WOLLO UNIVERSITY
KOMBOLCHA INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHATRONICS ENGINEERING

McEng 2262–Basic Electricity and Electronics

Year/ Sem. : II / 2nd **ECTS: 5**

COURSE OUTLINE

Course Description

This course provides a comprehensive introduction to Electricity and Electronics. It mainly concentrates on circuit analysis techniques and simple passive networks. Further, it deals with diodes and transistors as active devices. This comprehensive introduction serves to provide the students with the requirements for the Electrical machines and drives courses to follow. The course will be supported by practical demonstrations .

I. Basic Electrical Theory

- **Circuit elements and sources**
- Atom and Its Forces, Electrical Terminology, Units of Electrical Measurement, Methods of Producing Voltage, Electrical Symbols, Conductors, Insulators and Semiconductors

II. Basic DC Theory

- DC circuits, batteries, DC generators and DC motors

III. DC and AC circuit analysis

- **Circuit theorem**
- (ohms , Norton, superposition and kirchoff law)

IV. Basic AC Theory

Sinusoidal and phasor

- AC Reactive components, AC power, AC generators, transformers

V. **Electronics**

VI. Semiconductor Theory

- Conductors, Semiconductors, Silicon Crystals, Intrinsic semiconductors, Two types of Extrinsic semiconductors, Doping a semiconductor, Diode biasing
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VII. Diode Theory and Circuits and transistor

- Ideal Diode, Diode Approximation, Half-wave Rectifier, Full Wave Bridge Rectifier,clippers, clampers, zener diode, LED, unregulated and regulated power supply transistor basic – BJT and FET, transistor as switch, transistor as an amplifier
- OP-AMPS theory and application

Reference:

1. Malvino, Albert and Bates, David, **ELECTRONIC PRINCIPLES**, 7TH Edition

2. http://www.free-ed.net/free-ed/courses/trades/electrical/fundelect.asp

3. Petruzella, Frank D, Essentials of electronics, 2nd ed.
4.Fundamental-of-Electric-Circuits---Alexander-Sadiku

Assessment / Evaluation & Grading System	**Assignments/Seatworks/Worksheets –**	**5%**
	Test 1 –	**10%**
	Mid Exam-	**20%**
	Laboratory Exercise/ Exam -	**5% / 10 %**
	Final Examination-	**50%**
	Total	**100%**