KARNATAK UNIVERSITY, DHARWAD
ACADEMIC (S&T) SECTION

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ

ಸ್ವಾತಂತ್ರ್ಯದ ಅಮೃತ ಮಹೋತ್ಸವ

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NAAC Accredited
'A' Grade 2014

website: kud.ac.in

No. KU/Aca(S&T)/JS/MGJ(Gen)/2024-25/ 1612 Date: 27 JUL 2024

ಅಧಿಸೂಚನೆ

ವಿಷಯ: ಸರಕಾರದ ಆದೇಶ ದಿನಾಂಕ: 08.05.2024 ಅನುಸಾರ 2024–25ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಪದವಿಗಳಿಗೆ NEP ಅಡಿಯಲ್ಲಿ ಪ್ರೋಗ್ರಾಂ ವಿನ್ಯಾಸ (Curriculum Structure)ದಂತೆ ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮದ ಅನುಷ್ಠಾನ ಕುರಿತು.

ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿಗಳು, ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 166 ಯುಎನ್ಇ 2023, ದಿ: 08.05.2024.
2. ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯಗಳ ಸಂ:2, 3, 4, 5, 6, 7, 8 & 9, ದಿ:16.07.2024.
3. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಅನುಮೋದನೆ ದಿನಾಂಕ: 27/07/2024

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ, ಉಲ್ಲೇಖ–01ರ ಸರಕಾರ ಆದೇಶಾನುಸಾರ 2024–25ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, ಈ ಕೆಳಗಿನ ಎಲ್ಲ ಸ್ನಾತಕ ಪದವಿಗಳ NEP ಅಡಿಯ ಪ್ರೋಗ್ರಾಂ ವಿನ್ಯಾಸ (Curriculum Structure)ದಂತೆ ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮ ರಚನೆ ಕುರಿತಾಗಿ ಸಂಬಂಧಿಸಿದ ಅಭ್ಯಾಸಸೂಚಿ ಮಂಡಳಿ ಹಾಗೂ ನಿಖಾಯಗಳ ಶಿಫಾರಸ್ಸನಂತೆ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ ಪದವಿಗಳ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ www.kud.ac.in ದಲ್ಲಿ ಭಿತ್ತರಿಸಲಾಗಿದೆ. ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲದಿಂದ ಡೌನಲೋಡ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತ ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕ.ವಿ.ವಿ.ಯ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅ.ನಂ.	ಪದವಿ				ಸೆಮಿಸ್ಟರ್
1	1	B.A	8	BTTM	1 ರಿಂದ 6ನೇ ಸೆಮಿಸ್ಟರ್
	2	BSW	9	B.Sc	
	3	B.Sc. (H.M)	10	BCA	
	4	B.Com	11	B.Com (CS)	
	5	B.Com (E-Commerce Operation)	12	B.Com (Retail Operations)	
	6	B.Com (Banking Financial Services & Insurance)	13	B.Com (Logistics)	
	7	BBA	14	BBA (Logistics Management)	
2	1	B.Sc (Data Science)	2	B.Sc (Artificial Intellgence & Machinery Learning)	1 ಮತ್ತು 2ನೇ ಸೆಮಿಸ್ಟರ್
3	1	BASLP	3	BPA	1 ರಿಂದ 8ನೇ ಸೆಮಿಸ್ಟರ್
	2	BVA	4	B.Sc. Pulp & Paper	

ಕುಲಸಚಿವರು.

ಅಡಕ: ಮೇಲಿನಂತೆ

ಗೆ,
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚೆ ಮೂಲಕ ಬಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:
1. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು / ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು / ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಂಡಳ (ಪಿ.ಜಿ.ಪಿಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ ಕೋರ್ಸುಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ / , ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ನೊಡಲ್ ಅಧಿಕಾರಿಗಳು, ಯು.ಯು.ಸಿ.ಎಂ.ಎಸ್. ಘಟಕ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ಎನ್.ಇ.ಪಿ. ನೊಡಲ್ ಅಧಿಕಾರಿಗಳು, ಸಿ.ಡಿ.ಸಿ. ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

KARNATAK UNIVERSITY, DHARWAD

B.Sc.(ELECTRONICS)

SYLLABUS

With Effect from 2024-25

DISCIPLINE SPECIFIC CORE COURSE (DSC) FOR SEM I -VI

SKILL ENHANCEMENT COURSE (SEC) FOR SEM IV/V/VI

and ELECTIVE COURSES FOR SEM V AND VI

ASPER NEP (Revised): 2024

Karnatak University, Dharwad
B.Sc.in ELECTRONICS
Effective from 2024-25

SEM.	Type ofCourse	Theory/ Practical	Course Code	CourseTitle	Instructionhour/ week	Totalhours / sem	DurationofExam	Marks			Credits
								Formative	Summative	Total	
I	DSC-1	Theory	**C 1 ELE 1 T 1**	ELECTRONIC DEVICES AND CIRCUITS	04hrs	60	03hrs	20	80	100	04
	DSC-2	Practical	**C 1 ELE 1 P 1**	ELECTRONIC DEVICES AND CIRCUITS	04hrs	56	03hrs	10	40	50	02
II	DSC-3	Theory	**C 2 ELE 1 T 1**	ANALOG AND DIGITAL ELECTRONICS	04hrs	60	03hrs	20	80	100	04
	DSC-4	Practical	**C 2 ELE 1 P 1**	ANALOG AND DIGITAL ELECTRONICS	04hrs	56	03hrs	10	40	50	02
III	DSC-5	Theory	**C 3 ELE 1 T 1**	DIGITAL DESIGN USING VERILOG AND PROGRAMMING IN C	04hrs	60	03hrs	20	80	100	04
	DSC-6	Practical	**C 3 ELE 1 P 1**	DIGITAL DESIGN USING VERILOG AND PROGRAMMING IN C	04hrs	56	03hrs	10	40	50	02
IV	DSC-7	Theory	**C 4 ELE 1 T 1**	COMMUNICATION	04hrs	60	03hrs	20	80	100	04
	DSC-8	Practical	**C 4 ELE 1 P 1**	COMMUNICATION	04hrs	56	03hrs	10	40	50	02
V	DSC-9A	Theory	**C 5 ELE 2 T 1**	EMBEDDED CONTROLLERS	04hrs	60	03hrs	20	80	100	04
	DSC-10A	Practical	**C 5 ELE 2 P 1**	EMBEDDED CONTROLLERS	04hrs	56	03hrs	10	40	50	02
	DSC-9B	Theory	**C 5 ELE 2 T 2**	EMBEDDED CONTROLLERS AND PYTHON	04hrs	60	03hrs	20	80	100	04
	DSC-10B	Practical	**C 5 ELE 2 P 2**	EMBEDDED CONTROLLERS AND PYTHON	04hrs	56	03hrs	10	40	50	02
VI	DSC-11A	Theory-	**C 6 ELE 2 T 1**	SIGNALS AND SYSTEMS,OPTICAL FIBER AND CELLULAR COMMUNICATION	04hrs	60	03hrs	20	80	100	04
	DSC-12A	Practical	**C 6 ELE 2 P 1**	SIGNALS AND SYSTEMS,OPTICAL FIBER AND CELLULAR COMMUNICATION	04hrs	56	03hrs	10	40	50	02
	DSC-11B	Theory-	**C 6 ELE 2 T 2**	SIGNALS AND SYSTEMS,MICROWAVE AND RADAR COMMUNICATION	04hrs	60	03hrs	20	80	100	04
	DSC-12B	Practical	**C 6 ELE 2 P 2**	SIGNALS AND SYSTEMS,MICROWAVE AND RADAR COMMUNICATION	04hrs	56	03hrs	10	40	50	02
V	EC-1	Theory	**C 5 ELE 5 T 1**	BASIC ELECTRONICS I	03hrs	45	03hrs	20	80	100	03
VI	EC-2	Theory	**C 6 ELE 5 T 1**	BASIC ELECTRONICS II	03hrs	45	03hrs	20	80	100	03
IV/V/VI **	Skill	Practical	**C 0 ELE 6P 1**	PCB DESIGN AND SIMULATION	04hrs	56	03hrs	10	40	50	02

* Student shall study either DSC 9A and DSC10A or DSC 9B and DSC10B in 5th semester. Similarly, DSC 11A and DSC12A or DSC 11B and DSC12B in 6th semester.

