PURDUE UNIVERSITY | Delivered by simplilearn

Applied Generative AI Specialization

Table of Contents

About the Program

Generative Artificial Intelligence (Generative AI) is poised for exponential growth, fueled by staggering projections and its transformative potential across industries. By 2030, the Generative AI market is anticipated to surge by an astounding $667.9 billion, representing a remarkable 24.4% projected annual growth rate (CAGR) from 2023 to 2030. This growth trajectory underscores the increasing adoption and integration of Generative AI technologies into various sectors of the economy.

The impact of Generative AI extends far beyond market size. It is projected to contribute a substantial $4.4 trillion to the global economy annually. Such a significant contribution underscores the pivotal role Generative AI is poised to play in driving innovation, efficiency, and economic growth worldwide.

Generative AI's ability to autonomously create content, designs, and solutions is reshaping industries ranging from entertainment and healthcare to finance and manufacturing. Its diverse and far-reaching applications facilitate creative automation, personalized experiences, and data-driven decision-making processes.

Master the art and science of Generative AI with the Applied Generative AI Specialization program, a Purdue University and Simplilearn collaboration, and shape the future of a gen AI-driven world by learning in-demand skills and techniques. This game-changing program covers essential tools and concepts like prompt engineering, large language models, attention mechanisms, and LLM fine-tuning. You'll learn from experienced instructors through live interactive sessions and work-ready training through hands-on projects.

Key Features of the Program

Program completion certificate from Purdue University Online and Simplilearn

Access to Purdue's alumni association membership on program completion

50+ hours of core curriculum delivered in live-online classes by industry experts

Build Generative AI-enabled applications through hands-on projects

Live-online masterclasses delivered by Purdue faculty and staff

Gain exposure to ChatGPT, OpenAI, Dall-E, Hugging Face & other prominent tools

Get official learning path completion trophy and badges for 'Microsoft Azure AI Fundamentals: Generative AI'

Simplilearn's JobAssist helps you get noticed by top hiring companies

About Purdue University

A beacon of academic excellence, Purdue University is located in West Lafayette, Indiana. With a rich history dating back to its founding in 1869, Purdue has evolved into a prestigious institution renowned for its commitment to innovation, research, and education.

At the heart of Purdue's mission is its dedication to fostering intellectual curiosity and preparing students to tackle the challenges of tomorrow. With a diverse array of undergraduate, graduate, and professional programs spanning disciplines from engineering to liberal arts, Purdue offers students a comprehensive educational experience that equips them with the skills and knowledge to thrive in a rapidly changing world.

Purdue University boasts a distinguished faculty of leading scholars, researchers, and industry experts at the forefront of their respective fields. Through their mentorship and guidance, students are encouraged to explore their passions, push boundaries, and pursue groundbreaking research that addresses pressing global issues.

About Simplilearn

Simplilearn is the world's #1 online bootcamp provider, enabling learners around the globe with rigorous and highly specialized training offered in partnership with world-renowned universities and leading corporations. We focus on emerging technologies and skills transforming the global economy, such as artificial intelligence, data science, cloud computing, programming, and more. Our hands-on and immersive training includes live virtual classes, integrated labs and projects, 24x7 support, and a collaborative learning environment. Over two million professionals and 2000 corporate training organizations across 150 countries have harnessed our award-winning programs to achieve their career and business goals.

Eligibility Criteria

For admission to this Applied Generative AI Specialization program, candidates should:

- Be at least 18 years old and have a high school diploma or equivalent
- Have basic understanding of programming concepts and mathematics
- Preferably have 2+ years of professional wok experience, but not mandatory

Application Process

The application process consists of three simple steps.

Submit an Application

Complete the application, including a brief statement of purpose explaining your interest and qualifications for the program.

Application Review

A panel of admissions counselors will review your application and statement of purpose to determine whether you qualify for acceptance.

Admission

An offer of admission will be made to qualified candidates. You can accept this offer by paying the program fee.

Talk to an Admissions Counselor

Our team of dedicated admissions counselors is prepared to address your questions or concerns about this Business Analytics & Generative AI program.

- Answer your questions about the application process
- Discuss your financing options
- Provide insight into the curriculum, program outcomes, and more.

