DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

SYLLABUS

B.Sc. FIRST & SECOND SEMESTER

[ELECTRONICS (OPTIONAL)]

{Effective from – June- 2009 onwards}

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B.Sc. Electronics (Optional) Course Structure in Semester System

B.Sc. First Year

Semester	Course Code	Paper Number	Title of Paper	Credits	Marks
I	ELE-101	Paper-I	SEMICONDUCTOR DEVICES	03	50
	ELE-102	Paper-II	DIGITAL ELECTRONICS – I	03	50
	ELE-103	Paper-III	Practicals on Paper –I	1.5	50
	ELE-104	Paper-IV	Practicals on Paper –II	1.5	50
II	ELE-201	Paper-V	AMPLIFIERS	03	50
	ELE-202	Paper-VI	DIGITAL ELECTRONICS – II	03	50
	ELE-203	Paper-VII	Practicals on Paper –V	1.5	50
	ELE-204	Paper-VIII	Practicals on Paper –VI	1.5	50

B.Sc. Second Year

Semester	Course Code	Paper Number	Title of Paper	Credits	Marks
III	ELE-301	Paper-IX	To be Decided	03	50
	ELE-302	Paper-X	To be Decided	03	50
	ELE-303	Paper-XI	Practicals on Paper –IX	1.5	50
	ELE-304	Paper-XII	Practicals on Paper –X	1.5	50
IV	ELE-401	Paper- XIII	To be Decided	03	50
	ELE-402	Paper-XIV	To be Decided	03	50
	ELE-403	Paper-XV	Practicals on Paper – XIII	1.5	50
	ELE-404	Paper-XVI	Practicals on Paper – XIV	1.5	50

B.Sc. Third Year

Semester	Course Code	Paper Number	Title of Paper	Credits	Marks
V	ELE-501	Paper-XVII	To be Decided	03	50
	ELE-502A OR ELE-502B	Paper-XVIII (A) OR (B)	To be Decided	03	50
	ELE-503	Paper- XIX	Practicals on Paper – XVII	1.5	50
	ELE-504	Paper-XX	Practicals on Paper – XVIII	1.5	50
VI	ELE-601	Paper-XXI	To be Decided	03	50
	ELE-602A OR ELE-602B	Paper-XXII (A) OR (B)	To be Decided	03	50
	ELE-603	Paper-XXIII	Practicals on Paper – XXI	1.5	50
	ELE-604	Paper-XXIV	Practicals on Paper – XXII	1.5	50

Note: For Theory Paper, 1 Credit = 15 Periods; For Practical Paper, 1 Credit = 30 Periods

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. First Semester
Subject: ELECTRONICS
Course: ELE-101 Paper – I
(Effective from June 2009)

Title: Semiconductor Devices

Marks: 50 **Periods: 45** **Credits: 03**

1. **Diodes :** **(09) [0.6 credits]**
   P-N junction Diode, Biasing a semiconductor diode, breakdown of PN junction, ideal diode, Diode approximations, Types of diodes (Zener Diode, Photo Diode, Light Emitting Diode [LED], Varactor Diode, Tunnel Diode)
2. **Power supplies:** **(15) [1.0 credits]**
   Half wave rectifier, efficiency of HWR, Full wave rectifier, Full wave Bridge rectifier, efficiency of FWR, ripple factor, types of filter circuits (Capacitor Filter, Pi [π] Filter), Zener diode voltage regulator, transistor series voltage regulator, fixed positive linear regulators, fixed negative linear voltage regulators
3. **Transistors:** **(09) [0.6 credits]**
   Transistor, transistor action, transistor symbols, characteristics of common base, common emitter, Junction field effect transistor (JFET), static characteristics of JFET, transfer characteristics of JFET, small signal JFET parameters, MOSFET
4. **Transistor biasing techniques :** **(12) [0.8 credits]**
   Location of Q-point for transistor, Variation of the bias current, Fixed bias, Emitter feedback bias, Voltage feedback bias, Bias for emitter follower, Bias for the FET

Books Recommended:

1. Semiconductor Electronics – A K Sharma, New age international 1996(Chap.1)
2. Principle of Electronics – V K Mehta, (S. Chand and Co. 2004) (Chap. 2& 3)
3. Electronics Fundamentals and Applications – J.D.Ryder , 5th ed. (Chp.4)

Dr. Babasaheb Ambedkar Marathwada University Aurangabad.

