

Symbiotic Learning by Design

Indian institution brings FDM technology in-house to enhance learning

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Established in 1971, Symbiosis International University (SID) offers 107 undergraduate and post-graduate programs in Pune, India. SID offers a range of curriculum aiming to equip students with technical skills for future careers in the media, design and manufacturing industries.

As a select design school, SID calls for aggressive immersion of its students in cutting-edge technology. Its design lab was created to provide engineering design challenges that give students hands-on experience with the latest technologies. SID knew a state-of-the-art design lab wouldn't be complete without 3D printing technologies and solutions, and began investigating the right 3D printer for its community.

The 3d printing solutions company

Transforming the Design Validation Process SID wanted to invest in a 3D printer that printed strong and durable parts in minimal time without any complex post-processing procedures. Moreover, the 3D printer had to be easy to operate for both lab technicians and students.

We believe 3D printing will become a standard requirement in the future and thus we want to ensure our students enter the commercial world with industry knowledge and skills in 3D printing, said Kushal Jadhav, head of SID's Industrial Design discipline. SID purchased an FDM"-based uPrint" 3D Printer after researching its operation, mechanical properties of printed models and equipment costs.

3D printing has enabled students to quickly translate design concepts into real models for better idea communication and functional tests, such as assemblies and parts alignment.

In the past, students constructed models by hand in wood, clay, carbon fiber, foam core and different grades of polymers using tools and machines. This laborious process required skillful craftsmanship and prolonged production lead time. Due to the limited output capability of models, design errors could be easily overlooked and not

rectified in time. The 3D printer has empowered students to perfect their designs through iterations and modifications in the printers strong ABS plus material.

Giving Form to Design Concepts Industrial design has more to do with ergonomics, ease of use and operation, product handling, fit and form than aesthetics. These critical factors are well validated by building functional prototypes through 3D printing, Jadhav explained, citing the example of an automotive air-intake part. Designed by a mechanical engineering student, the original air-intake part consisted of separate components and had difficulties achieving an accurate snap fit because of its complex geometric design. Instead of handcrafting, the student can now 3D print the part in one piece, where the internal dimension of the part is available. The student also polished and plated the part before inserting it into the vehicle as a production part.

Serving the Community SID's design lab is also open to other faculties and departments. Apart from printing curriculum-based models for design students, the 3D printer has allowed students to conceptualize ideas and test-drive designs more quickly and cost-efficiently. Examples include producing creatures for film production and animation, modular switches and remote controls for home automation systems, pattern blocks for industrial molding and architectural models for simulated urban planning.

Furthermore, the design lab has provided service to local companies and individuals, printing enough functional prototypes and customized parts that the 3D printer is running almost around the clock. We can set it to print right before we leave office for the day, and come back to have the model ready the next day, added Jadhav.

Jadhav said that SID intends to broaden both academic and business uses of the 3D printer: 3D printing has benefited both teachers and students as it opens up possibilities and opportunities for design ideas that were previously too challenging to realize. We look forward to discovering additional research, academic and commercial opportunities.



Air-intake prototype designed by a mechanical engineering student



Air-intake prototype inserted into vehicle to test the form

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