I. DESCRIPTION
SPR 230 is a practical analysis design of current building-code (SNI 2847: 2013) based course, primarily covering reinforced concrete (RC) analysis and design for structures. This course introduce the mechanical properties of RC materials, design and investigation concepts and their application to reinforced concrete structural elements (RC plate/ slab and beam), develop a working knowledge of the relations between applied loads and their effects on structures, develop adequate skill in investigating (analysis) 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.

II. COURSE OBJECTIVES (DEVELOPED COMPETENCIES)
1. Explain the working principles of reinforced concrete structures based on the characteristics of its materials.
2. Calculate the load combination which should be applied on reinforced concrete building structures.
3. Design longitudinal steel reinforcement of one-way slab structures.
5. Analyze the flexural capacity of singly reinforced RC beam.
6. Analyze the flexural capacity of doubly reinforced RC beam.
7. Analyze the flexural capacity of T and inverted-L RC beam.
8. Design flexural/ longitudinal reinforcement of RC beam.
9. Design stirrup (shear reinforcement) on the beam element.
10. Draw details of reinforcement on plates and beams structures.

III. INDICATORS OF ACHIEVED COMPETENCE

A. Cognitive and Thinking Skills Aspects
1. Explain the working principles of reinforced concrete structures based on the characteristics of its materials.
2. Calculate the load combination which should be applied on reinforced concrete building structures.
3. Design longitudinal steel reinforcement of one-way slab structures.
5. Analyze the flexural capacity of singly reinforced RC beam.
6. Analyze the flexural capacity of doubly reinforced RC beam.
7. Analyze the flexural capacity of T and inverted-L RC beam.
8. Design flexural/longitudinal reinforcement of RC beam.
9. Design stirrup (shear reinforcement) on the beam element.

B. Psychomotor Aspects

C. Affective, Social Skills, and Personality aspects:
1. Having accuracy and precision in interpreting the reinforced concrete design and analysis codes.
2. Able to perform analysis and design with concentration, thorough, and meet the given time allocation.
3. Having a sense of responsibility and discipline in doing their jobs.
4. Develop the ability to participate as a member of a team work, and expressing his/her opinion in problem solving through discussion forums (held in presentations and evaluation activities of RC structures design/assignment).
5. Open minded and responsive in accepting evaluation and inputs from their counterparts.

IV. RECOMMENDED TEXTBOOKS:
1. ACI Committee 318, (2008), Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary, American Concrete Institute.

V. GRADING

The final grades for the course will be based on the following percentages:

1. Homework 10%
2. Project 30%
3. Exams 30%
4. Final Exam 30%
Total 100%

TABLE OF ACHIEVEMENT ON TARGETED COMPETENCE

<table>
<thead>
<tr>
<th>No.</th>
<th>Grade</th>
<th>Requirements</th>
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<tbody>
<tr>
<td>1.</td>
<td>A</td>
<td>Granted for students who collected at least 86 points</td>
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<td>2.</td>
<td>A-</td>
<td>Granted for students who collected at least 80 points</td>
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<td>3.</td>
<td>B+</td>
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<td>4.</td>
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<td>5.</td>
<td>B-</td>
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<tr>
<td>6.</td>
<td>C+</td>
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<td>7.</td>
<td>C</td>
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COURSE OUTLINE

<table>
<thead>
<tr>
<th>Week</th>
<th>Basic competence</th>
<th>Topics</th>
<th>Teaching-Learning Strategy</th>
<th>references</th>
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<tbody>
<tr>
<td>1-2</td>
<td></td>
<td>1. Concrete 2. Steel Reinforcement bar 3. Reinforced concrete structures</td>
<td>1. Presentation 2. Discussion</td>
<td>IV 1, 3, 6, 7</td>
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</tbody>
</table>

Prepared by: Slamet Widodo, S.T., M.T.  
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### FACULTY OF ENGINEERING
YOGYAKARTA STATE UNIVERSITY

SYLLABUS OF REINFORCED CONCRETE STRUCTURES I

<table>
<thead>
<tr>
<th>No.</th>
<th>Revision</th>
<th>Date</th>
<th>Pages</th>
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<tbody>
<tr>
<td>SIL/TSP/SPR 230</td>
<td>00</td>
<td>JULY 2, 2009</td>
<td>4 of 5</td>
</tr>
</tbody>
</table>

| Systems/Types | 3-4 | Calculate the load combination which should be applied on reinforced concrete building structures. | 1. Types and design loads value  
2. Load Combinations  
3. Acceptable practical approaches for indeterminate structural analysis | 1. Presentation  
2. Discussion  
3. Supervised assignment | IV 1, 2, 3, 7 |
|---------------|-----|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------|----------------|
|               | 5-7 | Design longitudinal steel reinforcement of slab structures. | 1. One-way slabs  
2. two-way slabs  
3. Detailed engineering drawing. | 1. Presentation  
2. Discussion  
3. Supervised assignment | IV 1, 3, 4, 7 |
|               | 8   | Mid-term exam | | | |
|               | 9-11 | Analyze the flexural capacity of singly reinforced RC beam. | 1. Singly reinforced RC beams  
2. Doubly reinforced RC beams  
3. T and Inverted-L RC beams. | 1. Presentation  
2. Discussion  
3. Supervised assignment | IV 1, 3, 5-7 |
2. Continuous beams.  
3. Detailed engineering drawing | 1. Presentation  
2. Discussion  
3. Supervised assignment | IV 1, 3, 5-7 |
2. Continuous beams.  
3. Detailed engineering drawing | 1. Presentation  
2. Discussion  
3. Supervised assignment | IV 1, 3, 5-7 |
|               | 16   | Mid-term exam | | | |

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