

COURSE CON1010: CONSTRUCTION TOOLS & MATERIALS

Level: Introductory

Prerequisite: None

Description: Students develop basic hand tool and production skills to transform common building materials safely into useful products.

Parameters: Access to a materials work centre, complete with basic hand tools.

Outcomes: The student will:

- 1. create a health and safety plan with special emphasis on conditions and factors related to the specific pathway or series of courses**
 - 1.1 research and identify the following eight common elements of a health and safety management system:
 - 1.1.1 management, leadership and organizational commitment including policies, guidelines and responsibilities
 - 1.1.2 hazard identification and assessment
 - 1.1.3 hazard control
 - 1.1.4 worker competency and training including technical competence, safe work practices and procedures, personal protective equipment
 - 1.1.5 work site inspection
 - 1.1.6 incident investigation
 - 1.1.7 emergency response
 - 1.1.8 management system administration including evaluation, records and statistics, maintenance of system
 - 1.2 explain each of the elements reflecting on occupational health and safety implications
 - 1.3 define health and safety elements relevant to the world-of-work
 - 1.4 present a health and safety plan clarifying its relevance to the work world and society in general
- 2. research common processes and methods of hazard identification, assessment and control specific to the pathway or series of courses**
 - 2.1 research and identify common job site hazard identification processes
 - 2.2 research and identify common methods for assessment and control of hazards
 - 2.3 explain and demonstrate appropriate health and safety effective practices
 - 2.4 demonstrate a proactive personal commitment toward improvement of workplace health and safety including concern for others and following instructions, rules and guidelines
- 3. identify and describe the safe use of basic hand tools**
 - 3.1 identify and describe basic hand tools that are used to measure, mark, hold, cut, form, fasten and finish materials
- 4. identify and compare the properties of common materials used in construction activities**
 - 4.1 identify and compare the properties of a variety of common materials used to make artifacts and structures
 - 4.2 identify common shapes, sizes and forms of construction materials
 - 4.3 describe appropriate methods to handle, recycle, store and dispose of materials

- 5. apply construction processes and skills to produce a product**
 - 5.1 outline the typical phases in a production system; e.g., planning, constructing, assembling, finishing or evaluating
 - 5.2 select or modify a plan for a simple product that will meet a defined need
 - 5.3 identify and select the appropriate tools, materials and processes required to make the product
 - 5.4 list the steps that are required to make a product in a safe and logical order
 - 5.5 develop basic construction skills by building, assembling and finishing a variety of products
 - 5.6 identify and demonstrate the appropriate use of personal protective equipment
 - 5.7 identify steps to be taken in the event of an accident
 - 5.8 describe ways to improve product quality and productivity
- 6. demonstrate basic competencies**
 - 6.1 demonstrate fundamental skills to:
 - 6.1.1 communicate
 - 6.1.2 manage information
 - 6.1.3 use numbers
 - 6.1.4 think and solve problems
 - 6.2 demonstrate personal management skills to:
 - 6.2.1 demonstrate positive attitudes and behaviours
 - 6.2.2 be responsible
 - 6.2.3 be adaptable
 - 6.2.4 learn continuously
 - 6.2.5 work safely
 - 6.3 demonstrate teamwork skills to:
 - 6.3.1 work with others
 - 6.3.2 participate in projects and tasks
- 7. make personal connections to the cluster content and processes to inform possible pathway choices**
 - 7.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
 - 7.2 create a connection between a personal inventory and occupational choices

COURSE CON1070: BUILDING CONSTRUCTION

Level: Introductory

Prerequisite: CON1010: Construction Tools & Materials

Description: Students examine common building systems and develop basic skills related to building a simple model or full-size system/structure.

Parameters: Access to a materials work centre, complete with basic hand tools.

Outcomes: The student will:

1. identify and describe the main systems found in a residential structure

- 1.1 identify the materials that can be used to construct the:
 - 1.1.1 foundation or support system
 - 1.1.2 floor and wall system
 - 1.1.3 roof system
 - 1.1.4 exterior/interior finishes
- 1.2 describe how information is gathered and used in the construction industry; e.g., site information, engineering specifications or building codes
- 1.3 describe systems that are found in most buildings; e.g., structural, electrical, heating, ventilating and air conditioning, or water and waste removal
- 1.4 describe the methods that are used to communicate ideas and information relative to the design and construction of a project; e.g., blueprints or architectural drawings
- 1.5 identify the factors that affect the design of a structure including:
 - 1.5.1 safety
 - 1.5.2 function
 - 1.5.3 aesthetics
- 1.6 identify design techniques that are used to counteract static and dynamic forces on a structure; e.g., braces, trusses or ties
- 1.7 describe the landscaping features that will be used to complete a project

