



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with 'A' grade by NAAC
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119.

Phone: 044 - 2450 3150 /3151 / 3152 / 3154 / 3155 Fax: 044 - 2450 2344
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SCHOOL OF MECHANICAL OF ENGINEERING

Department of Aeronautical Engineering

Value-Added Courses Conducted During the Academic Year 2016-2017

SATHYABAMA UNIVERSITY
CONCEPTS OF UAV DESIGN
ORGANIZED BY SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY DEPARTMENT OF AERONAUTICAL ENGINEERING

04.07.2016 – 12.08.2016

CHIEF PATRONS
Dr. Mariazeena Johnson
President
Dr. Marie Johnson
President

WEEK 1: REVIEW OF THE CONCEPTS
WEEK 2: UNDERSTANDING THE STATIC STABILITY OF VARIOUS UAV.
WEEK 3: APPROACH FOR WING DESIGN
WEEK 4: TAIL SIZING
WEEK 5: SUBROUTINE FOR DESIGN PROCESS
WEEK 6: DESIGN EXAMPLE FOR CONVENTIONAL TAKEOFF
WEEK 7: DESIGN EXAMPLE FOR HAND LAUNCH FIXED WING UAV
WEEK 8: DESIGN EXAMPLE FOR VTOL FIXED WING UAV

COORDINATORS
Mr.P. Gunasekar,
Mr.S. Manigandan

CONVENORS
Mr. Alexander
HOD, Aero
Dr. A Anderson
Prof, Aero

CONCEPTS OF UAV DESIGN

Course Outline

This course introduces the designing and sizing process (Simulation/Experimental) for fixed? wing UAV technology, integrated with its performance and stability analysis (Static & Dynamic) and prototype testing

Course Layout

Week	Time	Topic
Week 1	3 hrs	Review of the concepts covered in first part of the course.
Week 2	5 hrs	Understanding the static stability of various UAVs. Significance of location of Neutral point and centre of gravity for a stable flight.
Week 3	4 hrs	Approach for wing design and airfoil selection with examples
Week 4	4 hrs	Tail sizing, control surface sizing and significance of tail volume ratio with examples.
Week 5	3 hrs	Developing subroutine for design process.
Week 6	4 hrs	Design example for conventional takeoff fixed wing UAV for various mission requirements.
Week 7	4 hrs	Design example for hand launch fixed wing UAV for various mission requirement.
Week 8	3 hrs	Design example for VTOL fixed wing UAV for various mission requirement.



