



TEACHING PLAN

BUILDING ENGINEERING VOCATIONAL EDUCATION (BEVE) STUDY PROGRAM

CIVIL ENGINEERING DEPARTMENT, FACULTY OF ENGINEERING, UNIVERSITAS NEGERI PADANG

COURSE NAME	CODE	GRASS MK	SKS		SEM	VERSION
			Theory	Pract		
Building Utilities	SIP. 61.5301	Study Program Compulsory Courses	2	-		1
Lecturer in Charge	Nidal Zuwida, S.Pd., M.Pd.T		Lecturer in Charge <u>Nidal Zuwida, S.Pd., M.Pd.T</u> NIP. 199101172019032014			
Remarks	Dean of the Faculty of Engineering	Head of Civil Engineering Department	Coordinator of BEVE			
	<u>Dr. Fahmi Rizal, M.Pd., MT</u> NIP. 195912041985031004	<u>Faisal Ashar, Ph.D.</u> NIP. 19750103 200312 1001	<u>Drs. Revian Body, MSA.</u> NIP. 19600103 198503 1003			
Program Learning	Program Learning Outcomes (PLO)					
	1. Able to apply basic science knowledge (mathematics, natural sciences) and other multidisciplinary disciplines which become the foundation for the field of Building Engineering Vocational Education in carrying out professional work in					

their respective fields (Knowledge and Understanding).

- 1.1. Able to show a good understanding and implement basic mathematical concepts to solve various problems in the field of building engineering.
- 1.2. Have a high understanding and can implement basic concepts of physics and chemistry (natural sciences) in the field of building engineering.
- 1.3. Have a high understanding and can implement the basic principles of basic engineering (mechanics, engineering drawings, materials science) in the field of building engineering.
2. Able to think critically and creatively in identifying, formulating, problem solving, evaluating various problems in the field of Building Engineering Vocational Education with the most appropriate and effective scientific methods (Engineering analysis, investigations and assessment).
 - 2.1. Able to identify various technical problems in the field of building engineering
 - 2.2. Able to analyze various technical problems in the field of building engineering
 - 2.3. Able to evaluate various technical problems in the building sector
 - 2.4. Able to communicate Engineering Analysis, Investigation and Assessment materials to students / training.
3. Have a reliable ability in designing, implementing and supervising building engineering works (Engineering design).
 - 3.1. Able to realize work drawings in collaboration with various related parties.
 - 3.2. Able to manage building engineering work by paying attention to environmental, social, health and safety aspects.
 - 3.3. Able to supervise the implementation of building engineering work
 - 3.4. Able to communicate Engineering Design material to students.
4. Have a reliable ability to design, implement and evaluate the learning process in Building Engineering Vocational Education (Education design).
 - 4.1. Able to design curriculum and learning process in the field of building engineering.
 - 4.2. Able to implement, control, evaluate and improve the quality of the learning process
 - 4.3. Able to develop effective, efficient, and attractive learning media.
5. Having the ability to adapt and innovate to the development of science and technology and implement it into educational goals and professional work by considering possible non-technical risks (Engineering practice).

- 5.1. Able to innovate and develop 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. Having social and managerial competence, working together, communicating effectively, having an entrepreneurial character, having an environmental perspective and being aware of the importance of lifelong learning (transferable and soft skills).
- 6.1. Able to work creatively, innovatively, collaboratively, be careful, responsible, responsive to environmental changes.
- 6.2. Have curiosity, think critically, are open-minded, and objective.
- 6.3. Able to communicate effectively and work together in a team work.

