

TELANGANA UNIVERSITY



**Telangana State Council of Higher Education
Govt.of Telangana**

PROPOSED SYLLABUS

For

B.Sc Electronics (2016-17)

B.Sc. ELECTRONICS SYLLABUS

B.Sc. I YEAR , Semester - I

Paper - I :: Circuit Analysis

Total number of hours : 60

No of hours per week: 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-Grob 10th edition(TMH)
- 2) Circuit Analysis-P.Gnanaswam 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)

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

Paper – I :: Circuit Analysis

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_0 , 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 six 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.

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B.Sc. ELECTRONICS SYLLABUS
B.Sc. I YEAR , Semester - II
Paper –II :: Electronic Devices

Total number of hours : 60

No. of hours per week : 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.

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**B.Sc. I Year, Semester – II :: Electronics Practical
Paper – II :: Electronic Devices**

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 stand off 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

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Attended 28/7/16.

B.Sc. ELECTRONICS SYLLABUS

B.Sc. II YEAR , Semester - III

Paper - III :: Analog Circuits

Total number of hours : 60

No of hours per week: 4

UNIT – I

Rectifiers and filters:: Rectifiers– half wave, full wave and bridge rectifiers, Efficiency, Ripple factor, regulation, harmonic components in rectified output, **Filters** – choke input (inductor) filter, Shunt capacitor filter, L section and π section filters.

UNIT – II

Regulated Power Supplies:: Block diagram of regulated power supply, Series and shunt transistor regulated power supplies, three terminal IC regulators (78XX and 79XX), Principle and working of switch mode power supply (SMPS). UPS –Principle and working.

UNIT – III

Transistor amplifier:: Classification of amplifiers, Hybrid π model of a transistor, RC coupled CE amplifier – frequency response, analysis.

Feedback in amplifiers:: Positive and negative feedback, Effect of negative feedback on gain, bandwidth, noise, input and output impedances. Emitter follower and Darlington pair and its advantages.

UNIT – IV

Oscillators:: Barkhausen criterion for sustained oscillations, RC oscillators- RC phase shift and Wien's bridge oscillators, LC oscillators- Hartley and Colpitt's.

Multivibrators:: Astable, Monostable and Bistable multivibrators – Qualitative treatment only.

Recommended Books:

1. Electronic Devices and Circuits-Millman and Halkias (TMH)
2. Basic Electronics and linear circuits - Bhargava, Kulshreshta & Gupta TMH
3. A first course in Electronics-AA Khan and KK Dey-PHI
4. Electronic Devices and Circuit Theory-Robert L Boylestad & Louis Nashelsky
5. Pulse, Digital and Switching circuits by Millman and Taub

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B.Sc. II YEAR , Semester – III : Electronics Practical

Paper - III :: Analog Circuits

No. of hours per week : 3

1. Study of HWR, FWR and bridge rectifier, determination of ripple factor.
2. Series inductor, shunt capacitor, L-section and π -section filters; determination of ripple factor using Full wave Rectifier.
3. Study of voltage regulator using IC's - 78XX & 79XX.
4. Colpitt's oscillator – determination of frequency.
5. RC Phase shift oscillator- determination of frequency
6. Astable multivibrator – determination of time period and duty cycle.

7. Simulation experiments ::

- i) Rectifiers
- ii) RC coupled amplifier
- iii) Wein's bridge oscillator
- iv) Colpitt's oscillator
- v) RC phase shift oscillator
- vi) Astable multivibrator

Note: Student has to perform minimum of six experiments

- 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.

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B.Sc. ELECTRONICS SYLLABUS

B.Sc. II YEAR , Semester - IV

Paper - IV :: Linear Integrated Circuits and basics of Communication

Total number of hours : 60

No of hours per week: 4

UNIT – I

Operational Amplifiers:: Emitter Coupled Differential amplifier, Block diagram of Op.Amp. Characteristics of Op.Amp, .Op.Amp. parameters-Input resistance, Output resistance, Common mode rejection ratio (CMMR), Slew rate, Offset voltages, Input bias current, Basic Op-Amp circuits - Inverting Op-Amp, Virtual ground, Non-inverting Op-Amp, Frequency response of Op-Amp. Op Amp as : Summing amplifier, subtractor, Comparator, Voltage follower, Integrator, and Differentiator.

UNIT- II

Applications of Op-Amps:: Logarithmic amplifier, Sine wave [Wien Bridge] generator and square wave [Astable] generator, Triangular wave generator, Mono stable multivibrator, Solving Of simple second order differential equations. Basic Op-Amp series regulator and shunt regulator, IC 555 Timer [Block diagram and its working], IC 555 as mono stable and astable multivibrators.

UNIT – III

Modulation:: Need for modulation-Types of modulation- Amplitude,, Frequency and Phase modulation.

Amplitude modulation:: Analysis of Amplitude modulation, side bands, modulation index, AM modulator, Balanced modulator, Demodulation – diode detector.

UNIT – IV

Frequency modulation:: Analysis of FM. Working of simple frequency modulator, - detection of FM waves – FM Discriminator. Advantages of frequency modulation.

AM and FM Transmitters and radio receivers [block diagram approach].

Introduction to PAM, PPM, PWM, and PCM , Delta modulation.

Reference Books:

1. Op amps and linear Integrated Circuits – Ramakant Gayakwad, PHI
2. Linear Integrated Circuits- D Roy Choudhury and Shail B Jain
3. Electronic Communication Systems-George Kennedy & Bernard Davis
4. Principles of Electronic Communication Systems-Louis E Freznel, TMH

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B.Sc. II YEAR , Semester – IV: Electronics Practical

Paper - IV :: Linear Integrated Circuits and Basics of Communication

Total number of hours per week: 3

Practical : Using IC 741 OpAmp and IC 555 Timer ::

1. Op amp as inverting Amplifier- determination of gain(with AC and DC).
2. Op amp as non inverting Amplifier- determination of gain(with AC and DC).
3. OP Amp as Summing amplifier and comparator(Zero crossing detector)
4. Astable multivibrator – determination of time period and duty cycle.
5. Monostable multivibrator- determination of gate width.
6. Integrator/ Differentiator – study of wave forms.
7. Astable multivibrator using IC 555
8. Monostable multivibrator using IC 555.
9. AM modulator and detector

Simulation of all the above experiments::

1. Inverting and Non inverting amplifiers and comparator
2. Integrator/ Differentiator using op amp
3. Wein's bridge oscillator
4. Astable multivibrator using Op Amp
5. Astable multivibrator using IC 555

Note: Student has to perform minimum of six experiments

- 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.

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