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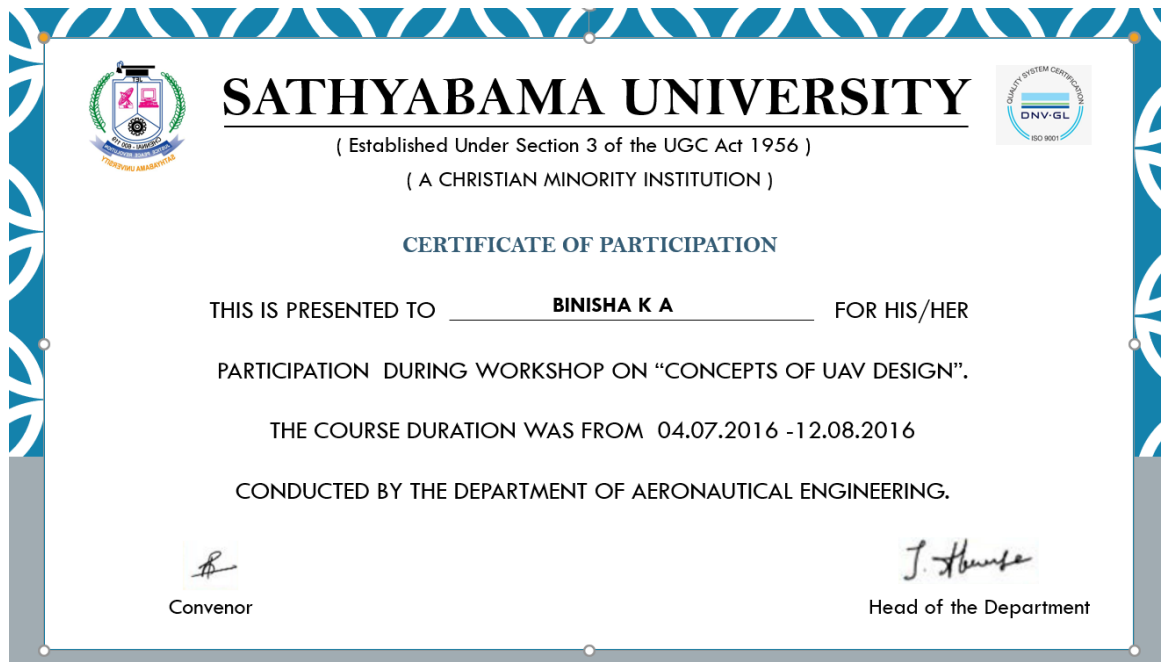
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This Aircraft Design option aims to provide a comprehensive overview of whole aircraft configuration design as well as structures and systems. A holistic teaching approach is taken to explore how the individual elements of an aircraft can be designed and integrated using up-to-date methods and techniques. You will learn to understand how to select and integrate specific systems such as fuel systems, and their effect on the aircraft as a whole. You will have the opportunity to fly during a Student Experience Flight in our National Flying Laboratory Centre's (NFLC) light aircraft. This flight experience will complement your MSc studies, focussing on the effects of controls, aircraft stability and angle of attack. During the flight you will have the opportunity to take control of the aircraft. Each experience is 2 to 3 hours in duration and includes a pre-flight safety briefing outlining the details of the manoeuvres to be flown, a flight of approximately 1 hour, and a post-flight debrief. Read Hari's blog on his flight experience. We have been at the forefront of postgraduate education in aerospace engineering since 1946. Aerospace Vehicle Design at Cranfield University was one of the original foundation courses of the College of Aeronautics. Graduates of this course are eligible to join the Cranfield College of Aeronautics Alumni Association (CCAAA), an active community which hold a number of networking and social events throughout the year.





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List of Participants

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1	14SAE301	Adlinnija M
2	14SAE101	Amar S K
3	14SAE603	Murali Krishna Appari
4	14SAE121	Satya Narasimha Gopal Bandaru
5	14SAE102	Benjamin S K
6	14SAE311	Binisha K A
7	14SAE103	Bharath Sai Kumar Dasari
8	14SAE551	Dhinesh T
9	14SAE104	Naveen Kumar Gandikota
10	14SAE604	Gautham T M
11	14SAE105	Gokul Kishan G
12	14SAE106	Gokulraj P
13	14SAE552	Gopi R
14	14SAE605	Gundlapallijyothirnaga Manjari
15	14SAE302	Jahnavi Vaka
16	14SAE107	Venkata Sujay Kumar Reddy J
17	14SAE303	Kajol Kulkarni
18	14SAE304	K Srisindhu
19	14SAE108	Karthick V

20	14SAE129	Keroji Akshay Arun
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37	14SAE116	Perumal Raj P
38	14SAE553	Pritam Kumar
39	14SAE307	Raja Rajeshwari S
40	14SAE119	Samdani Sankeshwar



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MODERN TOOLS FOR COMPUTATION FLUID DYNAMICS

The poster features a central image of a jet aircraft with a colorful aerodynamic flow visualization. The text is arranged around this central image. At the top, the Sathyabama University logo and name are displayed, along with its accreditation details. The main title 'WORKSHOP FOR MODERN TOOLS FOR COMPUTATION FLUID DYNAMICS' is prominently displayed in large, bold, orange letters. Below the title, the dates '12.09.16 - 03.10.16' are shown in a similar style. The organizing department, 'DEPARTMENT OF AERONAUTICAL ENGINEERING', is listed at the bottom. On the left side, a dark blue circle contains the names of the coordinators and convenors. On the right side, the names of the chief patrons are listed. The background of the poster is a light blue gradient with a subtle grid pattern.

