TEACHING PLAN
BUILDING ENGINEERING VOCATIONAL EDUCATION (BEVE) STUDY PROGRAM
CIVIL ENGINEERING DEPARTMENT, FACULTY OF ENGINEERING, UNIVERSITAS NEGERI PADANG

COURSE	CODE	COURSE CLUSTER	CREDITS		SEM.	VERSION
			Theory	Practice		
Calculus	SIP1.61.2102	Compulsory Course of Study Program	2		2	1

Lecturer in Charge		Lecturer in Charge
		Rizky Indra Utama, M. Pd.T. NIDN. 0006048805

Remarks	Dean of Faculty of Engineering	Head of Civil Engineering Department	Coordinator of BEVE
	Dr. Fahmi Rizal, M.Pd., M.T NIP. 195912041985031004	Faisal Ashar, Ph.D. NIP. 19750103 200312 1001	Drs. Revian Body, MSA. NIP. 19600103 198503 1003

Program Learning Outcomes	Program Learning Outcomes (PLO)
	1. The ability to apply basic knowledge of science (mathematics, natural sciences) and other multidisciplinary knowledges which are the basis of Building Engineering Vocational Education field in carrying out its professional work (Knowledge and Understanding). 1.1. Able to show good understanding and to implement the basic concept of mathematics to solve various problems in building engineering field. 1.2. Have a high understanding and able to implement the basic concept of Physics and Chemistry (natural sciences) in building engineering field. 1.3. Have a high understanding and able to implement the basic concept of basic engineering (Mechanics, Engineering Drawings) in building engineering field. 2. The ability to think critically and creatively in identifying, formulating, problem solving, and

	evaluating various problems in building engineering vocational educatipn field by using the most appropriate and effective scientific method (Engineering analysis, investigations and assessment). 2.1. Able to identify various technical problems in building engineering field. 2.2. Able to analyze various technical problems in building engineering field. 2.3. Able to evaluate various technical problems in building engineering field. 3. The reliable ability to plan, implement, and supervise the works in building engineering field. (Engineering design). 3.1. Able to implement shop drawings in collaboration with various related parties. 3.2. Able to manage building engineering works by paying attention to environmental, social, health and safety aspects. 3.3. Able to supervise the implementation of building engineering woks. 4. The reliable ability to plan, implement, and evaluate the learning process in Building Engineering Vocational Education study program (Education design). 4.1. Able to plan the curriculum and learning process in building engineering field. 4.2. Able to carry out, control, evaluate and improve the quality of the learning process. 4.3. Able to develop an effective, efficient and interesting teaching media. 5. The ability to adapt to and innovate towards the development of science and technology and implement it into educational and professional work goals by considering non-technical risks that may occur (Engineering practice). 5.1. Able to innovate and develop the technology in the field of building engineering by considering social, economic and environmental aspects. 5.2. Able to analyze environmental conditions in the planning, implementation and supervision of buildings. 5.3. Implement information technology and computers into the planning, implementation, and supervision processes of buildings. 6. Social and managerial competencies, collaboration and effective communication skills, entrepreneurial character, environmental insight, and awareness of the importance of lifelong learning (Transferable and softskill). 6.1. Able to work creatively, innovatively, collaboratively, carefully, responsibly, and

responsive to environmental change.

6.2. Have curiosity and critical thinking, open-minded, and objective.

6.3. Able to communicate effectively, and to collaborate in a team work.

Course Learning Outcomes

Course Learning Outcomes (CLO): CALCULUS

Course LO	PLO
1. Shows honesty, discipline, and responsible attitude in completing integral tasks	1.1, 6.1, 6.2, 6.3
2. Able to calculate indefinite integrals	1.1, 6.1, 6.2, 6.3
3. Able to apply sigma and quantity properties	1.1, 6.1, 6.2, 6.3
4. Able to calculate the surface area of a flat plane with curved boundaries in everyday life by using various methods.	1.1, 6.1, 6.2, 6.3
5. Able to understand basic definite integral concepts and apply them in solving curved boundary area problem.	1.1, 6.1, 6.2, 6.3
6. Prove the basic theorem of calculus and other integral theorems.	1.1, 6.1, 6.2, 6.3
7. Apply logical and critical thinking in the implementation of the theorem of definite integral properties.	1.1, 6.1, 6.2, 6.3
8. Apply basic theorems related to definite integrals and use them in problem solving	1.1, 6.1, 6.2, 6.3
9. Apply the concept of integral in determining the flat surface area, volume of rotating objects and the length of the curve.	1.1, 6.1, 6.2, 6.3
10. Use the correct theorem in calculating the surface volume of a rotating object.	1.1, 6.1, 6.2, 6.3

Course Description

This course contains the subject of Basic Calculus, which includes Integral and Its Use. Integral material consists of: Anti derivative (indefinite integral), differential equations, writing of numbers and sigma, area introduction, definite integrals, fundamental theorems of calculus, definite integral properties, and assistance in definite integral calculations. Integral Use material includes: calculation of the area of a flat plane, calculation of the volume of objects in space and the volume of rotating objects, calculation of the length of the curve, and calculation of the area of the rotating surface.

Literature

Main (ML):

1. E.J Purcell (1984) *Kalkulus dan Geometri Analisis*. Jilid 1. Penerbit Erlangga. Jakarta.

Supporting:

1. G.E. Dyball (1980). *Mathematics for Technician Engineers*. McGraw-Hill. London.
2. Kreyszig. (1993). *Matematika Teknik Lanjutan.* Edisi VI. Penerbit PT. Gramedia Pustaka Utama. Jakarta.
3. Wirodikromo, Sartono, Drs. (2005). *Matematika Berdasar Kurikulum Berbasis Kompetensi.* Penerbit Erlangga. Jakarta.

