		General Sir John Kotelawala Defence University Faculty of Engineering Electronic and Telecommunication Engineering Degree Program **Module Descriptor**						

Module Code	**ET 4253**	Module Title	**Mechatronics**					
Credits	**3**	Hours per Semester (Notional)	Lectures	39	Evaluation (%)	EA	60	
GPA/NGPA	GPA		Tutorials	-		CA	40	
C/E/O	E		Labs	12	Prerequisites/ Co-requisite	-		
Semester	8		Other Learning Activities	-				
			Independent Learning and Assessments	99				

C- Compulsory, E- Elective, O- Optional, GPA- Grade Point Average, EA -End Semester Assessment, CA: Continuous Assessment

Module Objective

To provide the students with the knowledge of Mechatronic Systems and Applications.

Learning Outcomes

After the successful completion of this module, the learner should be able to:

LO1: Discuss the basics of mechatronic systems and Key elements.
LO2: Formulate the modelling of the physical system.
LO3: Examine sensors and transducers used in Mechatronic Systems.
LO4: Analyze the Actuating devices used in Mechatronic Systems.
LO5: Review control aspects of Mechatronic Systems.
LO6: Design mechatronics systems by integrating appropriate sensors and actuators.

Content	Hours			
	L	**T**	**LB**	**O**
Mechatronic System Design [LO1] What is Mechatronics, Integrated Design Issues in Mechatronics, The Mechatronics Design Process, Mechatronics Key Elements, Applications in Mechatronics	6	-	-	-
Modeling and Simulation of physical systems [LO2] Operator Notation and Transfer Functions, Block Diagrams, Manipulations, and Simulation, Block Diagram Modelling—Direct Method, Block Diagram Modelling—Analogy Approach, Electrical Systems, Fluid Systems	5	-	-	-
Sensors and Transducers [LO3] Introduction to Sensors and Transducers, Sensitivity Analysis—Influence of Component Variation, Sensors for Motion and Position Measurement, Digital Sensors for Motion Measurement, Force, Torque, and Tactile Sensors, Vibration—Acceleration Sensors, Sensors for Flow Measurement, Temperature Sensing Devices, Sensor Applications	6	-	2	-
Actuating devices [LO4] Direct Current Motors, Permanent Magnet Stepper Motor, Fluid Power Actuation, Fluid Power Design Elements, Piezoelectric Actuators	6	-	2	-
System Control [LO5] Introduction to Signals, Systems, and Controls, Controller Design, Programmable Logic Controllers	8	-	4	-
Control Architectures and Case Studies [LO6] Programming and configuration of microprocessors using microcontroller development boards, microprocessor circuit prototyping using breadboards and various electronic system components.	8	-	4	-
Active Hours (AH) = 39 + 12/2 = 45	39	-	12	-

Notations: L-Lecture,   T- Tutorial,   LB-Practical, O-Other (Specify)*

Course Assessment / Evaluation

LO	Per Unit Weight of LO	Continuous Assessment (CA)		End Semester Assessment (EA) Marks	Total Marks Out of 100
		Lab/Field Assessment Marks	Other Continuous Assessment Marks		
LO1	0.05	-	-	05	05
LO2	0.15	-	-	15	15
LO3	0.20	5 (LAB1)	-	15	20
LO4	0.20	5 (LAB1)	-	15	20
LO5	0.20	10 (LAB2)	-	10	20
LO6	0.20	5 (LAB2)	15 (CA1)	-	20
Total Marks		40 Marks		60 Marks	100 Marks

Lab/Field work Details

LAB1	Electro-Pneumatic Systems
LAB2	Programmable Logic Controllers

Other Continuous Assessment Details

CA1	Design of a mechatronic system

LO-PO Mapping

Learning Outcome	Per unit weight	Program Outcome										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
LO1	0.10			L								L
LO2	0.15	H	H	H		H						
LO3	0.20	M	M	H								H
LO4	0.20	M	M	H								M
LO5	0.15	H	H	H		H		M	H	H	M	
LO6	0.20	H	H	H		H				H		H
Module	1.00	H	H	H		H				M		H

Recommended Reading

[1] Klaus Janschek, "Mechatronic Systems Design", Springer, 2014.

[2] Andrzej M Pawlak, "Sensors and Actuators in Mechatronics: Design and Applications", 1st Edition, CRC Press, 2006.

[3] Devdas Shetty, Richard A Kolk, "Mechatronic System Design", 2nd Edition, Cengage, 2012.