

Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Physics Education Undergraduate Study Program

Document Code

SEMESTER LEARNING PLAN

Courses		С	ODE			Cou	irse Fa	mily			Cred	it We	ight		SEME	STER	Co Dat	mpilati te
Basic Electronic	s II	84	420303051					y Stud ubjects			T=2	P=1	ECTS=4	.77		4	Ma 202	rch 31, 24
AUTHORIZATION	N	s	P Develope	er			-	-	Co	ourse	Clus	ter Co	ordinato	r	Study Coord	Progra linator	am	
		E	ndah Rahmawati, S.T., M.Si. Drs. Imam Sucahyo, M.Si. Mita Anggarya Ph.D								aryani h.D.	, M.Pd.						
Learning model	Project Based Le	earning																
Program Learning	PLO study prog	gram whi	ch is char	ged to	the co	urse												
Outcomes (PLO)	PLO-3	Develop accordar	logical, crition to the second	cal, syst k comp	ematic etency	and cr standa	eative rds in 1	thinkin the fiel	g in c d con	carryir Icerne	ng out ed	speci	fic work in	thei	ir field	of expe	rtise a	ind in
	PLO-4	Develop	Develop yourself continuously and collaborate.															
	Program Object	tives (PC))															
	PO-1 Students are able to explain the working principles and applications of Bipolar Junction Transistor (BJT), Junction Field Effect Transistor (JFET), amplifier circuits, power amplifier circuits, amplifier circuits with feedback, Operational-Amplifier (op-amp), oscillator circuits and basic electronics digital.																	
	PO - 2	Able to apply the correct Basic Electronics 2 concepts to obtain solutions to quantitative problems in physics.																
	PO - 3	Able to carry out Basic Electronics 2 practicum activities by applying scientific methods																
	PO - 4	Able to co	ommunicate	the cor	ncepts	and ap	plicatic	on of Ba	asic E	Electro	onics	2 effe	ctively dur	ing t	he lea	ning pr	ocess	
	PO - 5	Able to w	ork indeper	idently e	effective	ely and	collab	orate i	n grou	ups o	n lectı	ure an	d practicu	m as	ssignm	ents		
	PO - 6	Able to de	emonstrate	a scient	ific atti	ude an	nd critic	al thin:	king i	in solv	ing pi	roblen	ns faced b	oth a	academically and socially			
	PLO-PO Matrix																	
			P.O	PI	_0-3		PLC)-4										
		1	PO-1															
		1	PO-2															
		1	PO-3															
		1	PO-4															
		1	PO-5															
			PO-6															
	PO Matrix at the	e end of	each learn	ing sta	ge (Su	ub-PO)											
				-														
		I	P.O							1	Week							
				1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		PO-1		1	1	1	~											
		PO-2																
		PO-3																
		PO-4																
		PO-5																
		PO-6																
					1	1	1						1					
Short Course	The Basic Electro							nd app	licatio	on of	BJT	transis	stors, JFE	T fi	eld eff	ect trar	sistor	s, op-a
Description	characteristics an	ia circuits,	and basic d	ligital ele	ectronic	s mate	erial.											
	1																	
References	Main :																	