Course Learning Outcomes

Course Learning Outcomes (CLO)

CLO	CPL
1. Understanding in general about the utility system inside and outside the building according to standards	1.1,2.1,3.1
2. Able to understand, identify, and describe the vertical transportation system	1.3,3.1
3. Able to understand, identify, and describe the horizontal transportation system	1.3,3.1
4. Analyze simply the needs of air conditioners, lifts, and escalators	1.1,1.2,2.1,2.2
5. Understand, identify and describe lightning protection systems	1.2,1.3, 3.1,
6. Identify, design building access and environmental access for fire hazard prevention	1.3,2.1,3.1
7. Understand identifying, practically counting, and describing the water supply system	1.1,1.2,1.3,2.1
8. Understand, identify, practically calculate and describe the hot water supply system	1.1,1.2,1.3,2.1
9. Understand, identify, practically calculate, and describe the sewerage system of the building	1.1,1.2,1.3,2.1
10. Understand, identify, practically calculate, and describe the rainwater disposal system in buildings and sites	1.1,1.2,1.3,2.1

Course Description	The Utilities course provides knowledge about the functions, benefits, and principles of choosing a building utility system; Basics of utility planning & technical requirements, as well as calculating in a simple way the need for utilities inside and outside the building, namely: Air conditioning system; Vertical and horizontal transportation; Lightning protection system; Protection of buildings against fire; Provision of clean and hot water, disposal of dirty water and rainwater.	
Literature	Main (RU):	
	<ol style="list-style-type: none"> 1. Dwi Tanggoro. 2009. Building Utilities. Jakarta: UI Press 2. Hartono Poerbo, 1995. Building Utilities 	
	Supporting (RP)	
	<ol style="list-style-type: none"> 1. Paulus Agus Susanto. 2005. Provision of Clean Water in Buildings. Univ. Parahyangan 2. Paulus Agus Susanto. 2005. Disposal of Dirty Water from Buildings. Univ. Parahyangan 3. Paulus Agus Susanto. 2005. Provision of Hot Water in Buildings. Univ. Parahyangan 4. Paulus Agus Susanto. 2005. Rainwater Drainage from Buildings and Sites. Univ. Parahyangan 5. Paulus Agus Susanto. 2005. Building Protection Against Fire. Univ. Parahyangan 6. SNI 03-7017.2-2004, Procedure for Lift Installation 7. SNI 03-6572-2001, Procedure for Designing Ventilation and Air Conditioning Systems 8. SNI 03-3990-1995, Installation Procedure for Lightning Protection 9. SNI 03-1735-2000, Planning Procedures for Building Access and Environmental Access for Fire Hazard Prevention 10. SNI 03-1746-2000, Procedure for Planning and Installing Rescue Exit Means against Fire Hazards 11. SNI 03-3989-2000, Procedure for Planning and Installation of Automatic Sprinkler Systems 12. SNI 03-6573-2000. Procedures for Designing Vertical Transportation Systems in Buildings 13. SNI 03-6248-2000. General Conditions of Construction of an Electric Powered Escalator 	
Teaching Media	Software:	Hardware:
	Office Word and Excel	Computers, LCD projectors and whiteboards and peripherals
Team Teaching	Yuwalitas Gusmareta, S.Pd, M.Pd.T, Nidal Zuwida, S.Pd, M.Pd.T	
Assessment	Mid-Term Exam, Final Exam, Independent & Group Assignments, Group Presentations	
Prerequisite	Nothing	

TEACHING MATERIALS

Week	Expected Competency	Study Materials	Teaching Methods and Strategies	Assignments	Assessment Criteria / Indicators	Reference
1-2	CLO -1 (PLO - 1.1.2.1,3.1) Students understand in general about the utility system inside and outside the building according to air standards	Air conditioning design 1. Functions and benefits 2. Types 3. Installation and workings of each type of air conditioner	Material explanation Question and answer Discussion	1. Make a summary and description of the material presented in the resume book	Able to understand in general about the utility system inside and outside the building according to air standards	RU-1, RU-2, RP-2, RP-7
3-4	CLO -2 (PLO - 1.3,3.1) Students understand, identify, and describe the vertical transportation system in buildings	1. Functions, benefits, 2. Specifications, type 3. Installation and working of the vertical transportation system	Paper presentation Have a discussion	1. Make a summary and present it in front of the class 2. Quiz	Able to understand, identify, and describe the vertical transportation system	RU-1, RU-2, RP-2, RP-6
5	CLO -3 (PLO - 1.3,3.1) Students understand, identify, and describe the horizontal transportation system in buildings	1. Functions, benefits, 2. Specifications, type 3. Installation and working of the horizontal transportation system	Paper presentation Have a discussion	1. Make a summary and present it in front of the class 2. Quiz	Able to understand, identify, and describe the vertical transportation system	RU-1, RU-2, RP-12, RP-13

