

WCMA Competition License School – Produced by NASCC

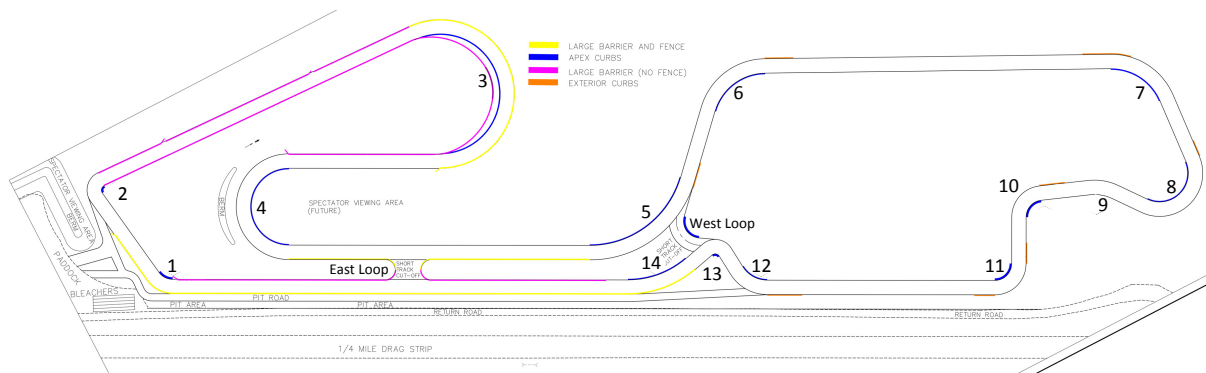
Saturday Exercises: Teaching Points

This outlines the objectives, for the Exercise component for the competition Driving School at Castrol Raceway. For these Saturday morning exercises, instructors will hop from car to car as required, with no assigned students.

There are two 40 minute exercise sessions for each Blue and Red run group. Within each 40 minute session the coloured run group is split in half and spends 20 minutes at the east end and then 20 minutes at the west end, or vice versa. Session 1 is then followed by a classroom period, and then Session 2.

Objectives:

To present students with the opportunity to experience the practical aspects of understanding and managing weight transfer associated with changes in direction, acceleration and braking. The 2 mile track will be divided into 2 separate components – East End and West End each of approximately 1 mile in length and run in the clockwise direction.



East End Loop: Slow Speed Continuous Flow from Beginning to End

There will be 4 exercise stations contained in this end and these will focus on braking and change of direction components with *no necessity for gear change*. Students should be running the east end all in second gear.

Station 1A – Slalom – (During Exercise Session 1)

Students will enter the slalom exercise after corner 2, along the East end back straight, at a speed that will be held constant throughout the exercise. The objective is to manage weight transfer through the timing of turn in and to experience the effect of the banking on the rate of weight transfer. Focus on looking ahead will also be stressed.

Station 1B – Straight line brake box setup – (During Exercise Session 2)

Students will accelerate down the back straight (to an initial speed of 80 kph), traveling in a straight line path to the brake box near the entrance to corner 3, and upon entry to the brake box apply the brakes to reach a full stop at the end of the box. They will then **immediately** leave the box, accelerating to the turn in for corner 3. The goal of the exercise is to introduce students to the concept of threshold braking and to bring the car to a controlled slow speed in the given distance as opposed to stopping in the shortest possible distance. PROGRESSION of BRAKING APPROACHES is important in this exercise. As the exercise progresses students should shorten the stopping distance by applying a later braking point or by retaining the original braking point but increase the entry speed.

All remaining stations are the same for both Exercise session 1 and 2

Station 2 – Cornering line in a banked sweeper (Corner 3)

Introduction to corner turn in, apex and exit on the banked corner. On exit from the back straight, students will accelerate towards the turn in pylon, transition from throttle to brake as necessary, adjust car placement to reach the very, very late apex point (also known as the clipping point), transition to throttle application at the apex and gradually release steering input out to the track out (corner exit) point. Students should vary the line they run through the sweeper, to experience the difference in load on the suspension and steering input with running a central line and the low line through the sweeper. Note the track is gritty with dirt at the very top of the banking, and consequently lacks traction, so an excessively high line near the outside wall is strongly discouraged.