2. list and describe the basic materials and hand tools used in building construction

- 2.1 describe how structural materials and construction tools are safely used on the work site

3. apply basic construction techniques to build a simple scale model or full-size structure/system

- 3.1 list and describe the major types of construction projects; e.g., residential, industrial, commercial or civil
- 3.2 select or modify a set of working drawings to build a simple building structure or system
- 3.3 select or identify an appropriate location
- 3.4 use the appropriate tools, materials and processes to:
 - 3.4.1 construct a simple shelter, scale model or system
- 3.5 use the appropriate personal protective clothing and equipment

4. demonstrate basic competencies

- 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems

- 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
- 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. make personal connections to the cluster content and processes to inform possible pathway choices**
 - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
 - 5.2 create a connection between a personal inventory and occupational choices.

COURSE CON1120: PRODUCT MANAGEMENT

Level: Introductory

Prerequisite: CON1010: Construction Tools & Materials

Description: Students develop basic shop drawing and estimating skills and apply them to build a product.

Parameters: Access to a materials work centre, complete with basic drawing and construction tools, and to instruction from an individual with specialized training in the use of power tools.

Outcomes: The student will:

1. identify and describe the parts of a technological system

1.1 describe the following components of a technological system:

- 1.1.1 input
- 1.1.2 output
- 1.1.3 process
- 1.1.4 feedback

2. apply basic drawing skills to prepare a shop drawing

- 2.1 list and describe common types of shop drawings
- 2.2 identify manual techniques and/or computer processes to create a drawing
- 2.3 create or modify a suitable product design
- 2.4 prepare a working drawing of a product with multiple parts

3. prepare a project timeline, cost estimate and work schedule

- 3.1 identify the method of costing materials using lineal, area and volume measurements
- 3.2 describe methods that are used to estimate the amount of time required to complete a project
- 3.3 analyze the drawing to create a:
 - 3.3.1 materials list
 - 3.3.2 cost estimate
 - 3.3.3 work schedule

4. apply the use of a technological system to construct a simple product with multiple parts

- 4.1 identify a variety of products and describe the types of materials, joints and fastening and finishing systems that are used, and explain how these details are shown on a drawing
- 4.2 for a product with multiple parts, use the appropriate tools, materials and processes to:
 - 4.2.1 lay out, cut, surface and size materials
 - 4.2.2 assemble and fasten parts
 - 4.2.3 prepare for finishing
 - 4.2.4 apply a simple finish
- 4.3 match the manufacturer's recommendations and Workplace Hazardous Materials Information System (WHMIS) regulations when using hazardous finishing materials
- 4.4 use personal protective equipment
- 4.5 identify methods to improve quality and productivity through:
 - 4.5.1 accurate measurements
 - 4.5.2 choice of correct tools
 - 4.5.3 use of tools that are in good condition

5. demonstrate basic competencies

- 5.1 demonstrate fundamental skills to:
 - 5.1.1 communicate
 - 5.1.2 manage information
 - 5.1.3 use numbers
 - 5.1.4 think and solve problems
- 5.2 demonstrate personal management skills to:
 - 5.2.1 demonstrate positive attitudes and behaviours
 - 5.2.2 be responsible
 - 5.2.3 be adaptable
 - 5.2.4 learn continuously
 - 5.2.5 work safely
- 5.3 demonstrate teamwork skills to:
 - 5.3.1 work with others
 - 5.3.2 participate in projects and tasks

6. make personal connections to the cluster content and processes to inform possible pathway choices

- 6.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
- 6.2 create a connection between a personal inventory and occupational choices

COURSE CON1130: SOLID STOCK CONSTRUCTION

Level: Introductory

Prerequisite: CON1010: Construction Tools & Materials

Description: Students develop basic hand and power tool skills to build a product made from solid wood.

Parameters: Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.

