A DESIGN FOR ARCHITECTURAL EDUCATION

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Introduction



- "Architects make blueprints."
- This thesis intends to address the public perception of Architecture through an educational setting.
- Process begins with development of an educational curriculum for instruction in architectural design principles.
- Process continues with an architectural program (based on curriculum) to facilitate the instructional aspect.
 - Process concludes with an architectural design that demonstrates the method by which the educational curriculum and architectural program have been incorporated into a built form.

"We shape our buildings; thereafter they shape us"

Sir Winston Churchill



Thesis Statement

This thesis will provide a design solution for a building to facilitate instruction of an educational curriculum related to architectural design principles.





Architecture is the art and science of designing buildings. The practice of architecture includes design from the macro-level (civic centers, subdivisions, urban planning and landscape design) to the micro-level. (furniture and product design).

There are three key aspects considered in this thesis:

1.0 Architecture:

- Touches our lives in every way by the manner in which we exist and present ourselves through our buildings.
- The environment provided by the design must reflect the subject matter in order to teach and provide experiential learning.





2.0 Education:

- Architects educate the client:
 - Explain the process
 - To analyze the problem
 - Propose the design solution

This thesis

- Creates opportunity for awareness and understanding
- Encourages positive development of attitudes and approaches.

Educational delivery process:

- Attendance one half-day each week
- Process based on Components of Differentiated Learning (Differentiating Instruction in the Regular Classroom Diane Heacox, Ed.D.):

CONTENT: What is to be taught.

PROCESS: How is it to be delivered.

PRODUCT: Show what you have learned.

ENVIRONMENT: Where would the learning take place.





3.0 Students:

- Retain capability and freedom to absorb new ideas and concepts
- Stereotypes relative to the built environment remain flexible
- Identifying their personal space and role within the community
- Developing a greater awareness of themselves in their world
- Have the language and comprehension skills necessary to discuss concepts and ideas relative to architectural design





Stage One <u>Research and Programming</u>

The first stage researches architectural design principles relative to proposed educational components.

The Research Process:

- Research of the specific component: existing literature, history and developments.
- Analysis relative to architectural design.
- Development of curriculum and instructional guidelines in coordination with Education Advisors.
- Development of spatial and functional program for each area.
- Review of the specific item with the advisor team to ensure relative aspects have been addressed.
- Additional research as required.



Curriculum Components

ABSTRACT:

{Definition of architectural relevance}

PREAMBLE:

{General course outline, course extent, etc}

COMPONENT INTIATIVE:

{Goals for providing this component: what do we hope to achieve}

COMPONENT COURSE MATERIALS:

{The instructional meat of the course}

- background
- reasons for learning
- relevance to architectural design

INSTRUCTIONAL STRATEGY:

{Fixed options will be expanded upon}

- Direct Instruction
- Indirect Instruction
- Experiential Learning
- Independent Study
- Interactive Instruction

ACTIVITIES:

{Student activity listing for participating in the class}

- Oral
- Visual
- Kinesthetic Written



Curriculum Components

ASSESSMENT METHOD:

{Assessment for student performance/retention evaluation}

- Pencil & paper method
- Performance assessment
- Personal assessments

COMMON ESSENTIAL LEARNINGS:

{How educational component fits the Common Essential Learnings}

- Communication
- Creative and Critical Thinking
- Independent Learning
- Numeracy
- Technological Literacy
- Personal & Social Values & Skills

ENVIRONMENT:

{Type of environment required}

- Classroom Climate
 - Physical Setting
 - Flexible student groupings
 - Extensions beyond classroom setting
 - Community experiences

MATERIALS / RESOURCES REQUIRED:

- {Listing of required materials}
 - In-room supplies
 - External supplies





Curriculum Sections

- Section 1.0: Architectural History of Western Civilization
- Section 2.0: The Science of Buildings
- Section 3.0: Art in Architectural Design
- Section 4.0: Sociology and Architectural Design
- Section 5.0: Geography
- Section 6.0: Mathematics
- Section 7.0: Architectural Design Elements



Section 1.0: Architectural History of Western Civilization

<u>Thesis Proposal:</u>

- Major periods of development
- Influence of context on period architecture
- Analysis of the development of early architecture
- Evolution from master builder to design consultant and architect
- Great architectural triumphs: Vitruvius, Palladio, Brunelleschi, the Renaissance architectural movement
- Modern architecture and current trends;
- Historic Precedents
- Influences in terms of period and style.
- Use of precedents in current architectural design.

