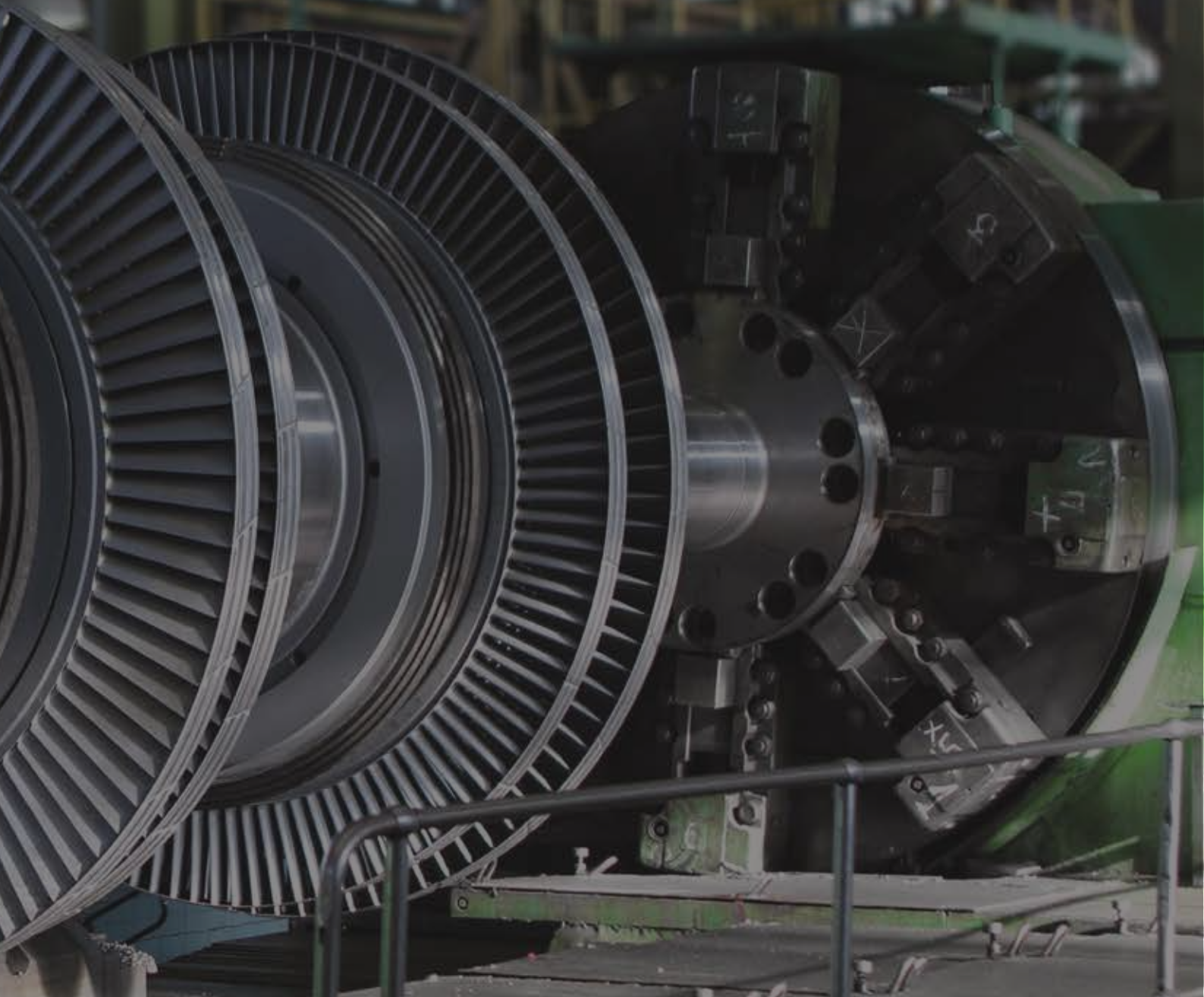


# पान्त्रिकी

Volume 4 | 2020-21





## Vision

“To be a nationally renowned Mechanical Engineering Department producing professionals, catering dynamic global industrial needs with sense of responsibility and social sensitivity towards national growth.”



## Mission

M1 - To provide an academic foundation in Mechanical Engineering while imbibing professional studies with advance skills to fulfil ever changing global industrial needs.

M2 - To impart graduates with social values and ethics by providing opportunities to solve environmental and social problems.

