5. Timothy A. Budd, —Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.,, 2015.

Suggestive readings

1. Kenneth A. Lambert, —Fundamentals of Python: First Programs‖, CENGAGE Learning, 2012.
2. Charles Dierbach, —Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
3. Paul Gries, Jennifer Campbell and Jason Montojo, —Practical Programming: An Introduction to Computer Science using Python 3‖, Second edition, Pragmatic Programmers, LLC, 2013.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

DISCIPLINE SPECIFIC CORE COURSE – 2 (DSC-2): Circuit Theory &

Credit distribution, Eligibility and Prerequisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Circuit Theory & Network Analysis ELDSC-2	4	3	0	1	Course Admission Eligibility	Nil

Learning Objectives

The Learning Objectives of this course are as follows:

- To study the basic circuit concepts in a systematic manner suitable for analysis and design.
- To study the steady state analysis of AC Circuits.
- To study and analyse electric circuits using network theorems.
- To study and design passive filters using R, L and C

Learning outcomes

The Learning Outcomes of this course are as follows:

CO1 Study basic circuit concepts in a systematic manner suitable for analysis and design.
CO2 Determine AC steady state response.
CO3 Analyse the electric circuits using network theorems.
CO4 Determine frequency response of filters

SYLLABUS OF DSC- 2

UNIT – I Introduction to Circuits and DC Analysis (12 Hours)
Basic Circuit Concepts: Voltage and Current Sources, V- I characteristics of ideal voltage and ideal current sources, various types of controlled sources, passive circuit components, V-I characteristics, and ratings of different types of R, L, C elements.
DC Circuit Analysis: Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), Node Analysis, Mesh Analysis, Super node & Super mesh Analysis, Star-Delta Conversion.

UNIT – II AC Analysis (12 Hours)
Steady State Analysis: Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. Phasor, Complex Impedance, Sinusoidal Circuit Analysis for RL, RC and RLC Circuits. Node and Mesh Analysis for AC circuits. Star-Delta Conversion for complex impedances.
Power in AC Circuits: Instantaneous Power, Average Power, Reactive Power, Power Factor.

UNIT – III Network Theorems (12 Hours)
Network Theorems: Principal of Duality, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Millman's Theorem, Maximum Power Transfer Theorem. (Independent Sources)
AC circuit analysis using Network Theorems.

UNIT – IV Filters (9 Hours)
Filters and Resonance: Introduction to Passive Filters-High Pass, Low Pass, Band Pass & Band Stop Filters, Frequency response of RC Circuits-High pass and Low pass filters, Frequency response of Series and Parallel RLC Circuits. Resonance in Series and Parallel RLC Circuits, Quality (Q) Factor and Bandwidth, Band Pass and Band Stop RLC Filters.

Practical component (if any) - Circuit Theory and Network Analysis Lab
(Hardware and Circuit Simulation Software) (30 Hours)
Learning outcomes

CO1 Verify the network theorems and operation of typical electrical circuits.
CO2 Choose the appropriate equipment for measuring electrical quantities and verify the same for different circuits.
CO3 Prepare the technical report on the experiments carried.

1. Familiarization with Multimeter: Resistance, Capacitor and Inductor in series, parallel and series-parallel.
2. Familiarization with Oscilloscope: Measurement of Amplitude, Frequency and phase of a sinusoidal signal
3. Verification of Kirchhoff's Current Law.
4. Verification of Kirchhoff's Voltage Law
5. Verification of Norton's theorem.
6. Verification of Thevenin's Theorem.
7. Verification of Superposition Theorem.

8. Verification of the Maximum Power Transfer Theorem.
9. Design of Low Pass RC Filter and study of its Frequency Response.
10. Design of High Pass RC Filter and study of its Frequency Response.
11. Study of Frequency Response of a Series LCR Circuit and determination of its (a) Resonant Frequency (b) Impedance at Resonance (c) Quality Factor Q (d) Band Width.

Note: Students shall sincerely work towards completing all the above listed practicals for this course. In any circumstance, the completed number of practicals shall not be less than nine.

Essential/recommended readings

1. S. A. Nasar, Electric Circuits, Schaum's outline series, Tata McGraw Hill (2004)
2. M. Nahvi and J. Edminister, Electrical Circuits, Schaum's Outline Series, Tata McGraw Hill.(2005)
3. Robert L. Boylestad, Essentials of Circuit Analysis, Pearson Education (2004)

Suggestive readings (if any)

1. Alexander and M. Sadiku, Fundamentals of Electric Circuits , McGraw Hill (2008)

DISCIPLINE SPECIFIC CORE COURSE– 3 (DSC-3): Semiconductor Devices

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Semiconductor Devices ELDSC-3	**4**	**3**	**0**	**1**	**Course Admission Eligibility**	**Nil**

Learning Objectives

The Learning Objectives of this course are as follows:

- To understand the Physics of semiconductor devices
- To be able to plot and interpret the current voltage characteristics for basic semiconductor devices
- The student should be able to understand the behaviour, characteristics and applications of power devices such as SCR, UJT, DIAC, TRIAC, IGBT

Learning outcomes

The Learning Outcomes of this course are as follows: