

TKB212201

Biomagnetics Engineering

Teknik Biomagnetika

BASIC INFORMATION

Course Credit	3 / 150 minutes per Week
Course Type	Required
Course Classification	Engineering Topics
Prerequisites	Fluid, Heat & Waves; Electricity & Magnetism

STUDENT AND LEARNING OUTCOMES

Covered Student Outcomes

Fundamental and Engineering Knowledge (KP.1) Development of Engineering Solution (KP.2)

Learning Outcomes

- LO1** Students are able to understand basic concepts of biomagnetic engineering
- LO2** Students are able to apply biomagnetic engineering for biomedical applications.

COURSE DESCRIPTION

Understand the basic concepts of Electromagnetic Fields include: Concept of Field and Vector Calculus, Coordinate System, Electrical Field Theory, Electric Current, Magnetic Field Theory, Electrical and Magnetic Material, Hysteresis, Electromagnetic Boundary Condition, Electromagnetic Induction, Inductance, Capacitance, Resistance, Ampere's Law, Faraday's Law, Gauss' Law, Ohm, Joule's Law, Magnetic Circuit, Transmission Line, Maxwell's Equation, Electromagnetic Waves

TOPICS

1. Magnetic Fields for Diagnostic Application (Medan Magnet untuk Aplikasi Diagnostik)
2. Transcranial Magnetic Stimulation (TMS) (Stimulasi Magnetik Transcranial)
3. Magnetic Fields Produced Inside The Human Body (Medan magnet diproduksi di dalam tubuh manusia)
4. The Principles of Operation and The Imaging Modalities Used in Clinical MRI (Prinsip Operasi dan Modalitas Pencitraan yang Digunakan dalam MRI Klinis).

REFERENCES

1. Shoogo Ueno and Masaki Sekino, 2015, *Biomagnetics: Principles and Applications of Biomagnetic Stimulation and Imaging*, CRC Press, Taylor and Francis Group
2. Shoogo Ueno, 1994, *Biomagnetic Stimulation*, Springer Science+Business Media, LLC