AUBURN
Human Resources

Research Engineer III, Industry 4.0

Job Description

JOB INFORMATION

Job Code	JA12
Job Description Title	Research Engineer III, Industry 4.0
Pay Grade	RE10
Range Minimum	$64,980
33rd %	$82,310
Range Midpoint	$90,970
67th %	$99,640
Range Maximum	$116,970
Exemption Status	Exempt
Organizational use restricted to the following divisions	128 Samuel Ginn Col of Engineering
Approved Date:	11/26/2024 11:45:46 AM

JOB FAMILY AND FUNCTION

Job Family:	Research
Job Function:	Disciplinary Research

JOB SUMMARY

Conducts research related to the Fourth Industrial Revolution or Industry 4.0 to help design and integrate smart manufacturing systems using IoT, AI, and machine learning to improve operational efficiency. This position will also use big data analytics to monitor and optimize production processes, ensure high-quality output and reduced downtime, and leverage advanced digital technologies to optimize manufacturing processes, enhance productivity, and drive efficiency across operations.

RESPONSIBILITIES

- Research & Development (R&D) in Advanced Manufacturing and Industry 4.0: Leads and conducts advanced research in smart manufacturing, IoT-enabled, and cyber-physical systems. Investigates and researches new technology, trends, standards, and products necessary to achieve smart manufacturing objectives, making recommendations to leadership and managing their acquisition and deployment. Conducts and collaborates on research in Industry 4.0, focusing on cyber-physical systems, verification and validation of software systems, digital twin technology, IoT solutions, and data collection systems.
- Software Development and System Architecture Design: Designs and implements architectures for Industry 4.0 solutions that integrate AI, IoT, cloud computing, and legacy systems. Collaborates with IT and engineers to design and implement network architecture for the manufacturing facility, ensuring robust connectivity and data flow. Establishes a standardized process for building IoT solutions, ensuring consistency and quality in development. Oversees the software solution's design, development, and implementation, ensuring it meets both technical and business needs.
- Collaboration and Project Management: Assembles, leads, and manages an interdisciplinary team of engineers, designers, data scientists, and domain experts to implement Smart Manufacturing solutions in alignment with Industry 4.0 principles. Acts as the primary point of contact between stakeholders and team members, ensuring clear communication on project progress, risks, and outcomes. Manages project timelines, ensuring milestones and deliverables are met and aligned with the project's goals. Coordinates with industrial partners to design and implement custom solutions tailored to their manufacturing environments.
- Smart Manufacturing Solutions: Investigates and decides on appropriate tools, frameworks, hardware, software, protocols, and standards to achieve digital and smart manufacturing objectives. Designs and develops an IoT data-gathering solution and interactive dashboard for legacy industrial machines, integrating sensors and modern communication protocols to enable real-time data collection, monitoring, and analysis. Develops Digital Twins and frameworks for manufacturing, ensuring accurate representation of processes and establishing methodologies for their development, verification, and validation.
- Data Analysis, ETL, and Machine Learning: Builds an ETL data collection architecture for industrial machines and the shop floor, integrating diverse protocols and standards to enable seamless data extraction,

RESPONSIBILITIES

transformation, and loading (ETL). Analyzes manufacturing data to provide actionable insights on process improvements, equipment efficiency, and resource utilization. Develops and deploys machine learning models for predictive analytics, quality assurance, and real-time decision-making in manufacturing.

- Planning, Outreach and Support: Coordinates with IT (Network Services and OIT) for the procurement of equipment, setup and maintenance of computers, network storage, and databases to ensure seamless operational support. Develops Smart Manufacturing implementation roadmap and standard guidelines. Prepares technical reports for long and short-range planning. Evaluates findings to develop new concepts, equipment, or processes.
- Attends conferences, manufacturing organizations, and exhibitions to build relationships and gain insights into Industry 4.0 initiatives. Evaluates and incorporates relevant Industry 4.0 initiatives into our program, identifying potential partnerships that align with our strategic goals. Advises faculty, postdocs, students, and staff on Industry 4.0, databases, software, and cybersecurity matters.
- Cybersecurity for Manufacturing Systems: Coordinates with IT to develop strategies for securely connecting new manufacturing machines, IoT devices, network storage, and databases, including defining access control and firewall rules. Implements and maintains robust cybersecurity frameworks that protect manufacturing systems and IoT networks from cyber threats. Conducts risk assessments to identify potential vulnerabilities in manufacturing and automation systems. Develops and implements a digital twin framework for cyber-physical security in manufacturing.
- Education, Mentorship, Knowledge Transfer and Training: Mentors undergraduates, researchers, developers, and engineers, guiding system design, architecture principles, and manufacturing best practices. Works with graduate students on their thesis, research areas, and topics, providing guidance and support to help them develop their projects effectively. Provides training on Industry 4.0 technologies such as IoT, AI, cloud computing, and digital twin implementation for technical and managerial audiences. Develops and delivers educational content on digital twin, cloud computing, and IoT in manufacturing, guiding technical and managerial audiences. Provides industry seminars and workshops, demonstrating the application of research and software solutions in smart manufacturing. Attends and presents at conferences, sharing research findings and insights while networking with industry professionals.

