



NEW JERSEY CHAPTER BMW CAR CLUB OF AMERICA, INC.

P.O. BOX 2305 \* WESTFIELD, NJ \* 07091-2305

# DRIVER SCHOOL HANDBOOK



# DRIVER SCHOOL HANDBOOK

## PLEASE READ THIS BOOKLET BEFORE THE EVENT

Welcome to the New Jersey Chapter's Driver School. We look forward to having you join us for an educational and fun-filled day at the track. It is important that you read this handbook thoroughly; it contains information about your preparation for the event, some basic safety information and terminology you should be familiar with and some tips on driving technique to get you prepared. Spending a little time on the information here before the event will greatly improve your experience at the school.

### GENERAL EVENT INFORMATION

There are few thrills in life that rival driving a high performance automobile at speed. Yet, as enjoyable as it is, the dangers are many and the risks are high. The NJ chapter has been conducting driver schools since 1974 and the information in this handbook reflects the lessons we have learned over 40+ years. The following material is designed to familiarize you with the proper technique of driving at the school and other tips to make the day more enjoyable. Understanding these fundamentals will make the total driving experience a safer and much more satisfying one. Note that our Driver School is a non-competitive, NON-RACING, NON-RACING PRACTICE event, the purpose of which is to provide you as a club member the opportunity to improve your driving skills and explore the limits of your car's capabilities. Our program involves both classroom instruction and in-car instruction on the race track's road course and may also involve skid pad instruction. On the race track, you and your instructor will be driving with other students in various vehicles. We group our students according to their experience/skill levels and not on the basis of the car they drive. **Promoting a safe event for you and the other participants is our first concern.**

**SCHEDULE** – The event must be run on a tight schedule in order to maximize your track time and assure that you get adequate instruction. Your cooperation will allow us to get through the necessary preliminaries quickly. Below is a typical day for our schools, although the precise times may vary depending on the venue – you will receive an email from the Registrar or Event Chair with announcements of times and other specific information.

6:45 AM:	Track entrance opens. BE THERE!
7:00-8:00AM:	Tech and Event Registration
8:10 AM:	Participant's Meetings. EVERYONE must attend.
9:00 AM:	First Run Group on track
6:00 PM:	Last Run Group ends
7:00 PM:	Paddock closes



**PROCEDURE**– When you arrive, each person entering the track will be required to sign a liability waiver for the track. You will also be required to sign a liability waiver (or use SpeedWaiver) for the NJ Chapter either at the gate or at Registration. Please read and fully understand these releases before signing; they are serious legal documents. Although the Driver School is not a racing school, it does involve driving and receiving in-car instruction around the race track and skid pad. For these reasons, participation in the School involves risks and dangers associated with race tracks, motor vehicle operation, and high vehicle speeds.

Upon entering the track, go directly to the paddock area, unload your car COMPLETELY, and then bring your car, completed Tech Form and helmet to pit lane for Tech. Alternatively, if you use the [Fast-Track Tech Procedure](#) you can bring your completed and stamped Tech form and helmet to the Chief of Tech. After passing Tech, park your car, take your Tech and Medical Forms and proceed to the Event Registration area to collect your event packet containing your car number, wrist band denoting your run group, the event schedule and any additional instructions. It is important that you get your car teched early so you will be ready for the mandatory participant's meeting at approximately 8:10 AM. The paddock space you select will be yours for the day. It is a good idea to bring a tarp, blanket or piece of plastic to cover your things in the event of rain. There can be no loose objects in the trunk, glove box or passenger compartment while your car is on the track or skid pad.

**DRIVER'S MEETING.** Prior to the start of each day, there will be a driver's meeting held by the Event Chair for all students (Instructors have a separate meeting). Attendance is mandatory. The purpose of the meeting is to review rules for the school, passing zones, safety concerns, track-specific information and other announcements.

**RUN GROUPS.** Each driver will be assigned to a Run Group commensurate with his or her experience. The color of your wristband corresponds to your run group on the schedule. All students must drive with an assigned instructor for the first run group. Your instructor will find you when you line up prior to your run group. In-car communication between you and your instructor is generally via in-helmet headsets. Vehicles that are too loud or have too harsh a ride to permit student-instructor interaction will be rejected. When possible, at the end of your run group drop off your instructor in the paddock. Only those drivers that have been "signed off" and approved by two instructors will be permitted to drive solo. Your instructor will give you a checkered wristband to signify that you are permitted to drive solo. Everyone is encouraged to take advantage of the instruction available for all levels of driving skill.

New Jersey Chapter Driver School procedures require that instructors be permitted to drive the student's car, with the student as a passenger, in track sessions. This is to allow your instructor to demonstrate driving techniques, the "driving line" around the track and visual guides around the track. If you find your instructor's style is ineffective in communicating with you, you may request a change of instructors by asking the Chief Instructor. Similarly, if you are particularly pleased with the instruction you receive, the Chief Instructor will be glad to hear that too.



**CLASSROOM SESSIONS.** Every run group is assigned time for classroom instruction. Your classroom instructor will review driving techniques, principles of car control, track-specific tips for better driving and other topics. Classroom and on-track instruction are designed to be complementary so that you receive the optimum opportunity to improve your driving skill. **CLASSROOM SESSIONS ARE MANDATORY.** Attendance is taken and if you fail to attend your session, you will not be allowed to run in your next on-track run group.

