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		
Concrete Structure			**3**			
Lecturer in Charge	**Dr.Eng Eka Juliafad** **Dr.Eng Prima Yane Putri** **Drs.Juniman Silalahi MPd** **Annisa Prita Melinda ST.,MT**		**Lecturer in Charge**			

Remarks	**Dean of Faculty of Engineering**	**Head of Civil Engineering Department**	**Kord. Prodi S1 Pendidikan Teknik angunan**
	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)**

By considering input from all stake holders and the minimum requirements set by ASIIN, the PLOs 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 (CLO): Concrete Structure

<table>
<tr><td>Course Learning Outcomes</td><td>
<table>
<tr><th>Course LO (CLO)</th><th>PLO</th></tr>
<tr><td>1. Able to understand the basics concepts of reinforced concrete.</td><td>1.1, 1.2, 2.1</td></tr>
<tr><td>2. Able to analysis and design concrete structure</td><td>1.1, 1.2, 1.3, 2.2, 2.3</td></tr>
<tr><td>3. Able to analysis and design flexure of single reinforced beam, flexure of doubly reinforced beam, continues beam and shear beam.</td><td>1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1</td></tr>
<tr><td>4. Able to analysis and design flexural of T Beam or flange section</td><td>1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1</td></tr>
<tr><td>5. Able to analysis and design One Way slab</td><td>1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1</td></tr>
<tr><td>6. Able to analysis and design Two Way slab</td><td>1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1,</td></tr>
<tr><td>7. Able to analysis and design column (combined axial load and bending).</td><td>1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1</td></tr>
<tr><td>8. Able to analysis and design shallow foundation (spread footing)</td><td>1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1, 5.3</td></tr>
</table>
</td></tr>
<tr><td>Course Description</td><td>This course studies the design and analysis of structural elements made of reinforced concrete in accordance with SNI-03-2847-2019 in order to meet safety, ductility, functional and economic requirements.</td></tr>
<tr><td>Literature</td><td>Main
1. SNI-03-2847-2019
2. Wang,CK et al
3. Juliafad.E. Perencanaan Rangka Beton Bertulang
Supporitng
1. Juniman Silalahi, 2009, Struktur Beton Bertulang Untuk Bangunan Gedung, Penerbit Sukabina Press, Padang.
2. Dipohusodo Istimawan, 1994, Struktur Beton Bertulang, Berdasarkan SK SNI T15-1991-03, PT. Gramedia Pustaka Utama, Jakarta.
3. Kusuma H. Gideon, dkk, 1995, Dasar-dasar Perencanaan Beton Bertulang, Berdasarkan SK SNI T-15-1991-03, Penerbit Erlangga, Jakarta.
4. Wahyudi L, dan Rahim A.Syahril, 1997, Struktur Beton Bertulang Standar Baru SNI T-15-1991-03, PT. Gramedia Pustaka Utama, Jakarta.
5. Juliafad, Eka, Iskandar G. Rani, and Fitra Rifwan. "Concreting Workmanship in Indonesia Study Case: Padang City, West Sumatra, Indonesia." International Journal on Advanced Science, Engineering and Information Technology 9.1 (2019): 300-306.</td></tr>
<tr><td>Teaching Media</td><td>Software: Microsoft Excel
Hardware: Computer, LCD Projector and White Board</td></tr>
<tr><td>Team Teaching</td><td></td></tr>
<tr><td>Assessment</td><td>Mid Semester Exam, Final Exam, Individual and Group Assignment, Group Presentation</td></tr>
<tr><td>Matakuliah Syarat</td><td>NA</td></tr>
</table>

TEACHING MATERIAL

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assigment	Assesment Criteria/Indicator	Refrence
(1)	**CLO 1: [PLO-1.2, 1.3)** Able to understand the basics concepts of reinforced concrete	1. Introduction of reinforced concrete buildings and their parts 2. Reinforced concrete design concept 3. Material of Reinforced concrete 4. Types of loading on structures	Explanation of material **[1x90']** Question and answer **[2x10']** Case study discussion **[2x25]**	Make a summary and description of the material presented in the resume book and discuss case studies related to reinforced concrete and make a summary report	1. Accuracy in describing reinforced concrete buildings and the structure elements. 2. Accuracy in explaining the design concept of reinforced concrete buildings 3. Accuracy in explaining the properties and behavior of reinforced concrete materials 4. Accuracy in explaining the types of loading on the building / structure	Main 1,2,3
(2)	**CLO-2: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3) Able to analysis and design concrete structure	1. Reinforced concrete planning 2. Reinforced concrete analysis method 3. The mistake on reinforced concrete planning	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. The accuracy of using reinforced concrete planning concepts. 2. Accuracy in performing reinforced concrete analysis. 3. Accuracy in explaining the consequences of errors in reinforced concrete planning.	
(3)	**CLO-3.1: [PLO-**11.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design flexure of single reinforced beam	1. The principle of design and analysis of single reinforced rectangular beams 2. Design of single reinforcing rectangular beams based on loading	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in calculating the load acting on a single reinforcing square beam.	

