SHARDA UNIVERSITY
Beyond Boundaries

# SHARDA SCHOOL OF DESIGN, ARCHITECTURE & PLANNING

## AI -Basics in Architecture & Design

## NV 40011

**VALUE ADDED COURSE BROCHURE 2024-25**

# ABOUT THE UNIVERSITY

Sharda University is a leading NAAC A+ educational institution based out of Greater Noida, Delhi NCR. A venture of the well-known Sharda Group of Institutions (SGI), The University has established itself as a high-quality education provider with major focus on holistic learning and imbibing competitive abilities in students.

# ABOUT SCHOOL

Sharda School of Design, Architecture & Planning (SSDAP) prepares the students for the real world they can make a lasting impact in designing the future and have an exciting and rewarding career. The students at SSDAP have crafted the world as renowned landscape architects, urban planners, urban designers, and history preservationists.

The school's nationally accredited degree programs, world-class faculty, and state-of-the-art facilities connect to provide the students with a broad range of opportunities in both the public and private sectors of the industry. SSDAP leads the students through both practical and theoretical learning until they can master in an innovative design that reflects art and science.

The school has forged numerous connections and partnerships with schools and professionals in countries around the world. The faculty comprises academicians from internationally renowned universities such as the School of Planning & Architecture, B.I.T Mesra, National Institute of Fashion Technology (NIFT), Sheffield University, Nottingham Trent University and Delhi College of Art, University of Delhi as well as leading Architectural practitioners and Planning professionals from all over the country.

# ABOUT DEPARTMENT

Department of Art & Design established in 2012 at Sharda University, as a multi-disciplinary department has been working tirelessly towards creating global design citizens. Holding their hands, driving them towards innovation through future aligned design thinking & design process, with continuous industry interactions through experiential project-based learning. Its aim is to establish Sharda as a premier center of Design education, where Students are surrounded by an environment of design intuitively based on strenuous research with an aim of developing a new generation of designers, who not only fill the gap of creative entrepreneurs but integrate social and environmental concern to become responsible designers with a mission of

- **Industry-based learning** within the classroom projects as the core of practical teaching, which will include continuous interaction with industries and industry experts to train students as confident Professionals for the future who are initiators & leaders.
- **Related Study Program (RSP)** as research projects based on complete business model by studying, analyzing crafts, connecting business with social impacts while exploring to the maximum and putting them on the forefront of the competitive design industry. Create craft-based design patents from RSPs as well as convert craft documentation into Publications & sources of innovation, combining craftsmanship with technology.
- **Sharda Design Center (SDC)**, used as a vehicle to connect industry with students, business with fresh minds and an instrument to establish Sharda as a multi-disciplinary design interaction center.

**Vision of Department**

- To be at the Centre of Excellence in Art & Design Education to shape future-ready professionals catering the needs of the design industry and the society

**Mission of Department**

- To create a global center of innovation and excellence in art and design industry.
- Promoting in-depth research in art and design studies for sustainable practices.
- To inculcate critical, analytical, cognitive, speculative and creative problem-solving skills.
- To develop a sense of social and professional ethics and values.
- To develop the essence of craftsmanship, future technological and vocational skills.

# About Value Added Course for Session 2024-2025

In accordance with the University requirement for Value Added Courses, the Department of Art & Design intends to conduct these courses in collaboration with Sharda Skills

**"AI -Basics in Architecture & Design" NV40011 for 1ST Year (2nd Semester) students pursuing Bachelors of Design and BVA respectively.**

## COURSE OUTCOMES

**CO1:** Develop foundational programming skills, covering variables, data types, control structures, and functions, applied to design and architecture data.
**CO2:** Use data structures (e.g., lists, dictionaries, sets, tuples) and tools like Pandas to manage data related to design specifications and spatial analytics.
**CO3:** Apply prompt engineering to create AI-driven design assistance tools, enhancing client interaction and data visualization.
**CO4:** Generate visual insights using tools such as Matplotlib and Seaborn for architectural data, supporting spatial analysis and project planning.
**CO5:** Critically evaluate the ethical implications of AI in design, including privacy concerns, data biases, and societal impacts.