**SAFETY** – Our over-riding intention is to run a safe event. While some rules and procedures may seem arbitrary at first, all are designed to promote safety and a fun event for everyone. Safety starts with Tech. Every car operated on the track must pass Tech to receive car numbers at Registration. No car will be allowed on the track without passing Tech. **THE ULTIMATE BURDEN FOR SAFETY IS YOURS!** Be certain that your car is safe to drive at speed over an extended period. A driver school will stress your car more than everyday driving. Therefore, we require that all cars to be driven on the track, or skid pad, receive a thorough inspection by a qualified individual prior to arriving at the track (see section below). Moreover, we require that this inspection take place no more than four weeks prior to the Driver School. Please review carefully the Pre-event Tech Inspection Form and follow its instructions carefully. The purpose of the form is to document the inspection that you or your designee performed on the vehicle you will drive at the event. This form must be completed at the time of the inspection, **NOT WHILE YOU ARE WAITING IN THE TECH LINE AT THE TRACK.** Regardless of who performs the inspection, your (and your co-driver's, if applicable) signature must appear on the form. Please understand that in completing and signing the Tech Form you are accepting responsibility for the condition of the vehicle you drive at the event. Our event-day spot check is not a complete inspection; it's purpose is to review and approve your previously-completed Tech Form and double check obvious items such as stop lamps, equal passenger restraints and seats, gross fluid leaks, etc.

**LIABILITY** – **PARTICIPANTS ASSUME ALL RISKS OF DAMAGE TO PERSONS AND PROPERTY DURING THE EVENT.** This includes times when an instructor is driving your car.

**PASSENGERS** – For insurance reasons, only instructors may ride as passengers while a student drives. Violators will be ejected from the event.

**FUEL, AIR, OIL & SNACKS** – Premium and race gasoline is sold at the track but at elevated prices. Therefore, you should arrive at the track with a full tank of gas. Compressed air is generally available but you should have a high quality air pressure gauge to measure your tire pressures throughout the day. In general, recommended cold tire pressures are between 36-42 psi but may vary considerably depending on your particular tire, car and driving style. There is a racing supply store at each facility the NJ Chapter uses for its schools. While they carry many grades of oil and other supplies, it is always a good idea to bring the particular oil you are using with you to the track.

There is a refreshment stand at every track as well. Its hours of operation vary during the year so it is highly recommended to arrive at the track with plenty of water and other fluids to drink during the day. Driving schools are strenuous events and dehydration is a significant concern. Be certain to stay hydrated.

**INTOXICANTS OF ANY KIND ARE STRICTLY PROHIBITED; VIOLATORS WILL BE EJECTED FROM THE EVENT.** Any medication should not be used if it will, in any way, affect your ability to concentrate or affect your reaction time. A Driver School is an activity requiring maximum effort and concentration for everyone’s safety. Any questions should be directed to the Event Chair. However, as stated before, the burden of safety is YOURS.

**DRIVING TO AND FROM THE TRACK** – Each of the tracks the NJ Chapter visits are located near residential neighborhoods. We ask that you respect local traffic laws and speed limits. We are guests in the area and look forward to being invited back.

**QUESTIONS** – Should you have any questions regarding any of the above or any other aspect of the event, you may contact the Event Chair:

Jamie Kavalieros  
jimkavobmw@optonline.net  
908-295-8486



## **PRE-EVENT PREPARATION**

Adequate preparation of you and your car before the event is essential to allowing you to get the most learning and enjoyment from any school. We always make the point to new students that modifications to your stock vehicle are not required to attend a driver school. Your BMW, MINI (or other vehicle) is engineered from the factory to capabilities that you will not exceed in your first event. However, this does not mean that you can just take your street car and drive it to the track. During the Driver School, you will be placing much more stress on your car than during a typical run to the mall. A well-tuned car will perform better and will result in a more pleasurable experience for you, the driver. Moreover, a complete inspection of drivetrain, suspension, brake system, exhaust and other components before you arrive at the track will greatly increase the probability that you and your car will have an uninterrupted event.

**PRE-EVENT TECHNICAL INSPECTION.** As noted above, it is a requirement that your vehicle undergo a pre-event technical inspection. The systems that must be reviewed are listed on the Driver School Pre-event Technical/Safety Inspection Form that can be downloaded from the NJ Chapter website (links to the form were included in your registration confirmation and acceptance emails). This inspection can be completed at an independent shop, by a dealer or by you, if you feel qualified to do so. Your BMW does not require any after-market equipment to participate in a Driver School. However, we want to be sure that there are no worn parts, loose hoses, belts, etc., your brake fluid must be fresh (less than 8 months old) and you should have at least 50% of your brake pad material still present at the start of the event.

Many students choose to install after-market window tinting – this can present a safety hazard on the track since drivers following you may not be able to see through your car to the track ahead. Therefore, **all after-market window tinting must be pre-approved by the Chief of Tech BEFORE the event. Failure to do so may result in your car failing Tech and you will forfeit your registration fee.** Any questions should be addressed to the Chief of Tech, Warren Brown at: Tech@njbmwcca.org .

