

Universitas Negeri Surabaya Faculty of Engineering , Electrical Engineering Education Undergraduate Study Program

Document Code

Data communication Saccious				S	Εľ	MES	STE	R L	ΕA	RN	IN	G F	PLA	N						
AUTHORIZATION SP Developer Course Cluster Coordinator Study Program Coord Dr. Nur Kholis, S.T., Learning model Program Case Studies PLO Study program that is charged to the course PLO-10 PLO-10 Have extensive knowledge in the fields of general knowledge, social and humanities (General). PLO-10 Program Objectives (PO) PO-1 Working together and having social sensitivity and concern for society and the environment in the field communications PLO-2 CPL-KU1 Have extensive knowledge in the fields of general knowledge, social and humanities PLO-PO Matrix P.O. PLO-8 PLO-10 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1 PO-2 PO-1 PO-1 PO-2 This course discusses communications system models including analog and digital data transmission, various transmission mercoding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / file coding data coding techniques, digital data coding data transmission mercodes. 1. William S. Data and Computer Communication 2010, Pearson	Courses	rning lel PLO study program that PLO-8 Have explored by Program Objectives (PO-1 Working commun. PO-2 CPL-KU		CODE				Cou	rse Fa	mily			Cred	lit We	ight	SEM	ESTER		Compi Date	lation
Dr. Hapsari Peni Dr. Lusia Rakhmawati Dr. Nur Kholis, S.T., Learning model Program Program Dutromes (PLO) Have a responsible character and be committed to professional ethics (General). Pl.O-10 Have a responsible character and be committed to professional ethics (General/SSC4.6). Program Objectives (PO) PO-1 Working together and having social sensitivity and concern for society and the environment in the field communications PO-2 CPL-KUI Have extensive knowledge in the fields of general knowledge, social and humanities PLO-PO Matrix PO-1 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1	Data commu	nication		832010204	19								T=2	P=0	ECTS=3.1	8	5		April 26 2023	5,
Learning model Program PLO-3	AUTHORIZA [*]	TION	-	SP Develop	per						Co	ourse	Cluste	er Co	ordinator	Stud	y Progra	m C	oordir	ator
PLO study program that is charged to the course PLO-8				Dr. Hapsari	i Pe	ni					Dr	. Lusia	a Rakh	nmawa	ati	Di	r. Nur Kho	olis,	S.T., M	1.T.
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Program Objectives (PO) PO-1	Outcomes	PLO-8	Have	extensive kn	nowl	ledge i	n the fi	elds o	f gene	ral kno	wle	dge, so	ocial a	nd hu	manities (G	eneral).				
PO-1 Working together and having social sensitivity and concern for society and the environment in the field communications PO-2 CPL-KU1 Have extensive knowledge in the fields of general knowledge, social and humanities PLO-PO Matrix PO-1 PD-8 PLO-10 PO-1 PO-2 PLO-8 PLO-10 PO-1 PO-2 PO-10 PO-1 PO-2 PO-10 PO-1 PO-2 PO-10 PO-1 PO-2 PO-10 PO-1 PO-2 PO-1 PO-1 PO-2 PO-1 PO-2 PO-1 PO-2 PO-1 PO-2 PO-1 PO-2 PO-1 PO-2 PO-1 PO-1 PO-2 PO-1 PO-1 PO-2 PO-1 PO-1 PO-2 PO-1 PO-1 PO-1 PO-2 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1	PLO)	PLO-10	Have a	a responsibl	le ch	haracte	er and b	e cor	nmitte	d to pr	ofes	sional	ethics	(Gen	eral/SSC4.6).				
PO - 2 CPL-KU1 Have extensive knowledge in the fields of general knowledge, social and humanities PLO-PO Matrix P.O PLO-8 PLO-10 PO-1 PO-2 PO-2 Week P-O Matrix at the end of each learning stage (Sub-PO) PO-1 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1 PO-1		Program Object	tives (PO)																
