SAKSHAM KUMAR | 20ME63R44

MECHANICAL SYSTEMS DESIGN

EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2022	M.TECH	IIT Kharagpur	9.23 / 10
2020	B.TECH, Mechanical Engineering	IIT Patna	8.39 / 10
2015	Class XII (CBSE)	Sir Padampat Singhania School, Kota	80.60%
2013	Class X (CBSE)	Kendriya Vidyalaya Kankarbagh, Patna	10 / 10

PROJECTS

Machinery Fault Diagnosis Using Machine Learning | M.Tech Project, Prof. Arun Kumar Samantaray, IIT Kharagpur (May 2021 – Apr 2022)

- Worked on building **machine learning models** trained with experimental data to **detect faults in systems** along with the nature of fault
- Built a model based on neural network which **classifies** bearings into one of the four classes - fault in inner race, outer race, balls or no fault
- Developed a model by making use of **convolutional neural network** (CNN) to predict the **remaining useful life** (RUL) of turbofan engines

Program to Predict Failure in Composites | Course Project, Dr. Atul Jain, IIT Kharagpur (Feb 2021 - Apr 2021)

- Developed a **Python program** to compute the properties of a composite material formed after mixing certain amounts of fibre and matrix
- The program predicts if the failure would occur in the composite and also the failure location when the loading conditions are applied

Flow Boiling in Microchannels | B.Tech Project, Dr. Manabendra Pathak, IIT Patna (Jul 2019 - May 2020)

- Executed the project in the area of **high performance compact cooling techniques** to attain a **high heat transfer rate** in confined space
- **Designed**, **fabricated** and **performed experiments** on an innovative **microchannel** with an aim to use it in places like electronic devices

Spam Classification Using Support Vector Machine | Self-Project (Aug 2021 - Sep 2021)

- Developed a spam filter using **SVM** utilising **4000** training examples; tested the model on **1000** samples; got a test-set accuracy of 98.80%
- Performed **feature extraction** to convert emails into vectors; applied techniques like **stemming** and **normalization** to improve the accuracy

Structural Health Monitoring | Course Project, Dr. Mayank Tiwari, IIT Patna (Jan 2018 - Apr 2018)

- Built a prototype to monitor health of civilian structures (bridges etc.) using non-destructive **electromechanical impedance (EMI)** method
- Employed **PZT** (lead zirconate titanate) **piezoelectric transducer** to detect a change in the mechanical impedance of the structure

Hand-Written Digit Recognition Using Neural Networks | Self-Project (Jul 2021 - Aug 2021)

- Developed a machine learning model to recognise hand-written digits on a 20x20 greyscale image using a **neural network** of 3 layers
- Utilised 5000 training examples to train the model; used techniques of forward propagation and backpropagation to get **99.12%** accuracy

Rotation Calculation in a Skewed Plate Using Python | Course Project, Dr. Jeevanjyoti Chakraborty, IIT Kharagpur (Mar 2021 - Apr 2021)

- Developed a **Python program** to calculate the rotation of the tip chord of a skewed plate fixed at one side with respect to the root chord
- This skewed plate may be used to represent the **swept wing** of a high-speed aircraft and therefore can have many practical applications

INTERNSHIPS

National Engineering Industries Ltd. | Jaipur | Project Internship (Jun 2019 - Jul 2019)

- Worked on the project **Starting and Running Torque in Bearings** in R&D department; performed experiments on different bearings
- Analysed the set of data obtained from a bearing torque transducer and suggested ways to **minimise the errors** during experiments

Indian Oil Corporation Limited | Barauni Refinery | Vocational Training (Dec 2018)

- Undergone four weeks of industrial vocational training at IOCL, Barauni refinery; it helped to learn more about the working of an industry

COURSEWORK INFORMATION

Vibration Analysis | Machine Learning | Deep Learning | Data Structures & Algorithms | Applied Elasticity | Mechanics of Solids | Finite Element Methods | Mechanics of Composites | Automatic Control | Modeling & Simulation of Dynamic Systems | Thermodynamics

AWARDS AND ACHIEVEMENTS

- **Departmental Rank 5** (out of 46 students) in the **Department of Mechanical Engineering, IIT Patna**; achieved an **SGPA of 10.00** in 2020
- Secured **All India Rank 4973** in JEE Advanced 2016 taken by 1.5 lakhs students who had qualified JEE Main amongst 12 lakhs students

SKILLS AND EXPERTISE

- **Programming Languages:** Fluent in Python and MATLAB; familiar with C | **Software:** ANSYS, Creo Parametric, ABAQUS, SolidWorks
- Skilled in Data Structures & Algorithms; have solved 350+ problems on coding platforms (HackerRank etc.); **3-star coder** on CodeChef

CERTIFICATIONS

- **Python for Mechanical Engineers**: Online course certification on Python issued by **Skill-Lync** for completing the lectures and projects
- **Machine Learning and Artificial Intelligence**: Workshop certification by **HT India Labs**; covered supervised and unsupervised learning

POSITIONS OF RESPONSIBILITY

- **Teaching Assistant**: Working as a TA at IIT Kharagpur for the course *Engineering Software Laboratory* being taken by Prof. C.S.Kumar
- **Organiser, Death Race**: Organised a racing contest of remote-controlled toy cars at IIT Patna; managed tasks like preparing the venue
- **Coordinator, Chess Club**: Served as the coordinator of the chess club at IIT Patna; organised intra-college chess tournaments
- **Student Mentor**: Guided the first-year students at IIT Patna; helped them get acquainted with the college activities and environment

EXTRA CURRICULAR ACTIVITIES

- **Active Chess Player**: Represented IIT Patna in **Inter IIT Chess Meet 2017;** finished at **rank 18** out of 86 chess players from 16 IITs