



MODULE HANDBOOK INTRODUCTION TO ELECTRICAL TECHNOLOGY



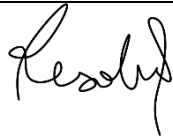
**BACHELOR DEGREE PROGRAM
DEPARTMENT OF BIOMEDICAL ENGINEERING
FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS
TECHNOLOGY**

INSTITUT TEKNOLOGI SEPULUH NOPEMBER

ENDORSEMENT PAGE



MODULE HANDBOOK
Introduction to Electrical Technology
DEPARTMENT OF BIOMEDICAL ENGINEERING
INSTITUT TEKNOLOGI SEPULUH NOPEMBER
Number : B/21331/IT2.IX.5.1.2/PP.03.00.00/2020

Proses Process	Penanggung Jawab Person in Charge			Tanggal Date
	Nama Name	Jabatan Position	Tandatangan Signature	
Perumus Preparation	Prof. Dr. Ir. Mohammad Nuh, DEA.	Dosen Lecturer	TTD	November 23, 2019
Pemeriksa dan Pengendalian Review and Control	Dr. Didik Khusnul Arif, S.Si, M.Si	Tim kurikulum Curriculum team	TTD	February 10, 2020
Persetujuan Approval		Koordinator RMK Course Cluster Coordinator	TTD	March 02, 2020
Penetapan Determination	Dr. Achmad Arifin, S.T., M.Eng.	Kepala Departemen Head of Department		March 09, 2020

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MODULE HANDBOOK

INTRODUCTION TO ELECTRICAL TECHNOLOGY

Module name	Introduction to Electrical Technology	
Module level	Undergraduate	
Code	EW184001	
Course (if applicable)	Introduction to Electrical Technology	
Semester	First Semester (Gasal)	
Person responsible for the module	Prof. Dr. Ir. Mohammad Nuh, DEA.	
Lecturer	Dr. Margo Pujiantara Tasripan MT Dr. M. Rameli Prof. Dr. Gamantyo Hendrantoro Prof. M. Nuh Prof. Yoyon Kusnendar	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergraduate degree program, mandatory , 1 st semester.	
Type of teaching, contact hours	Lectures, <60 students	
Workload	1. Lectures : 2 x 50 = 100 minutes per week. 2. Exercises and Assignments : 2 x 50 = 100 minutes per week. 3. Private learning : 2 x 50 = 100 minutes per week.	
Credit points	2 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	Course Learning Outcome (CLO) after completing this module, CLO 1: Students understand the introductory material of power system engineering. CLO 2: Students understand the introductory material of control system engineering. CLO 3: Students understand the introductory material of electronics.	PLO-09 PLO-09 PLO-09

	<p>CLO 4: Students understand the introductory material of telecommunication engineering.</p> <p>CLO 5: Students understand the introductory material of computer engineering</p> <p>CLO 6: Students understand the introductory material of biomedical engineering.</p> <p>CLO 7: Students understand the history and timeline of electrical technology.</p> <p>CLO 8: Students understand the basic electrical and magnetical phenomenon.</p> <p>CLO 9: Students understand the role of physics and mathematics in electrical technology.</p> <p>CLO 10: Students understand the impact of electrical technology on the development of civilization.</p> <p>CLO 11: Students understand the importance of creativity for electrical technology undergraduates in the face of technological developments.</p> <p>CLO 12: Students understand the importance of integrity for electrical technology undergraduates.</p>	<p>PLO-09</p> <p>PLO-09</p> <p>PLO-11</p> <p>PLO-09</p> <p>PLO-09</p> <p>PLO-11</p> <p>PLO-11</p> <p>PLO-11</p>
Content	<p>Introduction to Electrical Technology course studies about fundamentals of electrical technology which include the introductory material of power system engineering, control system engineering, electronics, telecommunication engineering, computer engineering, and biomedical engineering also include the history and impact of electrical technology to civilization, role of physics and mathematics in electrical technology, and the importance of creativity and integrity for electrical technology undergraduates.</p>	
Study and examination requirements and forms of examination	<ul style="list-style-type: none"> ● In-class exercises ● Assignment 1, 2, 3 ● Mid-term examination ● Final examination 	
Media employed	<p>LCD, whiteboard, websites (myITS Classroom), zoom.</p>	
Reading list	<p>Main :</p> <ol style="list-style-type: none"> 1. Anthonie Meijers, Philosophy of Technology and Engineering 2. Sciences, Elsevier, 2009. Clive Maxfield dkk, Electrical Engineering, Elsevier, 2008. 3. Don Johnson, J. D. Wise, Fundamentals of Electrical Engineering, University Press of Florida, 2009. 4. Charles Gross, Thaddeus Roppel, Fundamentals of Electrical Engineering, Taylor and Francis, 2012. 5. Stan Gibilisco, Teach Yourself Electricity and Electronics, ed. 4, McGraw-Hil, 2006. 	

