FORMAN CHRISTIAN COLLEGE UNIVERSITY
CSCS 105: Basic Electronics (4 Credit Hrs)
Spring 2023
Course Outline and Lesson Plan

Instructor Information:

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Office Hours: TR 1100- 0100

Online meetings will be appreciated

Pre Requisites:

- Intermediate Physics

Aims and Objectives:

This course will introduce students to electronics, a high-technology field undergoing great expansion in many societies. Through a theoretical and hands-on approach using a multitude of components and devices, students will explore the fascinating world of electricity and electronics. The course can be divided into three major components, DC circuits, Digital Circuits, Semiconductor Devices (Diodes and BJTs). It presents electricity, circuit boards, simple active and passive electronic components, semiconductors, semiconductor devices like Bipolar junction Transistors (BJTs), as well as digital logic circuits to students in an easy to understand and methodological way. These concepts provide students sufficient knowledge for the advanced courses like Embedded Systems. Through demonstrations and basic circuit design and assembly, students will demystify the wonderful world of electronics.

Course Material:

1. Lab Handouts
2. Class Handouts
3. Reading Assignments

Text Books:

[1] Thomas L. Floyd, Electronic devices; 9th edition

[2] Thomas L. Floyd, Digital Fundamentals; 9th edition

[3] Fundamentals of Electric Circuits 4th ed Alexander & Sadiku

Tentative Lesson Plan:

Week No	Lecture Description	Reading
Module 1: DC Circuits		
1 -2	• **Introduction to course** • **Electricity Vs Static Charge** • **Basic concepts of Electric field and Potential** • **Current, Voltage** • **Power and Energy** • **Problem Solving Session** • **Ohm's Law** • **Resistivity and conductivity** • **Nodes, branches and loops** **Lab 1 Introduction to Lab Components & Resistors Color Codes**	**Sadiku Ch1: 1.1, 1.3, 1.4** **Sadiku Ch 1: 1.5, 1.6** **Ch2: 2.1, 2.2, 2.3**
3	• **Kirchhoff's Current and Voltage laws** **Lab 2 Verifying Ohm's Law**	**Sadiku Ch 2: 2.4**
4	• **Series Resistors and Voltage Divider Rule** • **Parallel Resistors and Current Divider Rule** **Lab 3 KVL and KCL**	**Sadiku Ch 2: 2.5, 2.6**
5	• **Circuit Analysis** • **Nodal Method** • **Nodal Analysis with voltage sources** **Lab 4 Series and Parallel Circuits**	**Sadiku Ch 3: 3.1, 3.2, 3.3**
Module 2: Semiconductor Devices (Diodes and BJTs)		
6	• **Introduction to semiconductor materials** • **Electron and hole current** • **N-type and p-type materials** • **Intrinsic and extrinsic materials** • **Energy levels** **Lab 6 VI Characteristics of Diode**	**Floyd Ch 1: 1.1, 1.2, 1.3, 1.4**
7	• **PN junction** • **Forward Vs Reverse Biased Diode and its Models** • **VI Characteristics of diode** **Lab 7 VI Characteristics of Zener Diode**	**Floyd Ch 2: 2.1, 2.2, 2.3, 2.4**
8 - 9	**MID TERM EXAM: LAB +Theory**	

10-11	• **Half wave rectifier** • **Full wave rectifier** • **Bridge rectifier** • **Power supply filters and regulators** • **Design of a power supply.** **Lab 8 Series and Parallel Diodes**	**Floyd Ch 2: 2.5, 2.6** **Floyd Ch 3: 3.1, 3.2**
12-13	• **Introduction to BJTs** • **BJT operations** • **Transistor currents** • **BJT parameters** • **Characteristic curves** • **The BJT Load Line** **Lab 9 BJT characteristic Curves**	**Floyd Ch 4: 4.1, 4.2, 4.3**
14-15	• **BJT as Logic Gates** • **BJT as amplifier** • **BJT as a switch** • **Introduction to MOSFETS** • **Electronic Circuits in Computers** **Lab 10 BJT as Switch / Digital Gates Using BJTs**	**Floyd Ch 4: 4.4, 4.6**

Assessment Criteria

- Class Participation   20%
  - Quizzes, Tasks, Attendance
- Home Work   10%
- Labs   10%
- Mid Semester Exam   25%
- End of Semester Exam (Comprehensive)   35%

Important instructions:

- All information about the course will be emailed to your university email addresses.
- Make sure you check your mailbox at least twice a day.
- Number of quizzes, assignments and labs mentioned may vary based on class participation and will to learn.
- There will be **no retake for any instrument.**
- In unavoidable circumstances (for which an advanced information should be sent via email), you may earn marks no greater than 40% of your prior performance in quizzes, programming labs or exams.
- In case of assignment/homework, a delay by one day (week ends will be considered as two days) will result in a 10% deduction in marks. This means if an assignment is delayed by 10 days you will get zero marks for that.
- **Students are advised to attend all lectures**. It is entirely students' responsibility to recover any information or announcements posted during a lecture from which they were absent.
- **All work** that you submit in this course **must be your own**.
- **Unauthorized group efforts** are considered academic dishonesty.
- You may discuss homework in a general way with others, but you **must not** consult anyone else's written work. You are guilty of academic dishonesty if:
  - You **examine another's solution** to an assignment
  - You **allow another student to examine your solution** to an assignment
  - You fail **to take reasonable care to prevent another student from examining your solution** and that student **does examine your solution**.
- **Cheating, plagiarism and other forms of academic fraud** are taken very seriously. University Policy of plagiarism will be applicable in such a case.