Inquire Now

Contact Us | 1-800-212-7688

Generative AI Industry Trends

$667.9 bn

Expected Generative AI market size by 2030

Source: Fortune Business Insights

27.7%

The global Generative AI market's projected annual growth rate (CAGR) from 2023-2030

Source: Statista

$4.4 tn

Expected value added by Generative AI to the global economy annually

Source: Mckinsey

Who is this Program Ideal for?

This program caters to working professionals from various industries and backgrounds; the diversity of our students adds richness to class discussions and interactions. Generative AI is a solid career choice for both new and experienced professionals. Working professionals looking to upskill on the latest advancements of Generative AI, who have basic programming skills and an analytical frame of mind, are most suited to pursue this Applied Generative AI Specializationprogram, including:

- IT professionals
- Data analysts
- Business analysts
- Data scientists
- Software developers
- Analytics managers
- Data engineers
- Beginners or recent graduates with a bachelor's or master's degree

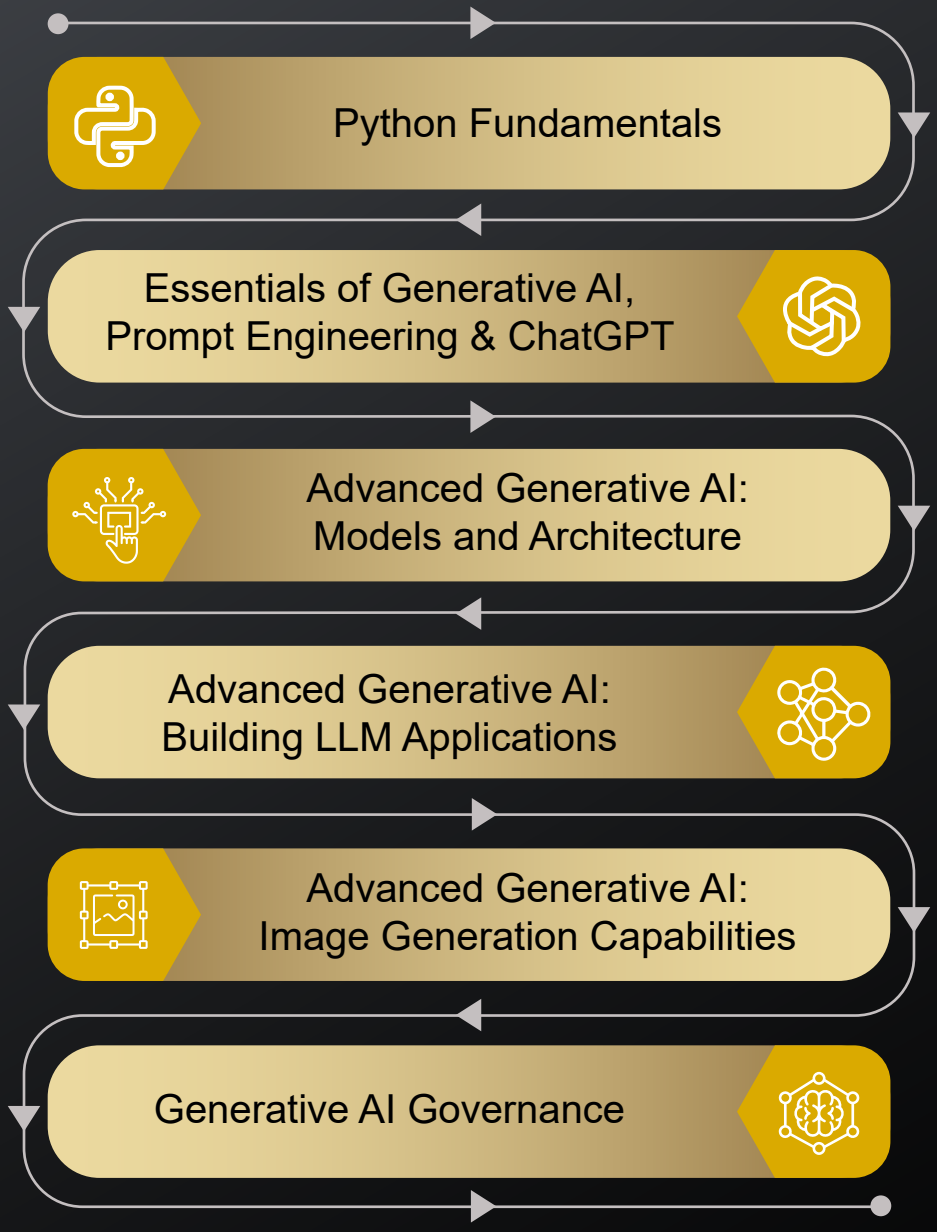
Program Outcomes

- Mastery of Python fundamentals, including procedural and object-oriented programming concepts
- Implementation of identifiers, indentations, and comments with precision
- Ability to implement various types of Python loops and comprehend variable scope in functions
- In-depth knowledge of generative AI, prompt engineering, and ChatGPT
- Effective utilization of AI technologies to solve real-world problems efficiently
- Understanding of various generative models including Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and attention mechanisms
- Advanced knowledge of prompt engineering techniques for customizing outputs
- Proficient installation and usage of Python and IDEs, with expertise in Jupyter Notebook
- Proficient understanding of Python data types, operators, and string manipulation techniques
- Comprehensive understanding of object-oriented programming (OOP) principles and characteristics
- Hands-on skills in implementing these concepts across diverse business applications
- Understanding of the significance of prompt engineering in tailoring outputs for specific needs
- Proficiency in implementing advanced generative AI techniques such as Langchain and workflow design
- Ability to develop and fine-tune Large Language Models (LLMs) for specific applications

- Competence in benchmarking and evaluating the capabilities of LLMs for different tasks
- Understanding of the importance of governance in AI and specific challenges in the context of generative AI
- Familiarity with ethical principles governing AI technologies
- Knowledge of governance structures, committees, and risk management strategies in AI projects
- Ability to integrate governance considerations into the AI project lifecycle
- Awareness of the evolving regulatory landscape and future trends in AI governance

Learning Path

Core Topics:



Electives:

Microsoft Azure AI Fundamentals: Generative AI

Python Fundamentals

Build essential Python skills that will serve as the building blocks for your learning journey. Utilize Python to implement artificial intelligence (AI) and machine learning (ML) algorithms effectively, conduct data analysis, and construct intelligent systems efficiently.

