### Assignment1: Analysis and report with project scoping for solving reliability problems:

This Task covers analysis and report with project scoping for solving reliability problems related to plant and infrastructure asset management problem/s relevant to industries, problem definition, background, relevant research, methodology and plan.

Proposed project needs to focus on how cost and risk can be reduced and performance can be enhanced using reliability engineering in industrial setting. Abstract should have appropriate title of the project and key words relevant to the topic. Scope of the project needs to cover the background of the problem, why proposed project is needed by the organisation, background research related to the proposed project, proposed methodology, deliverables, resources requirements, supporting documents including data and detailed plan using Gantt chart and references.

This task will be assessed based on the technical approach, literature research, proposed tools and techniques and/ or development of new tools, techniques, models, guidelines for reducing costs, risks and enhancing performance through reliability engineering and professional technical writing of the assessment item.

Assessments will be marked by Lecturer/ Academic Advisor.

Weights of assessments and criteria are as outlined in Course guide in Moodle.

This course needs 150 hrs of work including study, research and assessment tasks. Efforts are proportionate in line with the weights allocated for assessment tasks.

Due dates are as provided in Course Description in FDL Grade and outlined in Couse Guide in Moodle.

Submission of assessment items are through Moodle portal and feedbacks will be provided through Moodle.

##### Deliverable 1A: Abstract of the Project Proposal and Scope (Weight: As outlined in table); \*Hurdle: A4 within 250 words.

This is a hurdle task to ensure that each student has proposed a project, nominated an industry advisor (where it is industry based project).

Your project proposal should include items such as:

* Project Title
* Background including definition of the problem and the influencing parameters.
* Expected project outcome.
* Proposed approached to solve the problem.
* Methods of investigation and technical analysis.
* You should also include the name, designation, address and telephone number of your work-related ‘internal supervisor’.

Deliverable 1B: Progress report with supporting document: within 3000 words, (Weight: As outlined in table)

Students must be able to provide sufficient evidence that they have completed a significant amount of work deemed satisfactory for them to progress as per plan. Evidence of significant amount of progress including data analysis using systems/ Excel and report from findings of progressive implementation/ pilot run of activities till date. Report should include comments on what has been done along with supporting document to validate that claim and state any problems encountered with

probable solutions in the remaining part of the project along with a revised and updated Gantt chart for remaining part of the project and should cover:

* + Partially completed draft report which will include, but is not limited to; Introduction, Literature Review, Methodology and reasonable amount of work.
	+ Literature Review: Amount of literature reviewed is above and beyond what is expected of the student; Outstanding review that demonstrates critical understanding of various concepts in the literature; Evidence of critical assessment of the literature body.
	+ Well defined Scope: Excellent understanding of the objectives and expectations of the project; Research plan is meticulous and presented in a logical manner; Obvious links to literature body; Realistic project timelines proposed and maintained, data collected and analysed and report outline completed.
	+ Demonstrated progress: All preliminary work has been completed; Evidence of student progressing well and has done an amount of work more than what is expected till date of a 15 credit unit course.
	+ Problems encountered, if any, and how you resolved them/ propose to solve them.
	+ The achievements to date quantitatively and technically reported.
	+ The recommendations and follow-up actions that can be taken.
	+ Supporting documents including
	+ Gantt or PERT chart of the project milestones (activities versus time) on remaining project progress and completion.

### Assignment 2: Analysis of tools and techniques in reliability and report on industrial applications

Submit for assessment your answers to ALL THREE questions with Introduction, contribution, recommendation, reasonable number of references and any supporting document.

This Task covers analysis of tools and techniques in reliability and report on industrial applications.

It needs to cover reliability engineering tools, illustrative example from industry, detailed analysis for applications, literature research and detailed references.

This task will be assessed based on the technical approach, analysis, use of valid tools and techniques and/ or development of new tools, techniques, models, guidelines for reducing costs, risks and enhancing performance through reliability engineering, tools and techniques.

Assessment will be by Lecturer/ academic advisor.

Weights of assessments and criteria as outlined in Course guide in Moodle.

This course needs 150 hrs of work including study, research and assessment tasks. Efforts are in line with the weights allocated for assessment tasks.