** Student shall study Skill of this subject either in 4th / 5th / 6th but not in all the semesters.

Karnatak University, Dharwad
B.Sc. ELECTRONICS

Programme Specific Outcomes (PSO):

On completion of the 03 years Degree in Electronics students will be able to:

- Demonstrate, solve and understand the major concepts in all the disciplines of Electronics.
- Understand practical skills so that they can understand and assess risks and work safely and competently in the laboratory.
- To apply standard methodology to the solutions of problems in Electronics.
- Provide students with the ability to plan and carry out experiments independently and assess the significance of outcomes.
- Develop in students the ability to adapt and apply methodology to the solution of unfamiliar types of problems.
- Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of experiments in Electronics.
- To build confidence in the candidate to be able to work on his own in industry and institution of higher education.
- To develop an independent and responsible work ethics.

B.Sc. Semester–I

Discipline Specific Course(DSC)

Course Title:- ELECTRONIC DEVICES AND CIRCUITS

Course Code: C 1 ELE 1 T 1

Type ofCourse	Theory /Practical	Credits	Instructionhour perweek	TotalNo.ofLectures/Hours /Semester	Durationof Exam	FormativeAssessment Marks	Summative assessmentMarks	TotalMarks
DSC-1	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the courses tudents will be able to:

CO1. Ability to apply knowledge of logical thinking and basic science for solving Electronic related issues.

CO2. Ability to perform Electronic experiments, as well as to analyze and interpret data.

CO3. Ability to design and manage electronic systems or processes.

CO4. Ability to identify and understand various electronic devices.

CO5. Ability to apply Network theorems for circuit analysis.

CO6. Ability to use modern tools/techniques.

CO7: Gain basic knowledge about amplifiers and different number systems.

Unit	Title: ELECTRONIC DEVICES AND CIRCUITS	60 hrs/sem
Unit I	Electronic Components: Electronic passive and active components, types and their Properties, Concept of Voltage and Current Sources, electric energy and power(Qualitative only). Network Theorems: Thevenin's, Norton's, Maximum Power Transfer, Superposition and Reciprocity Theorems. (Statement, proof, simple numerical problems applicable to DC only) PN junction diode: Ideal and practical diodes, formation of Depletion Layer, barrier potential. I-V characteristics. Idea of static and dynamic resistance, Zener diode, Reverse saturation current, Zener and avalanche breakdown. Rectifiers-Half wave and Full wave (center tap and bridge) rectifiers, expressions for Output voltage, ripple factor and Efficiency. (Solve Numerical examples wherever applicable).	15hrs
Unit II	Filters: Importance of filters in power supply. Shunt capacitor filter,its ripple factor, L-C section filter, C-L-C filter and its ripple factor, comparison of these filters. Voltage regulator: Block diagram of regulated power supply, Line and Load regulation, Zener diode as voltage regulator – circuit diagram, load and line regulation, disadvantages. Fixed and Variable IC Voltage Regulators (78xx, 79xx, LM317). Special Semiconductor Diodes: Varactor diode, Schottky diode, Tunnel diode, Construction, characteristics, working, symbol, and applications for each. LED andSolar cell – construction, operation and applications. (Numerical problems, wherever applicable)	15hrs

Unit III	Bipolar Junction Transistor: types of transistors, C-E, C-B and C-C configurations (mention only), characteristics of transistor in C-E configuration, Regions of operation (active, cut off and saturation), Current gains Alpha, Beta and gamma and their inter-relations. Dc load line and Q point. Application of transistor as amplifierand switch – circuit and working. (Numerical examples wherever applicable).Transistor Biasing: Need for stabilization, stability factor, Thermal run away, thermal reststance. Different biasing circuits-Fixed Bias and Voltage Divider Bias. Amplifier: Transistor as a two-port network, h-parameter Equivalent circuit, Small signal analysis of single stage C-E amplifier using h-parameters, expressions for Input and Output impedances, Current and Voltage gains. Class A, B and C Amplifiers (qualitative). Types of coupling, Two stage RC Coupled Amplifier - circuit, working and its Frequency Response. (Solve Numerical examples wherever applicable).	15hrs
Unit IV	Number System: Decimal, Binary, Octal and Hexadecimal number systems, base conversions. Representation of signed and unsigned number system, 1's and 2's complement, Binary arithmetic; addition, Subtraction by 1's and 2's complement method, BCD code (8421, 2421, Excess-3), Gray code. Boolean Algebra: Boolean laws and fundamental theorems. Logic gates- AND , OR, NOT, Positive and negative logic, Derived logic gates (NAND, NOR, XOR & XNOR).De Morgan's Theorems, simplification of Boolean expressions,realization of Boolean equations using logic gates, Universal Property of NOR and NAND gates.	15hrs

Recommended books:

1. Electronic devices and circuit theory by Robert Boylestad.
2. Electronic devices and circuit theory by J B Gupta.
3. Electronic devices and circuit theory by David A Bell.
4. Digital Electronics by Malvino and Leach.
5. Basic Electronics and Linear circuits –Bhargav, Kulashreshta, Gupta.
6. Analog and Digital Electronics by A.P Godse and U.A.Bakshi.

FormativeAssessmentforTheory	
AssessmentOccasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20 Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester–I

Discipline Specific Course(DSC)

Course Title ELECTRONIC DEVICES AND CIRCUITS (Practical)

Course Code: C 1 ELE 1 P 1

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessment Marks	Total Marks
DSC-2	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Study and analyse basic networks using network theorems.

CO2: Describe the behavior of basic semiconductor devices.

CO3: Reproduce V-I characteristics of basic semiconductor devices.

CO4: Reproduce frequency response of BJT amplifiers.

CO5: Understand the basic knowledge of building blocks of digital systems,

List of the Experiments, each will have 4rs / Week

Minimum of eight experiments from the following to be performed,

1. Measurement of voltage and frequency using CRO.
2. Verification of Thevenin's theorem and Norton's theorem.
3. Verification of Superposition theorem.
4. Study of V-I characteristics of Zener diode.
5. Study of V-I characteristics of LED of two different colours.
6. Study of Bridge rectifier without and with shunt capacitor filter.
7. Study of zener diode as voltage regulator using bridge rectifier.
8. Study of Transistor in C-E configuration-determination of h-parameters.
9. Study of single stage R-C coupled C-E amplifier(frequency response).
10. Verification of truth tables of NOT, OR,AND,NAND,NOR XOR and XNOR gates using ICS.
11. Universal property of NAND and NOR gates.
12. Binary to gray and Gray to Binary conversion using IC 7486.

B.Sc. Semester– II

Discipline Specific Course (DSC)

Course Title: ANALOG AND DIGITAL ELECTRONICS

Course Code: C 2 ELE 1 T 1

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summative assessmen tMarks	Total Marks
DSC-3	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1. Understand and analyse VI characteristics of various MOSFET devices.
CO2. Apply standard device models to explain/calculate critical internal parameters of semiconductors devices.
CO3. Explain the behavior and characteristics of power devices such as UJT, SCR, Diac, Triac etc.
CO4. Understand the concept of feedback and oscillators.
CO5. Calculate various device parameter values from their VI characteristics.
CO6. Understand the block diagrams and applications of linear ICs .
CO7. Understand basic logic gates, concepts of Boolean algebra and techniques to reduce/simplify Boolean expressions.
CO8. Analyze combinatorial and sequential circuits.