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assigment	Assesment Criteria/Indicator	Refrence
		3. Analyze the results of reinforcing rectangular beams that are concerned with the design concept of reinforced concrete. 4. Design and analysis of single reinforced rectangular beams in accordance with the loading and design concept of reinforced concrete. 5. Design and analyze rectangular beam using software			2. Accuracy in planning a single reinforcing square beam. 3. Accuracy of analysis results in designing single reinforcing square beams 4. Accuracy in implementing single reinforcing square beam planning on simple portals. 5. Accuracy in using software commands.	
(4)	**CLO-3.2: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design flexure of doubly reinforced beam	1. The principle of design and analysis of double reinforced rectangular beams 2. Design of double reinforcement beams based on loading 3. Analyze the results of the design double reinforcement rectangular beam by taking into account the design concept of reinforced concrete. 4. Design and analysis of reinforced rectangular beams in accordance with the loading and design concept of reinforced concrete. 5. Design and analyze rectangular beam using software	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in calculating the load acting on the double reinforcing square beam 2. Accuracy in planning double reinforcing square beams 3. Accuracy of analysis results in designing double reinforcing square beams 4. Accuracy in applying double-beam square beam planning on simple portals. 5. Accuracy in using software commands	

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assigment	Assesment Criteria/Indicator	Refrence
(5)	**CLO-3.3: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design shear in beam	1. Design principle and analysis of double reinforced square beam shear 2. Designing a square beam based on shear loading 3. Design and analysis of shear square beams in accordance with the loading and design concept of reinforced concrete. 4. Design and analyze rectangular beam using software	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. The accuracy in calculating the shear load acting on a square beam 2. Accuracy in planning shear on a square beam 3. Accuracy of analysis results and shear planning on square beams. 4. Accuracy in applying shear planning to square beams on simple portals. 5. Accuracy in using software commands	
(6)	**CLO-3.4: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design flexure reinforced of continues beam	1. The principle of design and analysis of continuous reinforced rectangular beams 2. Design of continuous reinforcing beam based on loading 3. Analyze the results of the continuous reinforced square beam design by taking into account the design concept of reinforced concrete. 4. Design and analysis of continuous reinforced rectangular beams in accordance with the loading and design concept of reinforced concrete.	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in calculating the load acting on a continuous square beam 2. Accuracy in planning continuous square beam. 3. Accuracy of continuous square beam planning analysis results. 4. Accuracy in implementing continuous square beam planning	

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assigment	Assesment Criteria/Indicator	Refrence
(7)	**CLO-4: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design flexural of T Beam or flange section	1. Concept planning and T-beam analysis. 2. Designing of T beam based on the acting moment on the beam. 3. Analyze the ability of reinforcement and T-beam dimensions to withstand the working moment.	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. The accuracy of the T-beam design and analysis concept 2. The accuracy and accuracy of T-beam planning. 3. The Accuracy of dimensional analysis and T-beam reinforcement.	
(8)	**Mid Semester Exam**					
(9)	**CLO-5: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design One Way slab	1. One Way Slab principle 2. Design and analyze one-way slab 3. Design and analyze one-way slab using software.	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in explaining the concept of one-way slab. 2. The accuracy and precision of the design and analysis of the one-way slab. 3. The accuracy of analysis and design one-way slab. 4. Accuracy of design results and one-way slab analysis using software	
(10)	**CLO-6.1: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design Two Way slab using direct design method	1. Two way slab principle with direct design method 2. Designing and analyzing two-way slab with the Direct Design Method.	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in explaining the two-way slab concept with direct design method. 2. The accuracy of the design and analysis of the two-way slab with the Direct Design Method. 3. Accuracy of design results and two-way	

