TEACHING PLAN

BACHELOR OF EDUCATION IN BUILDING ENGINEERING (BE-BE) STUDY PROGRAM

DEPARTMENT OF CIVIL ENGINEERING, FACULTY OF ENGINEERING, UNIVERSITAS NEGERI PADANG

COURSE	CODE	COURSE CLUSTER	CREDITS		SEM	VERSION
			Theory	Practice		
Wooden Structure	**SIP1.61.4304**		**2**		**4**	**1**
Lecturer in Charge	**Annisa Prita Melinda, S.T., M.T.**					

Remarks	Dean of Faculty of Engineering	Head of Civil Engineering Department	Coordinator of BEVE
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Program Learning Outcomes

Program Learning Outcomes (PLO)

By considering input from all stake holders and the minimum requirements set by ASIIN, the PLO's that must be possessed by graduates from the Bachelor of Education in Building Engineering Study Program are determined as follows:

1. Master *basic knowledge of science* (mathematics, natural sciences) and other scientific disciplines that form the basis of building engineering vocational education field for carrying out professional work *(Knowledge and Understanding).*
   1.1. Able to implement basic concepts of mathematics and physics to master subjects matter in the field of building engineering vocational education.
   1.2. Mastering Statics, Mechanics, Statistics, Technology Materials, and Engineering Drawings as the basic

knowledge in the field of building engineering vocational education.

2. Able to identify, formulate, solve, and evaluate various technical problems of buildings as the basic ability for teaching in the field of building engineering vocational education *(Engineering analysis, investigation and assessment)* .
   - 2.1. Able to identify, formulate, solve, and evaluate technical problems in the field of geotechnical and transportation as the basic ability for teaching in the field of building engineering vocational education.
   - 2.2. Able to identify, formulate, solve, and evaluate technical problems in the field of structure and construction management as the basic ability for teaching in the field of building engineering vocational education.
   - 2.3. Able to identify, formulate, solve, and evaluate technical problems in the field of hydrology as the basic ability for teaching in the field of building engineering vocational education.
3. Possess the ability to design building by taking into account environmental, social, health and work safety issues as the basis for teaching in the field of building engineering vocational education *(Engineering design)*.
   - 3.1. Able to make design programming by taking into account environmental, social, health and work safety issues, in cooperation with various party related.
   - 3.2. Able to analyze the design by taking into account environmental, social, health and work safety aspects.
   - 3.3. Able to produce design by taking into account environmental, social, health and work safety aspects.
4. Possess social, managerial, team work, and effective communication competencies, entrepreneurial character, environmental insight and life-long learning habits. *(Transferable and soft skills)*.
   - 4.1. Possess religious character implemented in personal and professional activities.
   - 4.2. Possess the spirit of nationalism, social sensitivity and environmental insight
   - 4.3. Able to communicate effectively and work in a team.
   - 4.4. Able to transfer science and technology to the community to improve the quality of life
   - 4.5. Possess entrepreneurial character
5. Possess the ability to innovate and adapt to the development of science and technology, and implement it into the learning process of building engineering vocational education field by taking into account non-technical risks that may occur (ethical, ecological, commercial, and industrial impact) *(Engineering practice)*.
   - 5.1. Able to innovate and use information technology (software) in the field of building engineering

vocational education by taking into account the ethical, ecological, commercial and industrial impact.

5.2. Able to use information technology-based equipment (hardware) in field of building engineering vocational education.

6. Possess a good ability to design, implement and evaluate the learning process in the field of building engineering vocational education *(Educational design).*

6.1. Able to design curriculum and learning process of building engineering vocational education.

6.2. Able to implement, control, evaluate and improve the quality of learning process through research in the field of building engineering vocational education.

6.3. Able to develop an effective, efficient, and attractive learning media in the field of building engineering vocational education.

