

**Program Completion Report  
Of**

# **Online Workshop on Drone Design and Development**

**A weekender event held during 3<sup>rd</sup> to 31<sup>st</sup> October 2021**

**(Workshop Dates: 03/10/21, 09/10/21, 23/10/21, 30/10/21, 31/10/21)**



**Organized by  
Department of Production & Industrial Engineering  
In Association with  
Society of Industrial and Management Engineering  
Birla Institute of Technology, Mesra  
Ranchi**

## **Program Completion Report**

The Department of Production and Industrial Engineering in association with Society of Industrial Management and Engineering at BIT Mesra, Ranchi successfully conducted an Online Workshop on Drone Design and Development in the month of October 2021. This online workshop was a 5-day weekender event, and the sessions were held on 03/10/21, 09/10/21, 23/10/21, 30/10/21 and 31/10/21. The workshop was a pan-BIT event where students from BIT Mesra and the extension centers were allowed to register and participate. The workshop was a learning experience for the participants on the basic theory for the development and assembly of drones. The lectures were delivered by eminent resource persons from the field of drones, unmanned aerial vehicles and aerodynamics. The first four sessions were delivered by resource person Air Commodore Pradeep Kumar Choudhary VSM (Retd.) and the fifth lecture was delivered by Dr. Priyank Kumar. The workshop has provided a scope to the participants to gain knowledge about the basics of drone design, safety, maintenance, and rules in a comprehensive manner. The participant strength for the workshop included 25 students from the BIT community and interested faculty members who successfully completed the workshop.

**Dr. Vinay Sharma**

**Organizing Committee**

**Dr. Gayatri Paul**

**Organizing Committee**

**Dr. Suman Samanta**

**Organizing Committee**

# Approval for the Online Workshop



DEPARTMENT OF PRODUCTION & INDUSTRIAL ENGINEERING  
BIRLA INSTITUTE OF TECHNOLOGY, MESRA RANCHI-835215

Email: [hod.pe@bitmesra.ac.in](mailto:hod.pe@bitmesra.ac.in), phone: +91-651-2275444(Ext-4474), Fax: +91-651-2275401

To  
The Vice Chancellor  
Birla Institute of Technology, Mesra, Ranchi

Approved  
Justice 15-9-21

Dated: September 15, 2021

Subject: Permission for conducting workshop on 'Drone Design and Development' and necessary budgetary approval for the same.

Dear Sir,

The Department of Production and Industrial Engineering is planning to organize a workshop on the topic of 'Drone Design and Development'. The resource person for the workshop would be Air Commodore P. K. Choudhary, VSM (Retd). He has agreed to deliver lectures on basic topics of drone design ranging from fundamentals of quad-rotor theory to design and assembly of a simple quadcopter, drone rules 2021, etc. He also desires to demonstrate some hands-on on the development of drones.

The lectures of the workshop will be held during 4 consecutive Saturday mornings. After completion of the lecture series, a competition will be held among the students to develop a DIY drone.

A remuneration of Rs. 5000/- per lecture will be given to Air Commodore P. K. Choudhary. The total budget for the remuneration amounts to (Rs. 5000 × 4 =) Rs. 20,000/- for the workshop as of now.

The main target audience of this workshop will be students interested to learn keenly about drone technology from the eminent resource person. Interested faculty members may also join the workshop. The department is planning to make this a pan-BIT event.

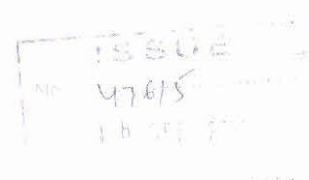
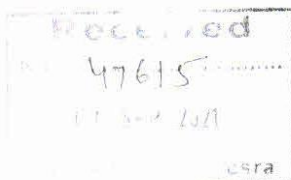
An entry fee of Rs. 200/- will be collected from the participating students and the collected amount will be utilized as the prize money for the best project award for the competition.

It is, therefore, requested that you to kindly permit me to conduct the workshop and provide a budgetary approval of Rs. 20,000/- for the same from departmental budget.

