I. INFORMACIÓN GENERAL

CURSO	:	Tecnología y Automatización Industrial
CÓDIGO	:	IN196
CICLO	:	201601
PROFESOR (ES)	:	**Klusmann Vieira, Hermann Mirko** **Power Porto, George Felix** **Torres Zavala, Javier Edgardo**
CRÉDITOS	:	3
SEMANAS	:	16
HORAS	:	2 H (Laboratorio) Semanal /2 H (Teoría) Semanal
ÁREA O CARRERA	:	Ingenieria Industrial

II. MISIÓN Y VISIÓN DE LA UPC

Misión: Formar líderes íntegros e innovadores con visión global para que transformen el Perú.

Visión: Ser líder en la educación superior por su excelencia académica y su capacidad de innovación.

III. INTRODUCCIÓN

Industrial Technology and Automation is a specialty course in the career of Industrial Engineering, with theoretical and practical approach, aimed at students of 10th term. The course seeks to develop general competencies Creative Thinking, Oral and Written Comunication, as well as specific ABET competence:

(b.3) Skill of designing and conducting experiments and analyze and interpret data.

Should know design (minimally) an experimental procedure, drive it using materials and tools laboratory or workshop with property and safety, carefully noting the observations and data in your lab notebook and should know clearly describe the procedure used for the understanding of others.

As the third millennium begins, we find ourselves in a process of fast and constant change, where technology plays a key role in the global economy. Because the application of these technologies favors the development of more and new competencies in this new scenario, every industrial engineer must have a strong knowledge of the state of the art in technological developments that contribute to this process.

Through the process of interactive learning, the students gain expertise related to existing technologies, delivering the theoretical foundation and practical elements that support the development of the industrial sector by applying automated technologies and systems. Automation significantly increases efficiency, productivity, quality, safety and integration in organizations.

IV. LOGRO (S) DEL CURSO

Upon successful completion of the course, the student is able to apply critical analysis and make functional and innovative proposals which respond efficiently to the proposed task. The student also develops and presents ideas in appropriate manner, communicating them in written and oral form. The presentation includes different examples and evidences that correspond to the purpose of the presentation.

V. UNIDADES DE APRENDIZAJE

UNIDAD Nº: 1 Introduction to Industrial Technology and Automation

LOGRO

After finishing this unit, the student relates the basic principles and grasps the importance of technology and automation in industrial development.

TEMARIO

Evolution of industrial technology and process automation.
Basic concepts of automatic control
Measured, manipulated and controlled variables.
Laboratory practice

HORA(S) / SEMANA(S)

Week 1

UNIDAD Nº: 2 Industrial processes and control variables

LOGRO

After finishing this unit, the student compares the different types of production processes, identifying the main control variables.

TEMARIO

Types of production processes
Block, flow and instrumentation diagrams
Feedback, feed forward, cascade, split-range and ratio control loops
Examples of control loops in industrial equipment and processes.
Laboratory practice

HORA(S) / SEMANA(S)

Weeks 2, 3 and 4

UNIDAD Nº: 3 Industrial process instrumentation

LOGRO

After finishing this unit, the student identifies the different automatic control devices, con-figures, programs and implements basic controller applications.

TEMARIO

Measurement elements: Sensors and signal conditioners
Controllers: Dedicated, programmable logic controllers, personal computers
Programming languages: instruction list, ladder logic, function block diagram, sequential function chart and structured text.
Final control elements: drives and actuators.
Laboratory practice

HORA(S) / SEMANA(S)
Weeks 5, 6 and 7

UNIDAD Nº: 4 Control algorithms and strategies

LOGRO
After finishing this unit, the student identifies the different types of control algorithms and strategies in conventional and advanced system applications.

TEMARIO
Classic control: ON/OFF, Proportional (P), Proportional-Integral (PI) and Proportional-Integral-Differential (PID)
Advanced control: Adaptive and predictive systems, fuzzy logic and neural networks.
Laboratory practice

HORA(S) / SEMANA(S)
Weeks 9, 10 and 11

UNIDAD Nº: 5 .Industrial robots

LOGRO
After finishing this unit, the student apply the different types of industrial robots and manipulators.