I. Rencana Pembelajaran Semester / Semester Learning Plan

		INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS) FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS TECHNOLOGY DEPARTMENT OF BIOMEDICAL ENGINEERING				Document Code
SEMESTER LEARNING PLAN						
MATA KULIAH (MK) COURSE	KODE CODE	Rumpun MK Course Cluster	BOBOT (sks) Credits		SEMESTER	Tgl Penyusunan Compilation Date
Pengantar Teknologi Elektro <i>Introduction to Electrical Engineering</i>	EW184001	Ilmu Dasar Teknik <i>Basic Engineering</i>	T=2	P=0	I	Oct 27, 2020
OTORISASI / PENGESAHAN AUTHORIZATION / ENDORSEMENT	Dosen Pengembang RPS <i>Developer Lecturer of Semester Learning Plan</i>		Koordinator RMK <i>Course Cluster Coordinator</i>		Ka DEPARTEMEN <i>Head of Department</i>	
	(Prof. Dr. Ir. Mohammad Nuh, DEA.)		(M. Hilman Fatoni, S.T., M.T.)		(Dr. Achmad Arifin, S.T., M.Eng.)	
Capaian Pembelajaran	CPL-PRODI yang dibebankan pada MK <i>PLO Program Charged to The Course</i>					
Learning Outcomes	CPL-09 PLO-09	Mampu mengetahui/mengikuti perkembangan terkini dibidang ilmu pengetahuan dan teknologi serta menyikapinya secara obyektif dengan mengedepankan nilai-nilai kebenaran universal <i>Able to know / follow the latest developments in the field of science and technology and to react objectively by promoting the values of universal truth.</i>				
	CPL-11 PLO-11	Mampu memahami kebutuhan akan pembelajaran sepanjang hayat <i>Able to understand the need for lifelong learning.</i>				
	Capaian Pembelajaran Mata Kuliah (CPMK) <i>Course Learning Outcome (CLO) - If CLO as description capability of each Learning Stage in the course, then CLO = LLO</i>					
	CP MK 1 CLO 1	Mahasiswa memahami materi pengantar teknik sistem tenaga. <i>Students understand the introductory material of power system engineering.</i>				
	CP MK 2	Mahasiswa memahami materi pengantar teknik sistem pengaturan.				

CLO 2	<i>Students understand the introductory material of control system engineering.</i>
CP MK 3	Mahasiswa memahami materi pengantar elektronika.
CLO 3	<i>Students understand the introductory material of electronics.</i>
CP MK 4	Mahasiswa memahami materi pengantar teknik telekomunikasi.
CLO 4	<i>Students understand the introductory material of telecommunication engineering.</i>
CP MK 5	Mahasiswa memahami materi pengantar teknik komputer.
CLO 5	<i>Students understand the introductory material of computer engineering.</i>
CP MK 6	Mahasiswa memahami materi pengantar teknik biomedik.
CLO 6	<i>Students understand the introductory material of biomedical engineering.</i>
CP MK 7	Mahasiswa memahami sejarah dan timeline teknologi elektro.
CLO 7	<i>Students understand the history and timeline of electrical technology.</i>
CP MK 8	Mahasiswa memahami dasar fenomena listrik dan magnet.
CLO 8	<i>Students understand the basic electrical and magnetical phenomenon.</i>
CP MK 9	Mahasiswa memahami peran fisika dan matematika dalam teknologi elektro.
CLO 9	<i>Students understand the role of physics and mathematics in electrical technology.</i>
CP MK 10	Mahasiswa memahami dampak teknologi elektro terhadap perkembangan peradaban.
CLO 10	<i>Students understand the impact of electrical technology on the development of civilization.</i>
CP MK 11	Mahasiswa memahami pentingnya kreativitas bagi sarjana teknologi elektro dalam menghadapi perkembangan teknologi.
CLO 11	<i>Students understand the importance of creativity for electrical technology undergraduates in the face of technological developments.</i>
CP MK 12	Mahasiswa memahami pentingnya integritas bagi sarjana teknologi elektro.
CLO 12	<i>Students understand the importance of integrity for electrical technology undergraduates.</i>

