



Engineering Program

Specialization	Hybrid Vehicles Technology
Course Number	20220252
Course Title	Hybrid Systems
Credit Hours	3
Theoretical Hours	3
Practical Hours	0

وصف المادة الدراسية:

Hybrid System over view. Principles of operation, Engine Control System, Fuel and EVAP system, High-Voltage Battery. Engine, Hybrid Vehicle control system ,Electric Power steering, , other systems .

أهداف المادة الدراسية:

Course Objectives:

- An introduction to Hybrid Technology systems to explain the basic principles of Hybrid Vehicles.
- Explain the purpose of a HV battery, basic parts of HV battery.
- To understand the basic principles of the engine, motor generators, planetary gear unit.
- To understand the principles of the inverter – converter operation.
- Explain the operating principle of the cooling systems in hybrid vehicles.
- To understand the operation of the AC in Hybrid Vehicles.

الوصف العام:

رقم الوحدة	اسم الوحدة	محتويات الوحدة	الزمن
1.	Hybrid System Overview	<ul style="list-style-type: none"> • Hybrid Systems • Hybrid system components. • MG1, MG2, Planetary Gear Unit, Inverter. • Hybrid System Control Modes. 	1 weeks
2.	Hybrid System Operation	<ul style="list-style-type: none"> • Hybrid Control System Diagram • Safety Procedures. • Hybrid Transaxle. • Transaxle Damper. • Reduction Unit. • Permanent Magnet Motor. • Speed Sensor (Resolver). 	2 weeks
3.	Inverter Assembly	<ul style="list-style-type: none"> • Inverter. • Boost Converter. • Inverter Assembly Diagram. • Converter. • A/C Inverter. • Cooling System for Inverter, MG1 and MG2. • HV ECU. 	2 week
4.	HV Battery	<ul style="list-style-type: none"> • Construction. • Power Cables. • Battery ECU. • State Of Charge (SOC). • System Main Relays (SMR) • Service Plug. • HV Battery Cooling System. • Auxiliary Battery. 	2 week

5.	Engine	<ul style="list-style-type: none"> • VVT-i and Atkinson Cycle. • Intake manifold. • Engine Control System Sensors. • Exhaust System. • Cooling System. • Bladder Fuel Tank, Fuel gauge, Fuel Capacity, Inclination Sensors. 	2weeks
6.	Chassis	<ul style="list-style-type: none"> • Shift Control. • Shift Actuator. • Cycloid Reduction Mechanism. • Brake System. • Hydraulic brake booster. • Brake Actuator. • Skid Control ECU. • Brake Pedal Stroke Sensor. • Regenerative Brake Cooperative Control. • Electronic Brake Distribution. • Brake Assist Control. • Electric Power Steering, Torque Sensor. 	4 weeks

طرق التقييم المستخدمة:

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
/ / التاريخ:	40%	الامتحان المتوسط
/ / التاريخ:	10%	أعمال الفصل
/ / التاريخ:	50%	الامتحانات النهائية

طرق التدريس:

❖ Lecture

الكتب و المراجع:

الكتاب المقرر:

1. Automotive Training and Resource Site For Automotive Electronics, 2016 © Kevin R. Sullivan. All rights reserved. Trademark of the National Institute for Automotive Service Excellence.

المراجع:

1. Jack Erjavec “ Automotive Technology. A system Approach”, 4th edition, Thomson Delmar Learning, a division of Thomson Learning Inc. 2005

Engineering Program

Specialization	Common
Course Number	20301114
Course Title	Hybrid Systems Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3

وصف المادة الدراسية:

- ❖ Hybrid System overview, Inverter Assembly, Transaxle, Engine, Fuel System.

أهداف المادة الدراسية:

Upon the completion of the course, the student will be able to:

1. Check and service HV Battery.
2. Inverter assembly.
3. MG1, MG2 and Planetary Gear Set.
4. Transaxle.
5. Cooling Systems.

الوصف العام:

رقم التجربة	اسم التجربة	محتويات التجربة	الزمن
1.	Inverter Assembly		2 weeks
2.	Hv battery		2 weeks
3.	Engine		2 weeks
4.	Chassis	<ul style="list-style-type: none"> • Shift Control. • Shift Actuator. • Cycloid Reduction Mechanism. • Brake System. • Hydraulic brake booster. • Brake Actuator. • Skid Control ECU. • Brake Pedal Stroke Sensor. • Regenerative Brake Cooperative Control. • Electronic Brake Distribution. • Brake Assist Control. • Electric Power Steering, Torque Sensor. 	3 weeks
5.	Fuel and Evaporative Systems		3 weeks

طرق التقييم المستخدمة:

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
	30%	التقارير
	20%	الامتحان المتوسط
	50%	الامتحانات النهائية

طرق التدريس:

❖ تجارب عملية في المختبر

الكتب و المراجع:

الكتاب المقرر:

1. أدلة التجارب العملية الخاصة بالمختبر.

المراجع: