KURUKSHETRA UNIVERSITY
KURUKSHETRA

Revised Scheme of Examination and

Syllabus for

Under-Graduate Programme

Subject: ELECTRONICS

B23-ELE-501 & B23-ELE-503
B23-ELE-601 & B23-ELE-603

Under Multiple Entry-Exit, Internship and CBCS-LOCF in accordance to NEP-2020 w.e.f. 2024-25 (in phased manner)

THIRD YEAR: SEMESTER-5

Remarks	Course	Paper(s)	Nomenclature of Paper	Credits	Hours/ Week	Internal marks	External Marks	Total Marks	Exam Duration
Scheme A, B & C	**CC-5 MCC-9 4 credit**	B23-ELE-501	Microprocessor Architecture and Programming with 8085	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme B & C	**MCC-10 4 credit**	B23-ELE-502	Digital Signal Processing	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme B & C	**DSE-2 4 credit Select one Option**	B23-ELE-503	Transducers and Sensors	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
		B23-ELE-504	Optoelectronic Devices	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme B & C	**DSE-3 4 credit Select one Option**	B23-ELE-505	Mechatronics	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
		B23-ELE-506	Introduction to Embedded Systems	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme A & C	**CC-M5 (V) 4 credits**	From Available CC-M5(V) of 4 credits as per NEP							
Scheme A, B & C	**Internship 4 credits**	Internship#4 credit after 4th semester							

THIRD YEAR: SEMESTER-6

Remarks	Course	Paper(s)	Nomenclature of Paper	Credits	Hours/ Week	Internal marks	External Marks	Total Marks	Exam Duration
Scheme A, B & C	**CC-6 MCC-11 4 credit**	B23-ELE-601	Interfacing Peripheral Devices and Applications of 8085	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme B & C	**MCC-12 4 credit**	B23-ELE-602	Basic Electrical Engineering & Skills	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme B & C	**DSE-4 4 credit Select one Option**	B23-ELE-603	Microcontroller 8051 and its Interfacing	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
		B23-ELE-604	Verilog and FPGA based System Design	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme B & C	**DSE-5 4 credit Select one Option**	B23-ELE-605	Introduction to C and its programming	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
		B23-ELE-606	Modern communication systems	3	3	20	50	70	3 hrs.
			Practical	1	2	10	20	30	3 hrs.
Scheme A only	**CC-M6 4 credits**	From Available CC-M6 of 4 credits as per NEP							
Scheme A only	**CC-M7(V) 4 credits**	From Available CC-M7(V) of 4 credits as per NEP							
Scheme B only	**CC-M5(V) 4 credits**	**From Available CC-M5(V) of 4 credits as per NEP**							
Scheme C only	**CC-M6(V) 4 credits**	**From Available CC-M6(V) of 4 credits as per NEP**							
Scheme C only	**SEC-4 2 credit**	From Available SEC-4 of two credits as per NEP							

Session: 2024-25			
Part A- Introduction			
Subject	ELECTRONICS		
Semester	FIFTH		
Name of the Course	Microprocessor Architecture and Programming with 8085		
Course Code	B23-ELE-501		
CourseType:(CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC-5, MCC-9		
Level of the course	300-399		
Pre-requisite for the course(if any)	Basic knowledge of digital electronics and computer organization.		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Perform in depth study of microprocessor architecture and programming using the Intel 8085 microprocessor. 2. To understand various instructions used for low level programming. 3. To analyze given problem and write programs using 8085 assembly language. 4. Present the experimental results and conclusion by having Hands-on experience in the Laboratory 5. Learning the above through practicals		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours per week	3	2	5
Max. Marks: 100 (70 Theory + 30 Practical) Internal Assessment Marks: 20 Theory +10 Practical End Term Exam Marks: 50Theory+ 20 Practical	Exam Time: 3 Hours each for Theory & Practical		

Part B-Contents of the Course

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. QuestionNo.1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	**Introduction:** Introduction to Microprocessors, microcomputer and single chip microcomputer, Components of Microprocessor: Registers, ALU and control & timing, CPU, I/O devices, clock, memory, bussed architecture, tri-state logic, address bus, data bus and control bus.	11
II	**Architecture and Programming of 8085:** Architecture of 8085 Microprocessor, Pin Description of 8085, Instruction set of 8085, Fetching and Executing Instructions, Idea of fetch execute overlap	11
III	**Instruction Set:** : Assembly Language Programming Basics, Data Transfer operations, Arithmetic Operations, Logic Operations, Branch Operations, Writing Assembly language Programs	11