Learning Outcomes

- Acquire knowledge of procedural and object-oriented programming
- Install Python and its integrated development environment (IDE)
- Implement Python identifiers, indentation, and comments effectively
- Learn about the various types of loops in Python
- Explain the concepts of object-oriented programming (OOP) and its characteristics
- Gain an understanding of multi-threading
- Explore the advantages of using Python
- Get experience with Jupyter Notebook and its usage
- Identify Python's data types, operators, and string functions
- Explore the scope of variables within functions
- Describe methods, attributes, and access modifiers in Python

Topics Covered

- Fundamentals of Programming
- Python Data Types and Operators
- Conditional Statements and Loops in Python
- Threading
- Introduction to Python Programming
- Python Functions
- Object-Oriented Programming Concepts with Python

Essentials of Generative AI, Prompt Engineering & ChatGPT

This course provides a comprehensive understanding of generative AI models focusing on ChatGPT. You will gain an understanding of the essentials of generative AI and its landscape, prompt engineering, explainable AI, conversational AI, ChatGPT, and other LLMs.

Learning Outcomes

- Understand the fundamentals of artificial intelligence and generative AI models, including the working principles and various types of generative AI models
- Apply effective prompt engineering techniques to improve the performance and control the behavior of generative AI models
- Identify and explore diverse applications and use cases where ChatGPT can be leveraged
- Understand the potential of generative AI to revolutionize industries and examine prominent generative AI tools in depth
- Comprehend the concept of explainable AI, recognize its significance, and identify different approaches to achieve explainability in AI systems
- Gain an understanding of ChatGPT, including its working mechanisms, notable features, and limitations
- Recognize the ethical challenges of generative AI models and ChatGPT to ensure responsible data usage, mitigate bias, and prevent misuse
- Gain insights into the future of generative AI, its challenges, and the steps needed to unlock its full potential

Topics Covered

- Generative AI and its Landscape
- Conversational AI
- Designing and Generating Effective Prompts
- ChatGPT and its Applications
- Ethical Considerations in Generative AI Models
- The Future of Generative AI
- Explainable AI
- Prompt Engineering
- Large Language Models
- Fine-tuning ChatGPT
- Responsible Data Usage and Privacy
- AI Technologies for Innovation

Advanced Generative AI: Models and Architecture

Unlock the creative potential of artificial intelligence with this Generative AI course. Dive into the fascinating world of generative models, including Variational Autoencoders (VAEs) and Generative Adversarial Networks (GANs), and explore the revolutionary Large Language Models (LLMs) and Transformer architectures. Delve deep into attention mechanisms and learn how they enhance the capabilities of AI models.