<u>Curriculum:</u>

- The Ancient World
- Egyptian Architecture
- Greek Architecture
- Roman Architecture
- Early Christian Architecture
- Byzantine Architecture
- Romanesque Architecture
- Gothic Architecture
- Renaissance Architecture
- Baroque Architecture
- The Eighteenth Century
- The Nineteenth Century
- The Twentieth Century





Section 2.0: The Science of Buildings

Thesis Proposal:

- Review building materials and their intended use
- Basic engineering concepts in design and construction
- The effects of climate, location, solar influence (uses and drawbacks), wind, rain, snow



<u>Curriculum:</u>

- Building Materials
- Seasonal Construction
- Structural Force Loads
- Structural Systems
- Building Orientation
- Wind / Snow / Rain Penetration
- Thermal Insulation / Vapour Barrier
- Air Leakage / Humidity Condensation
- Sealants





Section 3.0: Art in Architectural Design

Thesis Proposal:

- Development of a design
- Use of a sketch book
- Use of graphics to communicate the design solution.
- Bubbles, diagrammatic views, graphic symbols, means and methods by which to illustrate the idea
- Artistic composition: Creating a display to convey a design solution.





Curriculum:

- Development of Design
- Art within Architecture
- Article I Sketching
- Article II Graphic Presentation/Analysis
- Article III Artistic Composition



Section 4.0: Sociology

<u>Thesis Proposal:</u>

- The Concept of Space:
 - Personal and private spaces
 - Spatial separation
- Context of Society:
 - Concept of societal values (North American model)
 - Public and private relationships
 - Territory
- Role of the architect:
 - The influence of architects building design and city planning
 - Communicative and coordinative role
 - Design compromises, aspects of sacrifice
 - Reasons for including specific design elements to suit program requirements.

Curriculum:

- The Context of Society
- Cultural Traits
- Individual Social Aspects
 - Self-Worth/Friendship Formation
 - Group Involvement
 - Personal Space
 - Personal Status
 - Individual and Group Territory
 - Communication
 - Personal Safety and Security
 - The Role of Architectural Design







Section 5.0: Geography



<u>Thesis Proposal:</u>

- Land forms and topography
- Soil types soil conditions, contextual nature
- Orientation (views/vistas): a principle for design resolution.
- Wind and water elements: orientation and topography; building systems; wind patterns and climatic effects

<u>Curriculum:</u>

- Five Modes of Understanding
- Topography / Soil
- Orientation
- Solar Orientation
- Wind & Water Elements
- Urban Design
- City Planning Models
- Energy and Environmental Design
- Civic Environmental Design







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- Thesis Proposal: Building and Area calculations:
 - programmatic planning
 - area calculations
 - building estimating
- Proportional geometry:
 - proportional relationships in building design. design/planning as a
 - 0 mathematical construct
 - review of the Golden Section



Curriculum:

- Cost Estimating
 Estimating Methods
 Factors influencing estimating
 Building Development Costing
- Mathematical Factors
- **Estimate Types** 0

Mathematical Building Analysis Materials Analysis Life Cycle Costing

- Ö
- Value Engineering Project Delivery Methods
- **Design Area Calculations**

Geometry

- Basic Geometry •
- Golden Rectangle
- Fibonacci Number Series
- **Right Angle Analysis**





Section 7.0: Architectural Design Elements

Thesis Proposal:

- Colour
 - Relationship colour to emotion
 - Colour used for affect and contrast
 - Colour principles
- Light/Shadow
 - Natural lighting
 - Perception of surfaces and voids
 - Integration of natural/artificial light
 - The use of shadows
- Mass/Volume:
 - Definition of massing
 - Context
 - Interior spatial arrangements
 - Exterior appearance
- Texture:
 - Surface definition
 - Texture for purpose and effect
- Perceptions (Visual/Physical):
 - Stereotypes of building designs
 - Contraventions of design
 - The use of perception to benefit a design solution.

Curriculum:

- The Process of Design
- Architectural Design Elements
 - Materials
 - Color
 - Line
 - Shape
 - Mass
 - SpaceTexture
- Architectural Design Principles
 - Balance
 - Connection
 - Contrast
 - Emphasis
 - Form
 - Grouping
 - ImageryMeaning
 - Symbolism
 - Pattern
 - Placement/Proximity
 - Proportion
 - Rhythm
 - Scale
 - Unity
 - Variety
- Additional Design Considerations
 - Function
 - Time
 - Lighting in Architectural Design
 - Acoustic Influences in Design
 - Architecture and the Environment
 - Landscaping and Architectural Design







<u>Design Programme</u>

A design programme of individual room areas was generated upon completion of each curriculum section.

- These programme items were completed in conjunction with the teaching requirements of the curriculum
- Each space was reviewed relative to its specific requirements, spatial qualities and special features including design influences from the curriculum sections.
- The total design programme is available for review upon the web distribution site.

