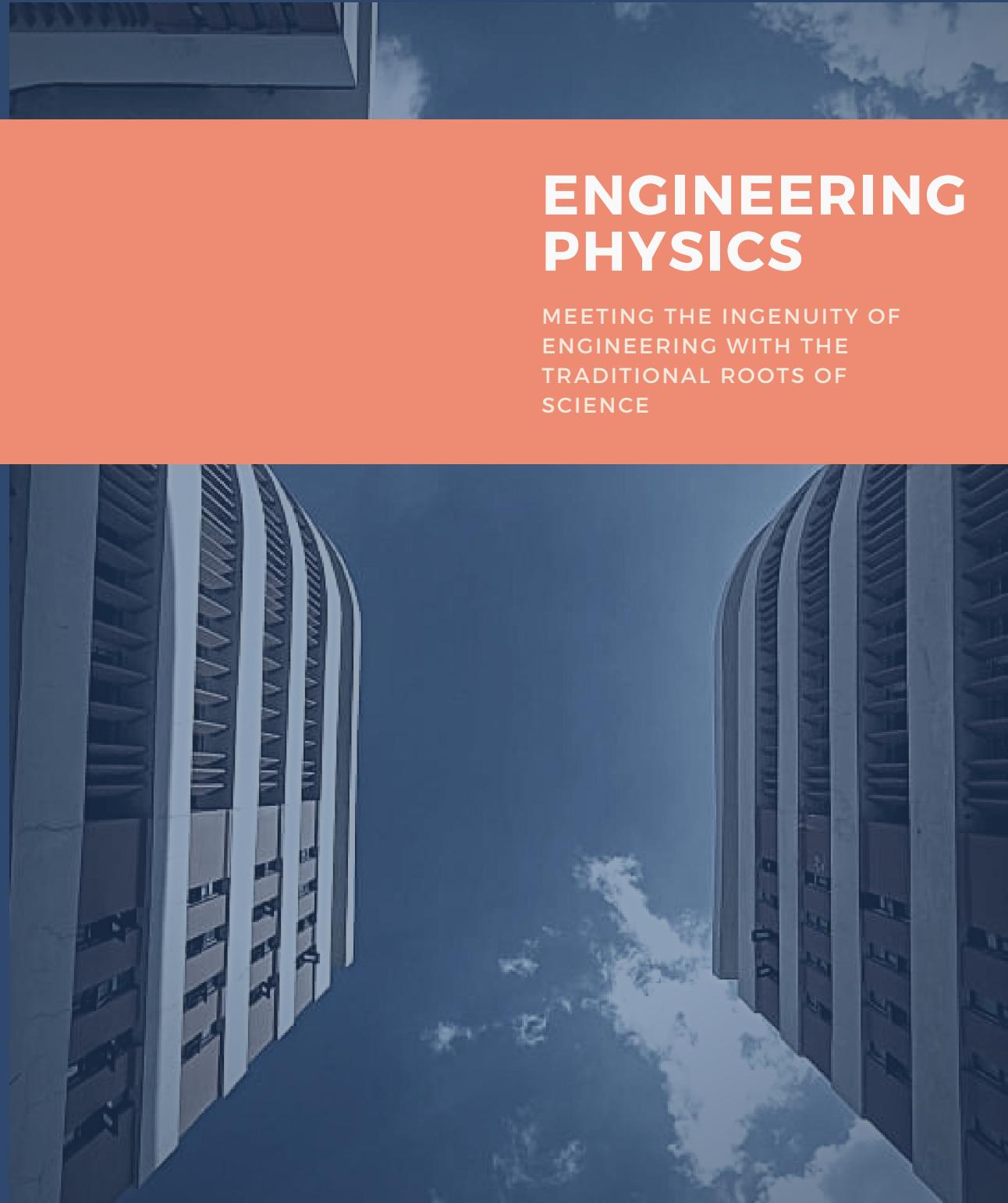


# ENGINEERING PHYSICS

MEETING THE INGENUITY OF  
ENGINEERING WITH THE  
TRADITIONAL ROOTS OF  
SCIENCE

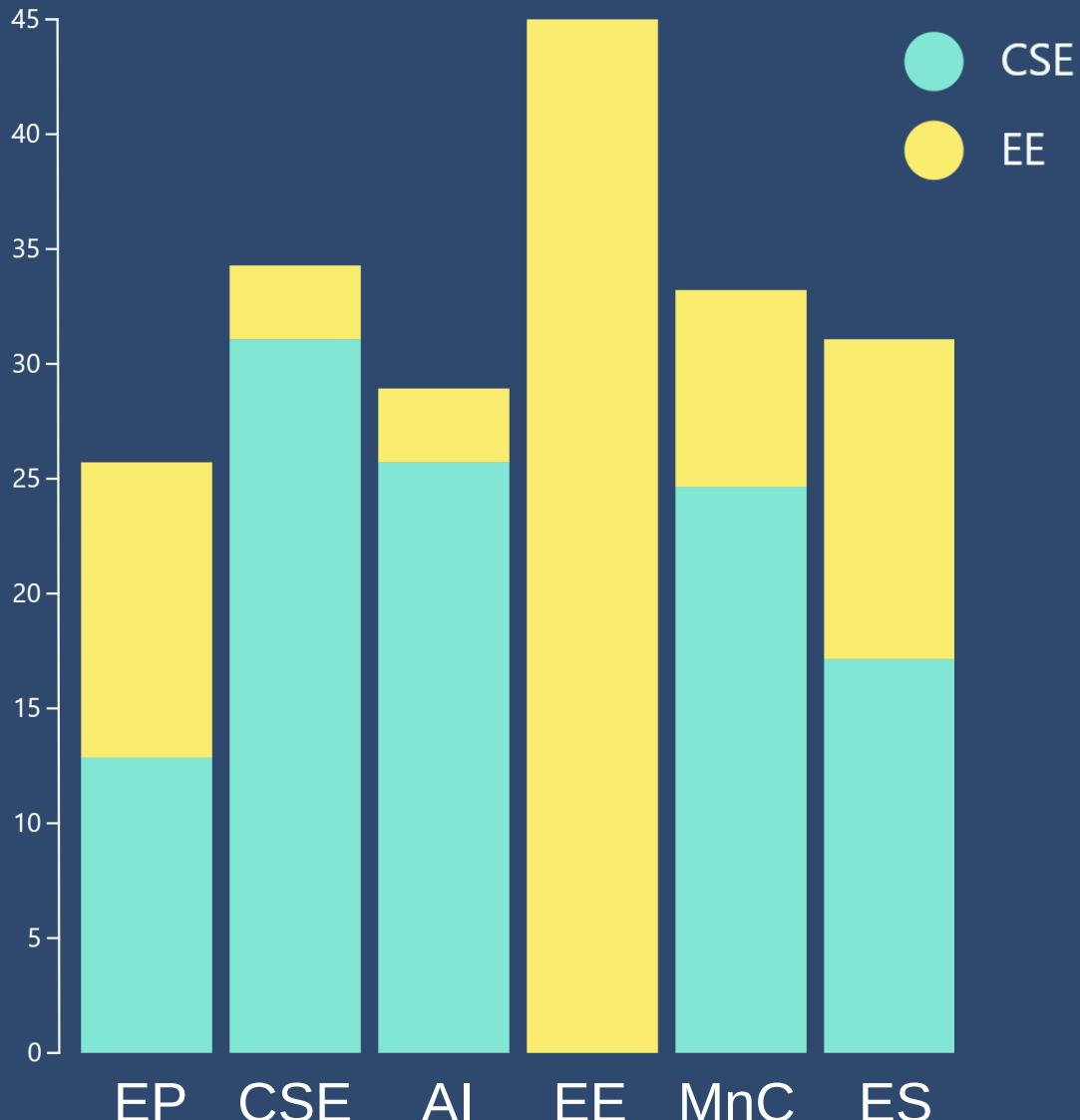
Engineering Physics is the branch that provides the opportunity to work on forefront ideas in technology and science.

Through an emphasis on science, mathematics, and engineering, our students are well-equipped with the skills needed to tackle complex problems in multidisciplinary areas, be it in research, industries, or academia.



## EP AS COMPARED TO SIBLING BRANCHES

CSE + EE department credits across branches



12 Credits by the Computer Science and Engineering and 12 Credits by the Electrical Engineering departments are offered as part of the core EP curriculum, which cover the amount of credits required for a minor in each of the departments respectively.

# CURRICULUM

CORE COURSES	EE COURSES	CS COURSES
Maths for Physics -I	Electric Circuits	Introduction to Programming
Classical Physics	Magnetic Circuits	Introduction to Data Structures
Classical Electromagnetism	Digital System Design	Algorithm
Tensors and Differential Forms	Applied Digital Logic Design	Data Structures
Electromagnetism and Maxwell Equation	Introduction to Drones	
Modern Physics	Matrix Analysis	
Thermodynamics	Analog Electronics	
Quantum Physics	Power Electronics	
Photonics	Analog System Design	
Relativity		
Analytical Mechanics		
Astroparticle Physics		
Statistical Physics-I		

The engineering physics curriculum is designed to fulfill the educational requirements for professional work in various fields of applied sciences. **Every core course is supplements real world applications.**

The courses offered allows us to have a **firm hold** upon the **theoretical concepts and science behind the technologies** in use today. An **equitable distribution between Core and Non Core** courses can be seen.