Peta CPL – CP MK Map of PLO - CLO		CPL-01	CPL-02	CPL-03	CPL-04	CPL-05	CPL-06	CPL-07	CPL-08	CPL-09	CPL-10	CPL-11	CPL-12	
	CPMK 1 / SUB CPMK 1 <i>CLO 1 / LLO 1</i>										√			
	CPMK 2 / SUB CPMK 2 <i>CLO 2 / LLO 2</i>									√				
	CPMK 3 / SUB CPMK 3 <i>CLO 3 / LLO 3</i>									√				
	CPMK 4 / SUB CPMK 4 <i>CLO 4 / LLO 4</i>									√				
	CPMK 5 / SUB CPMK 5 <i>CLO 5 / LLO 5</i>									√				
	CPMK 6 / SUB CPMK 6 <i>CLO 6 / LLO 6</i>									√				
	CPMK 7 / SUB CPMK 7 <i>CLO 7 / LLO 7</i>												√	
	CPMK 8 / SUB CPMK 8 <i>CLO 8 / LLO 8</i>									√				
	CPMK 9 / SUB CPMK 9 <i>CLO 9 / LLO 9</i>									√				

	CPMK 10 / SUB CPMK 10 CLO 10 / LLO 10											√	
	CPMK 11/ SUB CPMK 11 CLO 11 / LLO 11											√	
	CPMK 12 / SUB CPMK 12 CLO 12 / LLO 12											√	
Diskripsi Singkat MK Short Description of Course	<p>Mata kuliah Pengantar Teknologi Elektro membahas dasar-dasar teknologi elektro yang meliputi materi pengantar ke teknik sistem tenaga, teknik sistem pengaturan, elektronika, teknik telekomunikasi, teknik komputer, dan teknik biomedik serta sejarah dan dampak teknologi elektro bagi peradaban, peran fisika dan matematika dalam teknologi elektro, dan pentingnya kreativitas dan integritas bagi sarjana teknologi elektro.</p> <p><i>Introduction to Electrical Technology course studies about fundamentals of electrical technology which include the introductory material of power system engineering, control system engineering, electronics, telecommunication engineering, computer engineering, and biomedical engineering also include the history and impact of electrical technology to civilization, role of physics and mathematics in electrical technology, and the importance of creativity and integrity for electrical technology undergraduates.</i></p>												
Bahan Kajian: Materi pembelajaran Course Materials:	<ol style="list-style-type: none"> 1. Pengantar teknik sistem tenaga / <i>Introduction of power system engineering</i> 2. Pengantar teknik sistem pengaturan / <i>Introduction of control system engineering</i> 3. Pengantar elektronika / <i>Introduction of electronics</i> 4. Pengantar teknik telekomunikasi / <i>Introduction of telecommunication engineering</i> 5. Pengantar teknik komputer / <i>Introduction of computer engineering</i> 6. Pengantar teknik biomedika / <i>Introduction of biomedical engineering</i> 7. Sejarah/timeline teknologi elektro (Volta, Ohm, Kelvin, Faraday, Biot Savart, Laplace, Ampere, Maxwell, dan seterusnya) / <i>History and the timeline of electrical technology (Volta, Ohm, Kelvin, Faraday, Bio-Savart, Laplace, Ampere, Maxwell, etc.)</i> 8. Dasar fenomena listrik dan magnet (elektron, arus listrik, listrik magnet, baterai, dst) / <i>Basic of electrical and magnetical phenomenon</i> 												

