SAULT COLLEGE
of Applied Arts and Technology
Sault Ste. Marie

COURSE OUTLINE

ARCHITECTURAL ENGINEERING
III

ARC 205-4

revised June 1981 by G. Frech

ARCHITECTURAL DRAFTING TECHNICIAN

ARC 205-4

TEXT:

C.I.S.C. Metric Structural Steel Design Manual

Simplified Engineering for Architects and Builders - Parker

REFERENCE TEXTS:

Simplified Design of Structural Steel - Parker

Simplified Design of Roof Trusses - Parker

Theory of Simple Structures - Shedd and Vater

A.I.S.C. Shop Drafting

Smolye's Tables

Limit States Design Steel Manual - C.I.S.C.

Limit States Design in Structural Steel - C.I.S.C.

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Topic No.	Periods	Topic Description	Reference
1		Design - Beams 1. Loading 2. Design Loads 3. Flexure Formula 4. Beam Choice 5. Wall Plates 6. Shear & Crippling 7. Deflection	
2		Design - Columns 1. Loading 2. K Factor 3. Col. Formulae - Steel-Wood 4. Col. Design 5. Base Plates	
3		Connections 1. Tables 2. Riveted (Bolted) 3. Welded	
4		Clearance & Interference 1. Gauge Lines 2. Pitch 3. Centers 4. Shop & Field Clearance 5. Cuts, Copes	
5		Dwgs 1. Grid System 2. Details 3. Notes 4. Column Schedules	
6		Trusses 1. Stress Diagrams 2. Stresses 3. Member Design 4. Smoleys Tables	

ARCHITECTURAL TECHNICIAN

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The general objective of the course is to give the student a working knowledge into the design, framing and use of tables for structural shapes. Working in conjunction with an architectural project he will design and place the framework properly. He must upon completion be able to do basic design in S.I., Imperial, and Limit States for the following:

UNIT D-1 -- Loading & Design

1. Identify loading on beams and girders.
2. Calculate building and design loads.
3. Review flexure formula and use this in design of beams under different loading conditions.
4. Design most economical sections.
5. By use of the steel handbook formula, design wall bearing plates.

UNIT D-2 -- Column & Base Plates

1. Identify columns under axial load.
2. Identify K factor for column end restraint.
3. Identify least radius of gyration.
4. Calculate slenderness ratio $\frac{KI}{r}$ and relate it to short intermediate or long cols.
5. Identify Euler's col. formula.
6. Identify the Gordon Rankine formula.
7. Identify a straight line formula.
8. Know the procedure for column design (rules).
9. Design a column under single direct axial loading.
10. Identify column base plates and design a simple base plate by use of the base plate design formula in either the C.I.S.C. or A.I.S.C. handbook
11. Identify wood columns of rectangular shapes, their stress allowable from tables and the design of wood columns using an empirical formula from any timber handbook or the column chapter in Strength of Materials text.

UNIT D-3 -- Standard Connection Tables

1. Use the tables for bolted (riveted) connections in either A.I.S.C. or C.I.S.C. handbook for the design of standard connections.
2. Use the tables for welded connections in either the A.I.S.C. or C.I.S.C. handbook for the design of standard welded connections.
3. Solve problems using tables for standard connections: beam to column; beam to beam.

UNIT D-4 -- Clearance and Interference

1. Identify clearance and interference for field or shop assembly.
2. Identify gauge lines, pitch and centers for connections.
3. Identify cuts and copes.
4. Calculate copes for beam to beam or beam to column situations.
5. Identify the symbols for shop connections, field connections and open holes.

UNIT D-5 -- Grid System Information

1. Identify the grid system as used on construction and architectural drawings.
2. Identify column schedules.
3. Identify and draw column base details as required on construction plans.
4. Identify anchor plans and show information properly concerning column bases.
5. Apply the information above to the student's drawing and design project, along with all design and data sheets.

UNIT D-6 -- Truss Forces Graphically and Analytically

1. Identify and use Bow's Notation with respect to loads and truss members.
2. Draw to scale force and stress diagrams for trusses using Bow's Notation.
3. Measure stresses accurately from the stress diagram and determine whether the member(s) is in tension or compression.
4. Identify forces in a truss analytically - method of joints.
5. Calculate mathematically, stresses at panel points or a truss using laws of equilibrium, and indicate tension or compression.