IV	**Programming Technique**: Looping, Counting, and Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Operations Related to Memory, Logic Operations: Rotate, Logic Operations: Compare **8085 Programming**: Programs of Addition, Subtraction, Multiplication, Division , Ascending/Descending, Largest/Smallest	12
V*	**Note:** A candidate is required to perform minimum 5experiments, out of the list provided during course of study in this semester. 1. Addition and Subtraction of Two 8-Bit Numbers or microprocessor-Kit. 2. Addition and Subtraction of Two 16-Bit Numbers or microprocessor-Kit. 3. Multibyte Addition/Subtraction of two numbers by Repetitive addition/subtraction on Microprocessor-kit. 4. Division of two 8-Bit numbers by repetitive subtraction on microprocessor-Kit. 5. Multiplication of Two 8-Bit Numbers on Microprocessor –Kit. 6. Find the smallest/largest number from a give series of numbers on Microprocessor-Kit. 7.To sort a given series of unsigned numbers in Ascending order on Microprocessor-kit. 8.To sort a given series of unsigned numbers in Descending order on Microprocessor-kit. 9. Check even parity/add parity of binary number on microprocessor-Kit.	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory :20 Marks** ● Class Participation: **5 Marks** ● Seminar/presentation/assignment/quiz/class test etc.:**5 Marks** ● Mid-Term Exam: **10 Marks** ➢ **Practicum:10 Marks** ● Class Participation: ● Seminar/Demonstration/Viva-voce/Lab records etc.:**10 Marks** ● Mid-Term Exam:	**End Term Examination:** 50 Marks 20 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Digital Computer Electronics- A P Malvino (2nd Edition)
2. Microprocessor Architecture, programming and application with the 8085 by R S Gaonkar
3. Fundamentals of Microprocessors and Microcontrollers by B.RAM
4. Introduction to microprocessor 8085, D K Kaushik, Dhanpat Rai Publications

Session: 2024-25			
Part A-Introduction			
Subject	ELECTRONICS		
Semester	FIFTH		
Name of the Course	TRANSDUCERS AND SENSORS		
Course Code	B23-ELE-503		
CourseType:(CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	DSE-2		
Level of the course	300-399		
Pre-requisite for the course (if any)	Advance Knowledge of Electronics		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Understand the principles of various sensors and transducers for the measurement and instrumentation. 2. Evaluate various measurements techniques for industrial Applications. 3. Apply signal conditioning for measurements of various quantities 4. Present the experimental results and conclusions by having Hands-on experience in the Laboratory 5. Learning the above through practicals		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours per week	3	2	5
Max. Marks: 100 (70 Theory + 30 Practical) Internal Assessment Marks: 20 Theory +10 Practical End Term Exam Marks: 50 Theory+ 20 Practical	Exam Time: 3 Hours each for Theory & Practical		

Part B-Contents of the Course

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	**Transducers:** Classification, Active, Passive, Mechanical, Electrical, their comparison. Selection of Transducers, Principle and working of following types: Displacement transducers - Resistive (Potentiometric, Strain Gauges – Types, Gauge Factor, bridge circuits, Semi-conductor strain gauge) Capacitive (diaphragm), Inductive (LVDT-Principle and characteristics	11
II	**Introduction to Electronic Measurement and Instrumentation:** Transducers and sensors- Static and Dynamic Characteristics (Accuracy, repeatability, reproducibility, range/span, linearity, threshold, sensitivity, resolution, hysteresis, precision, drift , Speed of response, settling time, fidelity, lag etc. Errors (Types of errors, statistical analysis, probability of errors, limiting errors) Performance measures of sensors, Classification of sensors, Sensor	12