	<p><i>(electrons, electrical current, electrical magnet, battery, etc.)</i></p> <p>9. Fisika dan matematika dalam teknologi elektro (fenomena fisika dari elektro, pemodelan matematika untuk sinyal dan sistem dalam teknologi elektro) / <i>Physics and mathematics in electrical technology (physics phenomenon from electrical, mathematical modelling for signal and system in electrical technology)</i></p> <p>10. Dampak teknologi elektro terhadap perkembangan peradaban (transportasi, dsb) / <i>Impact of electrical technology to civilization development (transportation, etc.)</i></p> <p>11. Kreativitas bagi sarjana teknologi elektro dalam menghadapi perkembangan teknologi (memiliki penguasaan dasar yang kuat) / <i>Creativity for electrical technology undergraduates in the face of technological development (have a hard basic mastery)</i></p> <p>12. Kode etik dan integritas bagi sarjana teknologi elektro (pengakuan terhadap hasil karya orang lain, upaya mandiri dalam menyelesaikan permasalahan, dst) / <i>Ethics code and integrity for electrical technology undergraduates (recognition of the work of others, be independent in solving problems, etc.)</i></p>
Pustaka References	<p>Utama / Main:</p> <ol style="list-style-type: none"> 1. Anthonie Meijers, Philosophy of Technology and Engineering 2. Sciences, Elsevier, 2009. Clive Maxfield dkk, Electrical Engineering, Elsevier, 2008. 3. Don Johnson, J. D. Wise, Fundamentals of Electrical Engineering, University Press of Florida, 2009. 4. Charles Gross, Thaddeus Roppel, Fundamentals of Electrical 5. Engineering, Taylor and Francis, 2012. 6. Stan Gibilisco, Teach Yourself Electricity and Electronics, ed. 4, McGraw-Hil, 2006. <p>Pendukung / Supporting:</p>
Dosen Pengampu Lecturers	<p>Dr. Margo Pujiantara Tasripan MT Dr. M. Rameli Prof. Dr. Gamantyo Hendratoro</p>

	Prof. M. Nuh Prof. Yoyon Kusnendar						
Matakuliah syarat Prerequisite	-						
Mg ke/ Week	Kemampuan akhir tiap tahapan belajar (Sub-CPMK) / <i>Final ability of each learning stage (LLO)</i>	Penilaian / Assessment		Bentuk Pembelajaran; Metode Pembelajaran; Penugasan Mahasiswa; [Estimasi Waktu] / <i>Form of Learning; Learning Method; Student Assignment;</i> [Estimated Time]		Materi Pembelajaran [Pustaka] / <i>Learning Material</i> [Reference]	Bobot Penilaian /Assessment Load (%)
		Indikator / <i>Indicator</i>	Kriteria & Teknik / <i>Criteria & Techniques</i>	Tatap Muka / <i>In-class</i> (5)	Daring / <i>Online</i> (6)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Memahami materi pengantar teknik sistem tenaga. <i>Students understand the introductory material of power system engineering.</i>	Mampu menjelaskan materi pengantar system tenaga. <i>Able to explain the introductory material of power system engineering.</i>	Non-tes : Tugas 1 : Penyelesaian soal Non-test : Task 1 : Problem solving	<ul style="list-style-type: none"> • Kuliah dan brainstorming, tanya jawab. [TM : 2 x 50"] [BM : 2 x 60"] [PT : 2 x 60"] • Presentation and brainstorming, ask and answer. [FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"] 	<ul style="list-style-type: none"> • Chatting dan diskusi dalam forum platform ITS. • Chat and discussion in ITS platform forum. 	Materi pengantar teknik sistem tenaga. <i>Introductory material of power system engineering.</i>	10
2	Mahasiswa memahami materi pengantar teknik sistem pengaturan.	Mampu menjelaskan materi pengantar teknik sistem pengaturan.	Non-tes : Tugas 2 : Penyelesaian soal	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas. [TM : 2 x 50"] 		Materi pengantar teknik sistem pengaturan.	10