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(Established under section 3 of UGC Act, 1956) Accredited by NAAC (A Christian Minority Institution)
"ENTRY IS NOT IMPORTANT, EXIT IS IMPORTANT"
LEARN TODAY - LEAD TOMORROW

COORDINATORS
Dr. A. Anderson
prof, Aero
Mr. S. Manigandan
Prof, Aero

CONVENORS
Mr. Alexander
HOD, Aero
Dr. P. Gunasekar
Prof, Aero

**WORKSHOP FOR
MODERN TOOLS FOR
COMPUTATION FLUID
DYNAMICS**

12.09.16 - 03.10.16

**DEPARTMENT OF
AERONAUTICAL ENGINEERING**

CHIEF PATRONS
Dr. Mariazeena Johnson
President
Dr. Marie Johnson
President

Course Description

Computational Fluid Dynamics (CFD), is a simulation tool used for analyzing complex thermal and fluid phenomena. It is instrumental in maintaining the quality and safety of many products we use on a day-to-day basis, such as an automobile or even the house we live in. CFD software is indispensable for "Front-loading" product development to ensure the best product concepts are identified early in the design process. Design quality will be improved during the conceptual design phase by conducting basic studies of fluid and thermal phenomena that directly affect product performance. Visualizing the complicated movements of a gas or liquid flow can be quite convoluted. By implementing simulation software, Cradle CFD, into the workflow, analyzing these movements is easier than ever. It enables the user to predict the performance of their products before physical testing. This results in a more optimized design early in the product development cycle. In some cases, simulation can even replace the need for physical testing, altogether. Utilizing Cradle CFD will provide engineers with the understanding of these type of movements and an easy-to-use tool that anyone could implement. Cradle CFD strength lies in its coupling capacity with other simulations tools, such as mechanical and structural software. The reinforced co-simulation capability with MSC Software products, such as Marc, Nastran, Adams, and Actran, it is possible to represent more accurate, realistic phenomena in



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simulations, allowing users to take more pragmatic approach for assessing design performance and potential risks

Modules

Module No.	Modules	Duration
1	3D CAD data import	2 Hrs
2	Density-based solver	2 Hrs
3	Pressure-based solver	2 Hrs
4	Radiation	2 Hrs
5	Discontinuous mesh	2 Hrs
6	Overset mesh	2 Hrs
7	Moving object	3 Hrs
8	6-degree-of-freedom motion	3 Hrs
9	Free surface	2 Hrs
10	Boiling and condensation	3 Hrs
11	Solidification and melting	2 Hrs
12	Humidity and dew condensation	2 Hrs
13	Cavitation	2 Hrs
14	Discrete Element Method	3 Hrs
15	Wiring pattern import	2 Hrs
16	Particle tracking	2 Hrs
17	Climate data referral	2 Hrs
18	Thermoregulation model	2 Hrs
19	Heat stress and ventilation evaluation	3 Hrs
20	Mapping	2 Hrs





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Modern numerical simulation tools for Aircraft design

SATHYABAMA UNIVERSITY

MODERN NUMERICAL SIMULATION TOOLS FOR AIRCRAFT DESIGN

ORGANIZED BY SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY DEPARTMENT OF AERONAUTICAL ENGINEERING

23.01.2017 – 28.02.2017

CHIEF PATRONS
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Dr. Marie Johnson
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Prof, Aero
Mr.S. Manigandan
Prof, Aero

CONVENORS
Mr. Alexander
HOD, Aero
Dr. P. Gunasekar
Prof, Aero

Modules

Module No.	Modules	Duration
1	Drag and weight prediction: Drag sources, polar, estimation, weight prediction methods. Layout aspects: wing; power plant; landing gear; fuselage.	3 Hrs
2	Simple tail plane and fin layout.	3 Hrs
3	Overall project synthesis and case study of aircraft.	3 Hrs
4	Structural requirements, - strength, stiffness and serviceability.	3 Hrs
5	Analysis of requirements, sources of load and reference datum lines.	3 Hrs
6	Role of structural members - main plane, stabilizers, auxiliary surfaces, fuselage.	3 Hrs
7	Analysis and sizing methods - elementary theories.	3 Hrs
8	Departures from elementary theories - constraint effects, cut outs, buckling.	3 Hrs
9	This module has additional accompanying tutorials and workshops as required.	3 Hrs
10	A miniature group PBL conceptual design project will be completed during this module. Solutions will be collected in by the tutor at the end of the module.	3 Hrs