**TIRES.** Tires are often the single most important factor in measuring a car's cornering ability. Pay particular attention to the tips in this handbook regarding pressures and lug bolt/nut tightening. For novice and beginning students, we recommend that street tires be used for track sessions. This allows the student to get a "feel" for their car before moving to track-specific tires that generally lose grip more abruptly than street tires. This is particularly important if there is rain during the event.

**AFTER-MARKET SEATS AND HARNESSSES.** We do not recommend purchase of after-market seats and harnesses for beginning students. However, if you have purchased a vehicle that has these items installed, be certain that they have been installed per the manufacturer's instructions. Many DIYers install after-market equipment improperly leading to a less safe vehicle than when the OEM seats and belts were installed. If after-market seats or harnesses are installed, they must be equivalent between driver and passenger. We recommend that 5- or 6-point harnesses be installed only in conjunction with a roll bar or cage. If you do install a harness, please note that NJ State regulations require that they be two years old or less for SFI

approval or 5 years old or less with FIA approval. Never install 5- or 6-point harnesses with seats that are not specifically designed for these systems. Four-point harnesses may be used provided they are installed per manufacturer's instructions, including the proper seat, and provided that the factory 3-point belt is retained.

**HELMET** – All participants must wear a helmet with a SNELL approval of **2015**, or newer. We accept either SA or M rated helmets. The SNELL holographic label must be clearly legible inside your helmet. An example Snell label is shown below.



Helmets showing only a DOT label are NOT acceptable.

Per NJ State regulations, all helmets must be full-face helmets, face shields must either be worn in the fully closed position or removed. For events held at NJ Motorsports Park, we recommend that you bring your face shield with you, if you have removed it. NO exceptions will be made; helmets that do not meet this standard will be confiscated for the duration of the event and returned to the owner at the end of the event. For a limited number of events and for new students only, NJ Chapter may provide loaner helmets for Driver Schools. Please refer to the chapter website and event descriptions for details and availability.

**CLOTHING.** Comfortable, well-fitting garments of natural fibers are recommended. Long pants made of natural fibers are required on the track. Long sleeve shirts of natural fibers are recommended. You may wear shorts in the paddock when you are not on the track. Be sure to bring a hat, sunglasses and sun screen and a rain coat (not yellow).

**SHOES.** Choose a good sneaker or driving shoe with a flat rubber or crepe sole. Avoid athletic shoes with overly large or thick soles as they reduce your "feel" for the pedals. Driving in sandals, bulky or loose-fitting footwear, or bare feet, is prohibited. Racing boots are not required.

**DRIVER PREPARATION.** The single most important thing for you to be prepared is to be well-rested. Try to get at least two good night's sleep before the event. Driving on the track is far more tiring than you may realize requiring both physical and mental exertion. Avoid alcohol before the event, make sure you are hydrated and arrive with a clear head. Have a good breakfast (avoid fatty foods) and bring some snacks with you to the event along with fluids to drink during the day. Come with an open mind, have fun and be surprised by how much you learn.

## **TERMINOLOGY**

As is true for any sport, performance driving uses a set of terms to communicate specific information. Knowing the meaning of these terms before you arrive at the track will help you communicate with your classroom and in-car instructors (and with your fellow participants).

**The Line** refers to the route around the track that yields the fastest time while staying safe. The "generic" Line around any track is adjusted according to vehicle (depending on weight, suspension, brakes, tires, drivetrain and other factors), driver, weather and track conditions.

**Braking Zone** is that section of track where you apply and release the brakes in preparation for a turn.

**Turn-In Point** is where you begin to add steering input to drive through a turn/corner.

**Apex** is that ideal point on the innermost part of a corner where you transition from entry into the turn to exit from the turn. In a perfectly symmetrical 90° turn, the apex is at the mid-point of the turn (see below). Few turns, however, are perfectly symmetrical so the location of the apex will vary from turn to turn.

**Track-out** is that point on the track where you have completed a turn and the wheel is now set to take the car down the track. This will be a straight ahead wheel position if the turn is onto a straight or may be a position to turn the car to set up for a second corner.

**Unwind** is a term the instructor may use to have you return the wheel from a turned position toward the straight ahead position.

**Understeer** is a condition in which for a given amount of steering input, the car turns less than anticipated. In this situation, the car tends to "plow" forward rather than turn. If you have driven in snow and experienced a situation where you turned the wheel but the car kept going straight, that is understeer. For driver safety, most cars are engineered with a slight degree of understeer.