	<i>Students understand the introductory material of control system engineering.</i>	<i>Able to explain the introductory material of control system engineering.</i>	Non-test : Task 2 : <i>Problem solving</i>	<p>[BM : 2 x 60"] [PT : 2 x 60"]</p> <ul style="list-style-type: none"> • <i>Presentation, discussion, ask and answer, exercise, assignment</i> [FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"] 		<i>Introductory material of control system engineering.</i>	
3	Mahasiswa memahami materi pengantar elektronika. <i>Students understand the introductory material of electronics.</i>	Mampu menjelaskan materi pengantar elektronika. <i>Able to explain the introductory material of electronics.</i>	Non-tes : Tugas 3 : <ul style="list-style-type: none"> - Penyelesaian soal - Membuat kurva daya terima vs jarak menggunakan matlab. Non-test : Task 3 : <ul style="list-style-type: none"> - <i>Problem solving</i> - <i>Draw a power vs distance curve using matlab</i> 	<ul style="list-style-type: none"> • <i>Kuliah, diskusi, tanya jawab, latihan soal, tugas</i> [TM : 2 x 50"] [BM : 2 x 60"] [PT : 2 x 60"] • <i>Presentation, discussion, ask and answer, exercise, assignment</i> [FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"] 		Materi pengantar elektronika. <i>Introductory material of electronics.</i>	10

4	<p>Mahasiswa memahami materi pengantar teknik telekomunikasi.</p> <p><i>Students understand the introductory material of telecommunication engineering.</i></p>	<p>Mampu menjelaskan materi pengantar teknik telekomunikasi.</p> <p><i>Able to explain the introductory material of telecommunication engineering.</i></p>	<p>Non-tes : Tugas 4 : Penyelesaian soal</p> <p>Non-test : Task 4 : Problem solving</p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas [TM : 2 x 50"] [BM : 2 x 60"] [PT : 2 x 60"] • Presentation, discussion, ask and answer, exercise, assignment [FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"] 		<p>Materi pengantar teknik telekomunikasi.</p> <p><i>Introductory material of telecommunication.</i></p>	10
5	<p>Mahasiswa memahami materi pengantar teknik komputer</p> <p><i>Students understand the introductory material of computer engineering.</i></p>	<p>Mampu menjelaskan materi pengantar teknik komputer.</p> <p><i>Able to explain the introductory material of computer engineering.</i></p>	<p>Non-tes : Tugas 5 : Penyelesaian soal</p> <p>Non-test : Task 5 : Problem solving</p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas [TM : 2 x 50"] [BM : 2 x 60"] [PT : 2 x 60"] • Presentation, discussion, ask and answer, exercise, assignment [FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"] 		<p>Materi pengantar teknik komputer.</p> <p><i>Introductory material of computer engineering.</i></p>	10

6	<p>Mahasiswa memahami materi pengantar teknik biomedik.</p> <p><i>Students understand the introductory material of biomedical engineering.</i></p>	<p>Mampu menjelaskan materi pengantar teknik biomedik.</p> <p><i>Able to explain the introductory material of computer engineering.</i></p>	<p>Non-tes : Tugas 6 : Penyelesaian soal</p> <p>Non-test : Task 6 : Problem solving</p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas [TM : 2 x 50"] [BM : 2 x 60"] [PT : 2 x 60"] • <i>Presentation, discussion, ask and answer, exercise, assignment</i> [FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"] 		<p>Materi pengantar teknik biomedik.</p> <p><i>Introductory material of biomedical engineering.</i></p>	10
7-8	<p>Mahasiswa memahami sejarah dan timeline teknologi elektro.</p> <p><i>Students understand the history and timeline of electrical technology.</i></p>	<p>Mampu menjelaskan sejarah dan timeline teknologi elektro.</p> <p><i>Able to explain the history and timeline of electrical technology.</i></p>	<p>Non-tes : Diskusi dalam kelas</p> <p>Non-test : <i>In class discussion</i></p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas 2 x [TM : 2 x 50"] 2 x [BM : 2 x 60"] 2 x [PT : 2 x 60"] • <i>Presentation, discussion, ask and answer, exercise, assignment</i> 		<p>Sejarah/timeline teknologi elektro (Volta, Ohm, Kelvin, Faraday, Biot Savart, Laplace, Ampere, Maxwell, dan seterusnya)</p> <p><i>History and the timeline of electrical technology (Volta, Ohm, Kelvin, Faraday, Bio-Savart, Laplace,</i></p>	10


