

Course Code	18AIS102J	Course Name	SMART MANUFACTURING	Course Category	S	Engineering Sciences	L	T	P	C
							1	0	3	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department		Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
----------------------------------	--	----------	---------------------------------

CLR-1 :	Gain knowledge about Smart manufacturing		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Learning about various types of sensors																			
CLR-3 :	Familiarizing Arduino controller and its interfacing																			
CLR-4 :	Obtaining knowledge on Machine to Machine communication																			
CLR-5 :	Creating insights to Virtual and Augmented Reality																			
CLR-6 :	Knowing the security attacks and their counter measures																			
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																			
CLO-1 :	Understand the impact of smart manufacturing		1	850	80												H			
CLO-2 :	Design real time applications with sensors		3	80	75	H	H	H							H					
CLO-3 :	Interface devices with Aurdino controller		2	80	75	H	H	H		H					H					
CLO-4 :	Implement data transfer between devices		2	80	75		H		H						H					
CLO-5 :	Build AR and VR systems		3	75	70	H	H	H	H	H					H					
CLO-6 :	Secure the information systems and networks		2	85	80				H					H	H					

Duration (hour)	18	18	18	18	18
S-1	SLO-1	INTRODUCTION TO SMART MANUFACTURING : What is smart manufacturing ?	INTERCONNECTIVITY: Introduction to Arduino controller	MACHINE TO MACHINE (M2M)COMMUNICATION : Introduction to mobile networks	AUGMENTED REALITY (AR) AND VIRTUAL REALITY (VR) Introduction to AR and VR
	SLO-2	Drivers, enablers, forces and challenges of smart manufacturing	Basic structure	Fixed networks and sensor networks	VRML: Building objects
S-2	SLO-1	Components of smart manufacturing	Input and output processing in Arduino controller	Access technologies	VRML: Building world
	SLO-2	Sensors: Introduction and types	Timers in arduino	M2M terminals and modules	VRML: Adding light, sound effects
S-3	SLO-1	Flow and temperature sensors	Programming Arduino	Hardware and power interfaces	VRML: Forming complex shapes
	SLO-2	Force, pressure and torque sensors	Simple code to be executed on Arduino	USB Interface	VRML: Animations
S-3-6	SLO-1	Optical sensors	Study of Arduino microcontroller interfacing	GPIO	VRML: Adding colors and textures
	SLO-2	Design of automatic street lighting system using light sensors	Arduino microcontroller interfacing	Designing LED wireless lamp	Transformation of color model using VRML
S-7-	SLO-1	Humidity and water sensors	Study of Basic sensors interfacing	Oscilloscope	Scene creation
					Firewalls: Introduction

10	SLO-2	<i>Rain Alarm project</i>	<i>Basic sensors interfacing</i>	<i>Amplitude and frequency modulation</i>	<i>Creation of 3D scene</i>	<i>Configuration of firewalls</i>
S 11-15	SLO-1	Gas sensor	Brief description on GPS and Data logging	Study on IR rays	Simulation of real time environment	Security in web browsers
	SLO-2	Gas leakage detection system	GPS and Data logging	Designing an IR transmitter and receiver	Simulation of classroom	Implementing security measures in web browser

Learning Resources	1. J. Vetelino and A . Reghu, <i>Introduction to sensors</i> , CRC Press, 2010, ISBN 9781439808528. 2. J. Fraden, <i>Handbook of Modern Sensors: Physics, Designs and Applications</i> , 4 th edition, Springer, 2010. 3.. J. Nussey, <i>Arduino for Dummies</i> , 1st edition, Wiley, 2013. ISBN: 9781118446379.	4. J. Edward Carryer, et al., <i>Introduction to Mechatronic Design</i> , Prentice Hall, 1st edition, 2010, ISBN: 978-8131788257. 5. Michael E Whitman and Herbert J Mattord, —Principles of Information Security, Vikas Publishing House, New Delhi, 2003
---------------------------	--	---

Learning Assessment											
	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers						
Experts from Industry		Experts from Higher Technical Institutions				Internal Experts

Note:

Syllabus for Other Subjects - Please refer Syllabus for All Core Subjects document