

3. Module III: Introduction to Science and Technology

3.1. Module Objectives

On completion of this module, the students will have the ability to apply basic concept of science and technology in order to develop industries based on current problems

3.2. Module Data

Person in charge	Common First Year Unit (TPB)
Total Credits	8
Course	KU1101 Introduction to engineering and design I
	KU1201 Introduction to engineering and design II
	KU1071 Introduction to information technology A
	BI1201 Introduction to life sciences and technology
Modul Examination	Written Test

3.2.1. Sub-module I : Introduction to engineering and design I

Lecturer	Dr. Taufiq Mulyanto, ST. (Coordinator)
Semester	1
Type of submodule / course	Lecture with exercises
Credits	2
Workload:	2 hours lectures, 2 hours structured activities, 2 hours individual study, 16 weeks per semester, and total 144 hours a semester
Workload details	Textbook reading assignment, group discussion and presentation
Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of examination	Written Test
Language	Bahasa Indonesia
Course Target / Outcome	<i>After completion of this module students are expected to be able to:</i> Knowledge: <ul style="list-style-type: none">• Describe what is engineering and design• Define the role of professional engineer and their responsibilities• Discuss the interrelation among engineering disciplines• Recognize the contemporary issues related to engineering discipline Skills:

	<ul style="list-style-type: none"> Apply mathematics and basic sciences to solve simple engineering problem <p>Competences:</p> <ul style="list-style-type: none"> Identify a simple engineering problem Propose alternative solutions to solve the identified engineering problem
Teaching methods	Interactive Teaching
Contents	<p>This course activities consist of lectures and practice with scope:</p> <ul style="list-style-type: none"> Engineering and design in society Engineer as a profession Aspects in engineering Key elements of engineering analysis Steps in solving problems Concept of energy Conversion and conservation Examples of engineering discipline as well as ethics in engineering.
Literature / Sources	<ul style="list-style-type: none"> Philip Kosky et al.. 2010. Exploring Engineering: An Introduction to Engineering and Design. Academic Press. Saeed Moaveni. 2011. Engineering Fundamentals: An Introduction to Engineering. Cengage Learning. Holtzapple & Reece. 2003. Foundations of Engineering. McGraw-Hill.
Other specialties	

3.2.2. Sub-module II : Introduction to engineering and design II

Lecturer	Dr. Taufiq Mulyanto, ST. (Coordinator)
Semester	2
Type of submodule / course	Lecture with exercises
Credits	2
Workload:	2 hours lectures, 2 hours structured activities, 2 hours individual study, 16 weeks per semester, and total 144 hours a semester
Workload details	Textbook reading assignment, group discussion and presentation
Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of examination	Written Test
Language	Bahasa Indonesia

Course Target / Outcome	<p><i>After completion of this module students are expected to be able to:</i></p> <p>Knowledge:</p> <ul style="list-style-type: none"> • Describe engineering design process • Describe the significance of design requirements • Recognize the importance of teamwork in engineering project <p>Skills:</p> <ul style="list-style-type: none"> • Relate and apply mathematics and basic sciences to simple engineering problems • Employ tools and determined materials to fulfill a specific design requirements <p>Competences:</p> <ul style="list-style-type: none"> • Apply engineering design process to solve simple engineering problems
Teaching methods	Interactive Teaching
Contents	<p>Introduction to Engineering and Design II</p> <p>This course activities consist of lectures and practice with scope:</p> <ul style="list-style-type: none"> • Class orientation and team preparation <p>Student team activities: problem definition and formulation, propose alternative solution and conceptual design, experiment/implementation of design solution, evaluation of design solution</p>
Literature / Sources	<ul style="list-style-type: none"> • Philip Kosky et al.. 2010. Exploring Engineering: An Introduction to Engineering and Design. Academic Press. • Saeed Moaveni. 2011. Engineering Fundamentals: An Introduction to Engineering. Cengage Learning. • Holtzapple & Reece. 2003. Foundations of Engineering. McGraw-Hill.
Other specialties	

