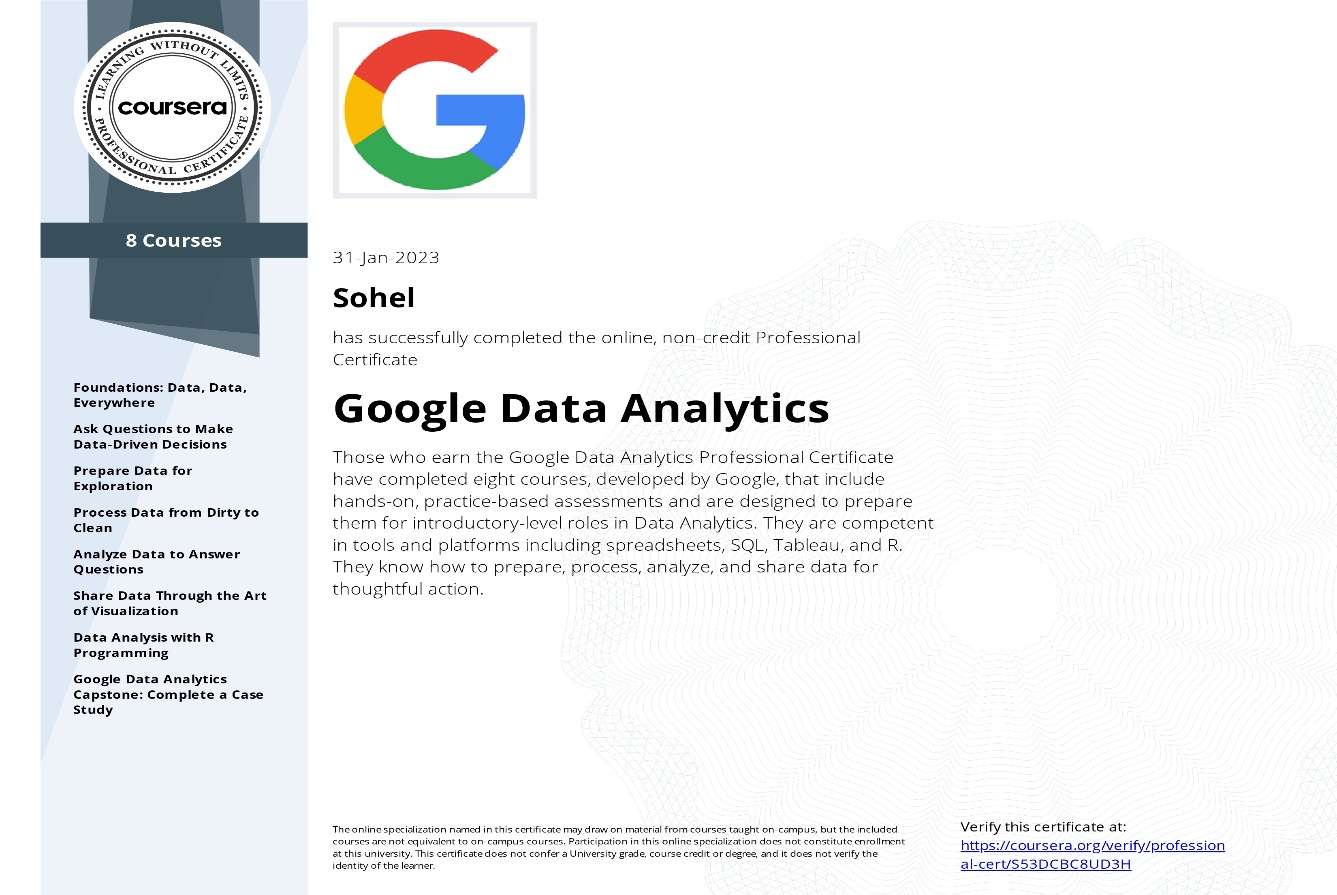
