Learning Outcomes:

LO1: Design and implement analytics strategies for chatbots, apply natural language processing (NLP) techniques to analyse user interactions and sentiment, fostering innovation in chatbot performance evaluation.

LO2: Conduct comprehensive research on industry-specific chatbot optimization challenges, critically analyse case studies and emerging trends to develop data-driven optimization strategies tailored to real-world applications.

LO3: Actively engage with practical projects to optimize chatbot performance, focusing on user-centric design, personalized responses, and ethical considerations, and communicate their findings effectively to non-technical stakeholders, bridging the gap between theory and practical implementation.

Overview:

This assignment challenges students to explore, implement, and critically evaluate a wide range of chatbot analytics techniques, from foundational performance metrics to advanced testing, personalization, and visualization strategies. Through a combination of research-driven analysis and hands-on experimentation, students will address real-world challenges in chatbot optimization. The final report will demonstrate technical proficiency in using analytics tools, a user-centric and ethical approach to design, and the ability to communicate insights clearly to both technical and non-technical stakeholders.

Task 1: Strategic Design of Chatbot Analytics Framework (20 Marks) (LO1)

- Design a comprehensive analytics strategy for a customer support chatbot used in a retail banking environment.
- Your strategy should include relevant chatbot performance metrics, user interaction logging, and business KPIs.
- Justify your selection of analytics types (e.g., A/B testing, funnel analysis, etc.) and how they contribute to innovation in performance evaluation.

Task 2: Research and Critique of Industry Optimization Approaches (20 Marks) (LO2)

- Select two industry-specific case studies involving chatbot optimization (e.g., travel, healthcare, or e-commerce sectors).
- Analyze how these organizations used analytics tools, retention/churn modeling, or ROI analysis to optimize chatbot performance.
- Compare these approaches with current trends such as adaptive dialog flow models, multivariate testing, and prompt engineering for LLMs.

Task 3: Practical Implementation and Evaluation of Chatbot Analytics (25 Marks) (LO3)

- Choose one of the following chatbot options as your base:
    - A chatbot you developed in the previous semester (e.g., using Rasa, Dialogflow, or BotPress).
    - A free, ready-made open source chatbot (e.g., from Rasa GitHub examples, BotPress demo bots, or Hugging Face spaces).
- Using your selected chatbot, integrate or simulate an analytics feature focused on one of the following areas:
    - Session heatmaps (e.g., user click paths or time-on-node visualizations)
    - User segmentation & personalization (e.g., by intent frequency, channel usage)
    - Accessibility or fallback optimization techniques
- You may use tools such as:
    - Python with Plotly/Dash for interactive visualizations
    - Rasa Analytics plug-ins or telemetry integrations
    - Flask with Matplotlib or Seaborn for simple analytics dashboards
    - Google Colab for running and showcasing the implementation
- Discuss how your implementation:
    - Help improve chatbot performance and user satisfaction
    - Addresses ethical design, transparency, and explainability

Task 4: Critical Evaluation and Testing Strategy (20 Marks) (LO1 & LO3)

- Propose a robust evaluation strategy for your chatbot use:
    - A/B testing
    - Statistical testing for dialogs
    - Dialogue anomaly or intent drift detection
- Critically reflect on how each testing method supports user-centric improvements and innovation.

Task 5: Insightful Reporting and Visualization (15 Marks) (LO1, LO2 & LO3)

- Propose a final dashboard design for your chatbot analytics using real or simulated data.
- Your dashboard should:
    - Present cross-platform performance, user journey attribution, and feedback/implicit signals
    - Support decision-making through visual insights
- Reflect on how this reporting structure helps non-technical stakeholders understand performance insights.