HINDUSTAN
INSTITUTE OF TECHNOLOGY & SCIENCE

SIMENDES
Center for Simulation & Engineering Design

# CENTRE FOR SIMULATION AND ENGINEERING DESIGN

*A Platform for Innovative Product Design through Product Life Cycle Management(PLM) Approach*

NAAC A

## SCHOOL OF MECHANICAL SCIENCES

QS STARS RATED FOR EXCELLENCE 2017

## ABOUT THE CENTRE

*Hindustan Institute of Technology & Science (HITS) is one of the leading Institute in India with an excellent established acadamic and research standing, offering U.G., P.G. and Ph.D. programs in Engineering and Technology and other disciplines including Architecture, Management studies, Applied Sciences and Social Sciences. HITS has more than 25 years of dedicated service to the nation generating trained and qualified graduated for the country.*

*The centre for Simulation and Engineering Design (SIMENDES) is established to promote teaching and research on the best practices in Product Life Cycle Management through virtual product design, virtual producttesting, virtual product manufacturing and virtual collaboration for product development. Also, prototype of the product will be manufacured so that the technology, thus developed, can be teandferred to the Industries. This will include Reverse Engineering Processes also.*

## VISION & MISSION

### Vision:

*To develop and deliver Innovative Product Designs harnessing the intellectual capabilities of both Academia and Industry to make **Make in India** a success*

### Mission:

*Creating a collaborative platform for Rational & Innovative product designs*
*Delivering product designs adopting the product life cycle design approach*
*Establishing as a leading center for manpower training*

## SIMENDES TEAM

**Dr. M. Ramakrishnan**
*Prof & Head*
*SIMENDES*

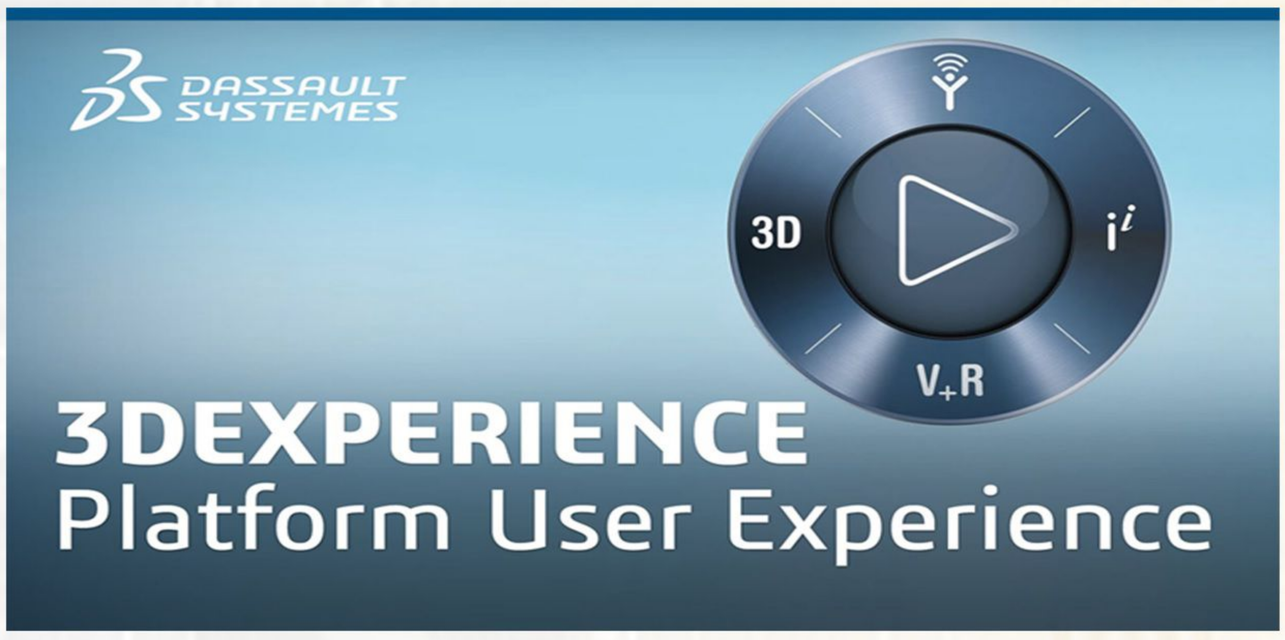
**Dr. T.Jeyapoovan**
*Professor*
*Mechanical Engineering*