				<p>2 x [FF : 2 x 50"]</p> <p>2 x [SA : 2 x 60"]</p> <p>2 x [SS : 2 x 60"]</p>		<p>Ampere, Maxwell, etc.)</p>	
9-10	<p>Mahasiswa memahami dasar fenomena listrik dan magnet.</p> <p><i>Students understand the basic electrical and magnetical phenomenon.</i></p>	<p>Mampu menjelaskan dasar fenomena listrik dan magnet</p> <p><i>Able to explain the basic electrical and magnetical phenomenon.</i></p>	<p>Non-tes : Diskusi dalam kelas</p> <p>Non-test : <i>In class discussion</i></p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas 2 x [TM : 2 x 50"] 2 x [BM : 2 x 60"] 2 x [PT : 2 x 60"] • <i>Presentation, discussion, ask and answer, exercise, assignment</i> 2 x [FF : 2 x 50"] 2 x [SA : 2 x 60"] 2 x [SS : 2 x 60"] 		<p>Dasar fenomena listrik dan magnet (elektron, arus listrik, listrik magnet, batere, dst)</p> <p><i>Basic of electrical and magnetical phenomenon (electrons, electrical current, electrical magnet, battery, etc.)</i></p>	10
11-12	<p>Mahasiswa memahami peran fisika dan matematika dalam teknologi elektro.</p>	<p>Mampu menjelaskan peran fisika dan matematika dalam teknologi elektro.</p>	<p>Non-tes : Diskusi dalam kelas</p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas 		<ul style="list-style-type: none"> • Fenomena fisika dari elektro • Pemodelan matematika untuk sinyal dan sistem 	10

	<i>Students understand the role of physics and mathematics in electrical technology.</i>	<i>Able to explain the role of physics and mathematics in electrical technology.</i>	Non-test : <i>In class discussion.</i>	<p>2 x [TM : 2 x 50"] 2 x [BM : 2 x 60"] 2 x [PT : 2 x 60"]</p> <ul style="list-style-type: none"> • <i>Presentation, discussion, ask and answer, exercise, assignment</i> 2 x [FF : 2 x 50"] 2 x [SA : 2 x 60"] 2 x [SS : 2 x 60"] 		<p>dalam teknologi elektro</p> <ul style="list-style-type: none"> • <i>Physics phenomenon from electrical</i> • <i>Mathematical modelling for signal and system in electrical technology)</i> 	
13	<p>Mahasiswa memahami dampak teknologi elektro terhadap perkembangan peradaban.</p> <p><i>Students understand the impact of electrical technology on the development of civilization.</i></p>	<p>Mampu menjelaskan dampak teknologi elektro terhadap perkembangan peradaban.</p> <p><i>Able to explain the impact of electrical technology on the development of civilization.</i></p>	Non-tes : Diskusi dalam kelas	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas [TM : 2 x 50"] [BM : 2 x 60"] [PT : 2 x 60"] • <i>Presentation, discussion, ask and answer, exercise, assignment</i> 		<p>Dampak teknologi elektro terhadap perkembangan peradaban (transportasi, dsb)</p> <p><i>Impact of electrical technology to civilization development (transportation, etc.)</i></p>	5

				<p>[FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"]</p>			
14	<p>Mahasiswa memahami pentingnya kreativitas bagi sarjana teknologi elektro dalam menghadapi perkembangan teknologi.</p> <p><i>Students understand the importance of creativity for electrical technology undergraduates in the face of technological developments.</i></p>	<p>Mampu menjelaskan pentingnya kreativitas bagi sarjana teknologi elektro dalam menghadapi perkembangan teknologi.</p> <p><i>Able to explain the importance of creativity for electrical technology undergraduates in the face of technological developments.</i></p>	<p>Non-tes : Diskusi dalam kelas</p> <p>Non-test : <i>In class discussion.</i></p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas [TM : 2 x 50"] [BM : 2 x 60"] [PT : 2 x 60"] • <i>Presentation, discussion, ask and answer, exercise, assignment</i> [FF : 2 x 50"] [SA : 2 x 60"] [SS : 2 x 60"] 		<p>Kreativitas bagi sarjana teknologi elektro dalam menghadapi perkembangan teknologi (memiliki penguasaan dasar yang kuat)</p> <p><i>Creativity for electrical technology undergraduates in the face of technological development (have a hard basic mastery)</i></p>	5
15-16	EVALUASI AKHIR SEMESTER FINAL-SEMESTER EXAM						

TM=Tatap Muka, PT=Penugasan Terstruktur, BM=Belajar Mandiri.
FF = Face to Face, SA = Structured Assignment, SS = Self Study.

