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| **logoUniversity of Management & Technology**School of Science & TechnologyDepartment of Electrical Engineering |
| EL-447 Power Electronics Lab |
| **Lab Schedule** | As per timetable | **Semester** | Fall 2013 |
| **Pre-requisite** | EE\_111: Circuits AnalysisEE\_209: Electronic Devices and Circuits  | **Credit Hours** | 2 |
| **Coordinator** | Nauman Ahmad | **Contact** | nauman.ahmad@umt.edu.pk |
| **Office** | C1-16 | **Office Hours** | See office window  |
| **Lab Work Objectives** |

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| This course provides an introduction to power electronics and its applications. The course starts with coverage of modern power semiconductor devices, their characteristic, and drive circuit design. Topologies of power electronic circuits including single phase and three phase ac-dc rectifiers, ac-ac voltage controllers, dc-dc converters, and dc-ac inverters will be covered along with their control techniques. Applications of modern power electronic devices are also included with emphasis on switch mode and linear regulators. These objectives confirm to the ones’ listed in HEC guidelines as a, d, e, & f.  |

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| **Expected Outcomes** | In accordance with HEC curriculum outcomes a, d, & k, students at the end of the course should be able to:* Develop and quantify common performance objectives for power electronic circuits.
* Develop simple power electronic converter topologies to meet certain functional specifications.
* Analyze power electronic converter operation to develop design guidelines for choice of switching devices and reactive elements.
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| **Grading Policy** | Final Viva: 60% Sessional (Each lab evaluation + Project) = 40% |

**Lab Schedule**

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| **Exp #** | **Experiment Name** | **Study Material** |
| 1. | Oscilloscope and Function Generator Operation | Lab Manual |
| 2. | Single phase half wave uncontrolled rectifier with R,RL load | Lab Manual |
| 3. | Single phase full wave uncontrolled rectifier with R,RL load | Lab Manual |
| 4. | VI Characteristics of Thyristor | Lab Manual |
| 5. | SCR using R firing circuit  | Lab Manual |
| 6. | SCR using RC firing circuit | Lab Manual |
| 7. | SCR power control using UJT phase control | Lab Manual |
| 8. | AC/DC Three Phase Not-Controlled Half Wave Rectifier with R-Load and RL-Load | Lecture Notes |
| 9. | AC/DC Three Phase Not-Controlled Full Wave Rectifier with R-Load and RL-Load | Lecture Notes |
| **Mid Term Viva & Performance** |
| 10. | AC/DC Three Phase Controlled Half Wave Rectifier with R-Load and RL-Load | Lecture Notes |
| 11. | AC/DC Three Phase Controlled Full Wave Rectifier with R-Load and RL-Load | Lecture Notes |
| 12. | Single phase half wave controlled rectifier with R,RL load | Lab Manual |
| 13. | Single phase full wave controlled rectifier with R,RL load | Lab Manual |
| 14. | A simple series voltage regulator | Lab Manual |
| 15. | A simple shunt voltage regulator | Lab Manual |
| 16. | An improved variable output series voltage regulator | Lab Manual |
| 17. | A variable voltage regulator using op-amp with over current protection | Lab Manual |
| 18. | Design and simulation of Buck regulator and Boost regulator | Text Book |
| 19. | Design and simulation of Buck-Boost regulator | Text Book |
| **Final Viva** |