
# ENGINEERING SCIENCE

# IIT Hyderabad

## INTERNSHIP BROCHURE

# Overview

## Interdisciplinary Studies

In this branch, students complete the majority of courses from CSE, MnC departments, and some from other departments in the first 4 semesters.

## Project opportunities

The courses in the curriculum emphasized projects and work experience throughout, building better problem-solving skills and industry exposure.

## Specialization

By the end of the 4th semester, students from the Engineering Science department take a specialization in either of the CSE, AI, or MnC departments or choose to continue in  ES.

Those who continue in ES 4 year program, restrict themselves to 4 departments. Students of the current batch chose CS, AI, and MnC as 3 out of 4 departments for the next two years.

# Objectives

- Interdisciplinary Engineering Program
- This program is in tune with what the industry is demanding today. They would like students to be educated with what they call a **T** education
- First 2 years: Broad exposure to core engineering and science streams
- Next 2 years: Either Specialize in a core engineering stream or continue in engineering science

# Expected outcomes

- Ability to apply acquired math, science and engineering skills to solve real-world engineering problems
- Ability to identify, formulate and solve multi-disciplinary engineering problems
- Emphasis on understanding and integrated application of engineering, science and math principles

JEE ADVANCED

# PAST YEARS
# OPENING AND CLOSING RANKS

| Year | Opening Rank | Closing Rank |
|---|---|---|
| 2018 | 2389 | 3582 |
| 2019 | 1477 | 2733 |
| 2020 | 2111 | 3167 |
| 2021 | 2155 | 3902 |

This data reflects the interest of top Rankholders of the country in Engineering science.
(In 2020 total seats for IITs were increased for all branches by significant percentage)

## CURRICULUM

**Intro to computing**
**Data Structures and Applications**
**Algorithms**
**Theory of Computation**
**Discrete Mathematics**
**Probability**
**Elementary Linear Algebra**
**Operating Systems-I**
**Operating Systems-II**
**DBMS - I**
**DBMS - II**
**Computer Networks**
**Statistics**
**Foundations of ML**
**Probability & Random Variables**
**Matrix Theory**
**Deep Learning**
**Natural Language processing**
**Image and Video Processing**
**Convex Optimization**

# 4-Yr Engineering Science

- ES students have completed nearly 70% of CS courses in the first 4 semesters compared to the CS students
- For the last two years, 4-year ES students can **design their curriculum following the given baskets of departmental courses**. Also, they complete 2 semester-long projects under professors.
- Decoding ES curriculum -
  - ES students are doing **24 CS credis**, **8 AI credits** and **15 Maths credits** as **Mandatory part** of their curriculum. Along with at least 1 course in all Engineering branches
  - Besides that they are left with **17 free credits as electives** that can be utilized for CS, AI and Maths courses.
- With appropriate management of free electives, the **ES 4-year program** curriculum can be made equivalent to **2 double majors** and **1 minor** in **CS**, **AI**, or **MnC** departments

At IIT Hyderabad, **Double major** requires **24 credits** in that department, and **12 credits** required for **Minor** in that department

# ES-CS SPECIALIZATION

## CURRICULUM

**Discrete Mathematics**
**Data Structures & Applications**
**Algorithms**
**Theory of Computation**
**Compilers-I**
**Compilers-II**
**Operating Systems-I**
**Operating Systems-II**
**Computer Networks I**
**Computer Networks II**
**DBMS I**
**DBMS II**
**Introduction to AI**
**Computer Architecture**
**Software Development Fundamentals**
**Software Engineering**
**Probability & Random Variables**

- The student gets the degree as **B.Tech in Computer Science and Engineering Science**
- ES-CS students complete approximately 80% of the Computer Science credits done by CSE students
- Apart from the of CS mandatory courses, students are required to do **21 credits of core electives** from core CS basket which consists of courses related to machine learning, computer vision, quantum computing and many more
- Apart from few courses, all the CS courses are done by ES students who are specializing in CS which amounts to a **total of 57 CS credits** which is much higher than that completed by a student pursuing a double major (Only 24 credits for double major In CSE)

## CURRICULUM

- Discrete Mathematics
- Data Structures & Applications
- Algorithms
- Theory of Computation
- DBMS I
- DBMS II
- Foundations of ML
- Matrix Theory
- Deep Learning
- Reinforcement Learning
- Natural Language processing
- Image and Video Processing
- Convex Optimization
- Optimization Methods in Machine Learning
- Robotics
- Data Mining
- Cloud Computing

# ES-AI SPECIALIZATION

- The student gets the degree as **B.Tech in Artificial Intelligence and Engineering Science**
- ES students in the first four semesters complete almost all the CS credits done by the CS/AI students
- Apart from the mandatory courses **students are required to do 19 credits of AI electives** from core AI and ML basket(min 6), language technologies, speech and vision basket(min 3) and data analytics, natural and artificial intelligence(min 3)
- In total **34 AI credits, 18 CS credits and 9 free elective credits** are done by ES-AI students which is **much higher** than that of student pursuing a **double major(24) or a minor(12)** in AI

## CURRICULUM

**Data Structures and Applications**
**Algorithms**
**Intro to computing**
**Theory of Computation**
**Discrete Mathematics**
**DBMS I**
**DBMS II**
**Operating Systems I**
**Probability**
**Statistics**
**Numerical Linear Algebra**
**Set, Logic and Boolean algebra**
**Mathematics behind ML**
**Regression Analysis**
**Statistical analysis using R**
**Introduction to modern number theory**
**Cryptography**
**Calculus I & II**
**Vector Calculus**

# ES-MNC SPECIALIZATION

- The student gets the degree as **B.Tech in Mathematics & Computing and Engineering Science**
- ES students in the first four semesters have completed more CS Credits compared to MnC students
- ES-MNC students will complete maths and advanced CS courses like Data Mining, Machine Learning courses, Quantum computing as department electives.
- Along with core computer science courses ES-MnC students also do advanced computational courses such as Statistical Analysis, Advanced Cryptography, Mathematics behind Machine learning and many more

# Previous Year's data

## Internships of ES2019 Batch

- 4 students have interned in **Microsoft**
- 2 student have interned in **Oracle**
- 3 student have interned in **LTI**
- 2 student have interned in **Samsung R&D**
- 2 student have interned in **Providence global**
- 1 students has interned in **Goldman Sachs**
- 1 student has interned in **Salesforce**
- Remaining students got internshipsin **Qualcomm**, **I-Pac**, **Mathworks**, and **Lotusdew wealth and investment advisor**

## Internships of ES2018 Batch

- 2 student have interned in **Amazon**
- 4 students have interned in **Goldman Sachs**
- 1 student has interned in **BNY Mellon**
- 1 student has interned in **Arcesium**
- Remaining students got internshipsin **Samsung**, **Tenhard**, **Publicis sapient**, **Servicenow**, and **NTT-AT**
- One ES student did a research Internship at **IISc Bangalore** on integrating human eye tracker with VR.