Build an elegant patio set

This table and chairs set is great on the deck, patio or balcony

Sometimes simpler is better, and these bar-height table and chairs show how well good looks and clean lines can go together. My design calls on mortise-and-tenon joinery for the frames, while the horizontal seat slats and tabletop are fastened with corrosion-resistant screws. This approach is strong, attractive, easy to build and makes it easy to replace parts later, if needed.

The tabletop is large enough for four chairs, one on each side. All of the parts are cut from one-inch and 1 1/2"-thick white oak. This terrific eastern hardwood looks great and stands up to outdoor weather well. It's heavy, hard and strong, with excellent wear-resistance. It also holds screws solidly, although you'll need to predrill for them. Oak contains high levels of tannic acid, a substance that reacts with some metals to produce black stains. Choose stainless-steel screws: they minimize discolouration of the wood.

YOU WILL NEED		
FOR EACH CHAIR	**SIZE (T x D x L*)**	**QTY.**
Front legs	1 1/4" x 1 1/4" x 39 1/2"	2
Rear legs	1 1/4" x 1 1/4" x 35"	2
Face seat rails	1 3/4" x 1 3/4" x 19 1/2"	2
Side seat rails	2 1/2" x 3/4" x 14 3/4"	2
Face lower rails	3/4" x 1 1/4" x 19 1/2"	2
Side lower rails	3/4" x 1 1/4" x 14 3/4"	2
Back uprights	1 1/4" x 3 3/8" x 13 5/8"	2
Seat slats	3/4" x 2 7/8" x 18 3/8"	5
Back slats	3/4" x 2 3/8" x 15 3/8"	5
Screw cleats	3/4" x 3/4" x 13 3/16"	2
Armrests	1 3/4" x 1 1/4" x 20 3/4"	2
FOR THE TABLE		
Legs	1 1/4" x 1 3/4" x 39 1/2"	4

Leg rails	3/4" x 1 1/4" x 18"	4
Tabletop frames	1 1/16" x 2" x 30"	4
Side/mid slat support rails	3/4" x 1 1/2" x 28 1/2"	3
Top slats	11/16' x 2" x 27"	12
Top leg braces	3/4" x 1 3/4" x 2"	2

*Length indicates grain direction. All parts are white oak

Start with the chairs
Each chair consists of four frames connected at the corners with 1 1/4"-square legs. All rails are cut from 3/4"-thick material, organized as a set of thin lower rails and wider upper seat rails. You'll join them with blind mortise-and-tenons, which are hidden.

Click here for detailed chair project plans!

Mill the front and rear legs to 1 1/4" square, then cut them a bit longer than required. The angle on the top of the legs will be cut later, after you've shaped the armrests. Mark the legs according to location: front right, front left, back right, back left. Don't forget: the front legs are longer than the rear ones.

Carefully lay out the mortise locations, making sure the joint orientation is correct relative to the other legs. Cut all mortises 1/2"-wide and 3/4"-deep, centred on the legs. The simplest way to prepare mortises involves boring out the majority of the waste with a drill, then squaring the holes with a chisel. You can also use a plunge router or, if you're lucky enough to own one, a mortising machine.

Regardless of how you prepare them, lightly chamfer the edges of each mortise to prevent chipping of the wood along the edges. White oak is especially prone to this! As you work, keep in mind that the longer mortises for the seat side rail meet inside the legs with those for the face seat rail.

Next, mill face seat rails, side seat rails, the lower face rails and the lower side rails to 3/4" thick. It's easy to get these parts mixed up, so bundle them in groups with tape to keep things orderly while you cut to final length. This is especially important if you're building four chairs at once.

Use a dado blade in your tablesaw to prepare the 3/4"-long tenons you'll need on the ends of all the frame rails. Cut the tenons to width first by tweaking the height of the blade until the tenon is a snug fit into the mortise. Cut all tenons to the same width at this machine setting, then cut the cheeks to bring the tenons to the correct height in the same way. Make sure your machine settings are correct first, then run all the parts through.

Take a look at the plans and you'll see that the side and face seat rails meet in the corners. Make this happen smoothly by trimming the ends of the tenons on these parts to 45º, so

that they meet without interfering within the mortises. By now you've probably discovered how splintery white oak can be. That's why you should lightly chamfer the corners of all tenons.

Test-fit each joint and use a chisel and file to tweak the joints until they're snug. Clamp the chair frame together without glue, checking that all the joints are tight and the frame is square. Carefully label each part (on end grain surfaces) to make it easy to reassemble the frame during glue-up.

