

	Proceso: Formulación del Currículo y Plan de Estudios Guía de Cátedra	Código:	DOC11-FO-01
		Versión:	3
		Fecha:	23/05/2019
		Hoja:	Página 1 de 3

1. Identificación del Curso/ Módulo					
Nombre del Curso/ Módulo: <b>DISEÑO MECATRONICO</b>		Línea de conocimiento: <b>DISE</b>		Código de materia: <b>DISE 18012</b>	Número de credits: <b>3</b>
Facultad/ Departamento		<b>FAC DE INGEN FISICO MECANICAS</b>			
Programa que Administra el curso o módulo		<b>INGENIERIA MECATRONICA</b>			
Niveles de Formación	Técnico Profesional			Especialización	
	Tecnológico Profesional			Maestría	
	Profesional		X	Doctorado	
Modalidad	Presencial	X	Dual		Virtual
Número de horas con acompañamiento del profesor: 80			Número de horas de trabajo independiente: 64		
Fecha de actualización de la guía: 21/02/2023					

2. Conocimientos previos requeridos para el curso
Previous knowledge required for this course is given in the following subjects: - Control Avanzado - Automatización Industrial - Robótica

3. Justificación
Mechatronic design is a complex and iterative process which involves various skills and disciplines. The core part of the mechatronic approach lies in the integration of fields such as mechanics, electronics, computer technologies and control engineering. In order to familiarize students with several modern design methodologies, Project Based Learning and Flipped Classroom are use as pedagogical strategies. Therefore students are divided into teams to execute the clarification, ideation, prototyping and validation phases applied to a mechatronic device.

4. Competencias de formación		
Id	Competencia	Resultado de aprendizaje esperado
1	An ability to plan the design and development of a product, component, system or process to meet given needs	1 - Recognize the need to be met by the project 2 - Apply a mechatronic design methodology to plan a project 3 - Schedule activities considering the stages of a chosen methodology
2	An ability to design and simulate mechatronic systems	1 - Simulate electronic circuits 2 - Create 3D models using computer aided design programs 3 - Simulate the operation of the mechatronic system
3	An ability to validate mechatronic systems	1 - Prototype the mechatronic design 2 - Validate the design by using a test strategy 3 -

5. Contenidos		
Id	Unidad de aprendizaje	Temáticas
1	Introduction	Introduction to mechatronic design Mechatronic product design Mechatronic design process Mechatronic design phases Product life cycle Interdisciplinary nature of mechatronic engineering Concurrent engineering Mechatronic engineering

<b>Id</b>	<b>Unidad de aprendizaje</b>	<b>Temáticas</b>
2	Design Methodologies	Traditional methodology Mechatronic design methodologies Project planning Need analysis models Functional analysis and requirement modelling <i>iii</i> APTE methodology Technical solutions <i>iii</i> FAST methodology Evaluation matrices - QFD (Quality Function Deployment) State Transition Diagram
3	Design Preview, Design Modelling and Evaluation	CAD/CAE Software DFD Analysis and design of systems Electronic Design Software: Electronic Workbench, PROTEUS
4	Design integration	Block diagram modelling Concept map
5	Prototyping	2D Rapid Manufacturing Technologies 3D Rapid Prototyping Technologies Fused Deposition Modelling workshop
6	Innovation	Six Sigma Methodology TRIZ Methodology

<b>6. Evaluación y calificación</b>	
<b>Actividades o tipos de actividades</b>	<b>Porcentaje</b>
Homework	15
Class participation	15
Project progress oral presentations	25
Project report	20
Project operation	25

<b>7. Bibliografía</b>
BISHOP, Robert H. The mechatronics handbook. New York CRC Press ISA. 2002
PAWLAK, Andrzej. Sensors and actuators in mechatronic design and applications. Boca Raton Taylor & Francis. 2007
Mechatronics and the design of intelligent machines and systems, D. Bradley, D. Seward, D. Dawson.. Stanley ThornesThe Mechanical Design Process. David G. Ullman.
Introduction to Mechatronics. Michael B. Hstand. McGraw-Hill
Mecatronica. Bolton. Alfaomega
Analisis estructurado moderno. Yourdon. Prentice Hall.
Automatas Programables, BALCELLS, Joseph. Primera Edicion Alfaomega

Diseno de Maquinas. DEUTSCHMAN, Aaron; MICHELS, Walter. Primera Edicion. Ceca 1985

Sistemas de Control Automatico. KUO. Prentice Hall

Introduccion al Proyecto de Produccion. CAPUZ, Salvador, Primera Edicion. Alfaomega

Diseno en Ingenieria Mecanica. SHIGLEY, Joseph; MISCHKE, Charles. Sexta Edicion. McGraw Hill 2001.

Elementos de Maquinas. SPOTTS,M; SHOUP, T. Septima Edicion. Pearson 1999

Fundamentals of Machine Component Design. JUVINALL, Robert. John Wiley & Sons

Mechatronics Systems Design. Devdas Shetty, Richard A. Kolk. CL Engineering. Primera Edicion.

Mechatronics. Gedge, Genesh. Jones and Bartlett Publishers. 2010

Mechatronics mechanical system interfacing. Auslander, David M. Prentice Hall. 1996

## **8. Observaciones**