		 Rahmawa Rahmawa Rahmawa Tooley, N 	ati, E., Sucahyo, I., dan ati, E., Sucahyo, I., dan 1. 2006. Electronics Circ	ori dan Penerapannya . P Kholiq, A. 2017. Hand ou Kholiq, A. 2017. Panduan cuit: Fundamentals and Ap Electronics Devices and	t Elektronika Dasa Praktikum Elektro pplications . Third	ar 2 . onika Dasar 2. Edition. Elesevier Ltd.	e Hall.	
	S	Supporters:						
		1. Floyd, T.	L. 2012. Electronics De	evices . Prentice Hall.				
Support lecturer		Drs. Imam Sucah Dzulkiflih, S.Si., M Abd. Kholiq, S.Pd Endah Rahmawat Meta Yantidewi, S	Í.T. ., M.T. i, S.T., M.Si.					
Week-	learning		Eva	luation	Learn Studen	p Learning, ing methods, t Assignments, <mark>imated time]</mark>	Learning materials [References	Assessment Weight (%)
	(Sub-PO	")	Indicator	Criteria & Form	Offline (offline)	Online (<i>online</i>)	1	
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	work of B. 2.Able trans amp 3.Able data expl conc on d guid	e to master the king principles JT transistors e to apply BJT sistors as lififers. e to analyze a with precise anations, and clusions based lata and ed/independent tysis for ning	 I.Identify problem cases I.Identify the concept/working principle of the BJT transistor and relate it to the problem case. Analyze the problem and apply BJT transistor to solve the problem 	Criteria: Complete assignments completely Form of Assessment : Participatory Activities	Form: Classical classroom Method: Case study Student assignment: Determine an amplifier circuit with a certain gain value. Case study. If a circuit requires 10 times amplification, what will the circuit be like and how to determine the value of each component. 3 x 50 minutes		Material:BipolarJunctionTransistor,AmplifierCircuitLibrary:Sutrisno.1978.Electronics 2.Theory andApplication.ITB BandungPublisher.Material:BipolarJunctionTransistor,AmplifierCircuitReference:Rahmawati,E., Sucahyo,I., and Kholiq,A. 2017.BasicElectronicsHand out 2.Material:BipolarJunctionTransistor,AmplifierCircuitLibrary:Tooley, M.2006.ElectronicsCircuitLibrary:Tooley, M.2006.ElectronicsCircuit:FundamentalsandApplications.Third Edition.Elesevier Ltd.Material:BipolarJunctionTransistor,AmplifierCircuitLibrary:Boylestad, R.,andNashelsky, L.ElectronicsDevices andCircuits:Theory.SeventhEdition.Prentice Hall.	4%

3	1.Able to understand	1.Identify problem	Criteria:	Form:	Material:	5%
	and master the	cases	1.Complete	Classical	Power	
	working principles	2.Identify the	assignments	classroom	amplifier	
	of class A power	concepts of	completely	Method: Case	Reference:	
	amplifiers, class B	class A, B and C	2.Carrying out a	study and	Sutrisno.	
	power amplifiers	power amplifiers	complete series of	practicum	1978.	
	and class C power	and relate them	practicums (pre-	(class A	Electronics 2.	
	amplifiers and their	to problem	lab, data	power	Theory and	
	applications.	cases	collection, reports).	amplifier)	Application.	
			collection, reports).	3 x 50 minutes	ITB Bandung	
	2.Able to apply the	3.Analyze	Form of Assessment :		Publisher.	
	correct working	problems and	Participatory Activities,		p	
	principles of power	apply class A, B	Practice/Performance		Material:	
	amplifiers to obtain	and C power	Practice/Performance		Power	
	solutions to	amplifier			amplifier	
	contextual	concepts to			Reference:	
	problems.	solve problems			Rahmawati.	
	3.Able to carry out				E., Sucahyo,	
	practical activities				I., and Kholig,	
	in accordance with				A. 2017.	
					Basic	
	systematic				Electronics	
	procedures or				Hand out 2.	
	procedures to solve					
	problems that				Material:	
	involve careful					
	observation and				Power	
	measurement as				amplifier	
	well as scientific				Reference:	
	hypotheses.				Rahmawati,	
	4.Able to work				E., Sucahyo,	
	independently				I., and Kholiq,	
	effectively or				A. 2017.	
	collaborate in				Basic	
					Electronics	
	group lecture				Practical	
1	assignments in the				Guide 2.	
	Basic Electronics 2				P	
	course.				Material:	
	5.Able to analyze				Power	
	data with precise				amplifier	
1	explanations, and				Reference:	
1	conclusions based				Tooley, M.	
1	on data and				2006.	
1	guided/independent				Electronics	
	analysis for				Circuit:	
	learning and/or				Fundamentals	
	research.				and	
	research.				Applications.	
					Third Edition.	
					Elesevier Ltd.	

