DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Sci./B.Sc. & M.Sc. Syll./5/2015

It is hereby notified for information to all the concerned that, on the recommendation of the Faculty of Science the Academic Council at its meeting held on 30-05-2015 has accepted the **revised semester-wise syllabi as mentioned against their names in the Faculty of Science as under** :-

Sr. No.	Name of the Subject	Semester
[1]	B.Sc. Computer Science Degree Course	III & IV
[2]	B.Sc. Information Technology Degree Course	III & IV
[3]	B.C.A. Science Degree Course	III & IV
[4]	B.Sc. Animation Degree Course	III & IV
[5]	B.Sc. Bioinformatics Degree Course	III & IV
[6]	B.Sc. Computer Science [Optional]	III & IV
[7]	B.Sc. Information Technology [Optional]	III & IV
[8]	B.Sc. Computer Applications [Optional]	III & IV
[9]	B.Sc. Computer Maintenance [Optional]	III & IV
[10]	B.Sc. Environmental Science [Optional]	V & VI
[11]	B.Sc. Bio-Chemistry [Optional]	V & VI
[12]	B.Sc. Forensic Science Degree Course	V & VI
[13]	B.Sc. Industrial Chemistry [Optional]	V & VI
[14]	B.Sc. Electronics [Optional]	V & VI
[15]	B.Sc. Zoology [Optional]	V & VI
[16]	B.Sc. Microbiology [Optional]	V & VI
[17]	B.Sc. Instrumentation Practice [Optional]	V & VI
[18]	B.Sc. Statistics [Optional]	V & VI
[19]	B.A. Statistics [Optional]	V & VI
[20]	B.A. / B.Sc. Mathematics [Optional]	V & VI
[21]	B.Sc. Home Science Degree Course	V & VI
[22]	B.Sc. Textile Interior Decoration Degree Course	V & VI
[23]	B.Sc. Fishery Science [Optional]	V & VI
[24]	B.Sc. Dairy Science & Technology [Optional]	V & VI
[25]	B.Sc. Botany [Optional]	V & VI
[26]	B.Sc. Physics [Optional]	V & VI
[27]	M.Sc. Computer Science	III & IV
[28]	M.Sc. I.T.	III & IV

This is effective from the Academic Year 2015-16 & onwards as appended herewith.

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

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/SU/SCI./
2015/3761-4160
Date:- 16-06-2015.

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Director,
Board of College and University Development.

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Copy forwarded with compliments to:-

1] The Principals, affiliated concerned colleges,
Dr. Babasaheb Ambedkar Marathwada University

Copy to :-

1] The Controller of Examinations,
2] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
3] The Superintendent, [B.Sc. Unit],
4] The Superintendent, [M.Sc. Unit],
5] The Programmer [Computer Unit-1] Examinations,
6] The Programmer [Computer Unit-2] Examinations,
7] The Record Keeper.

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S*/-160615/-

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

SYLLABUS

B.Sc. (Instrumentation Practice)
Third year (optional)
(Fifth And Sixth semester)

(Effective from June 2015)

Put before A.C. 7.5.15

Dr.Babasaheb Ambedkar Marathwada University,

Aurangabad

Syllabus

B.Sc.(Instrumentation Practice)

Third year

(Fifth And Sixth semester)

(Effective from june 2015)

Semester	Paper No.	Title of Paper	Periods	Marks
V	XV	Instrumentation-IX	45	50
V	XVI	Instrumentation-X	45	50
V	XVII	Practical-VII	45	50
V	XVIII	Practical-VIII	45	50
VI	XIX	Instrumentation-XI	45	50
VI	XX	Instrumentation-XII	45	50
VI	XXI	Practical-IX	45	50
VI	XXII	Practical-X	45	50

Note :

Scheme of practical examination

Student should perform ONE experiment from paper- XVII + paper-XXI and SECOND experiment from paper XVIII + paper XXII in the final practical examination at the end of the sixth semester.