PLO-PO Matrix P.O PLO-8 PLO-10 PO-1 PO-2 PO Matrix at the end of each learning stage (Sub-PO) P.O Week 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 PO-1 PO-2 This course discusses communication system models including analog and digital data transmission, various transmission mecoding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If telecommunications networks, wireless LAN ,WAN. This course is presented in theoretical form References Main: 1. William S. Data and Computer Communication.2010, Pearson 2. Dony A, Rum A. Komunikasi data.2008, Andi Supporting lecturer Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T. Dr. Raden Roro Hapsari Peni Agustin Tjahyaningtijas, S.S.I., M.T.		PO - 1	Workir commi	ng together unications	an	d hav	ng so	cial s	ensitiv	ity an	d co	oncern	for s	society	and the	environn	nent in t	he 1	ield o	f dat
P.O PLO-8 PLO-10 PO-1 PO-2 PO Matrix at the end of each learning stage (Sub-PO) P.O Week 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 PO-1 PO-2 This course discusses communication system models including analog and digital data transmission, various transmission mecoding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the course discusses communications networks, wireless LAN ,WAN. This course is presented in theoretical form References Main: 1. William S. Data and Computer Communication.2010, Pearson 2. Dony A, Rum A. Komunikasi data.2008, Andi Supporting Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T. Dr. Raden Roro Hapsari Peni Agustin Tjahyaningijas, S.Si., M.T.		PO - 2	CPL-K	(U1 Have ex	tens	sive kr	owledg	je in t	ne field	ds of g	ener	al kno	wledge	e, soc	ial and hum	anities				
PO-1 PO-2 PO Matrix at the end of each learning stage (Sub-PO) P.O Week 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 PO-1 PO-2 This course discusses communication system models including analog and digital data transmission, various transmission mer coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / If the coding data coding techniques, digital data coding techniques, digital data coding techniques, digital data coding techniques, network models in the form of OSI Layer and TCP / If the coding techniques, digital data coding techniques, network models in the form of OSI Layer and TCP / If the coding techniques, network models in the form of OSI Layer and TCP / If the coding techniques, network models in the form of OSI Layer and TCP / If the coding techniques, network models in the form of OSI Layer and TCP / If the coding tec		PLO-PO Matrix																		
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Short Course Description This course discusses communication system models including analog and digital data transmission, various transmission mer coding, data coding techniques, digital data communication techniques, network models in the form of OSI Layer and TCP / IF telecommunications networks, wireless LAN ,WAN. This course is presented in theoretical form References Main: 1. Wiliam S . Data and Computer Communication.2010, Pearson 2. Dony A, Rum A. Komunikasi data.2008, Andi Supporters: Supporting Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T. Dr. Raden Roro Hapsari Peni Agustin Tjahyaningtijas, S.Si., M.T.				. 1	1	L 2	3	4	5	6	7	8	9	10	11 1	2 13	14	15	10	3
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2. Dony A, Rum A. Komunikasi data.2008, Andi Supporters: Supporting Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T. Dr. Raden Roro Hapsari Peni Agustin Tjahyaningtijas, S.Si., M.T.	References	Main :																		
Supporting ecturer Prof. Dr. I Gusti Putu Asto Buditjahjanto, S.T., M.T. Dr. Raden Roro Hapsari Peni Agustin Tjahyaningtijas, S.Si., M.T.		_						n.201	0, Pea	arson										
lecturer Dr. Raden Roro Hapsari Peni Agustin Tjahyaningtijas, S.Si., M.T.		Supporters:																		
Dr. Lusia Rakhmawati, S.T., M.T. Pradini Puspitaningayu, S.T., M.T., Ph.D.		Dr. Raden Roro I Dr. Lusia Rakhm	Hapsari awati, S	Peni Ağustir S.T., M.T.	n Tj	ahyani	M.T. ngtijas,	S.Si.	, M.T.											