# COURSES DONE AS ELECTIVES

CSE/AI ELECTIVES	EE ELECTIVES	MATHS ELECTIVES
Database Management System I	Basic Control Theory	Probability
Database Management System II	Microprocessor and Computer Architecture	Linear Algebra
Operating Systems I	Communication Systems	Differential equations
Operating Systems II	Signals and Systems	Number system
Computer Networks	Information science	Transform Techniques
Introduction to Modern AI	Semiconductor fundamentals	Complex variables
Artificial Intelligence	Introduction to Hardware Description Languages	Introduction to Lattice Theory
Random Processes		Introduction to Group Theory
Data Analytics		

As part of our curriculum, we are given the freedom to take on electives and additional courses from any department, a majority of the **electives commonly taken** are listed in the adjoining table.

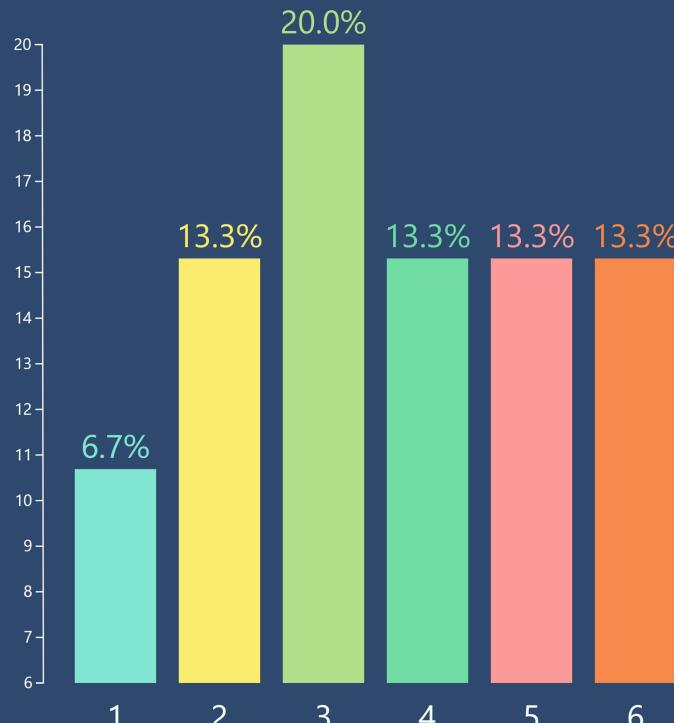
Courses involving **core Computer Science topics** and sub-fields of **Artificial Intelligence** and **Data Science** together with **Mathematical Courses** and **courses based on real world Electrical Engineering** compose the principal group of the electives.

This results in diverse knowledge about additional realms of engineering, which supplement our core skills.

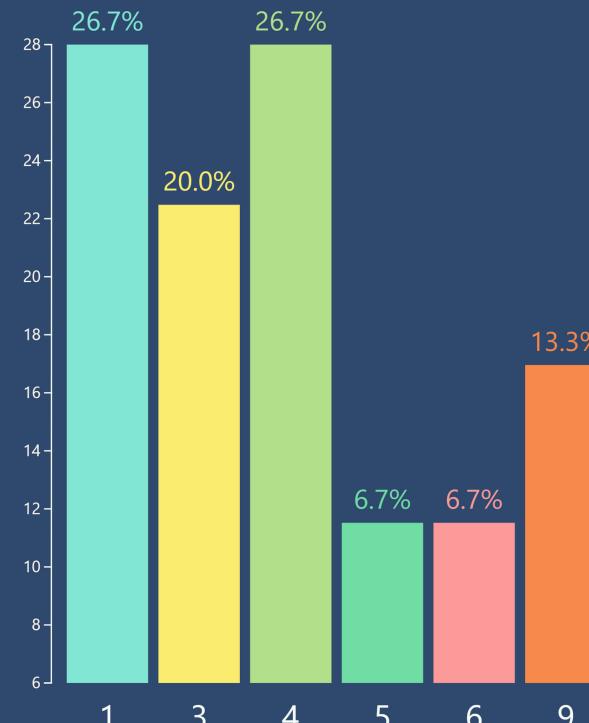
## CREDITS IN THE FIELDS OF ML/AI, EE AND CS

% of Students v/s Credits Done by them in the fields of :

ML/AI/Data Science



EE



CSE



Ample courses have been pursued by the students in diverse fields , namely, **Artificial Intelligence/Machine Learning**, **Computer Sciences**, and **Electrical Engineering**, which complement each other as well as core courses offered by our department, thus placing us a notch above our peers.

