Dr.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

CIRCULAR NO.SU/B.Sc./CBC&GS /08/2023

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies and recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted the **following syllabi of Bachelor of Science with Practical Pattern of Question Paper under the scheme of Choice Based Credit & Grading System** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Courses	Semester
1.	**B.Sc.Electronics (Optional)**	**IIIrd & IVth semester**
2.	**B.Sc. Instrumentation Practice (Optional)**	**IIIrd & IVth semester**
3.	**B.Sc.Non Conventional and Conventional Energy (Degree)**	**IIIrd & IVth semester**

This is effective from the Academic Year 2023-24 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.SU/2023/ 4017-25
Date:-04.07.2023.

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Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

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, Dr.BAMU,A'bad.

2] The Section Officer,[B.Sc.Unit] Examination Branch,Dr.BAMU,A'bad.
3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.
6] The Public Relation Officer, Dr.BAMU,A'bad.
7] The Record Keeper, Dr.BAMU,A'bad.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,

AURANGABAD

Electronics (Optional) Syllabus

As per
Choice Based Credit & Grading System

B. Sc. S. Y.
Semester III & IV

Effective From
Academic Year 2023 - 2024

Dr. Babasaheb Ambedkar Marathwada University Aurangabad

Choice Based Credit System (CBCS)

For Faculty of Science and Technology

of **B.Sc. IInd year (III and IV semester) Electronics optional**

Course Structure, Curriculumand Scheme of Examination

Semester III								
	Course Code	**Course title**	**Teaching Time/Week**	**Credits**	**Scheme of Examination**			
					Max Marks	**CIA**	**UA**	**Min Marks**
Optional I (DSC-IC) Core Courses	ELE-311	Core Course(Theory Paper-V) Linear Integrated Circuits	2 hours	2	50	10	40	20
	ELE-312	Core Course(Theory Paper-VI) 8086 Microprocessor	2 hours	2	50	10	40	20
	ELE-321	Lab Course 3 (based on ELE-311)	3 hours	1.5	50	10	40	20
	ELE-322	Lab Course 4 (based on ELE-312)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-1)	XXX-313	SEC-1 Any one skill to be chosen out of two SEC-I (A),SEC-I (B) SEC-I(A): Electronics Power Supplies SEC-I (B):Electronic Instrument	2 hours	2	50	10	40	20
Ability Enhancement	XXX-331	Communication Skill in English-III	3 hours	3	50	10	40	20

compulsory courses (AECC-3)	XXX-332	Marathi/Hindi Urdu/Sanskrit A student can opt for any one of these languages (SL-III)	3 hours	3	50	10	40	20
Non-Credit Course	XXX-333	Computer Ability	2 hours	2*				
			18	15	350	70	280	140

Total credits for Semester III: 15 (Theory: 12 : Laboratory :3)

Semester IV								
	Course Code	**Course title**	**Teaching Time/Week**	**Credits**	**Scheme of Examination**			
					Max Marks	**CIA**	**UA**	**Min Marks**
Optional I (DSC-1D) Core Courses	ELE-411	Core Course (Theory Paper-VII) Communication Electronics	2 hours	2	50	10	40	20
	ELE-412	Core Course (Theory Paper-VI) 8086 Microprocessor Interfacing	2 hours	2	50	10	40	20
	ELE-421	Lab Course 4 (based on ELE-411)	3 hours	1.5	50	10	40	20
	ELE-422	Lab Course 5 (based on ELE-412)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-2)	XXX-413	SEC-2 Any one skill to be chosen out of two SEC-2 (C) ,SEC-2 (D) SEC-2C :Digital inverter SEC-2D :Electrical Motors	2 hours	2	50	10	40	20

Total credits for Semester IV : 15 (Theory: 12 : Laboratory :3)

Ability Enhancement compulsory courses (AECC-4)	XXX-331	Communication Skill in English-IV	3 hours	3	50	10	40	20
	XXX-332	Marathi/HindiUrdu/Sanskrit A student can opt for any one of these languages (SL-IV)	3 hours	3	50	10	40	20
Non-Credit Course	XXX-333	Environmental Science	2 hours	2*				
			18	15	350	70	280	140

Semester III

B. Sc. Semester III
Subject: ELECTRONICS
Course code ELE – 311: Linear Integrated Circuits
Theory Paper – V

(2 credits: 50 marks)

Learning Objective:

- To understand the basic concepts of operational amplifier and its various applications.
- To understand the basics of oscillators and its practical applications.
- To study IC 555 timer and its use in different applications.

