**University of Management and Technology**

School of Engineering

Department of Electrical Engineering

**Course Outline**

Course code: EE-110L Course title: Circuit Analysis Lab

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| --- | --- |
| Program | BSEE |
| Credit Hours | 1 |
| Duration | One semester |
| Prerequisites | nil |
| Resource Person | Asfa Javed(Section A1, A2, B1, B2, C1, C2) |
| Counseling Timing(Room# SEN403 ) | Monday: 11:00 – 2:00 Tuesday: 8:00 – 11:00 Thursday: 8:00 – 11:00  |
| Contact | Asfa.javed@umt.edu.pk |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objective:**

This lab gives the foundation on which most other courses in electrical engineering curriculum rest. Subject areas included are, basic circuit quantities, voltage and currents, resistive circuits, Kirchhoff’s Laws, nodal and mesh analysis, linearity, source transformation, Thevenin’s and Norton’s theorems, maximum power transfer, Capacitance, Inductance, RC, RL, RLC circuits. Introduction to Op-Amp is also present. It will teach the students the practical implementation of different circuits. We have also designed labs on software i.e. Multisim. The course directly contributes to **objectives**, d, e and f of the HEC Electrical Engineering Curriculum.

In accordance with HEC curriculum **outcomes** a, b, d and e, the upon completion, students will be able

* Determine the voltage and current in simple resistive networks containing dependent and independent sources by applying a variety of techniques, such as nodal analysis, mesh analysis, source transformation, superposition, and Thevenin’s and Norton’s equivalent circuits.
* Determine natural, forced and step response of RL, RC, and RLC circuits

**Learning Methodology:**

Practical’s, interactive, participative

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Lab Manuals & Performance: 40%

Final Viva or Quiz + Performance: 60%

Total: 100%

**Recommended Text Books:**

**Text book:** Fundamentals of Electric Circuits, 5th Ed., By Alexander and Sadiku

**Reference Books:**

1)Basic Engineering Circuit Analysis, 8t h Ed., By J. David Irwin, John Wiley & Sons

2) Electric Circuits, Eighth Edition, by Nilsson & Riedel

3) Fundamental of electric circuits by Floyd

**Calendar of Course contents to be covered during semester**

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| --- | --- | --- |
| **Week** | **Course Contents** | **Relevance to Theory Course** |
| 1 | Implementation of Circuits on PROTEUS (ISIS) | .......... |
| 2 | Implementation of Circuits on PCB | .......... |
| 3 | Ohm’s Law and Familiarization with the Lab Instruments | Article 2.2 |
| 4 | Simulation and Implementation of Series and Parallel DC Circuits | Article 2.4, 2.5 |
| 5 | Applications of series and parallel circuits | Article 2.6 |
| 6 | Simulation and Implementation of Nodal and Mesh Analyses | Article 3.2 – 3.6 |
| 7 | Simulation and Implementation of ∆-Y conversion | Article 3.7 |
| 8 | Simulation and Implementation of Superposition and Maximum Power Transfer Theorem | Article 4.1- 4.4 |
| 9 | Simulation and Implementation of Thevenin’s and Norton’s Theorem | Article 4.5 – 4.7 |
| 10 | Simulation and Implementation of Series and Parallel RL and RC circuits | Article 7.1 – 7.6 |
| 11 | Simulation and Implementation of RLC series and Parallel Circuits | Article 8.1 – 8.7 |
| 12 | Design of Inverting and Non-inverting Amplifier | Article 5.2 – 5.5 |
| 13 | Design of OP-AMP as Summing and Differential Amplifier | Article 5.6 – 5.7 |
| 14 | AC voltage and current Measurements using oscilloscope and Function Generator | ……. |