



FACULTY OF ENGINEERING  
YOGYAKARTA STATE UNIVERSITY

TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 2, 2009	page 1 of 1
Fifth semester	TABLE OF CONTENT		16 x 100 minutes

SECTION	WEEK	TOPICS	PAGES
RPP 01	1-2	BASIC THEORY OF REINFORCED CONCRETE (RC) STRUCTURES	3
RPP 02	3-4	DESIGN LOADS FOR RC STRUCTURES	2
RPP 03	5-7	FLEXURAL DESIGN OF SLABS STRUCTURES	2
RPP 04	9-11	ANALYSIS OF THE FLEXURAL CAPACITY OF RC BEAMS	2
RPP 05	12-13	DESIGN OF THE FLEXURAL/ LONGITUDINAL REINFORCEMENT OF RC BEAMS	2
RPP 06	14-15	DESIGN OF THE STIRRUP/ SHEAR REINFORCEMENT OF RC BEAMS	2
<b>TOTAL</b>			<b>13</b>

Prepared by:  
Slamet Widodo, S.T., M.T.

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 2, 2009	page 1 of 3
Fifth semester	BASIC CONCEPT OF RC DESIGN		2x100 minutes

<b>COURSE</b>	<b>: REINFORCED CONCRETE STRUCTURES I</b>
<b>COURSE CODE</b>	<b>: SPR 230 (2 CREDITS, THEORY)</b>
<b>STUDY PROGRAM</b>	<b>: CIVIL ENGINEERING AND PLANNING EDUCATION</b>
<b>SEMESTER</b>	<b>: V (Fifth)</b>
<b>WEEK</b>	<b>: 1-2</b>
<b>TIME ALOCATION</b>	<b>: 2 x 100 minutes</b>

#### STANDARD OF COMPETENCY

Investigating (analyzing) capacity of reinforced concrete structural components and selecting (designing) reinforced concrete members to support a specified load, mainly on flexural reinforcement of plate/ slab and beam, and shear/ stirrup reinforcement of RC beam.

#### BASIC COMPETENCE

1. Explain the working principles of reinforced concrete structures based on the characteristics of its materials.

#### INDICATORS OF ACHIEVED COMPETENCE

1. Explain basic physical and mechanical properties of concrete materials.
2. Explain basic mechanical properties and classify steel Reinforcement bar.
3. Classify common reinforced concrete structures systems/types.
4. Explain basic principle of RC design based on strength and Seviceability concept.

#### I. COURSE OBJECTIVES

1. To be able explaining physical and mechanical properties of concrete materials.
2. To be able explaining mechanical properties and classify steel Reinforcement bar.
3. To be able classifying reinforced concrete structures systems/types.
4. To be able explaining principle of RC design based on strength and Seviceability concept.

#### II. COURSE MATERIALS

1. Concrete
2. Steel Reinforcement bar
3. Reinforced concrete structures systems/types
4. Strength and Seviceability concept

#### III. TEACHING-LEARNING METHOD

1. Presentation

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No. RPP/SPR/230	Revision: 00	July 2, 2009	page 2 of 3
Fifth semester	BASIC CONCEPT OF RC DESIGN		2x100 minutes

2. Discussion

IV. TEACHING-LEARNING STEPS

A. Opening:

1. Explaining course objectives.
2. Sampling oral pre-test.
3. Motivating.

B. Main Activities:

1. Explaining physical and mechanical properties of concrete materials.
2. Explaining mechanical properties and classify steel Reinforcement bar.
3. Explaining Classification of reinforced concrete structures systems/ types.
4. Explaining principle of RC design based on strength and Serviceability concept.

C. Closing:

1. Sampling oral post-test.
2. Summarizing.

V. Teaching Aids

1. Whiteboard and boardmarker.
2. Laptop (computer) and LCD Projector.

VI. RECOMMENDED TEXTBOOKS:

1. ACI Committee 318, (2008), *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*, American Concrete Institute.
2. Badan Standarisasi Nasional, (2013), *SNI 2847: 2013: Persyaratan Beton Struktural untuk Bangunan Gedung*, Badan Standardisasi Nasional.
3. Park, R. and Paulay, T., (1975), *Reinforced Concrete Structures*, New York: John Wiley & Sons. Inc.
4. Nawy, E.G., (1996), *Reinforced Concrete: A Fundamental Approach 3rd edition*, New York: Prentice Hall. Nawy, E.G., (1996), *Reinforced Concrete: A Fundamental Approach 3rd edition*, New York: Prentice Hall.

