

STUDY GUIDE FOR RESIDENTIAL DESIGN EXAMINATION

NEVADA STATE BOARD OF ARCHITECTURE, INTERIOR DESIGN & RESIDENTIAL DESIGN



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STUDY GUIDE FOR RESIDENTIAL DESIGNER EXAMINATION

INTRODUCTION

Under the provisions of the Nevada State Board of Architecture, Interior Design and Residential Design's *Rules and Regulations*, Chapter 623, to qualify as a Residential Designer, an applicant must pass a written examination covering:

- Structural Technology
- Materials and Methods of Construction
- Building Systems & Life Safety
- Graphic Design

The applicant's knowledge in each of these subject areas will be assessed by separate tests. This study guide is designed to help the applicant prepare for the written tests on the first three subject areas listed above.

Each of the above tests consists of 60 multiple-choice questions. Each question is weighted equally. Regardless of the question's level of difficulty, it is worth one point. The applicant will have three hours to complete each test and must score at least 70% to pass. To pass the examination, the applicant must pass each individual test.

The *International Residential Code* and the *International Building Code* (2012), and a silent, nonprinting, nonprogrammable calculator may be used while taking the Structural Technology, Materials and Methods of Construction, and Building System & Life Safety exams.

The following pages contain information specific to each of the tests, i.e., overviews, subjects covered and suggested reading lists.

Structural Technology Content Outline

Exam purpose: Designed to determine applicant's ability to apply basic structural principles to problems encountered in the design and construction of single and multiple-family dwelling structures (composed of not more than 4 dwellings units in each structure) not exceeding two stories in height.

Exam content: The candidate will be able to define, interpret, and apply concepts regarding load, moments, stress, selection modules, and shear modulus of elasticity in accordance with the limitations and standards imposed by the ICC. Knowledge of general construction and design terminology is required.

		Approximate Percentage
I.	Sitework* **	10%
A.	Excavation and Grading	
B.	Soils	
C.	Compaction	
D.	Cut and Fill	
E.	Retaining Wall	
II.	Concrete*	30%
A.	Accessories	
B.	Reinforcing	
C.	Post Tensioning	
D.	Joints	
E.	Structures	
F.	Curing	
III.	Masonry*	13%
A.	Concrete Masonry Units (CMUs)	
B.	Masonry Reinforcing	
C.	Accessories	
D.	Masonry Ties	
E.	Brick	
F.	Fireplaces and Chimneys	
IV.	Wood*	44%
A.	Framed Wood Floors	
B.	Framed Roof Rafters	
C.	Framed Stud Walls	
D.	Framed Ceiling Joists	
E.	Sheathing	
F.	General Knowledge	
G.	Manufactured Trusses	
H.	Decks/Balconies	
I.	Wood Accessories	
J.	Engineered Lumber	
K.	Metal Web Wood Joists	
L.	Pre-Fabricated Shear Walls	
V.	Steel	3%
A.	Structural Steel	
B.	Light-Guage Steel Framing	
		100%

Structural Technology References

Title	Edition	Year	Author	Publisher	Address
Building Code Requirements for Structural Concrete and Commentary		2005	ACI	American Concrete Institute (ACI)	(www.concrete.org), PO Box 90994 Farmington Hills, MI 48333
Carpentry and Building Construction	6th	2004		Glencoe Division of McGraw-Hill	(www.glencoe.com), Box 543 Blacklick, OH, 43004-0544
Construction Materials, Methods, and Techniques		1998		Delmar Learning	(www.delmarlearning.com), PO Box 6904, Florence, KY 41002
Design and Control of Concrete Mixtures	14th	2002	Steven H. Kosmatka	Portland Cement Association	(www.cement.org), 5420 Old Orchard Road Skokie, IL 60077
Essential Guide to Framing		2005	Editors of JLC	Hanley Wood	(www.hanleywood.com), One Thomas Circle NW, Suite 600, Washington, DC 20005
International Building Code		2012	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
International Residency Code for One- and Two-Family Dwellings		2006	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
Modern Masonry	3rd	2003	Clois E. Kicklighter	Goodheart-Willcox Company, Inc.	(www.goodheartwillcox.com), 18604 West Creek Drive, Tinley Park, IL 60477-6243
Placing Reinforcing Bars	8th	2005	CRSI	Concrete Reinforcing Steel Institute	(www.crsi.org), Distribution Center, 933 North Plum Grove Road Schaumburg, IL, 60173-4758
Statics and Strengths	3rd	2006	Barry Onouye and Kevin Cane	Prentice Hall/Pearson Education	(https://vigprenhall.com), PO Box 11071, Des Moines, IA 50336-0693
Structural Design: A practical Guide for Architecture	2nd	2007	Rod Underwood and Michelle Chiuni	Wiley Publishing, Inc.	(www.wiley.com), 10475 Crosspoint Blvd., Indianapolis, IN 46256
The Essential Guide to Foundations		2005	Editors of JLC	Hanley Wood	(www.hanleywood.com), One Thomas Circle NW, Suite 600, Washington, DC 20005

Methods and Materials of Construction Content Outline

Exam purpose: Designed to determine applicant's general knowledge of residential building methods and the ability to evaluate and select materials for typical construction products. The evaluation will take into consideration such factors as economy, ease of erection, and minimum construction standards as imposed by the ICC.