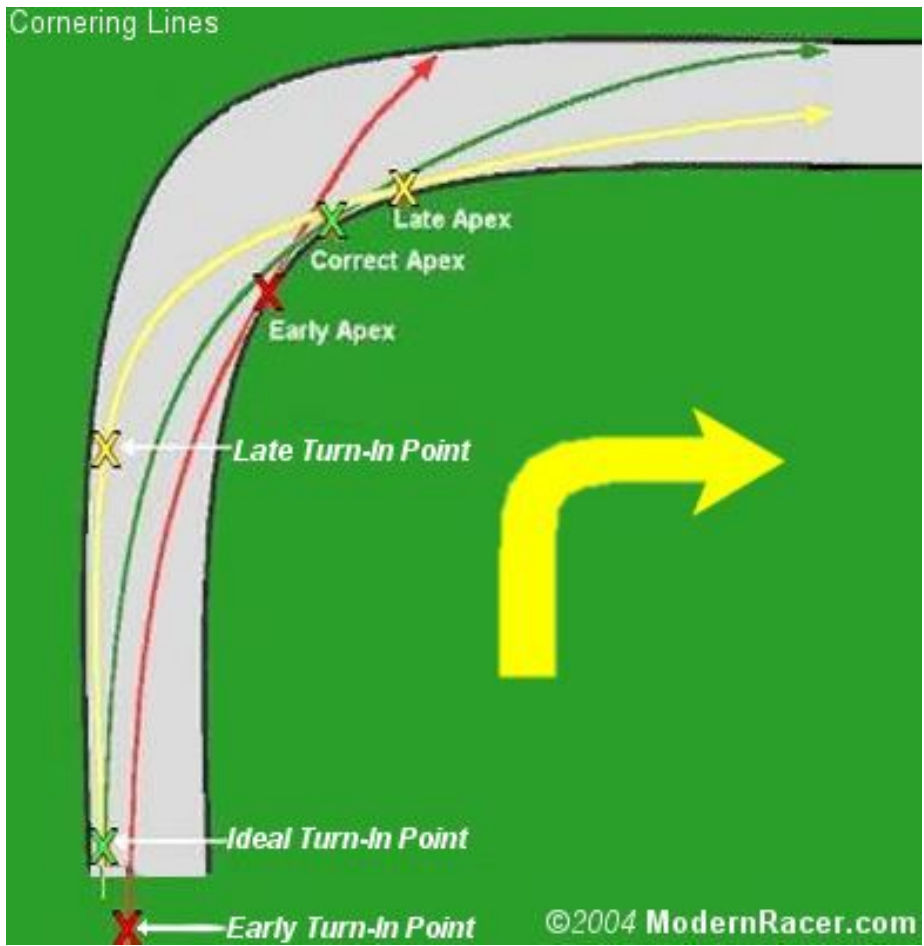
**Oversteer** is a condition in which for a given amount of steering input, the car turns more than anticipated. In this situation, the back end of the car tends to snap around. If you have driven on ice or wet pavement and experienced a situation where you turned the wheel and then felt the back of the car lose traction and start to come around, that is oversteer.

**Early** (or In Early or Early Apex) is when a driver has initiated turn-in to the corner too soon. This results in the car arriving at the inside of the corner before the apex. If the driver then applies too much power, the car will run off the track. The correction for an early turn-in is to stay off the power (no additional throttle input) until the apex is reached and then drive to the track out point. See graphic below.



**Late** is when a driver has initiated turn-in to the corner too late. Depending on how late the turn-in occurred, this may result in the car being wide of the apex. The correction for being late is to accept that you have missed the turn and just drive to the track out point and continue the lap. You can get it right next time. Do not try and "pinch" the car down to the apex with excess steering input as this can result in a spin.

The graphic below illustrates the different lines a vehicle takes with proper (green), early (red) and late (yellow) turn-ins.



(Graphic courtesy of Scott Barton: [http://www.MyTrackSchedule.com/HPDE\\_Novice\\_Guide.html](http://www.MyTrackSchedule.com/HPDE_Novice_Guide.html) )

All of these topics will be covered by the classroom instructor.

Additional terminology definitions can be found at:

[http://www.MyTrackSchedule.com/HPDE\\_Novice\\_Guide.html#Glossary](http://www.MyTrackSchedule.com/HPDE_Novice_Guide.html#Glossary)

## **FLAGGING – PLEASE READ CAREFULLY!**

NJ Chapter Driver Schools use professional corner workers (flaggers) whose job is to communicate to you what is happening on the track ahead of where you are driving. What they are telling you is vital to your safety, so PLEASE READ AND UNDERSTAND THE FOLLOWING SECTIONS THOROUGHLY. The safety of any high-speed event depends upon the proper use of signal flags. The flags we use will be green, yellow, red, black, blue (or blue with a yellow stripe), yellow with red stripes and checkered. We will answer any questions you may have regarding flags at the Driver's meeting or in classroom on the morning of the event.



The **GREEN FLAG** indicates the course is clear and open for use.



The **YELLOW FLAG** indicates trouble on the course. This flag is the one most commonly displayed in response to on-track incidents or conditions that threaten the safety of the event. This flag is displayed at the discretion of either the flag station or upon instruction from the Control Tower. A flag station electing to display the yellow flag must immediately inform the Tower of the situation and the manner in which the flag is being displayed (waving or stationary). A waving yellow flag indicates a problem that is immediately in front of you on the track surface. The response to a waving yellow flag is to reduce speed (do not slam on your brakes or you may collect the person behind you) and be prepared to take evasive action, including driving off the track surface if necessary. A stationary yellow flag indicates a problem off the track surface but you should still proceed with caution. During a yellow flag period, **NO PASSING** is allowed and a reduced rate of speed is required in the area in which the yellow flag is displayed. **BE PREPARED TO STOP SAFELY.**



The **RED FLAG** is displayed to indicate serious trouble on the track. It is displayed only when an on-track incident or condition requires that the event be stopped. It may be preceded by a waving yellow flag. **THE RED FLAG IS DISPLAYED SIMULTANEOUSLY AT ALL FLAG STATIONS, ONLY ON INSTRUCTION FROM THE CONTROL TOWER. TREAT THE RED FLAG AS YOU WOULD A TRAFFIC LIGHT. ALL CARS MUST COME TO A COMPLETE STOP, PULLING TO THE EDGE OF THE TRACK SURFACE SO THAT SAFETY VEHICLES CAN PASS EASILY. REMEMBER, OTHER CARS ARE BEHIND YOU, THERE IS NO NEED TO JAM ON YOUR BRAKES.** If possible, stop or creep forward to a location where you can see a flag station. Do not move your car until signaled to do so by a flagger, usually with the display of a yellow or black flag.



