

# **Tamalpais Union High School District**

## **Larkspur, California**

### **Course of Study**

#### **Construction Technology**

##### **I. INTRODUCTION**

Construction Technology is the study of hand and machine tools, the materials, the processes and products of industry. Its purpose is to help students locate and develop interests and aptitudes that are related to industrial fields. Its outcomes may be of benefit in chosen professions, business or trades, in avocational activities or in the solving of consumer problems.

A modern Construction Technology program, one that emphasizes the “laboratory of industries” concept, can be of value to students at all levels of ability and aspirations. Each Construction Technology area presents may practical problems which apply, reinforce and extend the academic skills learned in other classes. A sequence of beginning, intermediate and advanced courses enables students with varying interests and abilities to acquire the skills and knowledge appropriate to their needs.

The technical core complements and reinforces the academic core of education encompassing the awareness of careers, employability skills and the development of personal skills.

##### **II. EXPECTATIONS**

###### **A. Objectives**

- To develop understanding of industry in terms of raw materials, processes, products, occupations and service.
- To apply academic skills including reading, mathematics, and science in a practical way.
- To develop the ability to plan and work alone and in cooperation with others toward the orderly, effective and complete performance of the assigned or selected task.
- To develop skill in the use of tools, machines and materials.

- To develop pride in good workmanship and ability to evaluate his/her own accomplishments objectively.

**B. General Competencies**

Beginning, Intermediate and Advanced Levels:

- Arrives in class on time, ready to start work.
- Begins work tasks promptly.
- Demonstrates knowledge of work, clean-up and grading procedures.
- Writes own safety rules for each machine
- Returns Student/Parent safety notification, signed.
- Demonstrates competency in using each machine safely.
- Practices safe use of tools and equipment in on-going projects.
- Designs each project
- Prepares cost/time estimate each project
- Completes each project within the designated time to meet the teacher's standards.
- Identifies and demonstrates proper use and care of hand tools as needed for projects.
- Identifies and demonstrates proper safe use and care of portable power tools as needed for projects.
- Uses equipment safely as needed for projects.
- Maintains machine tools appropriately as needed for projects.
- Completes project that demonstrates knowledge of accurate measuring skills.
- Completes project that demonstrates knowledge of types of joints demonstrated in class.
- Neatly uses appropriate adhesives as needed for projects.
- Selects and carefully installs fasteners/hardware appropriate for projects.
- Applies progressive grades of abrasives as needed for projects.
- Applies appropriate finishes or coatings as needed for projects.
- Selects construction materials appropriate for projects.
- Estimates expected costs and calculates final costs of all projects.
- Demonstrates ability to follow plans/drawings for projects as needed.
- Uses and/or designs and builds jigs or fixtures as needed for projects.
- Designs, creates, and completes a carving/sculpturing project.
- Supplies appropriate laminating techniques as needed for projects.
- Maintains a safe, clean shop environment.

#### Advanced Level:

- Participates in a team effort to mass produce a finished product.
- Applies plastic laminates as needed for projects.
- Designs and constructs a project with doors, drawers and frames (for very advanced only).
- Designs and completes a project requiring bending of materials.
- Designs and completes a project requiring veneers.
- Repairs and refinishes a project brought from home.
- Designs and completes an inlaying project.

#### C. Course Description

Construction Technology is a multilevel course (beginning, intermediate and advanced) that applies academic skills to building practical problem-solving projects. Students may choose from a variety of required or individual projects that may be constructed from plans or of their own design. All project assignments may be adapted to fit the needs and various capability levels and skill (e.g., a shelf may be constructed using simple lap joints or with dado joints). There are academic components of Construction Technology for which the student is responsible. The student who enrolls in each sequential course develops a progressively higher level of skill.

### III. GENERAL INFORMATION

#### IV. COURSE OF STUDY

##### A. Standard #1: Orientation (all levels)

The student will know and understand classroom procedures. The student will:

- Exhibit appropriate employability skills, such as promptness, attendance, staying on-task, willingness to work and learn cooperation.
- Demonstrate working effectively in the classroom with the instructor and classmates.
- Understand the expectations and grading system in the class.
- Follow classroom procedures regarding lockers, storage, clean-up, maintenance of equipment, safe-guarding personal property of self and others.

