

Carpentry / Residential Construction



Program / Hours: CIP 46.0201 – 2 Year Program

Course Description: A program that prepares individuals to apply technical knowledge and skills to lay out, cut, fabricate, erect, install and repair structures and fixtures using hand and power tools. Includes instruction in technical mathematics, framing, construction materials and selection, job estimating, blueprint reading, foundations and roughing-in, finish carpentry techniques, and applicable codes and standards.

Learning Activities / Modes of Assessment:

- Small Group
- Large Group
- Independent Work
- One-on-One
- Classwork Activities
- Guided Notes / Study Guides
- Presentations
- Technology Use
- Tests and Quizzes

Individual Resources:

- Textbooks
- Online Resources
- PowerPoint Presentations
- Computer Applications
- Carpentry / Residential Construction Equipment and Tools
- Carpentry / Residential Construction Lab Simulations

Year / MP	Task #	K - Know	U - Understand	D - Do
	100	Safety / Occupational Orientation		
Yr 1 MP 1	101	Follow basic, lab, and construction industry safety practices and procedures.	Safety is the foundation of carpentry; procedures prevent accidents.	Demonstrate PPE use, safe tool handling, and shop safety checks.
Yr 1 MP 1	104	Follow procedures in Safety Data Sheets (SDS) system.	SDS ensures material safety and hazard communication.	Locate and interpret an SDS for a shop chemical.
Yr 1 MP 1	105	Identify and follow OSHA safety standards at the construction site.	OSHA standards protect workers and ensure compliance.	Demonstrate OSHA standards in everyday work
	200	Hand Tools		
Yr 1 MP 1	201	Use and maintain small hand tools.	Hand tools are the foundation of carpentry tasks.	Safely demonstrate hammer, screwdriver, and plier use.
Yr 1 MP 1	202	Use and maintain sawing tools.	Proper sawing technique ensures accuracy and safety.	Cut wood accurately with hand saws.
Yr 1 MP 1	203	Use and maintain fastening tools.	Fastening tools secure materials effectively.	Use wrenches, pliers, and nail sets correctly.
Yr 1 MP 1	204	Use and maintain measuring tools.	Accurate measurement is essential for quality construction.	Measure with tapes, squares, and calipers.
Yr 1 – MP 1	205	Use and maintain cutting tools.	Sharp cutting tools improve efficiency and safety.	Demonstrate chiseling and cutting wood cleanly.
Yr 1 MP 1	207	Use and maintain ladders.	Ladder safety prevents jobsite accidents.	Set up and use ladders safely.
Yr 1 MP 1	208	Use and maintain finishing tools.	Finishing tools create smooth, professional surfaces.	Use planes, sanders, and files correctly.
Yr 1 – MP 1	210	Construct scaffolding.	Scaffolding provides safe elevated work access.	Build and inspect scaffolding for safety.
Yr 1 MP 1	211	Use and maintain leveling tools.	Leveling ensures accurate and square construction.	Set and check levels on structures.
	300	Power Tools		
Yr 1 MP 1	301	Use and maintain stationary power tools.	Stationary tools improve efficiency for large projects.	Operate table saws, drill presses, etc. safely.

