Subject Description Form

Subject Code	EE537
Subject Title	Railway Vehicles
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Collaboration Institute	MTR Academy
Objectives	1. To provide students with a comprehensive understanding on design and applications of railway vehicles. 2. To ensure the students aware of the current state-of-the-art on design, operation and maintenance of railway vehicles in Hong Kong and overseas. 3. To enable students to understand the procurement process of railway vehicles and the necessary management. 4. To acquire knowledge on the components in railway vehicles and their modelling for analysis. 5. To appreciate the testing standards for vehicles; and the inspection and quality control measures.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Identify various types and configurations of railway vehicles. b. Discuss the design principles and system performance of railway vehicles and be aware of the latest development in the technology. c. Elaborate on the project management process for railway vehicle procurement and devise feasibility study and maintenance planning. d. Apply appropriate modelling for vehicles, body design and train dynamics in vehicle performance analysis. e. Given the acceptance standards, formulate tests and inspection for quality control purposes. f. Appreciate the role of engineers on matters other than technical issues. g. Recognise the importance to engage in self-learning on latest technologies on railway vehicle design at this advanced level of study.
Subject Synopsis/ Indicative Syllabus	1. ***Project management for procurement of railway vehicle*:** Planning and preliminary design, System selection, definition of vehicle, specification, design management, testing and commissioning, maintenance planning. 2. ***Railway vehicle design and development*:** Types and configurations of railway vehicles, design principles, system performance, Interface and environmental considerations, modern development. 3. ***System description and mechanism design*:** Carbody, bogie, coupler, door, brake, pneumatics, air-conditioning, traction and control, pantograph, and train management system. 4. ***Vehicle modelling and gauging*:** Rail vehicle components, suspension system, modelling of vehicles and analysis, kinetic envelope, load gauge. 5. ***Vehicle structures and dynamics*:** Body shell design, load cases, structural testing and analysis, fundamentals of train dynamics, wheel rail interface, track geometry effect, derailment prediction.

6. ***Vehicle acceptance and testing*:** Acceptance standards, type test, inspection and quality control, static testing, dynamic runs, trial operation and reliability monitoring.

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

Teaching/Learning Methodology

The main lecturers are from MTRC, and their experiences/knowledge are shared with students via lectures and tutorials for conveying the concept and theories. The site visit to MTR system has reinforced the pragmatic design and application in a realistic system. Problem solving skill and team work are trained via minor project.

Teaching/Learning Methodology	Outcomes						
	a	b	c	d	e	f	g
Lectures	✓	✓	✓	✓	✓	✓	✓
Tutorials		✓	✓	✓	✓	✓	✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed						
		a	b	c	d	e	f	g
1. Examination	60%	✓	✓	✓	✓	✓	✓	
2. Test	25%	✓		✓	✓	✓	✓	
3. Presentation with Essay Submission	15%	✓	✓	✓	✓	✓	✓	✓
Total	100%							

The outcomes on concepts, design and applications are assessed by the usual means of examination and test.

The problem solving skill is evaluated via presentation (with essay submission).

Student Study Effort Expected

Class contact:	
▪ Lecture/Tutorial	33 Hrs.
▪ Presentation seminar	3 Hrs.
▪ Site visit	3 Hrs.
Other student study effort:	
▪ Presentation preparation/report	24 Hrs.
▪ Self-study	42 Hrs.
Total student study effort	105 Hrs.

Reading List and References

Textbooks:

1. A.H. Wickens, Fundamentals of Rail Vehicle Dynamics: Guidance and Stability, Swets & Zeitlinger Publishers, 2003

Reference books:

1. Selected papers from the Proceedings of IMechE Part F – Journal of Rail and Rapid Transit