The **BLACK FLAG** is used in two ways: (1) as a warning to a particular driver, and (2) as a signal for all cars on the track to slow down and immediately return to pit lane. The Black Flag is only displayed on instruction from the Control Tower. To warn a particular driver, the flag will be pointed at the car being black-flagged as the car passes the flag station or Control Tower. The designated driver should acknowledge the flag with a hand signal, safely enter pit lane (no cool-down lap) and report to the Control Tower IMMEDIATELY. The black flag may indicate that either mechanical trouble or incorrect driving procedure has been observed. Extremely careless or unsafe behavior, or failure to respond to a black flag signal, may result in ejection from the event at the discretion of the Event Chair.

Flag stations are requested to report safety problems to the Control Tower. If the black flag is observed at the Control Tower, it is because the driver failed to observe it at one of the Flag Stations. The signaled driver should proceed carefully around the track and return to pit lane.

When the black flag is displayed in a waving or stationary manner and not pointed at a particular car, it is a signal for ALL cars to slow down, proceed with caution and return directly to pit lane. A yellow flag may also be displayed. This is generally the flag shown when a car must be towed from the track or run-off areas to a safe position to allow the event to continue. Tow vehicles are not allowed on the track when cars are also running.



The **BLUE AND YELLOW** flag is shown to a particular car and indicates that you should look in your mirrors. You may be holding up faster cars behind you and should give them a passing signal. Failure to obey this flag will result in a black flag signal.



The **YELLOW WITH RED STRIPES** flag is shown to indicate debris or liquid on the track surface. Be prepared to reduce speed and take evasive action around the material.



The **CHECKERED FLAG** will be displayed at the Control Tower (or another designated Flag Station) at the conclusion of a session. When observing the checkered flag, proceed around the track at reduced speed to cool yourself, the brakes, tires and oil and enter pit lane. THERE IS NO PASSING UNDER THE CHECKERED FLAG, but you may complete a pass underway to maintain safety. Pass through pit lane and turn into the Paddock. Remember the 5 mph speed limit in the paddock. Instructor drop off should be performed in the paddock.

Please review the above flagging information. Know what each flag means. Failure to comply with flagging signals may result in ejection from the event. Note the location of each flagger at each Flag Station at the beginning of each track session.

## DRIVING RULES

Please read this section carefully. Safety is our most important concern. **NO RACING! NO RACING PRACTICE! REMEMBER, THIS IS NOT A RACING SCHOOL!** Anyone deemed to be driving in an unsafe manner is subject to loss of track time or ejection. If it begins to rain, slow down to a speed below which you know you can drive safely. Also, check the condition of your brakes, tires and lug nuts frequently. Check your Run Group schedule, listen for announcements and line up ON TIME!

### **PASSING**

DRIVERS MAY PASS ONLY ON DESIGNATED STRAIGHTAWAYS AND ONLY WHEN GIVEN A PASSING SIGNAL. The passing zones for each run group will be announced at the driver's meeting. Do not pass on any other portion of the course. Be sure you have plenty of time and space to complete the maneuver before the end of the straightaway.

To initiate a pass, the driver of the car being overtaken must signal with his/her hand by pointing to the side on which he/she wants the overtaking car to pass. **DO NOT TAILGATE.** It is expected that the driver being overtaken will stay on the racing line during the pass. It is the responsibility of the overtaking driver to move off the driving line, complete the pass and move back without impeding the progress of the other driver. While the obligation for a safe passing maneuver falls primarily on the passing car, the car being passed should never do anything unexpected or sudden.

Proper, predictable and courteous passing behavior will help ensure the safety and enjoyment of the event. **WATCH YOUR MIRRORS AND DO NOT BLOCK FASTER CARS.** If you see a car in your mirrors at every corner then you pull away on the straights, you have a more powerful car but you are not the faster driver. Let the other car pass – maybe you can learn something from the line he/she takes through the next corner.

**DO NOT GROUP TOGETHER.** If you find yourself running in a pack and want space around you, pull into pit lane and communicate to the pit out worker that you want some room. You will be directed back onto the track when that is possible and you can then concentrate on your own driving and not worry about how close other drivers are.

**CONCENTRATE ON BEING SMOOTH AND DRIVING THE CORRECT LINE.** Do not try for speed. Our purpose is for you to learn smoothness, consistency and car control, not raw speed. Higher speeds will come as your technique improves. Trying for speed prematurely will likely result in driving a bad line which, in turn, will slow you down and make you a hazard to other drivers on the track.