Unit	**Title: ANALOG AND DIGITAL ELECTRONICS**	**60 hrs/ sem**
Unit I	JFET: Types – p-channel and n-channel, working and VI characteristics, n-channel JFET, parameters and their relationships, Comparison of BJT and JFET. MOSFET: Depletion and enhancement type MOSFET, n-channel and p-channel, symbols, Construction, working and characteristics, CMOS – inverter circuit, working and characteristics. UJT: construction, working, equivalent circuit and VI characteristics, intrinsic stand-off ratio, relaxation oscillator. SCR: Construction, VI characteristics, working and applications – HWR and FWR. Triac – construction, working and characteristics, application of triac as an electronic switch.Diac-construction, working and characteristics application of Diac as a lamp dimmer.(Numerical examples wherever applicable)	15 hrs
Unit II	**Concept of feedback** : negative and positive feedback, advantages of negative feedback (qualitative) **Op-Amp:** Differential Amplifier and its types(mention), Block diagram of Op-Amp, Equivalent circuit,Characteristics of an Ideal Op-Amp, Operational amplifier parameters-input bias current,input offset voltage,output offset voltage,input offset current,input and output resistance,CMRR,slew rate and PSRR,concept of Virtual ground.Closed loop non-inverting and inverting operational amplifier(derivation of voltage gain,input resistance). **Applications of Op-Amp:** Summing and Difference Amplifiers, Differentiator, Integrator, Comparator and Zero-Crossing detector.	15 hrs

	Oscillators: Barkhausen criterion for sustained oscillations, Colpitt's oscillator and phase shift oscillators using transistor (no derivation) **IC 555Timer**: Introduction, Block diagram, Astable and Monostablemultivibrator circuits.(Numerical Examples wherever applicable).	
Unit III	**Combination Logic Circuits:** Standard representation of logic functions-– SOP and POS, Minterm, Maxterm, Simplification of Boolean expressions, Minimisation techniques using k-maps up to 4 variables. **Digital to Analog converter:** DAC with binary weighted resistor and R-2R resistor ladder network. Analog to Digital Convertor: Successive approximation method, performance characteristics. **Design of Arithmetic logic Circuits:** Half Adder, Full Adder, Half Subtractor, Full Subtractor, 4- bit parallel binary adder, 2-bit and 4-bit magnitude comparator. Encoder, decimal to BCD priority encoder. Decoder, 2:4 decoder using AND gates, 3:8 decoder using NAND gates, BCD to decimal decoder, BCD to 7-segment decoder, Multiplexer -4:1 and 8:1 multiplexer, Demultiplexer, 1:4 and 1:8 demultiplexer – logic diagram and truth table of each.	15 hrs
Unit IV	**Sequential Logic Circuits:** Flip-Flops- SR Latch, RS, D and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Racearound conditions in JK Flip-Flops. Master-Slave JK and T Flip-Flops. Applications of Flip-Flops insemiconductor memories, RAM, ROM and types. **Registers and Counters:** Types of Shift Registers, Serial Registers, Serial-in-Serial-Out, Serial-in Parallel-out, Parallel-in-Serial-Out and Parallel-in-Parallel-Out Shift Registers(only up to 4 bits), applications. Ring counter, Johnson counter applications. Asynchronous Counters: Logic diagram, Truth table and timing diagrams of 4 bit ripple counter, modulo-n counters, 4bit Up-Down counter, Synchronous Counter, 4-bit counter, Decade counter using J-K flip-flop.	15hrs

Recommended books:

1. Electronic devices and circuit theory by Robert Boylestad.
2. Electronic devices by Thomas Floyd.
3. Electronic devices and circuits David A Bell, 5th Edition, Oxford University press.
4. Op Amps and linear Integrated circuit by R A Gayakwad
5. Operational amplifiersar ICs by David A Bell, Oxford University press.
6. Linear Integrated Circuits by Roy Choudhary and Shail Jain.

FormativeAssessmentforTheory	
AssessmentOccasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester–II

Discipline Specific Course(DSC)

Course Title: ANALOG AND DIGITAL ELECTRONICS (Practical)

Course Code: C 2 ELE 1 P 1

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-4	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Reproduce the VI characteristics of various MOSFET device

CO2. Explain the behavior and characteristics of power devices such as UJT, SCR, Diac, Triac etc.

CO3. Perform experiments for studying the behavior of semiconductor devices.

CO4. Calculate various device parameter values from their VI characteristics.

CO5. Interpret the experimental data for better understanding of the device behavior.

CO6. Understand basic concepts of Boolean algebra and techniques to reduce/simplify Boolean expressions.

CO7. Design and analyze combinational and sequential circuits.

List of the Experiments, each will have 4rs / Week

Minimum of eight experiments from the following are to be performed

1. Study of JFET characteristics
2. UJT characteristics
3. UJT relaxation oscillator
4. SCR as power control device.
5. Inverting/Non-inverting operational amplifier.(DC/AC)
6. OP-AMP as adder and subtractor.
7. Colpitts Oscillator using Transistor.
8. Half adder and Full adder using logic gates.
9. Half Subtractor and Full Subtractor.
10. Study of clocked RS, D and JK flip-flop using NAND gates.
11. Study of 4 bit asynchronous counter using JK flip-flop(IC-7476).
12. Astablemultivibrator using IC -555 timer.

B.Sc. Semester–III

Discipline Specific Course(DSC)-

Course Title: - Digital Design using Verilog and Programming in C

Course Code: C 3 ELE 1 T 1

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-5	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs):Attheend ofthecoursestudentswillbeableto:

CO1: Understand Verilog as hardware description language which is used to model electronic systems.

CO2: Understand basics of system Verilog and development of digital design using Verilog.

CO3: Understand the basics of simulation and synthesis tools.

CO4: Understand basics of HDL, its syntax, data flow modeling and practical examples.

CO5: Build a strong foundation in programming and logical thinking.

CO6: Develop C-Programs.

CO7: Control the sequence of the program using control statements and looping.

CO8: Implement arrays and strings in the program.

Unit	Title: Digital Design using Verilog and Programming in C	60 hrs/ sem
UnitI	**Introduction to Verilog:** A Brief History of HDL, Structure of HDL Module, Comparison of VHDL and Verilog, Introduction to Simulation and Synthesis Tools, Test Benches. Verilog: Module, Delays, brief description - data flow style, behavioral style, structural style, mixed design style, simulating design. Language Elements- Introduction, Keywords, Identifiers, White Space Characters, Comments, format, Integers, reals and strings. Logic Values, Data Types-net types, undeclared nets, scalars and vector nets, Expressions: Operands, Operators, types of Expressions Gate level modeling - Introduction, built in Primitive Gates, multiple input gates, Tri-state gates, Illustrative Examples (both combinational and sequential logic circuits).	15 hrs
UnitII	**Data flow Modeling and Behavioral Modeling:** Data flow Modeling: Continuous assignment, net declaration assignments, delays, net delays and examples. Behavioral Modeling: Procedural constructs, timing controls, block statement, procedural assignments, conditional statement, The 'Case' Statement, 'If' and 'if-Else' Constructs, loop statement, 'Repeat' Construct, for loop, 'The Disable' Construct, 'While Loop', Forever Loop, procedural continuous assignment, Illustrative Examples	15 hrs

UnitIII	**Basics of "C"- Programming:** Brief explanation of basic block diagram of computer, Computer programming preliminaries, Algorithm, Flowcharts and their symbols, some simple examples. Introduction to C-programming, Importance of C, Character set, Basic Structure of C program, Execution of C, C tokens, key words, identifiers, Constants, Variables and data types,data type modifiers. Declaration of variables, assigning values to variables, defining symbolic constants,Formatted and unformatted Input and output statements,Operators and expressions (All type), Precedence of operators. Solve sufficient problems.	15 hrs
UnitIV	**Decision Making & Branching, Arrays and Functions:** Conditional & control statements- if statement, if-else statement, Nested if statement, Switch statement and goto- statement. Loop control structures- while, do-while and for statements. Arrays: One- and two-dimensional arrays, Declaration and initialization of arrays, multidimensional arrays. Strings: and initializing of string variables, reading and writing of strings, String handling functions. Functions: Function definition, arguments and parameters, local and global variable, Function declaration, simple C-programs using functions. Solve sufficient problems.	15hrs

Recommended books:

1. Digital Fundamentals: Thomas Floyd, Pearson publication Eleventh *Edition.*
2. Modern Digital Electronics: R.P. Jain, 3rd Edition, TMH Publications.
3. A Verilog HDL Primer – J. Bhasker, BSP, 2003 II Edition.
4. Verilog HDL-A Guide to Digital Design and Synthesis-Samir Palnitkar, Pearson, 2nd Edition.
5. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, 2004 IEEE
6. Fundamentals of Computers - V Rajaram, NeeharikaAdabala - PHI.
7. Computer Fundamentals - Peter Norton, McGraw-Hill Education.
8. Computer concepts and C-Programmimng, P.B. Kotur.
9. Let Us C, Yashavant Kanetkar, BPB Publications
10. Programming in ANSI C, Balagurusamy, 2nd edition, TMH.
11. Byron S Gottfried, Programming with C, Schaum Series

Formative Assessment for Theory	
Assessment Occasion/type	**Marks**
Internal Assessment Test1	05
Internal Assessment Test2	05
Assignment	10
Total	**20 Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester– III

Discipline Specific Course(DSC)

Course Title: Digital Design using Verilog and Programming in C(Practical)

Course Code: C 3 ELE 1 P 1

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-6	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Develop C Programs and execute them.

