REPORT ON TWO-DAY WORKSHOP

Acoustic Design, Modeling and Analysis Using COMSOL Multiphysics®

Organized by:

Department of Mechanical Engineering

In Association with VTU SEEL and Research and Development Cell

Rao Bahadur Y. Mahabaleswarappa Engineering College, Ballari

Date: 27th and 28th October 2026

Time: 9:30 AM to 5:00 PM

Venue: Mechanical Seminar Hall, RYMEC, Ballari

Mode: Offline

Resource Persons:

1. Mr. Nagabhushan N. Adike, Application Engineer
2. Mr. Vinuth Kumar T. M., Application Engineer

VTU SEEL Coordinator: Mr. Chandan

Institute VTU SEEL Coordinator: Dr. Veerabhadrappa Algur, Associate Professor, Department of Mechanical Engineering

Introduction

The Department of Mechanical Engineering, Rao Bahadur Y. Mahabaleswarappa Engineering College (RYMEC), Ballari, in association with VTU SEEL (Simulation Enabled Experiential Learning) and the Research and Development Cell, organized a Two-Day Workshop on **"Acoustic Design, Modeling and Analysis Using COMSOL Multiphysics®"** on 27th and 28th October 2026.

The workshop was organized with the objective of bridging the gap between theoretical engineering knowledge and practical industrial applications through advanced simulation tools.

The programme focused on introducing students to acoustic modelling, noise and vibration analysis, and the application of COMSOL Multiphysics software in solving real-world engineering problems.

The workshop also provided an opportunity to create awareness about the VTU SEEL initiative and its role in promoting simulation-based experiential learning, technical skill development, and industry-oriented education among engineering students.

Objectives of the Workshop

The major objectives of the workshop were:

1. To introduce participants to the fundamental concepts of acoustic design, modelling, and analysis.
2. To create awareness about the importance of simulation tools in modern engineering design and product development.
3. To familiarize students with the capabilities and applications of COMSOL Multiphysics software.
4. To provide practical exposure to acoustic simulation, noise analysis, and vibration-related engineering problems.
5. To encourage simulation-based experiential learning through the VTU SEEL platform.
6. To motivate students to apply simulation techniques in academic projects, research activities, and future industrial applications.

Inaugural Session

The workshop commenced with an inaugural session attended by the institutional dignitaries, resource persons, faculty members, coordinators, and participating students.

Dr. Kori Nagaraj, HoD, Mech Engg Dept welcome the gatering and Dr. Veerabhadrappa Algur, Institute VTU SEEL Coordinator, introduced the objectives and importance of the workshop and also SEEL.

During his welcome address, he highlighted the increasing importance of industry-relevant skills and the need for engineering students to develop practical competencies beyond classroom learning. He also introduced the VTU SEEL initiative, explaining its objective of connecting theoretical engineering education with practical, simulation-based learning experiences.







The participants were informed about the various opportunities available through the VTU SEEL platform, including virtual laboratories, industry-oriented technical programmes, workshops, certification courses, internships, project opportunities, and career-development resources.

Emphasis was placed on the importance of participating actively in technical learning activities to develop problem-solving abilities and professional competencies.

The resource persons, **Mr. Nagabhushan N. Adike** and **Mr. Vinuth Kumar T. M.**, were welcomed and introduced to the participants.

The workshop was structured over two days to provide participants with an understanding of acoustic engineering principles and their applications using COMSOL Multiphysics.

Day 1: 27th October 2026

The first day focused on introducing the fundamental concepts of acoustic modelling and the role of numerical simulation in engineering applications. The technical themes included the importance of acoustics in engineering design, basic principles of sound propagation, noise and vibration analysis, and an introduction to the COMSOL Multiphysics simulation environment.

The relevance of acoustic simulation in automotive engineering, aerospace, industrial machinery, building acoustics, and manufacturing was highlighted. Participants were introduced to the advantages of using simulation tools to study engineering systems virtually, evaluate design alternatives, and reduce dependence on repeated physical prototyping.







Day 2: 28th October 2026

The second day focused on extending the understanding of acoustic modelling towards simulation-based analysis and practical engineering applications.

The workshop themes included the modelling of acoustic systems, interpretation of simulation results, and the relationship between acoustic behaviour, structural vibration, and engineering design.

The importance of computational simulation in evaluating system performance, identifying potential design limitations, and improving engineering solutions was emphasized.