B. Sc. First Semester
Subject: ELECTRONICS
Course: ELE-102 Paper II

(Effective from June 2009)

Title: DIGITAL ELECTRONICS **-I**

Marks: 50 **Periods: 45** **Credits: 03**

1. Number System: **(15)** [**1 credits**]

Number System: Decimal, Binary, Hexadecimal Number Systems and their inter conversions , Binary arithmetic (addition, subtraction, multiplication and division), 1's and 2's compliment method for binary subtraction, Hexadecimal addition and subtraction, 8421 (BCD) code, Gray code, Excess-3 code, BCD addition and subtraction

2. Logic gates: **(09)** [**0.6credits**]

Logic Gates (NOT gate, AND gate, OR gate, NAND gate, NOR gate) using diodes & transistors, Gate propagation delay time, Power dissipation, Loading considerations

3. Boolean algebra: **(09)** [**0.6 credits**]

Boolean Operations, Rules and laws of Boolean algebra, DeMorgan's theorems, minterms, maxterms, SOP and POS form of Boolean expressions, Simplification of Boolean Expressions, Karnaugh map [K-map] (up to four variables only)

4. Combinational logic circuits: **(12)** [**0.8 credits**]

AND-OR logic, AND-OR-NOT logic, Ex-OR gate, Ex-NOR gate, NAND and NOR gate as universal building blocks, Half adder, Full adder, Half subtractor, full subtractor, 4 bit parallel adder and subtractor, 2's complement adder /subtractor, 3 bit binary decoder, decimal to BCD encoder, 8 to 1 multiplexer, 1 to 8 demultiplexer

Books Recommended:

1. Digital Fundamentals – Thomas L Floyd, Universal Book Stall New Delhi
2. Digital Electronics and Microcomputers – R.K.Gaur
3. Digital Analog Techniques – Navneth, Kale and Gokhale, Kitab Mahal
4. Digital Electronics with Practical Approach – G N Shinde, Shivani Publications Nanded
5. Digital Principles and Circuits – C B Agarwal, Himalaya Publishing House

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. First Semester
Subject: ELECTRONICS
Course: ELE-103 **Paper – III** (Practicals) [**1.5 credits**]

(Effective from June 2009)

Every candidate appearing for examination must produce journal showing that he/she has completed 08 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments **(Marks 50)**

1. Study of PN junction diode characteristics, determination of ac and dc resistance
2. Study of zener diode characteristics, determination of V_Z, I_Z, Z_Z.
3. Study of transistor characteristics in CE configuration, determination of β.
4. Study of transistor characteristics in CB configuration, determination of α.
5. Study of JFET characteristics, determination of parameters.
6. Study of LED characteristics.
7. Built and study a half wave rectifier.
8. Built and study a Full wave rectifier.
9. Built and study a bridge rectifier.
10. Built and study a shunt capacitor filter.
11. Built and study a Pi filter.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. First Semester
Subject: ELECTRONICS
Course: ELE-104 **Paper – IV** (Practicals) [**1.5 credits**]

(Effective from June 2009)

Every candidate appearing for examination must produce journal showing that he/she has completed 08 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

Experiments **(Marks 50)**

1. Built and study a shunt regulator, line and load regulation.
2. Built and study a series regulator, line and load regulation.
3. Study of IC 78XX regulator, line and load regulation.
4. Study of IC 79XX regulator, line and load regulation.
5. Built and study NOT, OR, & AND gates using Diodes and Transistor.
6. Built and study NOT, OR, & AND gates using ICs 7404, 7432 and 7408.
7. Built and Study NAND & NOR gates using Diodes and Transistor.
8. Built and study NAND & NOR gates using ICs 7400 & 7402.
9. Built and study basic gates using NAND gates.
10. Built and study basic gates using NOR gates.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Second Semester
Subject : ELECTRONICS

Course: ELE-201 Paper - V

(Effective from June 2009)

Title: Amplifiers

Marks: 50 **Periods: 45** **Credits: 03**

1. **Small signal Amplifiers:** **(12) [0.8 credits]**
   Two port network analysis, Control sources, h-parameter equivalent circuit, Equivalent circuit for BJT, Transconductance model, CE amplifier , CB amplifier, emitter follower circuit, equivalent circuit for JFET, CS amplifier, source follower amplifier
2. **Feedback Amplifier:** **(12) [0.8 credits]**
   An amplifier black box with feedback, stabilization of gain by negative feedback, reduction of nonlinear distortion by negative feedback, , effect of feedback on output resistance, effect of feedback on input resistance, voltage series feedback, voltage shunt feedback, current series feedback.
3. **Multistage transistor amplifier:** **(09) [0.6 credits]**
   Multistage transistor amplifier, important terms, RC coupled transistor amplifier, transformer coupled amplifier, direct coupled amplifier, Differential amplifier
4. **Power Amplifiers:** **(12) [0.8 credits]**
   Small Signal and Large Signal Amplifiers, Output Power of Amplifier, Performance Quantities of Power Amplifiers, Classification of Power Amplifiers, Maximum Collector Efficiency of Series-Fed Class A Amplifier, Maximum Collector Efficiency of Transformer Coupled Class A Power Amplifier, Thermal Runaway, Heat Sink, Mathematical Analysis, Stages of a Practical Power Amplifier, Driver Stage, Output Stage, Push-Pull Amplifier, Distortion, Maximum Efficiency of Class B Power Amplifier

