Course Title: Python & Generative AI Fundamentals: A 7-Day Bootcamp for Aspiring Innovators

Target Audience: Pursuing Candidates (Undergraduate/Graduate students exploring AI and programming)

Duration: 7 Days, 1.5 hours per day (Total 10.5 hours)

Overall Goal: To provide a foundational understanding of Python programming and introduce the exciting world of Generative AI with practical examples relevant to their future endeavors.

Day-by-Day Breakdown:

Day 1: Python Essentials - Getting Started (1.5 hours)

- Introduction to Python: Why Python for AI? Setting up the development environment (Anaconda/Colab). Basic syntax, variables, data types (integers, floats, strings, booleans).
- Control Flow: Conditional statements (if, elif, else), loops (for, while). Simple examples.
- **Hands-on:** Writing basic Python scripts, experimenting with data types and control flow.

Day 2: Python Data Structures & Functions (1.5 hours)

- **Data Structures:** Lists, tuples, dictionaries, sets their properties and basic operations.
- **Functions:** Defining and calling functions, passing arguments, return values. Introduction to built-in functions.
- Hands-on: Working with data structures and creating simple functions.

Day 3: Introduction to Generative AI & Core Concepts (1.5 hours)

- What is Generative AI? High-level overview, examples (text generation, image generation, music composition).
- Key Concepts: Understanding the basics of Machine Learning (briefly), Neural Networks (very high-level), and the idea of generating new data.
- Introduction to relevant Python libraries: transformers (Hugging Face briefly introduce its purpose).

Day 4: Text Generation with Transformers (1.5 hours)

- Introduction to Hugging Face Transformers: Installing the library, understanding pipelines.
- **Text Generation Task:** Using pre-trained models for basic text generation (e.g., completing sentences, simple story generation).
- **Exploring Model Parameters:** Briefly touch upon concepts like temperature and top-k sampling to influence output.

• **Hands-on:** Generating text using pre-trained models with different prompts and parameters.

Day 5: Image Generation Fundamentals (1.5 hours)

- Introduction to Image Generation Concepts: Briefly discuss diffusion models (high-level, no deep math).
- Using Pre-trained Image Generation Models (Simplified): Utilizing online platforms or simplified Python libraries (if feasible within the time, focusing on ease of use).
- Understanding Prompts for Image Generation: How to effectively describe what you want to generate.
- Ethical Considerations: Briefly discuss the ethical implications of image generation.
- Hands-on: Experimenting with image generation using provided tools/platforms.

Day 6: Combining Python and Generative AI (1.5 hours)

- **Building Simple Applications:** Using Python to interact with text and image generation models.
- **Example 1 (Text):** Creating a simple script to take user input and generate a story prompt.
- **Example 2 (Image):** (If feasible) A basic script to generate an image based on text input using a simplified library or API.
- **Discussion:** Potential applications of combining Python and Generative AI in various fields relevant to pursuing candidates (e.g., content creation, research, creative projects).

Day 7: Future Directions & Project Ideas (1.5 hours)

- Exploring Advanced Generative AI Models: Briefly introduce more complex models and their capabilities (e.g., larger language models, more sophisticated image generators).
- Ethical Considerations in Depth: Discuss bias, misinformation, and responsible use of Generative AI.
- **Resources for Further Learning:** Recommended books, websites, courses, and communities for continued exploration.
- **Project Ideas for Pursuing Candidates:** Brainstorming potential projects that students can work on to further develop their skills.
- **Q&A and Wrap-up:** Addressing student questions and summarizing the key takeaways from the bootcamp.