

Universitas Negeri Surabaya Faculty of Engineering, Mechanical Engineering Undergraduate Study Program

Document Code

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SEMESTER LEARNING PLAN

Courses			CODE				Cou	irse F	amily	'		Credi	t Wei	ght		SEME	STER	Co Dat	mpilat :e	ion
Mathematics	1		212010210	7			Con Sub	npulso jects ·	ory Cu • Natio	ırriculu onal	Im	T=3	P=0	ECTS=	4.77		1	Apr 202	il 28, 23	
AUTHORIZAT	ΓΙΟΝ		SP Develo	per						Cou	rse (Cluste	er Co	ordinat	or	Study	Progra	um Co	ordina	tor
			Ika Nurjann Ningsih, S. S.Pd., M.T.	Г., М.	.Pd., T. ; H	M.T. ; andin	Tri H i Novi	artutu ta Sa	ık ri	Ika I	Nurja	ınnah,	S.Pd	l., M.T.		Ir. P	riyo He S.T	ru Adi ., M.T.		Э,
Learning model	Case Studies		1																	
Program	PLO study prog	gram t	hat is char	ged t	o the	cou	rse													
Learning Outcomes	PLO-5	Work	independent	ly and	d in gr	roups														
(PLO)	PLO-11	Desig	n and develo	opmer	nt of s	olutio	ns tha	at take	e into	accou	nt the	e envi	ronm	ent and	sustai	nability				
	PLO-14	Scien	ce and engir	neerin	g kno	wledg	je													
	Program Object	tives ((PO)																	
	PO - 1	able to	o understand	and	calcul	ate ve	ectors													
	PO - 2	Able to	o define, dra	w and	l calcı	ulate f	functio	ons												
	PO - 3	Able to	o solve funct	ion lin	nits															
	PO - 4	Able to	o understand	I the c	contin	uity o	f func	tion a	t one	point										
	PO - 5		stand the de								dbe	able t	o find	derivati	ves of	various	s functi	ons		
	PLO-PO Matrix																			
			PO-1 PO-2 PO-3 PO-4 PO-5																	
	PO Matrix at th	e end	of each lea	rning	j sta	ge (S	ub-P	0)												
			P.0									Wee	ek]
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Short Course Description	Study of the basis real number syster functions along v students can app	ems, co with the	omplexes, ve eir applicatio	ctors n to	, func straig	tions, ht line	funct e equ	ion lin ations	nits ai	nd cor	ntinui	ty, gra	phs c	of function	ons, po	olar coo	ordinate	es, der	ivative	s of
References	Main :																			
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	Engineer Mathema 2. [2] D. Va 3. [3] Thom	ring Mathematic, Edis atics with Calculus, 20 rberg, E. J. Purcell, S. as, 7th ed dan Howard	si ke-7, John Wiley, 1 11, John Willey & Sons E. Rigdon, Calculus, 9t	.993 [3]. Paul A. Inc. Wesleyan U h ed., PEARSON	Graw Hill, Singapore, 196 Calter, MSME & Micha niversity, United Stated of , Prentice Hall, 2007.	el A. Calter, PH	-
	Supporters:						
	1. [4]. Huw 0750655		thematics for Engineer	s and Technologi	sts, 2002, Elsevier Sciend	ce & Technology	Books, ISBN:
Support lecturer		sih, S.T., M.T. .Pd., M.T.					
Week-	Final abilities of each learning stage	Evalu	uation	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>)	[References]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