Week	Expected Competency	Study Materials	Teaching Methods and Strategies	Assignments	Assessment Criteria / Indicators	Reference
6-7	CLO -4 (PLO-1.1,1.2,2.1,2.2) Students simply analyze the needs of air conditioners, lifts, and escalators	Simple calculation of the need for air conditioning, elevator, and escalator	Have a discussion Work on assignments	Work on assignments	Able to simply analyze the needs of air conditioners, lifts, and escalators	RU-1, RU-2. RP-12, RP-13
8	Mid-Semester Evaluation through Mid-Semester Examination					
9	CLO -5 (PLO-1.2,1.3,3.1) Students understand, identify, and describe a lightning rod system	Lightning rod installation 1. Definition 2. Element / material 3. Construction	Paper presentation Have a discussion	Quiz	Be able to identify, and describe the lightning protection system	RU-1, RU-2 RP-8
10	CLO -6 (PLO-1.3,2.1,3.1) Students understand, identify, and design building access and environmental access for fire hazard prevention	Prevention and control of fire hazards in buildings and housing environments 1. Terms and definitions 2. The concept of protection against fire hazards 3. Environmental	Paper presentation Have a discussion	Quiz	Able to understand, identify, and design building access and environmental access for fire hazard prevention	RU-1, RU, RP-5, RP-9 RP-10, RP-11

Week	Expected Competency	Study Materials	Teaching Methods and Strategies	Assignments	Assessment Criteria / Indicators	Reference
		<p>arrangement for fire protection</p> <p>4. The principle of prevention and overcoming fire in buildings and settlements</p> <p>5. Terms, technical requirements and fire protection devices</p>				
11-12	<p>CLO -7 (PLO-1.1,1.2,1.3,2.1) Students understand identifying, practically counting, and describing the clean water supply system</p>	<p>Provision of clean water in buildings</p> <p>1. Clean water supply</p> <p>2. Clean Water Design</p> <p>3. Calculation of water requirements and tool capacity</p> <p>4. Clean water installation</p>	<p>Paper presentation</p> <p>Have a discussion</p> <p>Work on assignments</p>	<p>1. Make a summary and present it in front of the class</p> <p>2. Work on assignments</p>	<p>Capable of identifying, practically counting, and describing the water supply system</p>	<p>RU-1, RU-2 RP 1</p>
13	<p>CLO -8 (PLO-1.1,1.2,1.3,2.1) Students understand, identify, practically calculate, and describe</p>	<p>Provision of hot water in buildings</p> <p>1. Hot Water and Standard Temperature</p>	<p>Paper presentation</p> <p>Have a discussion</p> <p>Work on assignments</p>	<p>1. Make a summary and present it in front of the class</p> <p>2. Work on assignments</p>	<p>Able to understand, identify, calculate practically, and describe the hot</p>	<p>RU-1, RU-2, RP 3</p>