Station 3 – Brake and lane change (Corner 3 to Corner 4)

Students will exit the banked corner and increase speed to enter the brake and avoidance zone, apply brakes and slow just enough to make the lane change, then apply throttle as they

return to the original pathway. This exercise is designed to further the concept of threshold braking and weight transfer in maintaining balance and car control.

Station 4 – Cornering line in a sweeper (Corner 4)

Introduction to corner turn in, apex and exit. On exit from the lane change exercise, students will accelerate towards the turn in pylon, transition from throttle to brake as necessary, adjust car placement to reach the very, very late apex point, transition to throttle application at apex and gradually release steering input out to the track out (corner exit) point. With each subsequent repetition experience students should alternate the apex point, using the various cones in that zone to judge the apex point changes they make.

Return to Station 1 – significantly reduce speed, come to a near halt at the stop cone, then follow the track cut-off around to the right, (east loop on map). Then travel around corner 1, and **be prepared to stop**. Expect to see a flagger at corner 2, who will bring you to a stop or wave you on, depending upon traffic in the exercise ahead.

West End Loop – High Speed Component With Continuous Flow

These exercises focus on smooth transitions from throttle-to-brake-to-throttle, steering input and release, gear selection – heel-and-toe, and car placement. Focus on looking ahead. Students may just use second gear, or may use a shift up to third along the back straight between Station 1 and 2, with a downshift to second between Station 2 and 3. Staging point for Station 1 is at Corner 5.

Station 1 – Increasing Radius Corner

Turn **6** – structured into an increasing radius turn with an early apex point, with several cones marking the possible apex to allow experimentation with identifying the correct point. The corner opens out wide on exit, allowing strong application of throttle as the steering wheel is quickly unwound back to straight.

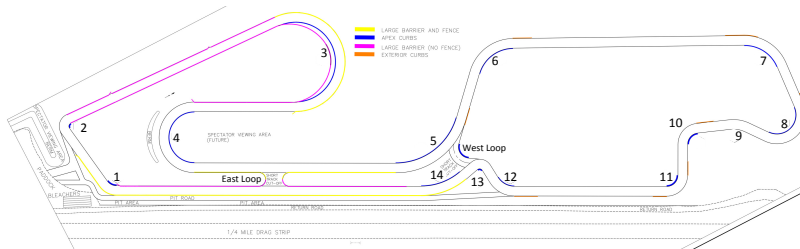
Station 2 – Off Camber Effect on Cornering

Turn **7** – High speed entry, experiencing the effect of an off-camber corner. First exercise session run two feet out from the race apex (cones will mark the shifted apex point), second session run at the proper race apex. Students should feel how much harder the suspension is working when running on the off-camber portion of the track, and may experience some oversteer, learning the importance of correctly making this apex under race conditions.

Station 3 – Decreasing Radius Corner

Turn **8** will be restructured into a decreasing radius turn with the placement of pylons so that there is a long wide entry followed by a very late tight exit. Turn-in to the late apex may require a gear down selection where heel-and-toe will be critical to maintain effective vehicle

balance. Students may experience understeer here if in too fast, or oversteer if they apply throttle too soon. They may wish to experiment with these effects here.



Station 4 – Compound Corner

Turns **9, 10 and 11** will be dealt with as a combination of turns with the placement of cones indicating turn-in at both **10 and 11**, apex points (double cones) at both **10 and 11** and track out for both **10 and 11**. Note location of turn-in to Turn **10** and late apex and mid-track exit. Turn **10** will have an apex point, and a shortened track out, intended to best set up entry to turn **11**. The key is to drive corner 10 to set up for fast entrance and exit of corner 11 on the short front straight segment.

Station 5 – Compound Corner – the Kink –

Turns **12, 13 and 14**. The Kink is a tight right-left-right combination of turns where the vehicle will be carrying considerable speed at entry to the first component – Turn **12**, aggressive straight line braking will be required prior to turn-in, trailing throttle or possible further braking to the Turn **13** turn in point, then increasing throttle as approaching the Turn 13 apex point, with further increasing throttle application towards the apex for Turn **14** and unwinding the steering to curve out to the left side of track at corner exit.

