

City University of Hong Kong
Course Syllabus

offered by Department of Systems Engineering
with effect from Semester A 2024 / 25

Part I Course Overview

Course Title:	<u>Asset and Maintenance Management</u>
Course Code:	<u>SYE6014</u>
Course Duration:	<u>One Semester</u>
Credit Units:	<u>3</u>
Level:	<u>P6</u>
Medium of Instruction:	<u>English</u>
Medium of Assessment:	<u>English</u>
Prerequisites: <i>(Course Code and Title)</i>	<u>Nil</u>
Precursors: <i>(Course Code and Title)</i>	<u>Students are expected to have either some working experience in management or taken management equivalent course(s)</u>
Equivalent Courses: <i>(Course Code and Title)</i>	<u>SEEM6014 Asset and Maintenance Management (offered until 2021/22)</u> <u>ADSE6014 Asset and Maintenance Management (offered until 2023/24)</u>
Exclusive Courses: <i>(Course Code and Title)</i>	<u>Nil</u>

Part II Course Details

1. Abstract

The aim is to provide a managerial perspective to the maintenance and physical asset management, and introduce an effective strategy for routine asset and maintenance control so that the students are capable of selecting suitable asset and maintenance management systems for public utilities and industries. The content of this course is especially designed to partially comply with **the major elements** in the British Standards on Asset Management.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Recognise the importance of maintenance and engineering asset management to manufacturing, public utilities, transportations and building services,	17%	✓		
2.	Understand the philosophies and international compliance on maintenance and engineering asset management,	17%	✓		
3.	Use of common condition monitoring, fault diagnosis, reliability, risk assessment in maintenance and engineering asset management, and	33%		✓	
4.	Formulate reliable and cost-effective managerial strategy for selected equipment/process operating in a particular kind of public utility and industry.	33%		✓	
		100%			

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Learning and Teaching Activities (LTAs)

(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lecture	Lectures have 26 hours. The content of lectures will roughly follow the topics covered in the Section of Keyword Syllabus with case studies for illustration purpose.	✓	✓	✓	✓	26 hours/sem
Demonstrations & Summaries (small class)	Demonstrations and preparation of Summaries have 9 hours distributed among a time span of 9 weeks (1 hr/week). In this activity, typical kinds of system and device for conducting physical asset health evaluation and maintenance that are related to the first three CILOs will be demonstrated to students in the concerned laboratory. After the demonstrations, questions and discussion items will be given to students. Each student must participate in discussions in his group and submit a short summary for each demonstration. Comments will be received from the course examiner and colleagues. Marks will be given to each student based on his/her responses to comments, the content of the summary and the eagerness in discussion.	✓	✓	✓		9 hours/sem
Term Project Presentation & Discussion (large class)	It includes the show case of samples of the term project and a presentation to highlight the achievement of the term project. To accomplish these activities, the students will form groups with a size of around 3 students per group. Duration the course, a term project, which focused on CILOs 3 and 4, must be accomplished by each group. For the term project, each group is required to develop an effective strategy in maintenance and engineering asset management for a given type of equipment/process operating in a particular kind of public utility and industry. A group report to describe the structure and the expected achievements of the designed strategy must be submitted. A group report to describe the structure and the			✓	✓	4 hours/sem

	expected achievements of the designed system must be submitted. A presentation will be held to highlight and demonstrate the student achievements in the term project so that comments can be given to further improve the designed strategy for performing asset and maintenance management to the selected industrial case.					
Consultation	For students' enquiries in a personal-basis	✓	✓	✓	✓	13 hours/sem

Maximum number of students in large class is 30.

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: <u>100</u> %						
Term Project and Its Report			✓	✓	50%	
Demonstrations and Summaries	✓	✓	✓		30%	
Term Project's Presentation and Discussion				✓	20%	
Examination: <u>0</u> % (duration: _____, if applicable)						
					100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Term Project and Its Report	The assessment of the term project will depend on the degree of achievement on CILOs 3 and 4, which include the understanding of the problems, the appropriateness of suggested methods to the given problems, the suitability of the managerial strategy for the given types of equipment/process operating in a given kind of company. A report must be submitted to lay out the designed strategy for maintenance and engineering asset management, the gained benefits as well as the effectiveness in cost and resources provided by the strategy.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Demonstrations & Summaries	The assessment of each submitted summary will be based on the degree of achievement on CILOs 1, 2 and 3. The portions of marks given are 1) the design and the style of submitted summary (10%), 2) the background and theory of each demonstrated AI method (20%), 3) the quality of the given comments and observations (20%) and 4) the	High	Significant	Moderate	Basic	Not even reaching marginal levels

	proof on understanding the demonstrations by given the suitable answer and discussion to each designed question stated in each submitted summary (50%)					
3. Term Project's Presentation and Discussion	The assessment is depended on the degree of achievement on CILO 4. It includes the preparation, the style and the clarity of presentation as well as the response to the comments asked during the presentation and lectures.	High	Significant	Moderate	Basic	Not even reaching marginal levels