Supporting Course: CON1120: Product Management

Outcomes: The student will:

- 1. identify and describe the physical characteristics of a variety of hard and soft woods**
 - 1.1 describe the physical characteristics of a variety of hard and soft woods
 - 1.2 list and describe common wood faults
 - 1.3 identify and describe correct methods of handling and storing lumber
- 2. apply basic drawing and transfer skills to prepare a pattern or template**
 - 2.1 identify common shapes and lines used in product design
 - 2.2 select or modify a plan for a free-standing or wall-mounted product that is made from solid or built-up stock
 - 2.3 produce a pattern or template from a scale drawing
 - 2.4 develop a cutting list and event sequence
- 3. construct a wooden product, using basic joinery techniques**
 - 3.1 describe common methods of making a built-up surface using edge joints and reinforce with dowels, biscuits or splines
 - 3.2 describe the process of squaring solid stock
 - 3.3 describe the safe operation of hand and power equipment that is used to:
 - 3.3.1 joint and surface solid stock
 - 3.3.2 cut and shape irregular surfaces
 - 3.3.3 scrape and sand flat and irregular surfaces
 - 3.4 use the appropriate tools, materials and processes to:
 - 3.4.1 cut and surface stock
 - 3.4.2 joint, glue and clamp
 - 3.4.3 measure and lay out parts
 - 3.4.4 cut and shape parts
 - 3.4.5 assemble and fasten
 - 3.4.6 prepare for finishing
 - 3.4.7 apply a finish
 - 3.5 complete a visual inspection of the product to see that the joints are tight fitting and surfaces are free of marks, gouges, burns and voids

4. demonstrate basic competencies

- 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems
- 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
- 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks

5. make personal connections to the cluster content and processes to inform possible pathway choices

- 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
- 5.2 create a connection between a personal inventory and occupational choices

COURSE CON1140: TURNING OPERATIONS

Level:	Introductory
Prerequisite:	CON1010: Construction Tools & Materials
Description:	Students use wood turning equipment and techniques to create a faceplate and spindle turning made from solid and/or built-up stock.
Parameters:	Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.
Supporting Course:	CON1120: Product Management
Outcomes:	The student will:

1. safely operate a power wood lathe

- 1.1 identify the common lathe chisels and accessories associated with wood turning
- 1.2 describe recommended tools and accessories for faceplate and spindle turning
- 1.3 identify and describe accepted work piece mounting and supporting techniques
- 1.4 describe the turning characteristics of a number of common woods
- 1.5 identify finishes and finishing procedures suitable for common turned products
- 1.6 identify and demonstrate the safe use and operation of the wood lathe

2. apply drawing and transfer skills to prepare a full-size pattern or template

- 2.1 select, modify or design a faceplate and/or spindle-type product that incorporates three or more different types of cuts
- 2.2 create a full-size pattern or template

3. produce a faceplate and spindle turning, using solid or built-up stock

- 3.1 prepare a material list and cost estimate
- 3.2 show a sequence of operations that facilitates the safe and efficient use of materials, tools and equipment
- 3.3 calculate the appropriate turning speeds using tables
- 3.4 demonstrate the appropriate skills to:
 - 3.4.1 prepare stock for turning
 - 3.4.2 lay out and size a rough turning
 - 3.4.3 rough cut and finish cut according to a predetermined pattern/template or free-forming principles
 - 3.4.4 sand and apply the recommended finish
 - 3.4.5 remove and assemble finished product
- 3.5 complete a visual inspection of a product to determine if the structure is sound and if surfaces are free of scratches, gouges, burns and voids
- 3.6 demonstrate efficient methods to improve quality and productivity

4. demonstrate basic competencies

- 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems

- 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
- 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. make personal connections to the cluster content and processes to inform possible pathway choices**
 - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
 - 5.2 create a connection between a personal inventory and occupational choices

COURSE CON1160: MANUFACTURED MATERIALS

Level: Introductory

Prerequisite: CON1010: Construction Tools & Materials

Description: Students select and use the appropriate materials and tools to build a product or structure from a wood composite or another manufactured material.

Parameters: Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.

Supporting Course: CON1120: Product Management

Outcomes: The student will:

1. identify and describe the characteristics of common manufactured materials

- 1.1 identify the various types of manufactured materials; e.g., plywood, hardboard, particle board
- 1.2 describe how a common manufactured material is made
- 1.3 explain the advantages of using manufactured materials

2. demonstrate the safe use of a given hand and power tool

- 2.1 describe the safe operation of hand and power tools to make dado, rabbet and mitre joints in plywood and other manufactured materials
- 2.2 use the appropriate tools, materials and processes to:
 - 2.2.1 measure and lay out the components
 - 2.2.2 cut to size and surface all edges
 - 2.2.3 edge bond all exposed surfaces, as required
 - 2.2.4 machine the appropriate joints
 - 2.2.5 assemble and clamp
 - 2.2.6 attach the appropriate hardware
 - 2.2.7 prepare for finishing
 - 2.2.8 apply a suitable finish