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assigment	Assesment Criteria/Indicator	Refrence
					slab analysis using the Direct Design Method	
(11)	**CLO-6.2: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analysis and design Two Way slab using equivalent frame method	1. Two-way slab principle with the equivalent frame method 2. Design and analyze two-way slab with the equivalent frame method.	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy to explain the two-way slab concept with the equivalent frame method. 2. The accuracy of the design and analysis of the two-way slab using the equivalent frame method. 3. Accuracy of design results and two-way slab analysis using the equivalent frame method	
(12)	**CLO-7.1: [PLO-**1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1] Able to analyze and design short columns due to small eccentricity loads	1. Types of columns. 2. Types of column collapse 3. Short column concept. 4. Planning and dimensional analysis of short columns with small eccentricities 5. Planning and analysis of short column reinforcement with small eccentricity	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in explaining column types. 2. Accurately describe the types of column collapse. 3. Accuracy in explaining the concept of short column planning with little eccentricity. 4. The accuracy of the results of the planning of short column dimensions with small eccentricities. 5. The accuracy of the design results of short	

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assigment	Assesment Criteria/Indicator	Refrence
					column reinforcement with small eccentricity.	
(13)	**CLO-7.2: [PLO-1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1]** Able to analyze and design short columns due to large eccentricity loads	1. Short column concept with large eccentricity 2. Planning and dimensional analysis of short columns with large eccentricities. 3. Planning and analysis of short column reinforcement with large eccentricity	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in explaining the concept of short column planning with large eccentricities. 2. The accuracy of the results of the planning of short column dimensions with large eccentricities. 3. The accuracy of the design results of short column reinforcement with large eccentricities.	
(14)	**CPL-7.3: [PLO-1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1]** Able to analyze and design slender columns	1. Difference in slender columns with short columns. 2. The concept of slender column design. 3. Analysis and design the slender columns	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy in explaining the difference between short and slim columns. 2. Accuracy in explaining the concept of short column planning with slim columns. 3. The accuracy slender column planning results.	
(15)	**CPL-8: [PLO-1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 5.1, 5.3]** Able to analysis and design shallow foundation (spread footing)	1. The concept of planning for shallow spread foundation reinforcement. 2. Planning and analysis of shallow foundation reinforcement.	Explanation of material **[1x90']** Question and answer **[2x10']** Exercise **[2x25]**	Make a summary and description of the material presented in the resume book and do exercises with group	1. Accuracy of explanation of the concept of shallow foundation reinforcement planning. 2. The accuracy of the results of the planning	

Week	Expected Competency	Study Material	Teaching Method and Strategy	Assigment	Assesment Criteria/Indicator	Refrence
					for the reinforcement of the shallow foundation.	
(16)	**Final Exam**					

Notes : 1 credits = (50' TM + 60' BT + 60' BM)/Weeks
TM = Offline class
BT = Learning
BM = Learning
PS = Simulation Experiment (160 minutes/weeks)
PL = Laboratory Experiment (160 minutes/weeks)
T = Theory
P = Practice

Correlation between CLO, PLO and Assessment Methods

	Assesment	Bobot (%)	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	4	5	1	2	3	1	2	3
CLO 1	Mid Exam 1	2.5	V	V	V																			
CLO 2	Mid Exam 2	2.5	V	V	V																			
CLO 3.1	Mid Exam 3	5	V	V	V	V	V	V		V									V					
CLO 3.2	Mid Exam 4	7.5	V	V	V	V	V	V		V									V					
CLO 3.3	Mid Exam 5	5	V	V	V	V	V	V		V									V					
CLO 3.4	Assigment	7.5	V	V	V	V	V	V		V									V					
CLO 4	Assigment	7.5	V	V	V	V	V	V		V									V					
CLO 5	Final Exam 1	5	V	V	V	V	V	V		V									V					
CLO 6.1	Assigment	7.5	V	V	V	V	V	V		V									V					
CLO 6.2	Assigment	7.5	V	V	V	V	V	V		V									V					
CLO 7.1	Final Exam 2	7.5	V	V	V	V	V	V		V									V					
CLO 7.2	Final Exam 3	7.5	V	V	V	V	V	V		V									V					
CLO 7.3	Final Exam 4	7.5	V	V	V	V	V	V		V									V					
CLO 8	Assigment	5	V	V	V	V	V	V		V									V		V			
Presence		10																						
TOTAL		100																						

