**Cabinet and Furniture Technology (CFT)**

Contact the Trade and Industry Department for further information. 
(760) 744-1150, ext. 2545
Office: T-102A
For transfer information, consult a Palomar College Counselor.

**Associate in Science Degrees** -
AS Degree requirements are listed in Section 6 (green pages).
- Cabinetmaking and Millwork
- Carving Technology
- Case Furniture Construction/Manufacturing
- Guitar Making Technology
- Lathe Turning Technology
- Table and Chair Manufacturing
- Veneering Technology
- Woodworking Skills Technology

**Program Requirements**

- **CFT 100** Fundamentals of Woodworking 4
- **CFT 105** Machine Woodworking/Furniture 4
- **CFT 108** Business Woodworking 2
- **CFT 153** Studio Furniture Design I 2
- **CFT 159** Advanced Design 2
- **CFT 195** Finishing Technology/Touch-Up and Repair 2

**Electives (Select 4 units)**

- **CFT 142** The Art and Craft of Planemaking 2
- **CFT 143** Decorative Box Making 2
- **CFT 144** Production Wood Products I 1
- **CFT 148** Marquetry, Inlay and Veneering 2
- **CFT 163** Plastic Laminate Fabrication Techniques 1
- **CFT 169** Cabinetmaking/Computer Cabinet Layout 2

**TOTAL UNITS** 27-28

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**Carving Technology**

Carving Technology prepares students to make a living at woodcarving. Students explore use of tools and techniques used in carving wood as it applies to furniture and architectural millwork. Students will begin by gaining skill in simple layouts and learn to sharpen and maintain tools. As student progresses, both low and high relief carving as well as incised lettering will be mastered. Period furniture and architectural carvings are eventually mastered. Students will be qualified carvers in furniture shop or prepared to start own business.

**A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT**

- **CFT 100** Fundamentals of Woodworking 4
- **CFT 105** Machine Woodworking/Furniture 4
- **CFT 108** Business Woodworking 2
- **CFT 118** Furniture Design Development 2
- **CFT 153** Studio Furniture Design I 2
- **CFT 149** Hand Joinery I 2
- **CFT 187** Introduction to Carving 2
- **CFT 188** Intermediate Carving 2
- **CFT 189** Advanced Carving 2
- **CFT 195** Finishing Technology/Touch-Up and Repair 2

**Electives (Select 4 units)**

- **CFT 142** The Art and Craft of Planemaking 2
- **CFT 143** Decorative Box Making 2
- **CFT 144** Production Wood Products I 1
- **CFT 148** Marquetry, Inlay and Veneering 2
- **CFT 163** Plastic Laminate Fabrication Techniques 1
- **CFT 169** Cabinetmaking/Computer Cabinet Layout 2

**TOTAL UNITS** 22

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**Case Furniture Construction/Manufacturing**

This program will prepare students to make a living manufacturing case furniture. The emphasis will be on utilizing construction processes and building skills to fabricate solid wood furniture with doors and drawers. By studying historic period furniture pieces students will apply traditional methods of construction to modern and contemporary designs while also developing production methods to increase efficiency and profit. Students will learn to work with clients to design and construct either period furniture pieces or custom contemporary pieces.

**A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT**

- **CFT 100** Fundamentals of Woodworking 4
- **CFT 105** Machine Woodworking/Furniture 4
- **CFT 108** Business Woodworking 2
- **CFT 110A** Period Case Furniture Design 4
- **CFT 111A** Period Case Furniture Production 4
- **CFT 118** Furniture Design Development 2
- **CFT 118** Furniture Design Development 2
- **CFT 111A** Period Case Furniture Production 4
- **CFT 195** Finishing Technology/Touch-Up and Repair 2

**Electives (Select 2 units)**

- **CFT 142** The Art and Crafts of Planemaking 2
- **CFT 143** Decorative Box Making 2
- **CFT 148** Marquetry, Inlay and Veneering 2
CFT 169  Cabinetmaking/Computer Cabinet Layout  2
CFT 170  Workbench Design and Production  2
CFT 175  Jigs/Fixtures and Routers  2
CFT 185  Machine Tool Set-Up and Maintenance  2

TOTAL UNITS  24

Table and Chair Manufacturing
Table and chair furniture is unique in that it is highly interactive with people who use them. Design and joinery must consider comfort, aesthetics and structure. This program will prepare students to make a living manufacturing table and chair furniture. The study of historic period pieces will enable students to apply traditional methods of construction to modern and contemporary designs. The finest furniture in the world is handmade and yet production methods can/will be applied to increase efficiency and profit.

