Medini® Technologies

Ref. No.: 2425/13
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To,
The Head,
Department of Mechanical & its associated Branches.

Subject: Invitation to Participate in SIH 2024: Autodesk Problem Statements in Software Category, Hardware Category (Additive Manufacturing and CAM)

Dear sir/madam,
Greetings!

In continuation to this, we, being associated with VTU as technology partner for core engineering, would like to support the affiliated institutes to participate in **Smart India Hackathon 2024 in big numbers**. (no Cost is involved)

We are excited to inform you that as part of Smart India Hackathon (SIH) 2024, Autodesk has announced three problem statements focused on the areas of Software Category, Hardware Category (Additive Manufacturing), and Hardware Category (CAM).

These problem statements present an incredible opportunity for students to apply their skills in cutting-edge technologies and contribute innovative solutions. We would like to encourage the faculties to guide your students through this exciting challenge and help them make the most of this learning experience.

What's Next?

- ✓ Scan for SPOC Registration. Smart India Hackathon (sih.gov.in)
- ✓ Scan for Conduct Internal Hackathon process

Feel free to connect in case of doubts or clarity.

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Thank you for your continued dedication to fostering innovation and creativity among your students. Look forward for your support to participate more numbers of group.

Thanks!
Regards,

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SIH 2024 – Hardware Edition (Additive Manufacturing)

Faculty (SIH SPOC) Form	Teams choosing to submit idea for Autodesk's problem statement are required to request their faculty (SIH SPOC) to fill this mandatory form.
Autodesk Fusion	• Fusion combines additive manufacturing (3D printing) capabilities with generative design features. It allows users to optimize designs for 3D printing, generate support structures, and explore numerous design options using algorithms. This integration enables the creation of complex and optimized parts using 3D printing technologies. • Students and educators can click here to get FREE access to Fusion.
Problem Statement	• **Research and redesign a conventional aerospace component commonly found in air vehicles and utilize Fusion software to reimagine its design. Students can use Fusion Features such as Generative Design, Topology Optimization, Additive Build etc. The redesigned component should showcase innovation, enhanced functionality, and improved efficiency, all while being optimized for 3D printing.** The student's focus should be on using Fusion's additive manufacturing capabilities. They should aim to learn about additive manufacturing and its applications in aerospace design. This includes studying how to design aerospace components with considerations for structural integrity, and weight reduction. They should define project objectives and design constraints, and then utilize generative design tools in Fusion to explore and generate optimized designs. The student should evaluate these designs using simulation and analysis tools within Fusion. They should refine and iterate on the designs to further enhance performance. Finally, they should prototype and test the finalized design using appropriate 3D printing technologies.
Participation Guidelines	**For Idea Submission:** • Each student team should submit Fusion public link of the Design and a PowerPoint presentation (5-7 Slides). • Designs should be created using only Fusion and not copied or taken from any other source. **For Grand Finale**: Students must use Fusion to design and 3D print final design within the given time period and present the following to the jury members: • PPT explaining the final project • Public link of the design • Rendered images

Marking Criteria	**Marks**
Design Complexity and Workability	20
Design Optimization for 3D Printing (DFAM)	20
Innovative Design Features	15
Use of Advanced Features in Fusion (Generative, Topology Optimization etc.)	30
Selection of AM Process & Materials	15
Total marks	**100**

SIH 2024 – Hardware Edition (CNC)

= **Faculty (SIH SPOC) Form**	Teams choosing to submit idea for Autodesk's problem statement are required to request their faculty (SIH SPOC) to fill this mandatory form.
Autodesk Fusion	• Autodesk Fusion makes it easy to program your CNC machine, fast. Manufacture with 2.5, 3, and multi axis milling, probing, turning, mill-turning, and profiling operations paired with a powerful post engine all included alongside professional design tools. • Students and educators can click here to get FREE access to Fusion.
Problem Statement	• **Students are supposed to use Fusion software to generate NC code with machine details & tool library for any industrial component.** • **students should possess technical skills in areas such as CAD/CAM software, G-code programming, toolpath optimization, and machining fundamentals. Additionally, their project ideas should demonstrate a viable solution to a real-world problem, ensuring feasibility and practicality in implementation.** "Computer-Aided Manufacturing (CAM) is the use of software and computer-controlled machinery to automate a manufacturing process. Based on that definition, you need three components for a CAM system to function: Software that tells a machine how to make a product by generating toolpaths. Machinery that can turn raw material into a finished product. Post Processing converts toolpaths into a language machines can understand. From high-efficiency roughing with Adaptive Clearing to simplified control of multi-axis machines with Tool Orientation"
Participation Guidelines	**For Idea Submission**: Each student team should submit Fusion public link (toolpath included for Machining) of the Design and a PowerPoint presentation (5-7 Slides). Designs should be created using only Fusion and not copied or taken from any other source. **For Grand Finale**: Students must use Fusion to design and generate G code for the specific component within the given time period and present the following to the jury members: • PPT explaining the final project • Public link of the design • G-code File

Marking Criteria	**Marks**
Complexity of product (CAD)	10
Out-of-the-Box Thinking and Practicality	20
Selection of Machine, Tools and Machining Process	30
Machining Simulation	20
G-code programming for CNC machine	20
Total marks	**100**

SIH 2024 – Software Edition

Faculty (SIH SPOC) Form	Teams choosing to submit idea for Autodesk's problem statement are required to request their faculty (SIH SPOC) to fill this mandatory form.
Autodesk Fusion	• Autodesk Fusion is a cloud-based 3D modeling, CAD, CAM, CAE, and PCB software platform for professional product design and manufacturing. • Students and educators can click here to get FREE access to Fusion.
Problem Statement	• Research and develop a design on " **autonomous water surface cleaning robot** " Design an **autonomous water surface cleaning robot**, to automate the task of cleaning water surfaces. These robots are particularly useful in environmental protection efforts, as they can perform high-efficiency cleaning without human intervention. It can be autonomous or remote-controlled. The robot needs to be lightweight and flexible for easy transportation. The specifications are as follows: Length × Height × Width - 2.5 m × 1.5 m × 0.75 m Weight - 80 kg Maximum Speed - 1.5 m/s Trash Payload - 25 kg Project submission must include conceptual sketches and images in the PPT presentation. At least one component must be optimized using the generative design module. The robot should incorporate Industry 4.0 applications, such as IoT and AI, for a smart and efficient cleaning solution.
Participation Guidelines	**For Idea Submission**: Each student team will have to submit a PowerPoint presentation (5-7 Slides) about their project with conceptual sketches and images. No design files required at this stage and design should only be created during the Grand Finale **For Grand Finale**: Students must use Fusion to design **autonomous water surface cleaning robot** within the given time period and present the following to the jury members: • PPT explaining the final project • Public link of the design • Rendered images and animations **Note: Teams coming with pre-designed files will be disqualified.**

Marking Criteria	**Marks**
Design Objective	10
Design Process	10
Creativity and Novelty	30
Software Usage	30
Manufacturability	20
Total marks	**100**