Course Learning Outcomes

Course Learning Outcomes (CLO): Concrete Technology

Course LO	PLO
1. Able to explain the types of wood and their use	1.2, 2.4, 4.2, 4.3
2. Able to describes the properties of wood	1.2, 2.4, 4.2, 4.3
3. Able to explain the wood structure planning regulations (SNI 7973-2013)	1.1, 1.3, 2.4, 4.2, 4.3
4. Able to design capacity of tensile rods and compressive rods on wooden structures	1.1, 1.3, 2.1, 2.2, 2.3, 2.4
5. Able to design the bending rods on wooden structures	1.1, 1.3, 2.1, 2.2, 2.3, 2.4
6. Able to describe the connection types and the name of connection	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2
7. Able to plan wooden joints	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2

Course Description	This course provides knowledge about the types, classes, properties of wood and planning wooden structural elements such as trusses, columns, beams and joints using planning planning principles in accordance with SNI 7973-2013 and other appropriate regulations.	
Literature	**Main:**	
	1. SNI 7973-2013. Spesifikasi desain untuk konstruksi kayu. Badan Standarisasi Nasional. 2. Juniman Silalahi, Annisa Prita Melinda. Struktur Kayu untuk Bangunan Gedung. UNP Compressive. 2018.	
	Supporting:	
	1. Wood Handbook, Stanford Publisher. 2. American Institute of Timber Construction (AITC). 2005. *Timber Construction Manual*, 5th ed., John Wiley & Sons Inc., Hoboken, NJ. 3. American Society of Civil Engineering, 1996. *Mechanical Connections in Wood Structures*, ASCE No. 84, 345 East 47 th Street New York. 4. ASD/LRFD,McGraw-Hill, 2007,*Design of Wood Structures*Sixth Edition, Donald E. Breyer, P.E.	
Teaching Media	**Software:**	**Hardware:**
	Office Word, Excell dan Power Point.	Komputer, LCD Projector dan Papan tulis dan perangkatnya
Team Teaching	Juniman Silalahi, S.Pd., M.Pd.T., Annisa Prita Melinda, S.T., M.T.	
Assessment	Mid-Semester Exam, Final Exam, Individual and Group Assignment, Group Presentation	
Assessment Prerequisite	Statika	

TEACHING MATERIAL

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
(1)	**CPMK-1:** Able to explain the types of wood and their use	1. Wood and its uses 2. The definition of wood material	Lectures and discussion.	Make presentation material in power point about the meaning of wood and its classification	Able to explain the meaning of wood and its classification.	M1 dan M2
(2)	**CPMK-1:** Able to explain the types of wood and their use	1. Timber utilization (advantages and disadvantages compared to other	Lectures and discussion.	Make a presentation material in a power point about the use of wood and wood types	Able to explain wood utilization and wood types	M1 dan M2

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
		materials) 2. Types of wood				
(3)	**CPMK-2:** Able to describes the properties of wood	1. The cross-sectional structure of wood 1.1. Wooden cross section 1.2. Bracelet year 1.3. Wooden cup 1.4. Wood properties 1.3.1. water content 1.3.2. Density and density 1.3.3. Properties of wood due to temperature 1.3.4. Acoustic properties of wood 1.3.5. The electrical properties of wood 1.5. Mechanical properties of wood 1.5.1. Comcompressiveive strength 1.5.2. Tensile Strength 1.5.3. Flexural strength 1.7. Wood quality 1.8. Wood Preservation Method	Lectures and discussion.	Make a summary and description of the material presented in the notebook	Able to explain the cross-sectional structure of wood, wood defects, wood properties and wood preservation methods.	M1, M2 dan S1

