Applied Physics and Electronics

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| Instructor *Muneeb Mehmood Abbasi* Contact Detail +923341059432  mabbasi@numl.edu.pk Office Location *Ghazali Block,*  *Room 20* Office Hours *11:00 to 12:00*  *Monday*  *10:00 to 11:00*  *Wednesday* | Course Overview  |  |  | | --- | --- | | Classes | BSCS 2A | | Session | Fall 2020 | | Course Time | Monday, 9:25 – 10:40 AM, Thursday, 10:50 – 12:05 , | | Credit Hours | 03 (2,1) | | Total Weeks | 16 | | Prerequisite | *None* |  Course DescriptionTo give understanding on how current flows through the p-n junction and relating this phenomena to the characteristics and operation of the diodes, bipolar and field-effect transistors. |

# Course Materials

# This course introduces Basic concepts of Electronics :

* Fundamentals of Semiconductor physics: Band theory, semiconductors (intrinsic and extrinsic), N-Type and P-Type semiconductors.
* Diode: Diode(Biasing, Voltage Current Characteristics, Diode models), Application of Diode(Half and Full wave rectification, Power Supply, Limiting and clamping circuits),
* Transistors: Bipolar Junction transistors, BJT biasing circuits, Q-point, BJT as a switch, BJT amplifiers, Field Effect transistors, FET biasing circuits, Q-point, FET as amplifiers.
* Power Amplifier: Class A, Class B, Class AB and Class C
* Decibel

# Course Learning Outcomes

At the end of this course, Students should be able to

To expose students to the function and application of the diodes, bipolar junction and field effect transistors in electronic circuits.

# Course Schedule

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| Week | Topic | Material | Assignment/Quiz |
| Week 1 | Introduction, semiconductors conductors and insulators, n-type and p-type semiconductors, |  |  |
| Week 2 | The Diode, Biasing a diode, voltage current characteristics of a diode |  |  |
| Week 3 | Diode models, Half wave rectifiers |  |  |
| Week 4 | Full wave rectifiers, Power supply filters and regulators |  |  |
| Week 5 | Diode Limiters , Biased Limiters, Voltage divider limiters, Diode clampers |  |  |
| Week 6 | Transistors, BJT transistors structure, Basic BJT transistor operation |  |  |
| Week 7 | Biasing for NPN as an amplifier transistors parameters, dc current and voltage analysis of NPN transistor |  |  |
| Week 8 | Transistor bias circuits, Q point, dc load line |  |  |
| Week 9 | FETS , JFET structures and basic operation, MOSFET, depletion MOSFET |  |  |
| Week 10 | Th Enhancement MOSFET, D and E MOSFET transfer characteristic |  |  |
| Week 11 | MOSFET biasing, zero bias, voltage divider bias, drain feedback bias |  |  |
| Week 12 | BJT amplifiers, Linear amplifier |  |  |
| Week 13 | Power Amplifiers, Class A |  |  |
| Week 14 | Class B, Class AB |  |  |
| Week 15 | Class C and Decibels |  |  |
| Week 16 | OP-Amplifier |  |  |

# Recommended Textbook

1. **Thomas L. Floyd Electronics Devices (7th and higher editions)**

**Reference Material**

Online Material: *Books:*

* Microelectronic Circuits by Sedra & Smith

**Teaching Methodology**

* Lecturing, Numerical problems, Lecture notes.

**Grading Policy**

Your final grade will depend on the following:

* Attendance and participation in class discussions
* Scores in assignment and quiz.
* The quality of your oral presentation and final report.

However, following calculations are necessary for the final evaluation:

* + - Mid Term Exam: 30%
    - End Term Exam: 50%
    - Assignment and Quiz: 20%
    - Lab Work: 20%
    - Theory : 80% (Mid Term + End Term + assignments + Quizzes) + Lab Work : 20% (Practical’s +Lab exam)

# Academic Honesty and Cheating

The University, the Faculty, and the teaching staff take cheating, plagiarism and other forms of academic fraud very seriously.

* Note 1: No late academic deliverables will be accepted.
* Note 2: There are no "make up" tests. Tests missed for no reason are deemed to have been written and failed and are marked “F”.