Learning Outcomes

- Understand the importance of generative AI and its modern applications
- Identify and describe various generative AI model types
- Explore the architecture and implications of large language models (LLMs)
- Implement Variational Autoencoders (VAEs) for data generation and anomaly detection
- Understand Generative Adversarial Networks (GANs) and their practical applications
- Explore attention mechanisms, transformer architecture and practical applications of transformers

Topics Covered

- Introduction to Generative Models
- Large Language Models Architecture
- Variational Autoencoders (VAEs)
- Generative Adversarial Networks (GANs)
- Attention Mechanisms and Transformers

Advanced Generative AI: Building LLM Applications

Explore the intricacies of LangChain Workflow Design, mastering the art of orchestrating language generation processes. Dive deep into Advanced Prompt Engineering, honing your ability to craft prompts that elicit desired responses from AI models. Learn the ins and outs of Large Language Model (LLM) Application Development, harnessing the power of cutting-edge language models for diverse applications. Discover the nuances of fine-tuning, refining LLMs to suit specific tasks and domains. Finally, delve into Benchmarking LLM Capabilities, evaluating and comparing model performance against industry standards.

Learning Outcomes

- Design LangChain workflows for generative AI applications
- Apply advanced prompt engineering techniques for tailored outputs
- Develop LLM applications and fine-tune models for specific tasks
- Evaluate LLM capabilities for summarization, Q&A, translation, chatbots, and sentiment analysis

Topics Covered

- LangChain and Workflow Design
- Advanced Prompt Engineering Techniques
- LangChain for LLM Application Development
- LLM Fine-Tuning and Customization
- Benchmarking and Evaluating of LLM Capabilities

Advanced Generative AI: Image Generation Capabilities

Explore the cutting-edge capabilities of Generative AI in image generation with our specialized course. Delve into Stable Diffusion and Denoising techniques, mastering the art of producing high-quality and coherent images from noisy data. Unlock the potential of Shared Embedding Systems, enabling seamless integration and representation of diverse image features. Learn Contrastive Learning Techniques to enhance model performance by leveraging data similarities and differences effectively.

Learning Outcomes

- Understand and implement stable diffusion methods to generate high-quality images from noisy or incomplete data
- Acquire proficiency in denoising techniques to enhance the clarity and fidelity of generated images
- Learn to leverage shared embedding systems to effectively represent diverse image features
- Gain hands-on experience in applying contrastive learning techniques to enhance model performance

Topics Covered

- Stable Diffusion
- Denoising
- Autoencoders in Generative AI
- Contrastive Learning Techniques
- Shared Embedding Spaces

Generative AI Governance

Explore the significance of Generative AI governance, challenges in Generative AI, ethical principles, governance structures, risk management, integrating governance into Generative AI projects, regulatory changes, and emerging trends in Generative AI governance.

Learning Outcomes

- Understand the importance of governance in Generative AI
- Recognize the role of governance in Generative AI projects for ensuring accountability and mitigating risks
- Implement ethical guidelines in Generative AI through fairness, bias mitigation, and privacy protection
- Learn risk management in Generative AI projects, including identification, mitigation strategies, and real-world case studies
- Explore future trends in Generative AI governance, including regulatory landscape, ethical innovation, and career opportunities
- Identify and address governance challenges in Generative AI, including ethical considerations and regulatory landscape
- Explore ethical foundations in Generative AI, including principles, moral dilemmas, and responsible development
- Establish governance structures and committees for Generative AI, defining roles, best practices, and communication strategies
- Integrate governance into the Generative AI project lifecycle, considering model selection, data sourcing, and auditing