Thanking you

Yours sincerely

  
Dr. Joyjeet Ghose 15/9/21



Dr. Joyjeet Ghose, Head,

Email: [joyjeet@bitmesa.ac.in](mailto:joyjeet@bitmesa.ac.in) MOBILE NO.: 9801339620

## About the Workshop

The Online Workshop on Drone Design and Development was organized by the Department of Production and Industrial Engineering in association with Society of Industrial and Management Engineering as a weekender event during 5 days over the month of October 2021. The primary resource person of the workshop was Air Commodore Pradeep Kumar Choudhary VSM (Retd.) who took the first four sessions of the workshop. He is the receiver of Vishisht Seva Medal by the President of India, the founder of General Aeronautics Pvt Ltd and a specialist Consultant at Aeronautical Development Agency. The topics covered by the resource person included Fundamentals of Quad-rotor Theory, Drone Dynamics, Risks & Reliability Design & Assembly of a Quadcopter, and Drone Rules 2021. The fifth session was delivered by Dr. Priyank Kumar, Assistant Professor, Department of Space Engineering and Rocketry. The topics covered by the resource person included Aerodynamic of Aero-Vehicles and AICTE Idea labs at BIT Mesra.

<b>Session I</b>	
Resource Person	Air Commodore P. K. Choudhary VSM (Retd.)
Topic	Basics of Quad-theory and Drone Dynamics
Date	03/10/2021
Time	11 AM to 1 PM

<b>Session II</b>	
Resource Person	Air Commodore P. K. Choudhary VSM (Retd.)
Topic	Risk and Reliability Analysis of UAV
Date	09/10/2021
Time	11 AM to 1 PM

### **Session III**

Resource Person	Air Commodore P. K. Choudhary VSM (Retd.)
Topic	Design and Assembly of a Simple Quadcopter
Date	23/10/2021
Time	11 AM to 1 PM

### **Session IV**

Resource Person	Air Commodore P. K. Choudhary VSM (Retd.)
Topic	UAV Maintenance – A Concept
Date	30/10/2021
Time	11 AM to 1 PM

### **Session V**

Resource Person	Dr. Priyank Kumar
Topic	Aerodynamic of Aero-Vehicles and AICTE Idea labs at BIT Mesra
Date	31/10/2021
Time	11 AM to 1 PM

# Workshop Brochure

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA**  
SOCIETY FOR INDUSTRIAL MANAGEMENT & ENGINEERING | DEPARTMENT OF PRODUCTION & INDUSTRIAL ENGINEERING

## ONLINE WORKSHOP ON DRONE DESIGN AND DEVELOPMENT

A 4-WEEK LIVE SESSION ON DRONE TECHNOLOGY DESIGN AND FLY YOUR OWN DRONES

**Speaker:**  
**Air Commodore Pradeep Kumar Choudhary VSM (Retd.)**



- The receiver of Vishisht Seva Medal by the President of India
- Founder of General Aeronautics Pvt Ltd
- Specialist Consultant at Aeronautical Development Agency

**EXCLUSIVE OPPORTUNITY TO LEARN FROM THE DRONAS OF DRONE**

**SATURDAY WEEKENDER EVENT**  
(3, 9, 23 & 30 OCTOBER 2021)  
**11 A.M. ONWARDS**  
**₹200/- REGISTRATION FEES**  
**E-CERTIFICATE & CASH PRIZES**

VISIT: [WWW.SIMEBITMESRA.COM](http://WWW.SIMEBITMESRA.COM) AND [WWW.BITMESRA.AC.IN](http://WWW.BITMESRA.AC.IN)

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA**  
SOCIETY FOR INDUSTRIAL MANAGEMENT & ENGINEERING | DEPARTMENT OF PRODUCTION & INDUSTRIAL ENGINEERING

## DRONE DESIGN CONCEPT DEVELOPMENT COMPETITION

**WITH EXCITING CASH PRIZES AND E-CERTIFICATE**

**Topics to be taught**

- Fundamentals of Quad-rotor Theory
- Drone Dynamics
- Risks & Reliability
- Design & Assembly of a Quad-copter
- Drone Rule 2021

- The drone design concept development competition would be held on the last day of the workshop wherein participants would have to present their own drone design to the judges.
- Every participant would get an e-certificate upon successful completion of the workshop.
- Winners of the competition would get a cash prize.

**REGISTER NOW!!!**  
ONLY FOR BIT STUDENTS  
LAST DATE TO REGISTER: 30 SEPTEMBER

**Note:**

1. The registration form consists of technical questions related to drones.
2. Registered candidates would be shortlisted based on their responses.
3. The shortlisted candidates would be mailed the further details for the workshop and only then do they have to pay for the workshop.
4. Please do not pay until and unless you receive an official mail from SIME.

