

## SUBJECT DESCRIPTION FORM

SUBJECT CODE: HTI2111

SUBJECT TITLE: Bioelectrical Technology I – Circuits and systems

CREDITS: 3

CO-REQUISITIES: AMA2152 Applied Mathematics II  
or equivalent

EXCLUSIONS: EIE201 Electronic Circuits I  
or EE202 Electrical Circuit Analysis  
or EE204/ENG222 Basic Electronics

RESPONSIBLE DEPARTMENT: Department of Health Technology and Informatics

RESPONSIBLE MEMBER OF THE ACADEMIC STAFF:

Dr. Mo Yang

CONTACT HOURS:

Lecture	33 hours
Laboratory	<u>9 hours</u>
Total contact hours	42 hours

RATIONALE:

Electronic circuits and systems are used widely in biomedical engineering. Examples include clinical equipments and in healthcare facilities and bioelectric systems in prosthetics and orthotics. Bioelectrical Technology I and II aim to provide a firm foundation on electronic circuits, systems, and devices.

LEARNING OUTCOMES:

At the end of this course, a student should be able to:

- Understand the i-v characteristics of passive components including resistor, capacitor, and inductor and active sources including current sources and voltage sources;
- Realize that passive electronic components can be biomedical sensors.
- Understand the input and output characteristics of operational amplifier;
- Use DC power supplier, functional generator, and oscilloscope in the circuit design and analysis;
- Follow the basic circuit description of biomedical equipment;
- Design simple circuits for biomedical applications using passive components;
- Analyze basic amplification circuits and analog filters constructed using operational amplifier;
- Design basic amplification circuits for biomedical signals;

## SYLABUS:

DC and AC circuits, resistors, capacitors, inductors, circuit analyses, circuit theorems, current sources, voltage sources, operational amplifiers, analog filters, functional blocks for electrical systems.

## TEACHING-LEARNING METHODS:

Lectures will deal with fundamentals and applications of circuits and systems illustrated with ample examples in biomedical engineering. Three hands-on laboratory sessions provide students with practical experiences in constructing circuits and systems using real components, and measuring their performance using common electronic test and measurement equipment.

## ASSESSMENT

Continuous assessment	60%
Final examination	40%

Note: To pass this subject, students must obtain grade D or above in BOTH the continuous assessment and the examination.

## REFERENCE MATERIALS:

1. Dorf, R.C. and Svoboda, J.A., Introduction to Electric Circuits, 5<sup>th</sup> Ed., John Wiley & Sons, Inc., New York, 2001.
2. Floyd T.L., Electronics Fundamentals: Circuits, Devices, and Applications, 5<sup>th</sup> Ed., Prentice Hall, New Jersey, 2001.
3. Smith I.M., Hiley J., and Brown K., Hughes Electrical and Electronic Technology, 8<sup>th</sup> Ed., Prentice Hall, London, 2002.