

S-08th July, 2014 AC after Circulars from Circular No.84 & onwards

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**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**

**CIRCULAR NO.ACAD/SU/Sci./B.Sc.Instru. Manuf.Proc./Syll./88/2014**

It is hereby informed to all concerned that, on the recommendations of the concerned Board of Studies & Dean, Faculty of Science, the Hon'ble Vice-Chancellor has accepted the *"Syllabus of B.Sc. Instrumentation Practice, Second Year, IIIrd & IVth Semester and B.Sc. Manufacturing Process, Third Year, Vth & VIth Semester under the Faculty of Science"* on behalf of the Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994 as appended herewith.

This is effective from the **Academic Year-2014-2015** and onwards.

All concerned are requested to note the contents of this 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./B.SC./  
2014/14672-81

Date:- 31-07-2014.

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**Director,**  
**Board of College and**  
**University Development.**

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S-08th July, 2014 AC after Circulars from Circular No.84 & onwards

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**Copy forwarded with compliments to :-**

- 1] The Principals, affiliated concerned Colleges,  
Dr. Babasaheb Ambedkar Marathwada University.
- 2] The Director, University Network & Information Centre, UNIC, with  
**a request to upload the above Syllabus on University Website.**

**Copy to :-**

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

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**Dr. Babasaheb Ambedkar**  
**Marathwada University,**  
**Aurangabad**

**Syllabus**  
**B.Sc. ( Instrumentation Practice )**  
**Second Year**  
**( Third and Forth Semester )**

**( Effective from June 2014 )**

**Dr. Babasaheb Ambedkar Marathwada University,**

**Syllabus**

**B.Sc. ( Instrumentation Practice)**

**Second Year**

**( Third and Forth Semester )**

**( Effective from June 2014 )**

Semester	Paper No.	Title of Paper	Periods	Marks
III	VII	Instrumentation -V	45	50
III	VIII	Instrumentation –VI	45	50
III	IX	Practical - III	45	50
III	X	Practical – IV	45	50
IV	XI	Instrumentation –VII	45	50
IV	XII	Instrumentation –VIII	45	50
IV	XIII	Practical – V	45	50
IV	XIV	Practical - VI	45	50

**Note :**

**Scheme of Practical Examination**

**Student should perform ONE experiment from Paper – III + V & Paper- IV + VI in the final practical examination at the end of the fourth semester.**

## **B.Sc. Second Year ( Instrumentation Practice) Semester III**

### **Paper VII :- Instrumentation V**

**Total Periods 45**

- 1. Digital Number Systems (Periods 12)**  
Decimal number system, Binary number system, Decimal- Binary, Binary-Decimal conversions, Octal number system, Hexadecimal number system, Decimal- Octal , Octal-Decimal conversions, Hexadecimal- Decimal, Decimal- Hexadecimal conversions, Binary- Octal, Octal-Binary conversions.
- 2. Binary codes and digital arithmetic (Periods 11)**  
BCD code, BCD- Binary , Binary-BCD conversions, Excess-3 code, Decimal-Excess-3 conversion, Gray code, Binary-Gray, Gray- Binary conversions, Binary addition, subtraction, multiplication, division, one's and two's compliment, addition and subtraction using two's complement.
- 3. Boolean Algebra and Logic Gate Operation (Periods 11)**  
The AND gate, OR gate, NOT gate, NAND gate, NOR gate, Ex-OR gate, Ex-NOR gate, Boolean algebra laws and rules, simplification of combinational logic circuits, De Morgan's theorems, Karnaugh mapping.
- 4. Arithmetic Circuits (Periods 11)**  
Half Adder, Full Adder, Half Subtractor, Full Subtractor, 4-bit binary adder, Excess-3 adder, 4-bit binary Subtractor.

#### **Text Books :**

1. Digital Electronics :- Anil K. Maini , Wiley India Pvt.Ltd.
2. Digital and Microprocessor fundamentals :- William Kleitz, Prentice Hall Internationals.

## **B.Sc. Second Year ( Instrumentation Practice) Semester III**

### **Paper VIII :- Instrumentation VI**

**Total Periods 45**

#### **1. Introduction to Op-Amp (Periods 12)**

Inverting and noninverting amplifier, OP-Amp parameters, Op-Amp symbol, Op-Amp transfer characteristics, equivalent circuit of Op-Amp, Ideal operational amplifier, Voltage follower, differential input – differential output amplifier, Bridge amplifier, Reference Voltage Sources, Charge amplifier.

#### **2. Op-Amp Application (Periods 11)**

Summing amplifier, Difference amplifier, Instrumentation Amplifier, Transducer bridge Amplifier. Half wave and full wave Rectifier, Log and Antilog Amplifiers. D. C. Sources, Current Amplifier, A. C. Amplifier.