Topics Covered

- Introduction to Generative AI Governance
- Governance Structures and Committees
- AI Project Lifecycle and Governance
- Ethical Frameworks and Principles
- Risk Management in AI Projects
- Future Trends in AI Governance

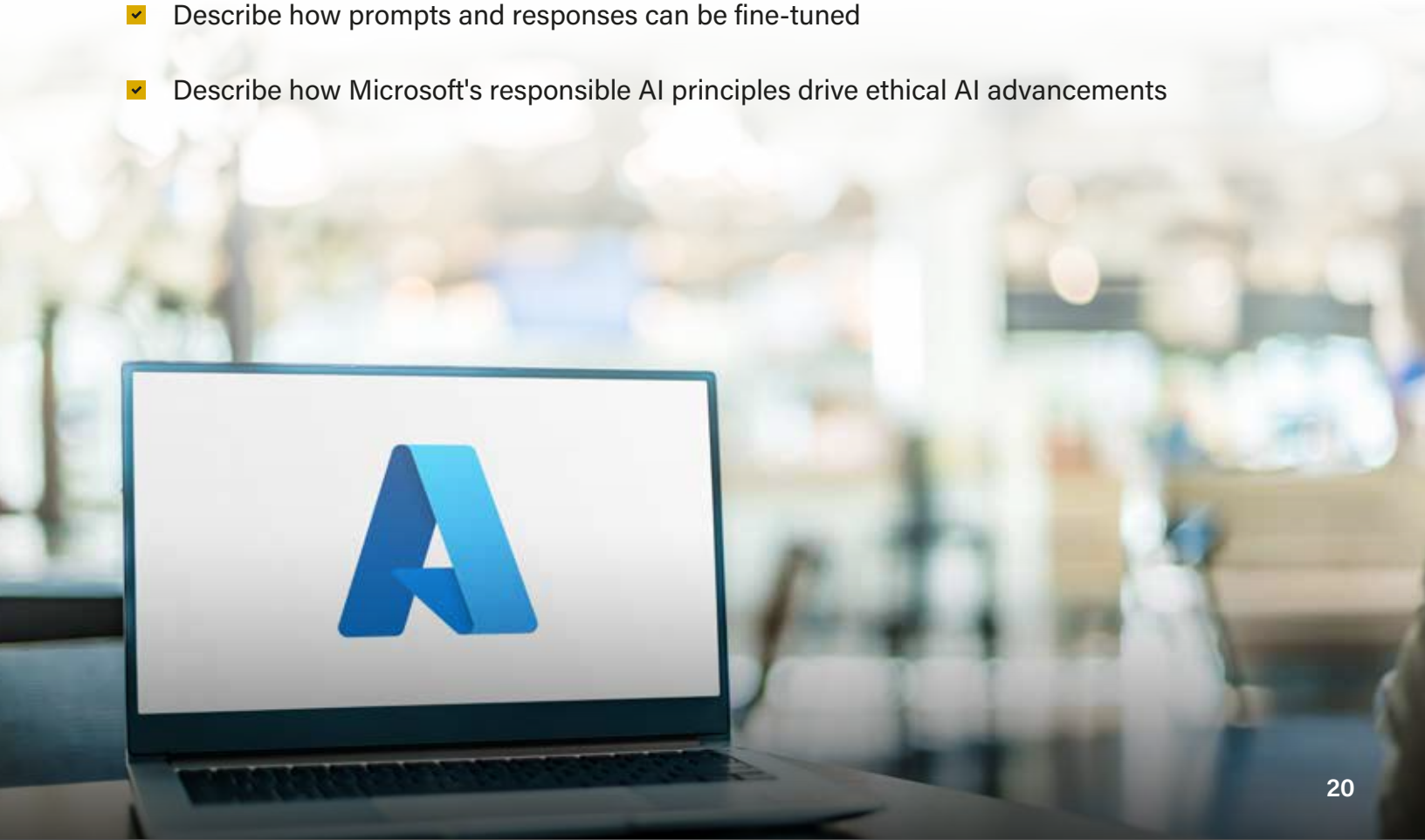
Electives

Microsoft Azure AI Fundamentals: Generative AI

This learning path on the Microsoft Learn portal aims to provide you with a foundational understanding of Generative AI concepts, techniques, and ethical considerations, preparing you to explore further and apply your knowledge in practical scenarios.

