# Project :Manufacturing Downtime

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**1. Overview of the Project**

The **Manufacturing Downtime** project aims to analyze and predict downtime in a manufacturing environment to optimize production efficiency. By leveraging data analytics, the project will identify patterns, root causes, and trends in downtime, enabling decision-makers to take proactive measures to reduce losses and improve operational performance.

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**2. Objectives**

- Identify patterns and root causes of downtime.
- Analyze the impact of downtime on production output.
- Create an interactive dashboard for stakeholders to monitor downtime trends and forecasts.
- Provide actionable insights to reduce downtime and improve efficiency.

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**3. Scope**

- Analysis of historical downtime data.
- Creation of interactive dashboard for visualization.
- Delivery of a final report and presentation.

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## 4. Project Plan

### 4.1 Timeline

| Week | Tasks | Deliverables |
|---|---|---|
| Week 1 | Data collection, cleaning, and preprocessing | Cleaned dataset, preprocessing notebook |
| Week 2 | Define analysis questions and perform exploratory data analysis (EDA) | List of analysis questions, initial insights |
| Week 3 | Perform advanced data analysis and answer key questions | Analysis results, visualizations |
| Week 4 | Build Tableau dashboard and prepare final report/presentation | Dashboard, final report, presentation |

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### 4.2 Milestones

1. **Milestone 1 (End of Week 1):** Cleaned dataset ready for analysis.
2. **Milestone 2 (End of Week 2):** Finalized list of analysis questions.
3. **Milestone 3 (End of Week 3):** Completed data analysis and visualizations.
4. **Milestone 4 (End of Week 4):** Dashboard and final deliverables submitted.

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### 5. Task Assignment & Roles

| Task | Responsible Team Member | Role |
|---|---|---|
| Data cleaning and preprocessing | Abdelaziz Essam | Clean and preprocess data |
| Define analysis questions | Mahmoud Abd Elrahman | Align questions with business goals |
| Perform advanced data analysis | Mohamed Salah | Answer key analysis questions |
| Create dashboard / presentation | Mahmoud H. Wahdan | Design and implement dashboard and present |
| Prepare final report | Rana Abd El-Wahab | Summarize findings |

**6. Risk Assessment & Mitigation Plan**

| Risk | Impact | Mitigation Plan |
|---|---|---|
| Poor data quality | Delays in analysis | Perform thorough data cleaning and validation |
| Time constraints | Missed deadlines | Prioritize tasks and allocate resources wisely |
| Technical issues with tools | Delays in deliverables | Have backup tools or alternative solutions |

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**7. KPIs (Key Performance Indicators)**

| KPI | Description | Target |
|---|---|---|
| Data cleaning accuracy | Percentage of clean, usable data | 100% clean data |
| Analysis question relevance | Number of analysis questions aligned with business goals | 10+ relevant questions |
| Dashboard usability | Stakeholder feedback on dashboard usability | 90% satisfaction rate |
| Project completion rate | Percentage of tasks completed on time | 100% on-time completion |

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**8. Final Deliverables**

1. **Cleaned Dataset:** Ready for analysis.
2. **Preprocessing Notebook:** Documentation of data cleaning steps.
3. **Analysis Questions:** List of questions and initial insights.
4. **Dashboard:** Interactive visualization tool.
5. **Final Report and Presentation:** Summary of findings, recommendations, and next steps.

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**9. Conclusion**

This project will provide actionable insights to reduce manufacturing downtime and improve operational efficiency. By focusing on data analysis and visualization, the team will deliver high-quality results that align with stakeholder expectations.