TEMARIO
Types of robots, movements and degrees of freedom
Robot structure, control system, sensors and actuators
Programming and industrial applications, AS/RS and AGV
Laboratory practice

HORA(S) / SEMANA(S)
Weeks 12, 13,14, and 15

VI. METODOLOGÍA

Active methodology, with presentation of objectives, application of concepts and interactive learning with examples and practical cases.
Laboratory practice with state-of-the-art equipment and training software.
Group research work.
Learning assessment (midterm and final exam).

VII. EVALUACIÓN

FÓRMULA

5% (LB1) + 5% (LB2) + 5% (LB3) + 20% (EA1) + 5% (LB4) + 5% (LB5) + 5% (LB6) + 25% (TF1) + 25% (EB1)

TIPO DE NOTA	PESO %
LB - PRACTICA LABORATORIO	5
LB - PRACTICA LABORATORIO	5
LB - PRACTICA LABORATORIO	5
EA - EVALUACIÓN PARCIAL	20
LB - PRACTICA LABORATORIO	5
LB - PRACTICA LABORATORIO	5
LB - PRACTICA LABORATORIO	5
TF - TRABAJO FINAL	25
EB - EVALUACIÓN FINAL	25

VIII. CRONOGRAMA

TIPO DE PRUEBA	DESCRIPCIÓN NOTA	NÚM. DE PRUEBA	FECHA	OBSERVACIÓN	RECUPERABLE
LB	PRACTICA LABORATORIO	1	Sem. 2	Unidad 1	NO
LB	PRACTICA LABORATORIO	2	Sem. 4	Unidad 2	NO
LB	PRACTICA LABORATORIO	3	Sem. 6	Unidades 2 y 3	NO
EA	EVALUACIÓN PARCIAL	1	Sem. 8	Unidades 1 - 3	SÍ
LB	PRACTICA LABORATORIO	4	Sem. 10	Unidades 3 y 4	NO
LB	PRACTICA LABORATORIO	5	Sem. 12	Unidades 3 y 4	NO
LB	PRACTICA LABORATORIO	6	Sem. 14	Unidad 5	NO
TF	TRABAJO FINAL	1	Sem. 15	Unidades 1 - 5	NO
EB	EVALUACIÓN FINAL	1	Sem. 16	Unidades 1 - 5	SÍ

IX. BIBLIOGRAFÍA DEL CURSO

BÁSICA

ACEDO SÁNCHEZ, José (2006) Instrumentación y control básico de procesos,

ACEDO SÁNCHEZ, José (2006) Instrumentación y control avanzado de procesos. Madrid : Díaz de Santos.
(670.4275 ACED)

CREUS SOLÉ, Antonio (2011) Instrumentación industrial. México, D.F. : Alfaomega.
(670.42 CREU 2011)

GROOVER, Mikell P. (2007) Fundamentos de manufactura moderna : materiales, procesos y sistemas. México, D.F : Prentice-Hall Hispanoamericana.
(670.51 GROO 2007)

RODRÍGUEZ PENIN, Aquilino (2007) Sistemas SCADA. Barcelona : Marcombo ; México, D.F. : Alfaomega.
(629.895 RODR)

TORRES FernandoPomares, Jorge y GIL, Pablo (2002) Robots y sistemas sensoriales. Madrid : Pearson Educación.
(629.892 TORR)

RECOMENDADA
(No necesariamente disponible en el Centro de Información)

BEORKREM, Christopher (2013) Material strategies in digital fabrication. New York : Routledge.
(721.044 BEOR)

