Instructor: Professor Keith Bisharat

Lecture: Tuesdays and Thursdays 8:00 AM – 8:50 AM
Lab 1: Tuesday 9-11:50 AM
Lab 2: Thursday 9-11:50 AM
4003 Riverside Hall

Email: bisharat@ecs.csus.edu

Office hours by appointment
4024 C Riverside Hall
CM 21 – Construction Graphics

Course Description
Instruction and exercises in graphic techniques and procedures applicable to construction. The analysis of drawings in the civil, architectural, structural, mechanical and electrical fields and discussion of how drawings affect construction planning. Freehand sketching. Multiview, isometric and oblique presentations. Quantity surveying.

Prerequisites
CM 20 and competence in the fundamentals of technical drawing (Engineering 4 at CSUS) or the express permission of the instructor and Program Coordinator are the prerequisites for this class. Students must have completed all prerequisite classes with a grade of C- or better to be admitted to this class. Qualified students who have enrolled through Casper will be given the highest priority for admittance to overenrolled classes. Other qualified students will be admitted if room is available.

Academic Honesty and Grading System
All students are subject to the policies described in the University Catalogue. In particular, students should be familiar with policies described on pages 81-91, pages 98-106, and pages 328-331 in the 2006-2008 CSUS Catalogue. Any instance of academic dishonesty will result in a grade of “F” for the course and all other sanctions as applicable under the current university policy. Academic dishonesty includes, but is not limited to, copying another student’s work or using a computer or cell phone to access information when their use has been prohibited.

General Course Objectives
Generally, this course is designed to demonstrate the value of drawings to the construction professional. Among other things, students will learn how a set of construction drawings is organized and why. They will learn how to find and interpret the information contained in construction drawings; and they will exercise three critical communication skills: listening, speaking, and drawing.

Specific Learning Outcomes
After completing this course, students should be able to:

1. Translate construction graphics to words, and vice versa
2. Produce multi-view, isometric, and oblique drawings and understand their application
3. List and define plan views; exterior, interior, and framing elevations, and detail, wall, and building sections and their shortcomings
4. Identify the limits of two and three dimensional depictions of construction elements, components, and assemblies
5. Produce accurate free-hand sketches of simple construction components
6. Use architectural, engineering, and metric scales to determine the planned sizes of elements, components, and systems in construction
7. Properly dimension the components that make up a simple structure
8. Develop a topographic map from a survey grid using mathematical and graphic interpolation techniques.
9. Produce site sections and describe their value to the constructor
10. Explain and interpret utility profiles
11. Perform simple quantity surveys for earthwork, foundations, structural framing, roofing and flashing, mechanical equipment and ductwork, plumbing, electrical work, and finishes in standard US units as well as SI (metric) units.

12. Describe the role of the design professional in the project development process.

13. Describe the various roles that the constructor plays in construction projects.

14. Work productively individually as well as a member of a team.

15. Produce a detailed framing model of a building project after clarifying the team work scope, estimating the required materials, determining the schedule, and coordinating the team’s work with other construction teams.

Textbook (Required)

The University library contains copies of the required text. Students who choose not to purchase this text are nonetheless required to complete the assigned work.

References
Allen, Edward. The Architect’s Studio Companion.
Ching, Frank. Design Drawing.
Leibing, Ralph. Architectural Working Drawings.
Muller, Fausett, and Grau. Architectural drawing and Light Construction.
Wakita and Linde. The Professional Practice of Architectural Detailing.

Materials and Equipment (Required)*
Half-sized set of drawings (project to be announced). These plans will be available in the vault at Brownie’s Blueprints, 13th and V streets in downtown Sacramento. Ask for them by project name at the customer counter or via telephone. Printing costs vary, so ask for the least expensive drawing type and for a CSUS student discount. Allow several hours for the plans to be copied. Ordering plans by telephone prior to a trip to Brownie’s is recommended. (See contact details below.) The following equipment is required, unless noted otherwise:

- Bound sketchbook, available at most book stores and drawing supply retailers
- Architectural, engineering, and metric scales (those that are triangular in section are best)
- Mechanical (0.05mm and 0.09mm) or wood pencils (minimally, a 3H or 4H pencil for outline work, B or No. 2 for most sketching, and 2B, 3B or 4B for bold dark lines).
- A portable pencil or lead sharpener, if mechanical pencils are not used
- White plastic eraser
- One medium-sized 30°/60°/90° triangle and a medium-sized 45° triangle

* Drawing plans, materials, and equipment are required no later than the first day of class in the second week.

Materials and Equipment (Suggested)
- Compass
- Template of ellipses
- Erasing shield, dust brush
- Adjustable triangle
Drafting equipment is available at the Hornet Bookstore (recently completed by ’93 CSUS grad Rich Miller, project manager, Roebbelen Contracting), at office supply stores such as Office Depot, Office Max, Staples and the following:

University Art  
2601 J Street, Sacramento, CA 95816  
(916) 443-5721

Brownie’s Blueprint  
1322 V Street, Sacramento, CA 95818  
(916) 443-1322 or (800) 942-COPY(2679)

California Surveying & Drafting  
4733 Auburn Blvd., Sacramento, CA 95841  
(916) 344-0232 or (800) 243-1414  
Fax: (916) 344-2998

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Fax: (916) 344-2998

Utrecht Art Supply Center  
1612 Howe Avenue, Sacramento, CA 95825  
(916) 641-6400

Course Organization  
Class sessions of fifty minutes in length will be held twice weekly. A laboratory of 2 hours and 50 minutes will be held once weekly. Course time will be devoted to a combination of lecture and work on selected exercises and/or drawings. Quizzes will be given every week for 10 weeks starting in the second week of the semester.