Yr 1 MP 1	302	Use and maintain fastening tool systems.	Power fastening tools save time and ensure strong connections.	Use pneumatic nailers and screw systems safely.
Yr 1 MP 1	303	Use and maintain portable power tools.	Portable tools improve flexibility and jobsite efficiency.	Operate drills, circular saws, routers, jigsaws, etc.
	400	Blueprints Reading		
Yr 1 MP 2	402	Interpret and comprehend standard symbols and abbreviations.	Symbols are a universal construction language.	Identify and explain blueprint symbols.
Yr 1 MP 2	403	Interpret building specifications.	Specs describe required materials and methods.	Read and summarize building specs.
Yr 1 MP 2	404	Interpret a plot plan.	Plot plans show site layout and property details.	Locate features on a plot plan.
Yr 1 MP 2	405	Interpret a foundation plan.	Foundation plans detail the building base.	Read and mark dimensions from a foundation plan.
Yr 1 MP 2	406	Interpret elevation plans.	Elevations show vertical details of a structure.	Install finishes based on elevation plans
Yr 1 MP 2	407	Interpret details and section views.	Sections clarify hidden construction details.	Identify building techniques based on sectional drawings
Yr 1 MP 2	408	Interpret floor, wall, and roof framing plans.	Framing plans show structural components.	Read and explain framing layouts.
Yr 1 MP 2	409	Interpret building and zoning codes.	Codes ensure safety and legal compliance.	Apply code requirements to a sample plan.
Yr 1 MP 2	410	Interpret Americans with Disabilities Act (ADA) regulations.	ADA ensures accessibility in design.	Identify ADA compliance features in a plan.
	500	Site Preparation and Layout		
Yr 1 MP 2	501	Determine factors needed before starting a building project.	Preparation avoids costly mistakes.	List site preparation considerations.
Yr 1 MP 2	502	Explain the process of acquiring a building permit.	Permits are required by law for construction.	Research local permit requirements.
Yr 1 MP 2	503	Explain the process of PA One Call System.	One Call prevents utility accidents.	Demonstrate a mock utility locate request.
Yr 1 MP 2	504	Establish elevations and grades from benchmarks using leveling instruments.	Proper grading ensures stable foundations.	Set elevations using a builder's level.
Yr 1 MP 2	505	Lay out a building foundation using the Pythagorean Theorem.	Math ensures square and accurate layouts.	Use 3-4-5 method to square a foundation.

Yr 1 MP 2	506	Layout and construct batter boards.	Batter boards mark accurate building lines.	Build batter boards and string lines.
	600	Footings and Foundations		
Yr 1 MP 3	601	Identify footer and foundation materials.	Different materials serve different purposes.	Identify foundation materials in shop.
Yr 1 MP 3	602	Use leveling instruments to establish footer lines and elevations.	Footers must be level and precise.	Set and check footer elevations.
Yr 1 MP 3	605	Explain process to construct forms for footers and slabs.	Forms hold concrete in place while curing.	Build simple concrete forms.
Yr 1 MP 3	608	Install reinforcing materials.	Reinforcement increases concrete strength.	Install rebar in a form.
Yr 1 MP 3	609	Construct vertical and horizontal formwork.	Formwork supports poured concrete.	Build a pier form
	700	Framing – Floor Construction		
Yr 1 MP 3	703	Layout and install sill plates.	Sill plates anchor the structure to the foundation.	Install sill plates with anchor bolts.
Yr 1 MP 3	704	Layout and install floor joists, including manufactured floor joists.	Joists support the floor system.	Install floor joists to spec.
Yr 1 MP 3	705	Layout and install joists for a cantilever floor.	Cantilevers extend floor space safely.	Install cantilever joists.
Yr 1 MP 3	706	Construct and install cross and solid bridging.	Bridging adds strength and stability.	Install bridging/blocking between joists.
Yr 1 MP 3	707	Layout and install sub-flooring.	Subflooring distributes loads evenly.	Install plywood subflooring.
Yr 1 MP 3	708	Layout and construct floor openings.	Openings allow for stairs and utilities.	Identify different openings.
	800	Framing – Wall Construction		
Yr 1 MP 4	802	Layout and construct a wood frame wall.	Wood framing is standard in construction.	Build a stud wall.
Yr 1 MP 4	804	Layout and construct door openings.	Proper openings ensure door fits.	Frame a door opening.
Yr 1 MP 4	805	Layout and construct window openings.	Window openings allow for installation.	Frame a window opening.
Yr 1 MP 4	806	Construct a load bearing header.	Headers distribute loads above openings.	Install a header over an opening.
Yr 1 MP 4	807	Layout and install sheathing.	Sheathing ties walls together and resists forces.	Install wall sheathing.
Yr 1 MP 4	808	Plumb, align, and brace walls.	Walls must be square and stable.	Brace and align wall framing.