A.S. DEGREE MAJOR OR
CERTIFICATE OF ACHIEVEMENT

Program Requirements
CFT 100  Fundamentals of Woodworking  4
CFT 108  Business Woodworking  2
CFT 132A  Ukulele Making I/Tenor Ukulele  4
CFT 133A  Guitar Technician II/Set-Up  2
CFT 134A  Electric Guitar Construction/Solid Body  2
CFT 135  Acoustic Guitar Making I  4
CFT 136  Acoustic Guitar Making II  4
CFT 149  Hand Joinery I  2
CFT 195  Finishing Technology/Touch-Up and Repair  2

Electives (Select 2 or more units)
CFT 130  Stringed Instruments I  3 - 5
CFT 131  Stringed Instruments II  3 - 5
CFT 132B  Ukulele Making II  4
CFT 133B  Guitar Technician II/Major Repair  2
CFT 134B  Electric Guitar Construction II/Custom  4
CFT 137  Arch Top Guitar Construction I  4
CFT 138  Arch Top Guitar Construction II  4

TOTAL UNITS  28

Veneering Technology
The world's most beautiful woods are processed into veneers. Veneered furniture has a rich history in both period and contemporary furniture. This program will prepare students to make a living manufacturing veneered furniture. The study of historic period pieces will enable students to apply traditional methods of construction to modern and contemporary designs. Students will be able to design and fabricate period furniture as well as contemporary furniture pieces which use veneer as the primary visual wood or utilize veneer in the visual design elements of the piece. Students will be able to work with a client to design and fabricate commissioned veneered furniture pieces. Students will also be able to design a line of furniture, which can be fabricated, utilizing a combination of production methods of hand craftsmanship. The finest furniture in the world is handmade and yet production methods can/will be applied to increase efficiency and profit.

A.S. DEGREE MAJOR OR
CERTIFICATE OF ACHIEVEMENT

Program Requirements
CFT 100  Fundamentals of Woodworking  4
CFT 108  Business Woodworking  2
CFT 118  Furniture Design Development  2
CFT 135A  Classic American Chair Designs  2
CFT 135B  Classic American Chair Designs  2
CFT 136A  Ukulele Making II  4
CFT 136B  Ukulele Making II  4
CFT 138  Arch Top Guitar Construction II  4
CFT 139  Finishing Technology/Touch-Up and Repair  2

Electives (Select 2 units)
CFT 142  The Art and Craft of Planemaking  2
CFT 156  Advanced Classic American Chair Designs  2
CFT 170  Workbench Design and Production  2
CFT 173  Bamboo Fly Rod Building  2
CFT 180  Wood Bending and Lamination/Wood Technology  2
CFT 185  Machine Tool Set-Up and Maintenance  2
CFT 198  Advanced Wood Finishing  2

TOTAL UNITS  24

Veneering Technology
The world's most beautiful woods are processed into veneers. Veneered furniture has a rich history in both period and contemporary furniture. This program will prepare students to make a living manufacturing veneered furniture. The study of historic period pieces will enable students to apply traditional methods of construction to modern and contemporary designs. Students will be able to design and fabricate period furniture as well as contemporary furniture pieces which use veneer as the primary visual wood or utilize veneer in the visual design elements of the piece. Students will be able to work with a client to design and fabricate commissioned veneered furniture pieces. Students will also be able to design a line of furniture, which can be fabricated, utilizing a combination of production methods of hand craftsmanship. The finest furniture in the world is handmade and yet production methods can/will be applied to increase efficiency and profit.

A.S. DEGREE MAJOR OR
CERTIFICATE OF ACHIEVEMENT

Program Requirements
CFT 100  Fundamentals of Woodworking  4
CFT 108  Business Woodworking  2
CFT 118  Furniture Design Development  2
CFT 135A  Classic American Chair Designs  2
CFT 135B  Classic American Chair Designs  2
CFT 136A  Ukulele Making II  4
CFT 136B  Ukulele Making II  4
CFT 138  Arch Top Guitar Construction II  4
CFT 139  Finishing Technology/Touch-Up and Repair  2

Electives (Select 2 units)
CFT 142  The Art and Craft of Planemaking  2
CFT 156  Advanced Classic American Chair Designs  2
CFT 170  Workbench Design and Production  2
CFT 173  Bamboo Fly Rod Building  2
CFT 180  Wood Bending and Lamination/Wood Technology  2
CFT 185  Machine Tool Set-Up and Maintenance  2
CFT 198  Advanced Wood Finishing  2