understand the real number system, inequalities and absolute values astypes of numbers1.Full marks are obtained if you do all the questionsdiscussions and problem-based learning system num do all the offline is not possible 3 x 50Num system value	terial: 5% mber stems (Real nbers,
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Inequalities and absolute values as well as the CartesianInterfectsInterfectsInterfectsdo all the well as the Cartesianthe simplest numbers to the correctlydo all the questionscarried out online if offline is not possible absolute valuenum num	
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2	Understand the	Explains the	Criteria:	Problem-based	Material:
	definition of	definition of	1.Full marks are	learning and	definitions of
	vectors, relations	vectors and	obtained if you	discussion	vectors and
	and operations in	relations and	do all the	3 X 50	relations and
	vector algebra	vector algebra			vector algebra
		operations	questions		operations.
			correctly		
			2.The score is		Reference:
			not full, if there		[1]. Spiegel,
					Murray R,
			is an answer to		Advanced
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			is not correct,		Schaum's
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			point on the		Kreyzig Erwin,
			question		Advanced
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			Form of		Mathematics,
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					A. Calter,
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					Huw Fox & W.
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					Matarial
					Material:
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3	1.Understand	1.Explain vector	Criteria:	Problem-based learning and	Material: vector algebra	5%
	vector algebra	algebra	 Full marks are 			
	operations	operations	obtained if you	discussion	operations,	
	2.able to	2.Calculating the	do all the	3 X 50	angles formed	
	calculate the	angle formed	questions		by 2 vectors,	
	angle formed by	by 2 vectors,	correctly		area of a	
	2 vectors	calculating the	2.The score is		parallelogram	
	3.calculate the	area of a	not full, if there		and parallel	
					volume of the	
	area of a	parallelogram	is an answer to		epipedum .	
	parallelogram	and calculating	a question that		References:	
	4.able to	the parallel	is not correct,		[1]. Spiegel,	
	calculate the	volume of the	the score is		Murray R,	
	parallel volume	epipedum	adjusted		Advanced	
	of the		according to		Calculus,	
	epipedum		the score per		Schaum's	
	epipeddin		point on the		Series, Mc.	
					Graw Hill,	
			question		Singapore,	
			Farma of			
			Form of		1981 [2]. Krovzia Envin	
			Assessment :		Kreyzig Erwin,	
			Participatory		Advanced	
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					Material:	
					vector algebra	
					operations,	
					angles formed	
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					area of a	
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					volume of an	
					epipedum.	
					References:	
					[3] Thomas,	
					7th ed and	
					Howard Anton, 10th ed	

