Gondwana University, Gadchiroli

Choice Based Credit System (CBCS) Syllabus

B. Sc. II

Subject: Electronics

Semester-III & IV

Board of Studies - Electronics

Gondwana University, Gadchiroli

W. E. From 2018-19

Scheme of Bachelor of Science for CBCS Semester Examination

Gondwana University, Gadchiroli

Subject : Electronics

Class	Semester	Paper	Teaching Scheme Per Week			Examination Scheme				
			Theory	Total	Practical	Theory Marks			Practical Marks	Total Marks
						Paper	Internal Assessment	Total		
B.Sc.I	I	I	3	6 + 1T*	6	50	10	120	30	150
		II	3			50	10			
	II	I	3	6 + 1T*	6	50	10	120	30	150
		II	3			50	10			
B.Sc.II	I	I	3	6 + 2T*	6	50	10	120	30	150
		II	3			50	10			
	II	I	3	6 + 2T*	6	50	10	120	30	150
		II	3			50	10			
B.Sc.III	I	I	3	6 + 2T*	6	50	10	120	30	150
		II	3			50	10			
	II	I	3	6 + 2T*	6	50	10	120	30	150
		II	3			50	10			

***** Periods for Tutorials per batch.

**** The student should appear in the University practical examination otherwise he/she will be treated as a failed. However their internal marks will be carried forward.**

Pattern of Question Papers (UG)

Time : 3 Hours

Maximum marks : 50

Question No.		Marks Allotted
Que. 1	**Either**	
	From Unit - I	10
	Or	
	From Unit - I	10
Que. 2	**Either**	
	From Unit – II	10
	Or	
	From Unit - II	10
Que. 3	**Either**	
	From Unit - III	10
	Or	
	From Unit - III	10
Que. 4	**Either**	
	From Unit - IV	10
	Or	
	From Unit - IV	10
Que. 5	**Solve any 10 out of 12 questions**	10 marks
	(3 questions from each unit)	1 mark each

The above pattern is for all papers of each semester of B. Sc. II, w.e.f. 2018-2019 and B.Sc. III from subsequent years.

Details of the Syllabus

B.Sc. (Second Year)

Subject: Electronics

Scheme for Semester-III

W.E.F. 2018-19

Paper	No. of Periods per week (48 minutes each)			Marks				
	Lecture	Practical	Tutorial	Theory	Internal Assessment	Theory Total	Practical	Total
Paper – I (USELT05) Power Amplifier, Oscillators and Power Supplies	3	6	2	50	10	120	30	150
Paper – II (USELT06) Microprocessor	3			50	10			

CHOICE BASED CREDIT SYSTEM

B.Sc. SEM III

ELECTRONICS

Paper – I (USELT05)

(Power Amplifier, Oscillators and Power Supplies)

Theory : 48 Lectures **Credit : 02**

Unit-I

Power amplifier: Introduction to power transistor, difference between voltage and power amplifier, class A amplifier with resistive load and its efficiency, transformer coupled class A power amplifier and its efficiency, push pull amplifier, complimentary- symmetry power amplifier. 12L

Unit-II

Oscillator:- Introduction, Barkhausen criterion for oscillation, frequency determination device,

L-C oscillator citrcuit, phase shift oscillator, Wein bridge oscillator , transistor Colpitts oscillator and Hartley oscillator (frequency derivation not required).