TOTAL UNITS  24
## Woodworking Skills Technology

The finest furniture in the world is hand made. Skilled craftsmen are rare and valuable. There is always a market for quality. This program will prepare students to make a living at woodworking with an emphasis on hand skills, traditional methods and European craftsmanship. Students will gain competence in the use of hand tools, power tools, and power machines and be able to properly select and safely use, operate them. Students will be able to sharpen all of hand tools used. Students will gain basic proficiency in the following processes/techniques/skills: lathe turning, carving, wood bending, veneering, hand joinery and finishing. Students will also be able to write a business plan and gain an understanding of the operations of running a small business.

### A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

#### Program Requirements

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<thead>
<tr>
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<td>Furniture Design Development</td>
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<td>CFT 110A</td>
<td>Period Case Furniture Production</td>
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<td>CFT 113</td>
<td>Studio Furniture Design I</td>
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<td>CFT 114</td>
<td>Hand Joinery I</td>
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<td>CFT 115</td>
<td>Veneering Technology I</td>
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<td>CFT 116</td>
<td>Introduction to Woodturning</td>
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<td>CFT 117</td>
<td>Wood Bending and Lamination/Wood Technology</td>
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<td>CFT 118</td>
<td>Jigs/Fixtures and Routers</td>
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<td>CFT 119</td>
<td>Timber Framing Technology</td>
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<tr>
<td>CFT 120</td>
<td>Business Woodworking</td>
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<tr>
<td>CFT 121</td>
<td>Producing and Marketing</td>
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#### Electives (Select 2 units)

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<td>CFT 143</td>
<td>Decorative Box Making</td>
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<td>CFT 144</td>
<td>Production Wood Products I</td>
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<tr>
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<td>CFT 146</td>
<td>Advanced Classic American Chair Designs</td>
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<td>CFT 147</td>
<td>Bamboo Fly Rod Building</td>
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<td>CFT 148</td>
<td>Jigs/Fixtures and Routers</td>
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<td>CFT 149</td>
<td>Timber Framing Technology</td>
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### TOTAL UNITS

22

#### COURSE OFFERINGS

Courses numbered under 100 are not intended for transfer credit.

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<td>Studio Furniture Design I</td>
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<td>CFT 148</td>
<td>Marquetry, Inlay and Veneering</td>
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<td>CFT 151</td>
<td>Veneering Technology I</td>
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<tr>
<td>CFT 152</td>
<td>Veneering Technology II</td>
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<td>CFT 195</td>
<td>Finishing Technology/Touch-Up and Repair</td>
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<tr>
<td>CFT 175</td>
<td>Jigs/Fixtures and Routers</td>
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<td>CFT 156</td>
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<td>CFT 142</td>
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<td>CFT 145</td>
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<td>CFT 175</td>
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<tr>
<td>CFT 180</td>
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### Electives (Select 2 units)

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<td>CFT 145</td>
<td>Production Wood Products I</td>
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<td>CFT 146</td>
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<tr>
<td>CFT 180</td>
<td>Wood Bending and Lamination/Wood Technology</td>
<td>2</td>
</tr>
</tbody>
</table>

#### TOTAL UNITS

22

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Additional information can be found in the Palomar College 2015-2016 Catalog or at the provided URL.
CFT 120  Advanced Furniture Lab  (5, 1, 1.5, 2, 2.5, 3)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
Laboratory for students who need additional lab time to complete difficult, complex projects. Students will work under the supervision of an instructor.

CFT 122  Cabinetmaking Construction Lab  (5, 1, 1.5, 2, 2.5, 3)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
Laboratory for students who need additional lab time to complete difficult cabinet and other complex projects. Students will work under the supervision of an instructor.

CFT 124  Chair and Table Construction Lab  (5, 1, 1.5, 2, 2.5, 3)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
Provides additional laboratory time to complete complex projects required in other classes.

CFT 128  Stringed Instruments Lab  (5, 1, 1.5, 2, 2.5, 3)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
Laboratory for students who need additional lab time to complete difficult stringed instruments or other complex projects. Students will work under the supervision of an instructor.

CFT 130  Stringed Instruments I  (3, 4, 5)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
Through the fabrication of a steel stringed guitar, students will study the history, tone theory, construction processes, materials, finishing and set up of stringed instruments. Students will work together, production style, milling raw lumber from local sources into guitar part blanks. Students will then work individually constructing their own guitar. Traditional and modern methods of construction and fabrication are explored.

