SHARDA UNIVERSITY
Beyond Boundaries

NAAC
A+
ACCREDITED

SHARDA SCHOOL OF
ENGINEERING &
TECHNOLOGY

COURSE

PROGRAMMING SKILLS FOR ENGINEERING APPLICATIONS

VALUE ADDED
COURSE BROCHURE
2024-25

ABOUT THE DEPARTMENT

Department of Electrical Electronics and Communication Engineering is one of the premier departments od School of Engineering and technology, Sharda University. The department offers B.Tech, M.Tech and Ph.D programmes. The department has people of eminence from academia as well as industry, who have exposure to future cutting – edge research programs in the field of Power system, Power electronics, control engineering, smart grid communication Engineering, Internet of Things, LTE, Embedded systems, Microwave Engineering, Wireless Sensor Networks and VLSI, Robotics.

VALUE ADDED COURSE (VAC)

The Value added Education Courses aim to provide additional learner centric graded skill oriented training, with the primary objective of improving the employability skills of students

PURPOSE OF VALUE ADDED COURSE

VACs are relevant academic method in order to fill the gaps in students knowledge and add competitive edge to their job prospects. A well-defined of offspring VACs in the courses makes them extremely useful for improving employability quotient of students by building a range of competencies.

It helps students to build a creative foundation for their passion in an area (literary, visual and performing arts, etc) in additional to their professional courses creating dimensions which can help in converting their passion into profession.

VAC can also serve as top-up courses to make students industry-ready by exposing them to the current technology and practices than those covered in their formal degree courses.

Resource Person: Dr. C. Mohan has completed his B.E in Instrumentation and Control Engineering from Adhiyamaan College of Engineering, the University of Madras, Hosur in (1999). He completed M.Tech in Electrical & Electronics Engineering from Dr. A P J Abdul Kalam Technical University, Lucknow formerly UPTU., He has done his Ph.D from Sharda University. His areas of interest include Assistive Technologies, Embedded systems.

Course Schedule

S.No.	Topic	Week
1.	Introduction to Lift, Drag, Thrust, aerofoil, Cambered aerofoil, Chord line and Angle of Attack , Pressure distribution on Aerofoil, Centre of Gravity, Centre of Pressure, Lift Curve, Stall	1.
2.	Lift and Drag Equation, Control Surfaces of aircraft, Aileron, Elevator, Rudder, Flaps and slats, Turning, Yawing and Pitching movement of aircraft, Pitch of the propeller, Stalling Speed	2.
3.	Types of Aero Engine, Number and shape of blades, Gyroscopic effect , Laser Gyro, Gliding, VTOL, Mach Number, Height and Airspeed Measurement, Direction Measurement, Accelerometer	3.
4.	Various types of Drones, Principle of Operation of Drone, Telemetry , Autopilot, Flight Controller, Specifications of Motors used in Drones, Thrust measurement, GPS, Different types of power sources used in Drones	4.
5.	Building a Drone using DIY kits. DGCA Regulations for drone flying. Configuration of Autonomous Flight Controller, Calibration of the Drone.	5.
6.	To Design and develop the Airfoil using composite material and plot the CLVs Alpha graph using XFLR5 software	6.
7.	To calculate the performance parameters of a given RC Aircraft Model	7.
8.	Compute the performance characteristics of a Quadcopter UAV and Build the complete quadcopter with the given avionics system using a glass fibre frame	8.
9.	Perform the following using the given avionics system: a) Transmitter- Receiver Binding b) Motor ESC Calibration c) Channel reverse in the transmitter d) Transmitter settings for controlling a Servo	9.
10.	To find suitable propeller in order to generate maximum thrust for a given motor and power system.	10.
11.	Interfacing ADC and Sensors	11.
12.	LCD and Keyboard Interfacing to microcontrollers	12.

<table>
<tr><td colspan="2">School : SSET
Programme: B.Tech
Branch: EEE/ECE/ENC</td><td colspan="2">Batch :
Current Academic Year: 2024-25
Semester:</td></tr>
<tr><td>**1.** Course Code</td><td colspan="3"></td></tr>
<tr><td>**2.** Course Title</td><td colspan="3">Programming Skills for Engineering Applications</td></tr>
<tr><td>**3.** Credits</td><td colspan="3">NA</td></tr>
<tr><td>**4.** Contact Hours (L-T-P)</td><td colspan="3">30 Hours</td></tr>
<tr><td>**5.** Course Type</td><td colspan="3">Audit</td></tr>
<tr><td>**6.** Course Objective</td><td colspan="3">To impart knowledge on
• To familiarize with the main features of aircraft and important terms used in the aviation technology
• Exposure to the functioning of drone and building of a drone in a logical manner.
• Increasing productivity by learning to designing the aerofoils
Understanding the operation, characteristics and performance analysis of various parts of using simulator software.</td></tr>
<tr><td>**7.** Course Outcomes</td><td colspan="3">CO1: UNDERSTAND THE IMPORTANT TERMS USED IN THE AVIATION TECHNOLOGY

CO2: UNDERSTANDING OF VARIOUS PARTS OF DRONE AND BUILDING OF DRONE

CO3: UNDERSTANDING OF DESIGNING AND PERFORMANCE ANALYSIS OF VARIOUS PARTS OF AEROFOIL.

