**University of Management and Technology**

**School of Engineering**

**Department of Electrical Engineering**

**Course Outline, Fall 2015**

Course code……EE 212………………… Course title……Electrical Network Analysis……………………

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| Program | BSEE | | |
| Credit Hours | 3 | | |
| Duration | One semester | | |
| Prerequisites | EE111 | | |
| Resource Person | Muhammad Ilyas Khan | Muhammad Asim Butt | Usman Ali |
| Counseling Hours | Mon: 10:00 to 12:30  Tues: 01:00 to 12:30  Wed: 10:30 to 12:30  Thurs: 11:30 to 12:30 | Mon: 0300 to 0500  Tues: 1200 to 0100  0300 to 0500  Wed: 0300 to 0500  Thurs: 1200 to 0100  0300 to 0500 | Mon: 2:00 to 4:30  Tues: 3:30 to 4:30  Wed: 2:00 to 4:30  Thurs: 3:30 to 4:30 |
| Contact | ilyas.khan@umt.edu.pk | asim.butt@umt.edu.pk | usman.ali@umt.edu.pk |

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

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

**Learning Objective:**

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

1. Apply circuit analysis techniques to electrical networks that are energized by a single phase and three phase AC.
2. Understand and analyze magnetically coupled circuits and transformers.
3. Determine and interpret frequency response of a systems used as filters.
4. Evaluation and application of Laplace transform to solve circuits.
5. Evaluate trigonometric form of Fourier series to periodic signals.

g. Analyze Two-Port Networks

**Learning Methodology:**

Lecture, interactive, participative

**Grade Evaluation Criteria**

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

**Evaluation**

Quizzes /Assignments 20%

Mid Term 30%

Final exam 50%

Total 100%

**Recommended Text Books:**

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

**Reference Books:**

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

2) Basic Engineering Circuit Analysis, 8t h Ed., By J. David Irwin

**Weekly Distribution of the Syllabus**

**Course code………EE212 Course title…Electrical Network Analysis……………**

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| **Week** | **Course Contents** | **Reference Chapter(s)** |
| 1 | 9.1 Introduction; introduction to Complex Numbers  9.2 Sinusoids  9.3 Phasors | Ch-9 |
| 2 | 9.4 Phasor Relationships for Circuit Elements  9.5 Impedance and Admittance  9.6 Kirchhoff’s Laws in the FrequencyDomain  9.7 Impedance Combinations | Ch-9 |
| 3 | 10.1 Introduction to Sinusoidal Steady State Analysis  10.2 Nodal Analysis  10.3 Mesh Analysis  10.4 Superposition Theorem  10.5 Source Transformation | Ch-10 |
| 4 | 10.6 Thevenin and Norton Equivalent Circuits  10.7 Op Amp AC Circuits  11.1 Introduction to AC Power Analysis  11.2 Instantaneous and Average Power | Ch-10  Ch-11 |
| 5 | 11.3 Maximum Average Power Transfer  11.4 Effective or RMS Value  11.5 Apparent Power and Power Factor  11.8 Power Factor Correction | Ch-11 |
| 6 | 12.1 Introduction to Three-Phase Circuits  12.2 Balanced Three-Phase Voltages  12.3 Balanced Wye-Wye Connection  12.4 Balanced Wye-Delta Connection | Ch-12 |
| 7 | 12.5 Balanced Delta-Delta Connection  12.6 Balanced Delta-Wye Connection  12.7 Power in a Balanced System | Ch-12 |
| 8 | **Mid Term Examination** |  |
| 9 | 13.1 Introduction to Magnetically Coupled Circuits  13.2 Mutual Inductance  13.3 Energy in a Coupled Circuit  13.4 Linear Transformers  13.5 Ideal Transformers  13.6 Ideal Autotransformers | Ch-13 |

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| 10 | 14.1 Introduction to Frequency Response  14.2 Transfer Function  14.3 †The Decibel Scale  14.4 Bode Plots  14.5 Series Resonance  14.6 Parallel Resonance | Ch-14 |
| 11 | 14.7 Passive Filters  14.7.1 Lowpass Filter  14.7.2 Highpass Filter  14.7.3 Bandpass Filter  14.7.4 Bandstop Filter | Ch-14 |
| 12 | 15.1 Introduction to Laplace Transform  15.2 Definition of the Laplace Transform  15.3 Properties of the Laplace Transform  15.4 The Inverse Laplace Transform  15.4.1 Simple Poles  15.4.2 Repeated Poles  15.4.3 Complex Poles | Ch-15 |
| 13 | 16.1 Introduction to the Application of Laplace Transform  16.2 Circuit Element Models  16.3 Circuit Analysis  16.4 Transfer Functions | Ch-16 |
| 14 | 17.1 Introduction to Fourier Series  17.2 Trigonometric Fourier Series  17.3 Symmetry Considerations  17.3.1 Even Symmetry  17.3.2 Odd Symmetry  17.3.3 Half-Wave Symmetry  17.4 Circuit Applications | Ch-17 |
| 15 | 19.1 Introduction to Two-Port Networks  19.2 Impedance Parameters  19.3 Admittance Parameters  19.4 Hybrid Parameters  19.5 Transmission Parameters  19.7 Interconnection of Networks | Ch-19 |
| 16 | **Final Examination** |  |