

Subject Description Form

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| Subject Code | ME584 |
| Subject Title | Airworthiness and Maintenance |
| Credit Value | 3 |
| Level | 5 |
| Pre-requisite/ Co-requisite/ Exclusion | Nil |
| Objectives | To provide students with knowledge of airworthiness and aircraft maintenance to facilitate compliance with the mandatory civil airworthiness requirements. |
| Intended Learning Outcomes | <p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. understand the objectives and mandatory requirements of airworthiness and the role of regulatory bodies; b. know the characteristics of different maintenance processes; c. apply reliability analysis in alert level development; and d. identify the essential qualities of a Condition Monitored Maintenance Programme. |
| Subject Synopsis/ Indicative Syllabus | <p><i>Airworthiness Regulation:</i> Role of the HK CAD Airworthiness Office. HK Air Operator Certificate. HKAR-145 Approved Maintenance Organization. Management commitment and responsibility. Safety accountabilities of AMO managers.</p> <p><i>Airworthiness Certification:</i> Compliance with the HK airworthiness codes. Airworthiness Certificate requirements in respect of civil aircraft – engines and associated equipment, aircraft radio equipment, aeronautical materials, etc. Maintenance, overhaul and repair manuals. Continued airworthiness – responsibilities of the operator.</p> <p><i>HK Airworthiness Requirements:</i> Airworthiness procedures. Administrative and guidance materials. Certification of aircraft and related products, parts and appliances, and of design and production organisations. Licensing of maintenance personnel. Approved maintenance organisations. Approved maintenance training/examination. Minimum equipment list.</p> <p><i>Reliability and System Availability:</i> Failure probability distributions. Parallel and series hybrid systems. Failure characteristics of aircraft mechanical, electrical and electronic components. System redundancy and availability evaluation. Mean time between unscheduled removal(MTBUR). Mean time between failure(MTBF).</p> <p><i>Condition Monitored Maintenance Application:</i> Primary maintenance processes. Transport category aircraft. Maintenance review board and maintenance steering group procedures. Pireps. Flight crew reports of unscheduled engine shut-downs. Line maintenance reports on mechanical delays and cancellations. Miscellaneous reports, especially on component unscheduled removals and confirmed failures. Reliability alert levels. Compliance with continuous airworthiness requirements. Maintenance steering group logic analysis.</p> <p><i>Maintenance Error Management:</i> Safety management system. Human factors in aircraft maintenance and inspection. Technical maintenance planning. Mandatory occurrence reporting. Required inspection items – continuing analysis and surveillance.</p> |

| Teaching/Learning Methodology | <ol style="list-style-type: none"> The teaching and learning methods include lectures/tutorial sessions, homework assignments, test, case study report and examination. The continuous assessment and examination are aimed at providing students with integrated knowledge required for advanced materials and structural design. Technical/practical examples and problems are raised and discussed in class/tutorial sessions. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Assessment Methods in Alignment with Intended Learning Outcomes | <table border="1"> <thead> <tr> <th rowspan="2">Teaching/Learning Methodology</th> <th colspan="4">Intended subject learning outcomes</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>1. Lecture</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2. Tutorial</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3. Homework assignment</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>4. Case study report and presentation</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> </tbody> </table> | | | | | | Teaching/Learning Methodology | Intended subject learning outcomes | | | | a | b | c | d | 1. Lecture | √ | √ | √ | √ | 2. Tutorial | √ | √ | √ | √ | 3. Homework assignment | √ | √ | √ | √ | 4. Case study report and presentation | √ | √ | √ | √ | | | | | | | | | | | | | |
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| | 3. Homework assignment | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4. Case study report and presentation | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 2. Test | 20% | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Case study report and presentation | 20% | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Examination | 40% | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Overall Assessment:</p> $0.40 \times \text{End of Subject Examination} + 0.60 \times \text{Continuous Assessment}$ <p>The continuous assessment consists of three components: homework assignments, test, and case study report & presentation. They are aimed at evaluating the progress of students study, assisting them in self-monitoring of fulfilling the respective subject learning outcomes, and enhancing the integration of the knowledge learnt.</p> <p>The examination is used to assess the knowledge acquired by the students for understanding and analyzing the problems critically and independently; as well as to determine the degree of achieving the subject learning outcomes.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Student Study Effort Expected | <table border="1"> <tr> <td colspan="6">Class contact:</td> </tr> <tr> <td colspan="5">▪ Lecture</td> <td colspan="1">24 Hrs.</td> </tr> <tr> <td colspan="5">▪ Tutorial/Case study/Laboratory</td> <td colspan="1">15 Hrs.</td> </tr> <tr> <td colspan="6">Other student study effort:</td> </tr> <tr> <td colspan="5">▪ Self Study</td> <td colspan="1">45 Hrs.</td> </tr> <tr> <td colspan="5">▪ Case study report preparation and presentation</td> <td colspan="1">21 Hrs.</td> </tr> <tr> <td colspan="5">Total student study effort</td> <td colspan="1">105 Hrs.</td> </tr> </table> | | | | | | Class contact: | | | | | | ▪ Lecture | | | | | 24 Hrs. | ▪ Tutorial/Case study/Laboratory | | | | | 15 Hrs. | Other student study effort: | | | | | | ▪ Self Study | | | | | 45 Hrs. | ▪ Case study report preparation and presentation | | | | | 21 Hrs. | Total student study effort | | | | | 105 Hrs. |
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| ▪ Self Study | | | | | 45 Hrs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ▪ Case study report preparation and presentation | | | | | 21 Hrs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Reading List and References | <ol style="list-style-type: none"> Lewis, E.E. Introduction to reliability engineering, John Wiley & Sons, latest edition. Pham, H. Handbook of reliability engineering. Springer, latest edition. HK Civil Aviation Department. CAD 418, Condition Monitored Maintenance: an Explanatory Handbook, latest edition. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |