

B.Sc. Syllabus for Electronics under CBCS

**Semester-I**

**Title: Electronic Circuit Analysis**

**Course Code: UELTC101**

**Credits: 4**

**Total Marks: 100**

**Internal Examination: 20 marks**

**End Semester Examination: 80 marks**

**Duration: 3 hours**

**Validity of Syllabus: 2016, 2017, 2018 Dec Exams**

- UNIT-I**      *Network Analysis*  
Kirchoff's laws; voltage and current sources; source transformations; mesh and nodal analysis; star and delta transformations, Network theorems: Thevenin's, Norton's, Superposition, Millman's, Maximum power transfer, and Compensation.
- UNIT-II**      *A.C. Circuit Analysis*  
Fundamentals: sinusoids, exponential functions, solution (exponential function real and imaginary parts); resonance: series and parallel resonance (BW, resonance condition, impedance variation, effect of resistance, and reactance curves); coupled circuits: mutual inductance, coefficient of coupling, ideal transformer, series connection of coupled circuit.
- UNIT-III**      *Analysis of R, L, C Circuits*  
Transient analysis of RC, RL, RLC circuits using differential equations; Laplace transform: transforms of linear combinations, transforms of derivatives & integrals, solution of problems using Laplace transform (partial fraction expansion and heavy side expansion theorem) : solution of series RL, RC, RLC circuits using Laplace transform.
- UNIT-IV**      *Two port Networks*  
Introduction, two port Network parameters: Open circuit impedance, short circuit admittance, Transmission, Inverse Transmission, Hybrid and Inverse hybrid. Inter-relationship of different parameters, T and  $\pi$  representation, Lattice network, Image parameters.

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### UNIT-V *Filters*

Fundamentals: neper, decibel, current & voltage ratios as exponentials; symmetrical networks: properties, propagation, and  $Z_0$ , filter fundamentals: pass and stop bands, behavior of characteristic impedance, constant k low pass and high pass filters, m-derived T and pi section filters; termination with m-derived half sections; band pass and band elimination filters; filter design.

### References

1. Sudhakar and Shyam Mohan, **Network and Circuits: Analysis Synthesis**, Tata McGraw-Hill, New Delhi
2. M.E. Van Valkenburg, **Network Analysis**, Prentice-Hall of India, New Delhi
3. Schaum's outline series, **Electric Circuits**, Tata McGraw Hill, New Delhi
4. T.F. Bogart Jr. **Electric Circuits**, Tata McGraw-Hill, New Delhi

### Scheme of Examination

The students shall be evaluated during the conduct of the course in the semester as follows:

Examination (Theory)	Syllabus to be covered in the examination	Time allotted	% Weightage (Marks)
Internal Assessment Test	Upto 50% (after 45 days)	1 hour	20 % (20 marks)
External End Semester University Examination	Upto 100% (after 90 days)	3 hour	80% (80 marks)
Total			100

**Scheme for Internal assessment Test:** The question paper would comprise of One long answer type question of 10 marks and Five short answer type questions of 2 marks each.

**Scheme for End Semester Examination:** There shall be Ten questions in all in the End Semester University Examination, two from each Unit covering the entire syllabus. Each question would comprise of two parts: Part (a) Short answer type of 04 marks each and Part (b) Long answer type of 12 marks each. The numerical content in the question paper shall not exceed 15% of the maximum marks. The candidates are required to attempt any Five questions selecting one from each unit. All questions shall carry equal marks.

# B.Sc. Syllabus for Electronics under CBCS

## Semester-I

**Title: Laboratory Course in Electronic Circuit Analysis**

**Course Code: UELPC102**

**Credits: 2**

**Total Marks: 50**

**Internal Examination: 25 marks**  
**End Semester Examination: 25 marks**

**Validity of Syllabus: 2016, 2017, 2018 November Exams**

**Note:** Each student has to perform a minimum of 06 experiments selecting at least one experiment from each of the following set of topics:

Set I: Network theorems

Set II: A.C. Circuits

SET III: Filters

### **Scheme of Examination**

<b>Examination (Practical)</b>	<b>Syllabus to be covered in the examination</b>	<b>% Weightage (Marks)</b>
Daily evaluation of practical records/Viva voce/attendance etc.		50% (25 Marks including 5 for attendance, 5 for Viva voce and 15 for internal test and day to day performance)
Final Practical Performance + Viva voce (External Examination)	100% syllabus	50% (25 Marks including 20 for external paper and 5 marks for viva voce)
<b>Total</b>		<b>100% (50 Marks)</b>