Fundamental drafting skills are reviewed in the first few class meetings, followed by analyses of construction drawings in a sequence that approximates how buildings are constructed. The course requires students to learn by doing. Some exercises can be completed during the scheduled class period, while others will require more than one lab period and may require work outside the class. Assignments build on one another; students are encouraged to keep current. Academic work, like physical exercise, requires activity—one must do to accomplish.

Evaluation of Students’ Performance  
Course grades will be based on 10 quizzes and a final project (scale model). Student work will be evaluated for technical content, clarity, thoroughness, and accuracy. The scale model, to be constructed in teams, will be evaluated on planning, accuracy, completeness, and neatness. Students are expected to know their model well and should be able to answer on-the-spot questions during their presentations. Students will be required to evaluate their own performance, as well as that of their teammates. These evaluations will be factored into the semester grade. Students are required to complete all assignments and submit a completed sketchbook including: 1) assignments designated by the instructor; 2) drawings of the student’s choice; and 3) purposeful “doodles.” Students must do all the work assigned and must submit their completed sketch books no later than November 27, 2007, in order to receive a semester grade. Late assignments will not be accepted; exceptions will be made for documented medical and family emergencies.

Grades will be weighted as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>80%</td>
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<tr>
<td>Final Project</td>
<td>20%</td>
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<tr>
<td>Total</td>
<td>100%</td>
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Grading  
Grades will be assigned in accordance with the grading policy of the university as outlined in the section entitled “Grading System” in the current copy of the university catalog.
### Tentative Instruction Schedule for Fall 2007

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/4</td>
<td>Introduction – review syllabus, record class goals</td>
<td>1, 2</td>
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<tr>
<td></td>
<td>9/6</td>
<td>Equipment, lines, lettering, assignment format,</td>
<td>3, 4</td>
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<tr>
<td>2</td>
<td>9/11</td>
<td>Sketching techniques; (proficiency exam—lab)</td>
<td>5</td>
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<tr>
<td></td>
<td>9/13</td>
<td>Sketching techniques; Quiz 1 (proficiency exam—lab)</td>
<td>3</td>
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<tr>
<td>3</td>
<td>9/18</td>
<td>Projection types</td>
<td>4</td>
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<td></td>
<td>9/20</td>
<td>Graphic conventions: scale, symbols, dimensioning; Quiz 2</td>
<td>4</td>
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<tr>
<td>4</td>
<td>9/25</td>
<td>Scale, symbols, dimensioning</td>
<td>4</td>
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<td></td>
<td>9/27</td>
<td>Interpreting construction drawings; Quiz 3</td>
<td>handout</td>
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<tr>
<td>5</td>
<td>10/2</td>
<td>Topographic maps;</td>
<td>6</td>
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<td>10/4</td>
<td>Site sections, earth quantity take-offs; Quiz 4</td>
<td>handout</td>
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<tr>
<td>6</td>
<td>10/9</td>
<td>Foundation drawings</td>
<td>7</td>
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<td>10/11</td>
<td>Foundation drawings Quiz 5</td>
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<td>7</td>
<td>10/16</td>
<td>Framing drawings, concrete take-offs</td>
<td>8</td>
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<td>10/18</td>
<td>Framing drawings; Quiz 6</td>
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<tr>
<td>8</td>
<td>10/23</td>
<td>Framing drawings</td>
<td>8</td>
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<td>10/25</td>
<td>Building and wall sections; Quiz 7</td>
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<td>9</td>
<td>10/30</td>
<td>Roof plans, sections, and details</td>
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<td>11/1</td>
<td>Roofing and flashing take-off; Quiz 8</td>
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<td>10</td>
<td>11/6</td>
<td>Interior construction, finishes,</td>
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<td>11/8</td>
<td>Mechanical drawings – plumbing and piping; Quiz 9</td>
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<td>11</td>
<td>11/13</td>
<td>Mechanical drawings – HVAC, take-off</td>
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<td>11/15</td>
<td>Electrical drawings; Quiz 10</td>
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<tr>
<td>12</td>
<td>11/20</td>
<td>Scale model assigned</td>
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<td></td>
<td>11/22</td>
<td>THANKSGIVING HOLIDAY</td>
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<td>13</td>
<td>11/27</td>
<td>Scale model scope letter due; complete sketchbooks due</td>
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<td></td>
<td>11/29</td>
<td>Scale model estimate and schedule due</td>
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<td>14</td>
<td>12/4</td>
<td>Scale model construction</td>
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<tr>
<td></td>
<td>12/6</td>
<td>Scale model construction</td>
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<td>15</td>
<td>12/11</td>
<td>Scale model presentations - Field Trip (lab)</td>
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<td></td>
<td>12/13</td>
<td>Scale model presentations - Field Trip (lab)</td>
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