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4	1.Understand	1.able to	Criteria:	Problem-based	Material:	5%
	vector algebra	calculate	 Full marks are 	learning and	vector algebra	
	operations.	values in	obtained if you	discussion	operations,	
	2.able to	vector algebra	do all the	3 X 50	angles formed	
	calculate the	operations.	questions		by 2 vectors,	
	angle formed by	2.Calculate the	correctly		area of a	
	2 vectors.	angle formed	2.The score is		parallelogram	
	3.Able to		not full, if there		and parallel	
		by two vectors.	,		volume of the	
	calculate the	3.calculate the	is an answer to		epipedum .	
	area of a	area of a	a question that		References:	
	parallelogram.	parallelogram	is not correct,		[1]. Spiegel,	
	4.able to	calculate the	the score is		Murray R,	
	calculate the	parallel volume	adjusted		Advanced	
	parallel volume	of the	according to		Calculus,	
	of the	epipedum	the score per		Schaum's	
	epipedum.		point on the		Series, Mc.	
			question		Graw Hill,	
					Singapore,	
			Form of		1981 [2].	
			Assessment :		Kreyzig Erwin,	
			Participatory		Advanced	
			Activities		Engineering	
					Mathematics,	
					7th Edition,	
					John Wiley,	
					1993 [3]. Paul	
					A. Calter,	
					MSME &	
					Michael A.	
					Calter, PH.D,	
					Technical	
					Mathematics	
					with Calculus,	
					2011, John	
					Willey & Sons	
					Inc. Wesleyan	
					University,	
					United States	
					of America [4].	
					Huw Fox & W.	
					Bolton,	
					Mathematics	
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					Technologists,	
					2002, Elsevier	
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					Material:	
					vector algebra	
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					epipedum .	
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					[4]. Huw Fox &	
					W. Bolton,	
					Mathematics	
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5	1.Able to define	1.Explain the	Criteria:	Problem and		Material:	3%
	functions,	definition of	1.Full marks are	discussion		definition of	
	understand	function	obtained if you	based learning.		function,	
	various	2.Explain the	do all the	3 X 50		various	
	functions.	various	questions			functions,	
	2.Able to draw	functions.	correctly.			function	
	function graphs.	Draw function	The score is			graphs, domains and	
	3.able to	graphs,	not full, if there			function areas,	
	determine the	determine	is an answer to			function	
	origin area	domain areas	a question that			graphs with	
	(domain) and	and function	is not correct,			translation/shift	
	the result area	areas.	the score is			laws, function	
	(function).	Draw function	adjusted			graphs in polar	
	4.Able to	graphs with	according to			coordinates	
	understand	translation/shift	the score per			References:	
	graphic shifts.	laws.	point on the			[1]. Spiegel,	
	5.Able to	5.Explains the	question.			Murray R,	
	calculate	occurrence of				Advanced	
	function	new functions	Form of Assessment :			Calculus, Schaum's	
	operations and	based on the	Participatory			Series, Mc.	
	function	operation of	Activities			Graw Hill,	
	composition,	functions and	/ touvideo			Singapore,	
	6.Able to draw	function				1981 [2].	
	function graphs	composition.				Kreyzig Erwin,	
	in polar	6.Explain the				Advanced	
	coordinates.	depiction of				Engineering	
		function graphs in polar				Mathematics,	
		coordinates				7th Edition,	
		coordinates				John Wiley, 1993 [3]. Paul	
						A. Calter,	
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						Michael A.	
						Calter, PH.D,	
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						with Calculus,	
						2011, John	
						Willey & Sons	
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						of America [4].	
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						function	
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						graphs with	
						translation/shift	
						laws, function	
						graphs in polar	
						coordinates.	
						References:	
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						Anton,	
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						9th Edition, Wiley, 2005.	
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2. Able to draw function, graphs, determine the origin and recall area. 2. The score is graphs, determine the origin and recall area. unction, graphs, determine the origin area. 1. Unction, graphs, determine the origin area. Unction, graphs, determine the origin or the origin				,			
2. Addie to draw 3. Able to determine the origin actual (function), 4. Able to understand graphs, with tandiation that a determine the origin actual (function), 4. Able to understand graphs with tandiation that a determine the origin actual (function), 4. Able to understand function tandiation 5. Able to draw function 5. Able to draw function 1. Content (function), 5. Able to draw function function function composition 5. Able to draw function function contributes. 5. Explain the description 6. Able to draw function function contributes. 5. Explain the description function contributes. 5. Explain the description 6. Able to draw function contributes. 5. Explain the description function contributes. 5. Explain the description 6. Able to draw function contributes. 5. Explain the description 6. Able to draw function function contributes. 5. Explain the description 6. Explain the descripti							
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4 Able to calculate graphs with translation/bitter graphs with translation/bitter graphs with translation/bitter Graph with translation/bitter Graph with translation/bitter 5 Able to calculate Exclution to the score per operation of the correct of the corr							
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 function perations and perations of composition, 6 Able to draw function and unciton fractors and functions and function				question.			
operations and composition, 6.Able to draw function graphs in polar coordinates. based on the operation of functions and function composition, 6.Explain the depiction of function graphs in polar coordinates. Softaum's Participationy 6.Explain the depiction of function graphs in polar coordinates. Softaum's function function graphs in polar coordinates. Image: Softaum's function graphs in polar coordinates. Softaum's function graphs in polar coordinates. Softaum's function graphs in polar coordinates. Softaum's function graphs in polar coordinates. Image: Softaum's function function function function function function graphs with ransfationshift taws, function graphs with ransfationshift taws, function graphs with ransfationshift taws, function graphs in polar coordinates				Form of			
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6. Composition. 6. Cable to draw function graphs coordinates. 6. Explain the depiction of function graphs in polar coordinates. 6. Explain the depiction of function function graphs with function graphs with function graphs in polar coordinates. 6. Explain the depiction function graphs in polar coordinates. 6. Explain the depiction function graphs in polar coordinates. 6. Explain the depiction function graphs in polar coordinates. 6. Explain the depiction function graphs in polar coordinates. 6. Explain the function functi			operation of				
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Mathematics with Calculus, 2011, John Willey & Sons Inc. Wesleyan University, United States of America [4]. Huw Fox & W: Bolton, Mathematics for Engineers and Technologists, 2002, Elsevier Science & Technology Books, ISBN: 0750655445 Material: function definitions, starious functions, function graphs, function graphs with transition/shift laws, function graphs in polar coordinates References: [2] D. Varberg, E.J. Purcell, SE Rigdon, Calculus, 9th ed., PEARSON, Perentsol, SE							
with Calculus, 2011, John Willey & Sons Inc. Westeyan University University University University United States of America [4], Huw Fox & W. Bolton, Mathematics for Engineers and Technologists, 2002, Elsevier Science & Technology Books, ISBN: 0750655445 Material: function definitions, various functions, function graphs, domain areas and function graphs, domain areas and function graphs, domain areas and function graphs in polar coordinates References: [2] D. Varberg, EJ D. Varberg, EJ D. Varberg, EJ D. Varberg, EJ Purcell, SE Rigdon, Calculus, 9th ed., PEARSON, PEARSON, PEARSON, PEARSON,							
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PEARSON, Prentice Hall,							
						PEARSON,	
2007.						Prentice Hall,	
						2007.	

