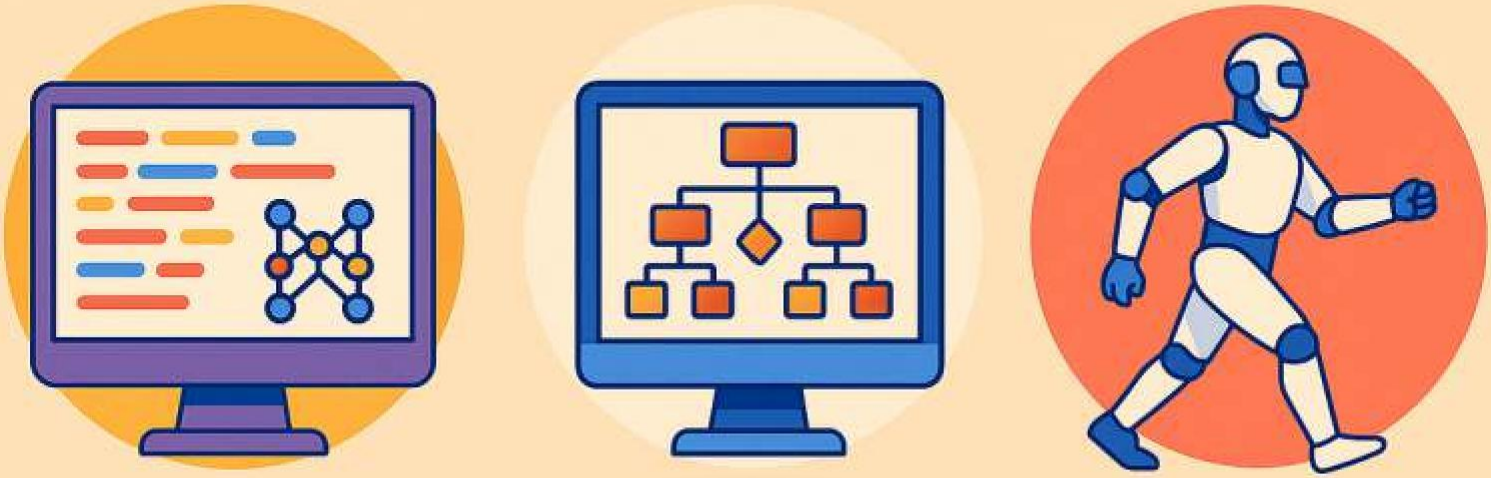
SHARDA UNIVERSITY
Beyond Boundaries

NAAC A+ ACCREDITED

SHARDA SCHOOL OF COMPUTING SCIENCE & ENGINEERING



COURSE

# Predictive Intelligence and Decision System (NV62110)

VALUE ADDED

Course Brochure

2026-27

# ABOUT THE UNIVERSITY

Sharda University envisions serving society by being a global University of higher learning in pursuit of academic excellence, innovation, and nurturing entrepreneurship. It has 13,000+ students from 95+ countries, 29 states, and Union Territories, providing cultural diversity and global exposure to students. It has 26000+ alumni who are today leaders in their realms. Sharda University is a NAAC A+ University with an Overall NIRF Rank of 86. The Teaching Learning Center at Sharda University is to equip the faculty members with the expertise, skills, and knowledge they need for capacity building of students. Teaching as a profession requires highly specialized skills and knowledge to have a significant impact on student learning; therefore, teachers must continually refine their conceptual and pedagogical skills.

## ABOUT SCHOOL

Sharda School of Computing Science & Engineering is an open platform for diverse voices where teaching runs parallel to the real world, and students are groomed to join the global workforce. SSCSE is distinguished as one of the top-ranked engineering schools in India. The students at SSCSE benefit from the professional grooming of renowned faculty and industry experts who have experience in tackling pressing engineering problems. Students discover their passion in one of the various offered Engineering majors at the Sharda School of Computing Science & Engineering. A student-centric pedagogy, project-based approach, and design-driven curriculum provide students with an inclination for complex problem-solving, design, innovation, and a passion for learning.