VII. GRADING

1. Techniques: Written and oral test.
2. Score range: 0-100

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 2, 2009	Page 1 of 2
Fifth semester	DESIGN LOADS OF RC STRUCTURES		2x100 minutes

<b>COURSE</b>	<b>: REINFORCED CONCRETE STRUCTURES I</b>
<b>COURSE CODE</b>	<b>: SPR 230 (2 CREDITS, THEORY)</b>
<b>STUDY PROGRAM</b>	<b>: CIVIL ENGINEERING AND PLANNING EDUCATION</b>
<b>SEMESTER</b>	<b>: V (Fifth)</b>
<b>WEEK</b>	<b>: 3-4</b>
<b>TIME ALOCATION</b>	<b>: 2 x 100 minutes</b>

**STANDARD OF COMPETENCY**

Investigating (analyzing) capacity of reinforced concrete structural components and selecting (designing) reinforced concrete members to support a specified load, mainly on flexural reinforcement of plate/ slab and beam, and shear/ stirrup reinforcement of RC beam.

**BASIC COMPETENCE**

1. Calculate the load combination which should be applied on reinforced concrete building structures.

**INDICATORS OF ACHIEVED COMPETENCE**

1. Classify design load types
2. calculate design loads value
3. calculate load combinations
4. Analyze structural internal forces using acceptable practical approaches

**I. COURSE OBJECTIVES**

1. To be able classifying design load types
2. To be able calculating design loads value
3. To be able calculating load combinations
4. To be able analyzing structural internal forces using acceptable practical approaches

**II. COURSE MATERIALS**

1. Types and design loads value
2. Load Combinations
3. Acceptable practical approaches for indeterminate structural analysis

**III. TEACHING-LEARNING METHOD**

1. Presentation
2. Discussion

**IV. TEACHING-LEARNING STEPS**

**D. Opening:**

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No. RPP/SPR/230	Revision: 00	July 2, 2009	Page 2 of 2
Fifth semester	DESIGN LOADS OF RC STRUCTURES		2x100 minutes

1. Explaining course objectives.
2. Sampling oral pre-test.
3. Motivating.

**E. Main Activities:**

1. Explaining load classification
2. Explaining design loads calculation
3. Explaining load combinations calculation
4. Explaining structural analysis using acceptable practical approaches

**F. Closing:**

1. Sampling oral post-test.
2. Summarizing.

**V. Teaching Aids**

1. *Whiteboard and boardmarker.*
2. *Laptop (computer) and LCD Projector.*

**VI. RECOMMENDED TEXTBOOKS:**

1. ACI Committee 318, (2008), *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*, American Concrete Institute.
2. Badan Standarisasi Nasional, (2013), *SNI 1727: 2013: Beban Minimum untuk Perancangan Bangunan Gedung dan Struktur Lain*, Badan Standardisasi Nasional.
3. Badan Standarisasi Nasional, (2013), *SNI 2847: 2013: Persyaratan Beton Struktural untuk Bangunan Gedung*, Badan Standardisasi Nasional.
4. Nawy, E.G., (1996), *Reinforced Concrete: A Fundamental Approach 3rd edition*, New York: Prentice Hall. Nawy, E.G., (1996), *Reinforced Concrete: A Fundamental Approach 3rd edition*, New York: Prentice Hall.