## Semester-II

**Title: Electronic Devices and Circuits**

**Course Code: UELTC201**

**Credits: 4**

**Total Marks: 100**

**Internal Examination: 20 marks**

**End Semester Examination: 80 marks**

**Duration: 3 hours**

**Validity of Syllabus: 2017, 2018, 2019 May Exams**

### UNIT-I

#### *Electronic Components*

Resistors: fixed resistors (wire wound, film and composite), variable resistors (mechanically and thermally variable); Capacitors: specifications, fixed capacitors (vacuum, gas filled, foil film, oil, mica, ceramic and electrolytic), variable capacitors (mechanical & voltage variable); Inductors: specification, fixed inductors (air, iron & ferrite cored); Integrated circuits: advantages, disadvantages, Integration scale, classification of ICs; Introduction to fabrication of electronic components: resistor, capacitor, diode.

### UNIT-II

#### *Semiconductor Diodes*

PN-junction diode: static and dynamic resistances, equivalent circuits, transition and diffusion capacitances; diode load line analysis; Rectifier analysis: half wave, full wave and bridge; Clippers and Clampers; Zener diode and its applications; Construction, working and characteristics of LED, Solar cell, Photo, Tunnel, Varactor and schottky diodes.

### UNIT-III

#### *Transistors*

BJT: biasing: fixed bias, collector feedback and voltage divider; stabilization and bias compensation; FET: construction and characteristics, Shockley equation, transfer curve, biasing (self and voltage divider); Construction, working and characteristics of MOSFET, Phototransistor and UJT.

### UNIT-IV

#### *Amplifiers*

h-parameters and equivalent circuit; BJT small signal analysis for CE, CB, and CC: input impedance, current and voltage gains, and output impedance; Cascading: RC coupled, TC, and DC amplifiers (circuit, analysis, and frequency response); Power amplifiers: class A, B, and C; class-B Push-pull amplifier.

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### UNIT-V *Feedback and Oscillator Circuits*

Analysis of voltage series, voltage shunt, current series, and current shunt feedback configurations; effect of negative feedback; simple practical feedback circuits; Barkhausen criterion; analysis of Phase shift, Wein bridge, Hartley, Colpitt, Clapp, and crystal oscillators.

### References

1. Robert Boylestad, **Electronic Devices and Circuit Theory**, Prentice-Hall of India, New Delhi
2. David A. Bell, **Electronic Devices and Circuits**, Prentice-Hall of India, New Delhi
3. Millman and Halkias, **Integrated Electronics**, Tata McGraw-Hill, New Delhi
4. S.M. Sze, **Physics and Technology of Semiconductor Devices**, John-Wiley & Sons

### Scheme of Examination

The students shall be evaluated during the conduct of the course in the semester as follows:

Examination (Theory)	Syllabus to be covered in the examination	Time allotted	% Weightage (Marks)
Internal Assessment Test	Upto 50% (after 45 days)	1 hour	20 % (20 marks)
External End Semester University Examination	Upto 100% (after 90 days)	3 hour	80% (80 marks)
Total			100

**Scheme for Internal assessment Test:** The question paper would comprise of One long answer type question of 10 marks and Five short answer type questions of 2 marks each.

**Scheme for End Semester Examination:** There shall be Ten questions in all in the End Semester University Examination, two from each Unit covering the entire syllabus. Each question would comprise of two parts: Part (a) Short answer type of 04 marks each and Part (b) Long answer type of 12 marks each. The numerical content in the question paper shall not exceed 15% of the maximum marks. The candidates are required to attempt any Five questions selecting one from each unit. All questions shall carry equal marks.

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## Semester-II

**Title: Laboratory Course in Electronic Devices and Circuits Course Code: UELPC202**

**Credits: 2**

**Total Marks: 50**

**Internal Examination: 25 marks  
End Semester Examination: 25 marks**

**Validity of Syllabus: 2017, 2018, 2019 April Exams**

**Note:** Each student has to perform a minimum of 06 experiments by selecting at least one experiment from each of the following set of topics:

Set I: Rectifier & Device Characteristics

Set II: Amplifies

SET III: Oscillators

### Scheme of Examination

<b>Examination (Practical)</b>	<b>Syllabus to be covered in the examination</b>	<b>% Weightage (Marks)</b>
Daily evaluation of practical records/Viva voce/attendance etc.		50% (25 Marks including 5 for attendance, 5 for Viva voce and 15 for internal test and day to day performance)
Final Practical Performance + Viva voce (External Examination)	100% syllabus	50% (25 Marks including 20 for external paper and 5 marks for viva voce)
<b>Total</b>		<b>100% (50 Marks)</b>