Wee	stage	h learning ge		Learni Student	D Learning, ing methods, : Assignments, imated time]	Learning materials [References]	Assessment Weight (%)
	(Sub-PO)	Indicator	Criteria & Form	Offline (offline)	Online (online)	[Kelelelices]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Students are able to explain communication system models	1.Students are able to understand Analog and Digital transmission models 2.Students are able to understand transmission problems 3.Students are able to calculate canal capacity	Form of Assessment : Participatory Activities	questions and answers, PPT 2 X 50	Meeting material 1 Reader: Wiliam S. Data and Computer Communication. 2010, Pearson	
2 Students are able to explain communication system models	1.Students are able to understand Analog and Digital transmission models 2.Students are able to understand transmission problems 3.Students are able to calculate canal capacity	Criteria: Evaluation Rubric Form of Assessment: Participatory Activities	Discussion, question and answer, PPT - Method: Case Method Learning Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentation. Lecturer examines the presentation, provides opportunities for questions and	Material: Meeting material 2 Reader: Wiliam S. Data and Computer Communication. 2010, Pearson	0%

				answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 2 X 50 questions		
3	Students are able to understand transmission media	Students are able to understand cable transmission media. Students are able to understand wireless transmission media	Criteria: 1.The assessment criteria are carried out by looking at aspects: 2.1. Participation: carried out by observing student activities (weight 2) 3.2. UTS: carried out with an assessment during the middle of the semester (weight 2) 4.3. UAS: carried out every semester to measure all indicators (weight 3) 5.4. Task: carried out on each indicator (weight 3) 6. Student Final Grade: 7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10 Form of Assessment: Participatory Activities	Discussion, Question and Answer, PPT Discussion, question and answer, PPT - Method: Case Method Learning Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying	Case Method Learning Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation, Lecturer examines the presentation for	5%

				provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented Provide suggestions and input on case examples presented Students Collect discussion results according to the agreed time limit. Present and respond to 4 X 50 questions		
4	Students are able to understand transmission media	Students are able to understand cable transmission media. Students are able to understand wireless transmission media	Criteria: 1.The assessment criteria are carried out by looking at aspects: 2.1. Participation: carried out by observing student activities (weight 2) 3.2. UTS: carried out with an assessment during the middle of the semester (weight 2) 4.3. UAS: carried out every semester to measure all indicators (weight 3) 5.4. Task: carried out on each indicator (weight 3) 6. Student Final Grade: 7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (3)%2 UTS Score (3) divided by 10 Form of Assessment: Participatory Activities	Discussion, Question and Answer, PPT Discussion, question and Answer, PPT - Discussion, question and answer, PPT - Method: Case Method Learning Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Step 3: Group Discussion Lecturer conducts observing/paying attention to the discussion process, providing information if necessary, encouraging all active group members Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and theirs. Preparing presentations. Preparing presentations. Step 4: Group Presentation.	Discussion, question and answer, PPT - Method: Case Method Learning Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions	5%

			Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 2 X 50 questions			
5 Students are to understan coding techn	nd data niques to know and understand various codes Students are able to understand digital data coding of digital data coding of Analog signals Students are able to understand Analog data coding of digital signals Students are able to understand Analog data coding of Analog signals Students are able to understand Analog data signals Students are able to understand Analog data coding of Analog signals	1.The assessment criteria are carried out by looking at aspects: 2.1. Participation: carried out by observing student activities (weight 2) 3.2. UTS: carried out with an assessment during the middle of the semester (weight 2) 4.3. UAS: carried out every semester to measure all indicators (weight 3) 5.4. Task: carried out on each indicator (weight 3) 6. Student Final Grade: 7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10 Form of Assessment	Questions and Answers PPT Discussion, questions and answers, PPT - Method: Case Method Learning Step 1: Preparing Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of	Discussion, question and answer, PPT - Method: Case Method Learning Step 1: Preparation of Case Examples Basic Questions The lecturer asks: what are the problems that arise, their causes and impacts? Students respond to lecturer's questions, question and answer Step 2: Determine discussion procedures (Individual/Ex) Lecturer determines collection procedures and time Lecturer makes agreement on deadline for collection, Gives students time to form groups Students Agree on schedule, Arrange groups, Step 3: Group Discussion Lecturer conducts observing/paying close attention to the discussion process, providing information if necessary, encouraging all active group members . Students. Discussing examples of cases that will be taken. Collecting and processing supporting data. Analyzing cases and their solutions. Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provide stime. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to questions	0%	