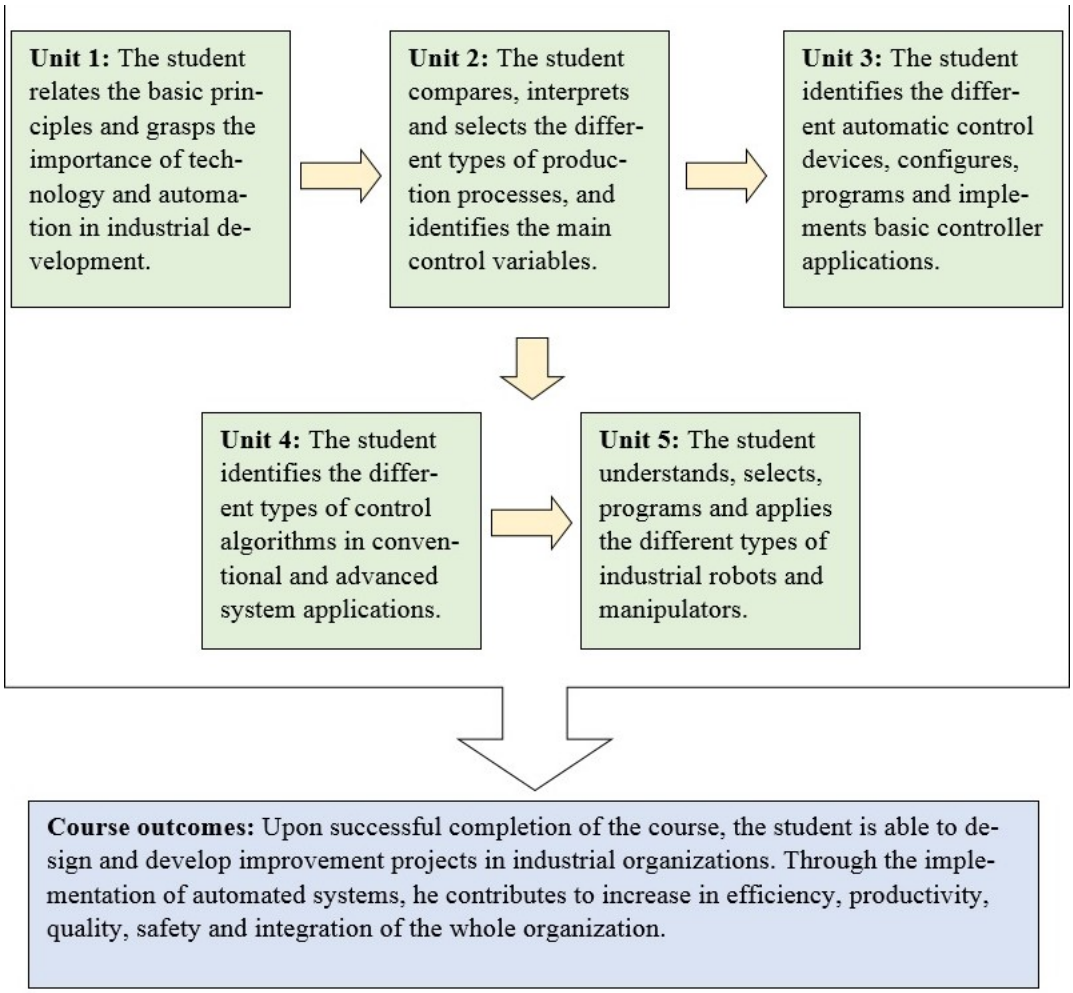
FERNÁNDEZ SÁNCHEZ EstebanAvella Camarero, Lucía y FERNÁNDEZ BARCALA, Marta (2006) Estrategia de producción. Madrid : McGraw-Hill Interamericana.
(670.5 FERN 2006)

HUIDOBRO MOYA, JoséMillán Tejedor, Ramón Jesús (2007) Domótica : edificios inteligentes. México D.F. : Limusa.
(643.6 HUID)

PONCE CRUZ, PedroHerrera, Alejandro, (2010) Inteligencia artificial con aplicaciones a la ingeniería. México, D.F. : Alfaomega.
(006.3 PONC)

ROMERO MORALES CristóbalVáquez Serrano, Francisco y CASTRO, Carlos de (Castro Lozano) (2007) Domótica e inmótica : viviendas y edificios inteligentes. México, D.F. : Alfaomega : Ra-Ma.
(643.6 ROME 2007)

X. RED DE APRENDIZAJE



Course outcomes: Upon successful completion of the course, the student is able to design and develop improvement projects in industrial organizations. Through the implementation of automated systems, he contributes to increase in efficiency, productivity, quality, safety and integration of the whole organization.