COURSE SYNOPSIS

CORE COURSES

MKMV 1203 - Automotive Electronics & Control

This course focuses on vehicle electronic, incorporating studies on the principles of sensors and actuators used in automotive control applications. The major topics cover the variety and role of electronic sensors and actuators, sensor's signal conditioning systems, actuator's drivers and control systems in automotive applications. At the end of this course, students are expected to be able to design and develop electronic and control system for vehicles.

MKMM 1213 - Advanced Engineering Mathematics

The primary goal of this course is to get students involve very much in the post-calculus mathematics needed and used by engineers and scientists. The mechanical engineering field depends on mathematics for their description with development of new mathematics from new mechanical engineering problems. Thus, this course aims to place at the disposal of the engineer the basis of intelligent working knowledge of facts and techniques relevant to engineering applications which have not been treated in Advanced Calculus.

MKMV 1803 - Quality Engineering

This course is focusing on statistical methods in quality improvement. It encompasses various statistical process control problem-solving tools. Emphasis is given on analysis of additional control charts. Advanced tools and techniques such as Gauge Reliability and Reproducibility (GR & R), and experimental design methodology are also covered. At the end, students are able to formulate quality assurance methodology for automotive application.

MKMM 1903 - Research Methodology

This course aims to provide students with fundamental knowledge of research and the methodologies commonly used in engineering. It encompasses literature review, problem formulation, designing research methods, analysis methods and report writing.

MKMV 2213 - Automotive Noise, Vibration and Harshness

This course is focusing on the principle of vehicle vibration and acoustics. The discussion includes the effects of vibration and acoustic on vehicle systems or components, popular approaches for reducing the vibration and acoustic, human perception to noise, vibration and guidelines and assessment method. Finally, the discussion concludes with the application of popular computational methods for automotive NVH applications. At the end of the course, students are able to categorized NVH of passenger vehicles.

ELECTIVE COURSES

MKMV 1213 - Vehicle Engineering

The course focuses on the principles of vehicle engineering, including the principal functions of the body structure, chassis system, powertrain system and vehicle electrical & electronic systems. Additionally, the discussions include vehicle design to meet the acceleration, braking, cornering, ride, rollover, road loads, durability, safety and vibration requirements.

MKMV 1313 - Advanced Vehicle Dynamics

This course discusses vehicle dynamics in general which covers the vehicle's ride and handling behaviours. The systems which contribute to a better vehicle dynamic performance in modern passenger vehicle will be covered in this course. This includes the semi-active and active suspension systems, roll control systems, electronic brake force distribution (EBD) system, anti-lock braking system (ABS) and active steering system. All of the mentioned systems will be introduced theoretically followed by the development of the system's controlled- simulation model using MATLAB/SIMULINK. At the end of the course, the students are able to develop controlled systems that can improve vehicle's dynamic performances.

MKMV 1403 - Internal Combustion Engines

This course focusses on advanced knowledge of internal combustion engine. The discussion on principle operating and engineering characteristics of internal combustion engine (ICE) used in the automotive industry. This discussion includes engineering analyses knowledge on engine cycles and thermo chemistry applied to engine operation and engine fuels. This also includes advanced engine design and heat transfer. At the end, student must be able to design a highly efficient internal combustion engine.

MKMV 1503 - Drivetrain Engineering

This course covers principle knowledge of automotive drivetrain/transmission. It includes mechanical components and sub-systems which consider the mechanics of the components, force flow, free body diagram and its working principle. At the end of the course, students should be are able to design transmission system for passenger vehicles.

MKMV 2223 - Automotive Braking System
This course focuses on the principles of brake systems such as disc and drum brakes. The discussion includes analyzing deceleration behaviour of a road vehicle and braking performance including thermal characteristics, main features of Anti-lock brake system and finally the noise and vibration issues of the brake systems.

MKMV 2323 - Automotive Aerodynamics
This course is focusing on the principles and applications of ground vehicle aerodynamics such as passenger and racing cars. The course emphasis on analysing aerodynamic behaviour of road vehicles on the influence of aerodynamics on energy efficient, performance, stability and handling including internal flow and aero noise characteristics. The course includes the effect of crosswind on safety, the use of wind tunnel, computational fluid dynamics (CFD) and road/track testing.

MKMV 2413 - Advanced Engine Boosting and Downsizing
This course is designed to deliver the principles of engine boosting and its significant role towards engine downsizing. The course emphasizes on the engine air induction system, in particular the turbocharging and supercharging methods. It covers the science governing the operation of turbochargers and superchargers – which include aerodynamics, gas dynamics and thermodynamics. Upon completion of this course students are able to design a supercharger/turbocharger and match it with an engine.

MKMV 2513 - Automotive Tribology
Tribology is focusing on the friction, wear and lubrication principle and application. The course is originated from the art of lubrication but has developed to many different types and range of applications. Among the topics discussed are principle of lubrication and surface topography characterization. In automotive application, almost half of the mechanical power generated by the engine is wasted in friction between pistons and cylinders and within the gearbox and transmission gears. At the end of this course, students are able to predict the most suitable tribological surfaces characteristic for best t ribological performance.