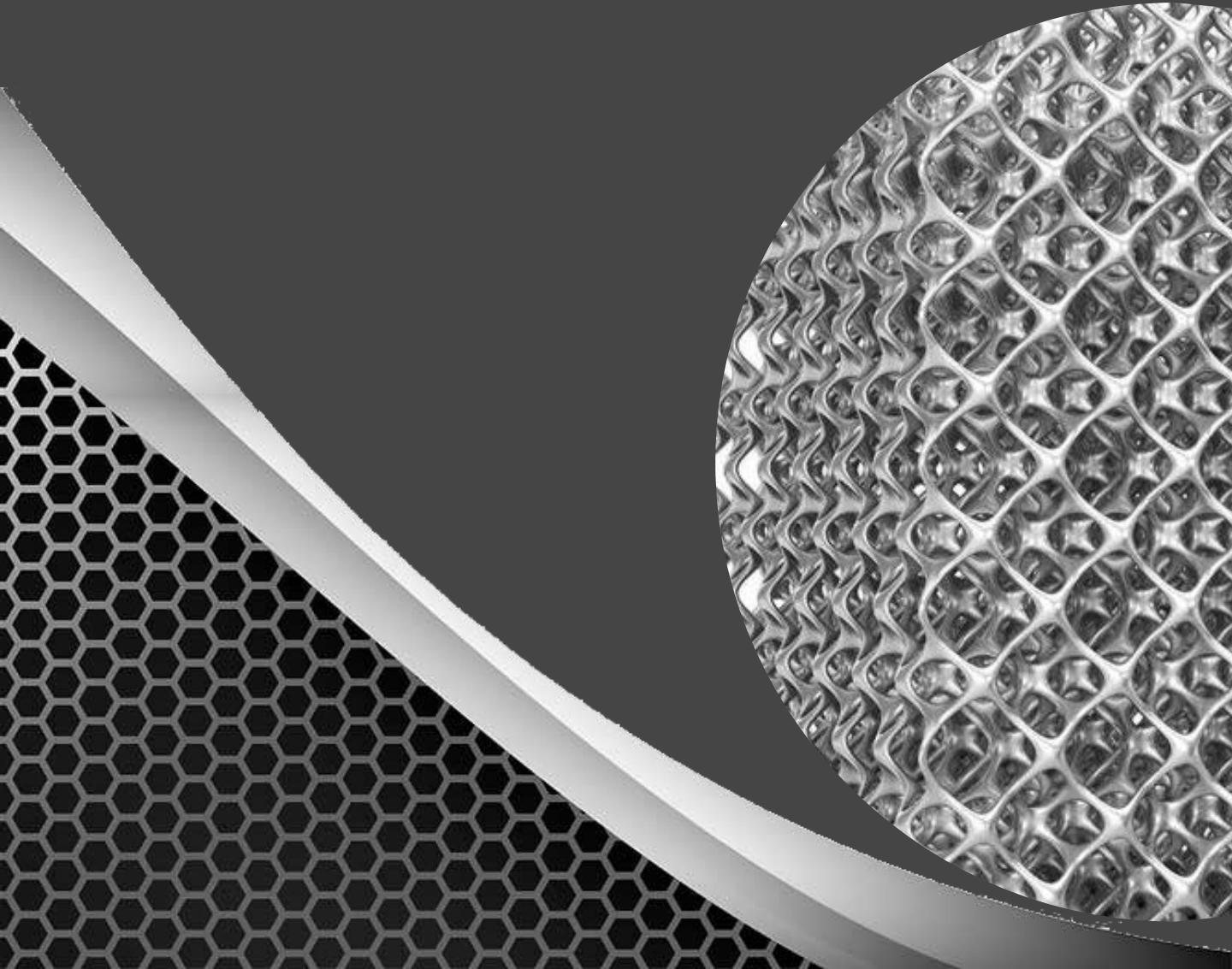




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भारतीय प्रौद्योगिकी संस्थान हैदराबाद  
Indian Institute of Technology Hyderabad