## ABOUT DEPARTMENT

The Department of Computer Science & Engineering strives to equip faculty and students with all the computing resources needed to address a wide range of scientific, technological, and socially complex problems. The department imparts technical education for designing quirky technological applications and innovations. The department aims to become a center of excellence and impart knowledge to intellectual professionals so as to equip them with the requisite skills as per Industry standards. The department aims to foster an innovative research environment by providing a supportive, amiable, and challenge-based learning culture. The department utilizes high-performance computing equipment and facilities to impart state-of-the-art technical knowledge to students and instill a desire to pursue lifelong learning. To emerge as a world-class department, we focus on innovative research and quality learning in computer science applications that prepare entrepreneurs and professionals to lead the social, economic, and technical development of society. The Value Added Education Courses aim to provide additional learner-centric centric graded skill skill-oriented training, with the primary objective of improving the employability skills of students.

## VALUE ADDED COURSE (VAC)

The Value Added Courses aim to provide additional learner-centric centric graded skill skill-oriented training, with the primary objective of improving the employability skills of students.

## PURPOSE OF VALUE ADDED COURSE

VACs are pertinent instructional strategies designed to close knowledge gaps in students and provide them a competitive edge in the job market. The courses' well-defined structure makes these VACs highly effective in enhancing students' employability quotient by developing diverse competencies. They help students lay the creative groundwork for passion projects (such as interactive dashboards, business analytics, or sector-specific visual reports) beyond their core academic curriculum, offering skills that can transform their enthusiasm into career opportunities.

## RESOURCE PERSON

**Dr. Nidhi Gupta**

Dr. Nidhi Gupta is an Associate Professor in the School of Computing Science and Engineering, Department of Computer Science and Engineering, Sharda University, Greater Noida. She has over 20 years of experience in teaching, research, and academic administration. Her research interests include Artificial Intelligence & Machine Learning, Computer Vision, NLP and Information Retrieval. She has authored numerous research papers published in reputed SCI, Scopus-indexed, and other peer-reviewed international journals and conferences. Her scholarly contributions also include authored and edited books, book chapters, and granted/published patents in emerging areas of computer science.

## COURSE SCHEDULE

| Week | Topic | Duration (Hrs.) |
|---|---|---|
| 1 | Introduction to predictive modelling, Ensemble learning | 3 |
| 2 | Boosting technique, Causal inference vs correlation | 3 |
| 3 | Deep Learning for Predictive Systems, Introduction to RNNs | 3 |
| 4 | LSTMs, Transformers for forecasting, Spatio-temporal modelling | 3 |
| 5 | Multimodal predictive systems, Sequence prediction using LSTM/Transformer models | 3 |
| 6 | Time-Series & Sequential Data Analytics, ARIMA, Prophet, neural forecasting techniques | 3 |
| 7 | Trend analysis and anomaly detection, Domain applications: finance, healthcare, IoT | 3 |
| 8 | Time-series forecasting using real-world datasets, Anomaly detection implementation | 3 |
| 9 | Decision Intelligence & Scalable AI Systems | 3 |
| 10 | Optimization and policy learning, real-time predictive pipelines | 3 |
| 11 | Edge AI, Cloud deployment, MLOps for predictive systems | 3 |
| 12 | End-to-end predictive decision system deployment using cloud/edge tools | 3 |
| Total | | 36 hours |

**School:** Sharda School of Computing Science & Engineering, (Department of Computer Science & Engineering)
**Program:** M. Tech CSE **Semester: III**
**Batch:** 2025-27 **Current Academic Year:** 2026-27

