

Sharda - Masai Academy - School of Engineering and Technology

CS/IT Departments

Revamped Curriculum for Computer Science & Engineering and Computer Science & Applications

Introduction

The Computer Science & Engineering and Computer Science & Applications departments at Sharda University are undergoing a transformative revamp to integrate project-based learning, industry-aligned curriculum, and modern pedagogy processes, in partnership with Masai. This comprehensive approach aims to enhance educational outcomes, better prepare students for the job market, and ensure they possess the skills and knowledge needed to excel in the rapidly evolving tech industry.

Key Components of the Revamped Curriculum

1. Project-Based Learning

Project-based learning (PBL) is at the heart of the revamped curriculum, ensuring that students apply theoretical knowledge to practical, real-world problems. PBL encourages active learning, critical thinking, and collaboration, providing students with hands-on experience that is crucial for their professional development.

2. Industry-Aligned Curriculum

The curriculum is aligned with current industry standards and practices, developed in collaboration with Masai and other industry partners. This alignment ensures that the courses remain relevant and up-to-date, reflecting the latest technological advancements and industry needs.

3. Modern Pedagogy Processes

Modern pedagogy processes, including flipped classrooms, blended learning, and continuous assessment, are integrated into the curriculum to create a dynamic and engaging learning environment. These approaches facilitate personalized learning, allowing students to learn at their own pace and according to their individual learning styles.

Benefits of the Revamped Curriculum

- Enhanced Employability:** The integration of project-based learning and industry-aligned curriculum ensures that students are job-ready upon graduation, equipped with skills that are in high demand.
- Practical Experience:** Students gain hands-on experience through real-world projects, making them adept at applying theoretical knowledge to practical situations.
- Industry Connections:** Collaboration with industry partners, including Masai, provides students with networking opportunities, internships, and mentorship, enhancing their career prospects.
- Modern Learning Approaches:** Modern pedagogy processes ensure a dynamic and engaging learning environment, catering to diverse learning styles and promoting lifelong learning.
- Interdisciplinary Skills:** The integration of AI, machine learning, and data science across various courses fosters interdisciplinary skills, preparing students for a wide range of career opportunities.

Detailed Course Revamp

C Programming

- Objective:** Provide a strong foundation in programming concepts using C.

- **Revamp:**
 - Integration of real-world projects to apply C programming skills.
 - Industry-specific case studies and applications.
 - Emphasis on problem-solving and algorithm development.

Python Programming

- **Objective:** Equip students with versatile programming skills using Python.
- **Revamp:**
 - Projects involving data analysis, web scraping, and automation.
 - Collaboration with industry experts for guest lectures and workshops.
 - Integration of AI and machine learning basics using Python libraries.

Java & OOPS

- **Objective:** Teach object-oriented programming concepts using Java.
- **Revamp:**
 - Development of complex applications to understand OOP principles.
 - Real-world project work in collaboration with industry partners.
 - Emphasis on design patterns and best practices in software development.

DSA Courses

- **Objective:** Master data structures and algorithms for efficient problem-solving.
- **Revamp:**
 - Practical projects involving algorithm optimization.
 - Competitive programming challenges to enhance problem-solving speed.
 - Real-world applications of data structures in software development.

Databases

- **Objective:** Understand database management systems and SQL.
- **Revamp:**
 - Projects involving database design and implementation.
 - Exposure to NoSQL databases and big data technologies.
 - Collaboration with industry experts for practical insights and applications.

Software Design

- **Objective:** Learn the principles of software design and architecture.
- **Revamp:**
 - Hands-on projects involving the design and development of software systems.
 - Emphasis on design patterns, architectural styles, and best practices.
 - Industry-aligned case studies and collaborative projects.

Web Development

- **Objective:** Master front-end and back-end web development technologies.
- **Revamp:**
 - Full-stack development projects involving HTML, CSS, JavaScript, and backend frameworks.
 - Industry-standard tools and practices, including version control and CI/CD.
 - Collaboration with industry partners for real-world web application development.

