GOVERNMENT OF TAMILNADU

DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI-25

STATE PROJECT COORDINATION UNIT

(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name	**MULTICOPTER DESIGNING AND PILOTING**
Course Code	**EC/2020/024**
Course Duration	40 Hours
Minimum Eligibility Criteria	10th/+2 /ITI/Diploma/Graduate
Pre-requisites (if any)	-
Course Objectives	Training module has been designed for the participants to • Understand the necessity and concept of Multicopter. • Practice on Assembling of Multicopter • Practice on Interfacing of Arduino with Multicopter Motors • Learn the Launching procedure of Quadcopter
Course Outcomes	At the end of training, the trainees will be able to • Explain the concept of Multicopter. • Build and customize radio-controlled quadcopters • Launch fully functioning quadcopters
Expected Job Roles	Multicopter Designer

TEACHING AND SCHEME OF EXAMINATION						
Course Code	Course Name	Hours		Assessment Marks		Duration of Examination
				Min	Max	
EC/2020/024	MULTICOPTER DESIGNING AND PILOTING	Theory	16	10	20	3 Hours
		Practical	24	40	80	
		Total	40	50	100	

EC/2020/024 – MULTICOPTER DESIGNING AND PILOTING

DETAILED SYLLABUS

Unit No	Modules	No.of.Hours	
		Theory	Practical
I	**Drone Basics**	**10 Hours**	
1.1	Introduction to Drone, History of Drones, Types of Drones	05	05
1.2	Drones working principle		
1.3	Aerodynamic Introduction		
1.4	Aerodynamic simple Experiments		
II	**Drones Controller**	**15 Hours**	
2.1	Introduction to Arduino controller	07	08
2.2	Arduino programming		
2.3	**Practical:** Interfacing sensors to Arduino		
2.4	**Practical:** Interfacing motor to Arduino		
2.5	**Practical:** Control of DC Motor by IR remote controller using Arduino		
III	**Drone Assembling**	**15 Hours**	
3.1	Component selection	04	11
3.2	Arm flight controller selection		
3.3	Assembling and Calibration of Quadcopter		
3.4	Flying section		
	Total Theory / Practical Hours	**16**	**24**
	Total hours	**40**	

HARDWARE REQUIREMENT

S.NO	LIST OF TOOLS /EQUIPMENTS
1	Arduino
2	Drone Motors
3	Sensor and Battery
4	IR Remote Control

SOFTWARE REQUIREMENT

S.NO	NAME OF THE SOFTWARE
1	Arduino IDE

REFERENCE BOOKS

S.NO	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Introduction to Multicopter Design and Control	QuanQuan	Springer
2	Multicopter Design and Control Practice	QuanQuan, Xunhua ,DaiShuai Wang	Springer
3	Build Your Own Quadcopter	Donald Norris	McGraw Hill Professional

ASSESSMENT AND CERTIFICATION

S.No	Criteria for assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the CIICP Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the CIICP Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max. Marks
1.	Theory Examination	20
2.	Practical Examination	
	a)Objective and Circuit Diagram	20
	b)Procedure and Connections / Execution	20
	c)Result and Viva	20
	d)Record	20
	Total Marks	**100**

THEORY MODEL QUESTION PAPER

EC/2020/024 – MULTICOPTER DESIGNING AND PILOTING

(Maximum Marks: 20)

(N.B: Answer any **Twenty** questions) **20x1= 20 Marks**

1. What is meant by Multicopter?
2. What are the advantages of Multicopter?
3. What are the disadvantages of Multicopter?
4. Define Quadcopter.
5. How many motors will be used in Quadcopter?
6. Expand: PWM
7. What are the applications of Quadcopter?
8. Expand: BLDC
9. Which type of motor gives high torque to weight ratio?
10. What are the functions of Electronic Speed controller in Drone?
11. What are the parts of Multicopter?
12. Define Roll rotation in Quadcopter?
13. Define Yaw rotation in Quadcopter?
14. Define Pitch rotation in Quadcopter?
15. How does a multi-copter fly?
16. What are the parts of a quadcopter?
17. What are the various configuration of Multicopter?
18. State True or False. Some Drones are Multicopters, but not every Multicopter is a Drone.
19. State True or False. The primary function of the Multicopter are Photography, Cinematography and Videography.
20. What are the three axes of rotation in Multicopter?
21. How does Multicopter move up and down?
22. What are the main parts of propulsion system in Multicopter?
23. What are the types of Drone?
24. What is aerodynamics?'
25. What is the function of RC Transmitter and Receiver?