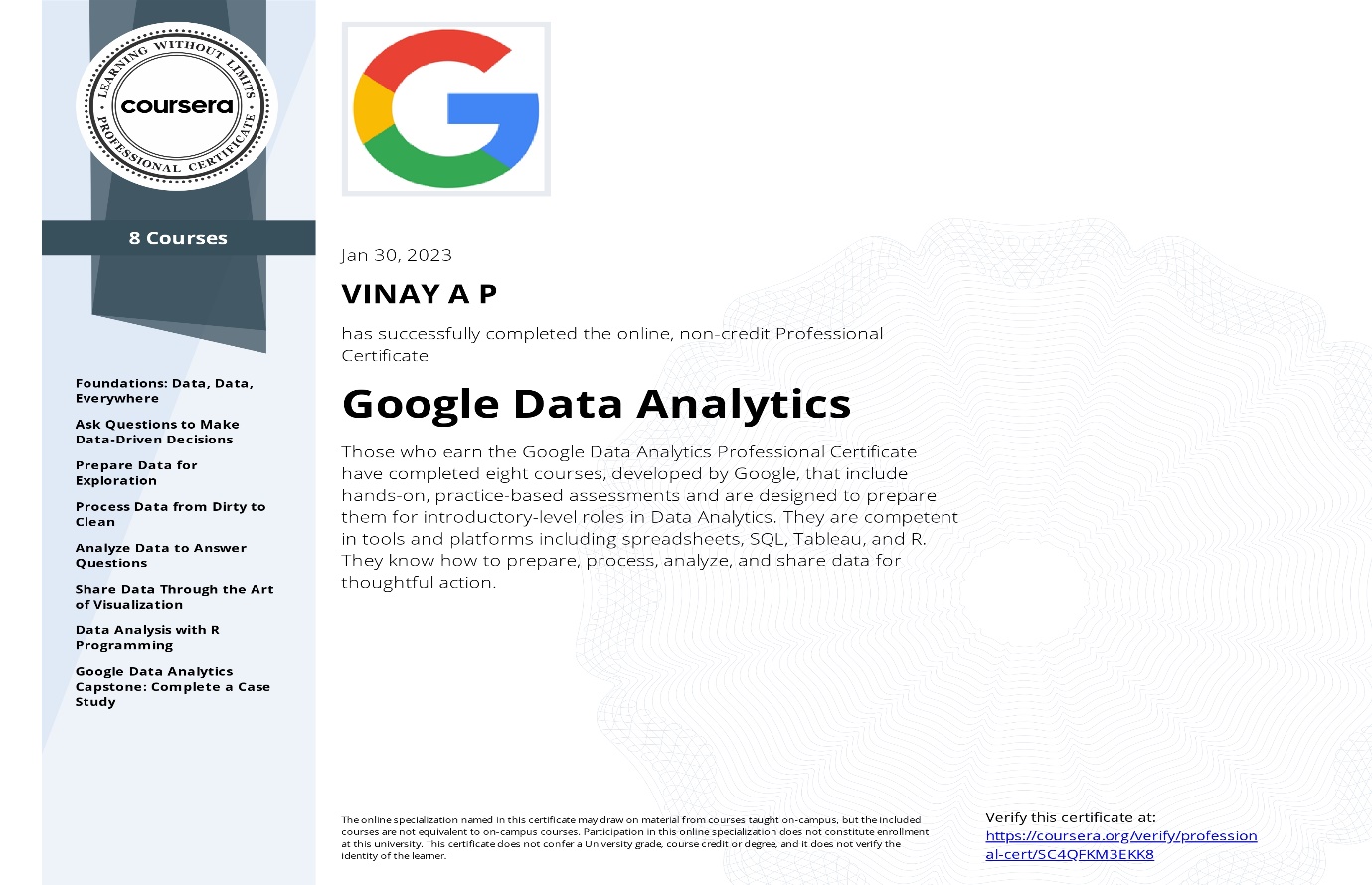
**APPENDICES**