6	Students are able	Students are able	Criteria:	Preparing presentations. Step 4: Group Presentation. Lecturer examines the presentation, provides opportunities for questions and answers. Provides time. students to reflect and revise cases presented. Provide suggestions and input on case examples presented. Students collect discussion results according to the agreed time limit. Present and respond to 4 X 50 questions.	Discussion, Q&A, PPT	0%
	to understand data coding techniques	to know and understand various codes Students are able to understand digital data coding of digital signals Students are able to understand digital data coding of Analog signals Students are able to understand Analog data coding of digital signals Students are able to understand Analog data coding of Analog signals Students are able to understand Analog data coding of Analog signals	1.The assessment criteria are carried out by looking at aspects: 2.1. Participation: carried out by observing student activities (weight 2) 3.2. UTS: carried out with an assessment during the middle of the semester (weight 2) 4.3. UAS: carried out every semester to measure all indicators (weight 3) 5.4. Task: carried out on each indicator (weight 3) 6. Student Final Grade: 7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10 Form of Assessment: Participatory Activities	Questions and AnswersPPT 4 X 50		

7	Students are able	Students are able	Criteria:	Presentation	Presentations,	0%
	to understand digital data communication	to understand Asynchronous transmission Students are able to understand Synchronous transmission Students are able to understand Parallel transmission Students are able to understand Serial transmission Students are able to understand Duplex communication Students are able to understand data communication standards	1.The assessment criteria are carried out by looking at aspects: 2.1. Participation: carried out by observing student activities (weight 2) 3.2. UTS: carried out with an assessment during the middle of the semester (weight 2) 4.3. UAS: carried out every semester to measure all indicators (weight 3) 5.4. Task: carried out on each indicator (weight 3) 6. Student Final Grade: 7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10 Form of Assessment: Participatory Activities	Discussion and Questions and Answers 4 X 50	Discussions and Questions and Answers	
8	UTS	Students are able to understand asynchronous transmission	Criteria: 1.The assessment criteria are carried out by looking at aspects: 2.1. Participation: carried out by observing student activities (weight 2) 3.2. UTS: carried out with an assessment during the middle of the semester (weight 2) 4.3. UAS: carried out every semester to measure all indicators (weight 3) 5.4. Task: carried out on each indicator (weight 3) 6. Student Final Grade: 7. Participation Score (2)%2 Lever Score (3)%2 UTS Score (2)%2 UAS Score (3) divided by 10	4 X 50		0%

