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| **logo University of Management & Technology**  School of Science & Technology  Department of Electrical Engineering | | | |
| EL 111 Linear Circuit Analysis Lab | | | |
| **Lab Schedule** | MON ( 8:00 - 11:00) Sec C1  MON (11:00 -14:00) Sec A  MON (15:30 - 18:30) Sec B  TUES (8:00 - 11:00) Sec E  TUES (11:00 - 14:00) Sec D  WED (8:00 - 11:00) Sec C  WED (11:00 - 14:00) Sec A1  WED (15:30 - 18:30) Sec B1  THURS (8:00 - 11:00) Sec E1  THURS (11:00 - 14:00) Sec D1 | **Semester** | Spring 2013 |
| **Pre-requisite** | NIL | **Hours** | 0+1 |
| **Instructor(s)** | Muhammad Shoaib1  (Sec C1)  Tabraiz Ahmad Alvi2 (Sec D1, E1)  Fahad Ali3  (Sec A,B,C & E)  Usman Ali4 (Sec D)  Ayesha Iqbal5 (Sec A1, B1) | **Contact** | [muhammad.shoaib@umt.edu.pk1](mailto:usama.elahi@umt.edu.pk1)  [tabraiz.alvi@umt.edu.pk2](mailto:tabraiz.alvi@umt.edu.pk2)  [fahad.ali@umt.edu.pk3](mailto:fahad.ali@umt.edu.pk3)  [usman.ali@umt.edu.pk4](mailto:kirn.zafar@umt.edu.pk4)  [ayesha.iqbal@umt.edu.pk 5](mailto:muhammad.shoaib@umt.edu.pk5) |
| **Office** | See On timetables | **Office Hours** | See Office Doors |
| **Course Description** | 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** a, d, e and f of the HEC Electrical Engineering Curriculum. | | |
| **Expected Outcomes** | 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 | | |
| **Grading Policy** | * Lab Manuals & Performance: 25% * Weekly Quizzes: 15% * Midterm Quiz + Performance: 5% + 5% * Final Viva or Quiz + Performance: 35% + 15% | | |

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| **Week** | **Experiments** |
| 1 | OHM’S LAW AND FAMILIARIZATION WITH THE LAB INSTRUMENTS |
| 2 | BASIC CIRCUIT ANALYSIS USING MULTISIM : AN INTRODUCTORY LECTURE AND DEMONSTRATION |
| 3 | SIMULATION AND IMPLEMENTATION OF SERIES DC CIRCUITS |
| 4 | SIMULATION AND IMPLEMENTATION OF PARALLEL DC CIRCUITS |
| 5 | SIMULATION AND IMPLEMENTATION OF NODEL AND MESH ANALYSIS |
| 6 | SIMULATION AND IMPLEMENTATION OF THEVININ AND NORTAN THEOREM |
| 7 | SIMULATION AND IMPLEMENTATION OF SUPERPOSITION THEOREM AND MAX POWER TRANSFER THEOREM |
| 8 | SIMULATION AND IMPLEMENTATION OF DELTA-WYE CONVERSION |
| 9 | SIMULATION AND IMPLEMENTATION OF SERIES AND PARALLEL RL CIRCUITS |
| 10 | SIMULATION AND IMPLEMENTATION OF SERIES AND PARALLEL RC CIRCUITS |
| 11 | SIMULATION AND IMPLEMENTATION OF SOURCE FREE SERIES AND PARALLEL RLC CIRCUITS |
| 12 | DESIGN OF OP-AMP AS SUMMING AMPLIFIER |
| 13 | DESIGN OF OP-AMP AS INVERTING AND NON-INVERTING AMPLIFIER |
| 14 | DESIGN OF OP-AMP AS DIFFERENCE AMPLIFIER |
| 15 | AC VOLTAGE AND CURRENT MEASUREMENT USING OSCILLOSCOPE AND FUNCTION GENERATOR |