**VII. GRADING**

1. Techniques: Written and oral test.
2. Score range: 0-100

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 2, 2009	Page 1 of 2
Fifth semester	FLEXURAL DESIGN OF RC SLABS STRUCTURES		3 x 100 menit

<b>COURSE</b>	<b>: REINFORCED CONCRETE STRUCTURES I</b>
<b>COURSE CODE</b>	<b>: SPR 230 (2 CREDITS, THEORY)</b>
<b>STUDY PROGRAM</b>	<b>: CIVIL ENGINEERING AND PLANNING EDUCATION</b>
<b>SEMESTER</b>	<b>: V (Fifth)</b>
<b>WEEK</b>	<b>: 5-7</b>
<b>TIME ALOCATION</b>	<b>: 3 x 100 minutes</b>

**STANDARD OF COMPETENCY**

Investigating (analyzing) capacity of reinforced concrete structural components and selecting (designing) reinforced concrete members to support a specified load, mainly on flexural reinforcement of plate/ slab and beam, and shear/ stirrup reinforcement of RC beam.

**BASIC COMPETENCE**

1. Design flexural/ longitudinal steel reinforcement of slab structures.

**INDICATORS OF ACHIEVED COMPETENCE**

1. Design one-way slabs reinforcement
2. Design two-way slabs reinforcement
3. Draw detailed reinforcement of slab structures

**I. COURSE OBJECTIVES**

1. To be able designing one-way slabs reinforcement
2. To be able designing two-way slabs reinforcement
3. To be able drawing detailed reinforcement of slab structures

**II. COURSE MATERIALS**

1. One-way slabs
2. two-way slabs
3. Detailed engineering drawing.

**III. TEACHING-LEARNING METHOD**

1. Presentation
2. Discussion

**IV. TEACHING-LEARNING STEPS**

**A. Opening:**

1. Explaining course objectives.
2. Sampling oral pre-test.

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

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Fifth semester	FLEXURAL DESIGN OF RC SLABS STRUCTURES		3 x 100 menit

3. Motivating.

**B. Main Activities:**

1. Explaining design procedures of one-way slabs reinforcement
2. Explaining design procedures of two-way slabs reinforcement
3. Explaining standards/ codes of detailed engineering drawing of slab reinforcement.

**C. Closing:**

1. Sampling oral post-test.
2. Summarizing.

**V. Teaching Aids**

1. *Whiteboard* and *boardmarker*.
2. *Laptop (computer)* and *LCD Projector*.

**VI. RECOMMENDED TEXTBOOKS:**

1. ACI Committee 318, (2008), *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*, American Concrete Institute.
2. Badan Standarisasi Nasional, (2013), *SNI 2847: 2013: Persyaratan Beton Struktural untuk Bangunan Gedung*, Badan Standardisasi Nasional.
3. Gideon Hadi Kusuma dan Vis, W.C., (1994), *Dasar-dasar Perencanaan Beton Bertulang Berdasarkan SK SNI T-15-1991-03*, Jakarta: Penerbit Erlangga.
4. Nawy, E.G., (1996), *Reinforced Concrete: A Fundamental Approach 3rd edition*, New York: Prentice Hall. Nawy, E.G., (1996), *Reinforced Concrete: A Fundamental Approach 3rd edition*, New York: Prentice Hall.

**VII. GRADING**

1. Techniques: Written and oral test.
2. Score range: 0-100

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 02, 2009	Page 1 of 2
Fifth semester	FLEXURAL ANALYSIS OF RC BEAM STRUCTURES		3 x 100 menit

<b>COURSE</b>	<b>: REINFORCED CONCRETE STRUCTURES I</b>
<b>COURSE CODE</b>	<b>: SPR 230 (2 CREDITS, THEORY)</b>
<b>STUDY PROGRAM</b>	<b>: CIVIL ENGINEERING AND PLANNING EDUCATION</b>
<b>SEMESTER</b>	<b>: V (Fifth)</b>
<b>WEEK</b>	<b>: 9-11</b>
<b>TIME ALOCATION</b>	<b>: 3 x 100 minutes</b>

**STANDARD OF COMPETENCY**

Investigating (analyzing) capacity of reinforced concrete structural components and selecting (designing) reinforced concrete members to support a specified load, mainly on flexural reinforcement of plate/ slab and beam, and shear/ stirrup reinforcement of RC beam.

