

Subject Description Form

Subject Code	AAE4003
Subject Title	Airport Services Engineering
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<ol style="list-style-type: none"> 1. To provide students broad understanding of the airport services in all phases of design and engineering to students; and 2. To provide students the essential knowledge in airport facility planning, management and ground services.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. Have the basic knowledge of how an airport is operating.; and b. Apply techniques to optimize the airport operations costs and efficiency, including capacity determination, airport facility selection, facility layout, and facility planning; and c. Establish effective ground maneuvering such as airport geometry, terminal layout, aircraft configuration optimization.
Subject Synopsis/ Indicative Syllabus	<p>Runway Planning, Analysis and Maintenance - Airfield design and planning (runway, taxiway and apron), aircraft runway length and takeoff weights, pavement strength and condition, Development of Allowable Load Determination and Pavement Classification Number (PCN), airport elevation, temperature, runway slope, obstacles, bird control, Foreign Object Debris, rubber removal, runway inspection.</p> <p>Airport Facility Planning and Engineering - Airport layout. Design of terminal facilities, baggage handling facilities, freight facilities, layout planning and optimization, ground support equipment and equipment selection, basic queuing theory and simulation (e.g., simulation of passenger flow for choke point analysis).</p> <p>Air Traffic Flow and Capacity Management - Ground Delay Program (GDP): Delay Assignment (DAS) mode, General Aviation Airport Program (GAAP), Unified Delay Program (UDP) mode. Peak-hour analysis (design peak hour and forecast). <i>Demand</i> management (Flight schedule coordination, congestion pricing, slot auction, etc.). Air traffic management (airspace structure, navigation systems, air traffic control tower). Collaborative Decision Making. Runway capacity (factors affecting runway capacity, e.g., number of runways, landscape, aircraft mix, wind direction, sequencing of movements, noise considerations).</p> <p>Ground Maneuvering and Gate Planning - Ground operations, ground maneuvering, gate operations, and terminal servicing including:</p>

	<ul style="list-style-type: none"> • Airport geometry for operating new and existing airplane models. • Terminal layouts and gate arrangements. • Aircraft configuration optimization. 																												
Teaching/Learning Methodology	Teaching is conducted through class lectures and case studies/laboratory exercises. Both the basic knowledge and theoretical models are going to be introduced. The understanding of how to address problems by using scientific tools is emphasized. Normally, examples of problem-solving techniques are taught in class and related scenarios are provided to students to enhance their application abilities. Laboratory exercises and short reports are used to make up the course work marks.																												
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="3">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>1. Case studies</td> <td>50%</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2. Assignments</td> <td>30%</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3. Group project report</td> <td>20%</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100 %</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>By the end of each laboratory exercise, a written report is required to be submitted to show the findings. Guest speakers in the aviation industry will be invited to deliver talks and students are required to produce short reports for talks to encourage their involvement. At the end of the semester, an examination is given to students to assess their learning outcomes.</p>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed			a	b	c	1. Case studies	50%		✓	✓	2. Assignments	30%		✓	✓	3. Group project report	20%	✓	✓	✓	Total	100 %			
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Reading List and References	<ol style="list-style-type: none"> 1. PS Senguttuvan 2007, Principles of Airport Economics, Excel Books. (or latest edition) 2. Airport Cooperative Research Program (ACRP) Reports, The National Academies of Sciences, Engineering, and Medicine. (or latest edition) 																												

	<ol style="list-style-type: none">3. Anne Graham 2014, <i>Managing Airports 4th Edition: An International Perspective</i>, Routledge. (or latest edition)4. Alexander T. Wells 2007, <i>Air Transportation: A Management Perspective</i>, Ashgate. (or latest edition)5. Norman J. Ashford, Saleh Mumayiz, Paul H. Wright 2011, <i>Airport Engineering: Planning, Design and Development of 21st Century Airports</i>, John Wiley & Sons. (or latest edition)
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April 2021