Do a little jig

The side seat rails have a decorative arch cut into their lower edge. To prepare this feature, you could draw the outline of the curves on each piece by hand, then use a saw to cut them before sanding, but there's a better way.

Start with a router table template made from a piece of scrap medium-density fibreboard (MDF) a couple of inches longer than the rail. Trace the required curve, as shown in the plans, with a drawing bow, then carefully saw and sand the MDF to the exact shape. Be careful: every bump and wave in the curved edge of the MDF will be transferred to your chair rails.

Rough-saw the curved shape onto the bottom edge of all white oak chair rails (no sanding is needed), keeping about 1/16" to 1/8" on the waste side of the line. Next, temporarily fasten one chair rail to the MDF template, with the oak overhanging the edge slightly. Install a flush-trimming bit into your table-mounted router, with the height of the bit adjusted so the bearing rides only on the edge of the MDF template. You can use double-sided tape, small finishing nails or a system of toggle clamps and stop blocks to hold the oak in place. The wood and MDF must stay solidly together while you push the assembly across the spinning flush-trimming bit.

The genius of the flush-trimming bit is that it cuts away everything that's beyond the diameter of the bearing. This means that all the excess oak you left when you roughed it out will neatly disappear, leaving the edge smooth, crisp and identical to the MDF pattern. Work slowly and take shallow passes as you rout against the grain of the curve to prevent splintering along the grain.

Once you've cut and trimmed the curves, use a 1/4" roundover bit to refine the edges of the legs, lower rails and the lower edges of the seat rails. Leave the seat rails' upper outside edges square.

Cleats and seats

With the side seat rails complete, cut the two screw cleats that will fasten the seat slats to the frame. Cut them a little shorter than the distance between the tenons, then bore countersunk screw holes to attach each cleat to its rail and the rail to the seat slats.

Mill enough wood for five seat slats for each chair you're building, then cut them to fit snugly between the side seat rails. Make one pair of slats for each chair notched to fit

around the front and rear legs. Use a 3/4" bullnose bit in the table-mounted router to profile the edges of all slats, then sand each piece smooth.

Attach the screw cleats to the side seat rails with glue and screws. Be sure to set the cleats below the top edge of the rails, the same thickness as the seat slats you'll add later.

Glue up the chairs

Start by gluing up each chair's side frame, one at a time, using outdoor glue. Make sure each frame is square (equalize diagonal measurements to within 1/16") and flat, then set them aside to dry. Continue by gluing one side of the four face rails, assemble the entire chair and set it on a flat surface. Clamp, make sure the whole assembly is flat and square, then allow the glue to set.

The back is made of a pair of back uprights, with back slats. The uprights are shaped to lean backward to provide lumbar support. While the uprights are cut from 1 1/4" thick material, the slats are from 3/4" stock, joined to the uprights with biscuits. You'll also join the uprights to the rear legs in the same manner.

Create a router template for making the chair back uprights using 1/4"-thick MDF or plywood. Carefully saw and smooth them as you did earlier with the side rail templates. Use the templates to make one pair of chair back uprights for each chair you're building.

Temporarily install the rear notched seat slat and clamp the uprights to the rear chair legs. Make matching marks on the legs and the uprights to locate a pair of #0 biscuits in each joint.

Measure the distance between the chair back uprights and cut five back slats to length. The plans show where the back slats should go. Cut matching #0 biscuit slots in the slats and uprights, then rout the edges of the slats with a 3/4" bullnose bit and sand them smooth. Assemble the back with glue, clamp and remove squeeze-out when the glue is half-cured. Reassemble the back into the chair and tweak all parts for fit.

When the chair parts fit and feel good, take everything apart, add glue and reassemble permanently. This operation also includes the second side frame on each chair, the one you left unglued so you could install the back. While you're at it, put in the seat slats with a dab of glue in the centre, then secure them with screws.

Give it a rest

The armrests are shaped from 1 3/4"-wide white oak and extend between the front and back legs with a shallow convex curve. Mill wood to thickness and trace the curve from the template onto your oak. Cut on the waste side of the line using a bandsaw before using the same template to draw the inside curve 3/8" below the other. Sand the surfaces smooth, then roundover the inside and outside edges with a 1/4" bearing-guided bit in a table-mounted router.

While the table and chairs are a standard bar height, not all family and friends are

“standard.” That's why you should consider the height of those who will be using the chairs most. People between 5' and 5'3" will be more comfortable if you lower the armrests and table height by 1 1/2". Before you add the armrests, try the heights, then fine-tune the length of the legs to match.