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
(4)	**CPMK-3:** Able to explain the wood structure planning regulations (SNI 7973-2013)	Timber Structure Planning Regulation (SNI 7973-2013) 1.1. General objectives of SNI 7973-2013 1.2. Terms used 1.3. Other regulations used / supported 1.4. Loading and loading combination 1.5. Resistance and resistance factor	Lectures and discussion.	Make a summary and description of the material presented in the notebook	Able to explain timber structure planning regulations and wooden structure design concepts	M1, M2, dan S4
(5)	**CPMK-4:** Able to design capacity of tensile rods and compressive rods on wooden structures	Tensile strength design 1.1. Understanding tensile rod 1.2. Tensile rod characteristics 1.3. Factorized tensile force 1.4. Resistance Tensile parallel and perpendicular to the fiber 1.5. Tensile rod planning calculations	Lectures and discussion. Exercises	Calculating the tensile resistance of the tensile rod factor	Able to calculate explain the concept of tensile resistance design of wood structures	M1, M2, S2, dan S3
(6)	**CPMK-4:** Able to design capacity of tensile rods and compressive rods on wooden structures	Compressive rod planning 1.1. Compressive rod planning 1.2. Definition of compressive rod 1.3. Compressive rod	Lectures and discussion. Exercises	Calculating the compressive resistance of the compressive rod factor	Able to calculate explaining the design concept of the comcompressiveive resistance of wood structures	M1, M2, S2, dan S3

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
		structural elements 1.4. Factorized comcompressiveive force 1.5. Compressive rod planning calculations				
(7)	**CPMK-4:** Able to design capacity of tensile rods and compressive rods on wooden structures	Compressive rod planning 1.1. Column as a press rod 1.2. Column slenderness 1.3. Column with massive wood 1.4. Columns with spaces 1.5. Column planning calculations	Lectures and discussion. Exercises	Calculating the comcompressiveive resistance of the column planning factor	Able to design compressive columns	M1, M2, S2, dan S3
(8)	**Mid-Semester Exam**					
(9)	**CPMK-5:** Able to design the bending rods on wooden structures	Design of bending rods in wooden structures 1.1. Definition of flexible rod 1.2. Beams as flexible rods 1.3. Notch and form factor	Lectures and discussion. Exercises	Calculating the flexural strength and bending design of the rods	Able to calculate flexural strength in wooden structures	M1, M2, S2, dan S3
(10)	**CPMK-5:** Able to design the bending rods on wooden structures	Design of bending rods in wooden structures 1.1. The bending resistance of composite beams 1.2. The bending resistance of arranged beams. 1.3. Calculation of bending rod planning	Lectures and discussion. Exercises	Calculating the flexural strength and planning of the bending beam of a composite beam	Able to calculate flexural strength in composite wood structure	M1, M2, S2, dan S3

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
(11)	**CPMK-6:** Able to describe the connection types and the name of connection	1 Types of connection 2 Joints on structures 3 Types of joints and supports 4 Types of fasteners and connecting tools	Lectures and discussion.	Make a summary and description of the material presented in the notebook	Be able to explain the types of joints in wooden structures	M1, M2, S2, dan S3
(12)	**CPMK-7:** Able to plan wooden joints	Design of wooden joints with nails	Lectures and discussion. Exercises	Design a wooden connection with nails	Able to calculate the resistance of wooden joints using nails	M1, M2, S2, dan S3
(13)	**CPMK-7:** Able to plan wooden joints	Design of wooden joints with bolts	Lectures and discussion. Exercises	Design a wooden connection with a bolt	Able to calculate the resistance of wooden joints using bolts	M1, M2, S2, dan S3
(14)	**CPMK-7:** Able to plan wooden joints	Design moment joints in wood	Lectures and discussion. Exercises	Design a moment connection in wood	Able to calculate the moment connection resistance in wood	M1, M2, S2, dan S3
(15)	**CPMK-7:** Able to plan wooden joints	Design of tooth joints in wood	Lectures and discussion. Exercises	Design joints in wood	Able to calculate the resistance of joints on wood	M1, M2, S2, dan S3
(16)	**Final Exam**					

Notes:

Correlation between CLO, PLO and Assessment Methods

	Assesment	Weight (%)	CPL-1			CPL-2				CPL-3				CPL-4			CPL-5			CPL-6		
			1	2	3	1	2	3	4	1	2	3	4	1	2	3	1	2	3	1	2	3
CPMK 1	Tugas dan Presentasi	20		V					V						V	V						
CPMK 2				V					V						V	V						
CPMK 3			V		V				V						V	V						

CPMK 4	UTS 1 dan UTS 2	35	V		V	V	V	V	V														
CPMK 5	UAS 1	17,5	V		V	V	V	V	V														
CPMK 6	UAS 2	17,5	V		V	V	V	V	V	V	V												
CPMK 7			V		V	V	V	V	V	V	V												
Kehadiran		10																					
TOTAL		100																					

Assesment Components

Mid-Semester Exam : 35%

Final Exam : 35%

Assignment : 20%

Reports : 10%

Total : 100 %

Description of Assessment Level

	Excellent	**Good**	**Satisfy**	**Fail**
Description				
Formulation				
Calculation				
Analysis				

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				

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MID-SEMESTER EXAM

Course : Wooden Structure
Code / Credits : SIP1.61.4304
Type of Exam : Open SNI
Lecturer : Annisa Prita Melinda
Time Allocation : 70 minutes
Maximum Grade : 100

No	Question	Grade
1	If the tensile rod with the quality code E22 receives a tensile force of 8 kN. Plan the size of the tensile rod. (Assumption: dry air conditions and normal temperature, a combination of loading 1.4D)	40
2	A wooden column has a height of 5 m with the type of wood with the quality code E22 With the placement of the end of the clamp-joint column experiences an ultimate comcompressiveive force of 40 kN, wood dimensions 80mm x 100mm, determin if the wood is strong enough to withstand the working comcompressiveive for (Assumption: no lateral bracing, dry conditions normal air and temperature, a combinati of loading 1,4D)	60

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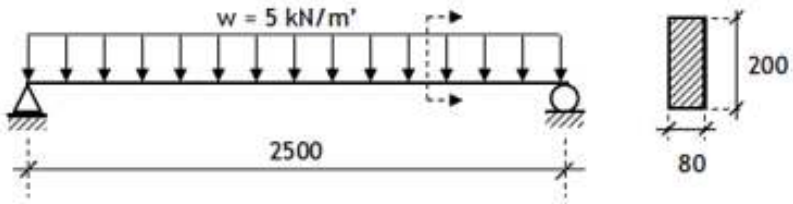
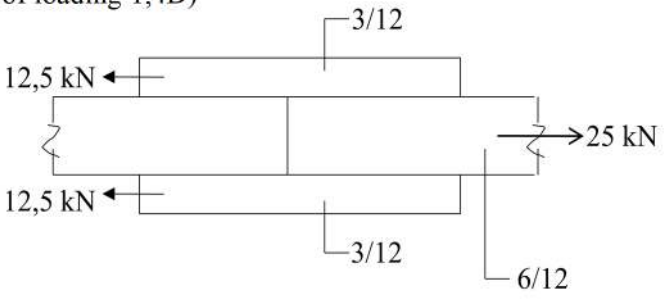
FINAL EXAM

Course	: Wooden Structure
Code / Credits	: SIP1.61.4304
Type of Exam	: Open SNI
Lecturer	: Annisa Prita Melinda
Time Allocation	: 90 minutes
Maximum Grade	: 100

No	Question	Grade
1	Consider the following simple block image:  The continuous beam above, receives the ultimate dead load that comes from the dead load weight (including the beam's own weight). The initial plan was to use blocks of size 80/200 with quality E 22. Correction factor CM = Ct = CL = CF = 1. Other unknown factors were determined based on the provisions contained in SNI. Based on the data above, indicate whether the beam meets the moment resistance requirements.	50
2	Plan a wooden joint like the image below using a nail joint. The wood has a specific gravity of 0.7. (Combination of loading 1,4D) 	50