3.2.3. Sub-module III : Introduction to information technology A

Lecturer	Common First Year Unit (TPB)
Semester	2
Type of submodule / course	Lecture with exercises
Credits	2
Workload:	2 hours lectures, 2 hours structured activities, 2 hours individual study, 16 weeks per semester, and total 144 hours a semester

Workload details	Textbook reading assignment, computer lab work
Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of examination	Written Test
Language	Bahasa Indonesia
Course Target / Outcome	<p><i>After completion of this module students are expected to be able to:</i></p> <p>Knowledge:</p> <ul style="list-style-type: none"> • Describe the basic concepts of computer systems and organizations; different types of hardware and software and its utilization; as well as the basic concepts of communication networks, including the Internet. • Describe how to use the computers and communication networks ethically in various aspects of human life, especially that are related to student life in general and specifically at faculty / school. • Describe an understanding of positive and negative impacts and implications of the use of computers and communication networks. <p>Skills:</p> <ul style="list-style-type: none"> • Operate computers and communication networks ethically in relation to student life in general and specifically at faculty / school. <p>Competences:</p> <ul style="list-style-type: none"> • Demonstrate skill in operating the computer, internet, and productivity applications that suits the needs of the faculty / schools that are ready to develop independently in the later stages.
Teaching methods	Interactive Teaching
Contents	<p>This course introduces:</p> <ul style="list-style-type: none"> • Information technology as a part of ethical development of creativity • The skill to work with various productivity applications that support students' academic and professional lives • The introduction to computer system and organization (hardware and software) • Communication network (including the internet) • The implications of the use of information technology in the aspects of human's life

	(especially the ones related to the life in the faculty/school) <ul style="list-style-type: none"> The skill to work with the computer, internet, and various productivity applications required by the faculty/school.
Literature / Sources	<ul style="list-style-type: none"> G. Beekman and B. Beekman. 2012. Digital Planet: Tomorrow's Technology and You, Complete Tenth Edition. Prentice Hall. B. K. Williams and S. C. Sawyer. 2011. Using Information Technology: A Practical Introduction to Computers and Communications, Ninth Edition Complete Version. Mc Graw Hill. D. Morley and C. S. Parker. 2013. Understanding Computers: Today and Tomorrow, 14th Edition Comprehensive. Course Technology.
Other specialties	

3.2.4. Sub-module IV: Introduction to Life Sciences and Technology

Lecturer	Prof. Dr. Tati Suriati Syamsudin MS.,DEA Dr. Achmad Sjarmidi
Semester	2
Type of submodule / course	Lecture with exercises
Credits	2
Workload:	2 hours lectures, 2 hours structured activities, 2 hours individual study, 16 weeks per semester, and total 144 hours a semester
Workload details	Textbook reading assignment, paper review, group discussion and presentation
Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of assessment/examination	Written Test : Midterm exam, Final exam, Quizess, Assigments
Language	Bahasa Indonesia
Course Target / Outcome	The students will have the ability to apply basic concept of science and technology in order to develop industries based on current problems
Teaching methods	Interactive Teaching
Contents (SAP)	
	1 Introduction of life sciences and technology
	2 Biosystem
	3 Natural Resources

	4	Technology System I
	5	Technology System II
	6	Biomangement
	7	Bio-economy
	8	
	9	Mid-Term Test
	10	Sociocultural aspect in bioindustry
	11	Energy-based bioindustry model
	12	Food-based bioindustry model
	13	Medical-based bioindustry model
	14	Environmental-based bioindustry model
	15	Material-based bioindustry model
	16	Final Test
Literature / Sources		<ol style="list-style-type: none"> 1. Ann Saterbak, Larry V. Mc Intire, Ka-Yiu San. Bioengineering Fundamentals. Pearson Prentice Hall Bioengineering. 2007 2. Joseph Fiksel. Design for Environment: Creating Eco-Efficient Products and Processes. McGraw-Hill. 1996 3. Bernard W., Taylor III. Introduction to Management Science (Sains Manajemen Edisi 8) Buku I dan II. Penerbit Salemba Empat. 2005 4. William W. Keller dan Richard J. Samuels. Crissis and Innovation in Asian Technology. Cambridge University Press. 2003
Other specialties		