**LOCATE ALL FLAG STATIONS AND BE ATTENTIVE TO THE DISPLAY OF ALL FLAGS.**

Your safety and the safety of others depend upon your prompt and correct response to all flags. Consciously locate and observe the flagger at every flag station at the start of each run group to help train your eyes to see flags when they are displayed.

**EXIT THE TRACK INTO PIT LANE CAREFULLY.** Whenever you enter the pits, extend your left arm with clenched fist straight upward out of the window well above the roof of your car so as to be visible to drivers behind you. This should be done as early as possible to give following drivers warning of your intention. Pull to the side of the track appropriate for entering pit lane and enter pit lane slowly.

**ENTER THE TRACK FROM PIT LANE QUICKLY AND CAREFULLY.** Pull up to the entrance to the track and the end of pit lane as instructed by the pit out worker. When given the signal to enter the track, do so QUICKLY but remain to the right side of the track as you accelerate toward the first corner. Use your mirrors or glance over your left shoulder to determine if you are being overtaken by a faster car BEFORE you attempt to leave the right side of the track.

**IN CASE OF TROUBLE.** If you are about to run off the track and still have control of your vehicle, try to DRIVE OFF STRAIGHT. Do not attempt to hold your car on the track, since this usually results in sliding off sideways, spinning, or worse. Your chances of suffering nothing more than a dirty car are much better if you drive off straight under control. However, if you err in judgment or skill and lose control of your car, the best rule to follow is: "in a spin – both feet in." This means fully depressing both the clutch and brake to lock up all four wheels and keeping them locked until the car has come to a complete stop. This also applies to cars with ABS. Wait for a corner worker to signal that it is safe for you to re-enter the track before doing so – don't be the cause of someone else's spin.



**IF YOU SUSPECT MECHANICAL PROBLEMS WHILE ON THE TRACK.** IF SERIOUS, pull off the track carefully, within sight of a flag station if possible, and await assistance. Signal the flag worker that you are ok. While you are awaiting assistance, either exit from your car to a safe place (e.g., at a flag station or behind a guard rail) away from the track surface, provided it is safe to do so, or stay in your car. DO NOT ATTEMPT TO WORK ON YOUR CAR WHILE THE SESSION IS IN PROGRESS. REMEMBER THERE ARE OTHER CARS ON THE TRACK MOVING AT SPEED. The reason we require you to install your tow hook before the session is to minimize disruption to the event if we have to tow you back to the paddock.

IF YOU CONTINUE, do so slowly and return to the pits. Pull off the preferred driving line to avoid dropping anything onto the track that might pose a hazard to other drivers. Use the pit signal and your hazard signals to indicate that you are having problems but be certain to give

passing signals to others. The Event Chair, and others, will help you find qualified technical assistance and make every effort to reschedule you for later run groups should some problem surface at the track.

### **BEFORE EACH TRACK SESSION**

**CHECK YOUR WHEEL LUG BOLTS OR NUTS FOR TIGHTNESS.** Use a torque wrench! Do not tighten lug bolts/nuts after a session while they are hot; they may over-tighten upon cooling. If you don't know how to do this, ask a neighbor in the paddock for help.

**CHECK THE OIL LEVEL.** Check and top off the oil before each track session to insure adequate oil supply during hard cornering. Oil may foam after a session yielding incorrect readings. Therefore, check the level before the session, not after. Besides, after the session may be too late to prevent engine damage. Also check for loose caps, cracked or leaking hoses and loose belts. You might consider overfilling the oil by no more than half a quart- more than that will result in excessive foaming. Oil supplements and racing oil are not necessary.

**CHECK TIRE PRESSURES.** Tires will heat up and cause pressures to increase by 4-6 pounds during a session. You may measure pressures after a session to gauge the evenness of wear, heating and suspension balance. However, pressures should be adjusted before the session not after.

**CHECK THE BRAKES.** Without air flow brakes develop hot spots. Therefore the brake fluid is more likely to boil while the car is sitting, resulting in reduced brake performance during the first lap of the subsequent session. Your brake pedal should never feel spongy and the first lap of any session should be taken at reduced speed to confirm that your brakes are functioning properly. When parking your car after a session, do not apply the parking brake. Hot brake drums and discs can be damaged by this practice. Leave your car in gear and/or chock the wheels instead of using your parking brake.

**DRIVING POSITION.** The driver must be able to reach the pedals, steering wheel and shift lever with ease. If unable to do so, the unconscious compensation will lessen concentration. The correct seating procedure is:

Dig yourself into the seat by pushing against the floor with your feet. Don't merely sit on the seat; sit in it. Become a part of it.

Adjust the seat bottom and back so that you can reach the top of the steering wheel with your arms slightly bent and your shoulders still supported by the seat back. This position is likely to be closer to the steering wheel, and possibly more upright, than your street driving position.

Check your reach to the shift lever. You should not have to lean forward. You should be able to depress the pedals without leaning forward or fully extending your legs. At the same time, your knees should not be so bent as to interfere with the steering wheel.

Tighten the seat belt, when adjustable, as tightly as possible without impairing circulation or causing discomfort. Seat belts keep you in the seat, behind the wheel and ready to control the car, rather than being thrown about during cornering.