B.Sc Third Year (Instrumentation Practice)
Semester V
Paper XV :- Instrumentation IX

Total Periods 45

1. Oscillators :- (Periods 12)

Sinusoidal oscillators, types of sinusoidal oscillations, Oscillatory circuit, essentials of transistor oscillator, Tuned collector oscillator, Colpitt's oscillator, Hartley oscillator, Phase shift oscillator, weinbridge oscillator.

2. Multivibrators :- (Periods 11)

Multivibrator, transistorized astable multivibrator, transistorized monostable multivibrator, transistorized bistable multivibrator. Schmitt trigger.

3. Field effect transistors :- (Periods 11)

Junction field effect transistor (JFET), JFET as an amplifier, output characteristics of JFET, shorted- gate drain current(I_{DSS}), pinchoff voltage(V_P), Gate source cut off voltage [$V_{GS(off)}$],expression for drain current, JFET parameters, Metal oxide semiconductor FET (MOSFET), D- MOSFET.

4. Instrumentation Amplifiers :- (Periods 11)

Single stage transistor amplifier, Multistage transistor amplifier, RC coupled transistor amplifier, transformer coupled amplifier, direct amplifier, Power amplifier, classification of power amplifier.

Books Recommended

1. Principles of Electronics by V.K.Mehta.
2. Introduction to Electronics by K.J.M.Rao.

B.Sc Third Year (Instrumentation Practice)
Semester V
Paper XVI :- Instrumentation X

Total Periods 45

1.Instruments and their representation : (Periods 12)

Introduction. Typical applications of instrument systems, measurement of system parameters, control of certain process or operation, simulation of system conditions, verification of phenomena or scientific studies, functional elements of a measurement system, description of functional elements of instruments.

2.Transducers : (Periods 11)

Typical examples of transducer element, characteristics of transducer element, Bourdon tube pressure gauge, Bourdon pressure gauge with electrical readout, Electrodynamic displacement measuring instrument, types of instruments, deflection and null types, analog and digital types, self- generating and power-operated types, microprocessor based instrumentation, advantages and disadvantages of computer based instrumentation systems.

3.Static performance characteristics of measurements : (Periods 11)

Types of errors, systematic or cumulative errors, accidental or random errors, miscellaneous or gross type of errors, type of uncertainty, external estimate of uncertainty, internal estimate of uncertainty, accuracy, precision, accuracy versus precision, specification of instrument static characteristics, selection of the instruments.

4 Process control instrumentation : (Periods 11)

Introduction, pharmaceutical industries – measurement of water content, paper and textile industries - measurement of relative humidity, food processing industry - measurement of flow, acrospace industry – selection of sensors. Nuclear power industry – safety and security instrumentation.

Text Book :

1) Instrumentation Measurement and Analysis by B.C. Nakra and K.K.Chaudhary, Tata Mc Graw Hill, New Delhi.

2) Transducers and instrumentation by D.V.S.Murthy (second edition) PHI Learning private limited, New Delhi.

B.Sc Third Year (Instrumentation Practice)

Semester V

Paper XVII :- Practical Paper VII

Total Periods 45

A. Experiments **20 Marks**

1. Study of Hartley oscillator.
2. Study of weinbridge oscillator.
3. Study of transistorized astable multivibrator.
4. Study of transistorized monostable multivibrator.
5. Study of transistorized bistable multivibrator.
6. Study of colpitt's oscillator.

B. Project **20 Marks**

C. Industrial Visit **10 Marks**

Paper XVIII :- Practical Paper VIII

A. Experiments **20 Marks**

1. Study of photo characteristics diode.
2. Study of CE amplifier.
3. Study of phototransistor.
4. Study of thermocouple.
5. Study of thermister as temperature sensor.
6. Study of shift register.