Number	Section Name					
L. L. I.	Architectural History: Lecture Area					
Visuality and the order of reproduction	Lottine series con	a byy	summer motivial locatoms			
Ecole des Beaux Arts. Remaissance in fluences relative to		Slide presentation of building types illustrated from handou				
the proportions of man. See also the Modular as proposed		materials. Audio visual presentations.				
ty LeCortaisner		Stud ent rosearch				
Brvfronment		Material Recou	roes			
Spen classroom layout, resource area, li heatre.	ecture assembly	Audio/visual reso	uræs. Mat	enals reproduction services.		
Spatal Requirements						
ecture TheaterPresentation area for vi- just speakers	ewing of Audio/Visua	il presentations, spok	n word lee	tares, student presentations and		
Number of Students Numbe	rof Staff	Principal Ro	om Size	Storage Requirements		
30	L	112		4		
Group Accommodation	Support Faoilitie	6	Ad lace	nt Relation thin s		
lassroom setting for group instruction	Storage zones for a'	Storger zones for aly materials, staff		e research area, art ar ta for		
En vironmental Variable s Standard for classroom settings						
Acousto Reguirements	Thermal Regulrements		Visual Requirements			
Spoken Word, enhanced woice systems, proup discussion capabilities	Standard requirements for instructional setting s		Vistal access for both eror and/o'vista recentations, flexible lighting conditions, day light			
Utility Service & Required	Dimiay Regularments		Special Fouls ment			
Basic utility services, write and data	Display area for illustrations and		Audio/Visual equipment, data projector			
spalalities, cety capabilities, computer modern'laptop connections	artifacts, display for student works		projection screens, voice enhancement systems			
Furnishing 6	adations, research and	ONE COMMUNICATION	Determine of the	c. form		
concerning proof screen processing						
Other Hem s						

<u>Design Programme</u>

The design programme breakdown includes:

- Room Number: Based on Section Number including sub-sections
- Section Name: As assigned
- Section Influence: Influential aspects of the curriculum.
- Instructional Strategy: Identifies the instructional methods intended.
- Environment: Identifies the type of space required.
- Material Resources: Identifies special materials.
- Spatial Requirements: Outline of the spatial functions and activities.
- Number of Students: Identifies the anticipated students.
- Number of Staff: Identifies the number of personnel.
- Principal Room Size: Identifies spatial requirements (sm)
- Storage Requirements: Identifies the storage area requirements (sm).
- Group Accommodation: Identifies anticipated group usage.
- Support Facilities: Describes the support facilities.
- Adjacent Relationships: Identifies the relationship to other spaces.
- Environmental Variables: Critical environmental factors.
- Acoustic Requirements: Identifies the acoustical needs of the area.
- Thermal Requirements: Identifies ventilation, equipment, exhaust.
- Visual Requirements: Identifies visual access or separation.
- Utility Services Required: Identifies the utility needs for the area.
- Display Requirements: Identifies display requirements.
- Special Equipment: Identifies specialty operational equipment.
- Furnishings: Identifies the type of furnishings.
- Others: Identifies any additional essential information.

<u>Design Programme</u>

Design Programme Influences:

Section 1.0: Architectural History of Western Civilization

- Vitruvius and the order of proportion.
- The Grid theory of Ecole des Beaux Arts.
- Renaissance influences relative to the proportions of man.
- Use of Materials to reflect historical development

Section 2.0: The Science of Buildings

- Clearly identifiable structural elements.
- Allow for study of structure to occur within facility.
- Exposed structure to illustrate influences.

Section 3.0: Art in Architectural Design

- Display areas for sketch materials and presentation submission.
- Areas allowed for sketching in groups.
- Natural elements and materials for sketch purposes.

Section 4.0: Sociology and Architectural Design

- Study of human nature, social observations, interactive relationships
- Role playing in class setting for situations

Section 5.0: Geography

• Land forms, contextual placement, natural force influences, landscaping; bringing the exterior in - unity between spaces

Section 6.0: Mathematics

- Allowances for special circumstances relative to areas of study
- Geometric study and analysis of the building form, clear geometry

Section 7.0: Architectural Design Elements

- Influence on design strategies on composition: light, shade, texture, colour, composition and presentation.
- Clear Massing, volume and spatial resolution.





Design Areas

The calculations for room areas area are based on:

- historical education area data as provided by SaskLearning
- spatial allowances for staffing and teaching environments
- percentage mark-ups for spaces such as building support areas, circulation and wall thickness allowances.

These area calculations total the gross square footage for the facility.