4	1.Able to understand and master the	1.Identify problem cases	Criteria: 1.Complete	Form: Classical		Material: Power	6%
	working principles	2.Identify the	assignments	classroom		amplifier	
	of class A power	concept of	completely	Method: Case study and		Reference: Sutrisno.	
	amplifiers, class B power amplifiers	feedback loops (positive and	2.Carrying out a complete series of	practicum		1978.	
	and class C power	negative) and	practicums (pre-	(reinforcement		Electronics 2.	
	amplifiers and their	relate them to	lab, data	with negative feedback)		Theory and Application.	
	applications.	problem cases	collection, reports).	3 x 50 minutes		ITB Bandung	
	2.Able to apply the correct working	3.Analyze problems with	Forms of Assessment			Publisher.	
	principles of power	mathematical	: Deutieineteur Activitier			Material:	
	amplifiers to obtain	formulas and	Participatory Activities, Practical Assessment,			Power	
	solutions to contextual	apply them	Practical / Performance			amplifier Reference:	
	problems.					Rahmawati,	
	3.Able to carry out					E., Sucahyo,	
	practical activities in accordance with					I., and Kholiq, A. 2017.	
	systematic					Basic	
	procedures or					Electronics Hand out 2.	
	procedures to solve problems that					Hanu Out 2.	
	involve careful					Material:	
	observation and					Power amplifier	
	measurement as well as scientific					Reference:	
	hypotheses.					Rahmawati,	
	4.Able to work					E., Sucahyo, I., and Kholiq,	
	independently effectively or					A. 2017.	
	collaborate in					Basic Electronics	
	group lecture					Practical	
	assignments in the Basic Electronics 2					Guide 2.	
	course.					Material:	
	5.Able to analyze					Power	
	data with precise explanations, and					amplifier Reference:	
	conclusions based					Tooley, M.	
	on data and					2006.	
	guided/independent					Electronics Circuit:	
	analysis for learning and/or					Fundamentals	
	research.					and Applications.	
						Third Edition.	
						Elesevier Ltd.	
L			ļ	ļ	ļ	ļ	