**B. Standard #2: Safety (all levels)**

The student will have a thorough understanding of all aspects of safety operations and instructions involving the school, home, commercial and residential construction industry. The student will:

- Listen to and understand explanations of safety rules.
- Pass a written test on all required safety rules.
- Demonstrate appropriate safe use of hand and power tools and equipment.
- Practice safe use of tools and equipment in on-going projects.

**C. Standard #3: Planning/Design (all Levels)**

The student will develop products of suitable design to provide for ease of fabrication and be aesthetically pleasing. The student will:

- Follow, modify, or make a plan for all projects.
- Follow through a complete project from planning/design to completion.

**D. Standard #4: Hand Tools (all levels)**

The student will be proficient in the use, safety, and care of basic hand woodworking tools.

The student will identify and demonstrate proper use and care of specific hand tools

**E. Standard #5: Portable Power Tools (all levels)**

The student will be skilled in the safe use of portable power tools as they apply to the construction industry.

The student will identify and demonstrate proper safe use and care of specific portable power tools.

**F. Standard #6: Machine Usage (all levels, progressive with type of machine)**

The student will be able to select and safely operate specific machine tools needed to complete the task. The student will:

- Observe the proper use of equipment as provided by the instructor.

- Practice using equipment under the supervision of the instructor.
- Use equipment safely in on-going projects.
- Maintain machine tools appropriately.

**G. Standard #7: Measurement/Layout (all levels)**

The student will be proficient in the reading of all types of measuring devices to 1/16 of an inch. The student will be able to transfer the measurements from the plan to the project and apply proper layout procedures. The student will:

- Review basic measuring mathematics, especially fractions and mixed numbers.
- Demonstrate proper use of appropriate measuring devices.
- Apply measuring skills appropriately to projects.

**H. Standard #8: Joints (all levels)**

The student will be able to identify and construct the basic wood joints used in the applicable construction trades. The student will:

- Describe the purpose and functions of various joints.
- Draw samples of joints.
- Match joints to their appropriate function.
- Practice making joints.
- Apply joints appropriately to specific projects.

**I. Standard #9: Gluing and Clamping (all levels)**

The student will be proficient in the selection and application of the proper glue(s) and clamps necessary to accomplish the joining of materials for an aesthetically pleasing and structurally sound project. The student will:

- Describe the purpose and function of various types of adhesives and clamps.
- Use the proper adhesive and clamps for the job
- Demonstrate neatness and clean-up with adhesives.

**J. Standard #10: Fasteners/Hardware (all levels)**

The student will be proficient in the selection and installation of the proper fasteners and hardware used on the product being fabricated. The student will:

- Identify the types of fasteners/hardware and their use.
- Select and carefully install fasteners/hardware appropriate for projects.

**K. Standard #10: Abrasives (all levels)**

The student will have knowledge of the varieties and characteristics of abrasives and have skill in their selection and application. The student will:

- Identify the types of abrasives and their use.
- Apply progressive grades of abrasives to their projects.

**L. Standard #12: Finishes and Coatings (all levels)**

The student will have knowledge and skill in selection and application of finishes and coatings appropriate to the construction project being finished. The student will:

- Identify the types of finishes and coatings and their use.
- Apply some finishes and coatings to their projects.

**M. Standard #13: Materials (all levels)**

The student will understand the manufacturing techniques of lumber and the lumber products industry and will identify, select, and use appropriate materials. The student will:

- Describe the manufacturing process of lumber/plywood.
- Identify and select the most commonly used woods used in the construction industry.
- Examine alternatives to lumber, such as laminates, particle board, Formica, veneers, comparing quality, availability, and cost.
- Select the construction materials for their own projects.

**N. Standard #14: Mass Production (advanced level)**

The student will have an understanding of the principles of mass production and the impact it has on the lives of people in the world today. The student will:

- Apply cooperative learning to mass produce a product in teams.
- Design a product and all supporting jigs and fixtures necessary to build the product.

- Develop quality standard for their product
- Repeatedly produce the product.