M3 - To establish an environment that encourages and builds an ambience of learning and practical application of underlying principles at various level.





## From the Principal's Desk ...

Dear Readers,

It gives me immense pleasure to present the fourth issue of Yantriki before you all. Nurturing creativity and inspiring innovation are two key elements of successful education and the Mechanical Department has been following this motto throughout its journey.

This magazine will be a vital part of this journey as it will serve as a platform for all the students as well as faculties to share their ideas, technical knowledge and opinions on various things happening at APSIT, Mechanical Department. The dept. has started various skill development courses for students to mold themselves according to the industrial requirements.

I would like to appreciate the Editorial and Design team of the magazine for putting their valuable efforts for the magazine development and also making it reader friendly. Also, my heartfelt congratulations to the HOD and faculty members of the Mechanical Department for their valuable and fruitful efforts towards nurturing students.

**Dr. Uttam D. Kolekar**

Principal APSIT

## From the HOD's Desk . . .



Dear Readers,

I am pleased to share with you the fourth edition of 'Yantriki', a magazine from Mechanical department of APSIT. The title reflects basis of our department which is 'Mechanics'!

Events in Yantriki 4.0 is a look back through all the curricular as well as extra curricular activities organized by our department in academic year 2020-21. In this period, we've had many interactive seminars, training programmes, etc. All these activities were organized by student committees like MESA and ISHRAE of the Mechanical Department. Other articles included in the magazine have some amazing technological advancements taking place in field of science and technology.

I hope reading this magazine will be a wonderful experience. My profound thanks to the editorial and design team of the magazine for their continuous efforts and I wish them luck!

**Prof. Venkatesh Rao**  
HOD, Mechanical Engineering

# MAGAZINE COMMITTEE



**Sharvil Joglekar**  
Designer



**Mukul Aigalikar**  
Editor



**Atharva Linge**  
Editor

## **Chief Editor - Prof. P.K. Jadhav**

Yantriki 4.0 is the 4<sup>th</sup> edition of the official magazine of Mechanical Engineering Department at APSIT.

The magazine covers all the aspects of the department including industry collaborations, and the collegiate clubs such as ISHRAE, MESA, SAE and MAC which offer student a chance to enhance their knowledge by participating in various extra curricular activities. Also do read the articles provided by the students of Mechanical Department which give a wonderful insight into modern world technology.

We hope you would like this edition of the magazine and enjoy

- Magazine Team

# DEPARTMENTAL TOPPERS

## Sem III

Rank	Name Of Student	Pointer / GPA
1	Patil Aditya	10
	Panchal Gaurav	10
	Khadye Karan	10
	Pisat Kedar	10
	Desai Rushikesh	10
2	Gore Yaseen	9.92
3	Khot Durwas	9.88

## Sem IV

Rank	Name Of Student	Pointer / GPA
1	Patel Panth	10
	Joglekar Sharvil	10
	Mane Vinayak	10
2	Khan Anas	9.96
3	Mhamunkar Anshul	9.91

## Sem V

Rank	Name Of Student	Pointer / GPA
1	Kale Akshay	10
	Antarkar Sarthak	10
2	Kulkarni Aditya	9.96
3	Rodrigues Roshwin	9.93

### Sem VI

Rank	Name Of Student	Pointer / GPA
1	Ambekar Manas	9.96
	Kobal Chinmay	9.96
2	Mistry Palak	9.92
3	Lawate Rashmin	9.88

### Sem VII

Rank	Name Of Student	Pointer / GPA
1	Gawde Akshay	10
	Surve Atharva	10
	Jawale Sayali	10
2	Jadhav Vaibhav	9.96
	Lokhande Omkar	9.96
	Jain Parakh	9.96
3	Jagdish Vishwakarma	9.84
	Tarun Shriyan	9.84
	Bhagwath Amogh	9.84
	Pal Yogesh	9.84
	Bhalekar Shrutik	9.84
	Barbhai Sainath	9.84

# SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

## About SAE

SAEINDIA is India's leading resource for mobility technology. As an individual member-driven society of mobility practitioners, the ownership of SAEINDIA wrests with its members who are Individuals from the mobility community, which includes Engineers Executives from Industry, Government Officials, Academics and Students.

SAEINDIA is a strategic alliance partner of SAE International registered in India as an Indian nonprofit engineering and scientific society dedicated to the advancement of the mobility industry in India.