Assesment Components

Mid Exam Semester : 22,5%

Final Examr Semester	: 22,5 %
Assigment	: 35 %
Presence	: 10 %
Total	: 100 %

Description of Assessment Level

	Excellent	**Good**	**Satisfy**	**Fail**
Description	Able to describe correctly and completely	Able to describe correctly but incomplete	Able to describe but less clear and incomplete	Unable to describe
Formulations	Able to formulate correctly and completely	Able to formulate correctly but incomplete	Able to formulate but less clear and incomplete	Not able to formulate
Computing	Able to calculate correctly and completely	Able to calculate correctly but not complete	Able to count but less clear and incomplete	Not able to count
Analysis	Able to analyze correctly and completely	Able to analyze correctly but incomplete	Able to analyze but less clear and incomplete	Not able to analyze

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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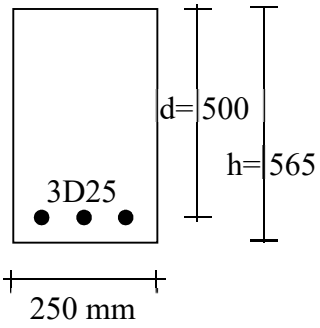
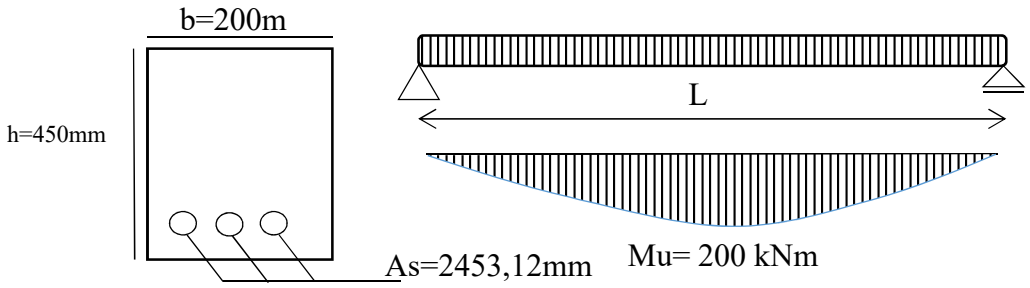
MID-SEMESTER EXAM

Course : Concrete Structure
Code / Credits : SIP.... /3
Type of Exam : Open Equations
Lecturer : Team
Time Allocation : 120 minutes
Maximum Grade : 100 (22,5)

No	Questions	Bobot
1	Describe five aspects that must be considered in order to obtain good concrete quality for reinforced concrete structures	2,5
2	Explain why the design of reinforced concrete structural elements requires a load factor and a reduction factor	2,5
3	Calculate the nominal moment capacity, Mn, for the cross-section of the reinforced concrete drawn. The analysis must be accompanied by a diagram of the strain and stress of the concrete section.  Group A $f_c' = 20$ MPa $f_y = 400$ MPa Group B $f_c' = 25$ MPa $f_y = 350$ MPa	5
4	A simply supported beam with a span of length is 6 meters loaded by a dead load of 27 kN / m (excluding its weight). The live load is consisting of a uniform life load 12 kN/m and a point live load 54 kN that is applied in the middle of the span. The concrete strength f_c' = 30 MPa, and the yield strength of the reinforcement is f_y = 400 MPa. Determine the beam dimension in order to obtain a doubly reinforced section if the diameter of reinforcement provided is 25mm. Note: a is the last digit of the student's number	7,5

5	A singly reinforced rectangular beam has a width b = 200mm and a total height h = 450mm. If the concrete strength is 40 MPa, and the yield strength of the reinforcement is 400 MPa, determine the shear strength of the beam. The uniform load is 30 kN.m	5



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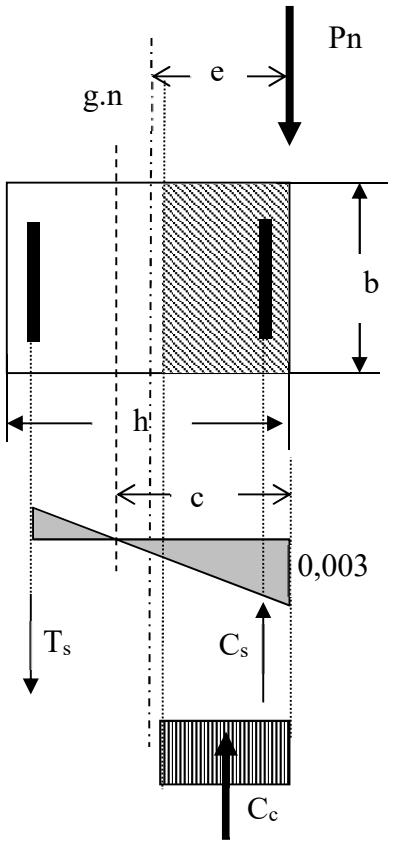
FINAL EXAM

Course : Concrete Structure
Code / Credits : SIP.... /3
Type of Exam : Open Equations
Lecturer : Team
Time Allocation : 120 minutes
Maximum Grade : 100 (22,5)

No	Questions	Bobot

1. The tied-column is loaded by the axial eccentric load and moment as follows: 7,5



P_{DL} = 490 kN, M_{DL} = 123 kNm and

P_{LL} = 468 kN, M_{LL} = 95 kNm.

