MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Electronics Engineering

SEP 2023

Module Name: Robotics and Automation

Name of Department	**Department of Electronics Engineering**
Module Name	**Robotics and Automation**
Module Coordinators	1)Dr. Rahul Dubey, rahul@mitsgwalior.in 9165577117
	2)Dr. VikasMahor, vikas@mitsgwalior.in 7000771599
Module Objective	Robotics is an interdisciplinary domain which effectively involves electronics. The objective of this online internship is to give the basic idea about designing and functioning of basic industrial robots and application of microcontroller programming for a robot. The software is designed by researcher of IIT Delhi to help students in the designing of DH parameter, degree of freedom for a Robot.
Module Content	Introduction to Robotics, Designing of Controller, Robot Dynamics, Degree of Freedom, Hands on Session on Robo-Analyzer Software, Embedded System for Robotic design, Hands-on session on EdSim51 simulation software.
Module Methodology	The workshop will start with various aspects of robotic design such as controller designing, robot dynamics, embedded system employed in robotic designing and PLC technology. Further, Various hands-on session is scheduled on various freeware software used in robotic and automated designs such as: RoboAnalyzr, TinkerCAD and edSim51.
Module Outcome/ Impact	Understand the basics of Robotics and Automation in the context using Robotic products. Understand the various skills for robotic and automated system design. Understanding the process configurations and their realization of given automated system. Able to design and simulate automated systems and robots.
Duration	4 Weeks (30 days)

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Day Wise Schedule				
Robotics and Automation				
Week	**Date**	**Day**	**Module Contents to be covered/ Interactive Session/ Assignment/ Quiz/ Exercises/ Daily practice sheets (DPP)/Tutorial/Project etc(10:00 AM onward, 4 Hrs/ Day)**	**Faculty**
Week 1	17/05/2023	Wednesday	Robotics: Definitions & History	Dr. Rahul Dubey
	18/05/2023	Thursday	Nature Inspired Robots: Biomimicry MATLAB Basics	Dr. Rahul Dubey
	19/05/2023	Friday	Time domain & Frequency domain Analysis	Dr. Rahul Dubey
Week 2	22/05/2023	Monday	Introduction to controller	Dr. Rahul Dubey
	23/05/2023	Tuesday	Computer-based measurement and control systems	Dr. Rahul Dubey
	24/05/2023	Wednesday	Basic components, Architecture and Hardware of computer-based process control system	Dr. Rahul Dubey
	25/05/2023	Thursday	Introduction to DH Parameters	Dr. Rahul Dubey
	26/05/2023	Friday	Introduction to Forward Kinematics	Dr. Rahul Dubey
Week 3	29/05/2023	Monday	Introduction to Inverse Kinematics	Dr. Rahul Dubey
	30/05/2023	Tuesday	Introduction to Robot Dynamics	Dr. Rahul Dubey
	31/05/2023	Wednesday	Calculation of Degree of Freedom	Dr. Rahul Dubey
	01/06/2023	Thursday	Hands on Session on Homogeneous Transformation using RoboAnalyzer - I	Dr. Rahul Dubey
	02/06/2023	Friday	Hands on Session on Homogeneous Transformation using RoboAnalyzer – I	Dr. Rahul Dubey
Week 4	05/06/2023	Monday	Introduction to Embedded System, Applications of Embedded System	Dr. Vikas Mahor
	06/06/2023	Tuesday	Using 8051 as a microcontroller in an embedded	Dr. Vikas Mahor

			system. Introduction to the concepts of 8051 Microcontroller, Pin architecture and Programs for 8051 Micro controller.	
	07/06/2023	Wednesday	Introduction to 8051 simulator EdSim51. Installation of the software and simulating the first program.	Dr. Vikas Mahor
	08/06/2023	Thursday	Hands-on session I on EdSim51: 1. Simulate a program to interface LED with 8051 and display a string on LCD. 2. Simulate a Program to interface a Seven Segment Display with 8051 and display a result of arithmetic operation on it.	Dr. Vikas Mahor
	09/06/2023	Friday	Hands-on session II on EdSim51: 1. Simulate a program to interface DAC with 8051 and generate unit-step, saw-tooth and triangular waveform. 2. Simulate a program to interface Stepper motor with 8051 and generate clockwise and anti-clockwise motion	Dr. Vikas Mahor
Week 5	12/06/2023	Monday	Hands on session III on EdSim51: 1. Simulate a program to interface 10 LED lights with 8051 and perform rotating light operation. (VM) 2. Simulate a program to operate internal timer of 8051 as event counter.	Dr. Vikas Mahor
	13/06/2023	Tuesday	Introduction to Arduino Board for Embedded System Development	Dr. Vikas Mahor

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	14/06/2023	Wednesday	Arduino Programming -I	Dr. Vikas Mahor
	15/06/2023	Thursday	Arduino Programming -II	Dr. Vikas Mahor
	16/06/2023	Friday	Quiz/Viva	
Module Coordinators Email Id and Mobile Number	1) Dr. Rahul Dubey – rahul@mitsgwalior.in (9165577117) 2) Dr. Vikas Mahor – vikas@gmail.com, (7000771599)			