CO4: PERFORMANCE ANALYSIS OF DRONE WITH THE HELP OF SOFTWARE TOOLS TO SELECT THE BEST MODEL.
CO5: UNDERSTANDING THE CONCEPT OF TIMER PROGRAMMING AND FREQUENCY COUNTER USING EMBEDDED C
CO6: UNDERSTANDING THE CONCEPT OF FLIGHT CONTROLLER PROGRAMMING.</td></tr>
<tr><td>**8.** Course Description</td><td colspan="3">The main focus of this course is to give hands-on training to the students for aviation dynamics. It will acquaint the students with basic knowledge of dron technology by using various single board computers.</td></tr>
<tr><td colspan="3">**9.** Outline syllabus</td><td>**Duration Hours**</td></tr>
<tr><td>**Unit 1**</td><td colspan="2">**Introduction to basic terms of Aerodynamics**</td><td></td></tr>
<tr><td>A</td><td colspan="2">Introduction to Lift, Drag, Thrust, aerofoil, Cambered aerofoil, Chord line and Angle of Attack , Pressure distribution on Aerofoil, Centre of Gravity, Centre of Pressure, Lift Curve, Stall</td><td>**CO1**</td></tr>
<tr><td>B</td><td colspan="2">Lift and Drag Equation, Control Surfaces of aircraft, Aileron, Elevator, Rudder, Flaps and slats, Turning, Yawing and Pitching movement of aircraft, Pitch of the propeller, Stalling Speed</td><td>**CO1**</td></tr>
<tr><td>C</td><td colspan="2">Types of Aero Engine, Number and shape of blades, Gyroscopic effect , Laser Gyro, Gliding, VTOL, Mach Number, Height and Airspeed Measurement, Direction Measurement, Accelerometer</td><td>**CO1**</td></tr>
<tr><td>**Unit 2**</td><td colspan="2">**Drone Technology**</td><td></td></tr>
<tr><td>A</td><td colspan="2">Various types of Drones, Principle of Operation of Drone, Telemetry , Autopilot, Flight Controller, Specifications of Motors used in Drones, Thrust measurement, GPS, Different types of power sources used in Drones</td><td>**CO2**</td></tr>
<tr><td>B</td><td colspan="2">Building a Drone using DIY kits. DGCA Regulations for drone flying</td><td>**CO2**</td></tr>
<tr><td>C</td><td colspan="2">Configuration of Autonomous Flight Controller, Calibration of the Drone.</td><td>**CO2**</td></tr>
<tr><td>**Unit 3**</td><td colspan="2">**Designing of Aerodynamic Analysis**</td><td></td></tr>
<tr><td>A</td><td colspan="2">To Design and develop the Airfoil using composite material and plot the CL Vs Alpha graph using XFLR5 software</td><td>**CO3**</td></tr>
<tr><td>B</td><td colspan="2">Perform the Aerodynamic analysis of a wing for the given specification using XFLR</td><td>**CO3**</td></tr>
<tr><td>C</td><td colspan="2">To calculate the performance parameters of a given RC Aircraft Model</td><td>**CO3**</td></tr>
<tr><td>**Unit 4**</td><td colspan="2">**Performance Analysis**</td><td></td></tr>
<tr><td>A</td><td colspan="2">Compute the performance characteristics of a Quadcopter UAV and Build the complete quadcopter with the given avionics system using a glass fibre frame</td><td>**CO4**</td></tr>
<tr><td>B</td><td colspan="2">Perform the following using the given avionics system: a) Transmitter- Receiver Binding b) Motor ESC Calibration c) Channel reverse in the transmitter d) Transmitter settings for controlling a Servo</td><td>**CO4**</td></tr>
<tr><td>C</td><td colspan="2">To find suitable propeller in order to generate maximum thrust for a given motor and power system.</td><td>**CO4**</td></tr>
<tr><td>**Unit 5**</td><td colspan="2">**Programming**</td><td></td></tr>
<tr><td>A</td><td colspan="2">Interfacing External ROM</td><td>**CO5**</td></tr>
<tr><td>B</td><td colspan="2">Interfacing ADC and Sensors</td><td>**CO5**</td></tr>
<tr><td>C</td><td colspan="2">LCD and Keyboard Interfacing to microcontrollers</td><td>**CO6**</td></tr>
<tr><td>**10.** Mode of Examination</td><td colspan="3">Practical/Viva/Project</td></tr>
<tr><td>**11.** References</td><td colspan="3">1. E.L. Houghton and P.W. Carpenter "Aerodynamics for Engineering Students"
1.2. A. C. KERMODE Revised by R. H. BARNARD and D. R. PHILPOTT 'Mechanics of Flight'</td></tr>
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