**APPENDIX A: CERTIFICATES OF ONLINE COURSES ATTENDED**

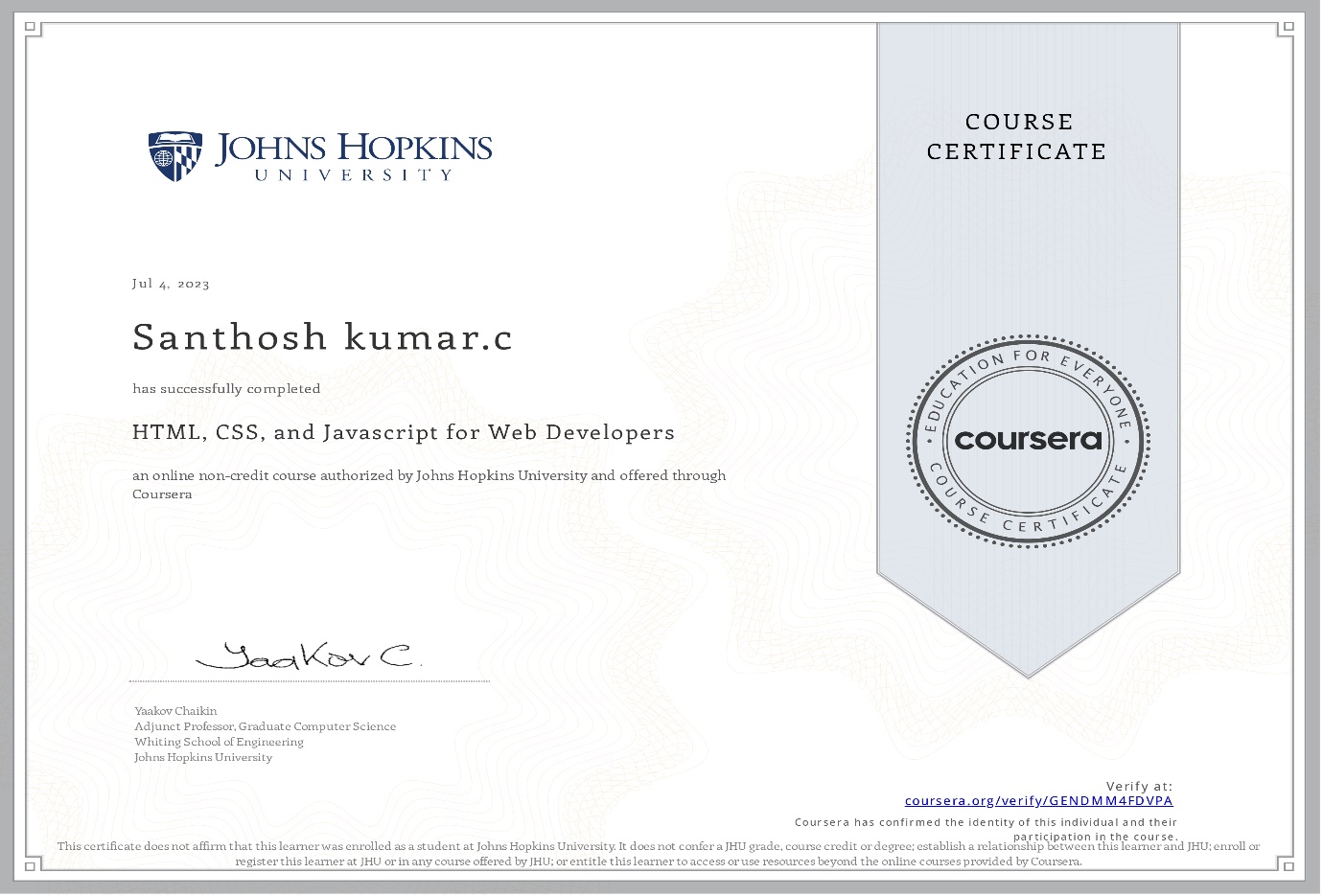


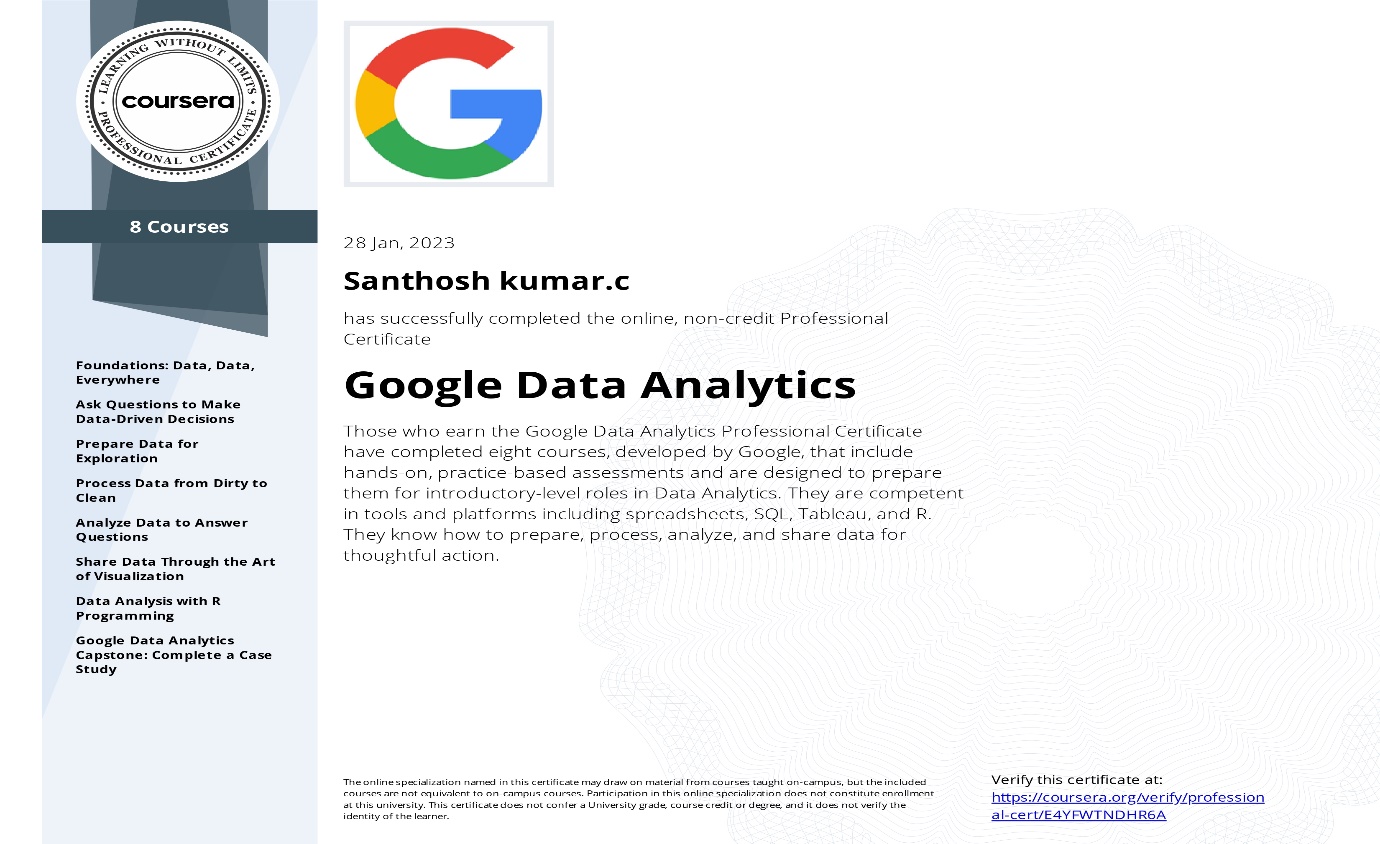












**APPENDIX B: CERTIFICATE OF PAPER PRESENTATION**









**APPENDIX D: FINAL PLAGIARISM CHECK REPORT**

**APPENDIX E: INSTALLATION AND EXECUTION STEPS**

**1.Installation Steps:**

* Set Up Environment:
  + Install Python and Jupyter Notebook
  + Ensure Python is installed on your machine. You can download it from python.org.
  + Install Jupyter Notebook using pip:
  + pip install jupyter.
* Install Required Python Libraries:
* Install necessary libraries such as NumPy, pandas, matplotlib, and networkx for network simulations and data processing.

pip install numpy pandas matplotlib network.

* Set Up NS2 (Network Simulator 2):
* Download and install NS2 from NS2 official site.
* Follow the installation instructions provided on the site to set up NS2 on your system.

**2.Execution Steps:**

* Start Jupyter Notebook:
  + Open your command line and navigate to the directory where your Jupyter Notebook files are located.
  + Load and Execute the Python Code
  + Open the specific Jupyter Notebook file (.ipynb) that contains project code.
* Execution Steps for NS2
* Place hashchain.tcl in Your Working Directory:
* Ensure the hashchain.tcl file is in your current working directory or provide the correct path to it.
* Execute the TCL Script:
* Open a terminal and navigate to the directory containing hashchain.tcl.
* Run the following command to execute the script:
* ns hashchain.tcl.
* Generate Output Files:
* The script will generate output files such as trace files (.tr) and NAM files (.nam), which contain simulation results and visualization data, respectively.
* Visualize the Simulation Using NAM:
* If your script generates a NAM file (e.g., output.nam), you can visualize the simulation using Network Animator (NAM).
* Run the following command to start NAM:
* nam output.nam
* This will open the NAM interface, where you can observe the simulated network behavior.

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