Exam content: Types of materials include masonry, finishes, concrete, doors/windows, wood and earthwork. In addition to the knowledge of Code, methods and materials, the applicant will be required to estimate labor and material costs to various applications.

		Approximate Percentage
I.	Sitework* **	10%
A.	Excavation, Grading and Drainage	
B.	Measurements and Markings	
C.	Surveying	
D.	Cut and Fill	
II.	Concrete*	10%
A.	Accessories	
B.	Joints	
C.	Composition	
D.	Formwork	
E.	Curing	
F.	Placing/Finishing	
III.	Masonry*	10%
A.	Accessories	
B.	Concrete Masonry Units (CMUs)	
C.	Masonry Patterns/Configuration	
D.	Brick	
E.	Masonry Fireplaces/Chimneys	
F.	Mortar and Grout	
G.	Joints including expansion and control	
H.	Glass Masonry Units	
I.	Stone	
J.	Veneer	
IV.	Metals	10%
A.	Reinforcement (Rebar/Welded Wire Fabric)	
B.	Metal Lath	
C.	Metal Framing	
D.	Structural Metal Materials	
E.	Structural Steel Connection	
V.	Wood*	17%
A.	Framing Assemblies (Floor, Walls, Ceiling, Roof)	
B.	Sheathing	
C.	Stairs	
D.	Softwood and Hardwood	
E.	Wood Accessories	
F.	Manufactured Trusses	
G.	Wood Chimneys/Chases	
H.	Treated Lumber	
I.	Engineered Lumber	

Methods and Materials of Construction Content Outline (continued)		
VI.	Thermal Moisture Protection*	17%
A.	Moisture and Vapor Barriers	
B.	Roofing	
C.	Waterproofing/Dampproofing	
D.	Stucco	
E.	Ventilation	
F.	Exterior Insulation and Finish Systems (EIFS)	
G.	Roof Accessories and Flashings	
H.	Joints and Sealants	
I.	Snow and Ice Protection	
J.	Deck Accessories and Flashings	
K.	Decks and Balconies	
L.	Penetrations	
VII.	Doors and Windows*	9%
A.	General Knowledge	
B.	Flashings, Weather Protection, and Sealant	
C.	Door and Window Frames	
D.	Hardware	
E.	Door and Window Types	
VIII.	Interior and Exterior Finishes	10%
A.	Gypsum Board and Accessories	
B.	Interior and Exterior Plaster	
C.	Wall and Ceiling Finishes	
D.	Tile	
E.	Natural and Manufactured Stone	
F.	Paint and Coatings	
G.	Interior and Exterior Trim	
H.	Flooring	
I.	Exterior Finishes	
IX	Testing and Inspection	4%
A.	Soils	
B.	Concrete	
C.	Steel	
D.	Special Inspections	
E.	Anchorage and Connections	
F.	Masonry	
X	Fire Resistive Construction	3%
A.	Wall Assemblies	
B.	Floor and Ceiling Assemblies	
C.	Penetrations and Openings	
		100%

Materials and Methods of Construction References

Title	Edition	Year	Author	Publisher	Address
Building Code Requirements for Structural Concrete and Commentary - ACI 318-05		2005	ACI	American Concrete Institute (ACI)	(www.concrete.org), PO Box 90994 Farmington Hills, MI 48333
Carpentry and Building Construction	6th	2004	John L. Feirer	Glencoe Division of McGraw-Hill	(www.glencoe.com), Box 543 Blacklick, OH, 43004-0544
Construction Materials and Processes	3rd	1986		McGraw-Hill Publishing, inc.	(books.mcgraw-hill.com), PO Box 182604 Columbus, OH 43004-0544
Construction Materials, Methods and Techniques	2nd	2006	William Spence	Delmar Learning	(www.delmarlearning.com), PO Box 6904, Florence, KY 41002
Design and Control of Concrete Mixtures	14th	2002		Portland Cement Association	(www.cement.org), 5420 Old Orchard Road Skokie, IL 60077
Evacuation and Grading Handbook		2006	Nick Capachi	Craftsman Book Company	(www.craftsman-book.com), 6058 Corte del Cedro, Carlsbad, CA 92009
International Building Code		2012	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
International Residency Code for One- and Two-Family Dwellings		2012	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
Modern Masonry	3rd	2003	Clois E. Kicklighter	Goodheart-Willcox Company, Inc.	(www.goodheartwillcox.com), 18604 West Creek Drive, Tinley Park, IL 60477-6243
The Contractor's Guide to Quality Construction	3rd	2005	ACI	American Concrete Institute (ACI)	(www.concrete.org), PO Box 90994 Farmington Hills, MI 48333