7	1.Able to define	1.Explain the	Criteria:	Problem-based	Material:	3%
-	functions,	definition of	1.Full marks are	learning and	definition of	0,0
				discussion	function,	
	understand	function.	obtained if you	3 X 50	various	
	various	2.Explain the	do all the	57.00	functions,	
	functions.	various	questions		function	
	2.Able to draw	functions.	correctly.		graphs,	
	function graphs.	Draw function	The score is		domains and	
	3.Able to	graphs,	not full, if there			
	determine the	determine	is an answer to		function areas	,
	origin area	domain areas	a question that		function	
	(domain) and	and function	is not correct,		graphs with	e.
			the score is		translation/shi	
	result area	areas.			laws, function	
	(function).	4.Draw function	adjusted		graphs in pola	r
	4.Able to	graphs with	according to		coordinates	
	understand	translation/shift	the score per		References:	
	graphic shifts.	laws	point on the		[1]. Spiegel,	
	5.Calculating	Explains the	question.		Murray R,	
	function	occurrence of			Advanced	
	operations and	new functions	Form of		Calculus,	
	function	based on the	Assessment :		Schaum's	
	composition.		Participatory		Series, Mc.	
		operation of	Activities		Graw Hill,	
	6.Able to draw	functions and	-		Singapore,	
	function graphs	function			1981 [2].	
	in polar	composition.			Kreyzig Erwin	
	coordinates	Explain the			Advanced	
		depiction of			Engineering	
		function			Mathematics,	
		graphs in polar			7th Edition,	
		coordinates.			John Wiley,	
		coordinates.			1993 [3]. Paul	
					A. Calter, MSME &	
					Michael A.	
					Calter, PH.D,	
					Technical	
					Mathematics	
					with Calculus,	
					2011, John	
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					University,	
					United States	
					of America [4]	
					Huw Fox & W	
					Bolton,	
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					Material:	
					function	
					definitions,	
					various	
					functions,	
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					graphs,	
					domain areas	
					and function	
					areas, function	ו
					graphs with	.
					translation/shi	
					laws, function	
					graphs in pola	r
					coordinates	
					References:	
					[2] D. Varberg	,
					EJ Purcell, SE	
					Rigdon,	
					Calculus, 9th	
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					ea., PEARSON,	
					PEARSON, Prentice Hall,	
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8	Midterm exam	Midterm exam	Criteria:	Midterm Exam	Material:	20%
			 Full marks are 	3 X 50	definition of	
			obtained if you		function,	
			do all the		various	
			questions		functions,	
			correctly.		function	
			2.The mark is not		graphs,	
			full if there is		domains and	
					function areas,	
			an answer to		function	
			the question		graphs with	
			that is not		translation/shift	
			correct, and the		laws, function	
			mark is based		graphs in polar	
			on the score		coordinates	
			per point of the		References:	
			question		[1]. Spiegel,	
			44004011		Murray R,	
			Form of		Advanced	
			Assessment :		Calculus,	
			Test		Schaum's	
					Series, Mc.	
					Graw Hill,	
					Singapore,	
					1981 [2].	
					Kreyzig Erwin,	
					Advanced	
					Engineering	
					Mathematics,	
					7th Edition,	
					John Wiley,	
					1993 [3]. Paul	
					A. Calter,	
					MSME &	
					Michael A.	
					Calter, PH.D,	
					Technical	
					Mathematics	
					with Calculus,	
					2011, John	
					Willey & Sons	
					Inc. Wesleyan	
					University,	
					United States	
					of America [4].	
					Huw Fox & W.	
					Bolton,	
					Mathematics	
					for Engineers	
					and	
					Technologists,	
					2002, Elsevier	
					Science &	
					Technology	
					Books, ISBN:	
	1				0750655445	

