School of Engineering and Physical Sciences
Department of Mathematics and Physics

Course Name	Electronic Circuits and Analysis
Course Code	PHY 335
Course Credit Hours	3
Prerequisite	PHY 108
Course Objective	The objective of this course is to make the students acquainted with analysis and design electronic circuits involving electronic components such as diodes, BJTs, FETs and OP-amp. They also learn how to build and test electronic circuits using available electronic equipment.
Course Description	Students develop an understanding of the working principles and applications of the basic circuits using electronic devices. The students pursue a hands-on approach to learn the principles of operation of electronic devices as well as analysis, assembly, and testing of electronic circuits. Discrete and integrated amplifiers, filters, power supplies will be studied in detail.
Method(s) of Instruction(s)	Interactive lectures, Laboratory sessions, CAD simulations

COURSE CONTENT BY TOPIC

Module #1	**DC Circuits:** DC Sources, Ohm's Law, Kirchhoff's Voltage Law and Kirchhoff's Current Law, Voltage Divider, Voltage Source and Current Source, Thévenin Equivalent Circuit
Module #2	**AC Circuits:** Signals, RC Circuit, Differentiator, Integrator, RC High Pass and Low Pass Filter, Inductor, LC Filters
Module #3	**Diode and Diode Circuits:** PN Junction and its Characteristics, Types of Diodes, Filtering, Inductive Load and Diode Protection
Module #4	**Bipolar Transistors:** Operation of a Transistor, Transistor Biasing, Transistor as a Switch, Single Stage Amplifier
Module #5	**Field Effect Transistor:** Operation of FET, Biasing, Transconductance, JFET Switches, JFET Amplifiers
Module #6	**Operational Amplifier:** Operational Amplifier Basics, Inverting and Non-Inverting Amplifier, Voltage Follower, Difference Amplifier, Current Sources, Integrators, Active Filter with Op-amp
Actual contact hours: Lecture : 3 hours per week; Laboratory works: 3 hours per week	

TEXTBOOK REQUIREMENT

1. The Art of Electronics, Paul Horowitz and Winfield Hill
2. Principle of Electronic Instrumentation, A. J. Diefenderfer and Brian E. Holton
3. Electronic Principles, Albert Malvino and David J. Bates

ASSESSMENT STRATEGY AND GRADING SCHEME

NSU's grading and performance evaluation policies will be followed in assigning your grade. Please note that all final grades are subject to departmental review and approval. A guideline of course assessment is as follows-

Class Attendance	Assignments/Projects	Lab	Quiz	Midterm	Final
5%	10%	20%	10%	25%	30%

MAPPING OF COURSE OUTCOMES

CLO-#	Outcome Types	Bloom's Taxonomy level (C- Cognitive, A- Affective, P- Psychomotor)	Delivery Method	Assessment Tools	
CLO #1	Describe the operation and applications of semiconductor diodes.	C2, P2	Lecture, Simulation, and Discussion	Quiz, Assignment	Midterm Exam
CLO #2	Analyze dc circuits as well as ac circuits involving semiconductor diodes.	C4, P2	Lecture, Simulation, and Discussion	Quiz, Assignment	
CLO #3	Understand the characteristics of a bipolar junction transistor under different configuration.	C2	Lecture, Simulation, and Discussion	Quiz, Assignment	
CLO #4	Describe the operation of a bipolar junction transistor as a switch and an amplifier.	C2, P2	Lecture, Simulation, and Discussion	Quiz, Assignment	Final Exam
CLO #5	Explain the principle of operation of a field effect transistor and its application as a switch and an amplifier.	C2, P3	Lecture, Simulation, and Discussion	Quiz, Assignment	
CLO #6	Explain the operation of different electronic circuits using operational amplifiers.	C2, P3	Lecture, Simulation, and Discussion	Quiz, Assignment	
CL0 #7	Utilize software tools like PSPICE to analyze and design basic electronic circuits.	C4, C6, P4	Simulations and Discussion	Assignment/ project	