5	1Able to understand	1.Identify problem	Criteria:	Form:	Material:	6%
	and master the	cases	1.Complete	Classical	Power	
	basics of feedback	2. Identify the	assignments	classroom	amplifier	
	circuits (positive	concept of	completely	Method: Case	Reference:	
	and negative)	feedback loops	2.Carrying out a	study and	Sutrisno.	
	2.Able to apply the	(positive and	complete series of	practicum	1978.	
	basics of feedback	negative) and	practicums (pre-	(reinforcement	Electronics 2.	
	circuits	relate them to	lab, data	with negative	Theory and	
	appropriately to	problem cases	collection, reports).	feedback)	Application.	
	obtain solutions to	3.Analyze	concouchi, reperio):	(3 x 50	ITB Bandung	
	contextual	problems with	Forms of Assessment	minutes)	Publisher.	
	problems.	mathematical	:		P	
	3.Able to carry out	formulas and	Participatory Activities,		Material:	
			Portfolio Assessment,		Power	
	practical activities	apply them	Practical Assessment,		amplifier	
	in accordance with		Practical / Performance		Reference:	
	systematic		1		Rahmawati,	
	procedures or				E., Sucahyo,	
	procedures to solve				I., and Kholiq,	
	problems that				A. 2017.	
	involve careful				Basic	
	observation and				Electronics	
	measurement as				Hand out 2.	
	well as scientific					
	hypotheses				Material:	
	4.Able to work				Power	
	independently				amplifier	
	effectively and				Reference:	
	collaborate in				Rahmawati,	
	group lecture				E., Sucahyo, I., and Kholiq,	
	assignments in the				A. 2017.	
	Basic Electronics 2				Basic	
	course				Electronics	
	5.Able to analyze				Practical	
	data with precise				Guide 2.	
	explanations, and					
	conclusions based				Material:	
	on data and				Power	
	guided/independent				amplifier	
	analysis for		1		Reference:	
	learning				Tooley, M.	
	icannig		1		2006.	
					Electronics	
			1		Circuit:	
					Fundamentals	
					and	
					Applications.	
					Third Edition.	
					Elesevier Ltd.	
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6	1.Able to master the	1.Identify problem	Criteria:	Form:	Material:	6%
	working principles	cases	Complete	Classical	(JFET, JFET	
	of JFET and its	2.Identify the	assignments	classroom	Amplifier)	
			completely	Method: Case	Library:	
	application	concept/principle		study and	Sutrisno.	
	2.Able to apply JFET	of JFET work	Forms of Assessment	practicum	1978.	
	working principles	and relate it to	:	(JFET	Electronics 2	
	correctly to obtain	the problem	Participatory Activities,			
	solutions to	case	Practical Assessment,	reinforcement)	Theory and	
	contextual	3.Analyze	Practical / Performance	(3 x 50	Application.	
	problems.	problems with	i faotioar i chomanoc	minutes)	ITB Bandung	
		1			Publisher.	
	3.Able to work	mathematical				
	independently	formulas and			Material:	
	effectively or	apply them			(JFET, JFET	
	collaborate in				Amplifier)	
	lecture assignment				References:	
	groups in the Basic				Rahmawati,	
	Electronics 2				E., Sucahyo,	
					L., Sucariyo, I., and Kholig	
	course.					,
					A. 2017.	
					Basic	
					Electronics	
					Hand out 2.	
					Material:	
					(JFET, JFET	
					Amplifier)	
					References:	
					Rahmawati,	
					E., Sucahyo,	
					I., and Kholiq	,
					A. 2017.	
					Basic	
					Electronics	
					Practical	
					Guide 2.	
					Material:	
					(JFET, JFET	
					Amplifier)	
					References:	
					Tooley, M.	
					2006.	
					Electronics	
					Circuit:	
					Fundamental	S
					and	
					Applications.	
					Third Edition.	
					Elesevier Ltd	.
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7	 Able to master the working principles of JFET and its application Able to apply JFET working principles correctly to obtain solutions to contextual problems. Able to work independently effectively or collaborate in lecture assignment groups in the Basic Electronics 2 course. 	 Identify problem cases Identify the concept/principle of JFET work and relate it to the problem case Analyze problems with mathematical formulas and apply them 	Criteria: Complete assignments completely Forms of Assessment : Participatory Activities, Practical Assessment, Practical / Performance	Form: Classical classroom Method: Case study and practicum (JFET reinforcement) (3 × 50 minutes)	Material: (JFET, JFET Amplifier) Library: Sutrisno. 1978. Electronics 2. Theory and Application. ITB Bandung Publisher. Material: (JFET, JFET Amplifier) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics Hand out 2. Material: (JFET, JFET Amplifier) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics Practical Guide 2. Material: (JFET, JFET Amplifier) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics Practical Guide 2. Material: (JFET, JFET Amplifier) References: Tooley, M. 2006. Electronics Circuit: Fundamentals and Applications. Third Edition. Elesevier Ltd.	6%
ŏ	Midterm Evaluation		Criteria: Complete the test well and correctly Form of Assessment : Portfolio Assessment, Test	Form: Written test with material from meetings 1-7 (2 x 50 minutes)		10%

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9	 Mastering the working principles, characteristics and application of Op- Amp Able to apply opamps in circuits appropriately to get solutions to contextual problems. Able to carry out practical activities in accordance with systematic procedures or procedures to solve problems that involve careful observation and measurement Able to work independently effectively or collaborate in lecture assignment groups in the Basic Electronics 2 course Able to analyze data with precise explanations, and conclusions based on data and guided/independent analysis for learning 	 1.Identify problem cases 2.Identify the concept/working principle, characteristics and application of Op-Amp and relate it to the problem case 3.Analyze problems with mathematical formulas and apply them 	Criteria: 1.Complete assignments completely 2.Carrying out a complete series of practicums (pre- lab, data collection, reports). Form of Assessment : Participatory Activities, Practice/Performance	Form: Classical classroom Method: Case study and practicum (application of Op-Amps for inverting and non-inverting amplifiers) (3 x 50 minutes)	Material: (Op- Amp) Library: Sutrisno. 1978. Electronics 2. Theory and Application. ITB Bandung Publisher.Material: (Op- Amp) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics Hand out 2.Material: (Op- Amp) References: References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics Hand out 2.Material: (Op- Amp) References: References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics Practical Guide 2.Material: (Op-Amp) References: References: Tooley, M. 2006. Electronics Fundamentals and Applications. Third Edition. Elesevier Ltd.Material: (Op-Amp) References: Fundamentals and Applications. Third Edition. Elesevier Ltd.Material: (Op-Amp) References: Fundamentals and Applications. Third Edition. Elesevier Ltd.Material: Cop-Ampl References: Fundamentals and Applications. Third Edition. Elesevier Ltd.Material: Cop-Ampl References: Fooley. References: Boylestad, R., and Nashelsky, L. Electronics Devices and Circuits: Theory. Seventh Edition. Prentice Hall.	6%

