

Architect -- Measurable Outcomes

				Bloom level						
				No Knowledge	Knowing	Understanding	Applying	Analyzing	Synthesizing	Evaluating
				0	1	2	3	4	5	6
1 PROGRAMMING										
1	1	Understand the process for the preparation of an architectural programme								
	1	1.1.1	Identify the components of an architectural programme							
	2	1.1.2	Describe the steps needed to prepare an architectural programme for a client							
1	2	Analyze an architectural programme								
	1	1.2.1	Analyze a architectural program regarding its feasibility (project constraints and opportunities)							
	2	1.2.2	Analyse the program regarding the site components							
	3	1.2.3	Analyze the program regarding the proposed budget							
	4	1.2.4	Compare program with the client's objectives							
1	3	Understand the principles of sustainable development within an architectural project								
	1	1.3.1	Describe the principles of sustainable development							
	2	1.3.2	Identify optimal site design							

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2				SITE AND ENVIRONMENTAL ANALYSIS							
2 1				Understand the principles related to the siting of a building and its environment: land planning, urban design and environmental evaluation							
		1	2.1.1	Describe the physical, cultural and regulatory factors related to site planning							
		2	2.1.2	Explain urban design issues and planning processes that influence the design of a building on a specific site							
		3	2.1.3	Identify strategies for dealing with environmental, social and economic issues in site evaluation ***more to add here							
2 2				Apply the principles related to the siting of a building to its environment							
		2	2.2.1	Understand the principles of grading and storm water management as they apply to site design							
		3	2.2.2	Describe the relationship between energy consumption and site design							
		5	2.2.3	Apply the principles of sustainable development to site design							
2 3				Analyze data relevant to the siting of a building to its environment							
		1	2.3.1	Understand data from environmental and engineering reports to determine design opportunities/constraints							
		2	2.3.2	Understand data from a legal land survey							

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3				SCHEMATIC DESIGN							
3 1				Understand aspects of schematic design							
		1	3.1.1	Identify the information required for schematic design, given specific conditions							
			3.1.2	Describe impact of factors such as human behaviour, historic precedent and design theory in schematic design							
		2	3.1.3	Categorize the engineering services required for the schematic design of a given project (program, clients and context)							
		3	3.1.4	Identify the documentation typically prepared for the client's approval of the schematic design							
		4	3.1.5	Explain the scope of building code analysis in schematic design							
		4	3.1.6	Describe impacts of universal accessibility as it applies to site design							
		5	3.1.7	Describe the impacts of universal accessibility on schematic design							
		6	3.1.8	Explain the principles of sustainable design as they relate to schematic design							

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3.2				Apply the principle of Schematic Design to craft solutions							
			3.2.1	Apply building codes, specialty codes, zoning and other regulation requirements to craft a viable set of schematic design solutions							
			3.2.2	Demonstrate ability to formulate design concept that integrate programming requirements derived from spacial relationships							
		1	3.2.3	Formulate a building siting solution given a specific site, selected physical factors and design criteria							
		2	3.2.4	Compare design solutions based on site and environmental analysis in section 2 and understanding of aspects of schematic design described above							
		3	3.2.5	Demonstrate ability in preparation and presentation of design concept, drawings and models							

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4	COORDINATING ENGINEERING SYSTEMS (STRUCTURAL, MECHANICAL, ELECTRICAL, CIVIL)										
4	1	Understand engineering systems									
		1	4.1.1	Describe the main properties of the structural system;							
				4.1.1.1 Application of general structural <u>principles</u> to building design & construction							
				4.1.1.2 Application of <u>codes & regulatory requirements</u> on the design of the structure							
				4.1.1.3 Analysis of implications of design decisions in the selection of systems, <u>materials and technology</u> , and construction details related to general structural design							
				4.1.1.4 Site and <u>Environmental</u> characteristics in the selection, design, and construction of structural system							
		2	4.1.2	Understanding Seismic Forces							
				4.1.2.1 Application of lateral force <u>principals</u> to the design & construction of buildings to resist seismic forces							
				4.1.2.2 Incorporation of building <u>code & other regulatory requirements</u> related to seismic forces							
				4.1.2.3 Analysis of the implications of design decisions in the selection of systems, materials and construction details related to seismic forces							
				4.1.2.4 Analysis of site & <u>environmental characteristics</u> in the selection, design, and construction of building structural systems related to seismic forces							