CO2: Control the sequence of the program and give logical outputs.

CO3: Implement strings in C program and will have ability to work with arrays.

CO4: Store different data types in the same memory.

CO5: Manage I/O operations in C program.

CO6: Able to write c programs using loop structures.

CO7: Understand the basics of Hardware Description Languages, Program structure and basic language elements of Verilog.

CO8: Understand types of modelling, modules, functions of Verilog and simulate and synthesize related Programs.

CO8: Design, Simulate and Synthesize various Verilog descriptions for Combinational circuits.

CO9: Design, Simulate and Synthesize various Verilog descriptions for Sequential circuits.

List of the Experiments, each will have 4rs / Week

Minimum of eight experiments from the following are to be performed

1. Realization of basic gates (OR, AND and NOT) using verilog code.
2. Simplify the given Boolean expressions and realize using verilogprogramme.
3. Realize Adder/subtractor (Full/Half) circuits using verilog data flow description.
4. Realize the following code converters using verilog behavioral description.
   a) Gray to Birary and Vice – Versa.
   b) Binary to excess 3 and vice-versa.
5. To realize counters: Up/down (BCD & Binary) using verilog behavioral description.
6. To realize using verilog behavioral description flip flops:
   a) JK - type (b) SR type (c) T-type (d) D-type.

7. To realize 4-bit ALU using verilogprogramme
8. C-Program to find i) area of a triangle ii) area of triangle when sides are given iii) area of a circle.
9. C-program using if-else statement i) to check whether given number is odd or even ii) to find whether a given integer is positive or negative.
10. C-program to find largest and smallest of given numbers.
11. C-program to find the roots of a quadratic equation.
12. C-program to illustrate switch statement.
13. C-program to find factorial of a number using while, do and for loops.
14. C-program to generate the Fibonacci series.
15. C-program to find sum of odd and even numbers using functions.
16. Write code to realize basic and sum & difference of two matrices using arrays.
17. C-program to find reverse of a number and to check whether it is a palindrome or not.

B.Sc. Semester–IV

Discipline Specific Course(DSC)

Course Title: - COMMUNICATION

Course Code: C 4 ELE 1 T 1

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-7	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1:Understand ionosphere, and different types of wave propagation.
CO2:Have knowledge about various modulation and demodulation techniques.
CO3:Understand block diagram of communication system.
CO4:Learn the communication satellite mechanics, block diagram of satellite communication system and applications of satellites.
CO5: Understand the introduction of antennas, their principle of operation and their types.
CO6:Understand the basics of digital communication.

Unit	Title: COMMUNICATION	60 hrs/ sem
UnitI	Classification of EM waves,propagation of radio waves(ground,sky,space),ionosphere and its layers,virtual height,critical frequency,skip distance,MUF and fading.**Modulation**:Need for modulation,types of modulation-AM,FM,PM.Amplitude modulation representation,modulation index,expression for instantaneous voltage,sidebands and power relation,AM collector modulator.FM-definition, modulation index,expression for FM modulated wave,deviation ratio and FM sidebands.**Demodulation:**Diode AM detector,Transistor AM detector,FM detector-Balanced slope detector,Foster Seeley discriminator and ratio detector(solve numerical problems)	15 hrs
UnitII	**Transmission and receivers:** Block diagram of AM and FM transmitter,characteristics of radio receiver-sensitivity,fiedility,selectivitysignal to noise ratio,noise figure and stability.AM receivers- Block diagram of straight radio receiver and superheterodyne receiver.Image frequency,intermediate frequency and its choice. Block diagram of FM superheterodyne receiver.Comparison of AM and FM.**Antenna:** Introduction,basic functions of radio antenna,antenna parameters,Yagi-uda antenna and dish antenna(principle,working and application. (solve numerical problems)	15 hrs
UnitIII	**Phase, Pulse and Digital Modulation** **Phase Modulation:** Definition, Description, Comparisonwith "FM". **Pulse Modulation:** Analog Pulse Modulation, Sampling Theorem PAM, PWM & PPM. **Digital Pulse Modulation:** Need, Pulse code modulation (PCM). **Digital Carrier Modulation:** Sampling, Quantizationand Encoding, Conceptof Amplitude Shift Key (ASK), FrequencyShift Key (FSK) and Phase Shift Key (PSK).	15 hrs

UnitIV	**Satellite Communication**:Introduction,Satellite Orbits & Positioning circular orbit & elliptical orbit, Satellite Height, apogee and perigee in case of elliptical orbits, satellite speed, satellite period, Kepler's Laws of planetary motion,Angle of elevation, Geosynchronous orbits, geostationary orbits, advantages of geostationary satellites. Satellite visibility, Satellite communication System: general block diagram. Repeaters and transponders (qualitative), up linking and down linking. Frequency allocation. transponders (C - Band), path loss, simplified block diagram of earth station,Satellite Applications: Discuss application of satellite in (1) communication (2) GPS (global positioning system) (3) weather forecasting (4) disaster management (5) agriculture.	15hrs

Recommended books:

1. G.K Mithal, "Radio Engineering Vol- II", Khanna Publishers, New Delhi.
2. K.D Prasad, "Antenna and Wave Propagation", Satyaprakashan, New Delhi.
3. Sanjeev Gupta, "Electronic Communication Systems", Khanna Publishers, New Delhi.
4. Roddy and Coolen, "Electronic Communication", PHI, IV Edition, 2012.
5. George Kennedy, "Electronics and Communication System", TMH, Edition, 2012.
6. Frenzel, "Principle of electronic communication system", III edition, Mc Graw Hill Publications.
7. S.Haykin, "Communication Systems", 2006, Wiley edition

FormativeAssessmentforTheory	
AssessmentOccasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20 Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester–IV

Discipline Specific Course (DSC)

Course Title: COMMUNICATION (Practical)

Course Code: C 4 ELE 1 P 1

Type of Course	Theory /Practical	Credits	Instruction hour per week	Total No.of Lectures/Hours /Semester	Duration of Exam	Formative Assessment Marks	Summativeassessment Marks	Total Marks
DSC-8	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Know the basic concepts of Analog Communication.

CO2: Understand the principle with which Analog Communication works.

CO3:Know the Various modulation techniques involved in radio communication before the transmission.

CO4:Know different detection process involved in receiver to detect the original signal and able to design “AM” and “FM” detectors.

CO5: Familiar with “AM” and “FM” super heterodyne receiver.

CO6: Understand the basic concept of Pulse Modulation and able to construct simple pulse modulation.

List of the Experiments, each will have 4rs / Week

Minimum of eight experiments from the following are to be performed

1. Construct amplitude modulator using transistor / I.C. Determination the modulation index.
2. Construct an A.F amplifier (R-C coupled amplifier). Determine the bandwidth and mid gain.
3. Construct Frequency Modulator Circuit – Determine the Modulation Index.
4. “AM” Linear Diode detector – Trace the input and output waveforms.
5. Study “AM” receiver.
6. Pulse Amplitude Modulation (PAM) - trace the output waveforms.
7. Pulse Width Modulation (PWM) – trace the output waveforms.
8. Pulse Position Modulation (PPM) - trace the output waveforms.
9. Amplitude Shift Keying (ASK).
10. Frequency Shift Keying (FSK).
11. Study the impedance characteristics of Microphone.
12. Study the Characteristics of loud speaker.

B.Sc. Semester–V

Discipline Specific Course(DSC)

Student shall select DSC 9A & 10 A or 9B & 10 B for 06 credits only

Course Title: - Embedded Controllers

Course Code: C 5 ELE 2 T 1

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-9A	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1: Understand the basic knowledge about microprocessors.

CO2: Identify and understand function of different blocks of 8051 microcontrollers.