#### **3. Voltage regulators (Periods 11)**

Parameters of voltage regulators, Basic configuration of voltage regulators, Basic block diagram of linear voltage regulator.  
Study of LM 105, LM 723, LM7805, LM 7905, LM 317

#### **4. Active Filters (Periods 11)**

Ideal and Realistic frequency response, various filter responses, Basic low pass and high pass filters, Second order low pass filter, Second order high pass filter, the Bequad filter.

#### **Books-**

1. Integrated circuits by K. R. Botkar (Khanna Publications)
2. Analog Electronics by L. K. Maheshwari , M.M.C.Anand  
P H I India

## **B.Sc. Second Year ( Instrumentation Practice) Semester III**

### **Paper IX :- Practical Paper III**

1. Study of Inverting Amplifier
2. Study of Noninverting Amplifier
3. Study of Offset null arrangement
4. Study of Load and Line Regulation of IC 7805
5. Study of Load and Line Regulation of IC LM317
6. Study of Astable Multivibrator using timer IC 555
7. Study of Instrumentation Amplifier

### **Paper X :- Practical Paper IV**

1. Study of Full Adder
2. Study of Digital Basic Gates
3. Study of NAND gate as universal building block
4. Study of De Morgan's theorem
5. Study of Decoder (3 : 8)
6. Study of Multiplexer
7. Study of J-K Flip flop

## **B.Sc. Second Year ( Instrumentation Practice)**

### **Semester IV**

#### **Paper XI :- Instrumentation VII**

**Total Periods 45**

- 1. Data Control Devices (Periods 12)**  
Comparators, Decoders, Encoders, Multiplexers, Demultiplexers
- 2. Flip-flops and Sequential Logic (Periods 11)**  
R S Flip flops, R-S Flip flop with active low inputs, R-S Flip flop with active high inputs, D Latch, D Flip flop, J-K Flip flop, Flip flop timing parameters, three stage buffers, Octal latches, Transceivers.
- 3. Counter Circuits and Shift Registers (Periods 11)**  
Ripple ( Asynchronous ) counter, Synchronous counter, modulus of a counter, Divide by n counter, Binary ripple counter, Decade counter, BCD counter, Shift register, serial in serial out shift register, serial in parallel out shift register, parallel in serial out, parallel in parallel out shift register, ring shift counter.
- 4. Interfacing to analog world: (Periods 11)**  
Digital to analog representations, Binary weighted D/A converter, R-2R Ladder D/A converter, parallel encoded A/D converter, counter type A/D converter, Successive approximation A/D converter, Data acquisition system.

#### **Text Books :**

1. Digital Electronics :- Anil K. Maini , Wiley India Pvt.Ltd.
2. Digital and Microprocessor fundamentals :- William Kleitz, Prentice Hall Internationals.



## **B.Sc. Second Year ( Instrumentation Practice) Semester IV**

### **Paper XII :- Instrumentation VIII**

**Total Periods 45**

#### **1. Signal generators:- (Periods 12)**

Ramp generators using IC 555 in monostable mode, free running ramp generators, missing pulse detectors, timer/ counter circuits.

Study of XR-2240 timer/counter, XR-2242 timer/counter, Triangular waves generators, Basic Triangular waves generators, Voltage controlled Triangular/square waves generators, Triangular to sine wave conversion.

#### **2. Study of IC (Periods 11)**

Study of IC-566 VCO, Study of IC- 8038 function generator, Study of XR-2206 function generator, Voltage to frequency and frequency to voltage converter.

#### **3. Study of LED :- (Periods 11)**

LCD display, Various display formats, display characteristics, addressing techniques, construction of LED display, direct drive circuits for LED display, multiplexed drive circuits for LED display, Alphanumeric LED display

#### **4. Study of LCD:- (Periods 11)**

Liquid crystal display (LCD), Liquid crystal, LCD modes of operation, principle of operation of twisted nematic LCD (TN-LCD)

Books-

1. Integrated circuits by K. R. Botkar (Khanna Publications)

## **B.Sc. Second Year ( Instrumentation Practice) Semester IV**

### **Paper XIII :- Practical Paper V**

- 1 Study of Load and Line regulation of IC 7905
2. Study of Monostable Multivibrator using timer IC 555
3. Study of V.C.O. IC 566
4. Study of Function Generator IC 2206
5. Study of Function Generator IC 8038
6. Study of Op-Amp as summing amplifier
7. Study of Op-Amp as difference amplifier

### **Paper XIV :- Practical Paper VI**

1. Study of Full Subtractor
2. Study of De multiplexer
3. Study of NOR gate as universal building block
4. Study of DFF and TFF
5. Study of 4-Bit asynchronous counter
6. Study of study of mod-8 counter
7. Study of Study of 8-bit A/D converter
8. Study of 8-bit D/A converter

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