

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**CIRCULAR NO.SU./B.Sc.CBC & GS/11/2022**

It is hereby inform to all concerned that, on the recommendation of Faculty of Science & Technology Meeting dated 24.08.2022, **the Academic Council at its meeting held on 29 August 2022 has accepted the following Syllabi of B.Sc. Degree under the Choice Based Credit & Grading System along with Rules and Regulation** as appended herewith:-

1.	B.Sc.Computer Science (Optional)	Ist and IInd semester
2.	B.Sc.Computer Application (Optional)	Ist and IInd semester
3.	B.Sc.Computer Application (Degree)	Ist and IInd semester
4.	B.Sc.Computer Science (Degree)	Ist and IInd semester
5.	B.Sc.Horticulture (Optional)	Ist to VIth semester
6.	B.Sc.Botany (Optional)	Ist to VIth semester
7.	B.Sc. Agrochemical & fertilizer (Optional)	Ist to VIth semester
8.	B.Sc.Home Science (Optional)	Ist and IInd semester
9.	B.Sc.Automobile Technology (Degree)	Ist and IInd semester
10.	B.Sc.Workshop Technology (Degree)	Ist and IInd semester
11.	B.Sc.Refrigeration and Air Conditioning (Degree)	Ist and IInd semester
12.	B.Sc.Environmental Science (Optional)	Ist and IInd semester
13.	B.Sc.Biotechnology (Degree)	Ist and IInd semester
14.	B.Sc.Biotechnology (Optional)	Ist and IInd semester
15.	B.Sc.Dairy Sci.& Tech (Optional)	Ist and IInd semester
16.	B.Sc.Zoology (Optional)	Ist to VIth semester
17.	B.Sc.Polymer Chemistry (Optional)	Ist and IInd semester
18.	B.Sc.Fisheries Science (Optional)	Ist and IInd semester
19.	B.Sc.Instrumentation Practice (Optional)	Ist semester
20.	B.Sc.Biochemistry (Optional)	Ist and IInd semester
21.	B.Sc.Non Conventional & Conventional Energy (Degree)	Ist and IInd semester

This is effective from the Academic Year 2022-23 and onwards.

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.

Ref.No. SU/B.Sc./2022/ 8428-35

Date:-29.08.2022.

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[Signature]
**Deputy Registrar,
Academic Section**

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Copy forwarded with compliments to :-

- 1] **The Principal, concerned affiliated College,**
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 2] **The Director, University Network & Information Centre, UNIC, with a
request to upload this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation,
- 2] The Section Officer,[B.Sc.Unit] Examination Branch,
- 3] The Programmer [Computer Unit-1] Examinations,
- 4] The Programmer [Computer Unit-2] Examinations,
- 5] The In-charge, [E-Suvidha Kendra],
Rajarshi Shahu Maharaj Examination Branch,
- 6] The Public Relation Officer,
- 7] The Record Keeper,

JS*29082022/-

Dr. Babasaheb Ambedkar Marathwada University
Aurangabad



Instrumentation Practice

Choice Based Credit System

B. Sc. F. Y.

Effective From

Academic Year 2022-2023

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad


Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

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B. Sc. First Year Instrumentation Practice Syllabus

Choice Based Credit System Syllabus To be implemented from Academic Year 2022-2023

Title of the Course: B.Sc. (Instrumentation Practice)

Preamble:

The curriculum for the B. Sc. (Instrumentation Practice) programme is designed to cater to the requirement of Choice Based Credit System following the University Grants Commission (UGC) guidelines. In the proposed structure, due consideration is given to Core and Elective Courses (Discipline specific Instrumentation Practice), along with Ability Enhancement (Compulsory and Skill based) Courses Furthermore, continuous assessment is an integral part of the CBCS, which will facilitate systematic and thorough learning towards better understanding of the subject. The systematic and planned curricula from first year to the third year (comprised of six semesters) shall motivate the student for pursuing higher studies in Instrumentation Practice and inculcate enough skills for becoming an entrepreneur.

Objectives:

- To foster scientific attitude, provide in-depth knowledge of scientific and technological concepts of Instrumentation Practice.
- To enrich knowledge through problem solving, minor/major projects, seminars, tutorials, review of research articles/papers, participation in scientific events, study visits, etc.
- To familiarize with recent scientific and technological developments
- To create foundation for research and development in Instrumentation and Instrumentation Practice.
- To help students to learn various experimental and computational tools thereby developing analytical abilities to address real world problems.
- To train students in skills related to research, education, industry, and market.
- To help students to build-up a progressive and successful career in Instrumentation Practice.