9	Students are able	1	Cuitouio	Dragantation	Cton 1. Dranavation of	600/
9	to understand	1.Students are able to	Criteria: 1.The assessment	Presentation Discussion and	Step 1: Preparation of Case Examples Basic	60%
	digital data communication	understand	criteria are	Questions and	Questions	
	Communication	asynchronous	carried out by	Answers	The lecturer asks: what	
		transmission,	looking at	Step 1: Preparation of	are the public problems that arise, their causes	
		Students are able to	aspects: 2.1. Participation:	Case Examples	and impacts?	
		understand	carried out by	Basic Questions	Students respond to	
		data	observing	The lecturer asks: what are	lecturer's questions, question and answer	
		communication	student activities	the public	Step 2: Determine	
		standards 2.Students are	(weight 2) 3.2. UTS: carried	problems that	discussion procedures	
		able to	out with an	arise, their causes and	(Individual/Ex) Lecturer determines	
		understand	assessment	impacts?	collection procedures	
		synchronous	during the middle	Students	and time	
		transmission	of the semester	respond to lecturer's	Lecturer makes agreement on deadline	
		3.Students are able to	(weight 2) 4.3. UAS: carried	questions,	for collection,	
		understand	out every	question and	Gives students time to	
		parallel	semester to	answer Step 2:	form groups Students Agree on schedule,	
		transmission,	measure all	Determine	Arrange groups,	
		4.Students are able to	indicators (weight 3)	discussion	Step 3:	
		understand	5.4. Task: carried	procedures (Individual/Ex)	Group Discussion Lecturer conducts	
		serial	out on each	Lecturer	observing/paying	
		transmission	indicator (weight	determines	attention to the	
		5.Students are able to	3) 6.Student Final	collection procedures and	discussion process, providing information if	
		understand	Grade:	time	necessary,	
		Duplek	7.Participation	Lecturer makes	encouraging all active	
		communication	Score (2)%2	agreement on deadline for	group members . Students. Discussing	
			Lever Score (3)%2 UTS	collection,	examples of cases that	
			Score (2)%2	Gives students	will be taken. Collecting	
			UAS Score (3)	time to form groups Students	and processing supporting data.	
			divided by 10	Agree on	Analyzing cases and	
			Form of Assessment	schedule,	their solutions.	
			: Doublein-t A. M. W.	Arrange groups, Step 3:	Preparing presentations.	
			Participatory Activities	Group	Step 4: Group	
				Discussion	Presentation.	
				Lecturer conducts	Lecturer examines the presentation, provides	
				observing/paying	opportunities for	
				close attention to the discussion	questions and answers.	
				process,	Provides time. students	
				providing	to reflect and revise	
				information if necessary,	cases presented. Provide suggestions	
				encouraging all	and input on case	
				active group	examples presented.	
				members . Students.	Students collect discussion results	
				Discussing	according to the agreed	
				examples of cases that will	time limit. Present and respond to questions	
				be taken.	respond to questions	
				Collecting and		
				processing supporting data.		
				Analyzing cases		
				and their		
				solutions. Preparing		
				presentations.		
				Step 4: Group Presentation.		
				Lecturer		
				examines the		
				presentation, provides		
				opportunities for		
				questions and		
				answers. Provides time.		
				students to		
				reflect and revise		
				cases presented.		
				Provide Provide		
				suggestions and		
				input on case examples		
				presented.		
				Students collect discussion		
				results according		
				to the agreed		
				time limit. Present and		
				respond to		
				4 X 50 questions		
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10	Charlends and alde					l	2001
10	Students are able to understand	1.Students are able to	Criteria: 1.The assessment	Presentation Discussion and	Step 1: Preparation of Case Examples Basic		60%
	digital data	understand	criteria are	Questions and	Questions		
	communication	asynchronous	carried out by	Answers	The lecturer asks: what		
		transmission,	looking at	Step 1: Preparation of	are the public problems that arise, their causes		
		Students are	aspects:	Case Examples	and impacts?		
		able to understand	2.1. Participation: carried out by	Basic Questions	Students respond to		
		data	observing	The lecturer	lecturer's questions,		
		communication	student activities	asks: what are the public	question and answer Step 2: Determine		
		standards	(weight 2)	problems that	discussion procedures		
		2.Students are	3.2. UTS: carried out with an	arise, their	(Individual/Ex)		
		able to understand	assessment	causes and impacts?	Lecturer determines collection procedures		
		synchronous	during the middle	Students	and time		
		transmission	of the semester	respond to	Lecturer makes		
		3.Students are	(weight 2)	lecturer's questions,	agreement on deadline for collection,		
		able to understand	4.3. UAS: carried out every	question and	Gives students time to		
		parallel	semester to	answer	form groups Students		
		transmission,	measure all	Step 2: Determine	Agree on schedule, Arrange groups,		
		4.Students are	indicators	discussion	Step 3:		
		able to understand	(weight 3) 5.4. Task: carried	procedures	Group Discussion		
		serial	out on each	(Individual/Ex) Lecturer	Lecturer conducts observing/paying		
		transmission	indicator (weight	determines	attention to the		
		5.Students are	3) 6 Student Final	collection	discussion process,		
		able to understand	6.Student Final Grade:	procedures and time	providing information if necessary,		
		Duplek	7.Participation	Lecturer makes	encouraging all active		
		communication	Score (2)%2	agreement on	group members		
			Lever Score	deadline for collection.	. Students. Discussing examples of cases that		
			(3)%2 UTS Score (2)%2	Gives students	will be taken. Collecting		
			UAS Score (3)	time to form	and processing		
			divided by 10	groups Students Agree on	supporting data. Analyzing cases and		
				schedule,	their solutions.		
				Arrange groups,	Preparing		
				Step 3: Group	presentations. Step 4: Group		
				Discussion	Presentation.		
				Lecturer	Lecturer examines the		
				conducts	presentation, provides		
				observing/paying close attention to	opportunities for questions and		
				the discussion	answers.		
				process,	Provides time. students		
				providing information if	to reflect and revise cases presented.		
				necessary,	Provide suggestions		
				encouraging all	and input on case		
				active group members	examples presented. Students collect		
				. Students.	discussion results		
				Discussing	according to the agreed		
				examples of cases that will	time limit. Present and respond to questions		
				be taken.	respond to questions		
				Collecting and			
				processing supporting data.			
				Analyzing cases			
				and their			
				solutions. Preparing			
				presentations.			
				Step 4: Group			
				Presentation. Lecturer			
				examines the			
				presentation,			
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				discussion			
				results according to the agreed			
				time limit.			
				Present and respond to			
				4 X 50 questions			
					l	l	