**Organizing Committee:**  
Dr. Vinay Sharma, Professor, Dept. of Production & Industrial Engg, BIT Mesra  
Dr. Gayatri Paul, Asst. Professor, Dept. of Production & Industrial Engg, BIT Mesra  
Dr. Suman Samanta, Asst. Professor, Dept. of Production & Industrial Engg, BIT Mesra

**Contact us:**  
Dr. Gayatri Paul - [gayatri@bitmesra.com](mailto:gayatri@bitmesra.com)  
Mr. Rishi Raj Barnwal - +91 9631038681, President, SIME, BIT Mesra

VISIT: [WWW.SIMEBITMESRA.COM](http://WWW.SIMEBITMESRA.COM) AND [WWW.BITMESRA.AC.IN](http://WWW.BITMESRA.AC.IN)

# Workshop Poster

Birla Institute of Technology, Mesra

DEPARTMENT OF PRODUCTION & INDUSTRIAL ENGINEERING

SOCIETY FOR INDUSTRIAL MANAGEMENT & ENGINEERING

Presents

## ONLINE WORKSHOP ON DRONE DESIGN AND DEVELOPMENT

WIN PRIZE MONEY

EARN AN E-CERTIFICATE

3<sup>rd</sup>, 9<sup>th</sup>, 23<sup>rd</sup> & 30<sup>th</sup> October

PARTICIPATE IN DRONE DESIGN COMPETITION

SWIPE TO KNOW MORE

EXCLUSIVELY FOR BIT STUDENTS

Birla Institute of Technology, Mesra

DEPARTMENT OF PRODUCTION & INDUSTRIAL ENGINEERING

SOCIETY FOR INDUSTRIAL MANAGEMENT & ENGINEERING



Speaker:  
**Air Commodore Pradeep Kumar Choudhary VSM (Retd.)**

Topics to be covered

- > Fundamentals of Quad-rotor Theory
- > Drone Dynamics
- > Risks & Reliability
- > Design & Assembly of a Quad-copter
- > Drone Rule 2021

Online Platform

11 A.M onwards

To know the Tech behind drones

[Register Now](#)

LIMITED SEATS!!!

FEES ₹200

[www.simebitmesra.com](http://www.simebitmesra.com) or [www.bitmesra.ac.in](http://www.bitmesra.ac.in)

Birla Institute of Technology, Mesra

DEPARTMENT OF PRODUCTION & INDUSTRIAL ENGINEERING

SOCIETY FOR INDUSTRIAL MANAGEMENT & ENGINEERING



Speaker:  
**Dr Priyank Kumar**

INSTITUTION'S INNOVATION COUNCIL  
(Ministry of HRD Initiative)

Topics to be covered

- > Aerodynamics of Aerovehicles
- > Idea Lab at Birla Institute of Technology, Mesra


Online Platform (Google Meet)

11 A.M. onwards

31st October '21 Sunday







[Register Now!!!](#)  
Link in the description below


Innovate, Inculcate and Inspire

  
Workshop Drone Workshop



## Basics of Quad-theory & Drone Dynamics


Air Cmde PK Choudhary VSM (Retd)



  
PK Choudhary

## VITOL Ariel Vehicle



  
PK Choudhary

  
Workshop Drone Workshop

## Quadrotor Theory

- Ariel vehicle with four rotors located at ends of a cross structure
- Controlled by varying the speeds of each of the rotors
- Capability to Take off and Land Vertically (VTOL)
- Hovering Capability
- Can be moved slowly and precisely





  
PK Choudhary



Multicopter Drone Workshop

# Risk and Reliability Analysis for UAV

Air Cmde PK Choudhary VSM (Retd)