CFT 131  Stringed Instruments II  (3, 4, 5)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
A continuation of CFT 130, and the second semester of a year long curriculum. Students will complete the construction of the body, neck, and other components of the instrument. Finishing and final set-up techniques will be covered and utilized by students.

CFT 132A  Ukulele Making I/Tenor Ukulele  (3-5)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
Introduction to the processes and construction details for building a tenor ukulele. Major topics include acoustic theory and mill and fabrication of components for stringed instruments. Each student must complete an individual tenor ukulele.

CFT 132B  Ukulele Making II  (3-5)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 132A, or concurrent enrollment in CFT 132A
Students will construct an ukulele while concurrently preparing jigs, molds and fixtures for ukulele production. Students will also explore advanced techniques of embellishment and various ukulele models.

CFT 133A  Guitar Technician I/Set-Up  (2-4)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
Use techniques to analyze and diagnose common guitar repair issues. Determine options and techniques in the repair of common problems, with an emphasis on basic set-up and minor repair.

CFT 133B  Guitar Technician II/Major Repair  (2-4)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 133A
Use techniques to analyze and diagnose common guitar repair issues. Determine options and techniques in the repair of common problems, with an emphasis on major repair and advanced set-up.

CFT 134A  Electric Guitar Construction I/Solid Body  (2-4)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
The construction of a simple solid body electric guitar, either a "strat" or "tele" style, provides basic processes and construction details involved in the building of electric guitars, as well as the basic electronics. Skills gained in other CFT courses will be used to mill and fabricate parts. Production work and completion of an electric guitar are required. Excellent woodworking skills are essential. An extremely demanding and fast-paced course.

CFT 134B  Electric Guitar Construction II/Custom  (2-4)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 134A
Construction of a contour top electric guitar, such as a "Les Paul" style or a semi-hollow body guitar. Provides processes and construction details involved in the building of high-end and custom electric guitars, as well as the basic electronics. Skills gained in other CFT courses will be used to mill and fabricate parts. Production work and completion of an electric guitar are required. Excellent woodworking skills are essential. An extremely demanding and fast-paced course. Students will also be encouraged to build jigs forms and fixtures to aid in production.

CFT 135  Acoustic Guitar Making I  (3, 4, 5)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 100
First course of a two-semester sequence. Prepares students for a career as a luthier while studying the history, anatomy, construction methods, design, tone, and sound theory of acoustic guitars. Construction of either a nylon string or steel string acoustic guitar is required. Considerable prior woodworking/instrument making experience is recommended.