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		3	4.1.3	Wind Forces							
				4.1.3.1 Application of lateral force <u>principals</u> to the design & construction of buildings to resist wind forces							
				4.1.3.2 Incorporation of building <u>code</u> & other regulatory requirements related to wind forces							
				4.1.3.3 Analysis of the implications of design decisions in the selection of systems, <u>materials</u> and construction details related to wind forces							
				4.1.3.4 Analysis of site & <u>environmental characteristics</u> in the selection, design, and construction of building structural systems related to wind forces							
		4	4.1.4	Plumbing							
				4.1.4.1 Principals governing analysis and design of plumbing systems							
				4.1.4.2 Codes relevant to plumbing systems							
				4.1.4.3 Materials & Technology: Evaluation & selection of materials and details related to plumbing systems							
		5	4.1.5	Fire Protection							
				4.1.5.1 Relevant codes and their effect requirements for sprinkler systems & their design							
				4.1.5.2 Impact of sprinkler protection on size & construction of the building							
				4.1.5.3 Evaluation and selection of fire detectio & suppression systems							

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		6	4.1.6	Heating, ventilation, and air conditioning systems;							
				4.1.6.1 Analysis & comparison of HVAC systems							
				4.1.6.2 Sustainability & HVAC systems							
		7	4.1.7	Describe the main properties of the electrical system (lighting, electricity supply and distribution, fire alarm system, security and communications systems);							
				4.1.7.1 Codes relevant to electrical systems & fire alarm systems							
				4.1.7.2 Sustainability & Lighting systems							
		8	4.1.8	Describe the main properties of the civil engineering system (drainage, water supply, infrastructure);							
				4.1.8.1 Civil design impact on the site							
				4.1.8.2 Interface with municipal systems & approval process, service agreements etc.							

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4	2	Analyze engineering systems and their impacts on the project									
		1	4.2.1	Compare the advantages and limitations of the structural system;							
		2	4.2.2	Compare the advantages and limitations of the mechanical systems.							
		3	4.2.3	Describe impact of Structural, Mechanical and Lighting systems on the building form							
4	3	Coordinate engineering systems documentation									
		1	4.3.1	Demonstrate ability to coordinate with the consultants;							
		2	4.3.2	Identify the key stages at which coordination should occur							
		3	4.3.3	Coordinate the engineering systems documentation with the architectural documentation.							

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				No Knowledge 0	Knowing 1	Understanding 2	Applying 3	Analyzing 4	Synthesizing 5	Evaluating 6	
5 COST MANAGEMENT											
5 1 Understand the factors influencing cost											
		1	5.1.1 Identify the factors influencing cost								
		2	5.1.2 Evaluate cost implications of design decisions								
5 2 Evaluate cost management											
		1	5.2.1 Critique the client's budget in conjunction with the program and the conditions for completing the project								
		2	5.2.2 Critique the recommendations made to a client following a value analysis								
5 3 Understand the various methods of estimating cost											
		1	5.3.1 Describe the methods for estimating cost both at preliminary (schematic design) and implementation (design development/contract documents) stages of a project								
5 4 Apply estimating methods within the framework of a project.											
		1	5.4.1 Identify the resources available to do a cost estimate								
		2	5.4.2 Differentiate between the concepts of construction costs, project costs and overall costs								
		3	5.4.3 Use the preferred estimating method in a given situation								

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6	CODE RESEARCH									
6	1	Apply the National Building Code and other building codes, as relevant								
	1	6.1.1	Interpret Code requirements respecting classification of buildings							
	2	6.1.2	Interpret Code requirements respecting non-combustible construction							
	3	6.1.3	Interpret Code requirements respecting fire separations							
	4	6.1.4	Interpret Code requiremerements respecting fire fighter access							
	5	6.1.5	Interpret Code requirements respecting sound separations							
	6	6.1.6	Interpret Code requirements respecting safety within floor areas							
	7	6.1.7	Interpret Code requirements respecting exits							
	8	6.1.8	Determine occupant load given specific requirements							
	9	6.1.9	Interpret regulations respecting health requirements							

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		10	6.1.10	Interpret Code requirements respecting barrier-free design and universal accessibility							
		11	6.1.11	Identify the referenced documents and organizations included in the Code							
		12	6.1.12	Determine which Code parts apply to specific building types							
		13	6.1.13	Identify measures for high rise buildings							
		14	6.1.14	Identify measures for inter-connected floor space							

