SPS 105: AI and Automation in Textile & RMG

Course Objectives

- Understand the Fundamentals of AI and Automation in the context of manufacturing and the RMG industry.
- Explore Current and Emerging Technologies used in AI-driven automation for garment production.
- Learn Data Analysis and AI Tools to optimize processes, improve efficiency, and reduce waste.
- Apply AI Solutions to enhance productivity, quality control, and supply chain management.
- Identify Challenges and Opportunities in adopting AI and automation within Bangladesh's RMG sector.

Session No	Session Title	Detailed Topics	Key Learning Methods
1-2	**Introduction to AI and Automation in the RMG Industry**	• Overview of AI and its applications in manufacturing • Understanding automation technologies • Challenges and opportunities in the RMG sector • Case studies: Global adoption of AI in the textile industry	• Lecture • Group discussions on the current state of automation in Bangladesh's RMG industry • Short presentations on industry challenges
2-5	**Basics of Machine Learning and Data Analysis**	• Fundamentals of machine learning (supervised, unsupervised learning) • Introduction to data collection and preprocessing • Predictive analytics: Demand forecasting and inventory management • Tools: Python (pandas, scikit-learn), Excel	• Lecture • Hands-on sessions: Building a simple demand forecasting model • Assignments: Analyzing and visualizing RMG industry data
6-9	**Automation Technologies in RMG**	• Overview of robotics in garment manufacturing • Smart sewing machines and automatic cutting systems	• Workshop: Setting up and operating a smart sewing machine • Site visit: Automated garment manufacturing facility (optional)

Session No	Session Title	Detailed Topics	Key Learning Methods
		• Computer-aided design (CAD) in apparel production • Real-time production monitoring systems	
10-13	**AI for Quality Control and Process Optimization**	• AI-powered defect detection systems • Optimizing production lines with AI • Energy efficiency through AI-driven solutions • Ethical considerations and workforce impact	• Hands-on project: Develop a defect detection prototype using computer vision • Case studies: Examples from leading RMG companies
14-16	**Supply Chain and Logistics Optimization**	• Role of AI in supply chain management • Warehouse automation and inventory optimization • End-to-end production visibility with IoT and AI • Risk management in the RMG supply chain	• Simulation: Optimizing a supply chain scenario with AI tools • Group project: Create an AI-driven logistics improvement plan
17-19	**Implementation and Future Trends**	• Developing an AI and automation strategy for RMG factories • Barriers to adoption and overcoming them • Emerging technologies: Blockchain, IoT, and 3D printing in the garment industry	• Capstone project: Propose a comprehensive AI/automation solution for a specific RMG challenge • Final presentations and feedback

Assessment Methods:

- Quizzes and assignments (20%)
- Hands-on projects (40%)
- Capstone project and presentation (40%)