

Complete Skills Inventory: Vanderbilt AI Certifications + Professional Experience

Sources:

- Four Vanderbilt University AI Specializations on Coursera (14 total courses)
- Professional AI Engineering Experience (Jobot Consulting, Outlier AI)
- Enterprise Software Architecture Experience (15+ years)

Instructor: Dr. Jules White, Associate Professor of Computer Science

16 Specific Prompt Engineering Patterns

1. **Persona Pattern** - Role-based AI interactions
 2. **Question Refinement Pattern** - Iterative query improvement
 3. **Cognitive Verifier Pattern** - Logic validation
 4. **Audience Persona Pattern** - Target audience customization
 5. **Flipped Interaction Pattern** - Reverse questioning
 6. **Game Play Pattern** - Gamification approaches
 7. **Template Pattern** - Structured response formats
 8. **Meta Language Creation Pattern** - Custom instruction languages
 9. **Recipe Pattern** - Step-by-step procedures
 10. **Alternative Approaches Pattern** - Multiple solution paths
 11. **Ask for Input Pattern** - Interactive prompting
 12. **Outline Expansion Pattern** - Hierarchical content development
 13. **Menu Actions Pattern** - Multiple choice interactions
 14. **Fact Check List Pattern** - Verification protocols
 15. **Tail Generation Pattern** - Content completion
 16. **Semantic Filter Pattern** - Content filtering and classification
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Core AI Technical Skills

Advanced Prompting Techniques:

- **In-Context Learning** - Building reliable prompts with examples
- **Chain of Thought Reasoning** - Multi-step problem solving
- **Few-Shot Learning** - Effective use of limited examples
- **ReAct Prompting** - Reason-Action prompting techniques
- **Retrieval Augmented Generation (RAG)** implementation
- **Template-based output formats** for precision AI interactions
- **Preference-driven refinement** for expert-level optimization

AI Safety & Risk Assessment:

- **Hallucination identification and management**
 - **Risk assessment frameworks** for AI applications
 - **Output verification and validation methods**
 - **Ethical AI deployment practices**
 - **Human-AI collaboration frameworks**
 - **Problem framing to reduce AI risks**
 - **Problem suitability assessment** for determining appropriate AI applications
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Software Engineering & Development Skills

Claude Code & AI Orchestration:

- **Claude Code orchestration** for managing multiple AI developers
- **Git workflows** - Managing parallel AI agents across multiple branches
- **"Best of N" pattern** - Generate multiple feature versions and cherry-pick optimal components
- **CLAUDE.md files** - Perfect project context establishment for AI agents
- **Command libraries** - Complex workflow compression into single prompts
- **Git worktrees and AI subagents** - Parallel feature development with automatic integration
- **Multimodal prompting** - Converting sketches to complete UI components

Python AI Agent Development:

- **Python agent development** for autonomous data processing
- **Agent architectures** for sophisticated autonomous systems
- **Document analysis automation** across multiple file types
- **Multi-step workflow automation** for complex business processes
- **OpenAI API integration**
- **Anthropic API integration**

Custom AI Systems:

- **Custom GPT creation** for business-specific applications
 - **Domain-specific AI development** for industry contexts
 - **Business process automation** through intelligent interfaces
 - **Document integration systems** for organizational knowledge
 - **Workflow automation** with custom AI interfaces
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Data Analysis & Intelligence Skills

Data Analysis Frameworks:

- **CLUE Framework** - Comprehensive database context establishment
- **TRUST Method** - Query result verification and accuracy assurance
- **CAPTURE Pattern** - Reproducible analysis pipeline construction
- **DEBUG Framework** - Efficient SQL troubleshooting
- **Experimental Query Generation** - Complex query building through exploration
- **Visualization-First Query Design** - Query structuring for optimal visual output

Advanced Data Processing:

- **AI-Powered Data Exploration** - Systematic dataset examination
- **Data Unification Techniques** - Multi-source data merging
- **Error Detection and Resolution** - AI-assisted debugging
- **Automated Data Extraction** - Unstructured to structured data conversion
- **Narrative Construction** - Compelling story creation from insights
- **Traceability Framework** - Complete documentation of analysis steps

Multi-Modal Data Capabilities:

- **Multi-Modal Data Processing** - Text, image, video, and structured data handling
- **Automated Workflow Design** - End-to-end analytical pipeline creation
- **Document Intelligence** - PDF and unstructured document insights
- **Visual Analytics** - Data-to-presentation transformation
- **Content Generation Pipeline** - Analysis-to-marketing material workflows

Technical Integration:

- **Excel-ChatGPT integration** and cross-platform data processing
 - **Natural language to SQL query conversion**
 - **Database integration with AI systems**
 - **Automated visualization generation**
 - **ChatGPT Code Interpreter functionality**
 - **Real-time data processing capabilities**
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Leadership & Strategic Implementation Skills

Executive AI Applications:

- **Agenda Architecting** - AI-driven meeting planning and coordination
- **Proposal Proficiency** - AI-assisted strategic analysis and risk identification
- **Private Think-Tank** - AI as confidential strategic partner
- **Masterful Communication** - AI-enhanced executive messaging
- **HR Dynamics Navigation** - AI-supported complex management situations
- **Leadership Transitions Management** - AI-assisted succession planning

Organizational Transformation:

- **Change Management** for AI adoption with anxiety mitigation
- **Augmented Intelligence** deployment across organizations
- **Cognitive Enhancement** through "Exoskeleton for the Mind" concept
- **Productivity Acceleration** achieving 50-80% work completion improvements
- **Strategic Planning Facilitation** through AI brainstorming

- **Business Process Automation** via effective prompting

Governance & Risk Management:

- **Risk Framing Methodologies** - Strategic risk minimization approaches
 - **Trust-Based Prompt Engineering** - Reliable, verifiable output techniques
 - **Human-AI Collaboration Models** - Appropriate oversight frameworks
 - **Quality Assurance Protocols** - Decision-making checks and balances
 - **Output Verification Methods** - Strategic insight validation
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Business Process & Workflow Skills

Automation & Integration:

- **Document analysis automation** across multiple file types
- **Multi-step workflow automation** for complex business processes
- **Business process automation** through intelligent interfaces
- **End-to-end analytical pipeline creation**
- **Cross-platform data processing**
- **Template-based output formatting** for precision AI interactions

Content & Communication:

- **Social media content generation** from transcripts
- **Automated report generation**
- **Excel file transformation** into visualizations and PowerPoint presentations
- **PDF data extraction and analysis workflows**
- **Document processing and transformation techniques**
- **Image and video resizing** with automated cataloging

Domain-Specific Applications:

- **Domain-expert AI assistant creation**
- **Social media analysis and survey interpretation**
- **Policy compliance verification systems**
- **Pattern recognition through AI assistance**

- **Collaborative data exploration techniques**
 - **Multi-format data processing** (Excel, PDF, CSV, images, videos)
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Assessment & Validation Methodologies

Quality Assurance:

- **Framework application** in authentic contexts
- **Peer verification** of approaches
- **Technical functionality assessments**
- **Strategic impact measurements**
- **Systematic prompt testing and validation**
- **Cross-model prompt comparison and optimization**

Project Implementation:

- **Real-world scenario implementations**
 - **Portfolio development** of AI-enhanced tools
 - **Cross-domain application demonstrations**
 - **Iterative refinement exercises**
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Professional Experience Skills

AI System Evaluation & Quality Assurance:

- **Systematic evaluation of LLM code outputs** with weakness identification
- **Adversarial safety checks and vulnerability assessment**
- **Prompt validation and code/system analysis** for deployment readiness
- **Multi-agent orchestration security evaluation**
- **Structured feedback systems** for LLM refinement and improvement
- **Code correctness and architectural integrity validation**
- **Production system quality assurance** for mission-critical applications
- **Deployment readiness assessment** through systematic analysis

Advanced Testing & Benchmarking:

- **A/B testing and comparative analysis methodologies**
- **Prompt performance testing** across reliability, latency, and output quality
- **Version-controlled prompt experiments** with automated logging
- **Reproducible evaluation pipelines** with structured reporting (CSV, JSON, Markdown)
- **Quantitative performance benchmarking** across multiple LLM platforms
- **Hallucination rate assessment and adversarial robustness testing**
- **Automated testing integration** with development workflows

Multi-Platform AI Implementation:

- **Multi-platform LLM optimization** (OpenAI GPT, Anthropic Claude)
- **Cross-platform prompt framework development**
- **Domain-specific prompt libraries** across analytics, compliance, and operations
- **Multi-turn conversational system design and testing**
- **Reusable prompt framework development** for production systems
- **Modular system prompt architecture** with documentation standards

Production AI Workflow Design:

- **Conversational flow design** for multi-turn interactions
- **Prompt-based QA methods** for automated workflows
- **Domain-specific prompt optimization** for compliance and analytics
- **Multi-agent orchestration and automated code review workflows**
- **Scalable cross-team deployment standards**

Enterprise Software Architecture:

- **Enterprise system modernization** (VB6/ASP to Java platforms)
- **Mission-critical software architecture** for defense systems
- **Advanced analytics platform development** (15+ years experience)
- **Strategic military operations data analysis**
- **Enterprise data system architecture and optimization**
- **Legacy system modernization and platform migration**

Technical Leadership & Governance:

- **Standards and compliance enforcement** in system design
- **Architecture committee leadership** for security standards
- **Enterprise Architecture Advisory committee chair**
- **Distinguished Engineer level technical leadership**
- **Cross-team standards establishment and documentation**
- **Organizational transformation through technology adoption**
- **15+ years of senior technical leadership** in mission-critical environments

Development & Integration Technologies:

- **Python, SQL, Java, C++, C# development expertise**
 - **Git/GitHub version control** and collaborative development
 - **CI/CD implementation using Jenkins** for build automation
 - **Jenkins CI/CD pipeline implementation**
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Combined Expertise Integration

Unique Skill Combinations:

The intersection of formal AI education and hands-on production experience creates specialized capabilities in:

- **Enterprise-grade AI system deployment** with security and compliance considerations
 - **Systematic evaluation frameworks** that combine academic rigor with production requirements
 - **Multi-platform prompt optimization** informed by both theoretical patterns and real-world performance data
 - **Risk assessment and validation** that integrates formal AI safety principles with practical deployment experience
 - **Leadership in AI transformation** combining strategic vision with technical implementation knowledge
 - **Quality assurance methodologies** that bridge academic evaluation techniques with enterprise testing standards
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Summary

This comprehensive skills inventory encompasses:

Academic Foundation:

- 14 courses across four specialized domains
- 160+ hours of structured AI education
- 16 specific prompt engineering patterns
- Formal frameworks and methodologies

Professional Application:

- 3+ years of production AI system development
- Enterprise-scale deployment experience
- Multi-platform LLM optimization
- Mission-critical system architecture (15+ years)

Combined Value: The unique combination of comprehensive formal training and extensive hands-on experience provides capabilities that span from theoretical AI safety and optimization to practical enterprise deployment and governance.

Total Learning Investment: 160+ hours of structured AI education plus 3+ years of professional AI engineering experience, supported by 15+ years of enterprise software architecture and technical leadership.

All skills are derived from either official Coursera course curricula or documented professional work experience, representing verifiable competencies in generative AI applications across technical, strategic, and enterprise contexts.