(Numaricals on determination of frequency of different oscillators using equations directly) . 12L

Unit-III

Power Supply: Unregulated DC Power Supply and its Disadvantages, Regulated DC Power Supply, Terms related to Regulated Power Supply, Concepts of Series and Shunt type Regulator, Zener regulator, Transistor Regulator, Series Pass Regulator, Short Circuit Protection.(Simple numaricals are expected). 12L

Unit-IV

IC Voltage Regulator: Advantage of Three Terminal Voltage Regulator, LM 317 Voltage Regulator: Functional block diagram, Working and Application, IC 78XX, IC 79XX three terminal Regulators, Dual power supply using IC 78XX and 79XX. (Numerical based on design of IC-78XX, IC-79XX and LM 317 Regulators are expected). 12L

Reference Books

1. Integrated Electronics by Botkar
2. Fundamental Digital Electronics - Floyd
3. Elements of Electronics by, Singh, Bagade
4. Principle of Electronics by, V. K. Mehta
5. Electronics Devices and Circuit by, Allen Mottershed
6. Monograph Circuit Design by, Goyal and Khetan.
7. Basic electronics – B.L. Thareja
8. Electronics, Discrete and integrated Circuits – Y. M. Bapat
9. Basic electronics Linear Circuits – R. N. Bhargawa
10. Principle Electronics - Malvino
11. Electronics devices & circuits –Jocob Milliman & C. C. Hulkiyas
12. Integrated circuits –Jocob Milliman & C.C. Hulkiyas

Paper-II

(Microprocessor)

UNIT-I:

Microcomputer Organization : Input/Output Devices. Data storage (RAM and ROM), Computer memory. Memory organization & addressing. Memory Interfacing. Memory Map.

8085 Microprocessor Architecture: Main features of 8085. Block diagram. Pin-out diagram of 8085. Data and address buses. Registers. ALU. Stack memory. Program counter. Timing and Control Unit, Instruction decoder, Flags, PC & SP, Interrupts, Address and Data line multiplexing, Instruction and data Format. **12L**

UNIT-II:

Addressing Modes: Direct Addressing, Register Addressing, Register Indirect Addressing, Immediate Addressing and Implicit Addressing. *Instruction Set:* Data Transfer Group, Arithmetic Group, Logical Group, Branch Group, Stack, I/O and Machine Control Group. Flowchart and structured programming. Subroutine and stack operation. **12L**

UNIT-III:

8085 Programming : Instruction classification, Instructions set (Data transfer including stacks. Arithmetic, logical, branch, and control instructions). Subroutines, delay loops. Timing & Control circuitry. Timing states. Instruction cycle, Timing diagram of MOV
and MVI. Hardware and software interrupts. **12L**

UINT IV:

Intel 8086: Block Diagram and its explanation, Comparison of Intel 8085 and Intel 8086, Modes of 8086: Minimum and Maximum, Concept of Queue, Flag registers, Instruction Sets, Addressing modes and Simple Assembly Language Programming. **12L**

Reference Books:

1. Fundamentals of Microprocessor and Microcontrollers by B. Ram,
2. 8085 Microprocessor and its Applications, by A. Nagoor Kani. (Tata MGH Pub.)
3. Microprocessor, Architecture, Programming, and Applications with 8085 by Ramesh S. Gaonkar,
4. Microprocessors and Interfacing by Douglas V. Hall,
5. Digital circuits and microprocessors by Taub.
6. Introduction to microprocessor by A P Mathur.
7. Microprocessors and Interfacing techniques Rodney Zaks and Austin Lesea (BPB).
8. Microcomputer System the 8086/8088 Family: Gibson.
9. Microprocessor, Principles and Applications by Ajit Pal.
10. Microprocessors by K. M. Hebber and K.C. Shet.

Theory Internal Assessment (20 marks)

Sr. No.	Internal Assessment	P – I	P – II	T (20)
01	Assignment	02	02	04
02	Class Test	05	05	10
03	Adaptive Participation in routine class activities / seminars etc.	03	03	06
	Total	10	10	20

Note: An Industrial visit / Study tour should be arranged for the student after semester-III.

PRACTICALS (Conducted by internal examiner) (USELP03)

It is divided into two sections i.e. Section-A and Section-B. At least five experiments from each section must be performed and the practical record book duly signed should be submitted at the time of examination. Each student is expected to perform one experiment from each section, in the University Examination. The duration of practical examination is six hours.