Data Science

- **Objective:** Develop skills in data analysis, visualization, and machine learning.
- **Revamp:**
 - Projects involving real-world data sets and data science workflows.
 - Integration of AI and machine learning projects using industry-standard tools.
 - Guest lectures and workshops from data science professionals.

AI-ML

- **Objective:** Provide a comprehensive understanding of artificial intelligence and machine learning.
- **Revamp:**
 - Practical projects involving AI and ML model development and deployment.
 - Collaboration with industry partners for real-world applications and insights.
 - Emphasis on ethical AI practices and responsible AI development.

CyberSecurity

- **Objective:** Equip students with skills to protect systems and data from cyber threats.
- **Revamp:**
 - Projects involving penetration testing, network security, and threat analysis.
 - Industry-standard tools and practices for cybersecurity.
 - Workshops and guest lectures from cybersecurity professionals.

Non CS/IT Departments

Note on Integrating AI and GenAI into School of Engineering & Technologies

Integrating AI and GenAI into the undergraduate and postgraduate programs of Sharda University's School of Engineering & Technologies can revolutionize the educational experience and better prepare students for modern engineering challenges. By embedding these technologies into the curriculum, students will gain hands-on experience with state-of-the-art tools and methodologies. This integration will foster innovation, critical thinking, and problem-solving skills, making graduates highly competitive in the workforce. Additionally, students can collaborate on interdisciplinary projects that address real-world issues, leveraging AI to develop impactful solutions in their respective fields.

Integration Pointers

1. **Core Curriculum:** Incorporate AI and GenAI courses within the core curriculum to build foundational knowledge and skills.
2. **Interdisciplinary Projects:** Promote interdisciplinary projects that combine AI with engineering principles.
3. **Research Initiatives:** Encourage research projects focusing on AI applications within each engineering discipline.
4. **Industry Partnerships:** Collaborate with industry partners to offer AI-focused workshops, internships, and mentorship programs.
5. **AI Labs:** Set up dedicated AI labs equipped with advanced technologies for practical learning and experimentation.
6. **Capstone Projects:** Include AI-based projects in capstone courses to allow students to demonstrate their knowledge and application of AI.
7. **Hackathons:** Organize AI-themed hackathons to encourage innovation and teamwork.
8. **Guest Speakers:** Invite industry experts to give guest lectures on the latest trends and developments in AI.
9. **Ethics in AI:** Teach the ethical considerations and responsibilities involved in AI development and deployment.
10. **Specialized Tracks:** Offer elective courses and specialized tracks in AI for students who wish to deepen their expertise.

Sample Projects

Mechanical Engineering

1. **Predictive Maintenance:** Develop AI systems that predict mechanical failures and schedule maintenance to prevent downtime.
2. **Robotic Process Automation:** Design AI-powered robots for automated manufacturing processes to increase efficiency and precision.
3. **Smart Materials:** Use AI to create and optimize new smart materials with adaptive properties for various engineering applications.

Biotechnology

1. **AI in Genomics:** Create AI algorithms to analyze genomic data and identify genetic markers for diseases and traits.
2. **Drug Development:** Develop AI models to accelerate the discovery and testing of new pharmaceuticals.
3. **Bioprocess Optimization:** Use AI to optimize bioprocessing parameters for the production of biopharmaceuticals and biofuels.

Civil Engineering

1. **Smart Infrastructure:** Develop AI systems to monitor and manage the health of infrastructure such as bridges, roads, and buildings.
2. **Construction Automation:** Create AI-powered construction robots to automate tasks such as bricklaying, welding, and painting.
3. **Urban Planning:** Use AI to analyze urban data and optimize city planning for sustainable development.

Electrical Electronics and Communication Engineering

1. **AI in IoT:** Develop AI algorithms to manage and optimize Internet of Things (IoT) networks and devices.
2. **Smart Grids:** Create AI systems to monitor and optimize the performance of electrical grids for efficient energy distribution.
3. **5G Network Optimization:** Use AI to enhance the performance and reliability of 5G networks by optimizing resource allocation and signal processing.