CFT 136  Acoustic Guitar Making II  (3, 4, 5)
Transfer acceptability: CSU
A minimum grade of 'C' in CFT 135
Second course of a two-semester sequence. Prepares students for a career as a luthier while studying the history, anatomy, construction methods, design, tone, and sound theory of acoustic guitars. Construction of either a nylon string or steel string acoustic guitar is required. Considerable prior woodworking/instrument making experience is recommended.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecture/Lab Breakdown</th>
<th>Prerequisite</th>
<th>Transfer Acceptability</th>
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<tr>
<td>CFT 137</td>
<td>Arch Top Guitar Construction I</td>
<td>3, 4, 5</td>
<td>⅓, ½, or ½ hour lecture - 4⅓, 6, or ¾ hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 100</td>
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<td>CFT 138</td>
<td>Arch Top Guitar Construction II</td>
<td>3, 4, 5</td>
<td>⅓, ½, or ½ hour lecture - 4⅓, 6, or ¾ hours laboratory</td>
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<td>CFT 140</td>
<td>Making Woodworking Tools</td>
<td>1, 2, 3</td>
<td>½, 1, or 1½ hour lecture - 1⅓, 3, or 4⅓ hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 137</td>
<td>CSU</td>
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<td>CFT 141</td>
<td>The Art and Craft of Planemaking</td>
<td>1, 2, 3</td>
<td>½, 1, or 1½ hour lecture - 1⅓, 3, or 4⅓ hours laboratory</td>
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<td>CSU</td>
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<td>CFT 142</td>
<td>Decorative Box Making</td>
<td>2, 3, 4</td>
<td>1, ½ or 2 hours lecture - 3, 4, or 6 hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 105</td>
<td>CSU</td>
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<td>CFT 143</td>
<td>Production Wood Products I</td>
<td>1, 2, 3</td>
<td>½ or 1, ½ or 2 hour lecture - 1⅓ or 3, 4, or 6 hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 100</td>
<td>CSU</td>
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<td>CFT 144</td>
<td>Production Wood Products II</td>
<td>1, 2, 3</td>
<td>½ or 1, ½ or 2 hour lecture - 1⅓ or 3, 4, or 6 hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 144</td>
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<td>CFT 145</td>
<td>Production Wood Products III</td>
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<td>½ or 1, ½ or 2 hour lecture - 1⅓ or 3, 4, or 6 hours laboratory</td>
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<td>CSU</td>
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<td>CFT 146</td>
<td>Marquetry, Inlay and Veneering</td>
<td>2, 3, 4</td>
<td>1, ½, or 2 hours lecture - 3, 4, or 6 hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 100 and CFT 151</td>
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<td>CFT 147</td>
<td>Hand Joinsy II</td>
<td>1, 2, 3</td>
<td>1, ½, or 2 hours lecture - 3, 4, or 6 hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 105</td>
<td>CSU</td>
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<td>CFT 148</td>
<td>Veneering Technology I</td>
<td>2, 3, 4</td>
<td>1, ½, or 2 hours lecture - 3, 4, or 6 hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 151</td>
<td>CSU</td>
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<td>CFT 149</td>
<td>Studio Furniture Design I</td>
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<td>1 hour lecture - 3 hours laboratory</td>
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<td>CFT 150</td>
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<td>2, or 4 hours lecture</td>
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<td>CFT 151</td>
<td>Classic American Chair Designs</td>
<td>2, 3, 4</td>
<td>1, ½, or 2 hours lecture - 3, 4, or 6 hours laboratory</td>
<td>A minimum grade of ‘C’ in CFT 144</td>
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</table>
CFT 156  Advanced Classic American Chair Designs (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 155  
Transfer acceptability: CSU  
Chair making which emphasizes the use of traditional chair making tools to shape raw wood into chair parts. Skill development and improved craftsmanship is emphasized while learning to make more complex chairs. Advanced chair designs include: bow back, continuous arm, writing arm, double and triple settees and fan back Windsor chairs; Appalachian style three-slat side chair, four-slat arm chair, bar stools, youth rocker and six-slat rocking chair.

CFT 157A  Chair and Tables/Prototype Construction I (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 105  
Transfer acceptability: CSU  

CFT 157B  Chair and Tables/Prototype Construction II (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 105  
Transfer acceptability: CSU  
Table design and construction. Covers the history of table making. Design and application of pattern making techniques on student-selected projects. Machine tool operations necessary to produce various table leg, trussel, and base designs.

CFT 160A  Chairs and Tables/Production Manufacturing I (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 159A  
Transfer acceptability: CSU  
Second semester of a two-semester class (CFT 159A and CFT 160A). Chair and seating construction production and advanced machine tool techniques are used as they relate to chair making. Fine joinery, theory and advanced techniques.

CFT 160B  Chairs and Tables/Production Manufacturing II (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 159B  
Transfer acceptability: CSU  

CFT 163  Plastic Laminate Fabrication Techniques (1, 2)  
½ or 1 hour lecture - ½ or 3 hours laboratory  
Transfer acceptability: CSU  
Examines the manufacturing process for plastic laminate products, including tools, adhesives, jigs, application and installation techniques. Lectures, demonstrations, and hands-on exercises will give students the opportunity to develop the proficiency and knowledge to design, build and install plastic laminate products.

CFT 164  Cabinet Installation (1, 2)  
½ or 1 hour lecture - ½ or 3 hours laboratory  
Transfer acceptability: CSU  
Installation of both face frame and European (32mm) cabinetry. Topics include: Understanding wall structure, measuring and planning for installation, review of cabinet construction with emphasis on installation, in-depth discussion of the tools, jigs, and techniques used for installation, installation of lower face frame cabinets, installation of upper European (32mm) cabinets, finished scribings of molding.

CFT 165A  Cabinetry Design/Face Frame (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 105  
Transfer acceptability: CSU  
First course of a two-semester sequence (CFT 165A and CFT 167A). Emphasis is on face frame cabinets. Study of the principles of traditional and European styles of cabinetmaking as used to construct and install cabinetry in residential and commercial applications, with preference given to residential applications.

CFT 165B  Cabinetry Design/European (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 105  
Transfer acceptability: CSU  
First course of a two-semester sequence (CFT 165B and CFT 167B). With an emphasis on European 32mm cabinets. Study of the principles of traditional and European styles of cabinetmaking as used to construct and install cabinetry in residential and commercial applications, with preference given to residential applications.