Dr. Jyoti A. Pawar
Head of Department
Department of Science & Technology
University of Mumbai

Structure and curriculum for Bachelor of Science (B.Sc.) with Instrumentation Practice as one of the optional Subject

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum

For

Faculty of Science and Technology

Course Structure and Scheme of Examination

Table 1 to 2

-B.Sc. Three Year Undergraduate Degree Program

Semester I

	Course Code	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1A) Core Courses	IP-111	Core Course (Theory Paper-I) Basics of Instrumentation- I	45(3/week)	2	50	10	40	20
	IP -112	Core Course (Theory Paper-II) Basics of Instrumentation- II	45(3/week)	2	50	10	40	20
	IP -121	Lab course 1 (based on IP-111 and IP-112) Practical Paper – I	45(3/week)	1.5	50	10	40	20
Ability Enhancement compulsory courses (AECC-1)	XXX-131	Communication skills in English-I	45(5/week)	3	50	10	40	20
	XXX-132	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-I)	45(4/week)	3	50	10	40	20
			225	11.5	250	50	200	100

Total Credits for Semester I : 11.5 (Theory : 10 ; Laboratory : 1.5)


 5/29/22
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Semester II								
	Course Code	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1B) Core Courses	IP-211	Core Course (Theory Paper-III) Semiconductor Devices & Linear Integrated devices	45(3/week)	2	50	10	40	20
	IP-212	Core Course (Theory Paper-IV) Electronic Measurements & Instrumentation	45(3/week)	2	50	10	40	20
	IP-221	Lab course 2 (based on IP-211 and IP-212) Practical Paper – II	45(3/week)	1.5	50	10	40	20
Ability Enhancement compulsory courses (AECC-2)	XXX-231	Communication skills in English-II	45(5/week)	3	50	10	40	20
	XXX-232	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-II)	45(4/week)	3	50	10	40	20
Non-Credit Course /additional credits	XXX-213	Constitution of India	45(3/week)	2 *				
Non-Credit Course /additional credits	XXX-214	Compulsory Computer Course	45(3/week)	2*				
			225	11.5	250	50	200	100
Total Credits for Semester II : 11.5 (Theory : 10 ; Laboratory : 1.5								


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Structure of the Course:

Subject Name	Year	Semester	Course Type	Course Code	Course Name	Credits
Instrumentation Practice	I	I	Compulsory Course	IP 111	Basics of Instrumentation- I	2
				IP 112	Basics of Instrumentation- II	2
				IP 121	Practical Paper – I	1.5
		II	Compulsory Course	IP 211	Semiconductor Devices & Linear Integrated devices	2
				IP 212	Electronic Measurements & Instrumentation	2
				IP 221	Practical Paper – II	1.5

B.Sc. First Year (Instrumentation Practice)

Semester I

Paper I:- Basics of Instrumentation- I (IP- 111)

Periods (45)

Marks :50

1. Atoms and Charges

Periods (12)

Introduction, structure of Elements (The Electron, Energy of electron, valance electron, free electrons), conductors and Insulators, electric Current, electric voltage and voltage sources (Dc Source, AC source, Constant voltage source, constant current source)

2. Ohm's law:

Periods(9)

Introduction, Ohm's law, resistors, colour coding of resistors, types of fixed resistors, variable resistors, combination of resistors, series resistances, parallel resistances.

3. Kirchhoff's Laws:

Periods (12)

Introduction, Kirchhoff's voltage law, Loops, Loop current's sign conventions, Kirchhoff's voltage law in action, Kirchhoff's current law, Nodes, Kirchhoff current law in action.

4. Magnetism and Transformers:

Periods (12)

What is a magnet, producing magnetism with electricity, producing electricity with magnetism, Coefficient of coupling, Transformer action, centre tap.

Reference Book: 1. Basic Electricity and Electronics: Delton T. Horn, McGrawHill

2. Principles of Electronics: V.K. Mehta and Rohit mehta, Publication : S. Chand

Semester I

Paper II:- Basics of Instrumentation- II (IP- 112)

Periods (45)

Marks :50

1. Introduction to Electronic Instrumentation and Measurement: Periods (10)

Introduction, Scientific notations, Physical Units, Physical Constants, Average, Integrated Root Mean Square, Integrated Root Sum Squares.

2. Logarithmic Representations: Periods (10)

Decibels, Adding it all up, converting between dB notation and gain notation, special dB scales, converting dBm to voltage.

3. Basic Measurement Theory: Periods (12)

Introduction, Categories of measurements, Factors in making measurements, Errors, Validity, Reliability and Repeatability, Accuracy and Precision, Categories of Errors.

4. DC & AC Analog Deflection Meters: Periods (13)

The basic Analog dc meter, d-Arsonval meter movement, types of analog meters, Voltage measurement from dc current meters, The voltage sensitivity, Analog Multimeters, Thermocouple ac current meters, Rectifier based ac meters, Rectification, Rectifier circuits for ac meters, effects of waveform on meter readings, true rms reading, Rectifier Instruments.