Mechanical Department of A. P. Shah Institute of Technology appreciates the contribution of Mr. R. K. Agarwal (Mumbai zone coordinator SAEWS INDIA) and Mr. Onkar Deshpande (Engineer-SAEWS INDIA) for giving an opportunity and platform in the form of SAE CONVENTION for APSIT students to enhance their intellectual knowledge.

To provide opportunities to engineering students to showcase their talents in design, manufacture and testing of all-terrain vehicle, simulating the real-world product development process, Continuing education of Members and also other interested persons in the said sciences through Lectures, Workshops, Product Presentations, Publications and Expositions.



## SAE APSIT 2020-2021 working committee

Sr. No.	Post	Student Name
1	Chairperson	Omkar Narkar
2	Vice-Chairperson	Suyash Hotkar
3	Secretary	Sharvil Joglekar
4	Treasurer	Shubham Teli
5	Reception Chair	Shubham Gole
6	Program Chair	Akhilesh Desai
7	Publicity Chair	Durvesh Ponkshe
8	Membership Chair	Sumit Kamble
9	Joint Secretary	Yash Pawar
10	Joint Publicity Chair	Vinayak Mane
11	Joint Program Chair	Vedant Bhirud

# MODIFIED AUTO CLUB (MAC)

Modified Auto Club is a student engineering team founded in 2018 with the sole aim of making a difference in the world by formulating and manufacturing electric vehicles in various formats like E-bikes, solar cars and Electric Formula Student Vehicles.

We tend to propagate the power and benefits of green energy, and spread its awareness and work on improving the current technologies. This paired with the excellent facilities not only helps to achieve our goals but also provide industrial experience to budding engineers at the very roots of their academic endeavours.

The students of MAC are expanding knowledge by rigorously undergoing research and development in domains including but not limited to a high-performance battery pack, motor and controller, etc. This provides powerful insights and backing along with advancement to our present and future projects exponentially.



Rev-it Contest Prizes.

# Achievements

## Falcon - Electric Bike

EBRC - January 2020  
Overall winners & Best  
Innovation Award



## Formula Student Car

Formula Bharat Virtuals - Dec  
2020  
Best Debut Team, Overall 7th  
rank

Formula Bharat Virtuals - Sept  
2021  
Overall 2nd Winner (Rev-it  
Event)



# INDIAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ISHRAE)

## About ISHRAE

The Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE), was founded in 1981 at New Delhi by a group of eminent HVAC&R professionals. ISHRAE today has more than 28,780 HVAC&R professionals and Student-members.

ISHRAE operates from 41 Chapters and sub Chapters spread all over India, with HQ in Delhi. It is led by a team of elected officers, who are members of the Society, working on a voluntary basis, and collectively called the Board of Governors. Mission of ISHRAE is to promote the goals of the Society for the benefit of the general public.