**Dr. K. Ramajeyathilagam**
*Professor*
*Aeronautical Engineering*

**Mr. R.S. Nakandhrakumar**
*Assistant Professor*
*SIMENDES*

**Mr. P.Sundara Vinoth**
*Assistant Professor*
*SIMENDES*

## FACILITIES: SOFTWARE




**CAD Modeling Package (30 seats):**

*PLM Discover Pack:*
*CATIA V6 Master Design Pack*
*CATIA V6 Advance Design Pack*
*DELMIA V5 Master Design Pack*
*SIMULIA V6 Master Design Pack*

**FEA ANALYSIS SOFTWARE :**

*ANSYS Acadamic Research - 5 Seats*
*Mechanical & CFD: All Modules*
*Unlimited Nodes*

ANSYS®

## FACILITIES: HARDWARE

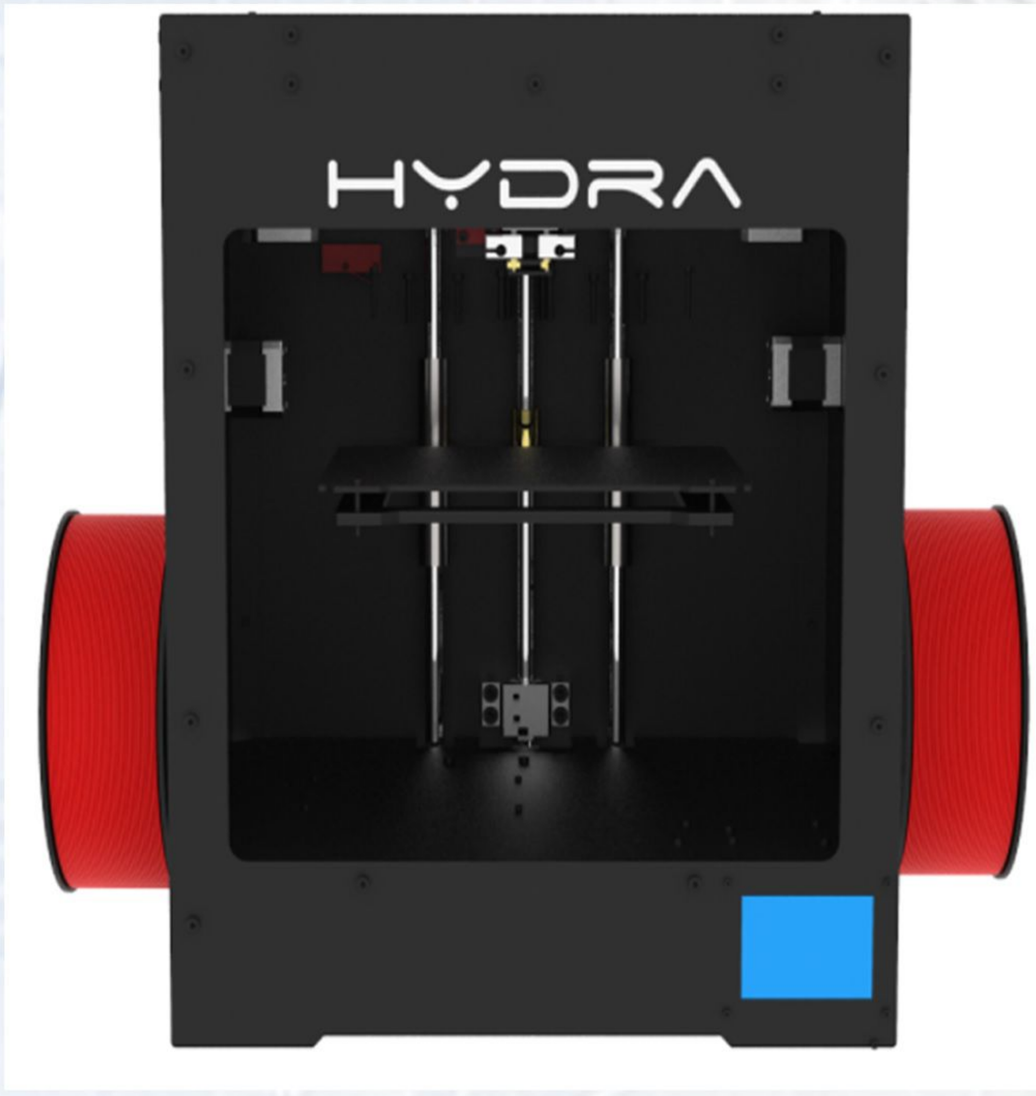
**High Performance Workstations (32 Systems)**