Course Outcomes:

At the end of the course the student should be able to:

- Understand and analyze the IC 741 operational amplifier and its characteristics.

Design the solution for linear & non-linear applications using IC741.

- Explain the principles of oscillation and design various oscillator circuits.
- Understand and analyze the IC 555 and its use in various applications.

Unit -I: Operational Amplifier

Differential amplifier-Dual input balanced output differential amplifier, block diagram of typical Op-Amp, schematic symbol, the ideal Op-Amp, equivalent circuit of an Op-Amp, Op-Amp Parameters-Input-Impedance, Output impedance, input offset voltage, Open Loop Voltage gain, input bias current, slew rate.

Unit -II: Operational Amplifier Applications

Voltage series feedback amplifier, Voltage shunt feedback amplifier, virtual ground, error voltage, gain of op-amp, Op-amp as inverting and non-inverting amplifier, buffer amplifier, adder, subtractor, integrator, differentiator, basic comparator, Schmitt trigger.

Unit -III: Oscillators:

Oscillator principle, types of oscillations, frequency stability, phase shift oscillator, Wien Bridge oscillator, square wave generator, triangular wave generator, sawtooth wave generator, voltage controlled oscillator.

Unit -IV: The 555 Timer:

Introduction, Basic block of IC 555 timer and function of each block, IC 555 as monostable multivibrator, monostable multivibrator applications, IC 555 as an astablemultivibrator, astablemultivibrator applications, Free running ramp generator.

Unit V: Tutorial and Assignments

Books Recommended:

1. Op-Amps & Linear Integrated Circuits (Second Edition) [Chapters 1 to 4], Ramakant Gaikwad, Prentice Hall of India.
2. Electronics Principles and Applications (Fifth edition) [Chapters 1and 2.], John D Ryder
3. Linear Integrated Circuits D Roy Choudhry &Shail B Jain, New Age International Publishing
4. Electronic Devices (Sixth Edition) Floyd, Pearson Education
5. Op Amps & Linear Integrated Circuits James M Fiore, Thomson Learning
6. Integrated Circuits, K R Botkar, Khanna Publishers, New Delhi.

B. Sc. Semester III
Subject: ELECTRONICS
ELE-312: 8086 Microprocessor
Theory Paper- VI

(2 Credits: 50 marks)

Learning Objective:

Students will be able to-

- Understand outline the history of computing devices.
- Describe the architecture of 8086 microprocessors.
- Develop programs for microprocessor.

Course Outcomes:

At the end of the course, students will develop ability to-

- Define the history of microprocessors.
- Describe the architectures of 8086 microprocessors.
- Draw timing diagram and write programs using 8086
- Distinguish between the different modules of operation of microprocessors.
- Evaluate the appropriateness of a memory expansion interface based on the address reference with particular application.
- Apply the above concepts to real world electrical and electronics problems and applications.

Course Contents

Unit I: The 8086 Microprocessor

Introduction to microprocessor, registered organization of 8086, features of 8086, architecture of 8086, Pin diagram (Signal Description), Physical Memory Organisation, general bus operation, I / O addressing capability, special processor activities, minimum mode 8086 system and timing, maximum mode 8086 system and timing.