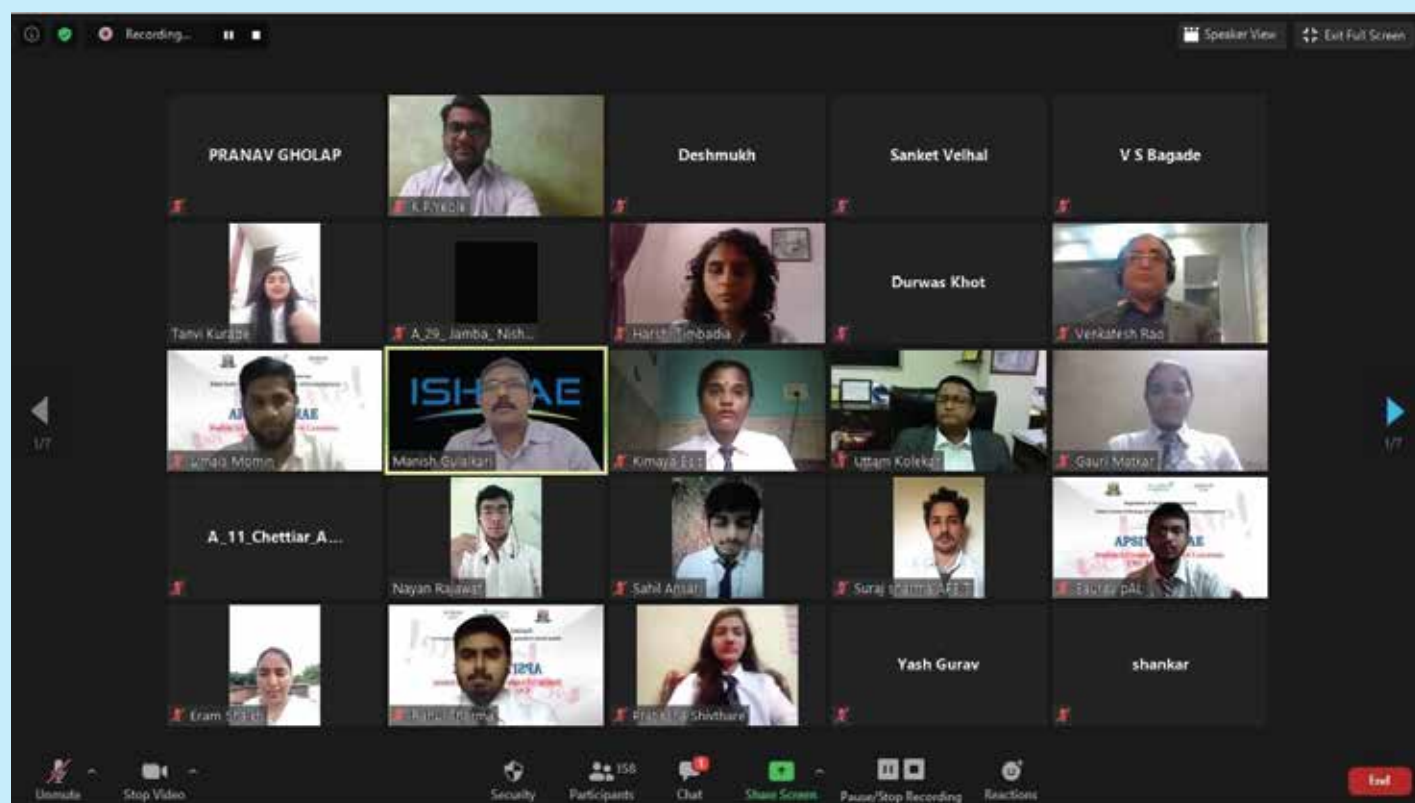
Towards this objective, the Chapters of the Society participate in, and organize, activities to protect the Environment, improve Indoor Air Quality, help Energy Conservation, provide continuing education to the Members and others in the HVAC&R related user Industries and offer certification programs, career guidance to students at the local colleges and tertiary institutions.

ISHRAE-APSIT Chapter was initiated on 15 th September 2018, under the guidance of Prof. V.S. Rao, Head-Mechanical Engineering Department along with Prof. U. M. Momin, Faculty In-charge, Mechanical Engineering Department. The inauguration ceremony of the ISHRAE-APSIT in association with ISHRAE-Thane Chapter was held on 18 th of January 2019 for Academic year 2018-19.



## ISHRAE APSIT 2020-2021 working committee

Sr. No.	Post	Student Name
1	President	Nayan Rajawat (B.E. Mech)
2	Secretary	Ganesh Patwa (B.E. Mech)
3	Treasurer	Eram Shaikh (B.E. Mech)
4	Publicity Head	Yash Gurav (B.E. Mech)
5	Membership In-Charge	Suraj Sharma (B.E. Mech)
6	Documentation In-Charge	Saurav Pal (B.E. Mech)
7	Project Head	Tanvi Kurade



**ISHRAE Team along with faculties during an online activity in the Covid-19 period.**

# INDUSTRY PARTNERS

## Dassault Systemes CLIC Program

Collaborative Learning and Innovation Centre (CLIC) offers various trainings on 3D Design and Simulation for Mechanical Engineering Students.



## Autodesk Hub

APSIT is an Autodesk Authorised Training Centre (ATC) and Learning Partner. The courses offered are related to 3D Modeling and Animation, CAD/CAM/CAE, Prototyping and Simulation, Building Information Modeling (BIM), etc.



## ANSYS Authorized Training Centre

ANSYS provides outstanding value, laying the foundation for educational and other opportunities that arise using best-in-class



simulation tools. Its high performance bundles of simulation tech includes structural, thermal, fluid dynamics, electronic and multi physics solver, etc,

## Free GATE/GRE/CAT coaching

An initiative to prepare students for post graduation studies in India and abroad.