II. Rencana Asesmen & Evaluasi (RAE) / *Assessment & Evaluation Plan*

	ASSESSMENT & EVALUATION PLAN BACHELOR DEGREE PROGRAM OF BIOMEDICAL ENGINEERING - FTEIC ITS Course : Introduction to Electrical Technology		RA&E
			Write Doc Code
Kode/code: EW184001	Bobot sks/credits (T/P): 2/0	Rumpun MK: Ilmu Dasar Teknik Course Cluster: Basic Engineering	Smt: I
OTORISASI AUTHORIZATION	Penyusun RA & E Compiler A&EP Prof. Dr. Ir. Mohammad Nuh, DEA.	Koordinator RMK Course Cluster Coordinator Muhammad Hilman Fatoni, S.T., M.T.	Ka DEP Head of DEP Dr. Achmad Arifin, S.T., M.Eng.

Mg ke/Week (1)	Sub CP-MK / Lesson Learning Outcomes (LLO) (2)	Bentuk Asesmen (Penilaian) Form of Assessment (3)	Bobot / Load (%) (4)
1	Sub CP-MK 1: Memahami materi pengantar teknik sistem tenaga. LLO 1: <i>Students understand the introductory material of power system engineering.</i> Mahasiswa memahami cara merepresentasikan data berdasarkan karakteristiknya.	Non-tes : Tugas 1 : Penyelesaian soal Non-test : Task 1 : Problem solving	10
2	Sub CP-MK 2: Mahasiswa memahami materi	Non-tes : Tugas 2 : Penyelesaian soal	10

	<p>pengantar teknik sistem pengaturan.</p> <p><i>Students understand the introductory material of control system engineering.</i></p>	<p>Non-test : Task 2 : <i>Problem solving</i></p>	
3	<p>Sub CP-MK 3: Mahasiswa memahami materi pengantar elektronika.</p> <p>LLO 3: <i>Students understand the introductory material of electronics.</i></p>	<p>Non-tes : Tugas 3 :</p> <ul style="list-style-type: none"> - Penyelesaian soal - Membuat kurva daya terima vs jarak menggunakan matlab. <p>Non-test : Task 3 :</p> <ul style="list-style-type: none"> - <i>Problem solving</i> <p><i>Draw a power vs distance curve using matlab)</i></p>	10
4	<p>Sub CP-MK 4: Mahasiswa memahami materi pengantar teknik telekomunikasi.</p> <p>LLO 4: <i>Students understand the introductory material of telecommunication engineering.</i></p>	<p>Non-tes : Tugas 4 : Penyelesaian soal</p> <p>Non-test : Task 4 : <i>Problem solving</i></p>	10
5	<p>Sub CP-MK 5: Mahasiswa memahami materi pengantar teknik komputer</p> <p>LLO 5: <i>Students understand the introductory</i></p>	<p>Non-tes : Tugas 5 : Penyelesaian soal</p> <p>Non-test : Task 5 : <i>Problem solving</i></p>	10

	<i>material of computer engineering.</i>		
6	<p>Sub CP-MK 6: Mahasiswa memahami materi pengantar teknik biomedik.</p> <p>LLO 6: <i>Students understand the introductory material of biomedical engineering.</i></p>	<p>Non-tes : Tugas 6 : Penyelesaian soal</p> <p>Non-test : Task 6 : <i>Problem solving</i></p>	10
7-8	<p>Sub CP-MK 7: Mahasiswa memahami sejarah dan timeline teknologi elektro.</p> <p>LLO 7: <i>Students understand the history and timeline of electrical technology.</i></p>	<p>Non-tes : Diskusi dalam kelas</p> <p>Non-test : <i>In class discussion</i></p>	10
9-10	<p>Sub CP-MK 8: Mahasiswa memahami dasar fenomena listrik dan magnet.</p> <p>LLO 8: <i>Students understand the basic electrical and magnetical phenomenon.</i></p>	<p>Non-tes : Diskusi dalam kelas</p> <p>Non-test : <i>In class discussion</i></p>	10
11-12	<p>Sub CP-MK 9: Mahasiswa memahami peran</p>	<p>Non-tes : Diskusi dalam kelas</p>	10