Exercise Completion – slow down, come to a near stop at Stop cone, following track out point at Turn **14**, proceed slowly to short East Loop cut-off point and turn right to proceed back toward Turn **5** to reform point at the West Loop Staging Point, Turn 5 and repeat Exercise sequence. Staging with a flag may be required along the short straight leading up to Turn **5**.

Sunday Exercises: Teaching Points

This section outlines the objectives for the Sunday, Full course Exercise components of the NASCC operated School at Castrol Raceway. These will be run during one 40 minute session, on the full course, with the assigned instructors in each student's car.

Objectives:

The goals of these exercises are for students to develop the sense of how braking can be used to balance the car on turn in to a corner, to experiment with the use of throttle steer, and to become comfortable with being side by side with other cars in corners, as they may be in race situations.

Exercise 1: Side by Side Driving:

Two cars are driven side by side, about 8 feet apart, noses lined up all the way around the track, including through each corner. Pairs of cars follow each other around the track leaving ten or more car lengths at least between pairs.

Cars will not drive in pairs through the **kink (12, 13, 14)**, and will instead use this location to switch the car running the inside (right) to the car running the outside (left). At the entrance to corner **12 (the kink)**, the car on the inside of the track (driver's right) will enter the **kink** first, drive to the apex of corner **13**, and then exit to the outside wall of the front straight. They must then allow their partner to catch up to them, so the partner can now run the right side of the track for the next lap. The car on the outside of the track before entering the **kink** will slow enough to let the inside car take the lead through the kink, then follow it through, and exit to the inside line of the front straight. So the previous outside car can now run around the inside of the track (driver's right) on the next lap, with their partner on the outside (driver's left).

This switching process will occur each lap for the duration of the exercise.

Students should use their peripheral vision to develop awareness of the car beside them at all times around the track, to help them develop situational awareness during racing. They need their eyes on the track, yet to be constantly aware of the car beside. This exercise also explores the importance of driving the line, and what it is like not being on the line.

Students will then pull into the hot pits, have a very short debrief session with their instructor, and then move back on track for the combination of Brake and Throttle Steer exercises

Exercise 2: Throttle Steer and Braking exercises.

While these are two separate exercises, they will be run at the same time, on different corners of the track, as the driver completes each circuit of the course. The instructor should inform students that in these exercises we are using the corners to illustrate ideas, so they may not end up driving the ideal lines or using ideal braking points during this set of lap circuits.

Corners 8, 9, 10 Throttle Steering

These 3 low speed corners provide an excellent chance to experiment with throttle steer. Students are encouraged to enter corner 8 at a high but controllable speed, and upon turn in, experiment with how excess application of throttle or of lifting off the throttle can rotate the car to change its angle of attitude within the corner complex. We expect the cars to get a bit out of shape, and to not drive a proper line here during this exercise.

Corners 5 and 6 Trail Braking

Students will have learned about trail braking in the classroom, but probably have not attempted it. Students should use trail braking in Corners **5** and **6** in this exercise, even if at race speeds their cars may not normally need to brake for these corners. They must get all of their heavy braking done in a straight line (we are not encouraging late braking for this exercise), but then keep their foot on the brake lightly as they execute turn in, and experiment with the effect of being heavier or lighter, and longer and shorter on the braking from lap to lap. Students should feel how the way they use the brake pedal after turn in affects the cars pitch and balance on corner entry.

Corner 7 Caution

With throttle steering going on ahead in corners **8-10**, entry to corner **7** should be just a wee bit slower than normal, with the students holding their eyes up to look ahead for any cars in trouble in the next stretch of corners. Speed needs to be carried into 8, so just a very slight reduction in corner 7 entry speed is needed.

Remaining Corners on track

Students should be asked to pay close attention to the attitude and pitch of the car throughout their brake application, and give feedback to the instructor on what they feel after passing through each corner. The instructor and the student can then explore the effect of braking longer, or harder or with brake pressure modulation on the balance and pitch of the car through corner entry. **To work, this must be done at the student's usual track speeds.**