GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)

BEGUMPET, HYDERABAD-16

Affiliated To Osmania University, Re-Accredited With 'B^{+}' Grade by NAAC

DEPARTMENT OF ELECTRONICS

SYLLABUS (2019-20)

Department of ELECTRONICS
B.Sc. ELECTRONICS II Year course structure

Paper	Semester	Hours per week	Hours per week		Max Marks		
			Theory	Practicals	Theory	Practicals	Credits
B.Sc-II	III	6	4	3	100	50	5
B.Sc-II	IV	6	4	3	100	50	5

Practicals for each 20 students per batch

OSMANIA UNIVERSITY

B.Sc. ELECTRONICS SYLLABUS

SCHEME OF INSTRUCTIONS

UNDER CBCS (w.e.f 2016-2017 academic year onwards)

Year	Semester	Title of the Paper[Theory and Practical]	Instructions Hrs/week	Number of Credits	Marks
1st Year	I Sem	Paper – I : Circuit Analysis	4	4	100
		Practical – I : Circuit Analysis Lab	3	1	25
	II Sem	Paper – II : Electronic Devices	4	4	100
		Practical – II : Electronic Devices Lab	3	1	25
2nd Year	III Sem	Paper – III : Analog Circuits	4	4	100
		Practical – III : Analog Circuits Lab	3	1	25
	IV Sem	Paper – IV : Linear Integrated circuits and basics of Communication	4	4	100
		Practical – IV : Linear Integrated Circuits and basics of communication Lab	3	1	25
3rd Year	V Sem	Paper –V : Digital Electronics	3	3	75
		Practical – V : Digital Electronics Lab	3	1	25
		Paper – VI : Discipline Specific Elective – i. 8085 Microprocessor and applications ii. Electronic Instrumentation	3	3	75
		Practical – VI : i. 8085 Microprocessor and applications Lab II. Electronic Instrumentation Lab	3	1	25
	VI Sem	Paper – VII : Digital Communication	3	3	75
		Practical – VII : Digital Communication Lab	3	1	25
		Paper – VIII : Discipline Specific Elective – II: i. 8051 Micro Controller and applications ii. Digital System Design using VHDL	3	3	75
		Practical – VIII : Elective-II : i. 8051 Micro Controller and applications Lab ii. Digital System Design using VHDL Lab	3	1	25

Total Credits: 36

ELECTRONICS COURSE OBJECTIVES

- To provide an experimental foundation for the theoretical concepts introduced in the lectures
- To teach how to make careful experimental observations and how to think about draw conclusions from such data
- To help students understand the role of direct observations in physics and to distinguish between interferences based on theory and the outcomes of experiments.
- To introduce the concepts and techniques which have a wide application in experimental science but have not been introduced in the standard courses
- To teach how to write a technical report which communicates scientific information in a clear and concise manner;

ELECTRONICS COURSE OUTCOMES

- **To apply and integrate knowledge of computing to the engineering discipline.**
- **To identify, analyze, formulate and solve complex problems related to computer science and engineering.**
- **To design, construct and evaluate a computer based system, process or component, to meet the evolving needs.**
- **To demonstrate application of engineering skills and techniques for efficient development of projects and products.**
- **To use modern techniques and tools necessary for computing practice that drives towards entrepreneurship.**
- **To develop innovative ideas that can be translated into commercial products benefiting the society and the economic growth.**
- **To understand the impact of engineering science solutions in a social, global, environmental and economic context.**
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- **To posses leadership and management skills with best professional, ethical practices and social concern.**
- **To interact professionally with others in the workplace and to function effectively as an individual and in a group.**
- **To demonstrate quality skills so as to speak, listen and present effectively the acquired technical knowledge to a range of audience.**

B.Sc. ELECTRONICS SYLLABUS
B.Sc. I YEAR
Semester – I

DSC- Paper –I : Circuit Analysis

Total number of hours: 60
No of hours per week:4
Credits:4

UNIT - I

AC Fundamentals : The sine wave –average and RMS values – The J Operator –Polar and Rectangular forms of complex numbers – Phasor diagram-Complex impedance and admittance.

Kirchhoff's Current and Voltage Laws: Concept of Voltage and current sources-KVL and KCL-application to simple circuits (AC and DC) consisting of resistors and sources – Node voltage analysis and Mesh analysis.

UNIT-II

Network Theorems (DC and AC): Superposition Theorem ,Thevenin's Theorem, Norton's Theorem, Maximum power transfer Theorem, Reciprocity Theorem, Milliman's Theorem, Application to simple Networks.

UNIT-III

RC and RL Circuits : Transient Response of RL and RC Circuits with step input, Time constants. Frequency response of RC and RL circuits ,Types of filters – Low pass filter and High pass filter-frequency response, passive differentiating circuit and passive integrating circuit.

UNIT-IV

Resonance :RLC Series and parallel resonance circuits –Resonant frequency –Q Factor- Bandwidth-Selectivity.

Cathode Ray Oscilloscope: Cathode Ray Tube (CRT) and its working, electron gun focusing, deflection sensitivity, florescent screen. Measurement of Time period, Frequency ,Phase and amplitude.