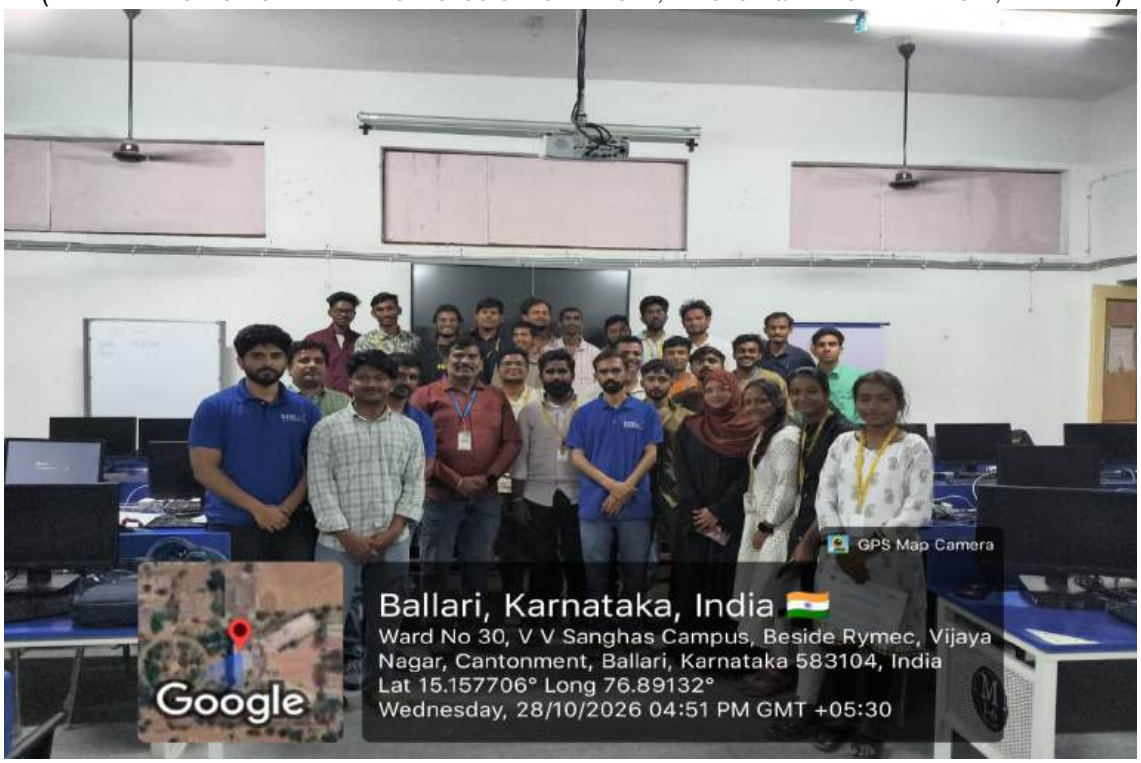
The sessions were intended to strengthen participants' understanding of how theoretical concepts can be translated into practical engineering analysis using modern simulation software.


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Importance of VTU SEEL

An important aspect of the workshop was creating awareness about **VTU SEEL – Simulation Enabled Experiential Learning**, an initiative of Visvesvaraya Technological University aimed at strengthening practical and industry-oriented engineering education.

The participants were encouraged to explore the VTU SEEL platform and utilize its various learning opportunities.

The platform aims to support students in developing technical competencies through simulation-based learning, industry-oriented training, expert interactions, skill-development programmes, and career preparation.

The workshop reinforced the importance of experiential learning in enabling students to apply theoretical concepts to real engineering problems.

Applications of COMSOL Multiphysics

The workshop highlighted the significance of COMSOL Multiphysics as an advanced engineering simulation tool used for modelling and analysing different physical phenomena.

Its relevance to acoustic engineering includes:

- Simulation of acoustic wave propagation.
- Analysis of sound pressure distribution and noise characteristics.
- Investigation of vibration and acoustic interactions.
- Evaluation of acoustic performance in engineering components.
- Analysis of noise and vibration in machines and automotive systems.
- Support for virtual prototyping and engineering design optimization.

The programme emphasized that simulation-based approaches can help engineers improve product performance, reduce development time, and make informed design decisions.

Learning Outcomes

The workshop was designed to help participants achieve the following learning outcomes:

1. Develop a fundamental understanding of acoustic design, modelling, and analysis.
2. Understand the importance of modern simulation software in mechanical engineering applications.
3. Become familiar with the basic capabilities and applications of COMSOL Multiphysics.
4. Recognize the role of numerical simulation in solving practical noise and vibration problems.
5. Understand the importance of simulation-based learning in improving engineering problem-solving skills.
6. Identify opportunities to use acoustic simulation in academic projects, internships, and research.
7. Gain awareness of the technical training and skill-development opportunities available through VTU SEEL.

Benefits to Students

The workshop provided an academic platform for students to connect engineering theory with industry-oriented technological applications.

Exposure to advanced simulation tools is particularly relevant for students pursuing careers in mechanical design, manufacturing, automotive engineering, aerospace, research and development, and related engineering fields.

The programme also encouraged participants to explore emerging technologies, strengthen analytical thinking, and develop an interest in computational engineering and simulation-based problem-solving.

Such initiatives contribute towards enhancing students' technical awareness, professional readiness, and employability.

Acknowledgement

The Department of Mechanical Engineering expresses its sincere gratitude to the **esteemed Management of V. V. Sangha, Ballari**, for their continuous encouragement and support in organizing academic and technical skill-development programmes.

The department also acknowledges the valuable guidance and encouragement extended by the respected Principal, Vice Principal, and Head of the Department of Mechanical Engineering. Special appreciation is extended to VTU SEEL and the Research and Development Cell for their association and support.

The department sincerely thanks the resource persons, **Mr. Nagabhushan N. Adike and Mr. Vinuth Kumar T. M.**, for their contribution to the technical programme.

Appreciation is also extended to **Mr. Chandan, VTU SEEL Coordinator**, and **Dr. Veerabhadrappa Algur, Institute VTU SEEL Coordinator**, for their coordination and efforts in organizing the workshop.

The contributions of faculty coordinators, organizing committee members, supporting staff, and participating students are gratefully acknowledged.

Conclusion

The Two-Day Workshop on **"Acoustic Design, Modeling and Analysis Using COMSOL Multiphysics®"**, organized on 27th and 28th October 2026, was an important academic initiative aimed at promoting simulation-based experiential learning and industry-relevant technical knowledge. The workshop provided a platform for introducing acoustic modelling and engineering simulation concepts while highlighting their relevance to practical design and analysis problems.

The programme also strengthened awareness about VTU SEEL and encouraged students to utilize the opportunities available through the platform for continuous technical learning and professional development. The workshop reflects the institution's commitment to promoting quality technical education, practical skill development, innovation, and industry-oriented learning.

Total Number of Participants: 85

Dr. Veerabhadrappa Algur	**Head of the Dept**	**Principal**
Institute VTU SEEL Coordinator	Dept of Mech Engg	RYMEC, Ballari
Department of Mech Engg		