CO3: Understand various I/O port operations, Timers, Serial port and Interrupts.

CO4: Able to write ALP programs.

CO5: Gain the knowledge to interface LCD, Keyboard, ADC, DAC, DC motor, etc.6

CO6: GainKnowledge about hardware programming.

CO7: Gain Knowledge about Arduino programming.

Unit	Title:Embedded Controllers	60 hrs/ sem
UnitI	**Microprocessor:** Introduction,basic block diagram of mp,speed,word size,memory capacity,classification of MP,MP8085,Features,architecture,internal registers,register pairs,flags,stalk pointer,program counter,types of buses,multiplexed address and data bus,pin description of 8085MP. **8051 Microcontroller**: - Features, Architecture- general purpose and special purpose/function registers, Program Status Word (PSW) register, SP, PC, DPTR,Pin diagram 8051, I/O ports functions, Internal memory organization, external memory (ROM and RAM) interfacing.	15 hrs
UnitII	**8051 Programming:** 8051 addressing modes: Immediate addressing, Register addressing, Direct addressing, Indirect addressing.Instructions set of 8051: Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions. Simple Assembly language program examples to use these instructions. 8051 Stack, Stack and Subroutine instructions, Assembly language program examples.	15 hrs
UnitIII	**8051 Microcontroller Hardware Programming in C:** Data types, declaring variables, time delays, I/O Programming, Timer Programming. Serial Communication- Basics of Serial Data Communication, RS-232 standard, 9 pin RS232 signals, UASRT Serial port programming.Interrupt programming, keyboard and LCD interfacing, DAC interfacing, Stepper motor and DC motor interfacing.	15 hrs

UnitIV	**Introduction to Embedded system:**Embedded systems and general-purpose computer systems,Architecture of embedded system, Classifications, applications and purpose of embedded systems. **Introduction to Arduino & Basic Concept of Arduino:** Pin configuration and architecture. Device and platform features. Concept of digital and analog ports. Familiarizing with Arduino Interfacing Board. Introduction to Embedded C and Arduino platform. Arduino data types. Variables and constants. Operators Control Statements Arrays Function. Pins Configured as INPUT, Pull-up Resistors. Pins Configured as OUTPUT.	15hrs

Recommended books:

1.Muhammad Tahir and KashifJaved, "ARM Microprocessor Systems: Cortex-M Architecture, Programming, and Interfacing".

2.Kenneth J. Ayala, "The 8051 Microcontroller", 3rd Edition, Thomson/Cengage Learning,1997

3.Muhammad Ali Mazidi and Janice Gillespie and Rollin D, "The 8051 Microcontroller and Embedded Systems using assembly and C".

4.Tim Wilmshurst, "Designing Embedded Systems with PIC Microcontrollers: Principles and applications".

5. A P Godse and Dr D A Godse'Microprocessors and microcontrollers '.

6. B Ram 'Fundamentals of Godse'Microprocessors and microcontrollers'.

7. Introduction to embedded system, K.V. Shibu, 1st edition, 2009, McGraw Hill.

8.Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning.

9. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill. Arduino by Tony Neal.

10. A complete guide to Arduino by James Arthur.

FormativeAssessmentforTheory	
Assessment Occasion/type	**Marks**
Internal Assessment Test1	05
Internal Assessment Test2	05
Assignment	10
Total	**20 Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester–V

Discipline Specific Course(DSC)

Course Title: EMBEDDED CONTROLLERS (Practical)

Course Code:C 5 ELE 2 P 1

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-10A	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Develop assembly language programming skills.

CO2: Develop program for I/O port operations using C and execute them.

CO3: Develop program for Timers, Serial port and Interrupts using C and execute them.

CO4: Develop Arduino programming.

CO5:Develop Experimental skill to interface with Arduino.

List of the Experiments, each will have 4rs / Week

Minimum of eight experiments from the following are to be performed

Conduct the following experiments by using µC 8051 kit / Keil µVision IDE for 8051

1.ALP for Addition, subtraction.

2.ALP for multiplication and Division of 8-bit number

3.ALP for Addition and subtraction of two 16-bit number and store the result.

4.ALP to find 2's compliment of i) 8-bit and ii) 16-bit numbers.

5.ALP to find largest/Smallest of N given numbers.

6.ALP to arrange the numbers in ascending and descending order.

7.ALP to count number of o's and 1's of an 8-bit d

8. LED blinking using Arduino (Uno/Pro) /microcontroller.

9. Interfacing buzzer with Arduino/microcontroller.

10.Interfacing a relay with Arduino.

11. Light sensor using Arduino.

12. Exchanging data over short distance with Bluetooth using Arduino.

B.Sc. Semester–V

Discipline Specific Course(DSC)

Student shall select DSC 9B & 10 B or DSC 9A & 10 A for 06 credits only

Course Title: -EMBEDDED CONTROLLERS AND PYTHON

Course Code: C 5 ELE 2 T 2

Type ofCourse	Theory /Practical	Credits	Instructionhour perweek	TotalNo.ofLectures/Hours /Semester	Durationof Exam	FormativeAssessment Marks	Summative assessmentMarks	TotalMarks
DSC-9B	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1:Understand the basic knowledge about microprocessors.

CO2:Identify and understand function of different blocks of 8051 microcontrollers.

CO3: Understand various I/O port operations, Timers, Serial port and Interrupts.

CO4: Able to write ALP programs.

CO5: Gain the knowledge to interface LCD, Keyboard, ADC, DAC, DC motor, etc.6

CO6: Gain Knowledge about hardware programming.

CO7: Gain Knowledge Python programming.

Unit	**Title: EMBEDDED CONTROLLERS AND PYTHON**	**60 hrs/ sem**
UnitI	Microprocessor: Introduction,basic block diagram of mp,speed,word size,memory capacity,classification of MP,MP8085,Features,architecture,internal registers,register pairs,flags,stalk pointer,program counter,types of buses,multiplexed address and data bus,pin description of 8085MP. **8051 Microcontroller**: - Features, Architecture- general purpose and special purpose/function registers, Program Status Word (PSW) register, SP, PC, DPTR, Pin diagram 8051, I/O ports functions, Internal memory organization, external memory (ROM and RAM) interfacing.	15 hrs
UnitII	8051 Programming: 8051 addressing modes: Immediate addressing, Register addressing, Direct addressing, Indirect addressing.Instructions set of 8051: Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions. Simple Assembly language program examples to use these instructions. 8051 Stack, Stack and Subroutine instructions. Assembly language program examples on subroutine and involving loops.	15 hrs
UnitIII	**8051 Microcontroller Hardware Programming in C:** Data types, declaring variables, time delays, I/O Programming, Timer Programming. Serial Communication- Basics of Serial Data Communication, RS-232 standard, 9 pin RS232 signals, UASRT Serial port programming.Interrupt programming, keyboard and LCD interfacing, DAC interfacing, Stepper motor and DC motor interfacing.	15 hrs

UnitIV	**Introduction to Python:** History, Introduction to Python, Why Python? Features, setting up path, working with Python, Basic Syntax, Python Variables and Data Types, Operators with examples. **Conditional Statements:** If, If- else and Nested if-else statements with examples.**Looping:** For, While, Nested loops with examples.**String Manipulation**: Accessing Strings, Basic Operations, String slices, Function and Methods with examples. **Data Types (Lists, Tuples, Dictionaries):** Introduction, Accessing list, Operations, Working with lists, Function and Methods.	15hrs

Recommended books:

1. A P Godse and Dr D A Godse'Microprocessors and microcontrollers '.
2. B Ram 'Fundamentals of Godse'Microprocessors and microcontrollers'.
3. Muhammad Ali Mazidi and Janice Gillespie and Rollin D, "The 8051 Microcontroller and Embedded Systems using assembly".
4. Let us Python by YshavantKanetkar and Aditya Kanetkar.
5. Python programming by Shridhar,Indumati and Hariharan.

FormativeAssessmentforTheory	
AssessmentOccasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester– V

DisciplineSpecificCourse(DSC)

Course Title:EMBEDDED CONTROLLERS AND PYTHON (Practical)

Course Code:C 5 ELE 2 P 2

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-10B	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Develop assembly language programming skills.

CO2: Develop program for I/O port operations using C and execute them.

