TKB213102

Anatomi dan Fisiologi

Anatomy and Physiology

BASIC INFORMATION

Course Credit	3 / 150 minutes per Week
Course Type	**Required**
Course Classification	**Engineering Topics**
Prerequisites	

STUDENT AND LEARNING OUTCOMES

Covered Student Outcomes

Fundamental and Engineering

Knowledge (a)

Data and Experiments (d)

Learning Outcomes

LO1 Students are able to understand organization and functions of human body as a single unit. (Mahasiswa untuk memahami organisasi dan fungsi tubuh manusia sebagai satu kesatuan.)

COURSE DESCRIPTION

This course discusses organization and functions of human body as a single unit.

Mata kuliah ini bertujuan untuk memberikan uraian organisasi dan fungsi tubuh manusia sebagai satu kesatuan.

TOPICS

1. Cell Structure and Biochemical Reactions
2. Cellular Homeostasis and Membrane Potential
3. The Action Potential
4. Cellular Transport and Communication
5. Pharmacokinetics
6. Tissue Mechanics
7. Cardiovascular System I: The Heart
8. Cardiovascular System II: The Vasculature
9. The Respiratory System
10. The Central Nervous System

195

REFERENCES

[1] Physiology, Biophysics, and Biomedical Engineering. Editor: A. W. Wood, CRCPress, Taylor & Francis Group, BocaRaton, FL, 2012

[2] Chappell, Michael, Payne, Stephen. Physiology for Engineers Applying Engineering Methods to Physiological Systems, Springer, 2016

TKU213101

Optimization Methods

Teknik Optimisasi

BASIC INFORMATION

Course Credit	3 / 150 minutes per Week
Course Type	Required
Course Classification	Engineering Topics
Prerequisites	Single- and Multi-Variable Calculus; Linear Algebra

STUDENT AND LEARNING OUTCOMES

Covered Student Outcomes

Development of Engineering Solution (KP.2) Engineering Design (KP.3)

Learning Outcomes

LO1 Students are able to undertand and solve unconstrained optimization problems.

LO2 Students are able to undertand and solve linear programming problems.

LO3 Students are able to undertand and solve nonlinear constrained optimization problems.

COURSE DESCRIPTION

This course deals with analitical methods to solve optimization problems which very often appear in engineering. It studies the uncontrained optimization, linear programming, and nonlinear constrained optimization problems.

TOPICS

PART I : MATHEMATICAL REVIEW

1. Methods of Proof and Some Notation

1.1 Methods of Proof

1.2 Notation

2. Vector Spaces and Matrices

2.1 Vector and Matrix

2.2 Rank of a Matrix
2.3 Linear Equations
2.4 Inner Products and Norms

3.Transformations
3.1 Linear Transformations
3.2 Eigenvalues and Eigenvectors
3.3 Orthogonal Projections
3.4 Quadratic Forms
3.5 Matrix Norms

4. Concepts from Geometry
4.1 Line Segments
4.2 Hyperplanes and Linear Varieties
4.3 Convex Sets
4.4 Neighbourhoods
4.5 Polytopes and Polyhedra

5. Elements of Calculus
5.1 Sequences and Limits
5.2 Differentiability
5.3 The Derivative Matrix
5.4 Differentiation Rules
5.5 Level Sets and Gradients
5.6 Taylor Series

PART II : UNCONSTRAINED OPTIMIZATION
6. Basics of Set-Constrained and Unconstrained Optimization
6.1 Introduction
6.2 Conditions for Local Minimizers

7. One-Dimensional Search Methods
7.1 Introduction
7.2 Golden Section Search
7.3 Fibonacci Method
7.4 Bisection Method
7.5 Newton's Method
7.6 Secant Method
7.7 Bracketing

[1] Edwin K. P. Chong, Stanislaw H. Zak., 2013., An Introduction to Optimization, 4th Edition