CFT 166  Cabinetmaking/Production and Manufacturing (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 165A  
Transfer acceptability: CSU  
Designed to give students the knowledge and ability to enter the cabinetmaking business. Manufacturing and production techniques will be examined along with design, assembly, and installation. Students will learn to bid on jobs, estimate materials, provide client satisfaction, and produce quality work on a profitable basis.

CFT 167B  Cabinet Production/Productive I (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 165B  
Transfer acceptability: CSU  
Second course of a two-semester sequence. Students will learn and apply the construction methods and installation processes of face frame cabinets by constructing the cabinets designed in CFT 165A.

CFT 168  Cabinetmaking/Ancient Furniture/Construction I (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 105  
Transfer acceptability: CSU  
Second course of a two-semester sequence (CFT 165B and CFT 167B). Students will learn and apply the construction methods and installation processes of European style 32mm cabinets by constructing the cabinets designed in CFT 165B.

CFT 169  Cabinetmaking/Computer Cabinet Layout (2, 3)  
1 or ½ hour lecture - 3 or 4½ hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 105  
Transfer acceptability: CSU  
Selection and application of appropriate software as developed for the cabinet industry. Development of industrial standard cabinet plans and specifications utilizing personal-size computer and software programs.

CFT 170  Workbench Design and Production (2, 3, 4)  
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory  
Prerequisite: A minimum grade of ‘C’ in CFT 100  
Transfer acceptability: CSU  
Design and construction of the most basic of woodworking tools, a workbench. Process rough lumber to maximize yield and minimize waste. Students will be allowed to customize the size of their bench to fit individual requirements within limits. However, mass-production techniques will not be sacrificed. In addition, a broad review of woodworking vises and other bench accessories will be conducted so that students will be able to further customize their own bench.
Cabinet and Furniture Technology

CFT 171  Furniture for the Wood Shop  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 100
Transfer acceptability: CSU
The individual student will be required to design and construct one or more projects from a broad range of furniture-quality accessories for the woodworking shop such as tool totes, tool boxes, chests and cabinets (both stationary and portable), step stools, saw horses or workbench accessories. Particular attention will be paid to artistic and functional design, utility, material selection and joinery techniques. Skills in spindle turning, marquetry and inlay, compound angle joinery, coopering, and veneering will be developed and employed depending on the project selected.

CFT 172  CAD for Cabinets & Furniture  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 170
Transfer acceptability: CSU
Introduction to basic CAD concepts and their direct application to the design and drawing of custom cabinets and furniture, as an alternative to hand drawn plans and a starting point to Computer Assisted Manufacturing.

CFT 173  Bamboo Fly Rod Building  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 105
Transfer acceptability: CSU
Instruction in the art of bamboo fly rod building. A bamboo culm will be split, straightened, heat treated, planed and glued. Tips, ferrels, cork handle and reel seat are installed. Wire guides are made and installed. Other projects include fish landing nets, hexagon rod storage tubes, cork lined wooden fly boxes and portable fly tying cases.

CFT 175  Jigs/Fixtures and Routers  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 105
Transfer acceptability: CSU
Theory of production tooling, fixtures, and jigs; design and develop practical applications of production tooling, fixtures and jigs as used in current machines within the industry. Field trips to local industries will allow students to further understand tooling as used in the trades.

CFT 176  The Lathe - An Introduction to Woodturning  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 100
Transfer acceptability: CSU
Emphasis on Spindle Turning or turning Between Centers. Students will learn the history of the lathe; the components of the lathe and how to select the best lathe and accessories for their particular turning style. Discussion of tool selection, proper tool sharpening techniques, what to expect from a basic set of turning tools with emphasis on the skew, the gouge, the parting tool and importantly – the handle. Design and fabrication of tool handles, including tool making and tool modification. Additionally, projects will include turning a mallet, tool handles, kitchen utensils, “weed vases” and ornaments. Introduction to bowl turning and turning other than solid wood such as laminates and acrylics.

CFT 177  Lathe II - Intermediate Turning  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 176
Transfer acceptability: CSU
The study of architectural turning in relation to furniture making and overall advanced turning techniques. Discussion of tool selection, proper tool sharpening techniques, what to expect from a basic set of turning tools, with emphasis on the skew, gouge, parting tool, and an introduction to specialty turning tools. Split turning, offset turning, multi-axis turning, and duplication will be introduced.