Unit II: The 8086 Microprocessor Instruction set

Machine language instruction formats, addressing modes of 8086, Data copy / transfer instructions, Arithmetic instructions, logical instruction, Branch instructions, loop instructions, machine control instructions, Flag manipulation instructions, Shift and rotate instructions, String instructions

Unit III: Assembly language programming

Assembly language programs- addition of two numbers, addition of a series of 8 bit numbers, find the largest number from given array of 8 bit numbers, find out odd and even numbers from the given series of hexadecimal numbers, find out positive numbers and negative numbers from a given series of signed numbers, move a string of data from one location to other location, arrange given array of 8 bit numbers in ascending order, arrange given array of 8 bit numbers in descending order, one byte BCD addition, factorial of a 8 bit number , average of block of 8 / 16 bit data.

Unit IV: Stack and Interrupts

Introduction to stack, stack structure of 8086, interrupt and interrupt service routines, interrupt cycle, non-maskable interrupt, maskable interrupt.

Unit V: Tutorial and Assignments

Books Recommended:

1. Advanced Microprocessors and Peripherals (Second Edition) – A K Ray & K M Bhurchandi Tata McGraw Hill 2009
2. The INTEL Microprocessors 8086 /8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Processor –Barry B. Brey Printice-Hall INDIA
3. Microprocessors – S. K. Gupta Pragati Prakashan Meerut
4. Microprocessors – II –A. P. Godse Technical Publications PUNE

B. Sc. Semester III
Skill Enhancement course

Subject: ELECTRONICS
SEC I (A)

Electronics Power Supplies

Course code: XXX313 (2 Credits: 50 Marks)

1. Basics of power supplies

Introduction, DC voltage ripple regulation, electronic power supply.

Cells and batteries primary or secondary, Battery design, lead acid batteries, lithium cells, Ni-MH, mobile phone batteries, batteries for UPS, batteries for emergency power, precautions, testing of batteries, solar cell.

Transformers

Introduction, transformer efficiency, primary winding connections, turns ratio.

2. Rectifier

Rectifiers, selenium rectifiers, silicon rectifiers, schottky diodes, Rectifier circuits, half wave rectifier, full wave rectifier, the bridge rectifier, three phase rectifier, variable transformer, SCRs, Triacs .

3. Filters

Introduction Types of capacitors, capacitor connections, charging of a capacitor, discharging of capacitor, energy stored in capacitor, capacitor in electronics, inductors, filter action, effect of adding a capacitor, types of filters choke input filters, capacitor input filters, two stage filtering negative lead filtering ,RF bypass

4. Power supply protection

Switches, switch ratings, arcing in switches, contact protection, connectors, Fuses, slow blow and fast blow Fuses, Fuse Mountings, Circuit Breakers, Protection against Power supply failures

Unregulated supplies

Unregulated Power Supplies, Transient Problems, Diode in Series, Diode in Parallel,

Rectifier circuits, rectifier protection, voltage regulation, bleeder resistor, Ripple voltage and frequency, input versus output voltage, dual voltage power supply, voltage multipliers, half wave Doublers, voltage triplers, voltage Quadruplers.

Voltage stabilization

Constant voltage source, principle of stabilization, series regulator, shunt regulator, zener regulator

Electronic Regulator

Series regulators, series pass transistors, shunt regulators.

Books Recommended:

1.Practical Electronic Power Supplies M.C.Sharma BPB Publication

2. Principal of Electronics V. K. Mehta S. Chand Publication

B. Sc. Semester III
Skill Enhancement course

Subject: ELECTRONICS
SEC I (B)

Course code: XXX313 (2 Credits: 50 Marks)

Electronic instrument

1. **Measurement Errors**
   Introduction, Methods of measurement, Classification of Measurement, classification of secondary instruments, classification of measurement systems, statics characteristics, accuracy and precision, conformity, measurement errors, gross errors, systematic errors, random errors
2. **Electronic instrument**:
   Multimeter, Application of multimeter, the sensitivity of multimeter, merits, and demerits of multimeter, meter protection, electronic voltmeter-vacuum tube meter (VTVM), Application of VTVM, Merits, and Demerits of VTVM, Transistor voltmeter Circuit, Bridge rectifier voltmeter
3. **Cathode ray oscilloscope**:
   Cathode ray oscilloscope, cathode ray tube, Deflection sensitivity of CRT, Applying signal across vertical plates, display of signal waveform on CRO, the signal pattern on the screen, various controls of CRO, Application of CRO
4. **Inductance and Capacitance Measurement**:
   Introduction, AC bridges, condition for balance bridge, maxwell inductance bridge, maxwell inductance-capacitance bridge, owen bridge, wein bridge