The grading of achievements is on a 100% course work basis. The portion of assessment is divided as 30% for the short summaries and eagerness in participating the demonstrations, 20% for the term project presentation and discussion, and 50% for the achievements in the term project and the quality of its report. Each term project must be accompanied by a presentation. All members of the group must responsible for the preparation of presentation. The attendance of the presentation is compulsory. Each group must submit a report for her completed term project. To facilitate individual assessment, each student in a particular group must also submit his own detailed section of contribution (called 'individual section'), which can be attached to the term project's report. In the individual section, each student must define clearly his role, the amount of work done by him, and the portion of his own contribution (in percentage) in completing the term project. The student should also include his own discussion and conclusion in the report to verify his degree on understanding the term project. Hence, the final mark given to each student may be varied due to his actual contribution and achieved efforts toward the term project.

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Term Project and Its Report	The assessment of the term project will depend on the degree of achievement on CILOs 3 and 4, which include the understanding of the problems, the appropriateness of suggested methods to the given problems, the suitability of the managerial strategy for the given types of equipment/process operating in a given kind of company. A report must be submitted to lay out the designed strategy for maintenance and engineering asset management, the gained benefits as well as the effectiveness in cost and resources provided by the strategy.	High	Significant	Moderate/Basic	Not even reaching marginal levels
2. Demonstrations & Summaries	The assessment of each submitted summary will be based on the degree of achievement on CILOs 1, 2 and 3. The portions of marks given are 1) the design and the style of submitted summary (10%), 2) the background and theory of each demonstrated AI method (20%), 3) the quality of the given comments and observations (20%) and 4) the proof on understanding the demonstrations by given the suitable answer and discussion	High	Significant	Moderate/Basic	Not even reaching marginal levels

	to each designed question stated in each submitted summary (50%)				
3. Term Project's Presentation and Discussion	The assessment is depended on the degree of achievement on CILO 4. It includes the preparation, the style and the clarity of presentation as well as the response to the comments asked during the presentation and lectures.	High	Significant	Moderate/Basic	Not even reaching marginal levels

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Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

- Overview of Engineering Asset and Maintenance Management
- Strategies and Schemes of Maintenance Practices
- Introduction to Condition Monitoring and Preventive Maintenance
- Basic Fault Diagnosis and Analysis
- Basic Reliability and Risk Management
- Reliability Centered Maintenance
- Maintenance Remedy, Planning and Scheduling
- International Compliance on Engineering Asset Management
- Benchmarking Maintenance and Physical Asset Management
- Industrial Case Studies and Demonstrations

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

NIL

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Asset Management — Overview, Principles and Terminology, ISO (the International Organization for Standardization) Standards - ISO 55000:2014(E)
2.	The Institute of Asset Management, <i>PAS 55-1 and 55-2: Asset Management</i> , British Standards Institute, (ISBN 0-580-42765 X)
3.	Jardine, A. and Tsang A., <i>Maintenance, Replacement, and Reliability – Theory and Applications</i> , Taylor & Francis, (ISBN 0-8493-3966-9)
4.	Kelly A, <i>Maintenance Management Auditing: in search of Maintenance Management Excellence</i> , Industrials Press, New York, (TS192.K425)
5.	Mather D., <i>CMMS (Computerized Maintenance Management System): A Time Saving Implementation Process</i> , CRC Press.
6.	Mobley, R., Higgins, L., and Wikoff, D., <i>Maintenance Engineering Handbook</i> , McGraw Hill, (TS192.M335)
7.	Levitt, J., <i>Complete Guide to Preventive and Predictive Maintenance</i> , Industrial Press, (TS192.L4667 2003)
8.	Koller G., <i>Risk Assessment and Decision Making in Business and Industry – a Practical Guide</i> , CRC Press, 1999 (ISBN 0-8439-0268-4)
9.	International Journal of Strategic Engineering Asset Management, www.inderscience.com
10.	Engineering Asset Management Review, www.springer.com/engineering
11.	Journal of Quality in Maintenance Engineering (e-journal), ISSN 1355-2511, http://ejournals.ebsco.com/Journal2.asp?JournalID=101232
12.	The Asset Journal, Asset Management Council, (e-journal), ISSN 1834-3864
13.	Maintenance Management (video recording, 9 records), TS192.M345/pt.1-9