



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

COURSE	CODE	COURSE CLUSTER	CREDITS		SEM	VERSI ON
			Theo ry	Prac tice		
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	
	<u>Dr. Fahmi Rizal, M.Pd., M.T</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 Outcomes	Program Learning Outcomes (PLO)					
	<p>At the time of graduation, students from Building Engineering Vocational Education study program are expected to have:</p> <ol style="list-style-type: none"> 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). <ol style="list-style-type: none"> 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 education 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 works.
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).

	<p>6.1. Able to work creatively, innovatively, collaboratively, carefully, responsibly, and responsive to environmental change.</p> <p>6.2. Have curiosity and critical thinking, open-minded, and objective.</p> <p>6.3. Able to communicate effectively, and to collaborate in a team work.</p>																
Course Learning Outcomes	Course Learning Outcomes (CLO): Concrete Technology																
	<table border="1"> <thead> <tr> <th>Course LO</th> <th>PLO</th> </tr> </thead> <tbody> <tr> <td>1. Able to explain the types of wood and their use</td> <td>1.2, 2.4, 6.2, 6.3</td> </tr> <tr> <td>2. Able to describes the properties of wood</td> <td>1.2, 2.4, 6.2, 6.3</td> </tr> <tr> <td>3. Able to explain the wood structure planning regulations (SNI 7973-2013)</td> <td>1.1, 1.3, 2.4, 6.2, 6.3</td> </tr> <tr> <td>4. Able to design capacity of tensile rods and compressive rods on wooden structures</td> <td>1.1, 1.3, 2.1, 2.2, 2.3, 2.4</td> </tr> <tr> <td>5. Able to design the bending rods on wooden structures</td> <td>1.1, 1.3, 2.1, 2.2, 2.3, 2.4</td> </tr> <tr> <td>6. Able to describe the connection types and the name of connection</td> <td>1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2</td> </tr> <tr> <td>7. Able to plan wooden joints</td> <td>1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2</td> </tr> </tbody> </table>	Course LO	PLO	1. Able to explain the types of wood and their use	1.2, 2.4, 6.2, 6.3	2. Able to describes the properties of wood	1.2, 2.4, 6.2, 6.3	3. Able to explain the wood structure planning regulations (SNI 7973-2013)	1.1, 1.3, 2.4, 6.2, 6.3	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
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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 principles in accordance with SNI 7973-2013 and other appropriate regulations.																
Literature	Main:																
	<p>1. SNI 7973-2013. Spesifikasi desain untuk konstruksi kayu. Badan Standarisasi Nasional.</p> <p>2. Juniman Silalahi, Annisa Prita Melinda. Struktur Kayu untuk Bangunan Gedung. UNP Compressive. 2018.</p>																
	Supporting:																
	<p>1. Wood Handbook, Stanford Publisher.</p> <p>2. American Institute of Timber Construction (AITC). 2005. <i>Timber Construction Manual</i>, 5th ed., John Wiley & Sons Inc., Hoboken, NJ.</p> <p>3. American Society of Civil Engineering, 1996. <i>Mechanical Connections in Wood Structures</i>, ASCE No. 84, 345 East 47 th Street New York.</p> <p>4. ASD/LRFD, McGraw-Hill, 2007, <i>Design of Wood Structures</i> Sixth Edition, Donald E. Breyer, P.E.</p>																
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 materials) 2. Types of wood	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
(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	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
		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. Compressive strength 1.5.2. Tensile Strength 1.5.3. Flexural strength 1.7. Wood quality 1.8. Wood Preservation Method				
(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	Tensile strength design 1.1. Understanding tensile	Lectures and discussion. Exercises	Calculating the tensile resistance of the tensile rod factor	Able to calculate explain the concept of tensile	M1, M2, S2, dan S3

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
	compressive rods on wooden structures	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			resistance design of wood structures	
(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 structural elements 1.4. Factorized compressive force 1.5. Compressive rod planning calculations	Lectures and discussion. Exercises	Calculating the compressive resistance of the compressive rod factor	Able to calculate explaining the design concept of the compressive resistance of wood structures	M1, M2, S2, dan S3
(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 compressive resistance of the column planning factor	Able to design compressive columns	M1, M2, S2, dan S3
(8)	Mid-Semester Exam					

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
(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
(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	M1, M2, S2, dan S3

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assignment	Assessment Criteria/ Indicator	Reference
					resistance in wood	
(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		√					√													√	√	
CPMK 2				√					√														√	√
CPMK 3			√		√					√													√	√
CPMK 4	UTS 1 dan UTS 2	35	√		√	√	√	√	√															
CPMK 5	UAS 1	17,5	√		√	√	√	√	√															
CPMK 6	UAS 2	17,5	√		√	√	√	√	√	√	√													
CPMK 7			√		√	√	√	√	√	√	√	√												
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				



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS NEGERI PADANG
JURUSAN TEKNIK BANGUNAN

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Telp. (0751) 7055644, Fax (0751) 7055628, website: www.ft.unp.ac.id, e-mail: info@ft.unp.ac.id

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 compressive force of 40 kN, wood dimensions 80mm x 100mm, determine if the wood is strong enough to withstand the working compressive force for (Assumption: no lateral bracing, dry conditions normal air and temperature, a combination of loading 1.4D)	60



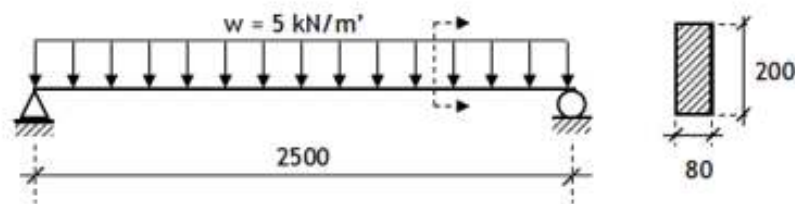
KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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FINAL EXAM

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:	50



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 $CM = C_t = C_L = C_F = 1$. 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.

2	Plan a wooden joint like the image below using a nail joint. The wood has a specific gravity of 0.7.	50
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(Combination of loading 1,4D)