B. Project **20 Marks**

C. Industrial Visit **10 Marks**

B.Sc Third Year (Instrumentation Practice)
Semester VI
Paper XIX :- Instrumentation XI
Total Periods 45

1. Medical Instrumentation :- **(12 Periods)**

Introduction, Man Instrumentation System, components of man Instrumentation System, general medical Instrumentation System, Operational modes, medical measurement constraints. Instrumental Characteristics.

2. Biomedical Recorders :- **(11 Periods)**

Electrocardiograph (ECG), block diagram of ECG, Electroencephalograph (EEG), block diagram of EEG, Electromyogram (EMG), Electrooculograph(EOG), Electroretinograph (ERG), Audiometers, Leakage Currents, Types of Leakage Currents.

3. Biological Stimulators and Controllers **(11 Periods)**

Electromyography, Electroneurography (ENG), Muscle and nerve stimulators, Transcutaneous Electrical Nerve Stimulation (TENS), Thermography, Heart-Lung machine, Pacemakers, Blood pumps.

4. LASER applications in biomedical Instruments (11 Periods)

LASER, principle of operation of laser, types of laser, pulsed ruby laser, helium neon laser, argon laser, co_2 laser, Applications of laser treatment, laser safety.

Books Recommended

1. Handbook of Biomedical Instrumentation by R.S.Khandpur, TMH New Delhi.
1. Biomedical Electronics & Instrumentation by Prof S.K.Venkata Ram.

B.Sc Third Year (Instrumentation Practice)
Semester VI
Paper XX :- Instrumentation XII

Total Periods 45

1. **Special Transducer Elements :** **(12 Periods)**

Analog transducers: Electromecanical transducers, Potentiometric resistance type transducer, Inductive type transducers, Capacitive type transducers, Ionisation transducers, Opto-electrical transducers, Photo-emissive transducers, Photo – conductive transducer, Photo- voltaic transducer, opto – electrical frequency domain transducer, vibratring string transducer, binary codes, digital encoders.

2. **Intermediate elements :** **(11 Periods)**

Amplifiers, mechanical amplifying element, optical amplifying element, electrical amplifying element, filters, A/D converters, D/A converters, data transmission elements, electrical type data transmission elements, position type data transmission elements, pneumatic type data transmission elements, radio frequency, transmission system.

3. **Indicating, Recording and Display elements : (11 Periods)**

Cathode ray oscilloscopes, galvanometric recorders, servo type potentiometric recorders, magnetic tape recorders, data acquisition systems, data display, data storage.

4. **Instrument calibration :** **(Periods 11)** Introduction, comparison methods, DC voltmeter calibration, deflection instrument calibration, ohmmeter calibration, wattmeter calibration, digital multimeters as standard instruments, DC ammeter calibration by potentiometer calibration method

Text Book :

1) Instrumentation Measurement and Analysis by B.C. Nakra and K.K. Chaudhary, Tata Mc Graw Hill, New Delhi.

2) Electronic Instrumentation and Measurements by David A.Bell. (second edition) PHI Learning private limited, New Delhi.

B.Sc Third Year (Instrumentation Practice)
Semester VI

Paper XXI :- Practical Paper IX

A. **Experiments** — **20 Marks**

1. Study of blood pressure measurement.
2. Study of the variation of oxygen contents of blood using oximeter.
3. Study of LVDT.
4. Measurement of divergence of laser beam.
5. Determining random sugar contents in blood using digital glucometer.
6. Study of Decade counter.

B. **Project** — **20 Marks**

C. **Industrial Visit** — **10 Marks**

Paper XXII :- Practical Paper X

A. **Experiments** — **20 Marks**

1. Calibration of D.C. Voltmeter.
2. Calibration of D.C. Ammeter.
3. Calibration of Potentiometer.
4. Calibration of A.C. Ammeter.
5. Calibration of Ohmmeter.
6. Calibration of A.C. Voltmeter.

B. **Project** — **20 Marks**

C. **Industrial Visit** — **10 Marks**