

## **Software Engineering Lab (CS331) 2025**

### **Rules for Conducting Labs**

1. The students will be involved in group-based projects. Each group will consist of 3 members.
2. Students will have to select one of the projects outlined below. However, within one week, they can choose any other relevant and important project by submitting a short project plan (highlighting the goal and key objectives).
3. Students can use their innovations and ideas to build the software. Hence, two groups adopting the same project will eventually build different types of software that meet common goals with different features and approaches.
4. Students will be given assignments in each lab. They have to solve the assignments for their respective projects.
5. The involvement of all group members is highly essential for grading. TAs will evaluate the assignments group-wise, but they will monitor carefully the individual effort given by each group member.
6. The deadline for each assignment will be given during lab hours. No extra time will be given once the deadline is met.
7. **In the lab 1, students are supposed to write formal requirements in English.**
8. We are planning to conduct an end-sem examination for the lab. Following is the weightage associated with the different components **1) Assignments (60%), 2) Novelty of the project (15%), and 3) End semester (25%).**

### **List of Projects for Software Engineering Lab Projects**

#### **Intelligent Process & Workflow Automation**

1. Automated Workflow Management System with Rule Engine
  2. Robotic Process Automation (RPA) for Office Operations
  3. Automated Document Classification and Routing System
  4. Intelligent Email Processing and Response Automation
  5. Automated Invoice Processing and Reconciliation System
  6. End-to-End Business Process Automation Platform
  7. Automated Compliance Monitoring System
  8. Self-Healing IT Operations Platform
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## AI-Driven Automation Systems

9. Automated Resume Screening and Interview Scheduling System
10. AI-based Customer Support Automation Platform
11. Automated Fraud Detection and Alerting System
12. Intelligent Chatbot with Task Execution Automation
13. Automated Essay Evaluation and Feedback System
14. Predictive Maintenance Automation System
15. Automated Quality Inspection using Computer Vision
16. AI-powered Test Case Generation and Execution System

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## DevOps, Cloud & Infrastructure Automation

17. CI/CD Pipeline Automation with Intelligent Failure Recovery
18. Infrastructure as Code (IaC) Automation Platform
19. Automated Cloud Resource Provisioning and Scaling System
20. Cloud Cost Monitoring and Optimization Automation
21. Automated Log Analysis and Incident Response System
22. Autonomous Load Balancing and Traffic Management System
23. Container Deployment and Rollback Automation System
24. Automated Backup and Disaster Recovery Platform

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## Security & Network Automation

25. Automated Intrusion Detection and Response System
26. Security Orchestration, Automation, and Response (SOAR) Platform
27. Automated Vulnerability Scanning and Patch Management
28. Phishing Detection and Automated Mitigation System
29. Network Configuration and Policy Automation System
30. Automated Digital Forensics Evidence Collection Tool

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## Data & Analytics Automation

31. Automated Data Ingestion and ETL Pipeline
32. Real-time Data Quality Monitoring and Correction System
33. Automated Anomaly Detection in Streaming Data
34. AutoML Platform for Model Selection and Training
35. Automated Report Generation and Visualization System
36. Self-Service Analytics with Query Automation

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## IoT & Cyber-Physical Automation

37. Automated Smart Home Control System
38. Industrial IoT-based Process Automation System
39. Smart Traffic Signal Automation System
40. Automated Energy Management System
41. Smart Agriculture Automation Platform
42. Autonomous Building Management System

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## Testing, Monitoring & Maintenance Automation

- 43. Automated Software Testing Framework with AI
- 44. Continuous Monitoring and Alert Automation System
- 45. Automated Root Cause Analysis Platform
- 46. Automated Performance Testing and Optimization Tool
- 47. Self-Updating Software System with Rollback Control
- 48. Automated Code Review and Quality Assessment Tool

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## Advanced & Emerging Automation Topics

- 49. Autonomous Decision-Making System using Reinforcement Learning
- 50. Digital Twin-based Industrial Automation System