Books:

1. Principle of Electronics V K Mehta, Rohit Mehta ,S. Chand & Company
2. Electronic Measurment and Instrumentation R.S.Sedha S. Chand

B. Sc. Semester III
Electronics
ELE - 321
Linear Integrated Circuits (Lab Course – 3) (Credits: 1.5)
(Practical Based on – 311)

Every candidate appearing for examination must produce journal showing that he/she has completed 07 experiments during the semester. The journal must be certified at the end of the semester by The Head of the Department.

List of Experiment:

1. Study of Op – Amp as a non-inverting amplifier.
2. Study of Op – Amp as an inverting amplifier.
3. Study of Op – Amp as an inverting adder.
4. Study of Op – Amp as an inverting subtractor.
5. Study of Op – Amp as an integrator.
6. Study of Op – Amp as a differentiator.
7. Study of Op – Amp as a Schmitt trigger.
8. Study of Op – Amp as an analog computer to solve simple equation.
9. Study of Op – Amp as Low voltage DC voltmeter
10. Built and study Wien Bridge oscillator using Op – Amp.
11. Built and study phase shift oscillator using Op – Amp.

B. Sc. Semester III
Subject: ELECTRONICS
Course: ELE-322 (Lab Course – 4) (Credits: 1.5)
(Practical based on 8086 Mircroprocessor-312)

Every candidate appearing for examination must produce journal showing that he/she has completed 07 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. Assembly language program to find sum of 8 bit numbers.
2. Assembly language program to find sum of 8 bit numbers in a given array.
3. Assembly language program to find out positive numbers and negative numbers from a given series of signed numbers.
4. Assembly language program to find average of block of data containing N numbers.
5. Assembly language program to determine whether the number is even or odd. If the number is odd, copy 00 to ML ------- otherwise copy EE.
6. Assembly language program to move a string of data from one location to other location.
7. Assembly language program to find a factorial of 8 bit number.
8. Assembly language program to find square root of a 16 bit number.
9. Assembly language program to perform one byte BCD addition.
10. Assembly language program to arrange given array of 8 bit elements in ascending order.
11. Assembly language program to arrange given array of 16 bit elements in descending order.
12. Assembly language program to add two multi-byte numbers and store the result as a third number.

Semester IV

B. Sc. Semester IV
Subject: ELECTRONICS
Course: ELE-411 Paper - VII
(Effective from June 2023)
Title: COMMUNICATION ELECTRONICS
(Credits: 2: 50Marks)

Learning Objectives:

- The fundamentals of signals & linear time invariant systems used in communication systems.
- Knowledge of probability, random variables & random processes
- In depth knowledge of different types of analogue communication system and different modulation techniques used in these systems.
- Analysis of noise and its impact on different modulation techniques.

Course Outcomes:

On Completion of this course the students will be able to:

- Analyzeanalogue communications in time domain and frequency domain.
- Distinguish between different analogue modulation techniques.
- Understand the importance of noise considerations in communication systems.

1. Types of Modulation:

Amplitude modulation, expression for amplitude modulated voltage, waveforms of amplitude modulated voltage, sidebands produced in amplitude modulated wave, Frequency modulation, expression for frequency modulated voltage, waveforms of frequency modulated voltage, sidebands produced in frequency modulated wave, Phase modulation, comparison of frequency modulated and phase modulated expressions

2. Modulation and Detection:

Amplitude modulation theory, Square Law modulation, class C linear diode detector, varactor diode frequency modulator, Armstrong modulator, phase discriminator, AM transmitter, Superheterodyne receiver.