**O. Standard #16: Plastic Laminate (advanced level – as needed)**

The student will understand the process of laminating plastic as applied to the cabinet industry. The student will:

- Describe the purpose and function of plastic laminates, especially as related to cabinet-making.
- Build cabinetry using those products.

**P. Standard #17: Estimation (all levels)**

The student will develop the skills necessary to estimate the job costs of products. The student will:

- Q. Estimate the cost of each project in advance including materials and time
- R. Maintain a project log.
- S. Calculate the finished cost of the project, including materials and time.

**Q. Standard #18: Print Reading (all levels)**

The student will comprehend appropriate symbols indicated on a blueprint/plan and will translate this information to the construction of usable items. The student will:

- Identify and draw symbols that are found on blueprint/plans.
- Accurately read blueprint/plans.
- Interpret and apply symbols on blueprint/plans.

**R. Standard #20: Sub-System Assembly (advanced level)**

The student will learn to construct face frames and utilize the appropriate techniques and procedures in the construction of doors and drawers. The student will:

Design and construct the framing for doors and drawers.  
Design and construct the door and drawer to fit the frame.

**S. Standard #23: Jigs and Fixtures (all levels)**

The student will demonstrate knowledge of jigs and fixtures.

Apply problem-solving techniques to design and build jigs and fixtures to accommodate desired needs.

**T. Standard #25: History of Furniture (individual basis)**

The student will learn to distinguish style, date, and materials used in earlier furniture; will understand the impact of design concepts, and will be better able to replicate and repair furniture and to appreciate the significance of the work being done. The student will:

- Research a special assignment to write, draw, and/or give an oral report on furniture.
- Use references in library, field trips to furniture and antique shops and other community resources to develop project.

**U. Standard #26: Wood Carving/Sculpturing (all levels)**

The student will be proficient in the creative design, the techniques of carving, and the knowledge of specific materials and their grain patterns and characteristics. The student will:

- Develop individual design for a carving project.
- Select appropriate wood,
- Use carving tools to create the project.
- Sand and finish project aesthetically.

**V. Standard #27: Laminating (all levels) and Bending (advanced level)**

The student will understand the three forms of bending wood. The student will employ the use of laminating techniques in a project to increase strength and aesthetic values.

The student will apply appropriate wood, adhesives, clamping and forms for laminating and bending to create a project.

**W. Standard #28: New and Emerging Technology (individual initiative, honors?)**

The student will learn and demonstrate the ability to keep up to date about methods and materials relating to construction technology. The student will:

- Use the latest technical references to become aware of modern methods and materials.

- Apply new methods and materials where possible considering availability, costs and skills involved.

**X. Standard #29: Veneers (advanced level)**

The student will identify methods of slicing and matching veneer and will utilize the appropriate techniques and procedures in applying veneer to an underlay.

The student will select, purchase and apply veneers as required for projects.

**Y. Standard #30: Repair and Refinishing (advanced level)**

The student will learn to employ skills and techniques in disassembly, repair or remake parts, reassemble and refinish fine furniture and apply hardware.

The student will refinish/repair a project brought from home including repairing, stripping, sanding, selecting and applying proper finish.

**Z. Standard #32: Marquetry and Inlaying (advanced level)**

The student will identify, select and apply appropriate materials utilizing proper techniques and tools. The student will:

- Design and make an exact pattern of an inlay or marquetry project
- Select appropriate different woods and adhesives.
- Prepare the wood for the inlay
- Insert the inlay.
- Select and apply finish.

**AA. Standard #52: Building Maintenance (all levels)**

The student will display the skills needed to properly maintain a structure, including plumbing, heating, cooling, wall surfaces, electrical, and floor material maintenance as it applies to maintaining the facility and the home. The student will:

- Learn basic building systems such as plumbing, electrical, heating/cooling.
- Apply knowledge of these systems to maintaining the shop and the home.

**BB. Standard #62: Boat Building (advanced team project)**

The student will read plans, identify components, and successfully construct water craft of various classes, such as motorboats, rowboats and sailboats. The student will:

- Apply cooperative learning skills in teams to follow a plan for and/or design a boat.
- Execute those plans to build a functional boat.

Adopted: 08/1990