# Interdisciplinary MTech in Lightweighting Engineering





# MTech in Lightweighting Engineering

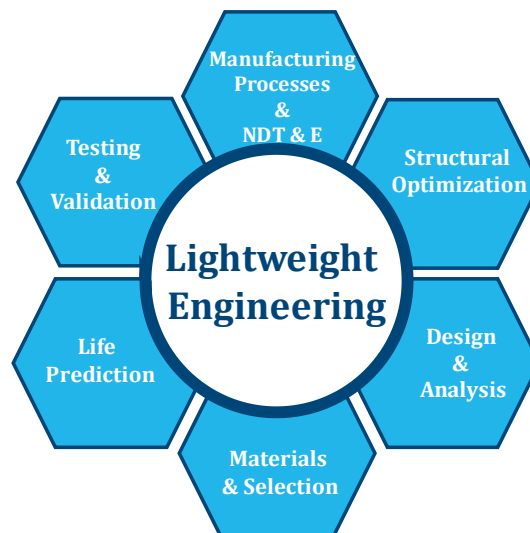
## Background

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### Objective:

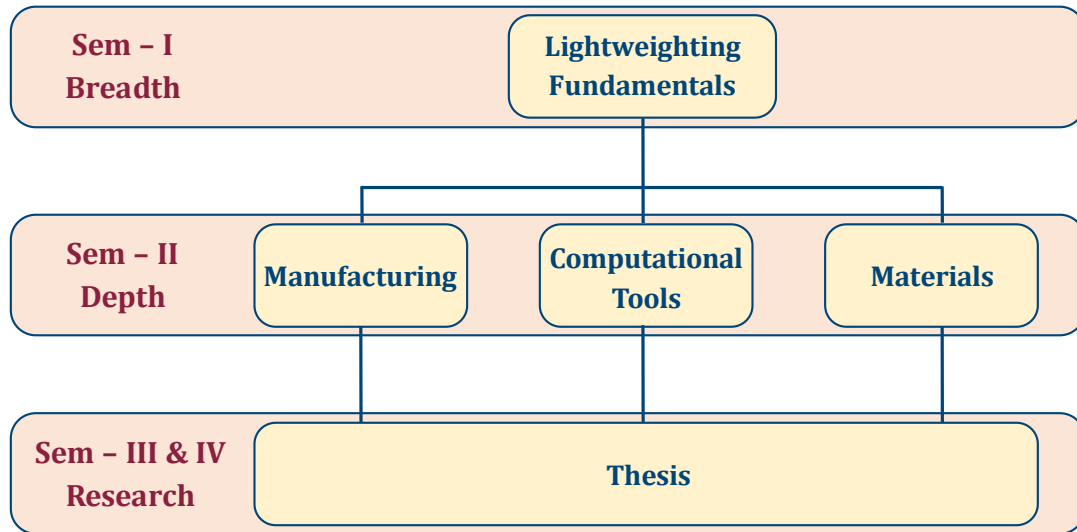
- ❖ The primary objective of this interdisciplinary MTech program is to develop a new generation of engineers and scientists with knowledge and skills in advanced technologies and trained in lightweighting engineering from conceptualization stage to component realization.
- ❖ Program focuses on the design, analysis, and development of lightweight structures and materials while maintaining or improving mechanical performance, durability, and safety.
- ❖ Develop proficiency in modern design and simulation tools used in the analysis and optimization of lightweight structures.
- ❖ Integrate knowledge from different engineering disciplines to solve complex problems related to lightweighting design and manufacturing.
- ❖ Explore advanced manufacturing processes, including additive manufacturing, precision machining, and material processing techniques specific to lightweighting engineering.
- ❖ Provide insights into the practical applications of lightweighting engineering in various industries, including automotive, aerospace, civil infrastructure, and renewable energy.