3.Pulse Modulation: Pulse amplitude modulation,pulse pulse code modulation, pulse frequency modulation,pulse position modulation, pulse width modulation

4. Digital Communication:

Synchronization, Asynchronous transmission, Probability of error in base-band transmission, Matched filter, Bit timing recovery, Digital carrier system, amplitude shift keying, frequency shift keying, phase shift keying, differential phase shift keying.

Unit V: Tutorial and Assignments

Books Recommended:

1) Electronics and Radio Engineering – M L Gupta (Chapters 1, and 2) Dhanpat Rai & Sons
2) Electronic Communications [IV Edition] –Dennis Roddy & J Coolen, (Chapters 3and 4) PHI Private Ltd. New Delhi
3) Hand book of Electronics Dr.S.L.GuptaDr.V.Kumar , Pragati Prakashan

B. Sc. SemesterIV
Subject: ELECTRONICS
ELE-412: 8086 Microprocessor Interfacing
Theory Paper-VIII

(2 Credits: 50 marks)

Learning Objective:

Students will be able to-

- Study of the Architecture and programming issues of 8086-microprocessor and interfacing with other peripheral ICs and co-processor.
- Study programmable communication interface with 8251 with 8086 microprocessor
- Study interface with 8254 and 8279 with 8086 microprocessor
- Study direct memory access with 8086 microprocessors

Course Outcomes:

At the end of the course, students will develop ability to-

- perform input/output device interfacing/programming in assembly,
- understand the memory organization and interfacing,
- understand the hardware and software interrupts and their applications.
- understand the properties and interfacing of the parallel and serial ports,

Unit I: Interface of memory and interface with 8255

Semiconductor memory interfacing,Static RAM interfacing, dynamic RAM interfacing,interfacing I/O ports

Interfacing I/O ports, features of 8255, PIO 8255 pin diagram and architecture, modes of operation of 8255, Interfacing ADC, interfacing of DAC.

Unit II: Programmable Communication Interface with 8251

Features of 8251, Methods of data communication, architecture and signal description, operating modes, interfacing and programming of 8251.

Unit III: Interface with 8254 and 8279

Features of 8254, Pin diagram and architecture, control word, operating modes, programming and interfacing 8254. Features of 8279, architecture and signal descriptions, Modes of operation, command words of 8279, programming and interfacing 8279.A

Unit IV: DMA Controller

Introduction, DMA controller 8257, Internal Architecture of 8257, Signal descriptions of 8257, DMA transfers and Operations, Interfacing with 8086.

Unit V: Tutorial and Assignments

Books Recommended:

1. Advanced Microprocessors and Peripherals (Second Edition) – A K Ray & K M Bhurchandi Tata McGraw Hill 2009
2. The INTEL Microprocessors 8086 /8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Processor –Barry B. Brey Printice-Hall INDIA
3. Microprocessors – S. K. Gupta Pragati Prakashan Meerut
4. Microprocessors – II –A. P. Godse Technical Publications PUNE

B. Sc. Semester IV
Skill Enhancement Course
Subject: ELECTRONICS
SEC2(A)
Digital inverter
Course Code:XXX 413
(Credits:2 ; 50 Marks)

1. Inverter

An introduction, inverter and UPS, basic working principle of the inverter, important component of the inverter, switching transistor and MOSFET, Bipolar
transistor versus the MOSFETs, comparator, operational amplifier comparator, use of bipolar winding in the inverter transformer.

2. Relays

Solenoids, relay construction of relay, relays in circuit, single double and triple pole relays

3. Transformer

Inductance effect, transformer, transformation in a transformer, voltage transformer, current transformation, impedance transformation, types of transformer
output voltage, core, usages, different types of winding, transformer rating, applying DC to transformer, advantages of transformer, parts of transformer.