## AI -BASICS IN ARCHITECTURE & DESIGN (NV40011)

| Outline syllabus | | |
|---|---|---|
| **WEEK** | CONTENT | Duration Hrs. |
| 6 Jan 2025 | Understanding AI in Design and Architecture | 2 |
| 9 Jan 2025 | Introduction to AI and its role in modern design tools (e.g., automated drafting, generative design, rastering) | 2 |
| 13 Jan 2025 | Types of AI: applications in architectural/design visualization and space optimization | 2 |
| 16 Jan 2025 | Ethical considerations: data privacy, AI bias in design standards | 2 |
| 20 Jan 2025 | **Prompt Engineering for Design Applications** | 2 |
| 23 Jan 2025 | Essentials of prompt engineering: creating user-friendly prompts for design suggestions | 2 |
| 27 Jan 2025 | Designing prompts for spatial data summaries and layout configurations | 2 |
| 3 Feb 2025 | Case studies: prompt examples in virtual 3D model generation | |
| 6 Feb 2025 | **Data Analysis for Design and Architecture** | |
| 10 Feb 2025 | Programming basics: variables, data types, operations | 2 |
| 13 Feb 2025 | Control structures for design data (e.g., loops for iteration over layouts) | 2 |
| 17 Feb 2025 | Introduction to spatial data structures for architectural applications | 2 |
| 20 Feb 2025 | **Design Data Handling and Visualization** | 2 |
| 24 Feb 2025 | Using Pandas for design data management (e.g., material specs, layout parameters) | 2 |
| 27 Feb 2025 | Visualizing architectural and design data with Matplotlib and Seaborn (e.g., heatmaps for space usage) | 2 |
| 3 March 2025 | Working with datasets related to project metrics (e.g., client feedback, cost analysis) | 2 |
| 6 March 2025 | **Introductory Project – Analyzing Design Data** | 2 |
| 10,17 March 2025 | Organizing and visualizing data on project timelines and space utilization | 2 |
| 20,24 March 2025 | Creating interactive dashboards for client presentations using Seaborn and Matplotlib | 2 |
| 3,7 April 2025 | Example: Visualizing trends in space allocation for different project types | 2 |

# FACULTY PROFILE

**Nishant Chaturvedi**
**Technical Trainer (Sharda Informatics)**

More than 15 years of experience in designing, development, debugging and analyzing of large amount of data and implementation of software applications.

I hold a B.Tech. in Information Technology from UPTU and MTech. from BITS Pilani. I have worked in various product based and service-based companies. Some of my past organizations are HCL, Ericssion and Globallogic.

My past experience is mostly into Data Science and Machine Learning. My last engagement was with HCL as Senior Manager in Analytics and the job profile was to get real-time insights into user interactions and measure and analyze performance to drive customer engagement using Natural Language Processing.

**Girish Kumar Bharati**
Assistant Professor, Art & Design
girish.bharati@sharda.ac.in

With over 12 years of immersive involvement in the design sector, he possesses a profound reservoir of expertise and creativity that he infuses into every project he undertakes. Holding a Master's degree in Social Design from Ambedkar University, New Delhi and a Bachelor's degree in Textile Design from NIFT, Gandhinagar.

During his tenure as a UI/UX Designer at Dew Solutions, he played a pivotal role in shaping projects ranging from website UI creation to app UI migration. At Stamp (Schoolnet), his responsibilities as an AMHSSC Coordinator involved overseeing assessment processes with precision and diligence.
As a Designer at Rosanature and Eco Tasar Silk, he meticulously interpreted client visions, innovative designs in collection making, and fostered invaluable relationships with esteemed buyers. Moreover, his contributions at Jharcraft, underscore his dedication to community empowerment through initiatives for handloom weaver development.
Whether designing motif libraries or delving into research on traditional crafts, he consistently strives to push boundaries and create impactful experiences in the realm of design.

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# FACULTY PROFILE

**Ashwani Balyan**
**Technical Trainer (Sharda Informatics)**

A data science and machine learning professional with a strong foundation in engineering and a passion for applying AI in real-world scenarios. With over 10 years of cross functional experience in engineering and training, with an aim to bridge the gap between academia and industry.
He has Certifications from The University of Texas at Austin and IMT College, along with winning three ML Hackathons, showcase his technical and problem-solving abilities.