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10	1.Mastering the	1.Identify problem	Criteria: 1.Complete	Form: Classical		Material: (Op- Amp)	8%
	working principles,	cases		classroom		Library:	
	characteristics and	2.Identify the	assignments	Method: Case		Sutrisno.	
	application of Op-	concept/working	completely	study and		1978.	
	Amp	principle,	Carrying out a				
	2.Able to apply	characteristics	complete series of	practicum		Electronics 2.	
	opamps in circuits	and application	practicums (pre-	(application of		Theory and	
	appropriately to get	of Op-Amp and	lab, data	Op-Amps for		Application.	
	solutions to	relate it to the	collection, reports).	inverting and		ITB Bandung	
	contextual	problem case	,,	non-inverting		Publisher.	
	problems.	3.Analyze	Forms of Assessment	amplifiers)			
	3.Able to carry out	problems with	:	(3 x 50		Material:	
			Participatory Activities,	minutes)		(Op- Amp)	
	practical activities	mathematical	Portfolio Assessment,			References:	
	in accordance with	formulas and	Practice / Performance			Rahmawati,	
	systematic	apply them				E., Sucahyo,	
	procedures or					I., and Kholiq,	
	procedures to solve					A. 2017.	
	problems that					Basic	
	involve careful					Electronics	
	observation and					Hand out 2.	
	measurement						
	4.Able to work					Material:	
	independently					(Op- Amp)	
						References:	
	effectively or					Rahmawati,	
	collaborate in					E., Sucahyo,	
	lecture assignment					I., and Kholig,	
	groups in the Basic					A. 2017.	
	Electronics 2					Basic	
	course					Electronics	
	5.Able to analyze					Practical	
	data with precise					Guide 2.	
	explanations, and					Guide 2.	
	conclusions based						
	on data and					Material:	
	guided/independent					(Op-Amp)	
	analysis for					References:	
						Tooley, M.	
	learning					2006.	
						Electronics	
			1			Circuits:	
						Fundamentals	
						and	
			1			Applications.	
			1			Third Edition.	
						Elesevier Ltd.	
			1			Material:	
			1			(Op- Amp)	
			1			References:	
						Boylestad, R.,	
						and	
						Nashelsky, L.	
						Electronics	
						Devices and	
						Circuits:	
						Theory .	
			1			Seventh	
						Edition.	
						Prentice Hall.	
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11	 Mastering the working principles, characteristics and application of Op- Amp Able to apply opamps in circuits appropriately to get solutions to contextual problems. Able to carry out practical activities in accordance with systematic procedures or procedures or procedures to solve problems that involve careful observation and measurement Able to work independently effectively or collaborate in lecture assignment groups in the Basic Electronics 2 course Able to analyze data with precise explanations, and conclusions based on data and guided/independent analysis for learning 	 1.Identify problem cases 2.Identify the concept/working principle, characteristics and application of Op-Amp and relate it to the problem case 3.Analyze problems with mathematical formulas and apply them 	Criteria: 1. Complete assignments completely 2. Carrying out a complete series of practicums (pre- lab, data collection, reports). Forms of Assessment Participatory Activities, Portfolio Assessment, Practice / Performance	Form: Classical classroom Method: Case study and practicum (application of Op-Amps for inverting and non-inverting amplifiers) (3 × 50 minutes)	Material: (Op-Amp) Library: Sutrisno. 1978. Electronics 2. Theory and Application. ITB Bandung Publisher.Material: (Op-Amp) References: Rahmawati, E., Sucahyo, I., and Kholiq A. 2017. Basic Electronics Hand out 2.Material: (Op-Amp) References: References: Rahmawati, E., Sucahyo, I., and Kholiq A. 2017. Basic Electronics Practical Guide 2.Material: (Op-Amp) References: References: Rahmawati, E., Sucahyo, I., and Kholiq A. 2017. Basic Electronics Practical Guide 2.Material: (Op-Amp) References: Tooley, M. 2006. Electronics Circuits: Fundamental and Applications. Third Edition. Elesevier LtdMaterial: (Op-Amp) References: Tooley, M. 2006. Electronics Circuits: Fundamental and Applications. Third Edition. Elesevier LtdMaterial: (Op-Amp) References: Boylestad, R. and Nashelsky, L. Electronics Devices and Circuits: Theory . Seventh Edition. Prentice Hall.	s s

