SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

B. Tech. Year II Semester – 3

Subject Name: Calibration & Testing **Subject Code: BTIC18114**

Type of course: Trans-disciplinary Open Elective (TOE)

Prerequisite (if any) : Desire to know the calibration and testing procedure, Fundamental laws of physics

List of Courses where this course will be prerequisite : In lab exercise, where you need to plan an experiment with any measuring instruments.

Rationale: (should also include Description of the relevance of this course in the Program)

Calibration is important because it helps ensure accurate measurements, and accurate measurements are foundational to the quality, safety and innovation of most products and services we use and rely on every day. calibration improves assurance of precise measurements required in research, development, and innovation, as well as the production of millions of products and services worldwide. This subject will help students to understand the standardization and traceability process adapted for measurement systems.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
2	0	0	0	60	25	15	-	-	100

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

BSC: basic science course /ESC: Engineering Science Course /HSM: Humanities and management /PCC: Professional Core course /PEC: professional Elective course /OEC: Open Elective course/ MD: mandatory non-credit course

Content:

Sr. No.	Content	Total Hrs.	Module Weightage
1	Introduction: Types of instruments: Indicating, Recording, Integrating, etc. Performance criteria of instruments: Static characteristics & Dynamic characteristics Testing of instruments	**8**	**27 %**
2	Measurement Instruments Analog meters, Digital meters, Oscilloscope, Function generators, Temperature simulators, Pressure measuring devices, etc.	**06**	**20 %**
3	Calibration & Traceability Definition of calibration, Why calibration, Benefits of calibration, Conditions subjected to calibration, Hierarchy of calibration, Importance of calibration, Classification of calibration, Set up for calibration, Practical example on calibration	**10**	**33 %**
4	Problem solving sessions with practical examples	**6**	**20 %**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**30**	**10**	**10**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr no	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Introduction to Instrumentation and Control	A. K. Ghosh	Prentice Hall ISBN 978-8120346253	2012	*4th Edition*
2	Calibration: A Technician's Guide		ISA	2018	1st Edition
3	Student reference manual for Electronic Instrumentation Laboratories	Wolf & Smith	Pearson ISBN 978-0138557768	1989	1st Edition
4	Electrical Measurement and Calibration: Fundamentals and Applications	Lawrence Thompson	ISA ISBN 978-1556174933	1994	2nd Revised edition

Course Outcomes: When completed this course, students will be able to:

Sr. No.		Marks % weightage
CO-1	differentiate between working instruments and calibration instruments	30
CO-2	evaluate the use of particular instruments for common measurement application and experimental research work	30

CO-3	understand the testing and calibration methods required to establish the traceability with national / international standards	40

Mapping with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	1			1	2	3	1		2	3	3	3	1	1
CO-2	3	1	1	1	1					2	3	3	2	1	1
CO-3	2	2	2	1	1	1	1	1	1	2	2	2	3	1	1
Rationale*															

Rationale* : The CO-PO-PSO mapping suggest that the students who opt this course will develop a skill of use of instruments for specific applications.and also understand the importance of calibration and testing in a day-to-day life too.

List of Open learning website:

https://as.flukecal.com/calibrator
https://instrumentationtools.com/instrument-calibration-lab-exercise/
http://www.iceweb.com.au/Test&Calibration/Test%20and%20Calibration.htm
http://sl-coep.vlabs.ac.in/

List of Open Source Software: - Nil

FOR LAB / PRACTICE SESSIONS:

List of Experiments / Exercise:

.1. Calibration and testing of sensors

2. Calibration and testing of measuring instruments

3. Study of standard measuring instrument for temperature instruments

4. Study of standard measuring instrument for pressure instruments

5. Study of standard measuring instruments fro voltage, current and other electrical parameters

6. Study of traceability of standard instruments to national standards through certification

7. History card for various test and calibrating instruments

Major Equipment Needed:

Dead weight Tester, Temperature bath, Universal calibrator, etc.