Subject Description Form

Subject Code: EE535

Subject Title: Maintenance and Reliability Engineering

Credit Value: 3

Level: 5

Pre-requisite/Co-requisite/Exclusion: Nil

Collaboration Institute: MTRC

Objectives
1. To provide students with a comprehensive understanding on various maintenance management processes.
2. To enable students to understand the impact of maintenance management on railway objectives in safety, reliability and cost effectiveness.
3. To enable students to acquire knowledge and techniques in reliability engineering.
4. To equip students to make decisions on sound maintenance and reliability improvement.
5. To enable students to apply the techniques in reliability engineering to railway operation.

Intended Learning Outcomes
Upon completion of the subject, students will be able to:

a. Identify the possible faults in railway systems and their impacts to the overall system reliability.
b. Develop fault trees for a sub-system in railways and apply various reliability models on fault analysis.
c. Discuss system data collection for reliability assessment.
d. Evaluate maintenance schedules and assess the corresponding risk with appropriate techniques and tools.
e. Review the advantages and limitations on condition based maintenance, alternative sourcing of inventory and maintenance outsourcing management for railway assets.
f. Organise and present an assigned research topic.
g. Recognise the importance to engage in self-learning on latest methodologies for system maintenance management at this advanced level of study.

Reliability Engineering

Maintenance Management

Case Study:
Site Visits to MTRCL Depot
Industrial/Research Seminars

Teaching/Learning Methodology

Teaching/Learning Methodology Outcomes

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Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed

| 1. Mini-project (group project) | 20% | a | b | c | d | e | f | g |
| 2. Tests                      | 20% | √ | √ |   |   |   |   |
| 3. Examination               | 60% | √ | √ | √ |   |   |   |
| Total                        | 100%|   |   |   |   |   |   |

This is a specialist subject with bias on maintenance and reliability of railway assets, in particular on rolling stocks. A large number of case studies are discussed in the lectures and the outcomes are to test the understanding of the student on the underlying fundamentals through quizzes, mini-projects and written examinations.

Student Study Effort Expected

Class contact:
- Lecture/Tutorial  36 Hrs.
- Industrial/Research seminars  3 Hrs.

Other student study effort:
- Assignment and Self-studies  65 Hrs.

Total student study effort  104 Hrs.

Reading List and References

Textbooks:
5. Bury St Edmunds, Railway rolling stock, organized by the Railway Division of the Institution of Mechanical Engineers (IMechE) and the Institution of Civil Engineers (ICE) for IMechE, 2001

June 2016