learn the course is "Self- Exploratory" and "Experiential Learning"
- 7. The onus of responsibility for completing the activities is with students.
- 8. The student has to complete at least **seven** no. of activities throughout the term to earn the credits.

References/ Books:

Sr.	Title	Author, Publisher, Edition and	ISBN
No.		Year Of publication	
1	A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria, Excel Books, New Delhi, 2010	978-8-174- 46781-2
2	Human Values	A.N. Tripathy, New Age International Publishers, 2003	978-8-122- 42589-5
3	Teacher's Manual - A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria, Excel Books, New Delhi, 2010	-
4	Science and Humanism, Towards a Unified World View	PL Dhar, RR Gaur, Commonwealth Publications, 1992	978-8-171- 69222-4
5	Education for values in schools- a framework	NCERT	
6	Value oriented education	E N Gawande	

E-References:

- 1) <u>https://youtu.be/kOJu1vj_BVk</u> (The 10 MostImportant Human Values)
- 2) Dr. Prakash Baba Amte- Movie
- 3) <u>https://youtu.be/QeogOlzG2ls</u> (Value of Education -short film)

E-References for mentors:

- 1) https://www.edutopia.org/
- 2) <u>https://sdgs.un.org/goals</u>

Consultation Committee:

C	NT	ESTD. 1960 /	Testitude (Organization
Sr.	Iname	Designation	Institute/Organisation
INO			
1	Dr. L.A. Patil	Principal (Retired)	Pratap College, Amalner
2	Dr. Nitin Deshpande	Lead Consulation WLEDGE	Dnyanpeeth Academy, Pune
3	Dr. Chandrakant	Founder Trustee	Karnala Charitable Trust, Pune
	Shahasane		
4	Mr. Sunil V. Joshi	Ex- Sr. Lecturer, Mechanical	Government Polytechnic,
		Engineering,	Mumbai
5	Mrs. Swati D. Deshpande	Principal	Government Polytechnic,
	_		Mumbai
6	Mr. U.A. Agnihotri	Lecturer, Mechanical Engineering	Government Polytechnic,
			Mumbai
7	Mr. K. V. Patil	Lecturer, Mechanical Engineering	Government Polytechnic,
			Mumbai

Institute Coordinator,

Curriculum Development,

Principal

Government Polytechnic, Mumbai

Program	Programme : Diploma in Instrumentation Engineering									
Course	Course Code:IS19R310 Course Title: Libre Office Suite (Writer and Draw)									
Compul	Compulsory / Optional: Compulsory									
Teaching Scheme and Credits			l Credits			Examina	tion Sc	heme		
TH	PR	TU	Total	TH (2:30 Hrs)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
	4#		4							

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Course Content Details:

Unit No		Topics / Sub-topics				
	Libre o	office suite writer				
	1.	Promo of LibreOffice Suite				
		Outline: - LibreOffice promo - Features of LibreOffice - Uses of LibreOffice - LibreOffice				
		formats - LibreOffice tutorials in Spoken Tutorial - Applications of LibreOffice, Libre				
		Office tutorials in various languages				
	2.	Introduction to LibreOffice Writer				
		Outline: Introduction to LibreOffice Writer Basic Features Toolbars How to open, close and				
		save a document Save in MS Office, PDF and other formats Open MS Office Documents				
		Change Bold icon Change Font Size, Change Font Name.				
	3.	Typing text and basic formatting				
		Outline: Typing text and basic formatting Aligning Text in writer Bullet points and				
		Numbering Cut Copy and Paste option Bold/Underline/Italics Font name/Font size/Font				
		color in Writer, Other important and popularly used formatting features.				
1	4.	Inserting pictures and objects				
1		Outline: Inserting pictures and other objects in a document Inserting pictures Inserting				
		Tables Hyperlinks (within, across documents, from web) Creating tables AutoFormat				
		Optimal Column Width option				
	5.	Viewing and printing a text document				
		Outline: Viewing and printing a text document Viewing Documents Printing Documents				
		Print Layout, Web Layout, Zoom factor, View layout. Page Preview bar Printer functions				
		Quick Printing Print in ,reverse page order				
	6.	Using search replace auto correct				
		Outline: Using search replace auto correct Find, Search, replace for select text Auto-correct				
		feature Spell check Language Settings				
	7.	Typing in local languages				
		Outline: Typing in local languages Using SCIM to type in Indian languages Bilingual				
		typing				
	8.	Using track changes				

