Woodworking lathe Syllabus

I. Basic terminology
II. Basic Lathe Safety
Iii. Turning tools
    a. Types of turning tools
    b. Carbide/Traditional HSS
    c. Rougher
    d. Finisher
    e. Detail Cutter
    f. Parting tool
IV. Basic turning
    a. Tool rest height
        i. Position of the Operator at the Lathe
        ii. Holding the tools
        iii. Moving the body, not the arms
        iv. Never adjust the tool rest while the lathe is spinning!
V. Mounting and setting
    a. Mounting stock (be alert for loose material)
        i. Screw chuck
        ii. Between centers
        iii. Lathe chucks
        iv. Faceplates*
        v. Using a glue/waste block*
    b. Locate center
VI. Starting the Lathe
    a. Lathe speed
        i. Spindles (1500-2000 RPM)
        ii. Bowls (depends on size and balance)*
        iii. Speeds are faster for carbide cutters
VII. Types of Cuts
    a. Cutting or Scraping
    b. Grain direction
        i. End grain vs Side grain
    c. Turning techniques

i. Roughing tool
ii. Finishing Tool
iii. Parting tool

VIII. Turning operations
a. Rough turning
b. Turning cylinder and tapers
c. Turning V-grooves
d. Turning beads
e. Turning coves
f. Turning shoulder
g. Turning/measuring tenon/mortice
h. Using calipers for measuring diameter
i. Using depth gauges*
j. Measuring wall thickness*
k. Turning complex shapes**
l. Turning glue-up stock**
m. Split turning**
n. Turning duplicate workpiece**
o. Off-center turning**
p. Thin wall turning**
q. Live edge bowls**
r. Green wood turning**
s. Chuck turning
i. Tenon or Mortice?
ii. Profile and depth of tenon/mortice
t. Faceplate turning*
i. Preparing material for faceplate turning
ii. Inboard and outboard faceplate turning

IX. Sanding turned products
a. Abrasive paper/Mesh

X. Finishing turned products
a. Open grain vs Closed grain
i. Sanding sealer
b. Types of finishes
c. Friction polish

d. Lacquer polish
e. Shellac

XI. Sharpening lathe tools
   a. Diamond Card/Lapping fluid

***Intermediate Classes**

****Advanced Classes**

Basic Woodturning Terminology

When you read about woodturning or talk with woodturners, these are some terms you're likely to encounter.

Bevel

The area beneath the cutting edge of a scraper or gouge. The bevel on a gouge is always held in contact with the wood.

Blank

A piece of wood rounded smooth or cut into a section for lathe use.

Burl

An unusual growth on a tree, producing swirls and other interesting grain patterns.

Chuck

A device that holds the workpiece on the lathe.

Faceplate

A device that holds the workpiece on the lathe.

Headstock

Provides the drive for the workpiece, usually through pulleys connected by a belt to the drive motor of a lathe.

Heartwood

The fully developed wood surrounding the core, usually darker than sapwood (see below) and really dense.

Moisture content

Percentage of water weight to total weight. Moisture content is usually 30 to 40 percent or more when wood is freshly cut (aka "green"). Dry wood typically has moisture content of less than seven to eight percent.

Sapwood

This surrounds heartwood and is usually softer. It transports sap from roots to leaves. It's a different color than the heartwood.

Spalted wood

Wood in the process of fungal decay that shows as black lines in the grain. Woodturners prize spalted wood because the black lines add an artistic element to the turning.

Tailstock

The movable assembly opposite the headstock that slides along the lathe bed and supports workpieces.

Basic Woodturning Methods

These are the ways woodturners execute their craft.

ABC turning

Anchor/bevel/cut, or ABC turning, is the only safe method to start a cut. Anchor the tool to the tool rest, bring the bevel in contact with the spinning wood, then slightly adjust the angle of the tool until the cutting edge begins to cut.

Spindle turning

Requires mounting wood between the headstock and tailstock, then turning the spindle to create intricate designs.

Segmented turning

Pieces of wood glued together form a blank for turning. The combination of different wood grains and textures creates unique patterns.

Faceplate turning

The woodturner attaches a circular metal plate to the end of the lathe. This stabilizes and holds wood for smoother turning, especially with large blanks of wood.

Bowl turning

A gouge bevel forms a blank into its final shape. This technique uses scraping tools to smooth out the hollow surface and create a seamless bowl.

Basic Lathe Safety Requirements*

- Use a full face shield (Safety glasses at a minimum) whenever the lathe is turned on.
- Tie back long hair, do not wear gloves, and avoid loose clothing or objects that may catch on rotating parts or accessories.
- Always check the speed of the lathe before turning it on. Use slower speeds for larger diameter or rough pieces, and higher speeds for smaller diameter and pieces that are balanced. Always start a piece at a slower speed until the work piece is balanced. If the lathe is shaking or vibrating, lower the speed. If the work piece vibrates, always stop the machine to check the reason.
- Check that all locking devices on the tailstock and tool rest assembly (rest and base) are tight before operating the lathe.
- Position the tool rest close to work, about 1" away from the material. Check tool rest position often and as wood is removed, turn off the lathe and re-position the rest.
- Rotate your work piece by hand to make sure it clears the tool rest and bed before turning the lathe "on." Be certain that the work piece turns freely and is firmly mounted. A handwheel on the outboard side of the headstock simplifies this process of spinning the lathe by hand before turning on the switch.
- Be aware of what the turners call the "red zone" or "firing zone." This is the area directly behind and in front of the work piece - the areas most likely for a piece to travel as it comes off the lathe. A good safety habit is to step out of this zone when switching the lathe to the "on" position. When observing others turn stay out of the area.
- Hold turning tools securely on the tool rest, holding the tool in a controlled and comfortable manner. Always contact the tool rest with the tool before contacting the wood.
- It is required to turn the lathe "off" before adjusting the tool rest or tool rest base (banjo).
- Remove the tool rest before sanding or polishing operations.
- Never leave the lathe running unattended. Turn the power off. Do not leave the lathe until it comes to a complete stop.

(*source: www.woodturners.org)

Square, Round, Diamond, and Parting Tools

What is a replaceable tip tool? A replaceable tip tool is just that: it is a tool with a removable cutting tip that can be rotated or removed once it has become dull, allowing you to always have a sharp cutting edge.

What makes them different from traditional style tools? Some traditional style tools have a steep learning curve and can be difficult to learn. Replaceable tip tools are simpler to learn. Keep the tool flat on the rest, parallel to the ground and advance slowly into your work. These tools allow you to easily cut from left to right or right to left. Another major difference is that most replaceable tip tools do not require sharpening like traditional style tools, which can be difficult to master at first. Some can, however, be resharpened, such as ones produced from high-speed steel, but most are treated as disposable when dull. Let's take a look at the four most common profiles or shapes.

Square Replaceable Tip

Square Tip: used primarily for turning square stock round. Able to remove massive amounts of material quickly and efficiently.

Round Replaceable Tip

Round Tip: used for finish cuts and works especially well on end grain. Easily creates coves in spindles and bowls.

Diamond Replaceable Tip

Diamond Tip: can be used to create details in spindle work, such as coves, beads, and other fine detail work.

Parting Tool Replaceable Tip

Parting Tool: can be used to cut deep grooves, to create flats for spindle turning, and of course to remove your finished work from the lathe.

* https://www.woodcraft.com/blog_entries/basic-introduction-to-turning-tools