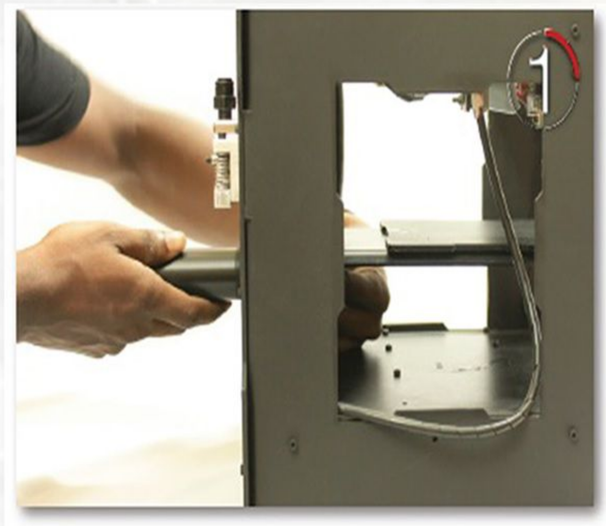
*Acer(Intel Core i7) – 12 Nos*
*HP Pro (Intel Core i5) – 2o Nos*

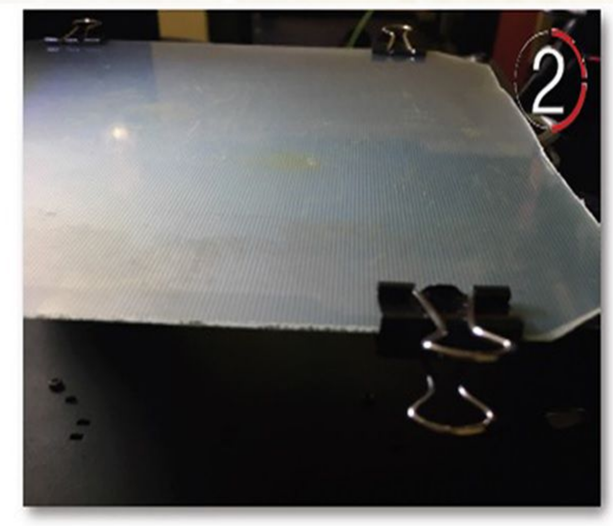
## 3D PRINTER

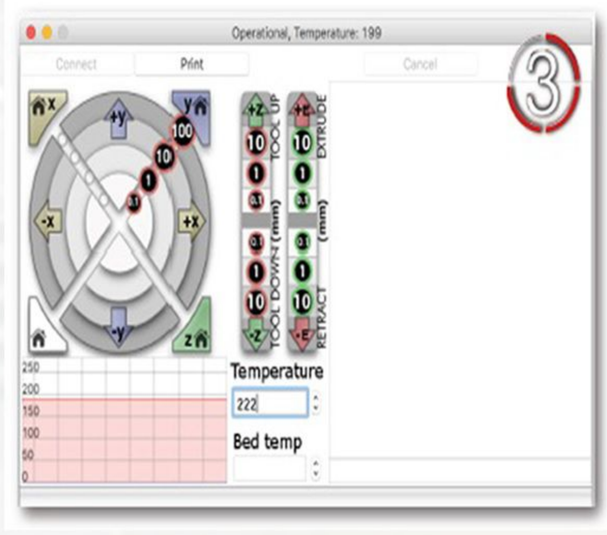
**Rapid Prototyping :** *FDM Technology Based 3D Printer – 1 No*