He is focused on continuous learning and delivering impactful AI solutions, whether through teaching or applying data science in practical contexts.

**Kandarp Singh**
Assistant Professor, Art & Design
kandarp.singh@sharda.ac.in

Master of Fashion Technology with Specialization in Strategy, NIFT New Delhi and
Bachelor of Fashion Technology, NIFT Gandhinagar, With Over 8+ years experience in Garment and Textile manufacturing Industry, have complete understanding of textile operations and management, with a focus on Lean manufacturing and TPM initiatives.

His Expertise include Apparel Production and Pattern Making, Functional Textiles, Textile Chemistry and New Textile Development, Design Innovation and Design Thinking , 3D Printing Technology, Functional Design Innovation and Textile Printing and Process

| School: SSDAP Program: B.Design & BVA | Academic Year: 2024-2025 |
|---|---|
| **Branch: Design** | Semester: 2nd |
| **Course Code** | NV40011 |
| **Course Title** | **AI -Basics in Architecture & Design** |
| **Credits** | Audit Course |
| **Contact Hours** | 30 hrs |
| **Course Type** | **NCVAC** |
| **Course Objective** | To introduce students in design and architecture to foundational AI concepts, focusing on practical skills in programming, prompt engineering, and data analysis, with applications in design and spatial planning.. |
| **Course Outcomes** | After completion of this course, students will be able to:<br>**CO1:** Develop foundational programming skills, covering variables, data types, control structures, and functions, applied to design and architecture data.<br>**CO2:** Use data structures (e.g., lists, dictionaries, sets, tuples) and tools like Pandas to manage data related to design specifications and spatial analytics.<br>**CO3:** Apply prompt engineering to create AI-driven design assistance tools, enhancing client interaction and data visualization.<br>**CO4:** Generate visual insights using tools such as Matplotlib and Seaborn for architectural data, supporting spatial analysis and project planning.<br>**CO5:** Critically evaluate the ethical implications of AI in design, including privacy concerns, data biases, and societal impacts. |
| **Course Description** | This course provides a foundation in AI and programming tailored for design and architecture students. Emphasis is placed on prompt engineering, data analysis for architectural applications, and visualization using industry-relevant tools, making AI concepts accessible and applicable in design and planning. |

| Outline syllabus | | CO Mapping |
|---|---|---|
| **Unit 1** | **Understanding AI in Design and Architecture** | |
| **A** | Introduction to AI and its role in modern design tools (e.g., automated drafting, generative design, rastering) | CO1 |
| **B** | Types of AI: applications in architectural/design visualization and space optimization | CO1 |
| **C** | Ethical considerations: data privacy, AI bias in design standards | CO1 |
| **D** | **Prompt Engineering for Design Applications** | CO2 |
| **Unit 2** | Essentials of prompt engineering: creating user-friendly prompts for design suggestions | |
| **A** | Designing prompts for spatial data summaries and layout configurations | CO2 |
| **B** | Case studies: prompt examples in virtual 3D model generation | CO2 |
| **Unit 3** | **Data Analysis for Design and Architecture** | |
| **A** | Programming basics: variables, data types, operations | CO3 |
| **B** | Control structures for design data (e.g., loops for iteration over layouts) | CO3 |
| **C** | Introduction to spatial data structures for architectural applications | CO3 |
| **D** | **Design Data Handling and Visualization** | CO4 |
| **Unit 4** | Using Pandas for design data management (e.g., material specs, layout parameters) | |
| **A** | Visualizing architectural and design data with Matplotlib and Seaborn (e.g., heatmaps for space usage) | CO4 |
| **B** | Working with datasets related to project metrics (e.g., client feedback, cost analysis) | CO4 |
| **C** | **Introductory Project – Analyzing Design Data** | CO5 |
| **Unit 5** | Organizing and visualizing data on project timelines and space utilization | |
| **A** | Creating interactive dashboards for client presentations using Seaborn and Matplotlib | C06 |
| **B** | Example: Visualizing trends in space allocation for different project types | CO6 |