		Staffing/Students Area		
ltem.	Area Name	Units	Unit Rate	Subtotal
1.0	Instructional Area			
	Lecture Area			888.75
	Lab Area			804.33
				1693.08
2.0	Resource Area			
	General Resource Area	319	0.5	159.60
	Seminar / Computer	9	5	45
	Resource Administrator	9	7	63.00
	Media Storage	268	15%	40.14
				307.74
3.0	Administration			
3.1	Administrator's Office	1	14.00	14.00
3.2	General Office	2	12.00	24.00
3.3	Workroom	319	0.20	63.84
3.4	Visiting Lecturer	1	12.00	12.00
3.5	Staff Room	319	0.20	63.84
3.6	Staff Lockers	32	0.44	14.04
3.7	Staff Washrooms	23	4.40	13.49
3.8	General Storage	319	0.15	47.88
				253.10
4.0	Building Support Services			
4.1	Student Washrooms	21	3.00	63.84
4.2	Maintenance Areas		10%	201.00
4.3	Building Service Areas		5%	110.55
4.4	Student Commons		20%	338.62
				714.01
5.0	AREA TOTAL			2967.93
6.0	Circulation		20%	593.59
7.0	Wall Allowance		9%	320.54
8.0	GRAND TOTAL			3882.05

Design Areas

The calculations for the individual room areas (sm) are based on:

- historical education area data as provided by SaskLearning
- anticipated number of students and staff within each space
- spatial allowances for staffing and teaching environments
- percentage mark-ups for spaces such as circulation and storage allowances.

These area calculations total the net square footage for the instructional spaces within the facility.

1.0	INSTRUCTIONAL AREA BREAKDOWN	N (Note: Areas contained in Total Area Spreadsheet)							
ltem.	Curriculum Course Section	Lecture Area							
		Students	Student Area	Instructors	Instructor Area	Circulation	Storage	Sub-total	
1.1	Architectural History of Western Civilization	30	75.00	1.00	15.00	18.00	4.50	112.50	
2.1	Science of Buildings	30	75.00	2.00	30.00	21.00	15.75	141.75	
3.1	Art in Architecture	30	75.00	1.00	15.00	18.00	4.50	112.50	
4.1	Social Elements	30	75.00	2.00	30.00	21.00	4.50	130.50	
5.1	Geology / Geography	30	75.00	2.00	30.00	21.00	4.50	130.50	
6.1	Mathematics	30	75.00	2.00	30.00	21.00	4.50	130.50	
7.1	Design Elements	30	75.00	2.00	30.00	21.00	4.50	130.50	
		210		12.00					
								888.75	
ltem.	Curriculum Course Section	Lab Area							
		Students	Student Area	Instructors	Instructor Area	Circulation	Storage	Sub-total	
1.2	Architectural History of Western Civilization	20	74.25	2.00	29.70	20.79	15.59	140.33	
2.2	Science of Buildings	30	112.50	3.00	67.50	36.00	27.00	243.00	
3.2	Art in Architecture	20	74.25	2.00	29.70	20.79	15.59	140.33	
4.2	Social Elements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5.2	Geology / Geography	20	74.25	2.00	29.70	20.79	15.59	140.33	
6.2	Mathematics	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7.2	Design Elements	20	74.25	2.00	29.70	20.79	15.59	140.33	
		109		11.00					
								804.33	

<u>Design Areas</u>



Design Areas Special Conditions:



- Student Commons:
 - Student Commons included as a central circulation space for the overall facility.
 - Area will serve as observation (Social), sketching (Art) and study (History and Design).
 - Area will also contain water elements (Geography)
- Individual room areas:
 - Individual room areas have been separated to include spaces for instructors and storage within each element. This is a response to the dedicated nature of the facility relative to the instruction.
- Additional storage:
 - Additional storage requirements identified for each space, based on percentage allowances of the net floor area for the specific space.
- Circulation allowance:
 - Circulation allowance is increased to allow for additional display, observation and gathering spaces around the facility.
 - Special features:
 - Commons serves as the student hub.
 - All areas of the curriculum bear influence on the design solution parti.
 - Future site development:
 - Site has to allow for bus accommodation to serve individual classes in each instructional area.
 - Site area also must allow for exterior class instruction around the facility.





Stage II Analysis and Design

Part Two: Building Design Solution

Buildings, too, are children of Earth and Sun Frank Lloyd Wright

This stage will create a design solution that embodies and reflects the principles developed through the Research Stage.

This stage will carry on from Stage One through:

- Site selection and analysis,
- Conceptual design and design development;
- Graphic analysis and integration of research concepts into design solutions;
- Final design solution;
- Graphic / verbal presentations;
- Final Presentation documentation and arrangement.



The Next Step

Stage II to follow....



... Questions and Feedback