**BASIC COMPETENCE**

1. Analyze the flexural capacity of RC beam.

**INDICATORS OF ACHIEVED COMPETENCE**

1. Analyze Singly reinforced RC beams
2. Analyze Doubly reinforced RC beams
3. Analyze T and Inverted-L RC beams.

**I. COURSE OBJECTIVES**

1. To be able analyzing Singly reinforced RC beams
2. To be able analyzing Doubly reinforced RC beams
3. To be able analyzing T and Inverted-L RC beams.

**II. COURSE MATERIALS**

1. Singly reinforced RC beams
2. Doubly reinforced RC beams
3. T and Inverted-L RC beams.

**III. TEACHING-LEARNING METHOD**

1. Presentation
2. Discussion

**IV. TEACHING-LEARNING STEPS**

**A. Opening:**

1. Explaining course objectives.
2. Sampling oral pre-test.
3. Motivating.

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 02, 2009	Page 2 of 2
Fifth semester	FLEXURAL ANALYSIS OF RC BEAM STRUCTURES		3 x 100 menit

**B. Main Activities:**

1. Explaining analysis of Singly reinforced RC beams
2. Explaining analysis of Doubly reinforced RC beams
3. Explaining analysis of T and Inverted-L RC beams.

**C. Closing:**

1. Sampling oral post-test.
2. Summarizing.

**V. Teaching Aids**

1. *Whiteboard* and *boardmarker*.
2. Laptop (*computer*) and *LCD Projector*.

**VI. RECOMMENDED TEXTBOOKS:**

1. ACI Committee 318, (2008), *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*, American Concrete Institute.
2. Badan Standarisasi Nasional, (2013), *SNI 2847: 2013: Persyaratan Beton Struktural untuk Bangunan Gedung*, Badan Standardisasi Nasional.
3. Istimawan Dipohusodo, (1999), *Struktur Beton Bertulang*, Jakarta: Gramedia Pustaka Utama.
4. Park, R. and Paulay, T., (1975), *Reinforced Concrete Structures*, New York: John Wiley & Sons. Inc.
5. Nawy, E.G., (1996), *Reinforced Concrete: A Fundamental Approach* 3rd edition, New York: Prentice Hall.

**VII. GRADING**

1. Techniques: Written and oral test.
2. Score range: 0-100

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

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Fifth semester	FLEXURAL DESIGN OF RC BEAM STRUCTURES		2 x 100 menit

<b>COURSE</b>	<b>: REINFORCED CONCRETE STRUCTURES I</b>
<b>COURSE CODE</b>	<b>: SPR 230 (2 CREDITS, THEORY)</b>
<b>STUDY PROGRAM</b>	<b>: CIVIL ENGINEERING AND PLANNING EDUCATION</b>
<b>SEMESTER</b>	<b>: V (Fifth)</b>
<b>WEEK</b>	<b>: 12-13</b>
<b>TIME ALOCATION</b>	<b>: 2 x 100 minutes</b>

**STANDARD OF COMPETENCY**

Investigating (analyzing) capacity of reinforced concrete structural components and selecting (designing) reinforced concrete members to support a specified load, mainly on flexural reinforcement of plate/ slab and beam, and shear/ stirrup reinforcement of RC beam.

**BASIC COMPETENCE**

1. Design flexural/ longitudinal reinforcement of RC beam.

**INDICATORS OF ACHIEVED COMPETENCE**

1. Design flexural/ longitudinal reinforcement of simple beams.
2. Design flexural/ longitudinal reinforcement of continuous beams.
3. Draw detailed reinforcement of RC beams.

**I. COURSE OBJECTIVES**

1. To be able designing flexural/ longitudinal reinforcement of simple beams.
2. To be able designing flexural/ longitudinal reinforcement of continuous beams.
3. To be able drawing detailed reinforcement of RC beams.

**II. COURSE MATERIALS**

1. Flexural/ longitudinal reinforcement of simple beams.
2. Flexural/ longitudinal reinforcement of continuous beams.
3. Detailed engineering drawing.

**III. TEACHING-LEARNING METHOD**

1. Presentation
2. Discussion

**IV. TEACHING-LEARNING STEPS**

**A. Opening:**

1. Explaining course objectives.
2. Sampling oral pre-test.

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Fifth semester	FLEXURAL DESIGN OF RC BEAM STRUCTURES		2 x 100 menit

3. Motivating.

**B. Main Activities:**

1. Explaining flexural design of simple RC beams
2. Explaining flexural design of continuous RC beams
3. Explaining detailed engineering drawing.