Reference Books:

1. Elements of Electronic Instrumentation and Measurements Joseph J. Carr Pearson Education III edition.
2. A course in Electronic Measurements and Instrumentation Books By A K Sawhney Dhanpat Rai & Co

B.Sc. First Year (Instrumentation Practice)

Semester I

Every candidate appearing for examination must produce journal showing that he/she has completed at least 75% experiments during the semester. The journal must be certified at the end of the semester by head of the department.

Paper III:-Practical Paper – I (IP 121)

Marks: 50

1. Study of resistance using colour code and finding their values when they are in series and in parallel.
2. Study of Kirchhoff's voltage law.
3. Study of Kirchhoff's current law.
4. Study of capacitors in series and in parallel.
5. Study of Transformers.
6. Study of errors in measurements.
7. Study of DC and AC meters.
8. Characteristics of Rectifier Diode.
9. Characteristics of Zener Diode.
10. Characteristics of Varactor Diode.
11. Characteristics of Displays.
12. Study of analog and digital multimeters.

Semester II

Paper IV: Semiconductor Devices & Linear Integrated devices (IP-211)

Periods (45)

Marks: 50

1. Semiconductors:

Periods (12)

Introduction, Semiconductor, n-type semiconductor, p-type semiconductor, semiconductor diode(PN junction diode: Construction, working, & Characteristics), Zener diode(Zener diode: Construction, working, & Characteristics)

2. Transistors:

Periods (12)

NPN transistor, working of NPN transistor, PNP transistor, working of PNP & NPN transistor, Basic transistor amplifier configurations, Common Base Amplifier, Common Emitter Amplifier, Common Collector Amplifier, Alpha and Beta, relation between Alpha and Beta.

3. Light Emitting Diodes:

Periods (9)

Introduction, Three State LED, Multiple segment Displays, Bar Graphs, 7 Segment displays, flasher LEDs, LCDs.

4. Operational Amplifiers & Timers

Periods (12)

Integrated circuits, Operational Amplifiers, Inverting Amplifier, Non inverting Amplifier, Integrator, Differentiator, 555 Basics, Monostable multivibrator using 555, Astable multivibrator using 555.

Text Book:

1. Basic Electricity and Electronics: Delton T. Horn, McGraw Hill
2. OP- Amps and Linear Integrated Circuits, Gaikwad Ramakant A., Pearson Education

B.Sc. First Year (Instrumentation Practice)

Semester II

Paper V : Electronic Measurements & Instrumentation (IP 212)

Periods (45)

Marks: 50

1. Bridge Circuits:

Periods (12)

Fundamental Concept of Bridges Circuit, Types of Bridges, DC-Wheatstone Bridge (Construction, Working, & Usages, Balance state , Sensitivity, Thevenin Voltage & thevenin Resistance) Kelvin Bridge (Construction, Working, & Usages) Bridges in the Null condition, DC bridge applications, DC Null Indicators.

2. AC Bridges:

Periods (9)

Types of AC Bridges, Maxwell's Bridge, The Hay's Bridge, The Schering Bridge.

3. Electronic Multimeters:

Periods (12)

Basic Electronic multimeter, AC multimeters, Electronic Ohm-meters, Digital Voltmeters (RMS, True RMS, AC & DC)

4. The Oscilloscope:

Periods (12)

The Cathode Ray Oscilloscope, Cathode ray tubes, Deflection systems, The XY Oscilloscope, The YT Oscilloscope, Sensitivity, Bandwidth, Rise time, Horizontal sweep time, Dual Beam models.

Reference Books:

1. Elements of Electronic Instrumentation and Measurements Joseph J. Carr Pearson Education III edition.
2. Electronic Measurements & Instrumentation, Dr. R. S. Sedha, Publication : S. Chand

B.Sc. First Year (Instrumentation Practice)

Semester II

Every candidate appearing for examination must produce journal showing that he/she has completed at least 75% experiments during the semester. The journal must be certified at the end of the semester by head of the department.

Paper VI :-Practical Paper-III (IP-221)

Marks: 50

1. Study of Maxwell's bridge.
2. Study of Potentiometers.
3. Study of CRT.
4. Characteristics of NPN transistor.
5. Study of photovoltaic cell.
6. Study of Inverting amplifier using IC 741,
7. Measurement of AC and DC voltages using GR.O.
8. Study of whetstone's bridge.
9. Characteristics of PNP transistor.
10. Study of Frequency Response of Transistor Amplifiers
11. Measurement of frequencies using C.R.O.
12. Study of IC 555 as an astable multivibrator.