4. Rechargeable battery and battery charger

Primary battery, secondary battery, Cells and batteries rechargeable battery, wet lead acid battery, dry lead acid battery, or maintenance free battery, battery
charger, types of battery charger, how to detect when the battery is fully charge, trickle charging, points to increase battery life
Integrated Circuits (ICs) in the inverter,
The basic principle of inverter,
PWM based 500 VA/ 625 VA -12 volt MOSFET inverter
PWM technology

Books Recommended :

1.Modern Digital Inverter ManaharLotia,Pradeep Nair : BPB Publication
2.Electical Technology II B.L.TherejaS.chand Publication

B. Sc. Semester IV
Skill Enhancement Course
Subject: ELECTRONICS
SEC2 (B)
Course Code:XXX 413
(Credits:2 ; 50 Marks)

Electrical Motors

1. **DC Motors**
   Introduction, Principles of operation, Rotary motion, practical DC motors, control field flux, counter electromotive force, armature reaction, motor selection, basic motor construction, motor classification
2. **AC motors**
   Introduction, fundamental operation, stator construction and operation, types of AC motors, single phase AC motors, Resistance start induction motors, capacitor start induction run motors,
3. **universal motors**
   Universal motors, three-phase motors, induction motors, wound rotor motor, synchronous motor, motor nameplate
4. **Servo motors**
   Introduction, DC servo motors, wound armature PM motor, moving coil motors, brushless motors, stepper motor, permanent magnet stepper motor, variable reluctance stepper motor, AC Servo motor

Books:

1. Industrial Electronics, Terry Bartelt Thomson Delmar Learning
2. Introduction to power electronics- V Jagannathan PHI New Delhi

B. Sc. Semester IV
Subject: ELECTRONICS
Course: ELE-421
(Practical based no ELE-411) Lab-5
(Credits: 1.5)

Every candidate appearing for examination must produce journal showing that he/she has completed 04 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 50)

1. Built and study astablemultivibrator using IC 555.
2. Built and study monostable multivibrator using IC 555.
3. Built and study free running ramp generator.
4. Study of amplitude modulation using transistor.
5. Study of AM detector using diode.
6. Study of F M modulation using IC.
7. Study of F M detector using IC.
8. Study of Balance modulator.

Project every student should construct one project based on syllabus of 3rd and 4 semester. He/She should submit the project and project report there on at the time of practical examination. The project report must be certified by the head of department.

Semester IV
Subject: ELECTRONICS
Course: ELE-422 [1.5 credits] Lab- 6
8086 Microprocessor Interfacing
(Practical based on ELE-412) (Credits: 1.5)

Every candidate appearing for examination must produce journal showing that he/she has completed 04 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 50)

1. Interface 8 LED and 8 switches & write ALP to display status of switch using 8255.
2. Write a program for 8 bit binary UP counter and implement it using 8255.
3. Write a program for 8 bit binary DOWN counter and implement it using 8255.
4. Write a program to acquire 8 – bit data from an ADC and implement it using 8255.
5. Interface Hex Key board and seven segment display to display key pressed on seven segment display.
6. Write ALP to generate triangular waveform of frequency 500 HZ using DAC 0800 with 8255 & 8086 microprocessor.
7. Design stepper motor controller and write an ALP to rotate shaft of stepper motor in clockwise direction (5 rotations) & anticlockwise direction (5 rotations).
8. Study of modes '0'of 8253.
9. Study of modes '1'of 8253.
10. Study of modes '2'of 8253.

Project every student should construct one project based on syllabus of 3rd and 4th semester. He/She should submit the project and project report there on at the time of practical examination. The project report must be certified by the head of department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Scheme of Practical examination and marks (Practical) for choice-based credit system (CBCS) semester pattern

B. Sc. Second Year Semester-III (ELE-321, 322) and Semester- IV (ELE-421, 422)

Subject: Electronics

Continuous Internal Assessment (CIA): Practical (10 Marks): 07 Marks for Internal Practical Examination and 03 Marks for record book for each paper

Practical examination: Annual examination

PRACTICAL EXAMINATION (UA)

Experimental performance 321 + 421: 50 marks for experiment performance+20 marks for project + Viva voce 10 marks = 80 Marks

Experimental performance 322 + 422: 50 marks for experiment performance + 20 marks for project+Viva voce 10 marks = 80 Marks