Week	Expected Competency	Study Materials	Teaching Methods and Strategies	Assignments	Assessment Criteria / Indicators	Reference
	the hot water supply system	2. Hot Water Supply System 3. Heating tank construction			water supply system	
14	CLO -9 (PLO-1.1,1.2,1.3,2.1) Students understand, identify, calculate practically, and describe the sewerage system of the building	Sewage disposal of the building Discharge of dirty water from buildings 1. Exhaust System Classification 2. Effects of Siphons and Ven Pipes on Systems 3. Part2 Exhaust System 4. Installation	Paper presentation Have a discussion Work on assignments	1. Make a summary and present it in front of the class 2. Work on assignments	Able to understand, identify, calculate practically, and describe the sewerage system of the building	RU-1, RU-2 RP-2
15	CLO -10 (PLO-1.1,1.2,1.3,2.1) Students understand, identify, calculate practically, and describe the rainwater disposal system in the building and site	Drainage of rainwater from buildings & sites 1. Rainwater and Control in Buildings 2. Drainage site 3. Simple Calculations	Paper presentation Have a discussion Work on assignments	1. Make a summary and present it in front of the class 2. Work on assignments	Able to understand, identify, calculate practically, and describe the rainwater disposal system in the building and site	RU-1, RU-2 RP 4

CLO 8	Uas	5	x	x		x														
	Presentation	2.5		x		x														
CLO 9	Uas	5	x	x		x														
	Presentation	2.5		x		x														
	Duty	5	x		x	x														
CLO 10	Uas	5	x	x		x														
	Presentation	2.5		x		x														
TOTAL		100																		

Assessment Components

Midterm exam	: 20%
Final exams	: 20%
Task (QUIZ)	: 20%
Papers and Presentations	: 30%
<u>Presence</u>	: 10%
Total	: 100%

Rating Level Description

	Excellent	Good	Satisfy	Fail
Description	80-100	70-79	51-69	> 50
Formulations	-	-	-	-
Calculation	-	-	-	-
Analysis	90-100	70-89	51-69	> 50

Assessment System

Score	Grade Letter	Grade Point	Notes	Score	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				



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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MID-SEMESTER EXAM

Course : Building Utilities
Code / Credits :
Type of Exam : *Close Book*
Lecturer : Yuwalitas Gusmareta, S.Pd., M.Pd.T
Nidal Zuwida, S.Pd., M.Pd.T
Time Allocation : 60 Minutes
Maximum grade : 20%

1	With regard to operating and maintenance factors for air conditioning, the indicators that need to be considered are: a. Simple construction b. Durable c. Easy to repair in case of damage d. Easy to reach and maintain e. Can serve changing operating conditions f. High efficiency Explain each of the factors above!	
2	A person who has a room measuring 8 x 7 m and a ceiling height of 3 m, installs 2 pieces of AC with a capacity of 1 PK. Analyze whether the correct capacity of the AC installed by the person?	
3	Factors that influence the consideration of choosing a lift design system are: Number of floors served a. Floor to floor distance b. The number of occupants per floor c. Building location d. Special use of elevators in buildings e. Special floors f. Building function Explain each of the above factors related to the design of a building lift (the focus of the explanation is oriented to the design of a passenger elevator)!	
4	Calculate the round trip time of the lift (round trip time) from the approach of a 23-storey hotel building with floor height = 3.50 m and the selected lift capacity = 10 people / lift	
5	Explain how the escalator works / operates!	