### **WORKING WITH YOUR INSTRUCTOR**

You will be assigned an instructor to work with you on the track for the entire event. Barring unforeseen or unusual circumstances, you will have the same instructor for all on-track sessions. Your instructor is a volunteer who is an experienced driver and who has completed rigorous training to become an instructor. However, it is important to remember that he or she wants to be there and to help you become a better driver.

The first step in working with your instructor is to be honest with him/her. Be clear about whether your car has any modifications from stock, whether you have previous track experience, and whether you have any physical limitations or medical conditions that may affect your driving. Second, talk about your goals for the event. Are you there to work on a specific skill or are you there because you heard about driver schools and thought it sounded like fun? Third, communicate: listen to what your instructor is saying and ask questions if you are unclear. However, don't get into a long discussion while you are on track. Leave that for the pit lane or paddock. On-track communication should be concise and clear. At the end of the session, talk about how you did and what you will work on in the next session. Finally, if you are not getting the information from your instructor in a way that works for you, talk to your instructor about that. If it still is not working then come find the Event Chair or the Chief Instructor to get a different instructor assigned. Every instructor and student is different and not all pairings will work. The purpose of the school is for you to learn and that may require a switch. Don't worry, no one's feelings will be hurt.

### **DRIVING TECHNIQUE**

It takes remarkably little skill to get in a car, depress the accelerator and "drive" the car as fast as it will go in a straight line. The true test of a skillful high speed driver is how quickly, smoothly and consistently she/he can drive through a corner and carry that speed to the next section of track. Proper driving techniques are an integral part of this driving skill.

HOLDING THE STEERING WHEEL. This is like catching a baseball. One hand for amateurs and two hands for the pros. Hands are held in the nine and three o'clock positions. The wheel should be gripped firmly but not so tightly with your fingers that your hands become tired. Do not hold the wheel with the palm of your hand; it's not as sensitive as your fingers. Occasionally on the straightaway, flex each hand sequentially to loosen your muscles and prevent fatigue. Always turn the wheel smoothly. Every time you turn the wheel, you increase the tire's resistance and lose speed while simultaneously putting a load on the suspension. "Sawing" at the wheel will tend to upset the balance of the car.

PEDALS. Accelerator, brake and clutch are the three pedals with which everyone is familiar. Being smooth with your application and release of each of these pedals is key to becoming a better driver. Yet, BMWs have a hidden "fourth" pedal: the dead, or brace, pedal positioned on the far left against the fender wall. Try planting your left foot there while cornering and you'll be surprised how much easier it is to stay in your seat and under control.

SHIFT LEVER. The shift lever must be treated as though it were made of thin glass. Although the big shift knob and thick shaft look sturdy, they are connected to delicate, breakable internal parts of the transmission. Speed shifting or slamming the shift lever home is a foolish bit of exhibitionism and a waste of time. The shift lever should not be held in the hand but, instead, cupped in the palm. The lever is used smoothly, delicately and precisely. If the transmission is grinding or not going into gear easily, there is a reason. Don't force it. Be sure the clutch is fully depressed and the engine revs are correct. With practice and a light touch, shifts will come quickly and effortlessly. When you're not actually shifting, your hand should be on the wheel.

BRAKING. When you mention power, most people think of engines. However, the most powerful part of your car is not the engine but rather the brakes. Think of how many feet it takes to come from 50 mph to a stop. Can you go from 0-50 in the same distance? No.

Most drivers use only 20%-30% of their car's braking ability. Under high speed driving conditions, proper braking should sound like maximum acceleration, i.e., just a faint squeal from the tires not a loud screech. A locked wheel during braking means lost traction, braking efficiency and steering. This results in loss of control and a skid. Or worse.

Do not slam on the brakes. Sudden, hard braking transfers too much of the car's weight to the front wheels, putting almost (if not) all of the braking effort there. This reduces the car's overall braking ability. It also transfers weight too quickly and upsets the balance of the car. Your instructor will work with you to develop the following proper braking technique:

Touch the brakes lightly to be sure they are working. Continue application, increasing pressure. Squeeze the brakes smoothly but firmly. Compared to normal braking, this will feel like you are standing on the brake pedal. The brake pedal should be hard and firm and you should feel slight pulsations. Develop a brake pedal touch so that you can keep the brakes on hard but not lock them up. You can develop this skill even if your car has ABS by braking almost hard enough to activate the ABS. In high performance driving, brakes should be used as hard as possible for as brief a time as possible with the goal of achieving a constant rate of deceleration.

DOWNSHIFTING. In order to quickly accelerate out of a corner, the car must be shifted to the appropriate lower gear before the corner. Naturally, this should be done as late as possible, preferably during braking for the corner, but not during cornering. If you are braking and shifting at the same time, the right foot is on the brake and the left foot is on the clutch, leaving the accelerator abandoned. Consequently, the engine rpms will drop and, when you let the clutch out, you may pop or jerk the rear wheels. This acts as an additional brake and can cause the rear wheels to exceed their traction limit and skid, to say nothing of the potential damage to



the drivetrain. The solution lies in "heel-and-toe" downshifting. This technique of downshifting helps achieve smoothness while eliminating possible clutch slippage and extending the life of the transmission rings.