11	Students	1.Students	Criteria:	Presentation	Presentation	60%
	understand the types of switching	understand the	Criteria: Analytical	Discussion and	Discussion and	
	and multiplexing	types of	Rubric Form: Non Test	Questions and	Questions and Answers	
	1 0	switching		Answers Step 1:	Step 1: Preparation of Case Examples Basic	
		2.• Students	Form of Assessment	Preparation of	Questions	
		understand the	: 	Case Examples	The lecturer asks: what	
		types of multiplexing	Participatory Activities	Basic Questions	are the public problems	
		multiplexing		The lecturer	that arise, their causes	
				asks: what are the public	and impacts? Students respond to	
				problems that	lecturer's questions,	
				arise, their	question and answer	
				causes and	Step 2: Determine	
				impacts?	discussion procedures	
				Students	(Individual/Ex)	
				respond to lecturer's	Lecturer determines collection procedures	
				questions,	and time	
				question and	Lecturer makes	
				answer	agreement on deadline	
				Step 2:	for collection,	
				Determine	Gives students time to	
				discussion procedures	form groups Students Agree on schedule,	
				(Individual/Ex)	Arrange groups,	
				Lecturer	Step 3:	
				determines	Group Discussion	
				collection	Lecturer conducts	
				procedures and time	observing/paying close attention to the	
				time Lecturer makes	discussion process,	
				agreement on	providing information if	
				deadline for	necessary,	
				collection,	encouraging all active	
				Gives students	group members	
				time to form groups Students	. Students. Discussing examples of cases that	
				Agree on	will be taken. Collecting	
				schedule,	and processing	
				Arrange groups,	supporting data.	
				Step 3:	Analyzing cases and	
				Group	their solutions.	
				Discussion Lecturer	Preparing presentations.	
				conducts	Step 4: Group	
				observing/paying		
				close attention to	Lecturer examines the	
				the discussion	presentation, provides	
				process, providing	opportunities for questions and	
				information if	answers.	
				necessary,	Provides time. students	
				encouraging all	to reflect and revise	
				active group	cases presented.	
				members . Students.	Provide suggestions and input on case	
				Discussing	examples presented.	
				examples of	Students collect	
				cases that will	discussion results	
				be taken.	according to the agreed	
				Collecting and	time limit. Present and	
				processing supporting data.	respond to questions	
				Analyzing cases		
				and their		
				solutions.		
				Preparing		
				presentations. Step 4: Group		
				Presentation.		
				Lecturer		
				examines the		
				presentation,		
				provides		
				opportunities for questions and		
				answers.		
				Provides time.		
				students to		
				reflect and revise		
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				presented. Provide		
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				Students collect		
				discussion results according		
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				Present and		