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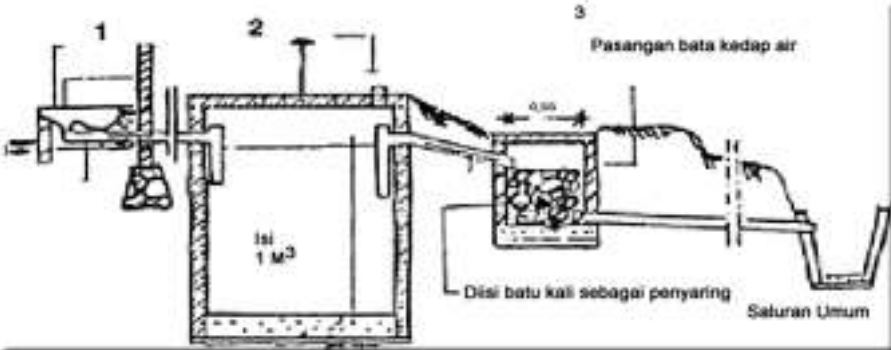
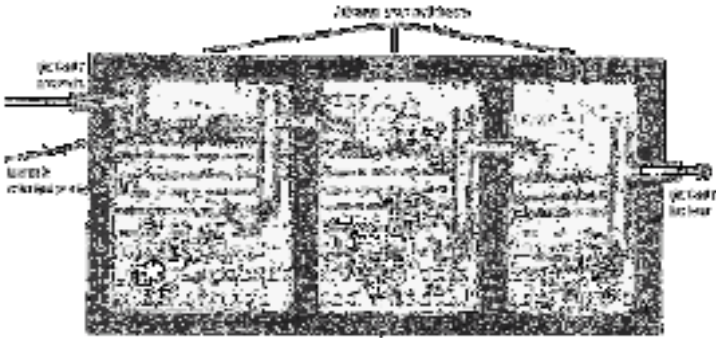
FINAL EXAM

Course : Building Utilities
 Code / Credits :
 Type of Exam : *Close Book*
 Lecturer : Yuwalitas Gusmareta, S.Pd., M.Pd.T
 Nidal Zuwida, S.Pd., M.Pd.T
 Time Allocation : 60 Minutes
 Maximum Grade : 20%

No.	Question	Weight
1	Give an explanation from the image below regarding the lightning protection system! <div style="text-align: center;"> </div>	
2	Describe the building's hot water supply system using a central installation heating system	
3	Write down the formula needed to calculate the need for clean water in buildings	
4	Describe the process of removing dirty water from the image below: <div style="text-align: center;"> </div>	
5	Explain and describe the efforts to drain rainwater on the lawn both coming from the roof of the building and from inside the building!	

ASSIGNMENT 3

Courses : Building Utilities
 Code / Credits : OK2,61,5301
 Type of Exam : *Close Book*
 Lecturer : Yuwalitas Gusmareta, S.Pd., M.Pd.T
 Nidal Zuwida, S.Pd., M.Pd.T
 Time Allocation : 30 minutes
 Maximum Grade : 5%

Group	Questions	Max value
1	Describe the process of removing dirty water from the image below 	
2	Calculate the size of each sump chamber from the image below 	
3	Design the size of a septic tank and infiltration well for a house that has 5 bedrooms, 10 0 people, sandy clay conditions and a groundwater level of 2.8 m below the ground level. Also design the fields and infiltration pipes needed for the dirty water from the septic tank treatment. Additional data: the time required for water to turrun its surface 2.5 cm is 10 minutes	



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**COURSE ASSIGNMENT
(QUIZ)**

Course : Building Utilities
Code / Credits :
Type of Assignment : Group discussion
Lecturer : Yuwalitas Gusmareta, S.Pd., M.Pd.T
Nidal Zuwida, S.Pd., M.Pd.T
Time Allocation : 30 minutes
Weighted Value : 20%

Group	Questions	Max value
CLO-1	Make a paper with the subject "Air Conditioning Systems"	2.0%
CLO-2	Make a paper with the subject "Vertical Transportation Systems"	2.0%
CLO -3	Make a paper with the subject "Horizontal Transportation System (Escalator)"	2.0%
CLO -5	Make a paper with the subject "Lightning Protection System"	2.0%
CLO -6	Make a paper with the subject "Procedures for Preventing and Overcoming Fire Hazards in Buildings and Housing Environments"	2.0%
CLO -7	Make a paper with the subject "clean water supply systems in high-rise buildings"	2.5%
CLO -8	Make a paper with the subject "building hot water supply system"	2.5%
CLO -9	Make a paper with the subject "sewerage system building"	2.5%
CLO -10	Make a paper with the subject "rainwater disposal systems in buildings and sites"	2.5%