

## OUTCOMES BASED LEARNING MATRIX

**Course: ESTIMATING ARCH-252**

**Department: ARCHITECTURAL TECHNOLOGY**

**Course Description:** This course considers cost per square foot, assemblies, and unit cost methods for estimating construction projects. Sample projects representing commercial and residential construction are used in computer labs for complete estimates. Working drawings and specifications are used for estimating quantities. Reference manuals, CD's and estimating software complement the specifications and drawings. 3 credits

| <b>*COURSE OUTCOMES</b>   | <b>OUTCOMES ACTIVITIES</b>  | <b>ASSESSMENT TOOLS</b>  |
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| 1. The student shall be able describe the use of AIA documents as they pertain to specifications so as to analyze scope of project for contractual relationship                                   | <ul style="list-style-type: none"> <li>- Read specifications and drawings</li> <li>- Listen to lecture with the use of AIA - sample documents distributed to students -</li> <li>- Participate in class discussion for interaction of comments</li> <li>- Compose a sample contract document</li> <li>- Listen to a lecture</li> <li>- Compare, discuss and revise contract documents</li> <li>- Reference applicable portions of related documents</li> <li>- Submit a sample contract</li> </ul> <p style="text-align: center;">R,W,TS,OC,CT,QT</p>   | <p>Quiz on AIA documents 201</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on reports</p> <p style="text-align: center;">R,W,TS,OC,CT,QT</p>                           |
| 2. The student shall describe the differences between 'assemblies cost', 'unit cost' and, 'cost per square foot' methods of estimating to compare the accuracy of estimating by different methods | <ul style="list-style-type: none"> <li>- Read specifications and drawings</li> <li>- Listen to lecture comparing assembly, unit and cost per square foot methods of estimating</li> <li>- Compare the assemblies cost, unit cost and cost per square foot method for estimating</li> <li>- Create sample estimating worksheets</li> <li>- Suggest alternate methods of construction based on comparison of cost</li> <li>- Submit a report</li> <li>- Develop alternate systems if applicable</li> <li>- Assess the overall project for cost</li> </ul> | <p>Quiz on examples of different methods of estimating</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on reports</p> <p style="text-align: center;">R,W,TS,OC,CT,QT</p> |

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| 3. The student shall analyze the differences between 'open' and 'union' shops to compare the different types of organization in a company structure for bidding purposes | <ul style="list-style-type: none"> <li>- Listen to lecture comparison of labor cost for 'Open Shop' and 'Union Shop'</li> <li>- Participate in class discussion</li> <li>- Compare the advantages from owner's perspective</li> <li>- Discuss limitations of where 'open shop' would meet with resistance from union labor</li> <li>- Compare cost estimate if to be done by union and open shop</li> <li>- Write report on advantages and disadvantages of 'open shop' vs 'union shop'</li> <li>- Discussion of student's experience</li> </ul> <p>R,W,OC,CT,QT</p>  | <p>Quiz based on lecture and class discussion</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on student reports on comparison for advantages and disadvantages</p> <p>Evaluation of verbal presentation of pros and cons of union vs non- union as applicable</p> <p>R,W,TS,OC,CT,QT</p>   |
| 4. The student shall be able to determine and derive costs factors that influence a building design to derive at a competitive bid                                       | <ul style="list-style-type: none"> <li>- Listen to lecture on building design, construction systems, availability of materials, and union labor as it influences the cost of a building</li> <li>- Review specifications and drawings</li> <li>- Use manuals and computers to estimate proposed building</li> <li>- Compare systems to derive at most economical cost</li> <li>- Revise documents to accommodate alternate systems as recommended by alternate suggested systems when reviewing documents</li> <li>-Analyze and document alternate systems</li> <li>-Write a sample report to owner if a negotiated bid</li> </ul> <p>R,W,TS,OC,CT,QT</p> | <p>Quiz on class discussion and text pertaining to influences</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on student reports from material suppliers to determine a revised economical efficient system</p> <p>Evaluation of thoroughness of estimate</p> <p>Evaluation of complexity of estimate and completion of estimate</p> <p>R,W,TS,OC,CT,QT</p> |

