

ARCH 631. Study Guide for Exam 2

This guide is not providing “answers” for the conceptual questions. It is a list of topical concepts and their application you should be familiar with. It is an *aid* to help prepare for the mid-term exam.

Covers material of Lectures 7, 8, 10, 11, 12, 13 & 14

General: Rigid Frames

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| <input type="checkbox"/> Rigid vs. non-rigid pinned frames | <input type="checkbox"/> Effect of relative frame member stiffnesses |
| <input type="checkbox"/> Rigid frame behavior | <input type="checkbox"/> Stiffness (relative to EI/L through Δ , or AE/L through δ) |
| <input type="checkbox"/> Connection types and load/moment transfer | <input type="checkbox"/> Sidesway |
| <input type="checkbox"/> Moment “redistribution” | <input type="checkbox"/> Cantilever method with lateral forces |
| <input type="checkbox"/> Methods for analysis of statically indeterminate frames | |

General: Plates & Grids

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|--|---|
| <input type="checkbox"/> Plate vs. slab | <input type="checkbox"/> Simplified Frame Analysis & “Strip” method |
| <input type="checkbox"/> One-way vs. two-way behavior | <input type="checkbox"/> Design shear & moments (spans “integral with support”, first interior support, etc.) |
| <input type="checkbox"/> Aspect ratio (with respect to bay dimensions) | <input type="checkbox"/> Direct design method for two-way slabs & M_o |
| <input type="checkbox"/> Space frame vs. grid | <input type="checkbox"/> Solutions for large shear at space frame supports |
| <input type="checkbox"/> Unit width for design | <input type="checkbox"/> Moment of inertia with respect to folded plates |
| <input type="checkbox"/> Moment redistribution | <input type="checkbox"/> Reason for stiffening of folded plates |
| <input type="checkbox"/> Pan joists, T sections & effective width of flange | <input type="checkbox"/> Live load reduction |
| <input type="checkbox"/> Drop panels | <input type="checkbox"/> Thickness as a fraction of bay span (L) |
| <input type="checkbox"/> Boundary conditions & effect on deflections / moments | <input type="checkbox"/> “Punching” shear at columns |
| <input type="checkbox"/> Point loads and effect on deflections / moments | |

General: Membranes & Shells

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| <input type="checkbox"/> Appropriate loads & primary stresses | <input type="checkbox"/> Tension vs. compression rings |
| <input type="checkbox"/> Air-supported vs. air-inflated | <input type="checkbox"/> “Thrust” |
| <input type="checkbox"/> Materials, durability, and punctures | <input type="checkbox"/> Buckling and “snap-through” |
| <input type="checkbox"/> Profiles and wind effects | <input type="checkbox"/> Anticlastic shell properties |
| <input type="checkbox"/> Shell vs. not shell (stresses are key) | <input type="checkbox"/> Pressure vs. membrane stress |
| <input type="checkbox"/> Meridional vs. Hoop | <input type="checkbox"/> Curvature and membrane stress |
| <input type="checkbox"/> Shell forces vs stresses (with respect to thickness and strips) | <input type="checkbox"/> Hyperbolic paraboloid |

General: Planning

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|---|---|
| <input type="checkbox"/> One-way vs. two-way systems | <input type="checkbox"/> Options for corners, large spaces, etc. |
| <input type="checkbox"/> “Collectors” | <input type="checkbox"/> Integration with building services |
| <input type="checkbox"/> Vertical & horizontal grid considerations | <input type="checkbox"/> Fire safety and planning |
| <input type="checkbox"/> Long span considerations | <input type="checkbox"/> “Weakness” Areas (Tolerances, Lateral bracing, etc.) |
| <input type="checkbox"/> Effect of loading types on system efficiency | |

Reinforced Concrete

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|--|--|
| <input type="checkbox"/> Cast-in place, precast, prestressed (pretensioned), post-tensioned | <input type="checkbox"/> Use of Strength Design Curves (R_n) |
| <input type="checkbox"/> Constituents to make concrete | <input type="checkbox"/> Purpose of stirrup requirement when concrete capacity is available |
| <input type="checkbox"/> Slump | <input type="checkbox"/> Diagonal tension cracks |
| <input type="checkbox"/> Behavior in compression vs. tension of concrete | <input type="checkbox"/> Stirrup strength |
| <input type="checkbox"/> Design methodology | <input type="checkbox"/> Shrinkage |
| <input type="checkbox"/> 28-day compressive strength | <input type="checkbox"/> Concrete cover and purpose |
| <input type="checkbox"/> Term “working stress design” | <input type="checkbox"/> #3 bar (meaning of the numeral) |
| <input type="checkbox"/> Creep | <input type="checkbox"/> Purpose of compression reinforcement |
| <input type="checkbox"/> Camber (hogging & sagging) | <input type="checkbox"/> T-section behavior and stresses in flange |
| <input type="checkbox"/> “composite” | <input type="checkbox"/> One-way joists, vs. beams, vs. girders |
| <input type="checkbox"/> Transformed section | <input type="checkbox"/> “Spandrel” |
| <input type="checkbox"/> Depth of the Whitney stress | <input type="checkbox"/> One-way slab design and “unit” strip |
| <input type="checkbox"/> Moment capacity (or ultimate strength) vs. nominal moment (or strength) | <input type="checkbox"/> One-way vs. two-way slabs |
| <input type="checkbox"/> Factored design moment (or shear or) | <input type="checkbox"/> One-way vs. two-way shear (load & strength) |
| <input type="checkbox"/> Design stress in reinforcement | <input type="checkbox"/> Plate vs. Flat Slab |
| <input type="checkbox"/> Design stress in concrete | <input type="checkbox"/> Openings in slabs and control of openings |
| <input type="checkbox"/> Reinforcement grades | <input type="checkbox"/> Continuous beam analysis with coefficients |
| <input type="checkbox"/> Reinforcement ratio | <input type="checkbox"/> Clear span / span length |
| <input type="checkbox"/> Effective depth vs. depth of a beam | <input type="checkbox"/> Columns with ties vs. spirals (stresses, factors, etc.) |
| <input type="checkbox"/> Under-reinforced vs. over-reinforced | <input type="checkbox"/> Interaction diagrams (P- Δ) |
| <input type="checkbox"/> Basis of maximum steel (related to evident strain) | <input type="checkbox"/> Location of maximum shear in beams |
| <input type="checkbox"/> Purpose of minimum reinforcement area requirement | <input type="checkbox"/> Live load reduction |
| <input type="checkbox"/> Why development length is necessary | <input type="checkbox"/> Beam self weight relationship to material density (150 lb/ft ³) |
| | <input type="checkbox"/> Design vs. analysis |