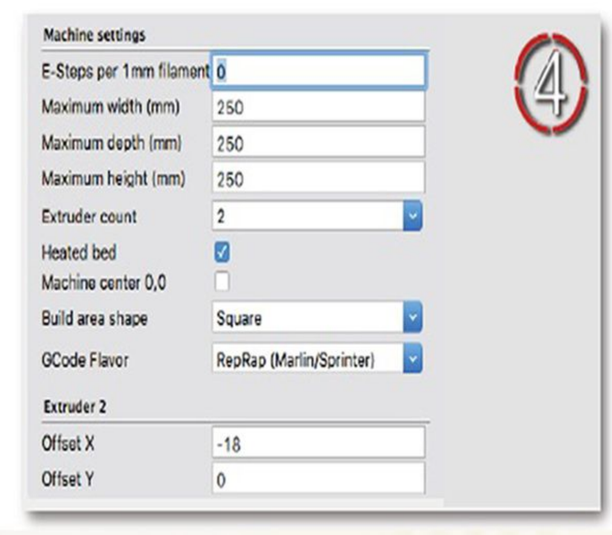
*Build Volume : 200X200X200 mm*
*Layer Resolution : 0.05- 0.4 mm*
*Print Speed : 20 - 50 mm/s*
*Print Technology : FDM(Fusion Deposition Modelling)*



## REASEARCH AREAS

01

### INNOVATIVE PRODUCT DESIGN
Through Product Life Cycle Management (PLM) Approach & Reverse Engineering

### SIMULATION STUDIES & FEA
Structural - Static & Dynamic including Flutter Analysis, CFD

02

03

### ADVANCED PRODUCT DESIGN
IN COMPOSITE & SMART MATERIALS

### RAPID PROTOTYPING
3D Printing using FDM Technology

04

## ON GOING FUNDED PROJECT

Project Name: *Study and Development of Composite Track guard Fuel Tanks with Polyurea Coating on the Striking Face for Futuristic AFV*

Principal Investigator: *Dr.M.Ramakrishnan*

Funding Agency: *CVRDE - DRDO*

**Research Significance:** *This project is a full scale product development work using new composite material system involving all phases of product design activities like CAD modeling, Finite Element Analysis for Structural integrity and Impact strength, Static & cyclic pressure testing and finally the bullet resistance testing.*