## **BMW Skill Next**

Students will have hands-on experience on BMW Twin Power Turbo, Inline 4 Cylinder Diesel engine, Eight-speed steptronic automatic transmission installed in the campus.



## **ICT Academy**

The aim of India's higher education system is attaining sustainable development and achieving higher growth rates which could be enabled through creation, transmission and dissemination of knowledge.



## **e-Yantra Robotics Lab**

To address the futuristic needs of industrial automation, eYantra Robotics Lab is set up in collaboration with IIT Bombay which facilitates design and development of Industrial Robotic Automation.



## **Siemens Excellence Centre**

APSIT is centre of excellence in CAD/CAM/CAE involved in Engineering Design and training.

## **Attendance Reward**

Regularity of students meet values here rewarding them with a Rs.1000 coupon.



# 3D PRINTED ROCKETS – A DREAM?

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When the concept of 3D Printing was introduced in the market, it was limited to small scale applications like toys, prototype parts, etc. No one thought that it could be used for large scale applications since the time to 3D print any part was very long.

But a startup called by the name – Relativity Space defied all the beliefs by manufacturing a full scale rocket which is the first fully recyclable and first fully 3D Printed rocket. Created in Relativity's Factory of the Future, Terran R is fully reusable including its engines, first stage, second stage, and payload fairing, and will be capable of launching over 20,000kg to low Earth orbit (LEO) in reusable configuration. Terran R provides both commercial and government customers affordable access to space, in LEO and beyond. Terran R helps accommodate the company's growing pipeline of commercial interest and will also eventually offer customers a point-to-point space freighter capable of missions between the Earth, Moon and Mars.

As a next generation launch vehicle, Terran 1 is designed for the future of constellation deployment and resupply. Its groundbreaking, unique and software-driven architecture is capable of accommodating satellite customers' evolving needs, while also providing the most agile and affordable launch service on the market. Designed and printed in the USA, Terran 1 is the most innovative product to emerge from the aerospace manufacturing industry since the dawn of privatization of space 20 years ago. Their engines, Aeon 1, Aeon R and Aeon Vac, are 3D-printed, enhancing mission reliability by reducing part count in engine combustion chambers, igniters, turbopumps, reaction control thrusters, and vehicle pressurization systems.





## **Payload Bay**

Terran 1 has the maximum capacity to hoist 1250 kgs of payload to the 185 km Low Earth Orbit and 700 kgs to the 1200 km Sun Synchronous Orbit.

## **2nd Stage**

The second stage of Terran 1 consists of one AEON VAC Engine. This engine makes use of future propellants like Liquid Oxygen and Liquid Natural Gas.

## **1st Stage**

The first stage of Terran 1 consists of nine AEON VAC Engine. Aeon has completed 2,000+ test fires. These engines are 3D-printed, enhancing mission reliability by reducing part count in engine combustion chambers, igniters, turbopumps, reaction control thrusters, and vehicle pressurization systems.

***RELATIVITY SPACE – TERRAN 1***

# EXPERIMENTAL ANALYSIS OF A VENTURI

The venturimeter is an obstruction meter named in honor of Giovanni Venturi (1746–1822), an Italian physicist who first tested conical expansions and contractions. The original, or classical, venturimeter was invented by a U.S. engineer, Clemens Herschel, in 1898. It consisted of a  $21^\circ$  conical contraction, a straight throat of diameter  $d$  and length  $l$ , then a  $7$  to  $15^\circ$  conical expansion. The discharge coefficient is near unity, and the non-recoverable loss is very small.