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12	 Able to master the working principles of several oscillator circuits (RC, LC, crystal) Able to apply the concept of oscillator circuits correctly to obtain solutions to contextual problems. Able to carry out practical activities in accordance with systematic procedures or procedures to solve problems that involve careful observation and measurement as well as scientific hypotheses Able to work independently effectively or collaborate in lecture assignment groups in the Basic Electronics 2 course Able to analyze data with precise explanations, and conclusions based on data and guided/independent analysis for learning and/or research 	 I.Identify problem cases I.Identify the concept/working principle of several oscillator circuits (RC, LC, crystal) and relate them to problem cases Analyze problems with mathematical formulas and apply them 	Criteria: 1.Complete assignments completely 2.Carrying out a complete series of practicums (pre- lab, data collection, reports). Form of Assessment : Participatory Activities, Practical Assessment	Form: Classical classroom Method: Case study and practicum (Wien bridge RC oscillator) (3 × 50 minutes)	Material: (Oscillator) Library: Sutrisno. 1978. Electronics 2 Theory and Application. ITB Bandung Publisher.Material: (Oscillator) References: Rahmawati, E., Sucahyo, I., and Kholiq A. 2017. Basic Electronics Hand out 2.Material: (Oscillator) References: Rahmawati, E., Sucahyo, I., and Kholiq A. 2017. Basic Electronics Practical Guillators) References: Rahmawati, E., Sucahyo, I., and Kholiq A. 2017. Basic Electronics Practical Guilators) References: Tooley, M. 2006. Electronics Circuits: Fundamenta and Applications, Third Editions Elesevier Ltd Material: (Oscillators) References: Boylestad, R and Nashelsky, L Electronics Devices and Nashelsky, L Electronics Devices and Nashelsky, L Electronics Devices and	
					and Nashelsky, L Electronics	
					Theory . Seventh Edition. Prentice Hall	

u b e c g d 2.4 e c c a c c 3.4 p g s s	 Students can understand the basics of digital electronics (number conversion, logic gates, binary code decimal (BCD). Able to apply digital electronics concepts appropriately to obtain solutions to contextual problems Able to carry out practical activities in accordance with systematic procedures or 	 Identify problem cases Identify the basic concepts of digital electronics and relate them to problem cases Analyze problems with mathematical formulas and apply them 	Criteria: 1.Complete assignments completely 2.Carrying out a complete series of practicums (pre- lab, data collection, reports). Form of Assessment : Participatory Activities, Practical Assessment	Form: Classical classroom Method: Case study and practicum (digital electronics) (3 × 50 minutes)	Material: (digital electronics) Library: Sutrisno. 1978. Electronics 2. Theory and Application. ITB Bandung Publisher. Material: (digital electronics) References: Rahmawati, E., Sucahyo, I., and Kholig, A. 2017.	0%
3,4 p ir s p p p p ir o n m 4,4 f f c g a a c f 5,4 d c c g a a b c f c f c c c c c c c c c c c c c c c	Able to carry out ractical activities a accordance with ystematic				References: Rahmawati, E., Sucahyo, I., and Kholiq,	