### Key Disciplines/Area





# Course Outline



## Course Structure

| Course Title  |
|---|
| <b>Semester I</b>   |
| Introduction to Lightweighting  |
| Topology Optimization   |
| Fundamentals of light weight alloys   |
| Industry Lecture  |
| Elective course(s) <i>(from elective basket)</i> *                              |
| <b>Semester II</b>  |
| Manufacturing Science for Lightweighting  |
| English for Communications  |
| Lab (Elective)  |
| Elective courses <i>(from any one or more of the three elective baskets)</i> ** |
| <b>Semester III and IV</b>  |
| Thesis  |

\*Elective Courses in Semester I (the list is not exhaustive)

| Basket    | Course Title                |
|-----------|-----------------------------|
| Materials | Automotive Materials Part-I |
|           | Fracture Fatigue and Creep  |

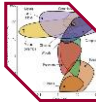
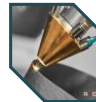
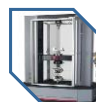
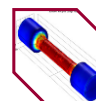


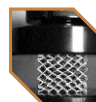

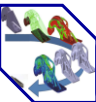
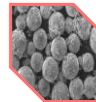



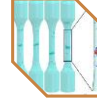


# Course Structure

**\*\*Elective Courses in Semester II (the list is not exhaustive)**

| Basket                          | Course Title  |
|---------------------------------|---|
| <b>Computation &amp; Design</b> | Design for Metal Additive Manufacturing                               |
|                                 | Lightweighting Design Topics  |
|                                 | Analysis and Design of Composite Structures                           |
|                                 | Introduction to Computational Methods in Materials Science            |
| <b>Manufacturing</b>            | Materials and processes for resource-efficient transport applications |
|                                 | Tribological and surface engineering aspects of Lightweighting        |
|                                 | Clean Steel Making: Theory, Practice and Modeling                     |
| <b>Materials</b>                | Automotive Materials Part-II  |
|                                 | Phase transformations   |

## Glimpse of Research Facilities & Capabilities

| Structural Design & Analysis   | Manufacturing and NDT&E  | Testing & Validation   | Life Prediction & Extension   |
|--|--|--|---|
|  <p>Material selection</p>                      |  <p>Manufacturing R&amp;D</p>         |  <p>Coupon level testing (Characterization &amp; Fatigue)</p> |  <p>High-fidelity modeling &amp; simulation</p>            |
|  <p>High-fidelity modeling &amp; simulation</p> |  <p>Lightweight Composites</p>        |  <p>Crash and impact studies</p>                              |  <p>Lifing Testing &amp; Modeling</p>                      |
|  <p>Structural/Topology optimization</p>        |  <p>Advanced high strength Alloys</p> |  <p>Component level testing</p>                               |  <p>Repair technologies Composite &amp; Metallic parts</p> |
|  <p>Reverse Engineering</p>                     |  <p>NDT &amp; Qualification</p>       |  |   |



## Eligibility & Admission Procedure

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- ❖ **Self-Sponsored candidates:** Candidates having BTech/BE in relevant field of Engineering and Technology with minimum CGPA of 7.0 or equivalent can apply. GATE score is not mandatory. This is a non-subsidized program and no financial support is provided to the students. Admission is based on Written Test &/or Interview.
- ❖ **Candidates sponsored by Govt. Labs/Public Sector Units:** Candidates working in Government or Public sector institutes (including armed forces) with more than 2-year experience and having a basic BTech/BE degree in relevant field can also apply. GATE score is not mandatory. Admission is based on Written Test &/or Interview.
- ❖ **Fee Structure:** Please refer to: <https://iith.ac.in/academics/fee-structure/>
- ❖ For any other queries, please contact:

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Dr. Mayur Vaidya, [vaidyam@msme.iith.ac.in](mailto:vaidyam@msme.iith.ac.in)