## VALUE ADDED TRAINING & COURSES

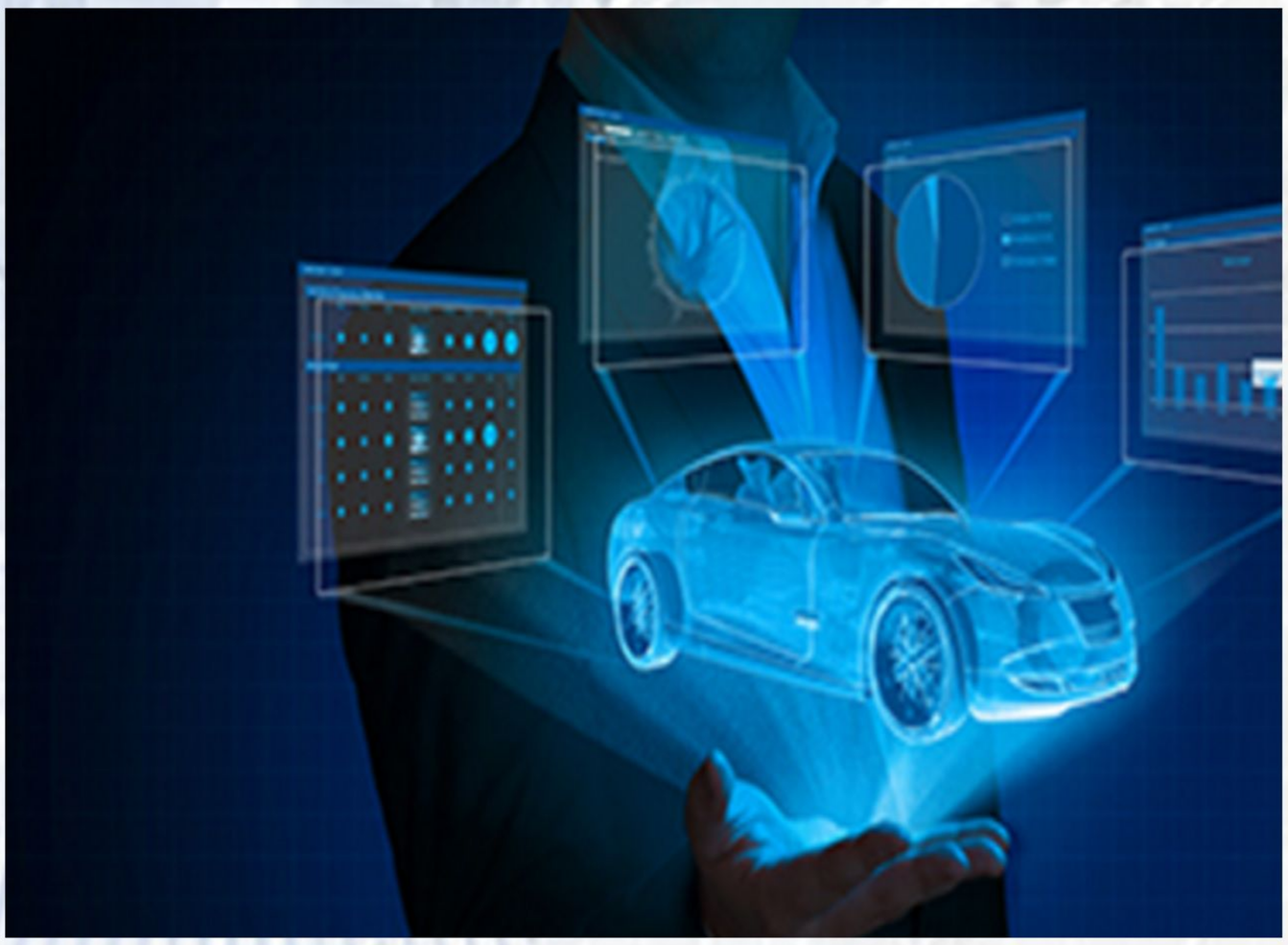
*Advanced Certificate course in CAD using CATIA V6 (80 hours)*

*Diploma Course in Mechanical CAD (120 hours)*

*Certificate Course in DELMIA (Virtual Manufacturing - 40 hours)*

### *Sketcher Workbench*
- *Basic drawing tools*
- *Editing tools*
- *Adding dimensions and constraints*

### *Part modelling Workbench*
- *Basic Modelling Commands*
- *Generating Reference Elements*
- *Dress up Commands*
- *Transformation features*
- *Boolean Operations*
- *Advanced Modelling Commands*
- *Measure Commands*
- *Assigning Materials*



### *Assembly design workbench*
- *Degrees of Freedom*
- *Types of Assembly*
- *Applying Constraints*
- *Inserting Components*
- *Editing Assemblies*
- *Sectioning and exploding assembly*

### *Drafting*
- *Types of Angle of projection*
- *Multiple projections using wizard*
- *Generating Multiple Views*
- *Generating Sectional Views*
- *Inserting Sheets and Tables*
- *Geometric dimensions and Tolerance*
- *Generating BOM table*
- *Generating Balloons*
- *Dress up features*

### *Surface modelling Workbench*
- *Generating Wireframe Elements*
- *Generating Basic Surfaces*
- *Performing Operations*
- *Transformation features*

### *Sheet metal workbench*
- *Generating Multiple Walls*
- *Bending Walls*
- *Cutting and Stamping*
- *Transformation features*
- *Generating multiple views*

## M.TECH PROGRAMS:

*M.Tech Program in Computer Aided Design (CAD)*

*M.Tech Program in Engineering Design*

## ONGOING STUDENT - LEVEL HIGH IMPACT RESEARCH ORIENTED PROJECTS

Flutter Analysis (Effect of Aerodynamic Force on Vibration) of Composite Wind Turbine Blade - KiyoTek (P) Ltd Bangalore

Fuel Feed Optimation for Inter connected Multiple Fuel storage tanks for CVRDE – CFD Analysis

Development of Composite Sluice Gates for dams – an alternate to steel.