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7				DESIGN DEVELOPMENT							
7 1				Understand aspects of design development							
		1	7.1.1	Identify the information required for design development, given specific conditions							
		2	7.1.2	Apply and explain the building construction system and materials choices made to a particular design							
		3	7.1.3	Categorize the engineering services required for the design development of a given project (program, clients and context)							
		4	7.1.4	Produce necessary schedules and outline specifications for materials, finishes, fixed equipment, fixtures, construction time and construction cost							
		5	7.1.5	Identify the documentation typically prepared for the client's approval of the design development							
		6	7.1.6	Identify the documentation and steps required for approval from authorities having jurisdiction (usually municipal planning departments)							
		7	7.1.7	Explain the scope of building code analysis in design development							
		8	7.1.8	Describe the impacts of universal accessibility on design development							
		9	7.1.9	Understand hazardous material mitigation, indoor air quality, sustainability, energy conservation, and alternative systems and their application during schematic design							

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8 CONSTRUCTION DOCUMENTS										
8 1 Understand principles of engineering and their influence on design and documentation										
		1	8.1.1 Explain general structural principles;							
		2	8.1.2 Explain general mechanical principles (plumbing, heating, ventilation, air conditioning, fire protection, conveyance systems);							
		3	8.1.3 Explain the principles of soil mechanics							
		4	8.1.4 Explain the principles of foundations							
		5	8.1.5 Explain the principles of building envelope							
		6	8.1.6 Explain the principles of acoustic design for a building							

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					0	1	2	3	4	5	6
8	2	Know construction materials, their properties and influence on design and documentation									
		1	8.2.1 Choose the appropriate materials for a given project								
		2	8.2.2 Identify the main properties of load-bearing materials (metal, wood, concrete, masonry)								
		3	8.2.3 Identify the properties of the types of building framework (metal, wood, concrete, masonry)								
		4	8.2.4 Identify the properties of the main types of insulating materials								
		5	8.2.5 Identify the properties of the main types of air/vapour/water barriers								
		6	8.2.6 Identify the properties of the main types of finishing materials								
		7	8.2.7 Identify the impact of materials and processes on health and the environment								
8	3	Understand construction processes and their influences on design and documentation									
		1	8.3.1 Describe foundation systems as they relate to soil types and conditions								
		2	8.3.2 Describe the role of components in a building envelope								
		3	8.3.3 Choose construction methods that are appropriate to given criteria (cost, timing, durability, aesthetics, performance) and environmental conditions								

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					0	1	2	3	4	5	6
8	4	Evaluate material assemblies and their influence on design and documentation									
		1	8.4.1 Evaluate an acoustic assembly								
		2	8.4.2 Evaluate a firestop assembly								
		3	8.4.3 Evaluate an assembly of materials in relation to its thermal resistance								
		4	8.4.4 Evaluate an assembly of materials in relation to moisture control								
		5	8.4.5 Evaluate an assembly of materials in relation to its air-tightness								
		6	8.4.6 Develop a structural system with a wooden frame from data provided								

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					0	1	2	3	4	5	6
8	5	Understand the components of the construction documents									
		1	8.5.1	Describe the contents of the specifications							
		2	8.5.2	Describe the function of the specifications							
		3	8.5.3	Describe the function of the working drawings							
		4	8.5.4	Know the main components of and explain the relationships among the components of the construction documents							
8	6	Understand the principles of writing a technical specification									
		1	8.6.1	Explain the links between the MasterFormat and the National Master Specification (NMS)							
		2	8.6.2	Distinguish among the divisions of the NMS that are common or specific to each of the disciplines (architecture, structural, mechanical, electrical, etc.)							
		3	8.6.3	Match a construction element to the appropriate division of the MasterFormat							
		4	8.6.4	Describe the components of a typical MasterFormat specification section							
		5	8.6.5	List the rules related to writing a good specification							

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8	7	Evaluate the components of the construction documents									
		1	8.7.1	Verify that products, materials and assemblies conform to standards and codes							
		2	8.7.2	Check that architectural documents are coordinated and complete							
		3	8.7.3	Demonstrate a knowledge of professional responsibilities and liabilities arising from the issuance of construction documents							
		4	8.7.4	Administer professional services and construction contracts							
		5	8.7.5	Demonstrate knowledge of issues pertaining to practice including risk management and professional and business ethics							

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9 BIDDING AND CONTRACT NEGOTIATIONS											
9	1	Understand the different methods of realizing construction projects									
		1	9.1.1 Differentiate between the forms of project delivery								
9	2	Understand the types of construction contract									
		1	9.2.1 Identify the different types of construction contract								
		2	9.2.2 Explain the purpose of the CCDC construction documents								
		3	9.2.3 Describe the responsibilities of partys in a construction contract								
9	3	Understand the methods for the awarding of a construction contract									
		1	9.3.1 Describe the responsibilities of each party involved in the tendering process								
		2	9.3.2 Describe the role of the local construction associations and bid depositories in the tendering process								
		3	9.3.3 Describe the methods for the awarding of a construction contract								
		4	9.3.4 Describe the stages of a standard tendering process								
		5	9.3.5 Describe the documentation required for each phase of the tendering process								

