Course Code	Course Title			
116U06O624	**DIY Electronics with Raspberry Pi**			
	TH	**P**	**TUT**	**Total**
Teaching Scheme (Hrs.)	3	--	--	3
Credits Assigned	2	--	--	2

Examination Scheme	**Marks**						
	CA		**ESE**	**TW**	**O**	**P**	**P&O**	**Total**
	ISE	**IA**						
	30	20	--	--	--	--	--	50

Course prerequisites:
Elements of Electrical and Electronics Engineering (2UHC107)

Course Objectives:
This course aims at developing students' ability to build hands-on things without having special electronics skills such as soldering. There are many do it yourself (DIY) platforms available and students taking this subject will able to learn and use these kits and make the most out of it. The course focuses on currently trending advance boards such as Raspberry Pi and at the end of course Student is expected to make project using any one DIY technology. This course will help students in making their projects.

Course Outcomes
At the end of successful completion of the course the student will be able to
CO 1. Understand details of Raspberry pi hardware technology
CO 2. Use Python programming with Raspberry Pi
CO 3. Controlling GPIO pins with Python code.
CO 4. Interfacing various sensors and actuators with Raspberry Pi.
CO 5. Gain basic knowledge on different DIY boards

Module No.	Unit No.	Details	Hrs.	CO
1		**Introduction to Raspberry Pi**	**10**	**CO1**
	1.1	Raspberry Pi hardware, GPIOs, CPU, Ports, Memory, Communication ports, Comparison of different Raspberry Pi versions.		
	1.2	Introduction to different operating systems on Raspberry pi, Raspbian OS.		
2		**Python programming with Raspberry Pi**	**10**	**CO2**
	2.1	Python versions and shells for Raspberry Pi. Introduction to Thonny Python editor.		
	2.2	Strings, lists, arrays, and dictionaries.		
	2.3	Using loops and conditionals like for loops, while loops, if-else statements, if-elif statements. Creating user-defined functions and classes.		
3		**Interacting with Raspberry Pi**	**10**	**CO3**
	3.1	Installing different python libraries for Raspberry Pi.		
	3.2	Setting up the GPIO pins and controlling them using Python code.		

		Accessing the GPIO pins, single LED output, PWM outputs, multiple outputs, basic switch. Setting up the serial port.		
4		**Getting started with Raspberry Pi**	10	CO4
	4.1	Interfacing ultrasonic sensor, IR sensor, temperature sensor, and pH sensor with Raspberry Pi and processing their inputs and outputs using Python code.		
	4.2	Peripheral interface Raspberry Pi: USB camera, Capacitive LCD with touchscreen, Pi Camera.		
	4.3	Interfacing various actuators with Raspberry Pi and controlling them using Python code.		
5		**Recent trends in do-it-yourself (DIY) technology**	05	CO5
	4.1	Linux-based DIY boards.		
	4.2	Windows-based DIY boards.		
	4.3	Comparison of different DIY boards.		
	4.4	Tinkering lab DIY with SOC, HDL, FPGA.		
	4.5	DIY used in electrical vehicles (EVs) and IC engine cars.		
		Total	45	

Practical and oral examination will be based on laboratory work and entire syllabus.

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	Warren Gay	*Raspberry Pi Hardware reference*	Apress, USA	Year 2014
1.	Simon Monk	*Raspberry Pi cookbook*	O'Reilly Media, USA	Year 2016
1.	Liz Clark	*Practical Tinker Board*	Apress, USA	Year 2018
1.	Dan Nixon	*Getting Started with Python and Raspberry Pi*	Packt Publishing Ltd	First Edition, 2015
2.	Wolfram Donat	*Learn Raspberry Pi Programming with Python: Learn to Program on the World's Most Popular Tiny Computer*	Apress	Second Edition, 2018