# SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution**
**Coimbatore – 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with ‘A++ Grade
Approved by AICTE , New Delhi and Affiliated to Anna University , Chennai.

## DEPARTMENT OF AEROSPACE ENGINEERING

## 19ASO301 BASICS OF AERONAUTICAL ENGINEERING

## UNIT 1 –HISTORY OF FLIGHT



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# HISTORY OF FLIGHT

- *History of Flights*
- *Ornithopters*
- *Hot Air Balloon*
- *Development of Flight - 18$^{th}$ & 19$^{th}$ century*
- *Development of Flight - 20$^{th}$ century*
- *Summary*

# TEXT BOOK

- ***Anderson. J D, "Introduction to Flight", McGraw-Hill, 1995***

- ***Richard S. Shevel, "fundamentals of Flight", Prentice Hall, 2010***

# ORNITHOPTER

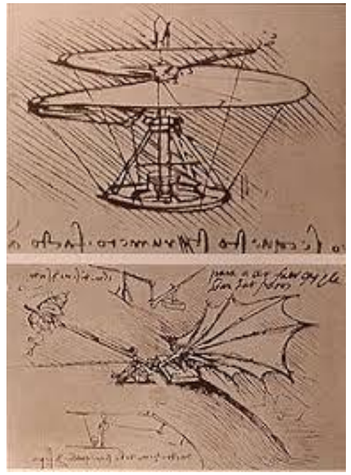
## ORNITHOPTER

- The word "ornithopter" means "***bird wing***".
- An ornithopter doesn't need to have feathers, though.
- What makes it birdlike is the flapping motion.
- Airplanes and helicopters use rotating propellers.
- Instead of rotation, the ornithopter imitates the reciprocating motion of a bird's wing.

29-07-2020

Fundamentals of Aeronautical Engineering
KIT-Kalaignarkarunanidhi Institute of Technology

# ORNITHOPTER



# ORNITHOPTER

## Timeline of Ornithopter

- Until the nineteenth century, Leonardo da Vinci was generally known only as a painter.
- Among the many subjects Leonardo studied, the possibility of human mechanical flight held particular fascination.

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# ORNITHOPTER

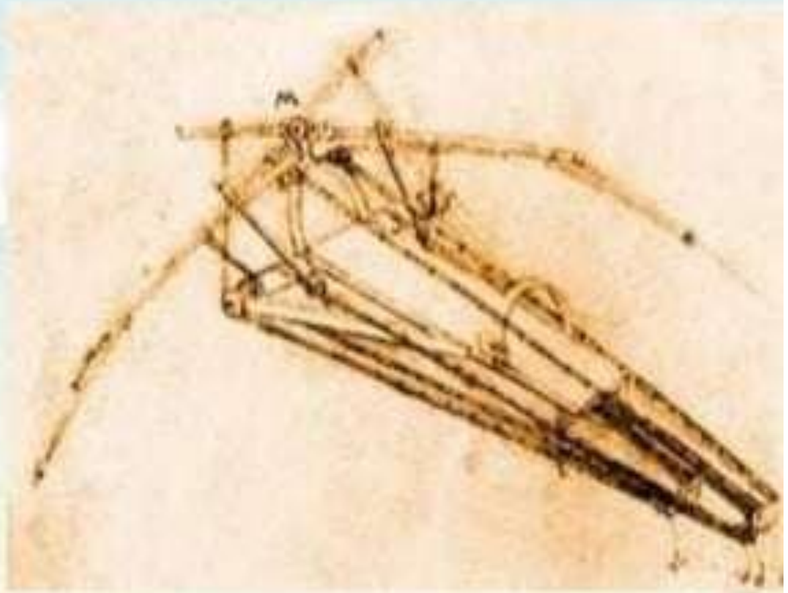
## In Indian Epic ?????

- The Sanskrit epic Ramayana describes an ornithopter, the Pushpaka Vimana.
- The first writings on trying to use the idea of flapping flight date all the way back, but there were not any recorded designs made from the descriptions in the writing.

# ORNITHOPTER

## Da Vinci sketches of the ornithopter

- It has used a system of pulleys and gears powered by the arms and legs that would make the wings move in the fashion that a bird's wing does.
- Da Vinci's design was not based on an idea of having a wing attached to each arm of a human and having that person flapping their arms up and down because he discovered that humans were not strong enough to generate the power needed to fly.



# ORNITHOPTER

- The amount of lift needed to put a human in the air was physically impossible to achieve so the lift to drag ratio compared to that of a bird was much too small due to the lack of lift generated.
- The only way to overcome that factor was to add the system of pulleys that would multiply the force exerted by the human's arms and legs and transfer that power to the wings to make them flap fast enough to generate the lift needed to fly.
- Da Vinci did not make a full scale model of his design, but many other future innovators in flight would try to perfect da Vinci's design and build a machine that would allow humans to fly through the phenomenon of flapping flight.