Books Recommended:

1. Electronics Fundamentals and Applications – J D Ryder, 5th ed. (Chap.1& 2)
2. Principle of Electronics – V K Mehta, (S. Chand and Co. 2004) (Chap.3 & 4)
3. Electronic Principles – A P Malvino, Second Edition, Tata McGraw-Hill Publishing CO. LTD.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Second Semester

Subject: ELECTRONICS

Course: ELE-202 Paper VI

(Effective from June 2009)

Title: DIGITAL ELECTRONICS **-II**

Marks: 50 **Periods: 45** **Credits: 03**

1. Flip-Flops: **(9 periods)** [**0.6 credits**]

SR flip flop (using gates), Edge triggered flip flops (SR, D, JK and T), Asynchronous inputs, Master slave JK flip flop, Operating characteristics

2. Counters: **(9 periods)** [**0.6 credits**]

Asynchronous Counters (three and four bit), Synchronous Counters (three and four bit), decade Counter (asynchronous and synchronous), Up/Down Synchronous Counter (three bit only)

3. Shift Registers: **(9 periods)** [**0.6 credits**]

Shift register functions, Serial In – Serial Out Shift Register, Serial In – Parallel Out Shift Register, Parallel In – Serial Out Shift Register, Parallel In – Parallel Out Shift Register, Bidirectional Shift Register, Ring Counter

4. Memories: **(9 periods)** [**0.6 credits**]

Memory Concept, Read Only Memory (RAM), Programmable ROMs (PROMs & EPROMs), Random Access (Read / Write) Memories (RAMs)

5. D/A and A/D converters: **(9 periods)** [**0.6 credits**]

R-2R Ladder type D/A converter, DAC Characteristics (Monotonicity, Resolution, Accuracy and Setting Time), Successive approximation A/D converter, Dual slope A/D converter, study of DAC0808 and ADC0801 chips

Books Recommended:

1. Digital Fundamentals – Thomas L Floyd, Universal Book Stall New Delhi
2. Digital Electronics and Microcomputers – R K Gaur
3. Digital Analog Techniques – Navneeth, Kale and Gokhale, Kitab Mahal
4. Digital Electronics with Practical Approach – G N Shinde, Shivani Publications Nanded
5. Digital Principles and Circuits – C B Agarwal, Himalaya Publishing House

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Second Semester
Subject: ELECTRONICS

Course: ELE-203 Paper – VII (Practicals) [1.5 credits]

(Effective from June 2009)

Every candidate appearing for examination must produce journal showing that he/she has completed 05 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

VII – A: Experiments (Marks 30)

1. Built and Study CE amplifier, frequency response and 3dB bandwidth.
2. Built and Study emitter follower amplifier, frequency response and 3dB bandwidth.
3. Built and Study Common Source (CS) FET amplifier, frequency response and 3dB bandwidth.
4. Built and Study Source Follower FET amplifier, frequency response and 3dB bandwidth.
5. Built and Study current series feedback amplifier, frequency response, 3dB bandwidth with and without feedback.
6. Built and Study voltage shunt feedback amplifier, frequency response, 3dB bandwidth with and without feedback.
7. Built and Study two-stage RC coupled CE amplifier, frequency response, 3dB bandwidth.
8. Built and Study Class-B Push-Pull amplifier.

VII – B: Project (Marks 20)

Every student should construct one project based on the syllabus of First and Second Semester. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B. Sc. Second Semester
Subject: ELECTRONICS

Course: ELE-204 **Paper – VIII** (Practicals) [**1.5 credits**]

(Effective from June 2009)

Every candidate appearing for examination must produce journal showing that he/she has completed 05 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

VIII – A: Experiments **(Marks 30)**

1. Study of Half adder & Half subtractor using gates.
2. Study of Full adder using gates.
3. Study of Full Subtractor using gates.
4. Study of JK, T and D- Flip-Flops using IC 7476.
5. Study of 4-bit binary parallel adder/subtractor using IC 7483.
6. Study of Asynchronous binary UP/ DOWN counter.
7. Study of Asynchronous binary decade UP/ DOWN counter.
8. Study of synchronous binary UP/ DOWN counter (MOD 08).
9. Study of D/A converter using R-2R ladder network.

VIII – B: Project **(Marks 20)**

Every student should construct one project based on the syllabus of First and Second Semester. He/she should submit the project and project report thereon at the time of practical examination. The project report must be certified at the end of the semester by The Head of the Department.