Outcomes

- Demonstrate a systematic understanding of the multidisciplinary nature of aircraft design.
- Identify the functional role of the structural elements of the entire airframe



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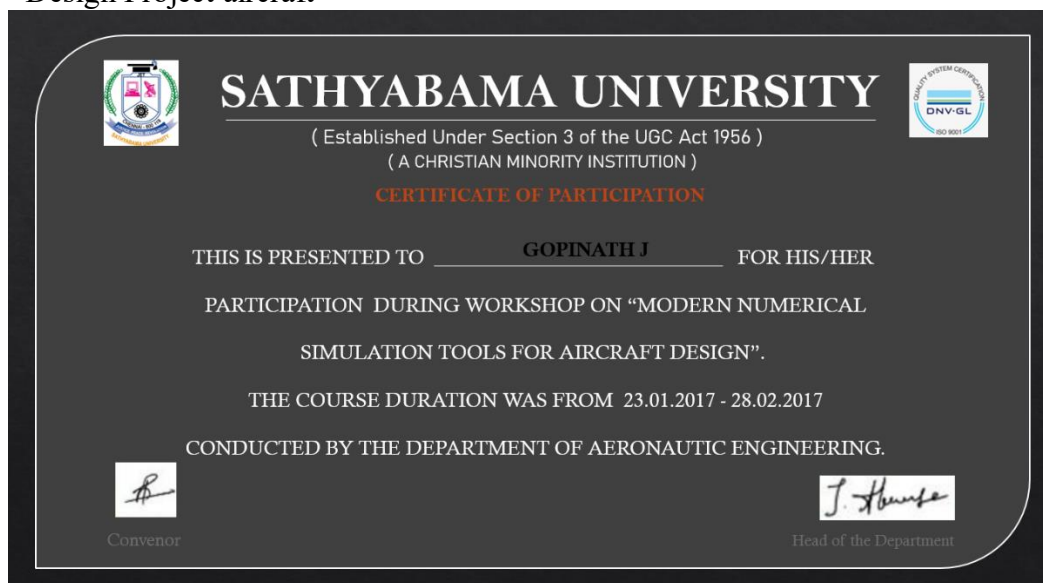
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- Demonstrate an understanding of the top-level aircraft design to put the detailed design of one aircraft component into context
- Perform a simple conceptual design of an aircraft
- Apply their knowledge and skills to derive the initial structural layout of the Group Design Project aircraft



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3	13SAE303	Ajitha P K
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6	13SAE601	Akhil Busa
7	13SAE121	Alok
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25	13SAE606	Harshavardhan M S
26	13SAE607	Hemanth Reddy Katukuri
27	13SAE113	Jibson Chalil Giriviriyose
28	13SAE315	Julia Joseph
29	13SAE114	Jupalli Pavan Preetham Naidu
30	13SAE608	Kandimalla Chacha Srihari
31	13SAE115	Keethivasan N
32	13SAE305	Kommineni Hyndavi
33	13SAE615	Lingala Manasa Reddy
34	13SAE609	Megavath Kalyan Naik
35	13SAE610	Para Sri Kanth
36	13SAE611	Praveen M V S N R
37	13SAE616	Puja Sharma
38	13SAE116	Rahul J Srinivas
39	13SAE117	Ram Narayan Holy
40	13SAE306	Ramalakshmi S
41	13SAE123	Ran Bijay Kunwar
42	13SAE316	Reshmaa S
43	13SAE612	Rushendar S
44	13SAE317	Sabbaarapu Usha Sowjanya
45	13SAE319	Sapna S