3. create a product from a manufactured material, using basic joinery techniques

- 3.1 describe typical methods of constructing a product from a manufactured material; e.g., types of joints, fastening systems, edge treatments
- 3.2 identify the factors that determine the quality of a wood joint
- 3.3 select or modify a plan for a project that incorporates basic joinery and edge treatment techniques
- 3.4 create a bill of materials, cutting list and event sequence
- 3.5 identify and describe common methods used to finish plywood and other wood substitutes
- 3.6 conduct a visual inspection of components to see that the joints are tight fitting, surfaces are free of marks and edges are covered and finished appropriately

4. demonstrate basic competencies

- 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems

- 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
- 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. make personal connections to the cluster content and processes to inform possible pathway choices**
 - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
 - 5.2 create a connection between a personal inventory and occupational choices

COURSE CON1180: MOULD MAKING & CASTING

Level: Introductory

Prerequisite: CON1010: Construction Tools & Materials

Description: Students apply knowledge of casting and moulding materials and processes to prepare a mould and produce a casting.

Parameters: Access to a materials work centre, complete with moulding and casting equipment.

Outcomes: The student will:

1. list and describe common materials and processes used in casting/moulding

1.1 identify and describe materials used to cast/mould including:

- 1.1.1 clay slip
- 1.1.2 concrete
- 1.1.3 polystyrene beads
- 1.1.4 plastisol
- 1.1.5 model metal

1.2 describe common processes of casting/moulding clay, concrete and plastic

1.3 differentiate between hardening by cooling, curing and drying

1.4 describe the kinds of materials and methods that are used to make patterns and moulds

1.5 describe factors that affect the quality of a cast or moulded product

2. apply principles of pattern making to create a simple mould

2.1 identify and describe the health and safety hazards associated with heating plastic and firing ceramic products

2.2 design or prepare a mould for a ceramic or plastic product

3. cast and finish a product, using the appropriate skills, materials and processes

3.1 calculate the quantities of materials required to make a casting

3.2 prepare a detailed step-by-step set of procedures to make a cast or moulded product

3.3 locate the necessary personal protective clothing and equipment for a specific casting/moulding process

3.4 describe a plan of action in the event of an accident

3.5 use the appropriate tools, materials and processes to:

- 3.5.1 make or prepare a mould
- 3.5.2 measure and mix quantities of materials
- 3.5.3 pour, cure and finish a cast and/or moulded product

3.6 use the appropriate personal protective equipment

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:

- 4.1.1 communicate
- 4.1.2 manage information
- 4.1.3 use numbers
- 4.1.4 think and solve problems

- 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
- 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. make personal connections to the cluster content and processes to inform possible pathway choices**
 - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
 - 5.2 create a connection between a personal inventory and occupational choices

COURSE CON1910: CON PROJECT A

Level: Introductory

Prerequisite: None

Description: Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

Parameters: Introductory project courses must connect with a minimum of two CTS courses, one of which must be at the introductory level and be in the same occupational area as the project course. The other CTS course(s) can be either at the same level or at the intermediate level from any occupational area.

Project courses cannot be connected to other project courses or practicum courses.

All projects and/or performances, whether teacher- or student-led, must include a course outline or student proposal.

Outcomes:

The teacher/student will:

- 1. identify the connection between this project course and two or more CTS courses**
 - 1.1 identify the outcome(s) from each identified CTS course that support the project and/or performance deliverables
 - 1.2 explain how these outcomes are being connected to the project and/or performance deliverables
- 2. propose the project and/or performance**
 - 2.1 identify the project and/or performance by:
 - 2.1.1 preparing a plan
 - 2.1.2 clarifying the purposes
 - 2.1.3 defining the deliverables
 - 2.1.4 specifying time lines
 - 2.1.5 explaining terminology, tools and processes
 - 2.1.6 defining resources; e.g., materials, costs, staffing
 - 2.2 identify and comply with all related health and safety standards
 - 2.3 define assessment standards (indicators for success)
 - 2.4 present the proposal and obtain necessary approvals

The student will:

- 3. meet goals as defined within the plan**
 - 3.1 complete the project and/or performance as outlined
 - 3.2 monitor the project and/or performance and make necessary adjustments
 - 3.3 present the project and/or performance, indicating the:
 - 3.3.1 outcomes attained
 - 3.3.2 relationship of outcomes to goals originally set

- 3.4 evaluate the project and/or performance, indicating the:
 - 3.4.1 processes and strategies used
 - 3.4.2 recommendations on how the project and/or performance could have been improved
- 4. demonstrate basic competencies**
 - 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems
 - 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
 - 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. make personal connections to the cluster content and processes to inform possible pathway choices**
 - 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences
 - 5.2 create a connection between a personal inventory and occupational choices