## REMARKABLE STUDENT LEVEL PROJECTS

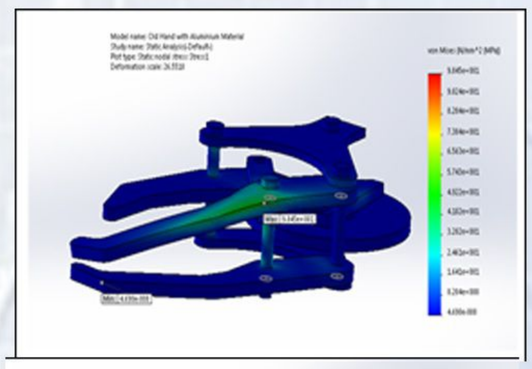
DESIGN ENHANCEMENT AND FINITE ELEMENT ANALYSIS OF A PROSTHETIC HAND WITH COMPOSITE MATERIAL

*Student: Mr. Raviteja Natti, M.Tech (CAD)*

*Guide: Dr. S. Darius Gnanaraj and Dr.M. Ramakrishnan*

*For: National Institute for Empowerment of Persons with Multiple Disabilities (NIEPMD)*

*Publication: 1 International Conference*



## FUTURE PLAN

*Converting Mechanical assemblies developed in CAD inVirutal Reality Environment.*

*Necessary support fecilities will be added.*

*VR contents and training in Aeronautical, Automobile & Mechanical areas for critical applications like Power plant simulation, Flight simulation & Race car simulation.*

# FACULTY DEVELOPMENT PROGRAM

Empowering Faculty On Latest Development in CAD & FEA

## PROGRAM DESIGN

*Finite Element Method (FEM) is a computer-based numerical technique for solving a variety of practical engineering problems involving structural, thermal and fluid flow domains. It is recognized by developers and users as one of the most powerful numerical analysis tools ever devised to analyze complex problems of engineering. Though an analysis output is obtained by feeding the necessary inputs with basic training in the software, a complete understanding of the theoretical foundations of FEM and structural/solid/fluid mechanics is an absolute requirement for correct interpretation of the results.*

*The best FEM Analyst is one who combines both. This faculty development program provides both in correct proportions for participants to gain the necessary confidence to take-up/approach complex engineering problems for consultancy or research.*

*The Faculty development Program is organised for faculty members from Mechanical Engineering and Aeronautical Engineering Disciplines. The highlight of this FDP is the integration of 2 day intensive CATIA training given our faculty by Practicing Dassault Certified Trainer from RGBSI, Bangalore.*

*An expert in FEM from industry handles the final closing session highlighting some critical case studies in FEA.*

*The program has full participation of the design stream of Mechanical Engineering, faculty from Aeronautical Engineering and Automobile Engineering.*

**Program Organiser:**

*Dr.M.RAMAKRISHNAN*
*Professor & Head- SIMENDES*

**Coordination**:

*Mr.Sundara Vinoth.P,*
*Assistant Professor - SIMENDES*

**Industry Experts:**

*Experts working in the area of CAD & FEA with software expertise and feild problems deliver guest lectures with case studies.*

## INDUSTRIAL PARTNER

Rapid Global Business Solutions Pvt. Ltd. (RGBSI)

*RGBSI is Multinational Consulting company having its Global Technical Centre (GTC) with 700 engineeers in Bangalore handling projects for global clients. Having presence in USA(Head office), Singapore, Germany, UK, Mexico, China, Canada and India.*

## Role of RGBSI

*Project based training: Training Modules with Real-time Industry projects*
*Project consultancy & collaborative research*
*Partnering for strategic decisions for centre development*

## ADVISORY BOARD

*Dr. Nanua Singh*
*President & CEO*
*RGBSI*

*Mr. Ravi Kumar*
*CIO*
*RGBSI*

*Dr. Yogesh Rawat*
*Director, SIMULIA R&D*
*3DPLM, India*

*Dr. D. Dinakaran*
*Group Lead*
*Centre for Automation & Robotics*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