

SAROJ BASNET

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PROFILE

Mechanical Engineering graduate from Pulchowk Campus, Tribhuvan University, with research experience in experimental thermal systems, process modeling, and computational vibration analysis. Experienced in experimental testing, energy balance calculations, numerical modeling, and mechanical design using Python, ANSYS, and SolidWorks.

EDUCATION

Bachelor of Engineering in Mechanical Engineering

Institute of Engineering (IOE), Pulchowk Campus – Tribhuvan University

📅 May 2021 – April 2025

📍 Pulchowk, Lalitpur

- Relevant coursework: Applied Thermodynamics & Heat Transfer; Machine Design & Simulation; Fluid Mechanics; Energy Resources; Operation Research; Mechanics of Solids; Strength of Materials; Finite Element Method; Numerical Methods; Probability & Statistics; Computer Programming; Engineering Chemistry,

Higher Secondary Education

Nepal Mega College - National Examinations Board

📅 2018 – 2020

📍 Babarmahal, Kathmandu

- GPA: 3.65/4.00

RESEARCH PROJECTS

Design, Modeling, and Experimental Assessment of Heat Exchanger-Based Reflux Batch Distillation System for Ethanol-Water Separation

Bachelor Final Year Project | Manuscript Under Review, *Journal of Thermal Engineering*

📅 June 2024 – August 2026

📍 Pulchowk Campus

- Designed the complete batch distillation apparatus in SolidWorks, including the boiler, bubble-cap trays, reflux system, and condenser, and participated in fabrication using copper brazing techniques.
- Fabricated and assembled the system, coordinating manufacturing and component integration.
- Conducted performance testing and analyzed separation efficiency under different operating conditions.
- Developed a Python model for performance evaluation and comparison with experimental results and Aspen Plus.
- Manuscript revised in response to reviewer comments and currently under review.

Free Vibration Analysis of a Rotating, Pre-twisted, Cambered and Tapered Compressor Blade Using FSDT-Based Rayleigh–Ritz Method

Research Project | Manuscript Under Preparation

📅 June 2025 – Ongoing

- Developed a First-Order Shear Deformation Theory and Rayleigh–Ritz based model to analyze the free vibration characteristics of the blade.
- Modeled the NACA 6412 blade geometry and incorporated the effects of rotation, pre-twist, stagger, camber, and taper into the formulation.
- Compared the predicted natural frequencies with ANSYS finite element simulations, with discrepancies below 1.5%.

Fabrication of a Plastic Injection Molding Machine

📅 May 2022 – February 2023

📍 Pulchowk Campus

- Manufactured and assembled a functional plastic injection molding machine using locally available materials.
- Participated in component fabrication, machining, assembly, and performance testing.

AWARDS & HONORS

- **3rd Rank among 12,000 Students**
Ranked 3rd in the IOE BE Entrance Examination 2021 with a score of 131.2/140, tied for the highest score.
- **Winner – Design Hackathon, MechTrix 2025**
24-hour 3D design competition project to design a modular, versatile, and cost-effective small-scale agricultural machine for cash crop cultivation in Nepal.
- **Selected Project – Pulchowk Innovation Program 2025**
Received NPR 50,000 in project funding for the development of a heat exchanger-based reflux batch distillation system for ethanol–water separation.
- **2nd Runner-up – Batch Distillation System**
Achieved 2nd Runner-up in both **Nepal Techno-Fest 2025** and **INNOCHEM'25** for designing an innovative batch distillation apparatus.
- **Best Engineering Award – MechTrix 2023**
Built a functional plastic injection molding machine using locally sourced materials.

TECHNICAL COMPETENCIES

Engineering Design

Numerical Modeling

CFD Simulation

FEA

Fluid Mechanics

Data Analysis

Experimental Testing

Technical Writing

Software:

SolidWorks

AutoCAD

ANSYS Mechanical

ANSYS Fluent

MATLAB

Python

Microsoft Excel Solver

LaTeX

EXPERIENCES

Technical Content Contributor (*Automotive Technology*)

Engineering textbook development project

 May – July 2026

 Remote

- Contributed to the preparation of technical content for an undergraduate mechanical engineering textbook based on the prescribed university syllabus.
- Prepared technical figures, worked examples, multiple-choice questions, review questions, and chapter exercises.
- Assisted with editing, formatting, and preparation of the textbook manuscript for publication.

Mechanical Engineering Intern

Gorkha Brewery Pvt. Ltd. (Part of Carlsberg Group)

 September – October 2024

 Mukundapur, Nawalpur

- Created plant layouts to improve workflow.
- Assisted in inspection and documentation of mechanical equipment.
- Recorded machine operating hours and maintenance data.

Teaching & Educational Content

 2022 – 2025

 Kathmandu, Nepal

- Delivered Physics MCQ classes for +2 students at Nepal Mega College.
- Taught engineering entrance preparation classes at Clamphook Academy.
- Conducted a workshop on the effective use of scientific calculators for engineering entrance students at Sagarmatha Engineering College.
- Created educational engineering and science content on YouTube, reaching over 11,000 subscribers and 1.7 million views.