9	Able to solve function limits.	1.Explain the definition of	Criteria: Full marks are	Problem-based learning and	Material: limits and functions	5%
		limit.	obtained if you do	discussion	References:	
		2.Explain limit	all the questions	3 X 50	[1]. Spiegel,	
		theorems.	correctly.		Murray R,	
					Advanced	
		3.Explain the	Form of		Calculus,	
		limits of	Assessment :		Schaum's	
		trigonometric	Participatory		Series, Mc.	
		functions.	Activities		Graw Hill,	
		4.Explain the			Singapore,	
		limits of			1981 [2].	
		rational			Kreyzig Erwin,	
		numbers.			Advanced	
		5.Explain the			Engineering	
					Mathematics,	
		limit of			7th Edition,	
		indefinite			John Wiley,	
		numbers.				
		Explain the			1993 [3]. Paul	
		limits of			A. Calter,	
		exponential			MSME &	
		numbers.			Michael A.	
					Calter, PH.D,	
					Technical	
					Mathematics	
					with Calculus,	
					2011, John	
					Willey & Sons	
					Inc. Wesleyan	
					University,	
					United States	
					of America [4].	
					Huw Fox & W.	
					Bolton,	
					Mathematics	
					for Engineers	
					and	
					Technologists,	
					2002, Elsevier	
					Science &	
					Technology	
					Books, ISBN:	
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					P	
					Material: limits	
					and functions	
					References:	
					[3] Thomas,	
					7th ed and	
			1		Howard Anton,	
					10th ed	

				1		
10	Able to solve	1.Explain the	Criteria:	Problem and	Material: limits	s 2%
	function limits	definition of	 Full marks are 	discussion	and functions	
		limit.	obtained if you	based learning.	References:	
		2.Explain limit	do all the	3 X 50	[1]. Spiegel,	
		theorems.	questions		Murray R,	
		3.Explain the	correctly.		Advanced	
		limits of	2.The score is		Calculus,	
					Schaum's	
		trigonometric	not full, if there		Series, Mc.	
		functions	is an answer to		Graw Hill,	
		Explain the	a question that		Singapore,	
		limits of	is not correct,		1981 [2].	
		rational	the score is		Kreyzig Erwin,	
		numbers.	adjusted		Advanced	
		5.Explain the	according to		Engineering	
		limit of	the score per		Mathematics,	
		indefinite	point on the		7th Edition,	
		numbers	question.		John Wiley,	
			question.		1993 [3]. Paul	
		6.Explain the	Form of		A. Calter,	
		limits of	Assessment :		MSME &	
		exponential	Participatory		Michael A.	
		numbers	Activities		Calter, PH.D,	
			ACIIVILLES		Technical	
					Mathematics	
					with Calculus,	
					2011, John Willey & Sons	
					Inc. Wesleyan	
					University,	
					United States	
					of America [4].	
					Huw Fox & W.	
					Bolton,	
					Mathematics	
					for Engineers	
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					Technologists,	
					2002, Elsevier	
					Science &	
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					Material: limits	5
					and functions	
					References:	
					[3] Thomas,	
					7th ed and	
					Howard Anton	
					10th ed	
					2007.00	