CFT 178  Lathe III - Advanced Turning  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 177
Transfer acceptability: CSU
Continuation of Lathe II - Intermediate Turning. Exploration of techniques and material in-depth, and focus on mastery.

CFT 180  Wood Bending and Lamination/ Wood Technology  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 105
Transfer acceptability: CSU
Principles and practical applications of both wood bending and lamination. Mechanical and chemical means of bending wood studied and developed, specific structure and properties of wood are developed.

CFT 182  Timber Framing Technology  (3, 4, 5)
1½, 2, or 2½ hours lecture - 4½, 6, or 7½ hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 100
Transfer acceptability: CSU
Timber framing is one of the oldest building systems in the world. Structures are created utilizing heavy timbers joined via pegged mortise and tenon joints. This course teaches how to design and engineer a modern timber frame using energy efficient systems. Introduction to engineering principles, analyzing loads, architectural design, and layout. In this hands-on class students will build a timber frame structure. The class structure will be rigged and raised by students.

CFT 185  Machine Tool Set up and Maintenance  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 100
Transfer acceptability: CSU
Set up, repair, rebuild, and maintain tools and machines used in the wood-related industries. Machine tool operations studies and applied. Consumer information developed to acquaint student with machines and tools within the field. Planned maintenance schedules developed and applied.

CFT 186  Machine Tool/Production Carving  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 105
Transfer acceptability: CSU
Introductory woodworking course using hand and power machine tools. Design considerations, carving techniques, production carving, and incorporation of woodcarving into cabinetmaking, furniture construction, and architectural millwork.

CFT 187  Introduction to Carving  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 187
Transfer acceptability: CSU
This beginning course in carving introduces students to the tools and techniques used in carving wood. The course includes specifics of available tools, their proper handling and maintenance, as well as discussions of layout and carving methods as applied to furniture and architectural millwork.

CFT 188  Intermediate Carving  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Prerequisite: A minimum grade of ‘C’ in CFT 187
Transfer acceptability: CSU
Examines methods relating to both low and high relief carving, as well as incised lettering. More complex layout and carving techniques are undertaken. Concepts such as setting-in and blocking-out are introduced while modeling, introduced in the beginning course, is more fully developed.

CFT 189  Advanced Carving  (2, 3, 4)
1, 1½, or 2 hours lecture - 3, 4½, or 6 hours laboratory
Transfer acceptability: CSU
Advanced carving is a topical study of specific carving applications as they relate to furniture or architectural millwork. Topics are largely gathered from period styles and may include ball and claw feet, Newport shells, and Philadelphia rococo, as well as contemporary interpretations. Art Nouveau, and maritime themes. See Class Schedule for specific period styles/themes to be emphasized.
CFT 190  Specialty and Manufactured Hardware  
(5, 1, 2, 3)  
\[1/2, 1, 2, 3, 4, 5, 6\] hours lecture  
Transfer acceptability: CSU  
Survey of traditional, contemporary, European, and Oriental market hardware found in the cabinet and furniture industries, including consumer applications. Exploration and application of various system solutions for given problem(s). Study and application of hinges, K D fasteners, fastening systems, joint systems, drawer guides, and runners.

CFT 195  Finishing Technology/Touch Up and Repair  
(2, 3, 4)  
\[1, 1/2, 2, 3, 4, 5, 6\] or 2 hours lecture - 3, 4, 5, 6, or 6 hours laboratory  
Prerequisite: A minimum grade of 'C' in CFT 100  
Transfer acceptability: CSU  
Finishes as used in the wood-related fields. Study and use of penetrating, surface, epoxy, catalytic, and resin surface finishes. Preparation to include staining, filling, and glazing. Chemistry of lacquers, urethanes, oils, and enamels. Instruction and practice in the touch-up of existing finishes through use of French polishing, burn-in sticks, and dry aniline staining. Repair of fine furniture as necessary prior to finishing.

CFT 196  Special Problems in Cabinet and Furniture Technology  
(1, 2, 3, 4, 5, 6)  
3, 6, 9, 12, 15, or 18 hours laboratory  
Prerequisite: A minimum grade of 'C' in CFT 100 or 105  
Transfer acceptability: CSU  
A research course through individual contract concentrating in the area of Cabinet and Furniture Technology.

CFT 197  Cabinet and Furniture Technology Topics  
(5 - 4)  
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.  
Transfer acceptability: CSU  
Topics in Cabinet and Furniture Technology. See class schedule for specific topic covered. Course title will designate subject covered.

