



MIA SCHOOL OF RACE ENGINEERING

MIA School of Race Engineering 2016

Part 1 – Saturday

Subject	Description	Timeframe
Course Objectives		15 minutes
Race Team Operations	<i>Team personnel and their roles, pre-race weekend procedures, race weekend formats, grid procedures, technical and sporting regulations, pit stop management, lifting of components.</i>	60 minutes
Race Engineering – Pre-Event	<i>Pre-event preparation, driver preparation, weather prediction, weather measurement, tyre management, fuel calculations, fuel measurement, radio protocol, pit stop calculation, pit lane engineering, wet weather racing, set-up sheets.</i>	60-90 minutes
Strategy	<i>Pit stop calculations, pit lane time loss, qualifying strategy, strategy considerations for different forms of racing, fuel mixture selection (short-fuelling / power vs. fuel economy), tyre changes, post-race strategy analysis, safety car strategy, professional gamesmanship.</i>	60-90 minutes
Discussion Forum		45 minutes

Part 1 – Sunday

Subject	Description	Timeframe
Vehicle Dynamics – Powertrain & Braking Systems	<i>Throttle mapping, clutch systems and mapping, differential operation and set-up, carbon and steel brake systems, glazing, disc and pad bedding, pad selection, master cylinder selection, brake bias, fluids, knock-off.</i>	60- 90 minutes
Vehicle Dynamics – Tyres	<i>Construction and compounds, how tyres work, Pacejka coefficients, Mu degradation, tyre pressure and temperature management, warm-up, graining, tyre selection.</i>	60 minutes
Vehicle Dynamics – Aerodynamics	<i>Importance of aerodynamics, understanding of aerodynamics, understanding of aerodynamic concepts and devices, aero data interpretation, selection of downforce level, high vs. low downforce set-up requirements, environmental effects.</i>	60- 90 minutes
Vehicle Dynamics – Suspension	<i>Springs types and conventions, bump rubbers, <u>damper operation</u> and specification, <u>4 post rig testing</u>, anti-roll bars function and effect, (geometry, kinematic software) measurement techniques.</i>	60- 90 minutes
Discussion Forum		45 minutes
Part 2 Overview		15 minutes



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Part 2 – Saturday

Subject	Description	Timeframe
Course B Objectives		15 minutes
Optimising Race Car Set Up	<i>Gear ratio selection, gear shift optimisation, fundamental set-up measurements, set-up equipment, set-up procedures.</i>	60 minutes
Data Engineering – Data Systems & Telemetry	<i>Data logging, telemetry, specifying logging configuration, sensor types and uses, maths channel, limitations.</i>	60- 90 minutes
Simulation – Creating Simulation Tools		60-90 minutes
Discussion Forum		45 minutes

Part 2 – Sunday

Subject	Description	Timeframe
Race Engineering – On-Event		
Simulation – An Introduction to Simulation	<i>Various types of simulation, gathering vehicle information, building a simulation model, validating the model, limitations of simulation, creating bespoke simulations, using simulation for strategy predictions, driver in the loop simulation (simulators)</i>	60-90 minutes
Data Engineering – Driver Analysis	<i>Driver feedback, analysing driving styles, braking techniques, gearshift points, driving lines, oversteer and understeer, driver consistency analysis</i>	60- 90 minutes
Data Engineering – Vehicle Analysis	<i>Analysing differential behaviour, bump rubber optimisation, damper analysis, and tuning, roll stiffness evaluation, brake pressure and temperature, brake bias, aerodynamic data analysis, trend data.</i>	60- 90 minutes
Simulation – Case Study		60-90 minutes
Race Engineering – Post Event		60-90 minutes
Discussion Forum, Summary and Presentation of Diplomas		45 minutes