	calibration techniques	
III	**Sensors:** Piezoelectric (Element and their properties, Piezo Electric coefficients. Equivalent circuit and frequency response of P.E. Transducers), light (photo-conductive, photo emissive, photo voltaic, semiconductor, LDR),Temperature (electrical and non-electrical). Pressure (force summing devices, load cell)	10
IV	**Magnetic Sensor, Optical Sensors and Special Sensors:** Magnetic Sensors –types, principle, requirement and advantages: Magneto resistive – Hall Effect – Current sensor, Optical Sensors - Photo conductive cell, photo voltaic, Photo resistive, IR sensor, LDR, Fibre optic sensors, Special Sensors: GPS, Bluetooth, Smart Sensors - Film sensor. Touch screen sensor	12
V*	**Note:** A candidate is required to perform minimum 5 experiments out of the list provided during course of study in this semester. 1. To determine the Characteristics of resistance transducer - Strain Gauge (Measurement of Strain using half and full bridge.) 2. To determine the Characteristics of LVDT. 3. Measurement of distance using LVDT plot ac and dc characteristics. 4. To determine the Characteristics of Thermistors and RTD. 5. Measurement of temperature by Thermocouples. 6. Study of transducers like AD590 (two terminal temperature Sensor), PT-100, J- type, K- type. 7. To study the Characteristics of LDR, Photodiode. 8. To study the Characteristics of Phototransistor: (i) Variable Illumination. (ii) Linear Displacement. 9. Characteristics of one Solid State sensor/ Fibre optic sensor	30

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory 20 Marks** ● Class Participation: **5 Marks** ● Seminar/presentation/assignment/quiz/class test etc.:**5 Marks** ● Mid-Term Exam: **10 Marks**	50 Marks
➢ **Practicum 10 Marks** ● Class Participation: ● Seminar/Demonstration/Viva-voce/Lab records etc.:**10 Marks** ● Mid-Term Exam:	20 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. H. S. Kalsi, Electronic Instrumentaion, TMH(2006)
2. W.D. Cooper and A. D. Helfrick, Electronic Instrumentation and Measurement Techniques, Prentice Hall (2005).
3. Instrumentation Measurement and analysis: Nakra B C, Chaudry K, TMH
4. A. K Sawhney, Electrical and Electronics Measurements and Instrumentation, Dhanpat Rai and Sons (2007).
5. C. S. Rangan, G. R. Sarma and V. S. Mani, Instrumentation Devices and Systems, Tata McGraw Hill (1998).
6. Patranabis D, "Sensors and Transducers", 2nd Edition, PHI, New Delhi, 201

Session: 2024-25			
Part A- Introduction			
Subject	ELECTRONICS		
Semester	SIXTH		
Name of the Course	**I**NTERFACING PERIPHERAL DEVICES AND APPLICATIONS OF 8085		
Course Code	B23-ELE-601		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	CC- 6 MCC-11		
Level of the course	300-399		
Pre-requisite for the course(if any)	Basic idea of 8085 architecture and its programming		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Learn various interrupts of 8085 microprocessor. 2. understand about 8255 PPT 3. Learn about the Timer IC 8253. 4. Study about the DMA controller and programming applications of 8085. 5. Hands-on experience in the Laboratory on the above topics		
Credits	**Theory**	**Practical**	**Total**
	3	1	4
Contact Hours per week	3	2	5
Max. Marks: 100 (70 Theory + 30 Practical)Internal Assessment Marks: 20 Theory +10 Practical End Term Exam Marks:50 Theory+ 20 Practical	Exam Time: 3 Hours each for Theory & Practical		

Part B-Contents of the Course

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit

Unit	Topics	Contact Hours
I	**Interrupts:** Methods of Input/output operations, Data transfer Schemes, software Interrupts, Hardware interrupts, Interrupt control circuits, Interrupt instructions.	11
II	**Programmable Peripheral Interface 8255:** operational modes of 8255, control word format for 8255, programming in Mode 0, programming in Mode 1, programming in Mode 2, BSR mode.	11
III	**Programmable Interval Timer 8253:** Block diagram of 8253, control word format for 8253, Interfacing & programming of 8253, Programming of 8253 in various modes	10
IV	**DMA Controller 8257 and 8085 Applications:** Block diagram, Programming of 8257, Applications to illustrate the use of Microprocessor in: 1. Traffic light 2. Temperature control	13

	3. Stepper Motor control 4. Washing machine control.	
V*	**Note:** A candidate is required to perform minimum 5 experiments out of the list provided during course of study in this semester. 1. Program to generate Square wave using Microprocessor-Kit. 2. Program to generate Sine wave using Microprocessor-Kit. 3. Program to generate triangular wave using Microprocessor-Kit. 4. Generate a time delay through software on Microprocessor-Kit and switch ON/OFF LED using IC 8255. 5. Write program to operate Stepper Motor using Microprocessor-Kit. 6. Write program to illustrate the use of Microprocessor in Traffic light system. 7. ADC interfacing using Microprocessor-Kit. 8. DAC interface using Microprocessor-Kit. 9. Interfacing of stepper motor and Rotating stepper motor by N Steps clockwise/ anticlockwise with speed control.	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory: 20Marks** ● Class Participation: **5 Marks** ● Seminar/presentation/assignment/quiz/class test etc.:**5 Marks** ● Mid-Term Exam: **10Marks** ➢ **Practicum10Marks** ● Class Participation: ● Seminar/Demonstration/Viva-voce/Lab records etc.: **10 Marks** ● Mid-Term Exam:	**End Term Examination:** 50 Marks 20 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Digital Computer Electronics- A P Malvino (2nd Edition)
2. Microprocessor Architecture, programming and application with the 8085 by R S Gaonkar
3. Fundamentals of Microprocessors and Microcontrollers by B.RAM
4. Introduction to microprocessor 8085, D K Kaushik, Dhanpat Rai Publications