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|---|---|---|
| **1.** Course Code | NV62110 | |
| **2.** Course Title | Predictive Intelligence and Decision System | |
| **3.** Credits | 0 | |
| **4.** Contact Hours (L-T-P) | 30 Hours | |
| Course Type | Value added course | |
| **5.** Course Objective | 1. Develop advanced predictive models using statistical and deep learning techniques<br>2. Understand uncertainty modeling and probabilistic reasoning<br>3. Apply predictive AI in dynamic, real-time systems<br>4. Integrate prediction with decision-making frameworks<br>5. Evaluate model performance, robustness, and interpretability | |
| **6.** Course Outcomes | After the completion of this course, students will be able to:<br>CO1: Describe predictive modeling techniques including probabilistic and ensemble methods to solve real-world problems<br>CO2: Understand deep learning models for sequential, spatio-temporal, and multimodal prediction tasks<br>CO3: Analyze and forecast time-series data using statistical and neural approaches across application domains<br>CO4: Apply predictive modeling using uncertainty estimation and explainability techniques for trustworthy AI systems<br>CO5: Implement integrated decision intelligence systems combining prediction, optimization, and reinforcement learning<br>CO6: Deploy scalable predictive AI systems using modern tools, ensuring efficiency, ethics, and real-world applicability | |
| **7.** Course Description | This course focuses on advanced predictive intelligence techniques and their integration into decision-making systems. It covers probabilistic models, deep learning for prediction, time-series forecasting, and decision intelligence frameworks. The course also emphasizes real-world deployment, explainability, and ethical considerations. | |
| **8.** Outline syllabus | | CO Mapping |
| **Unit 1** | **Predictive Modeling** | |
| A | Introduction to predictive modelling | CO1, CO2, CO3, CO4 |
| B | Ensemble learning and boosting techniques | |
| C | Causal inference vs correlation | |
| **Unit 2** | **Deep Learning for Predictive Systems** | |
| A | Introduction to RNNs, LSTMs, Transformers for forecasting | CO1, CO2, CO3, CO4, CO6 |
| B | Spatio-temporal modelling, Multimodal predictive systems | |
| C | Sequence prediction using LSTM/Transformer models | |
| **Unit 3** | **Time-Series & Sequential Data Analytics** | |
| A | ARIMA, Prophet, neural forecasting techniques | CO1, CO2, CO3, CO4, CO6 |
| B | Trend analysis and anomaly detection, Domain applications: finance, healthcare, IoT | |
| C | Time-series forecasting using real-world datasets, Anomaly detection implementation | |
| **Unit 4** | **Explainability & Uncertainty in AI** | |
| A | Model confidence and uncertainty quantification, XAI | CO1, CO2, CO3, CO4, CO6 |
| B | SHAP, LIME, counterfactual reasoning | |
| C | Applying SHAP/LIME for model interpretation | |
| **Unit 5** | **Decision Intelligence & Scalable AI Systems** | |
| A | Optimization and policy learning, real-time predictive pipelines | CO1, CO2, CO3, CO4, CO5, CO6 |
| B | Edge AI, Cloud deployment, MLOps for predictive systems | |
| C | End-to-end predictive decision system deployment using cloud/edge tools | |
| **Mode of examination** | Jury/Practical/Viva | CA 100% |
| **References** | 1. Neha Singh, Shilpi Birla, Mohd Dilshad Ansari, Neeraj Kumar Shukla, Intelligent Techniques for Predictive Data Analytics, 2024, ISBN:9781394227969<br>2. Gloria Phillips-Wren, Nikhil Ichalkaranje, Intelligent Decision Making: An AI-Based Approach: 97 (Studies in Computational Intelligence), 2008, ISBN: 978-3540768289<br>3. Shahab Saquib Sohail, Arpita Soni, Satish Mandavalli, AI for Decision Intelligence in Critical Systems (Advances in Applied Mathematics), CRC Press, 2026, ISBN: 9781041304838<br>4. Riccardo Galanti, Massimiliano de Leoni, Merylin Monaro, Nicolò Navarin, Alan Marazzi, Brigida Di Stasi, Stéphanie Maldera, An explainable decision support system for predictive process analytics, Engineering Applications of Artificial Intelligence, https://doi.org/10.1016/j.engappai.2023.105904 | |