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9 4				Evaluate the bids submitted by the contractors							
		1	9.4.1	Describe architect's responsibility in making recommendations							
		2	9.4.2	Assess bid submissions							
		3	9.4.3	Describe the process of evaluating submitted tenders							
		4	9.4.4	Demonstrate knowledge of bid and performance bonds and their role in the tendering process							
10				CONSTRUCTION PHASE - OFFICE							
10 1				Understand the roles of the architect and other participants in the administration of the construction contract							
		1	10.1.1	Explain the roles and responsibilities of the architect in the administration of a given construction contract							
		2	10.1.2	Explain the roles and responsibilities of the client (owner) in the administration of a given construction contract							
		3	10.1.3	Explain the roles and responsibilities of the contractor in the administration of a given construction contract							
		4	10.1.4	Understand the mechanism in which you participate in resolutions of disputes and interpretation of conflicts relating to the contract documents							
		5	10.1.5	Understand the mechanism in which you participate in the assembly of evidence and preparation of testimony to be used before an arbitration panel or in court							

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				0	1	2	3	4	5	6
10	2		Understand office administration tasks related to the different stages of a construction contract							
	1	10.2.1	Explain the tasks related to the construction phase (from the initial construction meeting, throughout construction and close-out, until the end of the warranty period)							
	2	10.2.2	Describe the documentation required of the contractor prior to commencement of construction							
	3	10.2.3	Describe the type of documentation required to effect changes to the construction contract							
	4	10.2.4	Explain the tasks involved in processing payment for the work							
	5	10.2.5	Explain the tasks involved in the review of shop drawings and submittals							

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	6	10.2.6	Explain the terms of a contract related to deficiencies, take-over procedures, commissioning, indemnification and warranty							
10	3	Apply the administration forms appropriate to different aspects of construction								
	1	10.3.1	Complete a certificate for payment							
	2	10.3.2	Complete a change order							
	3	10.3.3	Complete relevant forms or reports (substantial completion, final inspection, field review, etc.)							
	4	10.3.4	Understand professional obligations relating to the builders lien act							
11	CONSTRUCTION PHASE - SITE									
11	1	Understand the roles of the architect and the other participants in the administration of a construction contract								
	1	11.1.1	Explain the roles and responsibilities of the architect in the administration of a given construction contract							
	2	11.1.2	Explain the roles and responsibilities of the client (owner) in the administration of a given construction contract							
	3	11.1.3	Explain the roles and responsibilities of the contractor in the administration of a given construction contract							
	4	11.1.4	Explain the roles and responsibilities of the architect with respect to inspection and testing firms							

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11	2	Understand site tasks related to the different stages of a construction contract								
		1	11.2.1	Explain the tasks related to the construction phase on site (from the initial construction meeting, throughout construction and close-out, until the end of the						
		2	11.2.2	Describe the procedures for monitoring construction progress						
		3	11.2.3	Explain the terms of the construction contract related to field review						
		4	11.2.4	Explain the terms of the construction contract related to the takeover procedures						
		5	11.2.5	Explain the terms of the construction contract related to issues of hazardous materials and toxic substances						
11	3	Apply the administration forms appropriate to different aspects of construction								
		1	11.3.1	Complete relevant forms or reports (meeting report, field review, etc.)						
		2	11.3.2	Demonstrate awareness of contractual and professional obligation related to the observation of construction						

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12 PROJECT MANAGEMENT										
12 1 Understand the principles of project management and the provision of professional services										
		1	12.1.1 Explain the project management process;							
		2	12.1.2 Describe the role of the individuals involved in a project (project manager, internal and outside resources)							
		3	12.1.3 Describe the contents of a project file							
12 2 Evaluate a work plan										
		1	12.2.1 Identify the main components of a work plan;							
		2	12.2.2 Explain the essential elements of effective team management (communications, objectives, etc.)							
		3	12.2.3 Describe the quality assurance process for a project;							
		4	12.2.4 Evaluate a given work plan.							

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13				PROFESSIONALISM AND PROFESSIONAL PRACTICE							
13 1				Understand the principles of business management							
		1	13.1.1	Practice management							
		2	13.1.2	Fees							
		3	13.1.3	Describe the contents of a project file							
		4	13.1.4	Document managing							
13 2				Roles and Responsibilities.....							