**University of Management and Technology**

**Course Outline**

Course code……EE 110………………… Course title……Linear Circuit Analysis……………………

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| --- | --- |
| Program | BSEE |
| Credit Hours | 3 |
| Duration | One semester |
| Prerequisites | nil |
| Resource Person | Khan M. Nazir |
| Counseling Timing  (Room#Project Lab ) | 11 to 12 noon and 2 pm to 4pm , Monday & Wednesday  12 noon am to2 pm, Tuesday & Thursday |
| Contact | 03454030919  Khan.nazir@umt.edu.pk |

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

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

**Learning Objective:**

Upon Completion of the course, the students will be able to:-

1. Calculate 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.
2. Determine natural, forced and step response of RL, RC, and RLC circuits
3. Solve circuit problems containing operational amplifier.

**Learning Methodology:**

Lecture, interactive, participative

**Grade Evaluation Criteria**

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

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| --- | --- | --- |
| **Marks Evaluation** |  | **Marks in percentage** |
| Quizzes |  | 16 |
| Assignments/project |  | 9 |
| Mid Term |  | 25 |
| Final exam |  | 50 |
| Total |  | 100 |

**Recommended Text Books:**

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**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**

**Course code……………………………...... Course title………………………………………**

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| --- | --- | --- |
| **Week** | **Course Contents** | **Reference Chapter(s)** |
| 1 | 1.1 Electrical Engineering: An Overview  1.2 The International System of Units  1.3 Charge and Current  1.4 Voltage  1.5 Power and Energy  1.6 Circuit Element | Ch-1 |
| 2 | 2.1 Introduction to Basic Laws  2.2 Ohm’s Law  2.3 Nodes , Branches, Loops  2.4 Kirchoff’s Laws  2.5 Series Resistors and Voltage Division | Ch-2 |
| 3 | 2.6 Parallel Resistors & Current Division  2.7 Wye-Delta Transformation | Ch-2 |
| 4 | 3.1 Introduction to Methods of Analysis  3.2 Nodal Analysis  3.3 Nodal Analysis with Voltage Source | Ch-3 |
| 5 | 3.4 Mesh Analysis  3.5 Mesh Analysis with Current Source  3.7 Nodal Versus Mesh Analysis | Ch-3 |
| 6 | 4.1 Introduction to Circuit Theorems  4.2 Linearity Property  4.3 Superposition  4.4 Source Transformation | Ch-4 |
| 7 | 4.5 Thevenin’s Theorem  4.6 Norton’s Theorem  4.7 Derivations of Thevenin’s and Norton’s Theorem | Ch-4 |
| 8 | **Mid Term Examination** |  |
| 9 | 4.8 Maximum Power Transfer  4.9 Source Transformations | Ch-4 |

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| 10 | 5.1 Introduction to Operational Amplifier  5.2 Operational Amplifier  5.3 Ideal Op Amp  5.4 Inverting Amplifier  5.5 Non-inverting Amplifier  5.6 Summing Amplifier  5.7 Difference Amplifier | Ch-5 |
| 11 | 6.1 Introduction to Capacitors and Inductors  6.2 Capacitors  6.3 Series and Parallel Capacitors  6.4 Inductors  6.5 Series and Parallel Inductors | Ch-6 |
| 12 | 7.1 Introduction to First-Order Circuits  7.2 The Source-Free RC Circuit  7.3 The Source-Free RL Circuit | Ch-7 |
| 13 | 7.4 Singularity Functions  7.5 Step Response of an RC Circuit  7.6 Step Response of an RL Circuit | Ch-7 |
| 14 | * 1. Introduction to Second-Order Circuits   2. Finding Initial and Final Values   3. The Source Free Series RLC Circuit   8.4 The Source Free Parallel RLC Circuit | Ch-8 |
| 15 | 8.5 Step response of a Series RLC Circuit  8.6 Step response of a Parallel RLC Circuit  8.7 General Second-order circuit | Ch-8 |