OVERVIEW OF STRUCTURES

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Syllabus & Student Understandings
Bloom’s Revised Taxonomy

“Applied”

**Introduction 3**
**Lecture 1**
**Applied Architectural Structures**
**ARCH 631**

**Knowledge**
*Recall/regurgitate facts without understanding. Exhibits previously learned material by recalling facts, terms, basic concepts and answers.*

- Choose
- Copy
- Define
- Duplicate
- Find
- How
- Identify
- Label
- List
- Listen
- Locate
- Match
- Memorise
- Name
- Observe
- Spell
- Quote
- Tell
- Recall
- Trace
- Recite
- When
- Record
- Where
- Relate
- Which
- Remember
- Who
- Repeat
- Why
- Reproduce
- Write
- Retell
- Select

**Comprehension**
*To show understanding finding information from the text. Demonstrating basic understanding of facts and ideas.*

- Ask
- Cite
- Classify
- Compare
- Contrast
- Demonstrate
- Discuss
- Estimate
- Explain
- Express
- Extend
- Generalise
- Give examples
- Illustrate
- Indicate
- Infer
- Interpret
- Match
- Observe
- Outline
- Predict
- Purpose
- Relate
- Rephrase
- Restate
- Review
- Show
- Summarise
- Translate

**Application**
*To use in a new situation. Solving problems by applying acquired knowledge, facts, techniques and rules in a different way.*

- Act
- Administer
- Apply
- Associate
- Build
- Calculate
- Categorise
- Choose
- Classify
- Connect
- Construct
- Correlation
- Demonstrate
- Develop
- Dramatise
- Employ
- Experiment
- with
- Select
- Show
- Simulate
- Solve
- Summarise
- Teach
- Transfer
- Translate
- Use

**Actions:**
- Describing
- Finding
- Identifying
- Listing
- Locating
- Naming
- Recognising
- Retrieving

**Outcomes:**
- Definition
- Fact
- Label
- List
- Quiz
- Reproduction
- Test
- Workbook
- Worksheet

**Outcomes:**
- Classifying
- Comparing
- Exemplifying
- Explaining
- Inferring
- Interpreting
- Paraphrasing
- Summarising
- Collection
- Examples
- Explanation
- Label
- List
- Outline
- Quiz
- Show and tell

**Outcomes:**
- Carrying out
- Executing
- Implementing
- Using

**Outcomes:**
- Demonstration
- Diary
- Illustrations
- Interview
- Journal
- Performance
- Presentation
- Sculpture
- Simulation
### Bloom’s Revised Taxonomy

#### “Applied” Lecture 1

**Introduction 4**

**Applied Architectural Structures**

**ARCH 631**

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**High Level Thinking Skills**

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<th>Synthesis</th>
<th>Evaluation</th>
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<td>Elaborate</td>
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**Actions:**

1. Attribute
2. Deconstructing
3. Integrating
4. Organising
5. Outlining
6. Structuring

**Outcomes:**

1. Abstract
2. Chart
3. Checklist
4. Database
5. Graph
6. Mobile
7. Report
8. Spreadsheet
9. Survey

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**Outcomes:**

1. Constructing
2. Designing
3. Devising
4. Inventing
5. Making
6. Planning
7. Producing

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**Outcomes:**

1. Advertisement
2. Film
3. Media product
4. New game
5. Painting
6. Plan
7. Project
8. Song
9. Story

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**Actions:**

1. Attributing
2. Checking
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**Outcomes:**

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Reading Quizzes
Course Description

• synthesis in structural design
  – form and function
  – safety
  – serviceability
  – feasibility

• context of
  – design codes (loads, method, limits)
  – material properties and behavior
Architectural Space and Form

- structure is a device for channeling loads that result from the use and/or presence of the building to the ground
  - span a roof
  - hold up a floor
  - cross a river
  - suspend a canopy

www.pbs.org/wgbh/buildingbig/
Structure Definition

• alternatively:
  “a physical entity having a unitary character that can be conceived of as an organization of positioned constituent elements in space in which the character of the whole dominates the interrelationship of the parts”
Structural Organization

• classifications
  – geometry
    • line-forming
    • surface-forming
  – stiffness
    • rigid
    • flexible
  – one-way or two-way
    • spatial organization and load transfer
  – materials
Structural Components

• bearing walls
• columns
• beams
• flat plates
• trusses
• arches
• shells
• cables
Bearing Walls
Beams & Plates
Beams & Plates

(a)

(b)
Stone + Masonry

- columns
- walls
- lintels
- arches

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Wood

- columns
- beams
- trusses
Steel

- cast iron – wrought iron - steel
- cables
- columns
- beams
- trusses
- frames

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Concrete

- columns
- beams
- slabs
- domes

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Applied Architectural Structures
ARCH 631
Building Framing

- Components or Assemblages

(a) Common types of horizontal spanning systems (one, two, and three level systems) used in relation to different types of load-bearing wall and columnar vertical support systems.
**Building Framing**

Decking carries roof loads by bending.

Decking reactions become forces on beams (which carry loads by bending).

Beam reactions become forces on trusses.

Truss reactions cause compressive forces to develop in columns.

Columns are in compression.

Column reactions become forces on foundations (which distribute the forces into the earth).
System Selection

- evaluation of alternatives
Structural Design Criteria

- components stay together
- structure acts as whole to be stable
  - resist sliding
  - resist overturning
  - resist twisting and distortion
- internal stability
  - interconnectedness
- strength & stiffness