

## Subject Description Form

<b>Subject Code</b>	ME49004
<b>Subject Title</b>	Final Year Capstone Project
<b>Credit Value</b>	6
<b>Level</b>	4
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Pre-requisite: ME31001 Dynamics and Vibrations; ME31002 Linear Systems and Control; ME32003 Design and Manufacturing; ME33001 Mechanics of Materials; ME34002 Engineering Thermodynamics; and ME34004 Fluid Mechanics
<b>Objectives</b>	To provide students with an opportunity of integrating and applying knowledge from different disciplines of mechanical engineering to conduct an engineering project that is open-ended and requires team collaboration for its completion.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to:  a. Formulate the problem and suggest a practical solution to solve an open-ended real-world engineering problem. b. Utilize knowledge from different disciplines of engineering to solve problems encountered in conducting the team project. c. Design, plan and carry out scientific and engineering experiments (physical tests and/or computer numerical simulations) to prove the feasibility of their designed solutions. d. Design the test apparatus, rigs, assemblies or systems as required by the project. e. Apply appropriate engineering tool (analytical, experimental, and/or computational) for carrying out tasks in the development and implementation of a designed solution. f. Work in a professional manner and comply with all applicable standards and regulations in conducting the project. g. Select and employ the appropriate manufacturing methods in the production and fabrication of components and assemblies required by the project. h. Evaluate the potential impact of their designed solution on performance, safety, cost and environment. i. Participate and lead in a multi-functional team. j. Take into account of safety, legal, environmental protection considerations in an engineering project. k. Communicate their project work to sponsors (if any), supervisors, other peer teams, and even non-technical audience and articulate the results and findings with scientific and logical arguments. l. Conduct literature search including patents, books, archived publications and product catalogues, and to perform the state-of-the-art and benchmark studies.

<b>Subject Synopsis/ Indicative Syllabus</b>	<p>A project group consisting normally of three students will be expected to complete a substantial project of a major mechanical engineering task. The task can be an analytical study, an experimental investigation, a design project or a numerical simulation aimed at solving an engineering problem. The students are expected to go through the following stages of work:</p> <ul style="list-style-type: none"> <li>• Problem identification</li> <li>• Literature review</li> <li>• Methodology of study</li> <li>• Project execution</li> <li>• Report writing</li> <li>• Project presentation</li> </ul>																																																																																																
<b>Teaching/Learning Methodology</b>	<p>The subject is taught through guided studies. The students are given the project title, objectives and description. The students are guided by the project supervisor to go through the different stages of the project as shown in the Subject Synopsis/Indicative Syllabus. (Outcomes a – l)</p> <table border="1" data-bbox="440 831 1473 1037"> <thead> <tr> <th rowspan="2">Teaching/Learning Methodology</th> <th colspan="12">Outcomes</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>f</th> <th>g</th> <th>h</th> <th>i</th> <th>j</th> <th>k</th> <th>l</th> </tr> </thead> <tbody> <tr> <td>Guided study</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> </tbody> </table>	Teaching/Learning Methodology	Outcomes												a	b	c	d	e	f	g	h	i	j	k	l	Guided study	√	√	√	√	√	√	√	√	√	√	√	√																																																										
Teaching/Learning Methodology	Outcomes																																																																																																
	a	b	c	d	e	f	g	h	i	j	k	l																																																																																					
Guided study	√	√	√	√	√	√	√	√	√	√	√	√																																																																																					
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1" data-bbox="440 1095 1473 1653"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="12">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>f</th> <th>g</th> <th>h</th> <th>i</th> <th>j</th> <th>k</th> <th>l</th> </tr> </thead> <tbody> <tr> <td>1. Continuous monitoring</td> <td>15%</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2. Interim report</td> <td>10%</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3. Final report</td> <td>50%</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>4. Oral examination</td> <td>25%</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Total</td> <td>100%</td> <td colspan="12"></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Overall Assessment: 1.0 × Continuous Assessment</p> <ol style="list-style-type: none"> <li>1. Performance of each student should be assessed individually together with the team's overall performance by the supervisor, an independent assessor, the peers and an examination panel consisting of at least three academic.</li> </ol>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)												a	b	c	d	e	f	g	h	i	j	k	l	1. Continuous monitoring	15%	√	√	√	√	√	√	√	√	√	√	√	√	2. Interim report	10%	√	√	√	√	√	√	√	√	√	√	√	√	3. Final report	50%	√	√	√	√	√	√	√	√	√	√	√	√	4. Oral examination	25%	√	√	√	√	√	√	√	√	√	√	√	√	Total	100%												
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																																																																																													
		a	b	c	d	e	f	g	h	i	j	k	l																																																																																				
1. Continuous monitoring	15%	√	√	√	√	√	√	√	√	√	√	√	√																																																																																				
2. Interim report	10%	√	√	√	√	√	√	√	√	√	√	√	√																																																																																				
3. Final report	50%	√	√	√	√	√	√	√	√	√	√	√	√																																																																																				
4. Oral examination	25%	√	√	√	√	√	√	√	√	√	√	√	√																																																																																				
Total	100%																																																																																																