**C. Closing:**

1. Sampling oral post-test.
2. Summarizing.

**V. Teaching Aids**

1. *Whiteboard* and *boardmarker*.
2. Laptop (*computer*) and *LCD Projector*.

**VI. RECOMMENDED TEXTBOOKS:**

1. ACI Committee 318, (2008), *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*, American Concrete Institute.
2. Badan Standarisasi Nasional, (2013), *SNI 2847: 2013: Persyaratan Beton Struktural untuk Bangunan Gedung*, Badan Standardisasi Nasional.
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**VII. GRADING**

1. Techniques: Written and oral test.
2. Score range: 0-100

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 2, 2009	Page 1 of 2
Fifth semester	SHEAR DESIGN OF RC BEAM STRUCTURES		2 x 100 menit

<b>COURSE</b>	<b>: REINFORCED CONCRETE STRUCTURES I</b>
<b>COURSE CODE</b>	<b>: SPR 230 (2 CREDITS, THEORY)</b>
<b>STUDY PROGRAM</b>	<b>: CIVIL ENGINEERING AND PLANNING EDUCATION</b>
<b>SEMESTER</b>	<b>: V (Fifth)</b>
<b>WEEK</b>	<b>: 14-15</b>
<b>TIME ALOCATION</b>	<b>: 2 x 100 minutes</b>

**STANDARD OF COMPETENCY**

Investigating (analyzing) capacity of reinforced concrete structural components and selecting (designing) reinforced concrete members to support a specified load, mainly on flexural reinforcement of plate/ slab and beam, and shear/ stirrup reinforcement of RC beam.

**BASIC COMPETENCE**

1. Design stirrup/ shear reinforcement of RC beam.

**INDICATORS OF ACHIEVED COMPETENCE**

1. Design stirrup/ shear reinforcement of simple beams.
2. Design stirrup/ shear reinforcement of continuous beams.
3. Draw detailed reinforcement of RC beams.

**I. COURSE OBJECTIVES**

1. To be able designing stirrup/ shear reinforcement of simple beams.
2. To be able designing stirrup/ shear reinforcement of continuous beams.
3. To be able drawing detailed reinforcement of RC beams.

**II. COURSE MATERIALS**

1. Stirrup/ shear reinforcement of simple beams.
2. Stirrup/ shear reinforcement of continuous beams.
3. Detailed engineering drawing.

**III. TEACHING-LEARNING METHOD**

1. Presentation
2. Discussion

**IV. TEACHING-LEARNING STEPS**

**A. Opening:**

1. Explaining course objectives.
1. Sampling oral pre-test.

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TEACHING-LEARNING ACTION PLAN OF REINFORCED CONCRETE STRUCTURES I

No. RPP/SPR/230	Revision: 00	July 2, 2009	Page 2 of 2
Fifth semester	SHEAR DESIGN OF RC BEAM STRUCTURES		2 x 100 menit

2. Motivating.

**B. Main Activities:**

1. Explaining shear design of simple RC beams
2. Explaining shear design of continuous RC beams
3. Explaining detailed engineering drawing.

**C. Closing:**

1. Sampling oral post-test.
2. Summarizing.

**V. Teaching Aids**

1. *Whiteboard* and *boardmarker*.
2. Laptop (*computer*) and *LCD Projector*.

**VI. RECOMMENDED TEXTBOOKS:**

1. ACI Committee 318, (2008), *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*, American Concrete Institute.
2. Badan Standarisasi Nasional, (2013), *SNI 2847: 2013: Persyaratan Beton Struktural untuk Bangunan Gedung*, Badan Standardisasi Nasional.
3. Istimawan Dipohusodo, (1999), *Struktur Beton Bertulang*, Jakarta: Gramedia Pustaka Utama.
4. Park, R. and Paulay, T., (1975), *Reinforced Concrete Structures*, New York: John Wiley & Sons. Inc.
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**VII. GRADING**

1. Techniques: Written and oral test.
2. Score range: 0-100

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