		D : 1					
11	Able to understand the continuity of	Proving the condition that the	Criteria:	Problem and	Materia		
	function at one	function is	 Full marks are 	discussion	continu		
	point.	continuous at one	obtained if you	based learning.		n at one	
	point.	point	do all the	3 X 50	point		
		point	questions		Refere	nces:	
			correctly.		[1]. Spi	egel,	
			2.The score is		Murray	R,	
					Advand	ced	
			not full, if there		Calculu		
			is an answer to		Schaur		
			a question that		Series,		
			is not correct,		Graw H		
			the score is		Singap		
			adjusted		1981 [2		
			according to			g Erwin,	
			the score per		Advand		
					Engine		
			point on the		Mather		
			question.				
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			Form of		John W		
			Assessment		1993 [3		
			Participatory		A. Calt		
			Activities		MSME		
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					Calter,		
					Techni		
					Mather	natics	
					with Ca	alculus,	
					2011, 5	Iohn	
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					Wiley, J	2005.	

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12	Understand the	 Explain the 	Criteria:	Problem and		Material:	3%
	definition and	definition of a	 Full marks are 	discussion		derivatives and	
	properties of	derivative and	obtained if you	based learning.		derivative	
	derivatives and be able to find	the properties	do all the	3 X 50		properties	
	derivatives of		questions			References:	
	various functions.	of a derivative				[1]. Spiegel,	
	งฉาบบรานาเป็นเป็นร.	2.Explain	correctly			Murray R,	
		derivatives	2.The score is			Advanced	
		with chain	not full, if there				
		rules, higher	is an answer to			Calculus,	
		order	a guestion that			Schaum's	
1			is not correct,			Series, Mc.	
		derivatives,				Graw Hill,	
		implicit	the score is			Singapore,	
		function	adjusted			1981 [2].	
		derivatives and	according to			Kreyzig Erwin,	
		parameter	the score per			Advanced	
1		function	point on the			Engineering	
			question			Mathematics,	
		derivatives	question			7th Edition,	
			Form of			John Wiley,	
						1993 [3]. Paul	
			Assessment :				
1			Participatory			A. Calter,	
			Activities			MSME &	
						Michael A.	
						Calter, PH.D,	
						Technical	
						Mathematics	
						with Calculus,	
						2011, John	
						Willey & Sons	
						Inc. Wesleyan	
						University,	
						United States	
						of America [4].	
						Huw Fox & W.	
						Bolton,	
						Mathematics	
						for Engineers	
						and	
						Technologists,	
						2002, Elsevier	
						Science &	
						Technology	
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						Matarial	
						Material:	
						derivatives and	
						derivative	
						properties	
						References:	
						[3] Howard	
						Anton,	
						Elementary	
						Linear Algebra	
						9th Edition,	
						Wiley, 2005.	
				1	1		