Text Books:

1) Basic Electronics-Bernard Grob10th edition (TMH)
2) Circuit Analysis-P.Gnanasivam Pearson Education
3) Circuit and Networks-A. Sudhakar& S. Pallri (TMH)
4) Pulse, digital & switching waveforms-Milliman & Taub.
5) Networks, Lines and Fields-John Ryder (PHI)
6) Network theory-Smarajit Ghosh (PHI)

COURSE CODE: ELE101

- **B.SC LABORATORY COURSE OBJECTIVES**

- To provide an experimental foundation for the theoretical concepts introduced in the lectures
- To teach how to make careful experimental observations and how to think about draw conclusions from such data
- To help students understand the role of direct observations in physics and to distinguish between interferences based on theory and the outcomes of experiments.
- To introduce the concepts and techniques which have a wide application in experimental science but have not been introduced in the standard courses
- To teach how to write a technical report which communicates scientific information in a clear and concise manner;

- **LAB OUT COMES**

- By the end of the course students will be able
- To make careful experimental observations and draw conclusions from such data
- To distinguish between inferences based on theory and the outcomes of experiments
- To write a technical report which communicates scientific information in a clear and concise manner.
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B.Sc. I Year, Semester – I : Electronics Practical

Paper – I : Circuit Analysis Lab

No. of hours per week : 3

1. Measurement of peak voltage, frequency using CRO.
2. Measurement of phase using CRO.
3. Thevenin's theorem and Norton's theorem – verification.
4. Maximum power transfer theorem – verification.
5. CR circuit – Frequency response - (Low pass and High pass)
6. CR and LR circuits – Differentiation and integration – tracing of waveforms.
7. LCR – Series resonance circuit – frequency response – Determination of f_o, Q and band width.
8. Simulation: i) verification of KVL and KCL.

   ii) study of network theorems.

   iii) study of frequency response (LR).

Note: Student has to perform minimum of <u>Six</u> experiments.

Reference Books:

1) Lab manual for Electronic Devices and Circuits – 4th Edition. By David A Bell – PHI
2) Basic Electronics – A Text Lab Manual –Zbar, Malvino, Miller.

COURSE CODE: ELE201

B.Sc. ELECTRONICS SYLLABUS

B.Sc. I YEAR

Semester - II

DSC- Paper –II : Electronic Devices

Total number of hours : 60
No of hours per week: 4
Credits :4

UNIT-I

PN Junction: Formation of PN junction, Depletion region, Junction capacitance, Diode equation (no derivation) Effect of temperature on reverse saturation current , V - I characteristics and simple applications of i) Junction diode, ii) Zener diode, iii) Tunnel diode and iv) Varactor diode.

UNIT-II

Bipolar Junction Transistor(BJT) : PNP and NPN transistors, current components in BJT, BJT static characteristics (Input and Output) , Early effect , CB , CC , CE configurations of transistor and bias conditions (cut off, active, and saturation regions), CE configuration as two port network, h – parameter model and its equivalent circuit. Determination of h – parameters from the characteristics, Load line analysis (AC and DC). Transistor Biasing – Fixed and self bias.

UNIT-III

Field Effect Transistor (FET): Construction and working of JFET, output and transfer characteristics of FET, Determination of FET parameters. Application of FET as Voltage variable resistor. Advantages of FET over BJT.**MOSFET** :: construction and working of enhancement and depletion modes , output and transfer characteristics Application of MOSFET as a switch .

Uni Junction Transistor (UJT): Construction and working of UJT and its Characteristics. Application of UJT as a relaxation oscillator.

UNIT-IV

Silicon Controlled Rectifier (SCR): Construction and working of SCR. Two transistor representation, Characteristics of SCR. Application of SCR for power control.

Photo electronic Devices: Construction and Characteristics of Light Dependent Resistor (LDR), Photo voltaic Cell, Photo diode, Photo transistor and Light Emitting Diode(LED).

Books Recommended:

1) Electronic Devices and circuits-Millman and Halkias,(TMH)
2) Principles of Electronics-V.K.Mehta & Rohit Mehta
3) Electronic Devices and Circuits-Allen Moltershed (PHI)
4) Basic Electronics and Linear Circuits-Bharghava U
5) Electronic Devices and Circuits-Y.N.Bapat
6) Electronic Devices and Circuits-Mithal.
7) Experiments in Electronics-S.V.Subramanyam.

B.Sc. I Year, Semester – II : Electronics Practical

Paper – II : Electronic Devices Lab

No. of hours per week: 3

1. To draw volt- ampere characteristics of Junction diode and determine the cut – in voltage, forward and reverse resistances.
2. Zener diode V – I Characteristics – Determination of Zener breakdown voltage.
3. Voltage regulator(line and load) using Zener diode.
4. BJT input and output characteristics (CE configuration) and determination of 'h' parameters.
5. FET – Characteristics and determination of FET parameters.
6. UJT characteristics – determination of intrinsic standoff ratio.
7. UJT as relaxation oscillator.
8. Characteristics of LDR/Photo diode/Photo transistor/Solar cell.

Note: Student has to perform minimum of Six experiments.

Reference Books:

1) Lab manual for Electronic Devices and Circuits – 4th Edition. By David A Bell - PHI