	<p>fisika dan matematika dalam teknologi elektro.</p> <p>LLO 9: <i>Students understand the role of physics and mathematics in electrical technology.</i></p>	<p>Non-test : <i>In class discussion</i></p>	
13	<p>Sub CP-MK 10: Mahasiswa memahami dampak teknologi elektro terhadap perkembangan peradaban.</p> <p>LLO 10: <i>Students understand the impact of electrical technology on the development of civilization.</i></p>	<p>Non-tes : Diskusi dalam kelas</p> <p>Non-test : <i>In class discussion</i></p>	5
14	<p>Sub CP-MK 11: Mahasiswa memahami pentingnya kreativitas bagi sarjana teknologi elektro dalam menghadapi perkembangan teknologi.</p> <p>LLO 11: <i>Students understand the importance of creativity for electrical technology undergraduates in</i></p>	<p>Non-tes : Diskusi dalam kelas</p> <p>Non-test : <i>In class discussion</i></p>	5

	<i>the face of technological developments.</i>		
16	Evaluasi Akhir <i>Final Exam</i>	Tes: Ujian Tulis/Ujian Daring Test: <i>Writing Exams / Online Exams</i>	
Total bobot penilaian Total assessment load			100%

● **Indikator Pencapaian CPL Pada MK / *Indicator of PLO achievement charged to the course***

CPL yang dibebankan pada MK / <i>PLO charged to the course</i>	CPMK / <i>Course Learning Outcome (CLO)</i>	Minggu ke / <i>Week</i>	Bentuk Asesmen / <i>Form of Assessment</i>	Bobot / <i>Load (%)</i>
CPL-09 / <i>PLO-09</i>	CPMK 1 / <i>CLO 1</i>	<i>Week- 1</i>	<i>Task 1</i>	10
	CPMK 2 / <i>CLO 2</i>	<i>Week- 2</i>	<i>Task 2</i>	10
	CPMK 3 / <i>CLO 3</i>	<i>Week- 3</i>	<i>Task 3</i>	10
	CPMK 4 / <i>CLO 4</i>	<i>Week- 4</i>	<i>Task 4</i>	10
	CPMK 5 / <i>CLO 5</i>	<i>Week- 5</i>	<i>Task 5</i>	10
	CPMK 6 / <i>CLO 6</i>	<i>Week- 6</i>	<i>Task 6</i>	10
	CPMK 8 / <i>CLO 8</i>	<i>Week- 9</i>	<i>Discussion</i>	10
		<i>Week- 10</i>		
	CPMK 9 / <i>CLO 9</i>	<i>Week- 11</i>	<i>Discussion</i>	10
		<i>Week- 12</i>		
CPL-11 / <i>PLO-11</i>	CPMK 7 / <i>CLO 7</i>	<i>Week- 7</i>	<i>Discussion</i>	10
		<i>Week- 8</i>		
	CPMK 10 / <i>CLO 10</i>	<i>Week- 13</i>	<i>Discussion</i>	5
	CPMK 11 / <i>CLO 11</i>	<i>Week- 14</i>	<i>Discussion</i>	5
	CPMK 12 / <i>CLO 12</i>	-	-	-
				∑ = 100%

No	<i>Form of Assessment</i>	<i>PLO-01</i>	<i>PLO-02</i>	<i>PLO-03</i>	<i>PLO-04</i>	<i>PLO-05</i>	<i>PLO-06</i>	<i>PLO-07</i>	<i>PLO-08</i>	<i>PLO-09</i>	<i>PLO-10</i>	<i>PLO-11</i>	<i>PLO-12</i>	<i>Tota l</i>
1	<i>Task 1</i>									0.1				0.1
2	<i>Task 2</i>									0.1				0.1
3	<i>Task 3</i>									0.1				0.1
4	<i>Task 4</i>									0.1				0.1

5	<i>Task 5</i>									0.1				0.1
6	<i>Task 6</i>									0.1				
7	<i>Discussion</i>									0.2		0.2		0.4
	<i>Total</i>									0.8		0.2		1