Due dates are as in FDL Grade and outlined in Couse Guide in Moodle.

Submission of assessment items are through Moodle portal and feedbacks will be provided through Moodle.

#### Deliverable 2A: Reliability and maintenance data analysis

Prepare a research based report with introduction, contribution, recommendation, reasonable number (more than 9) of references including recent papers in refereed international journals and any supporting document.

* Need to demonstrate collation and analysis of failure, maintenance and reliability data.
* Conduct a research on the failure types, data collection and analysis for key asset/s applicable to your organisation (present, past or future).
* Explain which tools (quantitative and qualitative along with expressions and illustrative example/s) and systems (documented, information system and other systems) are being used and anything else you want to propose/use and why?
* What maintenance practices you recommend to be in place for tools and systems you selected/ proposed based on your scientific analysis.
* Analyse impact of your recommendation on the cost, risk and performance of the business?

Discuss your findings with line supervisor/ team members/ fellow students on review of current practice and changes, if any, would you suggest based on further analysis from stakeholder engagement?

#### Deliverable 2B: Accelerated testing

Prepare a research based report with introduction, contribution, recommendation, reasonable number of references (more than 9) including recent refereed international journal papers and any supporting document covering:

* Main factors need to be considered in designing an accelerated life test of a plant component relevant to your organisation (present, past or future).
* Follow-up activities which might be necessary after the Accelerated test plan proposed in the above.

#### Deliverable 2C: Fault-tolerant systems

Prepare a report with introduction, contribution, recommendation, reasonable number of references (more than 9) including recent refereed international journal papers and any supporting document.

Imagine you are designing a fault-tolerant system applicable to your critical asset/s or circulating cooling water system of a process plant (as alternative option for this assignment)using redundancies for pumps with a changeover control.

Draw a schematic block diagram of the asset you propose or for the cooling water system applicable to above scenario and explain what factors need to be considered in the design/ retrospective changes, if any for a cost effective solution to the function of the asset or circulation of cooling water (as the alternative option for this assignment).

### Assignment 3: Analysis and report from research on reliability problems and applications of solutions

This Task covers final report with analysis and report from research on reliability problems and applications of solutions, technical paper, voice embedded slides and presentation online, poster, data and analysis using system / excel and appendix with supporting documents.

This task needs to cover research findings on how cost and risk can be reduced and performance can be enhanced using reliability engineering and good asset management in industrial setting.

Final report should have summary with appropriate title of the project and key words relevant to the topic with background of the problem, importance to the organisation, research conducted, methodology used, deliverables including recommendations, limitation and scope for future work, lessons learned, supporting documents including data and opportunities for improvements if any and references.

This Task will be assessed based on final version of the technical approach, analysis, use of valid tools and techniques and/ or development of new tools, techniques, models, guidelines for reducing costs, risks and enhancing performance through reliability engineering and professional

presentations of findings using final report, technical paper, poster, voice embedded slides and online session.

Assessment will be by Lecturer/ academic advisor.

Weights of assessments and criteria as outlined in Course guide in Moodle.

This course needs 150 hrs of work including study, research and assessment tasks. Efforts are in line with the weights allocated for assessment tasks.

Due dates are as in FDL Grade and outlined in Couse Guide in Moodle.

Submission of assessment items are through Moodle portal and feedbacks will be provided through Moodle.

#### Deliverable 3A: Final Project Report

Final project report in form of a Technical Paper (within 4500 words) and supporting document. You can submit your final technical paper in a MS Word using online submission in Moodle or by email (for approved delayed submission if online submission is closed).

The report must outline the core elements of the project (objectives, significance, methodology, results, analysis, progress and conclusions) in a unified framework. Supporting document in report need to cover relevant details to crosscheck, data, analysis, progress and findings, including any supplementary collation of data/ sample data as an appendix. The assessment will be based on the following criteria:

##### Clarity of the report (weight is 20% of this assignment):

* + English grammar and spelling are correct
	+ Mathematical symbols and equations are easy to understand
	+ Figures and tables are well constructed and informative
	+ The paper is well organized with abstract, key words and index for contents.