1. Students understand about Spread Spectrum, Frequency Hoping Spread Spectrum and Direct Sequence Spread Spectrum 2. Students understand about Spread Spectrum, and Direct Sequence Spread Spectrum 4. Students understand about Spread Spectrum 5. Students understand about Spread Spectrum 6. Step 1: Preparing Case Step 1: Preparing Case Examples Basic Questions 6. Step 1: Preparing Case Examples Basic Questions 7. Method: Case	70%
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Frequency Hoping Spread Participatory Activities Participatory Activities Questions The lecturer asks: what are and impacts?	
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asks. What are and impacts:	
Snoctrum I	
works problems that lecturer's questions,	
3.Students arise, their question and answer	
understand causes and Step 2: Determine	
how Direct impacts? discussion procedures	
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Spread respond to Lecturer determines	
Spectrum lecturer's collection procedures	
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Step 2: for collection,	
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Lecturer Step 3:	
determines Group Discussion	
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Lecturer makes discussion process,	
agreement on providing information if	
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collection, encouraging all active Gives students group members	
time to form . Students. Discussing	
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Step 3: Analyzing cases and	
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15	Studente	1	Cuitouio	Math!	Mathadi	000/
15	Students understand the	1.Students understand the	Criteria: Criteria: Analytical	- Method: Case Method	- Method: Case Method Learning	90%
	function of the data link layer, error	function of the	Rubric Form: Non Test	Learning	· ·	
	detection and error correction	data link layer 2.Students		Step 1:	Step 1: Preparing Case Examples Basic	
	Correction	understand	Form of Assessment	Preparing Case	Questions	
		error detection	Participatory Activities	Examples Basic Questions	The lecturer asks: what are the public problems	
		and error correction		The lecturer	that arise, their causes	
		Correction		asks: what are the public	and impacts? Students respond to	
				problems that	lecturer's questions,	
				arise, their causes and	question and answer Step 2: Determine	
				impacts?	discussion procedures	
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				lecturer's	collection procedures	
				questions, question and	and time Lecturer makes	
				answer	agreement on deadline	
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				discussion	form groups Students	
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				(Individual/Ex) Lecturer	Arrange groups, Step 3:	
				determines	Group Discussion	
				collection procedures and	Lecturer conducts observing/paying	
				time	attention to the	
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				Discussion Lecturer	Preparing presentations.	
				conducts	Step 4: Group	
				observing/paying attention to the	Presentation. Lecturer examines the	
				discussion	presentation, provides	
				process,	opportunities for	
				providing information if	questions and answers.	
				necessary,	Provides time. students	
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				presentations. Step 4: Group		
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				examples		
				presented. Students collect		
				discussion		
				results according		
				to the agreed time limit.		
				Present and		
				respond to questions		
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16	Complete the Final Semester Exam	Evaluation Rubric	Criteria: Evaluation Rubric	Written Test 2 x 50	N n F S	Material: Meeting material 1-15 Reader: Wiliam S. Data and Computer Communication.	5%
						Communication. 2010, Pearson	

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage	
1.	Participatory Activities	445%	
		100%	

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** ability in the process and student learning outcomes are specific and measurable statements that identify the ability 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.
- 11. 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%.
- 12. TM=Face to face, PT=Structured assignments, BM=Independent study.