Session: 2024-25			
Part A- Introduction			
Subject	ELECTRONICS		
Semester	SIXTH		
Name of the Course	MICROCONTROLLER 8051 AND ITS INTERFACING		
Course Code	B23-ELE-603		
Course Type: (CC/MCC/MDC/CC-M/ DSEC/VOC/DSE/PC/AEC/VAC)	DSE-4		
Level of the course	300-399		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Understand the basic architectural blocks of a microcontroller. 2. Understand the difference between a microprocessor and microcontroller. 3. Understand the instruction set of 8051 microcontroller and will be able to write simple programs. 4. Interface various I/O devices with microprocessor and microcontroller. 5. Learning the above through practicals		
Credits	**Theory**	**Practical**	**Total**
	3	1	4
Contact Hours per week	3	2	5
Max. Marks: 100 (70 Theory + 30 Practical) Internal Assessment Marks: 20 Theory +10 Practical End Term Exam Marks: 50 Theory+ 20 Practical		Exam Time: 3 Hours each for Theory & Practical	

Part B- Contents of the Course

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	**Architecture of 8051 Microcontroller**- Basic block diagram of microcontroller, Comparison of microcontroller with microprocessors, Architecture -internal block diagram and key features of 8051, pin diagram, memory organization, Internal RAM memory, Internal ROM. General purpose data memory, special purpose/function registers, external memory.	11
II	**Counters /timers and Programming**: 8051 oscillator and clock, program counter, TCON, TMOD, timer counter interrupts, timer modes of operation. Input / output ports and circuits/ configurations, serial data input / output – SCON, PCON, serial data transmission modes. Programming 8051 timers, counter programming, programming timers 0 and 1 in 8051	12

III	**Interrupts, Addressing modes, Instruction set and Interfacing**: Interrupts, reset, interrupt control, interrupt priority, and interrupt destinations & software generated interrupts. Addressing modes, Data transfer instructions, Arithmetic and Logic operations, , flags, internal data move, external data move, code memory read-only data move, Push and Pop and data exchange instructions	11
IV	**Interface and Applications:** Develop the following applications with 8051 microcontroller using assembly language: i) Stepper-motor interface, ii) ADC interface, iii) DAC interface, iv) Keyboard interface	11
V*	**Note:** A candidate is required to perform minimum 5 experiments out of the list provided during course of study in this semester. 1. Program to find the sum of N 8-bit numbers. 2. Program to find largest of N numbers. 3. Program to find smallest of N numbers 4. Program to find whether the given data is palindrome. 5. Program to arrange the numbers in ascending order. 6. Interfacing of stepper motor and Rotating stepper motor by N Steps clockwise/ anticlockwise with speed control. 7. ADC interfacing. 8. DAC interface 9. Keyboard interface	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory 20 Marks** ● Class Participation: **5 Marks** ● Seminar/presentation/assignment/quiz/class test etc.:**5 Marks** ● Mid-Term Exam: **10Marks** ➢ **Practicum10Marks** ● Class Participation: ● Seminar/Demonstration/Viva-voce/Lab records etc.:**10 Marks** ● Mid-Term Exam:	**End Term Examination :** 50 Marks 20 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Muhammad Ali Mazidi, “Microprocessors and Microcontrollers”, Pearson, 2006
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay “The 8051 Microcontroller and Embedded Systems”, 2nd Edition, Pearson Education 2008.
3. "Programming and Customizing the 8051 Microcontroller" by Myke Predko
4. The 8051 Microcontroller Based Embedded Systems”, Manish K Patel, McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
5. “Microcontrollers: Architecture, Programming, Interfacing and System Design”, Raj Kamal, Pearson Education, 2005.