CO3: Develop program for Timers, Serial port and Interrupts using C and execute them.

CO4: Develop Python programming skills.

List of the Experiments, each will have 4rs / Week

Minimum of eight experiments from the following are to be performed

Conduct the following experiments by using µC 8051 kit / Keil µVision IDE for 8051,

1.ALP for Addition, subtraction.
2.ALP for multiplication and Division of 8-bit number
3.ALP for Addition and subtraction of two 16-bit number and store the result.
4.ALP to find 2's compliment of i) 8-bit and ii) 16-bit numbers.
5.ALP to find largest/Smallest of N given numbers.
6.ALP to arrange the numbers in ascending and descending order.
7.ALP to count number of o's and 1's of an 8-bit data.

Conduct the following experiments, by writing C programs on Keil µVision IDE, using 8051 kit / Proteus simulator,

8.To read 10 data from port P0 and store in internal RAM.
9.To read data from port P0 and send the data to P1 if it is even else send to P2 repeatedly.
10.To stop/start toggling of LED connected to P0, when there is an external hardware interrupt.
11. To toggle P0 bit for every 500ms continuously use TIMER 0 to generate time delay.
12. To send hex values of -4 to +4 to port P1.
13.To read switch status connected to P1.0 if switch is on set P2.0 on or if switch is off set P2.0off.
14. To toggle all the bits of P0 and P2 continuously with a 250ms delay.
15. Write and execute Python program to i) add two numbers ii) find largest of two numbers.
16. Write and execute Python program to find i) area of triangle ii) area of circle.
17. Write and execute Python program to check whether a number is prime or not.

B.Sc. Semester–VI

Discipline Specific Course(DSC)-

Student shall select DSC 11B & 12 B or DSC 11A & 12A for 06 credits only

Course Title: -SIGNALS AND SYSTEMS, OPTICAL FIBER AND CELLULAR COMMUNICATION

Course Code:C 6 ELE 2 T 1

Type ofCourse	Theory /Practical	Credits	Instructionhour perweek	TotalNo.ofLectures/Hours /Semester	Durationof Exam	FormativeAssessment Marks	Summative assessmentMarks	TotalMarks
DSC-11A	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1: Gain the knowledge on Signals and Systems

CO 2. Understand the operations on Signals

CO 3. Know the frequency domain representation of signals

CO 4. Distinguish between continuous-time and discrete-time signals and systems

CO 5. Find DTFS and IDTFS of the Signals

CO 6.Understand the basics of optical fiber and cellular communication.

Unit	Title- SIGNALS AND SYSTEMS , OPTICAL FIBER AND CELLULAR COMMUNICATION	60 hrs/ sem
UnitI	**Introduction to continuous-time and discrete-time signals:** Understanding signals and systems, some real-world examples of signals and systems. Mathematical and graphical representation of signals, Classification of signals: Continuous and discrete, periodic and non-periodic, even and odd, energy and power signals, related problems to enhance understanding of different signal types.Elementary signals – unit impulse, unit step, unit ramp, exponential and sinusoidal signals. Introduction to continuous-time and discrete-time systems, examples of systems, interconnections of systems.Properties of systems: Linear, Non-linear, time variance-invariance, causal-noncausal, memory-Memory less systems, feed-back in systems, stability, inverse systems.Operations on signals: amplitude scaling, shifting, folding, time scaling, addition of two signals etc., Time-domain representation of systems, Linear time-invariant systems.	15 hrs
UnitII	Convolution integral and convolution sum, properties of convolution, impulse and step response of systems, differential equation representation of LTI systems - natural response and forced responseproperties of LTI systems. Continuous-time Fourier series representation of periodic signals, convergence of Fourier series representation, Properties of continuous-time Fourier series-linearity, time shift, frequency shift, scaling, time differentiation, convolution and problems.Discrete-time Fourier Series (DTFS), properties of discrete-time Fourier series- linearity, time shift, frequency shift, scaling, time differentiation, convolution and problems on DTFS and IDTFS.	15 hrs

UnitIII	**Transmission Lines and optical fiber communications:** Transmission lines; Introduction, different types of transmission lines (parallel and coaxial lines), current and voltage relation on RF transmission line, definition ESWR and reflection coefficient. OFC;Introduction ,block diagram of optical fiber system, advantages, disadvantages and applications, fiber optic cable and its types(step index and graded index).Cable mode fiber (single mode and multimode), light propagation through fiber, critical angle, acceptance angle, expression for numerical aperture. Types of light sources and detectors, losses in optical fiber. Numerical problems wherever applicable.	15 hrs
UnitIV	**Cellular Communication and Wireless LANs:** Concept of cellular mobile communication – cell and cell splitting, frequency bands used in cellular communication, absolute RF channel numbers (ARFCN), frequency reuse, roaming and hand off, authentication of the SIM card of the subscribers, IMEI number, concept of data encryption, architecture (block diagram) of cellular mobile communication network, Multiplexing, FDMA, CDMA, TDMA, GSM.Wireless LAN requirements- Bluetooth, Wi-Fi, MIMO, LTE and 5G technology. Comparative study of GSM and CDMA, simplified block diagram of cellular phone handset, Major components of local area network-Primary characteristics of Ethernet-mobile IP, OSI model.	15hrs

Books recommended

1. Fiber Optic communication –Govind Agarwal.
2. Optical Fiber communication –Gerd Keyser.
3. David Tse, PramodViswanath 'Fundamentals of Wireless Communication', Cambridge University Press, 1st edition, 2005
4. Wayne Tomasi "Advanced Electronic Communication systems", - 6th edition, Low priced edition-Pearson education
5. Wayne Tomasi –"Electronic Communication systems, Fundamentals through Advanced
6. Radio Engineering—G K Mitthal.
7. Electronic Communication Systems- Kennedy & Davis.

FormativeAssessmentforTheory	
AssessmentOccasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester–VI

Discipline Specific Course (DSC)

Course Title: SIGNALS AND SYSTEMS, OPTICAL FIBER AND CELLULAR COMMUNICATION (Practical

Course Code: C 6 ELE 2 P 1

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-12A	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Learn features of MATLAB as a programming tool.

CO2: Use MATLAB as a simulation tool.

CO3: Learn graphic features of MATLAB.

CO4: Able to generate plot of test signals such as unit impulse,unit ramp,unit step etc.

CO5: Able to perform different operations on signals.

CO6: Understand basics of RADAR communication.

CO7: Understand basics of microwave communication.

List of the Experiments, each will have 4rs / Week

Minimum eight experiments of the following are to be performed

Write and execute following programs using MATLAB/OCTAVE/SCILAB, etc.

1.Generate and plot unit sample, unit step, ramp, real sequences
2.Generate and plot sinusoidal, cosinusoidal and periodic sequences
3.Generate even & odd components of a sequence
4.Perform amplitude scaling, time scaling, folding and time-shifting operations on signals
5.Perform addition, subtraction and multiplication operation on signals
6.Find the linear convolution of two finite duration sequen
7.Verify the sampling theorem.
8.Numerical aperture and acceptance angle of OFC.
9.Study of receiver characteristics of OFC.
10.Bending losses in OFC.
11.Study of Time Division Multiplexing and Demultiplexing.
12.Study of Frequency Multiplier.
13.QPSK modulator and demodulator.
14. Wave shaping circuits—clipping /clamping circuits.
15. Frequency selective circuits- Active Low pass/High pass filters.

B.Sc. Semester–VI

Discipline Specific Course(DSC)-

Student shall select DSC 11B & 12 B or DSC 11A & 12A for 06 credits only

Course Title: - SIGNALS AND SYSTEMS, MICROWAVE AND RADAR COMMUNICATION

Course Code:C 6 ELE 2 T 2

Type ofCourse	Theory /Practical	Credits	Instructionhou rperweek	TotalNo.ofLectur es/Hours /Semester	Durationof Exam	FormativeA ssessment Marks	Summative assessmen tMarks	TotalMa rks
DSC-11B	**Theory**	**04**	**04**	**60hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1: Gain the knowledge on Signals and Systems

CO 2. Understand the operations on Signals

CO 3. Know the frequency domain representation of signals

CO 4. Distinguish between continuous-time and discrete-time signals and systems

CO 5. Find DTFS and IDTFS of the Signals

CO 6. To understand the basics of Microwave communication.