Position the armrests on the legs so that two inches protrudes from behind the rear leg, at the point where the backrest uprights change angle. Mark the angle that the armrest crosses the legs, then trim the legs with a fine-tooth handsaw. Reposition the armrest on the legs now, then mark the place where the armrest needs a notch to fit around the rear leg. Cut this notch with the saw and chisel to 1/4" deep. Use a small flat file to adjust the notch for a snug fit.

Join the armrests to the legs with a countersunk and plugged screw driven down from the top. Centre the notched armrests on the legs and drill a counterbored pilot hole for #8 x 1 1/4 screws.

Finish the chairs

Sand your chairs up through 120-, 180- and 220-grit sandpaper, then clean up the dust in preparation for finishing. I used Danish oil. It adds a beautiful depth to the appearance and is easy to repair. A quick wipe covers scratches and scuff marks.

Build the matching Table

The table is constructed similarly to the chairs, but it's built with a combination of mortise-and-tenons, half-lap joints and glued-and-screwed assemblies.

The table's legs are joined with upper and lower rails that interlock as they cross with half-lap joints. Mill the wood for the legs and cross rails at the same time to keep them matching. With your stock ready, lay out mortises on the legs and prepare them as you did with the chairs. All of the mortises are 1/2"-wide, one inch long and 1 1/16"-deep.

Click here for detailed table project plans!

As before, use a dado blade in your tablesaw to cut the leg rail tenons. Adjust settings after cutting a piece of scrap first, sneaking up on the tenon width and length to achieve a snug fit into the mortises you've already made. When complete, your tenons should be one inch long, 1/2"-thick and one inch tall.

Now it's time to prepare the half-lap joints that connect the cross rails to each other. Adjust your dado blade again so it's exactly half as high as the thickness of the wood you're using, then prepare some test cuts in scrap. The goal is a half-lap joint that holds together with friction, while adjoining surfaces are flush. Test-fit the completed joints and adjust as necessary with a file.

Use a 1/4" roundover bit again to profile the edges and bottom ends of the four legs. Dry-fit the two pairs of cross-rails, and while they're together, round them over too. Sand all parts smooth and apply a coat of finish everywhere except the joints and leg tops. Glue

up the assembly and stand it on a smooth, flat surface. Clamp the assembly square before setting it aside.

Tabletop assembly

The tabletop is framed with four identical pieces, joined at the corners with mortise-and-tenons. Each piece has a tenon on one end and a mortise at the other, so the whole assembly has to be glued together at the same time. The mortise is inset to accommodate the curve cut into each outer frame side.

Mill all of the wood for the top, then prepare the frame using that dado blade again to create the tenons. Carefully dry-fit the frame, bringing all joints together at the same time.

Use your drawing bow again to lay out the curve on the outer edges of one of the frame pieces. Cut the curve with a bandsaw or jigsaw, then sand or plane the surfaces smooth. Transfer this curve to the other pieces and extend the curve to the mortised end of the adjoining parts. Cut the curves on all frame pieces, sand them smooth, then reassemble the frame. Join the parts with outdoor glue, then clamp them tight. Measure and equalize the diagonals to ensure the frame is square, then set it aside to dry.

When the glue has cured, sand the top frame smooth and rout a 1/4" roundover profile on the outer edges. Lightly relieve the inner edges with sandpaper.

The tabletop slats sit on three support rails: two opposite each other at the edges and one in the centre. These support rails are cut to fit inside the top frame, providing a lip to which the slats are glued and screwed. Measure the inside dimensions of the frame and then cut the three top slat rails 1 1/2" longer than this length. Use a dado blade to cut the 3/4"-long rabbets on all ends and 1/2" rabbets on the sides of the two side rails. Glue the side rails underneath the tabletop frame, but leave the middle one off for now.

Lay the middle support rail in the middle of the frame and mark its location there. Next, centre the middle support rail on a pair of legs and drill a pair of pilot holes through it and into each leg. Countersink the holes and secure the support to the legs with a dab of glue. Install a leg top brace in the same direction as the middle support rail, sitting on the top of the other two legs. Pre-drill, glue and screw in a similar manner. Give everything a final sanding and coat with the Danish oil.

Cut the top slats to length so they fit gap-free into the frame while resting on the side rails, then apply oil to the top and sides of the slats and frame. Glue the slats in place with proper spacing (I used stir sticks) and clamp them flat.

Give the top a final sanding and apply a couple of additional coats of oil. Fasten the top to the legs and drill pilot holes into either side of each leg brace and into the ends of the middle support rail. Countersink and screw each into place with a dab of glue under each slat. Sand the completed table and finish as you did with the chairs. Once the whole set is dry, you won't want to give up your seat anytime soon!