	<p>2. The continuous monitoring of a project group as a whole and that of each group member on an individual basis are conducted by the supervisor. The interim report is assessed by the independent assessor. The final report is assessed by both the supervisor and the independent assessor. As part of the assessment process, each group member is required to specify his/her own contribution in completing the project when compared to his/her team mates (peer assessment). In case of an industrial-based project, comments will be invited from the industrial supervisor but he/she will not be required to perform the formal assessment.</p> <p>3. The supervisor monitors and assesses the overall and individual progresses through regular meetings. The interim report should be submitted to the independent assessor at around week 8 of the first semester. The final report submitted before the end-of-year examination is assessed by both the supervisor and the independent assessor. Due consideration of each student's individual contribution and performance will be taken into account.</p> <p>4. During the oral examination, every group member is required to present the project especially on his/her significant contribution to the whole project, and respond to the questions addressed to him/her by the examination panel. Marks for oral examination are awarded to individual student by taking into account the group's overall performance.</p> <p>5. The assessment system is summarized as shown in the following table:</p> <table border="1" data-bbox="496 909 1453 1317"> <thead> <tr> <th rowspan="2">Assessor</th> <th colspan="5">Assessment Component (% of the total)</th> </tr> <tr> <th>Continuous Monitoring (15)</th> <th>Interim Report (10)</th> <th>Final Report (25)</th> <th>Final Report (25)</th> <th>Oral Examination (25)</th> </tr> </thead> <tbody> <tr> <td>Supervisor</td> <td>√</td> <td></td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>Independent Assessor</td> <td></td> <td>√</td> <td></td> <td>√</td> <td></td> </tr> <tr> <td>Examination Panel</td> <td></td> <td></td> <td></td> <td></td> <td>√</td> </tr> </tbody> </table>	Assessor	Assessment Component (% of the total)					Continuous Monitoring (15)	Interim Report (10)	Final Report (25)	Final Report (25)	Oral Examination (25)	Supervisor	√		√			Independent Assessor		√		√		Examination Panel					√
Assessor	Assessment Component (% of the total)																													
	Continuous Monitoring (15)	Interim Report (10)	Final Report (25)	Final Report (25)	Oral Examination (25)																									
Supervisor	√		√																											
Independent Assessor		√		√																										
Examination Panel					√																									
<p><b>Student Study Effort Expected</b></p>	<table border="1"> <tr> <td>Class contact:</td> <td></td> </tr> <tr> <td>▪ Guided study</td> <td>26 Hrs.</td> </tr> <tr> <td>Other student study effort:</td> <td></td> </tr> <tr> <td>▪ Conducting project</td> <td>154 Hrs.</td> </tr> <tr> <td>▪ Literature search and private study</td> <td>72 Hrs.</td> </tr> <tr> <td>Total student study effort</td> <td>252 Hrs.</td> </tr> </table>	Class contact:		▪ Guided study	26 Hrs.	Other student study effort:		▪ Conducting project	154 Hrs.	▪ Literature search and private study	72 Hrs.	Total student study effort	252 Hrs.																	
Class contact:																														
▪ Guided study	26 Hrs.																													
Other student study effort:																														
▪ Conducting project	154 Hrs.																													
▪ Literature search and private study	72 Hrs.																													
Total student study effort	252 Hrs.																													
<p><b>Reading List and References</b></p>	<p>To be advised by supervisor</p>																													