CO 7. To understand the basics of RADAR communication.

Unit	Title: SIGNALS AND SYSTEMS , MICROWAVE AND RADARCOMMUNICATION	60 hrs/ sem
UnitI	**Introduction to continuous-time and discrete-time signals:** Understanding signals and systems, some real-world examples of signals and systems. Mathematical and graphical representation of signals, Classification of signals: Continuous and discrete, periodic and non-periodic, even and odd, energy and power signals, related problems to enhance understanding of different signal types. Elementary signals – unit impulse, unit step, unit ramp, exponential and sinusoidal signals. Introduction to continuous-time and discrete-time systems, examples of systems, interconnections of systems. Properties of systems: Linear, Non-linear, time variance-invariance, causal-noncausal, memory-Memory less systems, feed-back in systems, stability, inverse systems. Operations on signals: amplitude scaling, shifting, folding, time scaling, addition of two signals etc., Time-domain representation of systems, Linear time-invariant systems.	15 hrs
UnitII	Convolution integral and convolution sum, properties of convolution , impulse and step response of systems, differential equation representation of LTI systems-Natural response and forced response, properties of LTI systems. Continuous-time Fourier series representation of periodic signals, convergence of Fourier series representation, Properties of continuous-time Fourier series-linearity, time shift, frequency shift, scaling, time differentiation, convolution and problems.Discrete-time Fourier Series (DTFS), properties of discrete-time Fourier series- linearity, time shift, frequency shift, scaling, time differentiation, convolution and problems on DTFS and IDTFS.	15 hrs

UnitIII	**MicrowavedevicesforCommunication:**RF/Microwaves,EMspectrum,Wavelengthandfrequency, rectangular waveguides, circular waveguides, microwave cavities, microwave hybridcircuits, directional couplers, circulators and isolators, GUNN diode, READ diode, IMPATT diode, BARITT diode, PIN diodes, Schottky barrier diodes, Multicavity Klystron, Magnetron, blockdiagram of Microwave communication and working, Applications.	15 hrs
UnitIV	**RADAR Communication Systems:** RADAR principles, frequencies and powers used in RADAR, maximum Unambiguous range, detailed block diagram of pulsed RADAR system,RADAR range equation-derivation, factors influencing maximum range, effect of ground on RADAR antenna characteristics, doppler effect, expression for Doppler frequency. MTIRADAR-block diagram, working, CWRADAR-block diagram, working, advantages, applications and limitations, FMCWRADAR-block diagram, numerical examples wherever applicable.	15hrs

Recommended books:

1.Digital Signal Processing, Tarun Kumar Rawat, 2015, Oxford University Press, India.

2. Digital Signal Processing, S. K. Mitra, McGraw Hill, India.

3.Fundamentals of Digital Signal processing using MATLAB, R.J. Schilling and S.L. Harris, 2005, Cengage Learning

4. Principles of Signal Processing and Linear Systems, B.P. Lathi, 2009, 1st Edn. Oxford University Press.

5.Fundamentals of signals and systems, P.D. Cha and J.I. Molinder, 2007, Cambridge University Press.

6. Digital Signal Processing Principles Algorithm & Applications, J.G. Proakis and D.G. Manolakis, 2007, 4th Edn., Prentice Hall.

7.Communication and Radar systems Nicolaos s Tzannes

8.Microwave ana Radar engineering by Vinit Chauhan

9. Microwave devices and circuits by Samuel Y Liao

FormativeAssessmentforTheory	
AssessmentOccasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester–VI

Discipline Specific Course(DSC)

Course Title: SIGNALS AND SYSTEMS, MICROWAVE AND RADAR COMMUNICATION (Practical)

Course Code: C 6 ELE 2 P 2

Type of Course	Theory /Practical	Credits	Instructionhourperweek	TotalNo.ofLectures/Hours /Semester	Durationof Exam	Formative Assessment Marks	Summative assessment Marks	TotalMarks
DSC-12B	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Learn features of MATLAB as a programming tool.

CO2: Use MATLAB as a simulation tool.

CO3: Learn graphic features of MATLAB.

CO4: Able to generate plot of test signals such as unit impulse,unit ramp,unit step etc.

CO5: Able to perform different operations on signals.

CO6: Understand basics of RADAR communication.

CO7: Understand basics of microwave communication.

List of the Experiments, each will have 4rs / Week

Minimum eight experiments of the following are to be performed.

Write and execute following program usingMATLAB/OCTAVE/SCILAB, etc.

1.Generate and plot unit sample, unit step, ramp, real sequences
2.Generate and plot sinusoidal, cosinusoidal and periodic sequences
3.Generate even & odd components of a sequence
4.Perform amplitude scaling, time scaling, folding and time-shifting operations on signals
5. Addition, subtraction and multiplication operation on signals
6.Find the linear convolution of two finite duration sequence.
7.Verify the sampling theorem
8.Find the i) auto-correlation of a sequence ii) cross-correlation of two finite duration sequences
9. Pulse code modulation and demodulation.
10. Frequency selective circuits- Active Low pass/High pass filters.
11. Study of Notch filters.
12. Study of switched mode regulator using PWM.
13. Wave shaping circuits—clipping /clamping circuits.
14.Determination of V-I Characteristics curve of a Gunn Diode.

B.Sc. Semester– V

Elective Course(EC)-
It is for other combination students

Course Title: -BASIC ELECTRONICS I
Course Code: C 5 ELE 5 T 1

Type ofCourse	Theory /Practical	Credits	Instructionhour perweek	TotalNo.ofLectures/Hours /Semester	Durationof Exam	FormativeAssessment Marks	Summative assessmentMarks	TotalMarks
EC-1	**Theory**	**03**	**04**	**.45hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1: Understand the development and scope of electronics.

CO2:Gain knowledge about applications of Electronics.

CO3:Know the principles of Electricity and basic laws

CO4: Understand the concept of networks and theorems in network analysis.

Unit	Title: BASIC ELECTRONICS I	45 hrs/ sem
UnitI	**Introduction to Electronics and Principles of Electricity:** **Introduction to Electronics:** Electronics and its scope : Development of vaccum tube devicessemiconductordevicesIntegratedcircuits,microprocessorsandmicrocontrollers. Applicationsofelectronics entertainment, communication, defense,industial, medical, Impact of electronics on quality of life. **Principles of Electricity:** Charge-positive and negativecharges,properties of charges,charge of an electron,number of electrons in one coulomb of charge,electric current–definition its unit and directionof current – conventional current and the electronic current .Potential difference and its unit related to electric circuit,Ohm's law –Statement and limitations,applicationto circuits.Resistance and its unit, electric power,electric energy. Combination of resistors, open and short circuit.Kirchhoff's current law and Kirchhoff's voltage law ,current and voltage division rule.(Sufficient number of numerical problems must be solved)	15 hrs
UnitII	**Passive electronic components, Application of DC and AC to passive components** **Passive electronic components:** Introduction, resistors, types of resistors, capacitors, principle of capacitor, energy stored in a capacitor, types of capacitors andcombination of capacitors. Inductors, self-inductance, mutual inductance, combination of inductors, energy stored in an inductor,choke,transformer,types of transformer,transducers,loudspeakes,microphone. **Application of DC and AC to passive components :** RC time constant ,charging of a capacitor(growth voltage),discharging of capacitor through resistor(decay voltage),L/R time constant, growth and decay of current through R-L circuit.AC applied to passive component :LCR series, resonance circuit, quality factor ,band width, RC low pass and high pass filter. (Sufficient number of numerical problems must be solved)	15 hrs

UnitIII	**Current and voltage sources and Network theorems:** **Current and voltage sources**: Sources of electric power, internal impedance of a source. Concept of voltage source: ideal voltage source, practical voltage source. Concept of current source: ideal current source, practical current source, equivalent between voltage source and current source, conversion of voltage source into current source and vice versa **Network theorems:** Thevenin's theorem, Nortan's theorem, Maximum power transfer theorem, Super position theorem, Reciprocity theorem(statement, and proof) all theorems with respect to DC circuits. (Sufficient number of numerical problems must be solved)	15 hrs

Recommended books:

1. Basics of electronics(solid state)-BL Theraja
2. Basics Electronics and linear circuits-N n Bhargava and others
3. Electronic principles –B.Basavaraj (vol-1)
4. Handbook of Electronics-Gupta Kumar
5. Basic and applied electronics-Bandopadhyay
6. Electronics –Dr.R.K.Kar.
7. Electronic devices and Circuits-David A Bell
8. Principles of Electronics- V.K.Mehta and Rohit Mehta

Formative Assessment for Theory	
Assessment Occasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20 Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester– VI

Elective Course(EC)

It is for other combination students

Course Title: -BASIC ELECTRONICS II

Course Code:C 6 ELE 5 T 1

Type ofCourse	Theory /Practical	Credits	Instructionhour perweek	TotalNo.ofLectures/Hours /Semester	Durationof Exam	FormativeAssessment Marks	Summative assessmentMarks	TotalMarks
EC-2	**Theory**	**03**	**03**	**45hrs.**	**3hrs.**	**20**	**80**	**100**

Course Outcomes (COs): At the end of the course students will be able to:

CO1: Gain knowledge about basics of semiconductors.