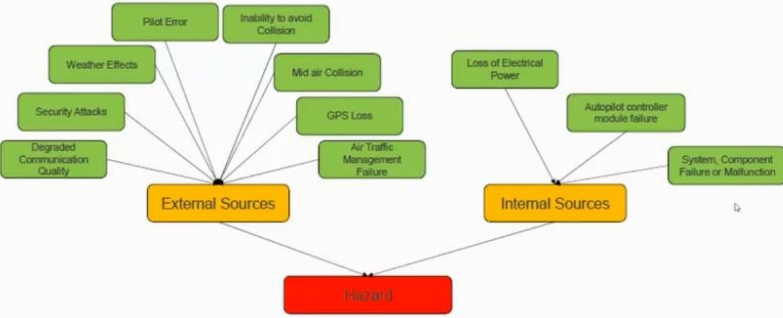


PK Choudhary

Multicopter Drone Workshop

## Hazard/Risk in Drone Operations

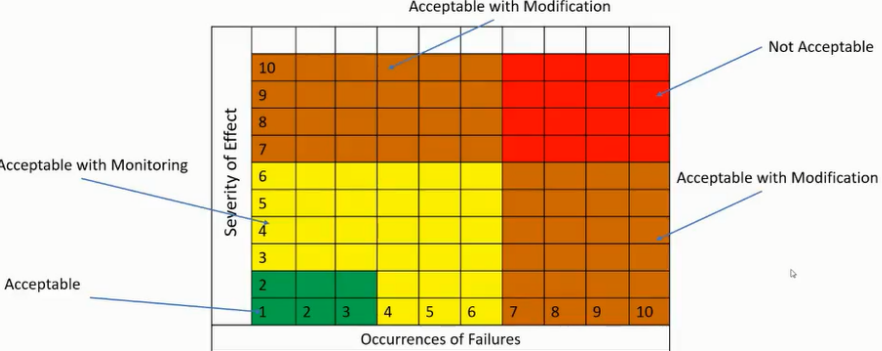
All except Pilot error (human error) involve software




PK Choudhary

Multicopter Drone Workshop

## RPN



Severity of Effect	1	2	3	4	5	6	7	8	9	10
1	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
2	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
3	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
4	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
5	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
6	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
7	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
8	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
9	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange
10	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange




PK Choudhary



# UAV MAINTAINANCE A CONCEPT




Air Cmde PK Choudhary VSM (Retd)




PK Choudhary


## Condition Base Maintenance



CHECK BRAKE WEAR INDICATOR

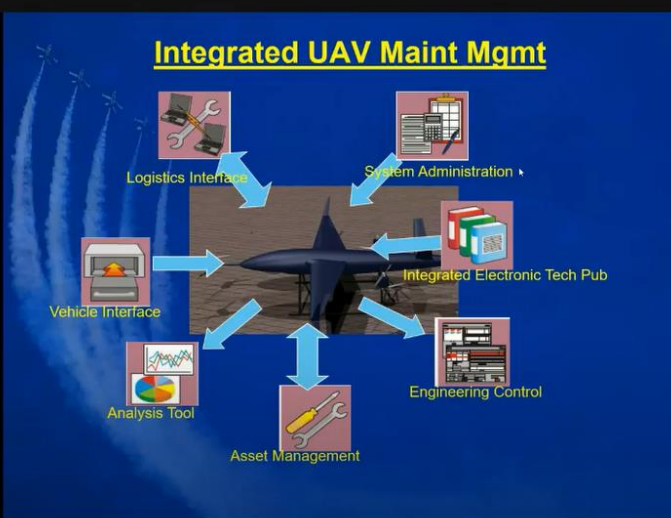


CHECK HARD LANDING DETECTOR @GLOUP IS NOT RE




PK Choudhary

## Integrated UAV Maint Mgmt



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graph TD; UAV[UAV] --> LI[Logistics Interface]; UAV --> SA[System Administration]; UAV --> IETP[Integrated Electronic Tech Pub]; UAV --> EC[Engineering Control]; UAV --> AM[Asset Management]; UAV --> AT[Analysis Tool]; UAV --> VI[Vehicle Interface];
```




PK Choudhary

Session V Screenshots: Speaker: Dr. Priyank Kumar

Why do we need a wind tunnel?

Geometric similarity - Scaling

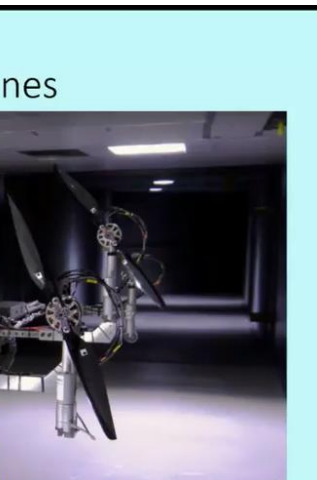
Dynamic Similarity – In fact flow similarities



meet.google.com is sharing your screen. Stop sharing Hide

Priyank Kumar

Wind Tunnel Testing of Drones



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Priyank Kumar



**AICTE – IDEA Lab**  
Birla Institute of Technology, Mesra,

meet.google.com is sharing your screen. Stop sharing Hide

Priyank Kumar

## List of Participants

Sl. No.	Full Name	Institute Roll No	Institute Email Id
1	Gaurav Kundara	BTECH/25069/19	Btech25069.19@bitmesra.ac.in
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3	Mariya Sunil	MGI/10007/20	mgi10007.20@bitmesra.ac.in
4	ROHIT AGRAWAL	PHD/ME/10004/20	phdme10004.20@bitmesra.ac.in
5	Joy Chakraborty	MTRS/10004/21	mtrs10004.21@bitmesra.ac.in
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14	Yashodip Sonawane	MT/SER/10022/20	mtser10022.20@bitmesra.ac.in
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