Session: 2023-24			
Part A - Introduction			
Subject	ELECTRONICS		
Semester	III/V		
Name of the Course	MOBILE PHONE REPAIRING		
Course Code	B23-VOC-118		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	VOC		
Level of the course	100-199		
Pre-requisite for the course (if any)	Physics as a Subject at 4.0 Level (Class XII)		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. To remove and fix all mobile components like charger jack, camera, speaker, jumper, SIM, Headphone jack etc. 2. Mobile phone Assembling & Dissembling 3. How to change/repair mobile screen (folder) 4. Unlock Any Phone: FRP, Pattern, Password, PIN 5. All types of mobile software updates		
Credits	Theory	Practical	Total
	2	2	4
Contact Hours	2	4	6
Max. Marks: 100 (50 Theory + 50 Practical) Internal Assessment Marks:15 Theory + 15 Practical End Term Exam Marks: 35 Theory + 35 Practical		Exam Time: 3 Hours each for Theory & Practical	

Part B- Contents of the Course

Instructions for Paper- Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	**Basics of Electronics :** Understanding Electrical Components: Resistors, Capacitors, Inductors, Diodes, Transistors and Transformer, Ohm's Law and basic circuit theory, Use of Multi-meter, DC Power Supply and Oscilloscope, Soldering and De-soldering techniques	7
II	**Mobile Phone Hardware :** Introduction to Mobile Phone Components, Circuit Diagrams and Block Diagrams of Phones Battery, Display, Charging Section, Speaker & Microphone repair, Troubleshooting Hardware Issues, Mobile Phone Disassembly and Reassembly, Diagnosis of Common Problems: Dead phones, No charging, No sound, Display issues	7
III	**Software in Mobile Phones :** Flashing and Formatting mobile phones, Understanding IMEI and Software Locks, Operating Systems (Android/iOS): Introduction, Basics of Firmware, Flashing Tools (e.g., SP Flash Tool, Odin), Unlocking Methods: FRP Lock, Password, and Pattern Unlocking, Software Troubleshooting: Software crashes, Boot loop, Stuck at logo	7
IV	**Troubleshooting, Diagnosis and Advanced Hardware Repair :** Systematic Problem Solving: Using Circuit Diagrams and Schematics, Identifying short circuits, testing different parts, and fixing issues, Common faults and their fixes for different phone brands (Samsung, Apple, Xiaomi, etc.) Chip-level repairs: IC replacement, jumper settings, board soldering, Network, Bluetooth and Wi-Fi repair, Understanding GSM and CDMA Technologies, Water-damaged mobile repair, Troubleshooting advanced issues like SIM card not detected, Network issues	9
V*	**Note:** A candidate is required to perform minimum 6 experimentsout of the list provided during course of study in this semester and need to prepare a report on an industrial visit. 1. Identification of basic Electrical & Electronic components : Resistors, Capacitors, Diode, Transistors, ICs 2. Measurement of current and voltage (AC/DC) using Ammeter and Voltmeter and Identification of legend, symbols, colour codes etc. 3. Measurement of current, voltage and resistance and testing of various using of Multimeter. 4. Measurement of amplitude, time period and frequency of signal using CRO. 5. Soldering & de-soldering of various electronic components/ICs on PCB. 6. To study various mobile hardware issues like : Dead phones, No charging(battery). 7. To study various mobile hardware issues like : Water damaged mobile repair.	60

	8. To study various mobile hardware issues like : No sound(speaker), Display issues(screen). 9. To study various mobile software issues like: Formatting mobile phones, Understanding IMEI and Software Locks. 10. To study various mobile software issues like: Unlocking Methods-FRP Lock, Password, and Pattern Unlocking. 11. To study various mobile software issues like: SIM card not detected, Network issues, Bluetooth. 12. Visiting a mobile repair centre and preparing a PPT amd PDF report on various hardware and software issues.	

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory 15 Marks** • Class Participation: 4**Marks** • Seminar/presentation/assignment/quiz/class test etc.: 4 **Marks** • Mid-Term Exam: 7 **Marks** ➢ **Practicum 15 Marks** • Class Participation:05 • Seminar/Demonstration/Lab records etc.: 10 **Marks**	**End Term Examination:** 35 Marks 35 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Basic Electronics for Mobile Repairing" by Manohar Lotia
2. Mobile Phone Repairing Made Easy" by A.K. Jha
3. Mobile Software Repairing Manual" by Shyamal Mitra
4. Advanced Mobile Repairing" by B.G. Gupta
5. Mobile Repair Guide: Troubleshooting Techniques" by Santosh Atra