CO2: Understand the Formation of semiconductor materials.

CO3:Gain knowledge about power supply.

CO4: Understand basics of number systems and their interconversions

CO5:Gain knowledge about basic building block of logic design.

Unit	Title: BASIC ELECTRONICS II	45 hrs/ sem
UnitI	**Semiconductor theory and diode**: Semiconductors: semiconductor materials, structure of an atom,atomic structureof some elements ,electron energies,energy bands of in solids,metals, insulators,semiconductors,hole formationand its movement,types of semiconductors,intrinsic semiconductor,extrinsic semiconductors,electron current and hole current,N-type and P-type semiconductor,majority and minority charge carriers, effect of temperature on extrinsic semiconductors.P-N junction theory, effect of temperature on barrier potential,current components in an open circuited P-N junction, biasing P-N junction, forward bias and reverse bias P-N junction.Ideal and practical diodes,formation of depletion layers,Diode equation and I-V characteristics.Idea of static and dynamic resistance.	15 hrs
UnitII	**Semiconductor Diode Applications:** Half wave and full wave rectifier (PIV, average voltage, load current, rms value, ripple factor, efficiency of rectification), Bridge rectifier working and comparison of rectifiers. **Power supply:** importance of filters in power supply, shunt capacitor filter, its ripple factor, LC-section filter, CLC section filter and its ripple factor. Comparison of these filters.Block diagram of power supply, unregulated power supply, voltage regulation and load regulation.Zener diode: Construction, working and its V-I characteristics, Zener diode as voltage regulator-circuit diagram, and line regulation, disadvantages. (Sufficient number of numerical problems must be solved)	15 hrs
UnitIII	Number System: Decimal, Binary, Octal and Hexadecimal number systems, base conversions.Representation of signed and unsigned number system, 1's and 2's complement,Binary arithmetic; addition, Subtraction by 1's and 2's complement method, BCD code(8421, 2421, Excess-3), Gray code.Boolean Algebra: Boolean laws and fundamental theorems.Logic gates- AND , OR, NOT, Positive and negative logic,	15 hrs

	Derived logic gates (NAND, NORXOR & XNOR).De Morgan's Theorems, simplification of Boolean expressions, realization of Boolean equations using logic gates, Universal Property of NOR and NAND gates. (Sufficient number of numerical problems must be solved)	

Recommended books:

1. Basics of electronics (solid state)-BL Theraja
2. Basics Electronics and linear circuits-N n Bhargava and others
3. Electronic principles –B.Basavaraj (vol-1)
4. Handbook of Electronics-Gupta Kumar
5. Basic and applied electronics-Bandopadhyay
6. Electronics –Dr.R.K.Kar.
7. Electronic devices and Circuits-David A Bell
8. Principles of Electronics- V.K.Mehta and Rohit Mehta
9. Digital principles and applications –A.P.Malvino,D.P.Leach and saha
10. Fundamentals of Digital circuits –ANAND Kumar
11. Digital Fundamentals –Thomas .L.Floyd.

FormativeAssessmentforTheory	
AssessmentOccasion/type	**Marks**
InternalAssessmentTest1	05
InternalAssessmentTest2	05
Assignment	10
Total	**20Marks**
Formative Assessment as per guidelines.	

B.Sc. Semester–IV/ V/VI

Skill Enhancement Course(SEC)

Student shall study SEC in any one of the Semesters either in IV or V or VI semester

College shall decide to allot the students

Course Title: PCB design and simulation Experiments (Practical)

Course Code: C 0 ELE 6P1

Type ofCourse	Theory /Practical	Credits	Instructionhour perweek	TotalNo.ofLectures/Hours /Semester	Durationof Exam	Formative Assessment Marks	Summativeassessment Marks	Total Marks
SEC	**Practical**	**02**	**04**	**56hrs.**	**3hrs.**	**10**	**40**	**50**

Course Outcomes (COs): At the end of the course, students will be able to:

CO1: Gain knowledge about designing of basic electronic circuits.

CO2: Understand soldering and de-soldering of components as per design.

CO3: Making schematic arrangements of components.

CO4: Make PCB of their own for project works.

CO5:Understand main features of Electronic simulation.

CO6: Solve, simulate and analyze basic electronic circuits.

List of the Experiments, each will have 4hrs/week

Minimum eight experiments of the following are to be performed,

1. Introduction to circuit creation and simulation software TINA student edition/Multisim/LT spice
2. Simulation of rectifier circuits half wave, full wave bridge rectifier and observe the outputs using virtual oscilloscope.
3. Simulation of full wave bridge rectifier with LC and π section filters and observe the outputs using virtual oscilloscope.
4. Power supply design with regulators LM7805 and LM7812.
5. Designing of clipper circuits and observe the output waveform using virtual oscilloscope.
6. Designing of clamper circuits and observe the output waveform using virtual oscilloscope.
7. Astable and monostablemultivibrator using BC 547. Observe the outputs using virtual oscilloscope.
8. Op-Amp inverting/non inverting amplifier simulation. Observe the outputs using virtual oscilloscope.
9. Op-Amp instrumentation amplifier design and simulation. Observe the outputs using virtual oscilloscope.
10. AM modulation and demodulation. Observe the outputs using virtual oscilloscope.
11. FM modulation and demodulation. Observe the outputs using virtual oscilloscope.
12. ASK and FSK modulation and demodulation. Observe the outputs using virtual oscilloscope.
13. Single side PCB Layout design using CAD tool.
14. Development of PCB in hardware Lab using printing, etching, drilling and coating.
15. Fabrication of single side PCB for full wave rectifier circuit and resistive load in the lab.

UG Programme: 2024-25

Scheme Of Evaluation For Practical Examinations In Electronics

1.	Basic formula with description of quantities, Units & Nature of graph.	-04 Marks
2.	Circuit Diagram/Ray Diagram/Schematic diagram with proper labeling.	-04 Marks
3.	Tabular Column with Quantities and Unit Mentioned.	-04 Marks
4.	Experimental Skills.	-04 Marks
5.	Recording of observations	-08 Marks
6.	Calculations and drawing graph	-06 Marks
7.	Accuracy of Result	-02 Marks
8.	Viva-Voce	-04 Marks
9.	Completed & Certified Journal	-04 Marks
	Total	**-40 Marks**

Scheme of Evaluation for Computer Programming

1.	Writing programs	-16 Marks
2.	Execution of program	-16 Marks
3.	Viva-Voce	-04 Marks
4.	Completed & Certified Journal	-04 Marks
	Total	**-40 Marks**

B.Sc. programme: 2024-25

GENERAL PATTERN OF **THEORY** QUESTION COURSE FOR DSC/ EC

(80 marks for semester end Examination with 3 hrs duration)

Part-A

1. Question number 1-10 carries 2 marks each. : 20 marks

Part-B

2. Question number 11- 18 carries 05Marks each. Answer any 06 questions : 30 marks

Part-C

3. Question number 19-22 carries 10 Marks each. Answer any 03 questions : 30 marks

(Minimum 1 question from each unit and 10 marks question may have sub questions for 7+3 or 6+4 or 5+5 if necessary)

Total: 80 Marks

Note: Proportionate weight age shall be given to each unit based on number of hours Prescribed