This technique is one that should be thoroughly practiced and learned on the street. Do not attempt it on the track until you are fully comfortable with it and you can execute a heel-and-toe downshift that is imperceptible to a passenger. Here's the technique:

While you are braking, depress and hold the clutch with your left foot.

The ball of the right foot should continue to apply required pressure to the brake pedal, while the side (or small toe or heel, whichever is more comfortable) of the same foot blips the throttle to raise engine rpms to the level which the lower gear and rear wheels will otherwise force it to go. This matches gear speeds so you are now ready to shift into the lower gear. Note that engine speeds may best be judged by sound, as the tach needle tends to overshoot when blipped.

As you complete the throttle blip, shift into the lower gear. If you matched gear speeds correctly, the gear shift will fall into place easily with no blocking from the syncromesh.

Once into gear, release the clutch pedal smoothly and either continue braking or begin accelerating, as required.

**CORNERING.** If a car is to corner as quickly as possible, it must be kept near its limit of adhesion from the moment it enters a corner until it has left. For a given radius curve and traction limit, there is a speed that cannot be exceeded if a car is going to stay on the road. This means that if a car is being driven around a corner at the maximum possible speed (its limit of adhesion), it cannot be accelerated until it has reached the end of the corner and the wheels begin to straighten. This concept will be clearer over time.

At this point, it is useful to discuss the concept of traction limit. The maximum traction capability of a tire is called the traction limit. It is approximately the same in all directions, meaning it will take the same amount of force to push a wheel forward, backward or sideways. It also means that when we place a combination of loads on a tire, for example while braking in a curve, we are using some of the total traction on braking, leaving less than the total possible to resist cornering forces. If the sum of these forces is greater than the traction limit, the tire will slide. This concept will be described in greater detail in your classroom sessions.



It should also be noted that a tire's traction limit varies with the weight or vertical load placed on it. As this load is decreased, the tire's traction limit decreases as well. That's why a smooth driving technique that results in a minimum of weight transfer from one tire to another is best.

Cornering a car at the limit of its adhesion or traction is never a comfortable feeling at first. Just hearing the tires screech is enough to scare some people. Nonetheless, learning to set up and execute such a cornering technique is a vital skill that should be mastered by all people who enjoy driving at high speeds. The skill to do so translates to everyday driving under less than ideal driving conditions. It is one of the skills we concentrate on at the Driver School.

The largest difference between a mediocre driver and an excellent driver is the manner in which he/she executes corners. Indeed, for many tracks the saying goes that "it is the driver that is fast not the car." Here are a few guidelines to help you master the techniques of high speed cornering:

Set the car up for the corner. Hard braking should be done while the car is traveling in a straight line. If you need to downshift it should be done now as well. If you are comfortable do so, use the heel-and-toe technique to equalize rpm and transmission speed and avoid a sudden over-rev of the engine or driving wheels. It is very important to complete your downshifting before entering the corner.

Turn the steering wheel in a smooth, continuous motion. If you turn the wheel too sharply, the car's weight will transfer to the outside wheels too quickly, unsettling the suspension and reducing your overall traction (and speed).

As entry to the turn is completed and the apex is in view, begin to gently accelerate. Among other things, this will result in a rearward weight transfer that will increase the rear wheels' traction limit and keep them from sliding.

As you approach and reach the apex, throttle should be applied, the extent of throttle application will be determined by the horsepower of your car, your particular suspension/tire setup and the particular corner. If you are not accelerating at or near the limit of traction at this stage, then you have entered the turn either at an inappropriate speed or with the car inappropriately balanced. Similarly, if you find that you are going to miss the apex, do not try and make a correction mid-turn. Keep your vision on the exit of the turn and try again next lap. As you continue to smoothly accelerate past the apex, gradually begin to turn the steering wheel out of the turn. If you are in a state of equilibrium (neither under- or over-steering), you should need little or no steering



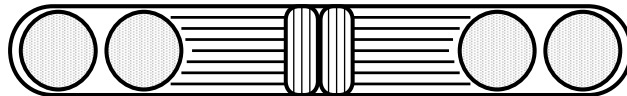
correction. Continue to apply throttle through the exit of the corner as you straighten the car's direction.

DRIVER CONDITION. High speed driving demands total concentration, split-second timing and fully coordinated eye and body movements. If a driver is tired, uncomfortable or bothered by headache or muscle pains, it is impossible to perform at maximum effectiveness and safety. Be sure to change your gaze often as you drive and keep your hands and shoulders relaxed. Take time on the straightaways to flex your fingers. If you start to feel fatigued or find yourself "missing" turns, pull into the pits and rest. It is remarkably easy to become dehydrated and not realize it. Pay attention to the signals your body is sending you.

The purpose of every driver school is to teach you new driving techniques, hone your existing skills and build your self-confidence. You will be coached to gradually increase your speed but no one will demand you do something you are not ready for or comfortable doing. The emphasis is on smoothness and consistency, with speed secondary although following naturally. If you insist on flogging your car around the track at the beginning of the event, you will find yourself doing the same thing at the end. The only difference is that you will be waving everyone else by.

Bring this guide with you to the track and refer to it during the day to help improve your skills. The only other thing you need to bring is an open mind and a willingness to learn.

See you at the track, rain or shine.



Revised: Mar. 2022