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| <p>5. The student shall be able to provide an analysis of comparative systems and techniques to determine economic construction</p>  | <ul style="list-style-type: none"> <li>- Listen to lecture of the different structural systems and techniques</li> <li>- Discuss and compare effects of economic factors, location of structure to be built, projected labor costs, and what the influence of each factor has on the final construction project</li> <li>- Read assignment</li> <li>- Refer to building specifications</li> <li>- Read and review drawings</li> <li>- Contact with professional societies representing their specialty type of construction</li> <li>- Evaluate and compare each specialty type of construction</li> <li>- Analyze each specialty type of construction from an economic stand point</li> <li>- Discuss the structural systems</li> </ul> <p>Write and submit a report based on a comparative evaluation of each system</p> <ul style="list-style-type: none"> <li>- Use the Internet for sources of system manufacturers</li> </ul> <p>R,W,TS,OC,CT,QT</p> | <p>Report on analysis of systems comparison</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on student reports</p> <p>Evaluation of verbal presentation</p> <p>Evaluation of the extent of Internet research from material suppliers</p> <p>Evaluate the extent to which a student researches the product and alternate products</p> <p>R,W,TS,OC,CT,QT</p>                 |
| <p>6. The student shall be able to utilize RS Mean's 'Unit costs' reference manuals to compare methods of 'unit costs' 'assemblies costs', and 'costs per square foot' basis</p> | <ul style="list-style-type: none"> <li>- Listen to lecture explaining the different methods of estimating and comparison of each with reference to accuracy</li> <li>- Compare reasons why cost per square foot is the least accurate and unit cost the most accurate</li> <li>-Determine flexibility and negotiations for determining accuracy of carrying out an estimated evaluation</li> <li>- Estimate examples from drawings</li> <li>- Discuss methods and techniques</li> </ul> <p>Suggest revisions to drawings to decrease</p>   | <p>Quiz on selected samples as explained in class pertaining to the 3 methods of estimation</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on student reports</p> <p>Evaluation of verbal presentation</p> <p>Evaluation of the extent of Internet research from material suppliers</p> <p>Evaluate the extent to which a student researches the product and alternate</p> |

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|  | <p>cost</p> <ul style="list-style-type: none"> <li>- Write reports on suggested alternate construction systems</li> <li>-Submit a report on the most economical system</li> </ul> <p>R,W,TS,OC,CT,QT</p>  | <p>products</p> <p>R,W,TS,OC,CT,QT</p>   |
| <p>7. The student shall be able to utilize RS Means 'Cost per square foot' manuals to determine the cost of a building</p> | <ul style="list-style-type: none"> <li>-Listen to lecture on the use of tables and sample breakdowns to provide an estimate on the 'Cost per square foot method'</li> <li>- Interpolate values between published and actual values</li> <li>- Apply cities index appropriate for location of building</li> <li>- Set up a list for alternate suggestions to decrease cost</li> <li>- Recommend alternate techniques for more efficient and economical structure</li> <li>- Consider alternate materials and price accordingly for a more economical structure</li> <li>- Implement and coordinate recommendations</li> </ul> <p>R,W,TS,OC,CT,QT</p> | <p>Quiz on estimating a building using RS Means manuals on the ' Cost per square foot' basis</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on student reports</p> <p>Evaluation of verbal presentation</p> <p>Evaluation of the extent of Internet research from material suppliers</p> <p>Evaluate the extent to which a student researches the product and alternate products</p> <p>R,W,TS,OC,CT,QT</p> |
| <p>8. The student shall be able to utilize RS Means 'Assemblies method' to determine the cost of a building</p>            | <ul style="list-style-type: none"> <li>- Listen to lecture on the use of data as pertains to sample breakdowns of a building as estimated by the assemblies method</li> <li>- Interpolate values between published and actual values</li> <li>- Apply cities index appropriate for location of building</li> <li>- Set up a list for alternate suggestions to decrease cost</li> <li>- Recommend alternate techniques for</li> </ul>  | <p>Quiz on estimating a building using RS Means manuals on the 'Assemblies Method'</p> <p>Class participation</p> <p>Small group presentation</p> <p>Oral Feedback</p> <p>Written feedback on student reports</p> <p>Evaluation of verbal presentation</p> <p>Evaluation of the extent of Internet research from material suppliers</p> <p>Evaluate the extent to which a student</p>  |

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|  | <p>more efficient and economical structure</p> <ul style="list-style-type: none"> <li>- Consider alternate materials and price accordingly for a more economical structure</li> <li>- Implement and coordinate recommendations</li> </ul> <p>R,W,TS,OC,CT,QT</p> | <p>researches the product and alternate products</p> <p>R,W,TS,OC,CT,QT</p> |
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\*Try to express an outcome as an infinitive phrase that concludes this sentence: **At the end of the course, the students should be able to . . .** Finding the line between too general and too specific can be difficult. In an English Composition course, for instance, it is probably too general to say, "The student should be able to write effective essays." It is probably too specific to say, "The student should be able to write an introductory paragraph of at least 50 words, containing an attention-getting device, an announcement of the narrowed topic, and an explicit thesis sentence." Just right might read, "The student will write introductions that gather attention and focus the essay."

\*\*Indicate the Core Competencies that apply to the outcomes activities and assessment tools: Critical Thinking (CT); technology skills (TS); oral communications (OC); quantitative skills (QS); reading (R); writing (w).