# ONLINE COURSES

In wake of the pandemic and the need for technological upskilling it brought, our students took to online courses to fulfill these global requirements.

The adjoining text summarizes the data of the various courses taken by the student population.

**MORE THAN 30%**

Machine Learning by Andrew Ng

**MORE THAN 25%**

- Neural Network and Deep learning specialization by Andrew Ng
- HTML, CSS, and Javascript for Web Developers

**20%**

Data Science and Analysis Specialisation

**MORE THAN 10%**

- DeepLearning and AI using TensorFlow specialization
- Statistics Foundations: Understanding Probability and Distributions

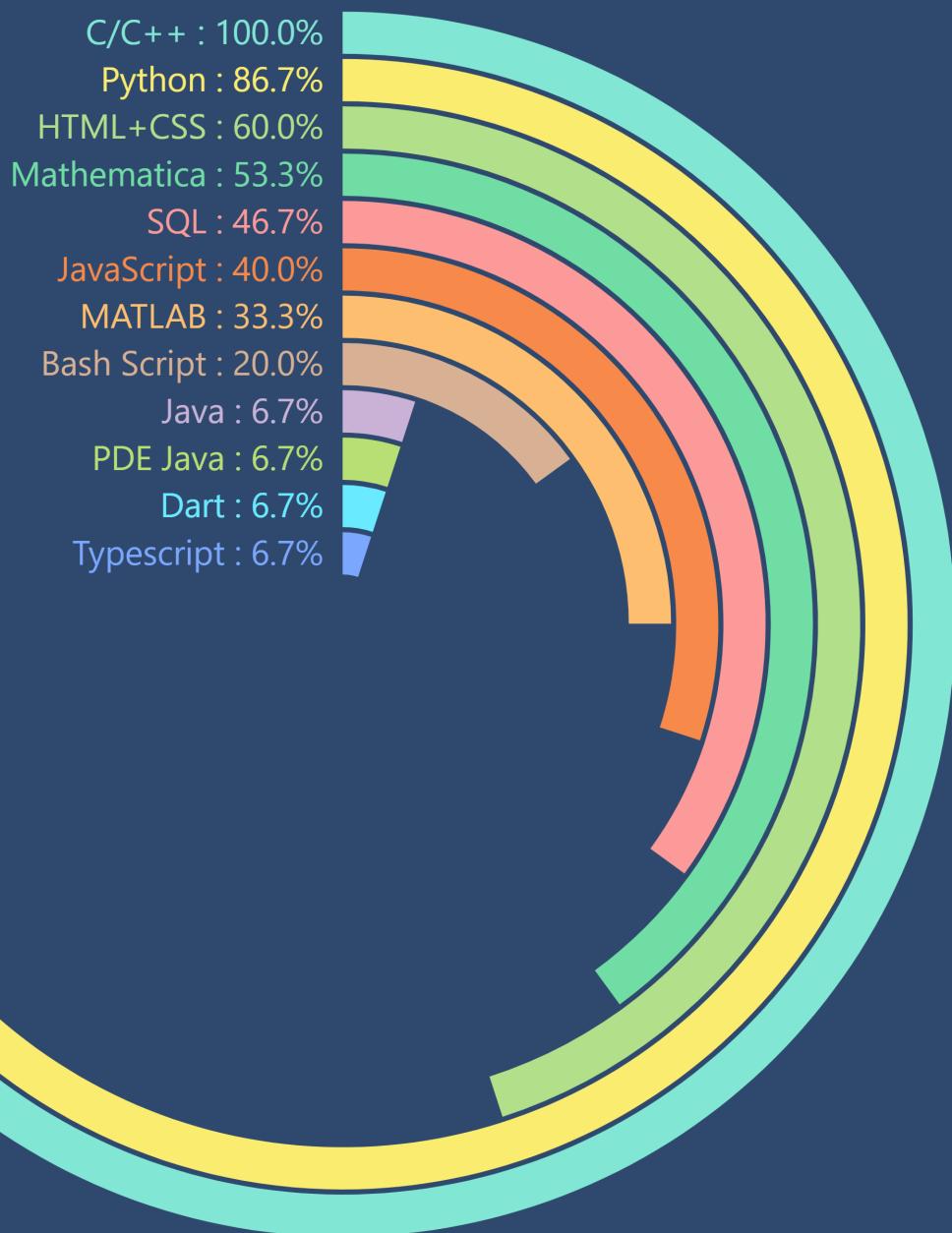
**STUDENTS HAVE ALSO TAKEN**

- Relational Database Design
- Interacting with OS with Python
- PostgresQL Data Manipulation
- Advanced Typescript
- HSE University Reinforcement learning offered by Coursera
- Android programming course by Udacity

**AND..**

- App development using Flutter
- Natural Language Processing with Classification and Vector Spaces
- Build Basic Generative Adversarial Networks (GANs)
- Mathematics for Machine Learning : Specialization
- Cybersecurity
- Internet Of Things

## WE POSSESS EXTENSIVE KNOWLEDGE OF NUMEROUS PROGRAMMING LANGUAGES



The graph displays the relative familiarity with working with various software languages.

**100% of the branch has knowledge of C/C++. Over 50% are familiar with languages such as Python, Mathematica, SQL, JavaScript and other development languages .**

Fluency in such skills allow us to be at par with students from computer science engineering in terms of formulating quick solutions to problems. **Software development also allows us to present the solutions developed on theoretical topics**, maximizing our capabilities, for an all-round development.

# PROJECTS

## Machine Learning

- Neural Style Transfer
- Computational techniques for astrophotography
- Noise Removal and OCS using CNN and Autoencoders