The responsibilities listed above show the typical duties for jobs in this classification. Actual tasks may differ depending on the department's needs. Other similar duties may be assigned with discretion of the supervisor. Not every duty will apply to every position, and the amount of time spent on each task can change based on department needs.

SUPERVISORY RESPONSIBILITIES

Supervisory Responsibility	May supervise employees but supervision is not the main focus of the job.

MINIMUM QUALIFICATIONS

To be eligible, an individual must meet all minimum requirements which are representative of the knowledge, skills, and abilities typically expected to be successful in the role. For education and experience, minimum requirements are listed on the top row below. If substitutions are available, they will be listed on subsequent rows and may only to be utilized when the candidate does not meet the minimum requirements.

MINIMUM EDUCATION & EXPERIENCE

Education Level	Focus of Education		Years of Experience	Focus of Experience	
Master's Degree	Computer Science, Software Engineering, or Cybersecurity	and	2 years of	experience in implementing Industry 4.0 technologies in a manufacturing environment, engineering and research practices and principles, database administration, smart manufacturing.	Or
PhD	Computer Science, Software Engineering, or Cybersecurity	and	0 years of	experience in implementing Industry 4.0 technologies in a manufacturing environment, engineering and research practices and principles, database administration, smart manufacturing.	

MINIMUM KNOWLEDGE, SKILLS, & ABILITIES

Knowledge and understanding of IoT, AI, machine learning, and big data analytics.	

MINIMUM KNOWLEDGE, SKILLS, & ABILITIES

Familiarity with robotics, PLCs, and automated control systems.	
Proficiency in data collection, storage, and analysis techniques.	
Insight into smart factories and digital twins.	
Strong analytical and problem-solving skills.	
Skills in planning, executing, and overseeing projects.	
Strong verbal and written communication skills for effective collaboration.	
Ability to learn quickly and implement new technologies and processes.	
Proficiency in programming languages and software used in Industry 4.0, such as Python, MATLAB, and various IoT platforms.	
Ability to identify, analyze, and solve complex technical issues.	
Ability to independently evaluate, select and apply standard engineering techniques and procedures while using judgment when making minor adaptations and modifications.	

MINIMUM LICENSES & CERTIFICATIONS

Licenses/Certifications	Licenses/Certification Details	Time Frame	Required/ Desired	
	IoT Certification		Desired	
	Certified Automation Professional (CAP)		Desired	
	Certified Systems Security Professional (CISSP)		Desired	
	Certified Data Scientist		Desired	
	Professional Engineer (PE) License		Desired	
	Project Management Professional (PMP)		Desired	

PHYSICAL DEMANDS & WORKING CONDITIONS

Physical Demands Category:	Other

PHYSICAL DEMANDS

Physical Demand	Never	Rarely	Occasionally	Frequently	Constantly	Weight
Standing			X			
Walking			X			
Sitting				X		
Lifting	X					
Climbing			X			
Stooping/ Kneeling/ Crouching			X			
Reaching				X		
Talking				X		
Hearing					X	
Repetitive Motions				X		
Eye/Hand/Foot Coordination				X		

WORKING ENVIRONMENT

Working Condition	Never	Rarely	Occasionally	Frequently	Constantly
Extreme cold			X		
Extreme heat			X		
Humidity			X		
Wet			X		
Noise			X		
Hazards			X		
Temperature Change			X		
Atmospheric Conditions			X		
Vibration			X		

Vision Requirements:

Ability to see information in print and/or electronically and distinguish colors.