While undertaking this learning path, you will:

- Understand how large language models form the foundation of generative AI
- Describe how Azure OpenAI Service provides access to the latest generative AI technology
- Understand how generative AI applications, such as copilots, support efficiencies
- Describe how prompts and responses can be fine-tuned
- Describe how Microsoft's responsible AI principles drive ethical AI advancements



Skills Covered

- Python Programming
- Prompt Engineering
- Generative Adversarial Networks (GANs)
- LLM Architecture
- Langchain for Workflow Design
- LLM Fine-Tuning
- Stable Diffusion
- Explainable AI
- Variational Autoencoders (VAEs)
- Transformers
- Attention Mechanism
- GenAI Application Development
- LLM Benchmarking
- Generative AI Governance

Tools Covered

Industry Projects

Crafting an AI Powered HR Assistant

Develop a virtual assistant designed to answer queries related to Nestle's HR policy. Leverage Python libraries and OpenAI's GPT model for accurate and efficient query responses.

Building a Creative Logo Designer

Use OpenAI's DALL-E and Gradio UI to develop an innovative logo builder. The app creates unique and stunning logos from text prompts, revolutionizing the logo design process.

Conversational chatbot that interacts with documents

Create a conversational chatbot able to engage users in meaningful dialogues, answer queries, offer recommendations, and aid tasks using provided documents as inputs.

Finetune Falcon-7b's Personalized LLM Instance

Embark on building a personalized language model with Falcon-7b. Utilize personalized LLM technique to explore text generation capabilities by providing task examples as inputs.

Developing an Image Generation App with LangChain

Create an application which uses LangChain to connect OpenAI API to DALL-E. This image generation application turns written descriptions into lifelike pictures and artwork.

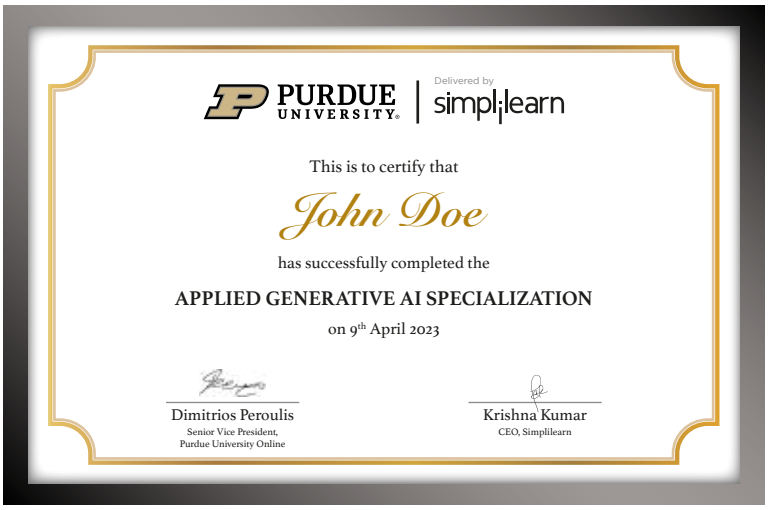
Developing a Shopping Application using Python

Develop a Python shopping app with login features, category management, cart functionality, and payment options. Backend only, no UX/UI or database needed.

Creating an Online Car Rental Platform

Create an online car rental platform where customers can view and rent cars hourly, daily, or weekly.
Use Python OOP for development.

University Certificate



Upon completing this Applied Generative AI Specialization program, you will receive a program completion certificate from Purdue University Online and Simplilearn. You will also receive certificates from Simplilearn for the courses completed in the learning path. These certificates will testify to your skills as a Generative AI expert.

Industry Certificate

Collaborating with Microsoft:

- Get an official certificate/trophy/badge hosted on the Microsoft Learn portal
- Acquire an official Microsoft learning path completion transcript

USA

Simplilearn Americas, Inc.
201 Spear Street, Suite 1100, San Francisco, CA 94105
United States
Phone No: +1-844-532-7688

INDIA

Simplilearn Solutions Pvt Ltd.
53/1 C, Manoj Arcade, 24th Main, Harlkunte
2nd Sector, HSR Layout
Bangalore - 560102
Call us at: 1800-212-7688

www.simplilearn.com