Yr 1 MP 4	809	Layout and construct a metal frame wall.	Metal studs are used in commercial settings.	Frame a wall with metal studs.
	900	Framing – Roof Construction		
Yr 1 MP 4	903	Layout and install a ridgeboard.	Ridgeboards support rafters at roof peak.	Install a ridgeboard.
Yr 1 MP 4	904	Layout and install common rafters.	Common rafters form main roof structure.	Cut and install common rafters.
Yr 1 MP 4	906	Layout and install roof trusses.	Trusses simplify roof construction.	Build / Install fabricated trusses.
Yr 1 MP 4	907	Layout and install roof sheathing.	Sheathing provides a roof deck.	Install plywood roof sheathing.
Yr 1 MP 4	908	Layout and construct roof openings.	Openings allow chimneys, vents, and skylights.	Frame a skylight opening.
Yr 1 MP 4	913	Identify various types of roof construction.	Different roofs suit different climates/designs.	Identify roof types from examples.
	1000	Exterior Finish		
Yr 2 MP 1	1003	Install house air and water infiltration barrier.	Barriers protect homes from moisture and air leaks.	Install house wrap.
Yr 2 MP 1	1004	Install exterior doors.	Doors secure and insulate a home.	Install a pre-hung door.
Yr 2 MP 1	1005	Install windows.	Windows provide light and ventilation.	Install a vinyl window.
Yr 2 MP 1	1006	Layout and install siding.	Siding protects and insulates.	Install lap siding.
Yr 2 – MP 1	1007	Layout and install soffits and fascias.	Soffits and fascias finish roof edges.	Install soffits and fascia boards.
Yr 2 MP 1	1008	Layout and install gutters and downspouts.	Gutters channel water away from the house.	Install gutter system.
Yr 2 MP 1	1009	Layout and install exterior deck, stair, and railing systems.	Decks expand living space outdoors.	Build a small deck with railing.
Yr 2 MP 1	1010	Identify, layout, and install roof coverings and accessory components.	Roof coverings protect the building.	Install shingles on a mock roof.
	1100	Interior Finish		
Yr 2 MP 2	1103	Layout, install and finish drywall.	Drywall creates interior walls.	Hang and finish drywall.
Yr 2 MP 2	1104	Layout and install suspended and tile ceilings.	Ceilings finish and hide overhead systems.	Demonstrate knowledge of installing a suspended ceiling.
Yr 2 MP 2	1105	Layout and install interior doors.	Doors provide privacy and access.	Install interior doors.

Yr 2 MP 2	1106	Layout and install door trim, casings, and hardware.	Trim completes and decorates doors.	Install casing around a door.
Yr 2 MP 2	1107	Layout and install window trim, casings, and hardware.	Trim completes and decorates windows.	Install casing around a window.
Yr 2 MP 2	1108	Layout and install baseboard and molding.	Molding finishes walls and floors.	Install baseboards.
Yr 2 MP 2	1109	Layout and install flooring materials.	Flooring provides finish and durability.	Install vinyl or laminate flooring.
Yr 2 MP 2	1110	Layout and install interior stair systems.	Stairs connect floors safely.	Build an interior stair unit.
	1200	Estimation		
Yr 2 MP 3	1201	Estimate amount and cost of bricks and blocks.	Estimating ensures budget control.	Calculate brick quantity for wall.
Yr 2 MP 3	1202	Estimate amount and cost of concrete.	Accurate concrete estimates prevent waste.	Compute yards of concrete for flat pours.
Yr 2 MP 3	1203	Estimate materials for exterior wall finish.	Exterior materials affect budget and appearance.	Estimate siding material needs.
Yr 2 MP 3	1204	Estimate materials for interior wall finish.	Interior finishes affect cost and appearance.	Estimate drywall sheets for a room.
Yr 2 MP 3	1205	Estimate materials for finished floor.	Flooring materials vary by use and cost.	Estimate square footage of flooring.
Yr 2 MP 3	1206	Estimate materials for finished roof.	Roofing material cost depends on slope/area.	Calculate shingles needed for roof.
Yr 2 MP 3	1207	Estimate siding material needs.	Siding estimation ensures proper ordering.	Estimate siding for house exterior.
	1300	Energy Efficiency		
Yr 2 MP 3	1301	Differentiate between and install various types of insulation.	Insulation improves energy efficiency.	Install fiberglass or foam insulation.
Yr 2 MP 3	1302	Compare types of weatherization techniques.	Weatherization reduces energy loss.	Identify weatherization methods on house model.
Yr 2 MP 3	1303	Compare various building envelopes.	Envelopes affect building energy efficiency.	Diagram building envelope types.
Yr 2 MP 3	1304	Differentiate types of caulks and sealants.	Caulks and sealants stop air and water leaks.	Apply caulk to a window frame.
Yr 2 MP 3	1305	Describe the importance of ventilation.	Ventilation maintains air quality and energy balance.	Demonstrate attic ventilation setup