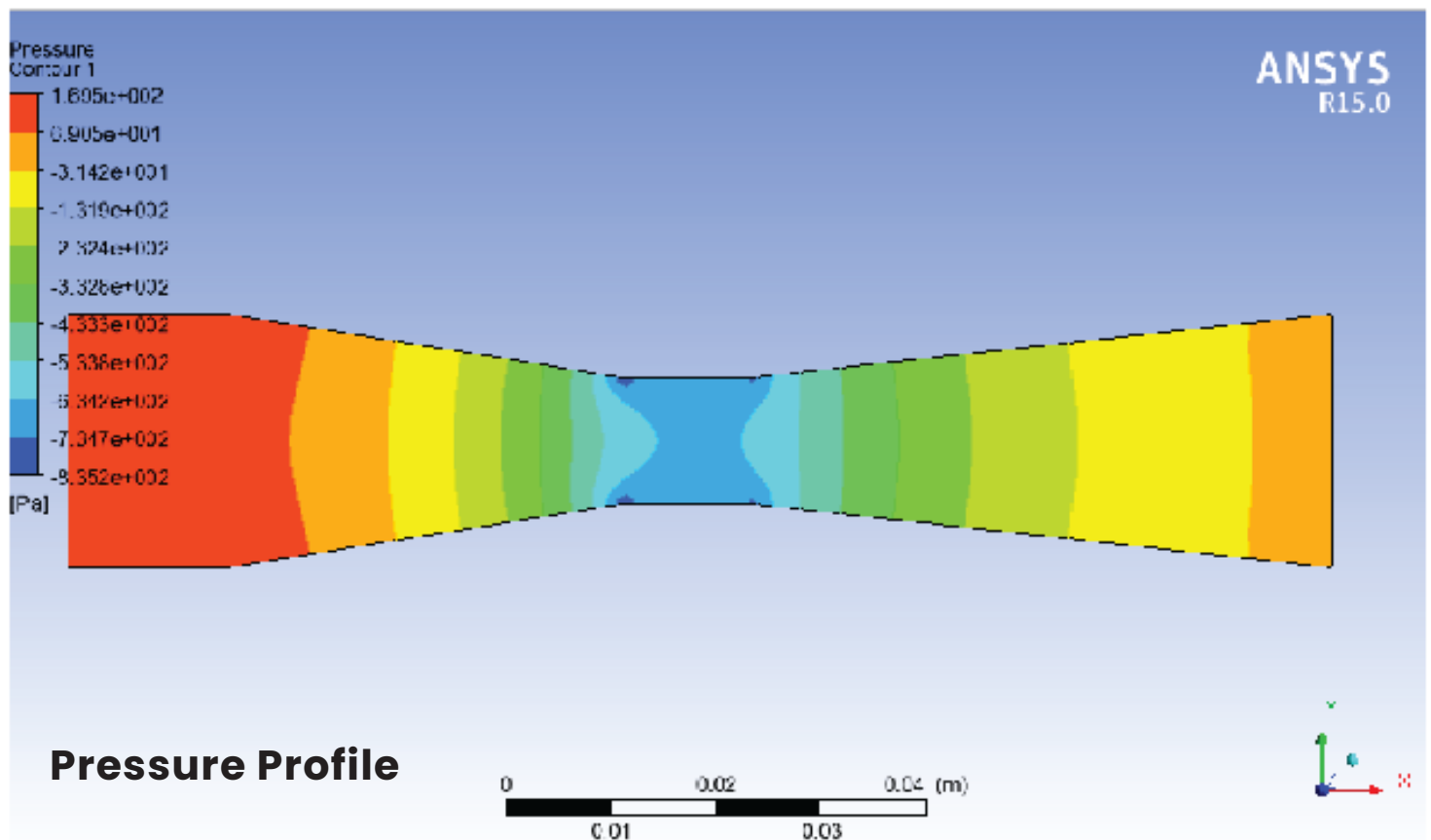
The obstruction caused to the flow of liquid at the throat of the venturimeter produces a local pressure drop in the region that is proportional to the rate of discharge. This phenomenon, using Bernoulli's equation, is used to calculate the rate of flow of the fluid flowing through the pipe. Nowadays, it is necessary to perform the calibration tests of the flow meters in order to find out the accuracy of the instrument. These can be done by calculating the discharge coefficient of the venturimeter.



There are several commercial codes present in the market like Ansys, CFX, Fluent etc. for solving the numerical equations Present study uses the Fluent code as the solver.

The present study aims at the qualitative and numerical investigation on coefficient of discharge of venturimeter. The study describes the development of a comprehensive mathematical and geometrical model for simulating the formation of venturimeter. A geometrical model is developed using CFD software Ansys FLUENT, which simulates the coefficient of discharge of venturimeter. An experiment is to be carried out to observe the coefficient of discharge of venturimeter, and CFD FLUENT software is used to predict the same result using multi-phase (VOF) model.

The apparatus consists of a venturimeter fitted in pipelines of 25mm diameter. The pipes are taken from a common manifold. At the downstream end of pipelines control valve are provided to regulate the flow through the meter. The  $C_d$  value obtained were - 0.908 (ansys) and 0.957 (experimental).



Project By – Prof. U.M. Momin, Mr. Sharvil Joglekar  
and Mr. Piyush Bhavsar



