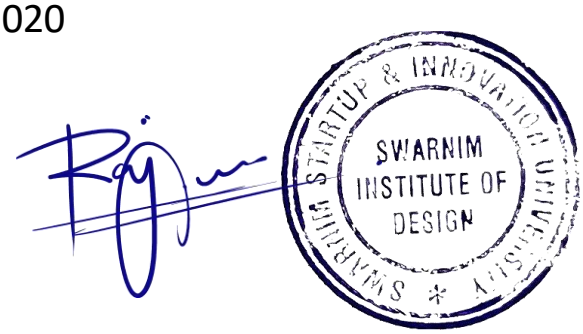
SWARRNIM
SCHOOL OF DESIGN

VALUE ADDED COURSE

Swarrnim Institute of Design

Branch: Bachelor of Architecture

YEAR: 2019-2020



SWARRNIM
STARTUP & INNOVATION
UNIVERSITY
WHERE IDEAS COME ALIVE.

Bhoyan Rathod, Opposite IFFCO, Near ONGC WSS, Adalaj
Kalol Highway, Gandhinagar, Gujarat - 382422.

Course Title: Digital Fabrication and Parametric Design

Course Code : VACDFPD

PROGRAMME:	Bachelors of Architecture	Branch:	All

Hours: 30 hrs

Course Overview: The "Digital Fabrication and Parametric Design" course is crafted to provide students and professionals with in-depth knowledge and hands-on experience in the cutting-edge fields of parametric design and digital fabrication. This 30-hour course aims to explore the intersection of technology and design, focusing on the use of computational tools to create complex and innovative architectural forms, as well as the practical techniques for fabricating these designs.

Course Objectives:

- To introduce the fundamentals of parametric design and its applications in architecture.
- To explore various digital fabrication techniques and their integration with parametric design.
- To develop skills in using computational design software and tools.
- To encourage creativity and innovation in the design and fabrication process.
- To understand the workflow from digital design to physical fabrication.

Target Audience: This course is ideal for architecture students, practicing architects, designers, and professionals in the construction and manufacturing industries who are interested in advanced digital design techniques and fabrication methods.

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Course outline		
Sr. No	**Content**	**Total hours**
1.	**Module 1: Introduction to Parametric Design** • Overview of parametric design: concepts and applications • History and evolution of computational design in architecture • Introduction to parametric design software (e.g., Rhino, Grasshopper) • Case studies of iconic parametric design projects	05
2.	**Module 2: Computational Design Tools and Techniques** • Exploring parametric design software interfaces and basic functions • Creating parametric models: curves, surfaces, and volumes • Algorithmic thinking and scripting basics (e.g., Python, visual scripting) • Advanced modeling techniques: pattern generation, form finding, and optimization	06
3.	**Module 3: Digital Fabrication Technologies** • Overview of digital fabrication: CNC machining, laser cutting, 3D printing, and robotic arms • Understanding the capabilities and limitations of different fabrication technologies • Material considerations in digital fabrication • Hands-on introduction to CNC machining and laser cutting	05

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Course outline		
Sr. No	**Content**	**Total hours**
4.	**Module 4: Integrating Parametric Design with Digital Fabrication** • Workflow from parametric design to digital fabrication • Preparing digital models for fabrication: file formats, tolerances, and nesting • Simulation and testing of designs for fabrication feasibility • Case studies of parametric design projects fabricated using digital technologies	06
5.	**Module 5: Advanced Fabrication Techniques and Applications** • Complex geometries and large-scale fabrication • Multi-material and hybrid fabrication processes • Robotic fabrication and automation in architecture • Exploring the future of digital fabrication: AI, machine learning, and adaptive systems	04
6.	**Module 6: Project Development and Prototyping** • Conceptualizing a design project using parametric methods • Developing a digital model and preparing it for fabrication • Prototyping and iterating the design through digital fabrication • Final project presentation and critique	04

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Teaching Methodology:

• Interactive lectures and software demonstrations

• Hands-on workshops in parametric modeling and digital fabrication

• Group discussions and collaborative design exercises

• Studio-based project work and prototyping

• Field visits to digital fabrication labs and studios

Learning Outcomes: By the end of the course, participants will be able to:

• Demonstrate proficiency in parametric design and computational modeling.

• Utilize digital fabrication tools and techniques to bring complex designs to life.

• Integrate parametric design with various fabrication technologies.

• Develop innovative design solutions through computational and digital approaches.

• Navigate the entire process from digital concept to physical prototype.

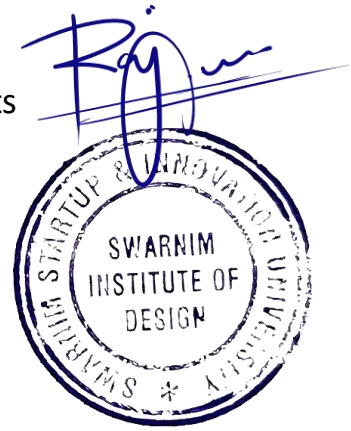
Assessment:

• Quizzes and assignments to assess understanding of theoretical concepts

• Hands-on projects in parametric modeling and digital fabrication

• Final design project involving the creation of a physical prototype

• Presentation and critique of the final project



Certification: Participants who successfully complete the course requirements will receive a certificate of completion in Digital Fabrication and Parametric Design.