Teaching Media

Software (SL):	Hardware:
Microsoft Word and Excel	Computer, LCD Projector and white board.

Team Teaching

Dr. Rijal Abdullah, M.T., Rizky Indra Utama, S.T., M.T., M.Pd.T, Windry Novalia Jufri, S.Pd., M.Pd.

Assessment	Mid-Semester Exam, Final Exam, Individual Assignment
Prerequisite	Mathematics Analysis

TEACHING MATERIAL

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
(1)	Students are able to understand lecture material and lecture contracts	**Introduction to Calculus, lecture contract, silabus**	Lecture	-	1. Attitude 2. Knowledge	ML 1 SL 1,2,3
(2)	CLO-1 Knowledge and understanding of: 1. Anti differentiation 2. Anti-derivative writing 3. Rules of rank 4. Indefinite integral	**Anti-derivative (Indefinite Integral)**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(3)	CLO-2 Knowledge and understanding of: 1. Differential Equations 2. Separation of variables 3. Motion Problem	**Differential Equations**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(4)	CLO-3 Knowledge and understanding of: 1. Writing sigma 2. Properties of Sigma 3. Special Additions 4. Mathematical Induction	**Writing Amount and Sigma**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(5)	CLO-4 Knowledge and understanding of: 1. Area according to the	**Introduction to Area**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
	inner polygon 2. Area according to the outer polygon					
(6)	CLO-5 Knowledge and understanding of: 1. Riemann Sum 2. Integral Theorem 3. Calculation of Definite Integral	**Definite Integral**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(7)	CLO-6 Knowledge and understanding of: 1. Basic Theorem 2. Iintegral linearity	**Basic Theorem of Calculus**	Lecture and discussion	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(8)	**Mid-Semester Exam**					
(9)	CLO-7 Knowledge and understanding of: 1. The Nature of Compariso 2. Differentiation of Definite Integral against its limit 3. Mean Value Theorem for Integral	**Properties of Definitie Integral Tentu**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(10)	CLO-8 Knowledge and understanding of: 1. Replacement Method 2. Use of Symmetry 3. Use of Periodic	**Assistance in Integral Calculations**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(11)	CLO-9	**Calculation of Flat Area**	Lecture and work in group	Individual Assignment	1. Attitude	ML 1

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
	Knowledge and understanding of: 1. The area above the x-axis 2. The area between 2 curves				2. Knowledge	
(12)	CLO-9 Knowledge and understanding of: 1. Rotary object: Disc Method 2. Ring Method 3. Other Spatial Objects With Known Sections	**Calculating the Volume of Objects in Slabs, Discs and Rings**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(13)	CLO-9 Knowledge and understanding of: Tube Shell Method	**Calculating the Volume of the Rotary Object: Tube Shell**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(14)	CLO-9 Knowledge and understanding of: 1. Length 2. Arc Length Differential	**Calculating the Length of Curve on a Plane (Flat Curve)**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1
(15)	CLO-10 Knowledge and understanding of: 1. Rotation around the x-axis 2. Rotation around the y-axis	**Calculating the Rotary Surface Area**	Lecture and work in group	Individual Assignment	1. Attitude 2. Knowledge	ML 1

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
(16)	**Final Exam (Evaluation to reveal the learning outcomes of students)**					

Correlation between CLO, PLO and Assessment Methods

	Assesment	Weigh t (%)	PLO-1			PLO-2				PLO-3				PLO-4			PLO-5			PLO-6		
			1	2	3	1	2	3	4	1	2	3	4	1	2	3	1	2	3	1	2	3
CLO 1	Mid-Semester Exam (Question 1)	**7**																				
CLO 2	Mid-Semester Exam (Question 2)	**8**																				
CLO 3	Group Assignment	**5**																				
CLO 4	Individual Assignment	**5**																				
CLO 5	Mid-Semester - Exam (Question 3)	**7**																				
CLO 6	Mid-Semester - Exam (Question 4)	**8**																				
CLO 7	Individual Assignment	**5**																				
CLO 8	Group Assignment	**5**																				
CLO 1	Final Exam (Question 1)	**7**																				
CLO 5	Final Exam (Question 2)	7																				
CLO 9	Final Exam	**7**																				

	(Question 3)																					
CLO 9	Final Exam (Question 4)	7																				
CLO 9	Final Exam (Soal 5)	**7**																				
CLO 10	Individual Assignment	**5**																				
Presence		**10**																				
TOTAL		**100**																				

Assessment Component

Mid-Semester Exam : 30%

Final Exam : 35%

Individual & Group Assignment : 25%

Presence : 10%

Total : 100%

Description of Assessment Level

	Excellent	**Good**	**Satisfy**	**Fail**
Description	80-100	70-79	51-69	>50
Formulation	-	-	-	-
Count	-	-	-	-
Analysis	90-100	70-89	51-69	>50

Assessment System

Score Range	Grade Letter	Grade Point	Notes	Score Range	Grade Letter	Grade Point	Notes
85 – 100	A	4.0	Exceptional	55 – 59	C	2.0	Quite Satisfactory
80 – 84	A-	3.6	Excellent	50 – 54	C-	1.6	Poor
75 – 79	B+	3.3	Very Good	40 – 49	D	1.0	Very Poor
70 – 74	B	3.0	Good	≤ 39	E	0.0	Fail
65 – 69	B-	2.6	Fairly Good	-	T	-	Delayed
60 – 64	C+	2.3	Satisfactory				