		Outline: Using track changes as a peer review / collaborative constructivist tool, accepting
		and rejecting changes How to use record changes to peer review documents, accept/reject
		these
	9.	Headers Footers and notes
		Outline: Headers, Footers and notes, Page format – header footer, how these can change
		within the same document (first page without header footers). Useful footer information
		(page number title) Insert Footnotes and endnotes Insert/Remove Header and Footer
	10	. Creating newsletter
	10	Outline: Creating newsletter Advanced use as a deskton tool to create a note with multiple
		columns use features like word count Spell check create newsletters in Libre Office Writer
		and few operations that can be performed on them
		and lew operations that can be performed on them.
	Libre	office suite Draw
	1.	Promo of LibreOffice Suite
		Outline: - LibreOffice promo - Features of LibreOffice - Uses of LibreOffice - LibreOffice
		formats - LibreOffice tutorials in Spoken Tutorial - Applications of LibreOffice.
	2.	Introduction
		Outline: Introduction to LibreOffice Draw LibreOffice Draw Create and save an Impress
		Draw file LibreOffice Draw Workspace Graphics - Bitmap or raster image - Vector
		graphics.
	3.	Create simple drawings
		Outline: Create simple drawings Basic shapes (lines, arrows, rectangles and squares, circles)
		(How to improve upon a water cycle diagram by adding shapes and so on.) Geometric
		shapes
	4.	Basics of working with objects
		Outline: Basics of working with objects Cut, copy, paste objects Resize objects dynamically
		using handles Object Arrangement Adding a new page to a file Group and ungroup objects
	5.	Fill objects with color
		Outline: Fill objects with color, gradients, hatching and bitmaps Making outlines invisible
		Adding a shadow to the objects Creating new colors How to import a bitmap into Draw.
2	6.	Insert text in drawings
		Outline: Insert text in drawings Insert text directly inside an object Changing the text color
		Working with text boxes and formatting text in objects Making the line wider.
	7.	Common editing and print functions
		Outline: Common editing and print functions Set the draw page for page size and margins
		Paper size, page count, page numbers, date, and time Undo and redo actions Rename a page
		Print.
	8.	Polygons and Curves
		Outline: Curves and Polygons Various types of Polygons Draw directions using arrows
		Flow charts Insert tables and graphs Page Margins and Orientation Font Type and Size
		modification
	9.	Edit Curves and Polygons
		Outline: Use the Edit Points toolbar Insert new points Move existing points Using control
		lines to change the shape of the objects Group the objects together
	10	Flow Charts Connectors Glue Points
	10	Outline: Draw Flowcharts To Draw Beizer curve Incert text in flow charts Various text
		insertion options Resizing shape to fit text width. Word wron toxt in shape What is
		Flowebart
1	1	1 to wonart.

11. Working with Objects
Outline: What are Grids? What are Guides? What are Snap Lines? Position objects with
grids, guides and snap lines Resize objects exactly and duplicate objects Distribute objects.
12. Import and Export Images
Outline: Import images into a Draw page *as a link * as an embedded image Edit Links
Remove links Automatic embedding of images Delete the picture Export the whole Draw
file or one or one page of the Draw file Export to a PDF, HTML, JPEG or a bitmap file,
Edit Raster images using the Format Picture tool
13. Basics of Layers Password Encryption PDF
Outline: Basics-of-Layers-Password-Encryption-PDF Layers -Layout -Controls -
Dimensions
14. Working with 3D objects
Outline: Enable the grids and the guide lines How to create 3D objects Extrusion(Creating
3D objects, using 2D objects) 3D Toolbar 3D Rotation Object Typing text in 3D objects
using Text tool, Ready-made 3D shapes.
15. Set Draw preferences
Outline: Learn how to set the following preferences: **Properties **Create versions
**View in color/grayscale/black-and-white Setting Title, Subject, Keywords and Comments
of a file.
STAR STAR

Coordinator,

Curriculum Development,

Department of Instrumentation

I/C, Curriculum Development Cell

Principal

Head of Department

Department of Instrumentation

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