The column height is 3.6 m and is a short column. The column size is 460 x 460 mm. Use fc' = 35 MPa and f_y = 420 MPa.

Compute:

1. Pu and Mu
2. Mn

Determine whether the beam capacity is able to support the loads?

2. A tied column 550mm x 550mm with bars 12D29, and stirrups D13-450 7,5
- The length of column, lu = 5,5 m
- The column is not be braced against sidesway (unbraced/sway frames)
- The effective length factor, k = 1,5
- βd = 0,25
- Cm = 1 (conservative)

Calculate the magnified moments with Pu = 2850 kN, Mu = 450 kNm, fc' = 30 MPa, fy = 400 MPaHitunglah momen rencana yang diperbesar dengan Pu = 2850 kN, Mu = 450 kNm, fc' = 30 MPa, fy = 400 MPa

3. A one-way slab plate which a thickness of 120mm is designed to support a uniform dead load of 20kN / m. If the slab is planned to be made of concrete strength fc = '30 MPa and the yield strength of the reinforcement is 300 MPa, then design the dimensions of reinforcement used for each meter length 5

4. A short 400x400mm column with 8D29 reinforcement has a 50mm concrete cover. Columns are casted in concrete with compressive strength of 28 MPa. The reinforcement used has a yield strength of 400MPa. If the column is planned to withstand the ultimate axial compressive load of Pu of 1200 kN, determine: 7,5
   a. The nominal cross-sectional strength of the column (Pn)
   b. The value of the cross-sectional strength of the column plan (Pr)

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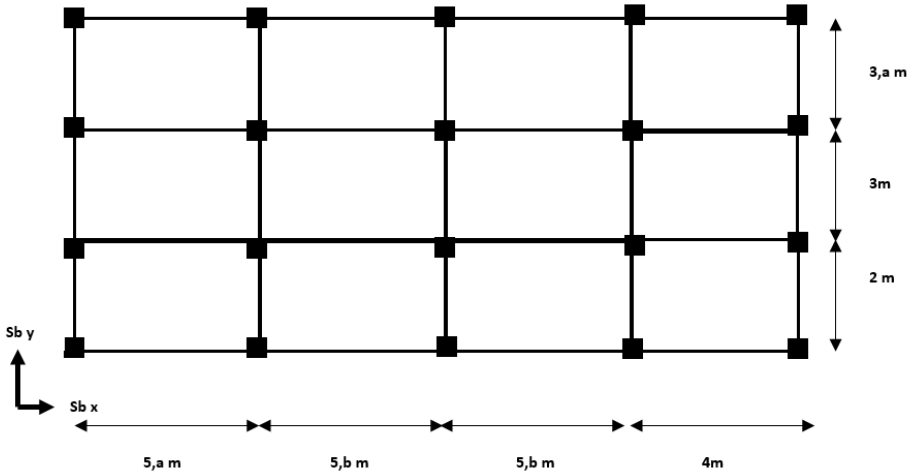
ASSIGMENT

Course : Concrete Structure
Code / Credit : / 3SKS
Type of Exam : Group
Lecturer :
Time Allocation : 2 hari
Grade : 10

Group	Question	Grade
	A slab system, without beams with a column size of 50x50 cm in a multi-story building as in the Figure below. It is planned that live load qLL = 5a0 kg / m2 (5, b0 kN / m2) and fc '= 2a MPa and steel fy = 240 MPa. Plan slab reinforcement with direct planning method in x direction. Include a slab reinforcement table and a drawing of the reinforcement.	10



Other provisions:
1. the values of a and b are the last two digits of your NIM, for example 12345, then a = 4 and b = 5
2. made by handwriting on lined double folio paper,
3. In addition to being calculated, the factored total moment on each portal shall be drawn
4. the distribution of moments in the column and middle lane is made in the form of a table
5. Likewise with the reinforcement on each panel
6. the reinforcement of the slab is illustrated in a good plan, (top view), cross-section of the x direction, do it neatly
7. Other variables that are not listed in the questions are determined by themselves based on the provisions in SNI-03-2847-2002