- Face mask detection using OpenCV
- TV script generation using RNN
- Information scraper using NLTK
- Reinforcement learning in cartpole game
- Learnable Image Resizing
- Color-detector using OpenCV
- Sentiment Analysis with scikit-learn
- Basic Image Classification with TensorFlow

- **Under Dr. Shantanu Desai :**

1. Symbolic Regression using Genetic Algorithms
2. Astronomical Data Analysis

- **Under Dr. Rupesh Ganpatrao Wandhare :**

1. Arduino based project
2. Arduino Drawbot
3. Automatic Water Sensing and Motor Switcher using Arduino
4. Arduino based door lock system

# PROJECTS

## Web Development

- Sentiment Analysis based social media site
- Content Aggregation Website
- Link Management Website
- Website for Research Scholars
- Habit Tracker (for Slack Bot)

## Inter IIT

- Tricopter for filming ( Electronics )
- Tricopter related Project (Engg. Conclave, Inter IIT - 2021)
- Bosch traffic sign recognition ps (Inter IIT tech meet )
- Improved Neural network for gtsrb dataset (Inter IIT Techmeet) - (AI)
- Drdo drone ps (Inter IIT tech meet )

## Databases

- IMDB dataset database creation

## Software Development

- Auto-Grader script
- Slack Bot : DevOps
- Variable name convention helper extension
- Personal Virtual Assistant (Chatbot) - Python
- Manipulation of Partially ordered set(Lattice theory) in C++

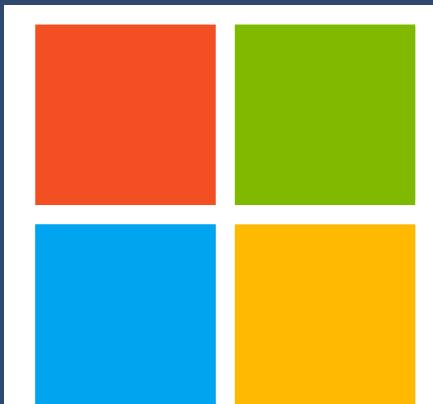
## Simulation

- Particle in EM wave simulator
- Simulation of Covid19-like epidemic in C
- SIR simulation using JavaScript

## Android Development

- Sunshine IITH App
- Cash manager app

## ORGANIZATIONS THAT HAVE RECRUITED US IN THE PAST



Microsoft



Honeywell



• Y • U • K • A • I •  
• E • N • G • I • N • E • E • R • I • N • G •

## CONTACT US

**OFFICE OF CAREER SERVICES (OCS),  
INDIAN INSTITUTE OF TECHNOLOGY, HYDERABAD, TELANGANA,  
INDIA-502285.**



**INTERNSHIPS@IITH.AC.IN**  
**HEAD@PHY.IITH.AC.IN**  
**OFFICE@PHY.IITH.AC.IN**



**040 2301 6810  
040 2301 7066**