Building Systems and Life Safety Content Outline

Exam purpose: Designed to determine applicant's understanding and ability to apply code requirements, principles of design, and life safety related to residential design.

Exam content: Cover general systems terminology, applications, principles and knowledge of applicable codes.

		Approximate Percentage
I. Sitework* **		10%
A.	Excavating, Grading, and Drainage	
B.	Orientation of Structure	
C.	Landscaping	
D.	Utilities	
II. Thermal and Moisture Protection*		10%
A.	Moisture and Vapor Barriers	
B.	Insulation Principles	
C.	Ventilation	
III. Doors and Windows*		20%
A.	Door and Window Egress Requirements	
B.	Fire Rating	
C.	Safety Glazing	
D.	Light and Ventilation Requirements	
IV. Special Construction		13%
A.	Energy Conservation Principles	
B.	Sound Transmission Control Principles	
C.	Vertical Circulation	
D.	Accessibility	
V. Mechanical		17%
A.	Chimneys, Flues, Vents, and Vent Connectors	
B.	Furnaces (Warm-air Heating Equipment)	
C.	Combustion Air	
D.	General Duct Systems Knowledge and Principles	
E.	HVAC Principles	
F.	HVAC Systems	
G.	Exhaust Systems	
VI. Electrical		15%
A.	Lighting	
B.	Power	
C.	Smoke, CO, and Fire Detection Systems	
D.	General Electrical Knowledge	
E.	Grounding and Bonding	
F.	Load Calculations	
VII. Plumbing		15%
A.	Fixtures and Equipment	
B.	Private Sewage Disposal	
C.	Materials	
D.	Water Supply and Distribution (public and private)	
E.	Sanitary Drainage Systems	
F.	Storm Systems	
G.	Water Heaters	
H.	Gas Piping Systems (Natural and LPG)	
		100%

Building Systems and Life Safety References

Title	Edition	Year	Author	Publisher	Address
American Electricians' Handbook	14th	2002		McGraw-Hill Publishing, inc.	(books.mcgraw-hill.com), PO Box 182604 Columbus, OH 43004-0544
Carpentry and Building Construction	6th	2004		Glencoe Division of McGraw-Hill	(www.glencoe.com), Box 543 Blacklick, OH, 43004-0544
International Building Code		2012	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
International Mechanical Code		2012	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
International Plumbing Code		2012	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
International Residency Code for One- and Two-Family Dwellings		2012	ICC	International Code Council	(www.iccsafe.org), 4051 West Flossmoor Road Country Club Hills, IL 60478-5795
Landscaping Principles and Practices	6th	2004		Thomson Delmar Learning	(www.delmarlearning.com), PO Box 6904, Florence, KY 41002
Modern Carpentry		2003		Goodheart-Willcox Company, Inc.	(www.goodheartwillcox.com), 18604 West Creek Drive, Tinley Park, IL 60477-6243
Modern Refrigeration and Air Conditioning	18th	2004	Althouse, Turnquist, & Bracciano	Goodheart-Willcox Company, Inc.	(www.goodheartwillcox.com), 18604 West Creek Drive, Tinley Park, IL 60477-6243
NEC 2005 Handbook	10th		Mark W. Earley et al.	National Fire Protection Association	(www.nfpa.org), 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
NFPA 70 National Electrical Code		2005		National Fire Protection Association	(www.nfpa.org), 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
Uniform Mechanical Code		2006		IAPMO-International Association of Plumbing and Mechanical Officials	(www.iapmo.org), 5001 E. Philadelphia St., Ontario, CA 91761-2816
Uniform Plumbing Code		2007		IAPMO-International Association of Plumbing and Mechanical Officials	(www.iapmo.org), 5001 E. Philadelphia St., Ontario, CA 91761-2817
Uniform Plumbing Code		2006		IAPMO-International Association of Plumbing and Mechanical Officials	(www.iapmo.org), 5001 E. Philadelphia St., Ontario, CA 91761-2818