CFT 198  Advanced Wood Finishing  
(2, 3, 4)  
1, 1/2, or 2 hours lecture - 3, 4, 5, 6, or 6 hours laboratory  
Prerequisite: A minimum grade of 'C' in CFT 195  
Transfer acceptability: CSU  
Wood finishing history, processes, and application of multiple colors and complex finishes on furniture. Topics include media, solvents and tools used to apply media, faux finishes, gilding, coloring the finishing materials, turning broken or missing parts, and veneer repair.

CFT 295  Directed Study in Woodworking  
(1, 2, 3, 4, 5, 6)  
48, 96, 144, 192, 240, or 288 hours laboratory  
Prerequisite: A minimum grade of 'C' in CFT 105  
Transfer acceptability: CSU  
Independent study in furniture making, cabinet making, shop layout, design, operation, and maintenance for students who have demonstrated advanced skills and/or proficiencies in Cabinet and Furniture Technology subjects and have the initiative to work independently on projects or research outside the context of regularly scheduled classes. Registration requires prior approval of supervising instructor.

Chemistry (CHEM)  
Contact the Chemistry Department for further information.  
(760) 744-1150, ext. 2505  
Office: NS-355B

Associate in Science Degrees -  
AS Degree requirements are listed in Section 6 (green pages).  
• Chemistry

Certificates of Achievement -  
Certificate of Achievement requirements are listed in Section 6 (green pages).  
• Chemistry

PROGRAM OF STUDY  
Chemistry  
Provides the background to begin upper division course work and prepares the student for entry level jobs that require a knowledge of chemistry. The student is advised to check with the institution to which he/she wishes to transfer for additional courses, which may be required.

A.S. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements  

<table>
<thead>
<tr>
<th>Program</th>
<th>Units</th>
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<tbody>
<tr>
<td>CHEM 110</td>
<td>General Chemistry</td>
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<td>CHEM 110L</td>
<td>General Chemistry Laboratory</td>
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<td>CHEM 115</td>
<td>General Chemistry</td>
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<td>CHEM 115L</td>
<td>General Chemistry Laboratory</td>
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<td>CHEM 210</td>
<td>Analytical Chemistry</td>
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<td>CHEM 220</td>
<td>Organic Chemistry</td>
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<td>CHEM 221</td>
<td>Organic Chemistry</td>
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TOTAL UNITS  
25

COURSE OFFERINGS

Courses numbered under 50 are non-degree courses.  
Courses numbered under 100 are not intended for transfer credit.

CHEM 10  Chemistry Calculations  
1 hour lecture  
Note: Pass/No Pass grading only  
Non-degree Applicable  
The basic calculation skills needed for successful performance in CHEM 100, 110, and 115. Areas such as significant figures, exponential numbers, and basic chemical problems are discussed. Emphasizes student practice of chemistry problems.

CHEM 100  Fundamentals of Chemistry  
(4)  
3 hours lecture - 3 hours laboratory  
Prerequisite: One year of high school algebra  
Transfer acceptability: CSU; UC – no credit if taken after CHEM 110  
Introductory study of the principles and laboratory techniques of general chemistry. Laboratory must be taken concurrently with lecture.

CHEM 104  General Organic and Biochemistry  
(5)  
3 hours lecture - 6 hours laboratory  
Transfer acceptability: CSU; UC  
This course will cover the basic principles of general chemistry, organic chemistry and biochemistry as needed to understand the biochemistry, physiology, and pharmacology of the human body. This course is intended mainly for students pursuing health professions.

CHEM 105  Fundamentals of Organic Chemistry  
(4)  
3 hours lecture - 3 hours laboratory  
Prerequisite: A minimum grade of 'C' in CHEM 100, or CHEM 110 and 110L  
Transfer acceptability: CSU; UC  
An introduction to the study of organic chemistry with an emphasis on classification, reactions, and application to allied fields. Laboratory includes techniques of isolation, identification, and synthesis of organic compounds.

CHEM 110  General Chemistry  
(3)  
3 hours lecture  
Prerequisite: A minimum grade of 'C' in CHEM 100 or high school chemistry with laboratory, and two years of high school algebra or MATH 60  
Corequisite: CHEM 110L  
Transfer acceptability: CSU; UC  
C-ID CHEM 110 for CHEM 110 and 110L combined; CHEM 120S for CHEM 110, 110L, 115 and 115L combined.

Principles of, and calculations in, areas such as atomic structure, solutions, chemical bonding, chemical formulas and equations, gases, energy transformations accompanying chemical changes, and descriptive chemistry.