Mark Distribution :

	Record	Experiment	Viva	Total
Section – A	3	9	3	15
Section – B	3	9	3	15
			Total	30

List of Experiments:

Section A

1. Study of Transformer couple Class A Amplifier.
2. Study of Push-Pull Amplifier.
3. Study of Unregulated Power Supply.
4. Study of Transistor Series Pass Regulator
5. Study of Zener Diode as a Voltage Regulator
6. Study of LM 317 and its uses as a Variable Voltage Regulator
7. Study of IC 78XX as voltage regulator.
8. Study of IC 79XX as voltage regulator.
9. Study of Wien Bridge Oscillator.
10. Study of Phase Shift Oscillator.

Section B

1. ALP (Microprpcessor-8085), for data transfer.
2. ALP (Microprpcessor-8085), for block of data transfer.
3. ALP (Microprpcessor-8085), for addition of 8-bit numbers (Hex and Decimal)
4. ALP (Microprpcessor-8085), for 8-bit subtraction.
5. ALP (Microprpcessor-8085), for multiplication.
6. ALP (Microprpcessor-8085), for Division
7. ALP (Microprpcessor-8085), for 1's and 2's complement of 8-bit numbers.
8. ALP (Microprpcessor-8085), for masking of 4 most and least significant bits of 8-bit numbers.
9. Study of ALU (IC74181).
10. ALP (Microprpcessor-8085), for conversion of Number System
11. Study of ALP using 8086 microprocessor for data transfer.
12. Study of ALP using 8086 microprocessor for addition.
13 Study of ALP using 8086 microprocessor for subtraction.
14. Study of ALP using 8086 microprocessor for multiplication and division.
15. Study of ALP using 8086 microprocessor for one's and two's compliment.

Details of the Syllabus

Second Year B.Sc.

Subject: Electronics

Scheme for Semester-IV

Paper	No. of Periods per week (48 minutes each)			Marks				
	Lecture	Practical	Tutorial	Theory	Internal Assessment	Theory Total	Practical	Total
Paper – I (USELT07) **Communication Electronics**	3	6	2	50	10	120	30	150
Paper – II (USELT08) **Interfacing, PPI devices and Microcontroller**	3			50	10			

CHOICE BASED CREDIT SYSTEM

B.Sc. SEM IV
ELECTRONICS

Paper – I (USELT07)
Communication Electronics

Theory: 48 Lectures **Credit: 02**

Unit I

Electronic communication: Introduction to communication, Block diagram of an electronic communication system. Electromagnetic communication spectrum, band designations and usage. Concept of Noise, signal-to-noise (S/N) ratio. Brief idea of frequency allocation for radio communication system in India (TRAI). Channels and base-band signals.

12L

Unit II

Analog Modulation: Need for modulation, Amplitude Modulation, modulation index and frequency spectrum. Amplitude Demodulation, Concept of Single side band generation and detection, Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM.

1**2L**

Unit III

Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver.

Analog Pulse Modulation: Channel capacity, Sampling theorem, Basic Principles- PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing. **12L**

Unit IV

Digital Pulse Modulation: Need for digital transmission, Pulse Code Modulation, Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK).

Satellite Communication– Introduction, need, Geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites.

Mobile Telephony System – Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, idea of GSM, CDMA, TDMA and FDMA technologies, GPS navigation system (qualitative idea only)

12 L

Reference Books:

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
2. Advanced Electronics Communication Systems- Tomasi, 6th edition, Prentice Hall.
3. Modern Digital and Analog Communication Systems, B.P. Lathi, 4th Edition, 2011,
4. Oxford University Press.
5. Electronic Communication systems, G. Kennedy, 3rd Edn., 1999, Tata McGraw Hill.
6. Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill
7. Communication Systems, S. Haykin, 2006, Wiley India
8. Electronic Communication system, Blake, Cengage, 5th edition.
9. Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press

Paper – II(USELT08)

Interfacing, PPI devices and Microcontroller

Theory: 48 Lectures **Credit:02**

Unit I:

Interfacing: Need of Interfacing, *Address space Partitioning*: Memory Mapped I/O Scheme and I/O Mapped I/O Scheme, *Memory and I/O interfacing*: *Memory interfacing, I/O interfacing, Data Transfer Schemes*: Programmed Data Transfer Schemes, Synchronous, Asynchronous and Interrupt driven data transfer, DMA data transfer scheme: burst mode &cycle stealing mode and their limitations. **12 L**

UNIT-II:

Interfacing devices: Introduction, Programmable Peripheral Interface (*PPI*) *Intel 8255*: Block diagram with discussion on each block, operating modes of 8255, Control Groups and Control Word, I/O Ports, *Programmable Counter/Interval Timer Intel 8253*: Schematic Diagram, Read/Write Logic, Control Word, Operation (Mode 0-Mode 5). *Programmable DMA Controller, Intel 8257*: Schematic Diagram, I/O signals. BSR (Bit Set/Reset) Mode.

12L

Unit III:

8051 microcontroller: Introduction and block diagram of 8051 microcontroller, architecture of 8051, overview of 8051 family, 8051 assembly language programming, Program Counter and ROM memory map, Data types and directives, Flag bits and Program Status Word (PSW) register, Jump, loop and call instructions. **12 L**

Unit IV:

8051 I/O port programming: Introduction of I/O port programming, pin out diagram of 8051 microcontroller, I/O port pins description & their functions, I/O port programming in 8051 (using assembly language), I/O programming: Bit manipulation.

8051 Programming: 8051 addressing modes and accessing memory locations using various addressing modes, assembly language instructions using each addressing mode, arithmetic and logic instructions. **12 L**

Ref. Books:

1. Fundamentals of Microprocessor and Microcontrollers by B. Ram,
2. Microprocessor, Architecture, Programming, and Applications with 8085 by Ramesh S. Gaonkar,
3. Microprocessors and Interfacing by Douglas V. Hall,
4. Digital circuits and microprocessors by Taub.
5. Introduction to microprocessor by A P Mathur.
6. Microprocessors and Interfacing techniques Rodney Zaks and Austin Lesea (BPB).
7. Microprocessor, Principles and Applications by Ajit Pal.
8. Microprocessors by K. M. Hebber and K.C. Shet.

Theory Internal Assessment (20 marks)

Sr. No.	Internal Assessment	P – I	P – II	T (20)
01	Assignment	02	02	04
02	Class Test	05	05	10
03	Adaptive Participation in routine class activities / seminars etc.	03	03	06
	Total	10	10	20

PRACTICALS (Conducted by internal examiner) (USELP04)

It is divided into two sections i.e. Section-A and Section-B. At least five experiments from each section must be performed and the practical record book duly signed should be submitted at the time of examination. Each student is expected to perform one experiment from each section, in the University Examination. The duration of practical examination is six hours.

Mark Distribution :

	Record	Experiment	Viva	Total
Section – A	3	9	3	15
Section – B	3	9	3	15
			Total	30

LIST OF EXPERIMENT

Section A

1. Study of Amplitude Modulation and Demodulation.
2. Study of VCO using IC 566
3. Study of PAM.
4. Study of PWM.
5. Study of ASK.
6. Study of FSK.
7. Study of PPM.
8. Study of PCM.
9. Study of FM using IC 565 PLL

Section B

1. Study of counter program using 8255 PPI and microprocessor 8085.
2. Study of SSD Interfacing using 8255 PPI and microprocessor 8085.
3. Study of LED Interfacing using 8255 PPI and microprocessor 8085.
4. Study of microcontroller-8051.
5. Study of ALP using 8051 microprocessor for data transfer.
6. Study of ALP using 8051 microprocessor for addition.
7. Study of ALP using 8051 microprocessor for subtraction.
8. Study of ALP using 8051 microprocessor for multiplication.
9. Study of ALP using 8051 microprocessor for division.