SYLLABUS:

Date / Revision	23 May 2015 / 02 May 2017 / PP
Faculty	Life Sciences (LS)
Study Programs	Biomedical Engineering (BME)

SUBJECT: Anatomy and Physiology

1 Basic Information

1.01	**Subject Name**	**Anatomy and Physiology**
1.02	**Semester**	3
1.03	**Level**	*1*
1.04	**SKS**	3
1.05	**Mandatory / Curriculum**	*D-02*
1.06	**Subject Code**	ANPH
1.07	**Subject Code**	BME-D-ELEC-117
1.08	**Year**	2017 (7)
1.09	**Quality Control**	Final Test, OFSE, see evaluation
1.10	**Limitations**	Min 12 and Max 32 students in one class
1.11	**Combined with**	Chemical Engineering 5 and Food Technology 5 (as elective)
1.12	**Pre-requisite**	Biology Chemistry Organic Chemistry Physics 1 & 2
1.13	**Responsible**	Dr. Tutun Nugraha
1.14	**Revision**	15-05-2017/pp

2 Description of Subject

This course is divided into two parts: introduction, theory and applications of continuous-time signals and systems, and theory and applications of discrete-time signals and systems. To help students understand the connection between continuous- and discrete-time signals and systems, the connection between infinitesimal and finite calculus is made in the introduction part, together with a motivation as to why complex numbers and functions are used in the study of signals and systems. The treatment of continuous- and discrete-time signals and systems is then done separately in the next two parts; combining them is found to be confusing to students. Likewise, it is important for students to understand the connections and relevance of each of the transformations used in the analysis of signals and systems so that these transformations are seen as a progression rather than as disconnected methods. Thus, the presentation of

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the Laplace analysis followed by the Fourier analysis, and the Z-transform followed by the discrete Fourier, and capping each of these topics with applications to communications, control, and filtering. The mathematical abstraction and the applications become more sophisticated as the material unfolds, taking advantage as needed of the background on circuits that students have.

3 Objectives

This course will provide introduction to the study of signal and system which will bridge the knwoledge that they acquire during the class of Basic Electrical Engineering and Lab (1 & 2) as well as the class of Electronic devices and Circuits. Students will alaso learn to apply fundamental knwoledge that they acquire in applied mathematics class such as the use of Laplace and Fourier Transform. This course will prepare students to learn more in the subsequent class of Digital Signal Processing.

4 Competency

After having the course, students are expected to:

a) understand continuous-time as well as discrete-time signals so as to avoid confusion in their processing later.
b) Understand the representation of signals in terms of basic signals that will be easily processed later with the transform methods.
c) Understand the general concept of systems.
d) Understand the basics of the Laplace transform and its application in the analysis of continuous-time
e) Understand the analysis of aperiodic signals resulting
f) Developing applications of the Laplace and the Fourier transforms to control, communications, and filtering
g) Understand the basic theory of the Z-transform and how to use it

5 Learning Approach / Methodology

- Lectures/ Class contact (time-tabled) supplemented with interactive questions and answers to build the projects;
- Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing;
- Student Study Effort: homework/assignment; preparation for test/quizzes/ examination.
- Writing assignments/preseantations

6 Evaluation

5.1	**Absence maximum**	25%
5.2	**Participation in Discussion**	5 Points
5.3	**Homework / Classwork**	-
5.4	**Presentation /Simulation**	10 Points
5.5	**Daily Quiz**	25
5.6	**Final Examination**	60 Points
	Total	100 Points

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7 Text Book and Reference

1	**Main Text Book:** Essential of Anatomy and Physiology – Kenneth S. Saladin and Robin K. McFarland – McGraw-Hill, Estimated Price of Book: Rp 306,000,-
2	**Supplement Textbooks:** Principles of Anatomy and Physiology, Organization, Support and Movement, and Control System of the Human Body – Gerard J. Tortora and Bryan Derrickson – John Wiley and Sons, Inc.

8 Content / Topics of Lecture

Week	Content/ Topics of Lecturing	Text Book Chapter	Remark
1	**Introduction to Anatomy and Physiology** • Why is it important? • Human structure and major body region. • Common use terminology.	Ch 1	1 x 3 x 50 minutes
2	**Cytology and Histology** • General structure of Cell. • Cell surface and life cycle of cells. • Connective tissues, Nervous and Muscular tissues. • Tissues Growth, Development, Repair, and Death.	Ch 2	1 x 3 x 50 minutes
3	**Skeletal and Muscular System** • Skeletal structure and function. • Bone development and metabolism. • Anatomy of Muscular system.	Ch 3	1 x 3 x 50 minutes
4	**Nervous System - I** The Physiology of Neuron. Spinal Cord, Spinal Nerves, and Reflexes.	Ch 4	1 x 3 x 50 minutes
5	**Nervous System - II** • Principal division of the Brain. • Brain functions and Cranial Nerves. • The Autonomic Nervous System.	Ch 5	1 x 3 x 50 minutes
6	**Sensing Organ** • Receptors and Sensations. • The general senses. • Taset and smell, Ear, and Eye and vision.	Ch 6	1 x 3 x 50 minutes

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7	**Endocrine System** • Overview of Endocrine System. • The Hypothalamus Glands and Tissues. • Endocrine Physiology.		1 x 3 x 50 minutes
8	**Midterm Break**		
9	**Circulatory System - I** • Erythrocytes. • Leukocytes. • Plateles.	Ch 8	1 x 3 x 50 minutes
10	**Circulatory System - II** • Cardiovascular System. • Gross Anatomy and Physiology of the Heart. • Blood Vessels and Circulation.	Ch 9	1 x 3 x 50 minutes
11	**Respiratory and Urinary System** • Pulmonary Ventilation, Gas Exchange, and Transport. • Function of Urinary System and Anatomy of Kidney. • Tubular Reabsorption and Secretion.	Ch 10	1 x 3 x 50 minutes
12	**Digestive System** • Esophagus, Stomach, Liver, Gallbladder, Pancreas, and Small Intestine. • Chemical Digestion and Absorption.	Ch 11	1 x 3 x 50 minutes
13	**Nutrition and Metabolism** • Carbohydrtae Metabolism. • Lipid and Protein Metabolism. • Energy Balance.	Ch 12	1 x 3 x 50 minutes
14	**Lymphatic System and Immunity** • The Lymphatic System. • Feature and Adaptive Immunity.		1 x 3 x 50 minutes
15	**Reproductive System** • Male Reproductive System. • Female Reproductive System. • Fertilization and Preembionic Development.		1 x 3 x 50 minutes
16, 17	**Final Examination**		

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