14	1.Students can understand the	1.Identify problem cases	Criteria: 1.Complete	Form: Classical	Material: (digital	0%
	basics of digital	2.Identify the	assignments	classroom	electronics)	
	electronics (number	basic concepts	completely	Method: Case	Library:	
	conversion, logic	of digital	2.Carrying out a	study and	Sutrisno.	
	gates, binary code	electronics and	complete series of	practicum	1978.	
	decimal (BCD).	relate them to	practicums (pre-	(digital	Electronics 2.	
	2.Able to apply digital	problem cases	lab, data	electronics)	Theory and	
	electronics		collection, reports).	(3 x 50	Application.	
		3.Analyze	collection, reports).	minutes)	ITB Bandung	
	concepts	problems with			Publisher.	
	appropriately to	mathematical			p	
	obtain solutions to	formulas and			Material:	
	contextual	apply them			(digital	
	problems				electronics)	
	3.Able to carry out				References:	
	practical activities				Rahmawati,	
	in accordance with				E., Sucahyo,	
	systematic				I., and Kholig,	
	procedures or				A. 2017.	
	procedures to solve				Basic	
					Electronics	
	problems that				Hand out 2.	
	involve careful				Trand out 2.	
	observation and				Material:	
	measurement as				(digital	
	well as scientific				electronics)	
	hypotheses				References:	
	Able to work				Rahmawati,	
	independently				E., Sucahyo,	
	effectively and				I., and Kholig,	
	collaborate in				A. 2017.	
	group lecture				Basic	
	assignments in the				Electronics	
	Basic Electronics 2				Practicum	
	course				Guide 2.	
	5.Able to analyze				Guide 2.	
	data with precise				Material:	
	explanations, and				(digital	
	conclusions based				electronics)	
	on data and				References:	
					Tooley, M.	
	guided/independent				2006.	
	analysis for				Electronics	
	learning and/or				Circuits:	
	research				Fundamentals	
					and	
					Applications.	
					Third Edition.	
					Elesevier Ltd.	

15	 Students can understand the basics of digital electronics (number conversion, logic gates, binary code decimal (BCD). Able to apply digital electronics concepts appropriately to obtain solutions to contextual problems Able to carry out practical activities in accordance with systematic procedures or procedures to solve problems that involve careful observation and measurement as well as scientific hypotheses Able to work independently effectively and collaborate in group lecture assignments in the Basic Electronics 2 course Able to analyze data with precise explanations, and conclusions based on data and guided/independent analysis for learning and/or research 	 I.Identify problem cases I.Identify the basic concepts of digital electronics and relate them to problem cases Analyze problems with mathematical formulas and apply them 	Criteria: 1.Complete assignments completely 2.Carrying out a complete series of practicums (pre- lab, data collection, reports).	Form: Classical classroom Method: Case study and practicum (digital electronics) (3 x 50 minutes)	Material: (digital electronics) Library: Sutrisno. 1978. Electronics 2. Theory and Application. ITB Bandung Publisher. Material: (digital electronics) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics Hand out 2. Material: (digital electronics) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics) References: Rahmawati, E., Sucahyo, I., and Kholiq, A. 2017. Basic Electronics) References: Tachicum Guide 2. Material: (digital electronics) References: Tooley, M. 2006. Electronics Circuits: Fundamentals and Applications. Third Edition. Elesevier Ltd.	0%
16	End of Semester Evaluation		Criteria: Complete the test well and correctly Form of Assessment : Portfolio Assessment, Test	Form: Written test with meeting material 9-15 (2 x 50 minutes)		13%

Evaluation Percentage Recap: Project Based Learning

Evaluation refeemage receap. ridjeet					
No	Evaluation	Percentage			
1.	Participatory Activities	29.34%			
2.	Portfolio Assessment	18.34%			
3.	Practical Assessment	10.5%			
4.	Practice / Performance	18.34%			
5.	Test	11.5%			
		88.02%			

Notes

- Learning Outcomes of Study Program Graduates (PLO Study Program) are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
- 2. The PLO imposed on courses are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
- 3. Program Objectives (PO) are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
- 4. Subject Sub-PO (Sub-PO) is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
- 5. Indicators for assessing abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities or performance of student learning outcomes accompanied by evidence.
- 6. Assessment Criteria are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
- 7. Forms of assessment: test and non-test.
- 8. Forms of learning: Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.

- 9. Learning Methods: Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
- 10. Learning materials are details or descriptions of study materials which can be presented in the form of several main points and sub-
- topics. The assessment weight is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
 TM=Face to face, PT=Structured assignments, BM=Independent study.