13	Understand the definition and properties of	1.Explain the definition of a	Criteria: 1.Full marks are	Problem and discussion based learning.	Material: derivatives a	and 3%
	derivatives and be	derivative and	obtained if you		derivative	
	able to find	the properties	do all the	3 X 50	properties	
	derivatives of	of a derivative.	questions		References	:
	various functions.	2.Explain	correctly.		[1]. Spiegel,	
		derivatives	2.The score is		Murray R,	
			not full, if there		Advanced	
		with the chain			Calculus,	
		rule, higher	is an answer to		Schaum's	
		order	a question that		Series, Mc.	
		derivatives,	is not correct,		Graw Hill,	
		implicit	the score is		Singapore,	
		function	adjusted		1981 [2].	
		derivatives and	according to		Kreyzig Erw	in
		parameter	the score per		Advanced	,
		function	point on the		Engineering	
					Mathematics	
		derivatives.	question.		7th Edition,	o,
			Form of		John Wiley,	
			Form of			
			Assessment :		1993 [3]. Pa	u
			Participatory		A. Calter, MSME &	
			Activities			
					Michael A.	
					Calter, PH.D),
					Technical	
					Mathematics	
					with Calculu	S,
					2011, John	
					Willey & Sor	
					Inc. Wesleya	an
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					of America [
					Huw Fox &	N.
					Bolton,	
					Mathematics	5
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					W. Bolton,	
					Mathematics	
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14	Able to understand	1.Explain the	Criteria:	Problem-based	Material:	3%
	the application of	application of	1.Full marks are	learning and	derivative of a	
	the derivative of a	the derivative	obtained if you	discussion	function on	
	function.	of a function to	do all the	3 X 50	solid particle	
		the velocity of	questions		velocity, liquid	
		solid particles,	correctly.		velocity,	
		the velocity of	2.The mark is not		extreme	
		liquids.	full if there is		values	
		2.extreme	an answer to		References:	
			the question		[1]. Spiegel,	
		values			Murray R,	
		(maximum-	that is not		Advanced	
		minimum) and	correct, and the		Calculus,	
		associated	mark is based		Schaum's	
		rates of	on the score		Series, Mc.	
		change.	per point on		Graw Hill,	
			the question.		Singapore,	
			Form of		1981 [2]. Krouzia Envir	
			Form of		Kreyzig Erwin,	
			Assessment :		Advanced	
			Participatory Activities, Portfolio		Engineering Mathematics,	
			Activities, Portiolio Assessment		7th Edition,	
			LINE LINE LINE		John Wiley,	
					1993 [3]. Paul	
					A. Calter,	
					MSME &	
					Michael A.	
					Calter, PH.D,	
					Technical	
					Mathematics	
					with Calculus,	
					2011, John	
					Willey & Sons	
					Inc. Wesleyan	
					University,	
					United States	
					of America [4].	
					Huw Fox & W.	
					Bolton,	
					Mathematics	
					for Engineers	
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I					Material:	
					derivative of a	
					function on	
					solid particle	
					velocity, liquid	
					velocity,	
					extreme values	
					References:	
					[4]. Huw Fox &	
					W. Bolton,	
					Mathematics	
					for Engineers	
					and	
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					2002, Elsevier	
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15	Able to understand	 Explain the 	Criteria:	Problem and		Material:	5%
	the application of	application of	 Full marks are 	discussion		derivative of a	
	the derivative of a	the derivative	obtained if you	based learning.		function on	
	function	of a function to	do all the	3 X 50		solid particle	
		the velocity of	questions			velocity, liquid	
		solid particles,	correctly.			velocity,	
			2.The score is			extreme	
		the velocity of				values	
		liquids.	not full, if there			References:	
		2.extreme	is an answer to			[1]. Spiegel,	
		values	a question that			Murray R,	
		(maximum-	is not correct,			Advanced	
		minimum) and	the score is			Calculus,	
		associated	adjusted			Schaum's	
		rates of	according to			Series, Mc.	
		change.	the score per			Graw Hill,	
		0	point on the			Singapore,	
			question.			1981 [2].	
						Kreyzig Erwin,	
			Form of			Advanced	
			Assessment :			Engineering	
			Participatory			Mathematics,	
			Activities			7th Edition,	
						John Wiley,	
						1993 [3]. Paul	
						A. Calter,	
						MSME &	
						Michael A.	
						Calter, PH.D,	
						Technical	
						Mathematics	
						with Calculus,	
						2011, John	
						Willey & Sons	
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						of America [4].	
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						Material:	
						derivative of a	
						function on	
						solid particle	
						velocity, liquid	
						velocity, liquid velocity,	
						extreme	
						values References	
						References:	
						[3] Thomas,	
						7th ed and	
						Howard Anton,	
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16	FINAL SEMESTER	Able to work on	Criteria:	Implementation		Material:	25%
		questions from	1.Full marks are	of		limits,	
	(UAS)	Limit, Continuity and Derivative	obtained if you	UAS.		continuity and	
		material.	do all the	3 x 50		derivatives	
			questions			References:	
			correctly.			[1]. Spiegel,	
			2.The score is			Murray R,	
			not full, if there			Advanced	
			is an answer to			Calculus,	
			a question that			Schaum's	
			is not correct,			Series, Mc.	
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Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	53.5%
2.	Portfolio Assessment	1.5%
3.	Test	45%
		100%

Notes
1. 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

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.