# **BC2406 Project Proposal**

Instructions: Fill up the boxes. Submit this word document into NTULearn > Class site > Team by the stated deadline. If there are major changes to proposal after submission, inform your instructor via email and re-submit. If there are too many teams that prefer a particular week, balloting will be done to fairly assign the project presentation timeslots and announced in NTULearn > Class Site.

| Class/Sem: | 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 (select) | Team: | 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 (select) |
| --- | --- | --- | --- |
| Preferred Project Presentation: | | | week 12 / week 13 (select) |

| Project Title |
| --- |
| Corrosion Control in Pipelines |

| Business Problem or Opportunity Statement |
| --- |
| Problem / Opportunity Statement:  Internal corrosion in pipelines is one of the greatest adversities that Aramco faces, resulting in operational inefficiency, substantial financial losses, as well as safety and sustainability concerns (Aramco, 2019).  Leveraging on data and analytics to pinpoint the most significant factors contributing to internal pipeline corrosion will empower Aramco to address this critical challenge, allowing them to better predict potential pipeline corrosion and conduct predictive maintenance in a timely and efficient manner. |

| Reasons |
| --- |
| [Why did your team choose this Problem/Opportunity Statement? Any special reasons?]  Safety: Internal corrosion can compromise and weaken the structural integrity of pipelines. This can lead to leaks, equipment failures or ruptures endangering the safety of workers.  Environmental contamination: Corrosion-related leaks can result in oil spills, chemical releases, and environmental contamination. This can have long-lasting and far-reaching environmental consequences. Hence, prevention is essential to fulfill environmental responsibilities and minimise ecological damage. (Schwartzkopff, 2023)  Reputation Management: Companies that are known for their commitment to safety, environmental responsibility, and asset integrity tend to have better reputations in the industry and among stakeholders. Preventing corrosion is essential for maintaining a positive reputation.  Asset protection: Corrosion can reduce the lifespan of expensive infrastructure and pipelines, minimising the need for costly repairs and replacements.  Significant financial losses: The oil and gas industry has faced internal pipeline corrosion globally, costing around $2.5 trillion and $1.372 billion yearly (Aramco, 2019). It is often more cost-effective to invest in corrosion prevention measures upfront than to deal with the consequences of corrosion-related failures. Preventive measures can save companies substantial costs associated with repairs, replacements, and cleanup.  Operational disruptions: Corrosion can lead to unplanned downtime and reduced production capacity. Preventing corrosion ensures the continuous and reliable operation of industrial systems. |

| Key Business Questions |
| --- |
| [What are the key business questions that must be answered in order to solve the business problem/opportunity?]  What is the current extent of internal corrosion in our pipeline infrastructure?  What are the current measures to mitigate corrosion and how effective are they?  What are the significant factors that contribute to internal corrosion in pipelines?  How can we optimize predictive maintenance to reduce corrosion-related incidents?  What are the potential impacts of our efforts to reduce corrosion and improve predictive maintenance?  To what extent does our solution help in mitigating corrosion?  How can we measure the success of attempts to reduce corrosion in pipelines? |

| Proposed Approach |
| --- |
| [How do you plan to solve/explain/demo it? A high-level plan is enough for now as topics are still being taught.]  Collect corrosion and oil spill data.  Data Cleaning: handle missing values, outliers and anomalies.  Perform exploratory data analytics  Develop predictive models  Create charts to visualize corrosion data  Evaluate the success of our solution |

| Data Sources |
| --- |
| [Where will you get the data? Provide links to data source.]  <https://www.sciencedirect.com.remotexs.ntu.edu.sg/science/article/pii/S1875510020305709#appsec1>  <https://data.mendeley.com/datasets/4nydhxjymw/1>  <https://www.kaggle.com/code/thisherenow/oil-pipeline-spill-visualizations/input> |

| Important References |
| --- |
| [What are the important publications or prior analysis done? Do a literature review and state the relevant findings. Provide the links or docs.]  <https://www.statista.com/statistics/1271803/most-common-us-oil-pipeline-incident-causes/>  A new hybrid algorithm model for prediction of internal corrosion rate of multiphase pipeline - ScienceDirect (ntu.edu.sg)  <https://data.mendeley.com/datasets/4nydhxjymw/1>  Primary Research:  *Tackling Corrosion: A $2.5 trillion problem globally*. Aramco. (2019, October 14). <https://www.aramco.com/en/news-media/news/2019/tackling-corrosion>  Schwartzkopff, F. (2023, August 26). Saudi Aramco targeted in UN human rights probe tied to climate change. Bloomberg.com. <https://www.bloomberg.com/news/articles/2023-08-25/aramco-targeted-in-un-human-rights-probe-tied-to-climate-change?leadSource=uverify+wall#xj4y7vzkg> |

| Project Schedule and Milestones |
| --- |
| [Planned Timeline and milestones to be achieved.]  Week 6: 22 September - Finalize the problem/opportunity statement & find the datasets (Allocate project proposal sections to each member)  Week 7: 27 September - Meeting to finalize proposal / check on progress  Week 7: 29 September - Submit proposal (due 30 Sept, 11.30pm)  Recess week: 1-3 October - Identify variables in the dataset to work with + Determine if any data needs to be cleaned  Recess week: 3 October - Discuss dataset + split work (R coding)  Recess week: 5 October - Start preliminary analysis & select the model & create visualizations  Week 8: 10-14 October - Consult professor on our project on any problems we face and/or any concerns we have  Week 10: 24 October - Start work on executive report  Week 11: 31 October - Finalise report and start on slides  Week 11: 2 November - Finalise slides and decide on who is presenting which part, rehearse  Week 12: Rehearse for our presentation before wednesday and plan out a script for what we want to talk about  **Project Deadline: 4 November (Wk 11) 11:30pm** |

| Key Responsibilities |
| --- |
| [State the Key Responsibilities of each team member.]  **Project Leader** – Yu Yi  Align our goals and milestones with the BC2406 course assessment outline. Ensure everyone in the group is up to date with discussion made.  **Strategy Planner** – Anh  Brainstorm on ideas on how we can approach the identified business problem.  **Secretary** - Lynn Chia Xiao Lian  Monitor list of objectives and ensure that tasks objective/timeline are met and assist Renee in taking meeting minutes.  **Quality Assurance Manager** - Seng Swee Chong  Check through datasets, report and references to ensure that sources used are reliable and relevant  **Project Coordinator** - Donovan  Assist in evaluating sources and references.  **Initiator** - Renee D’ Angela Raymond  Initiate zoom meeting and make summary plan of each zoom meeting. |