HONG KONG IGDS - MSC MODULE OUTLINE

Subject Title	**Managing Design and Manufacturing Technology (MDMT)**	
	HK PolyU	*WarwickU*
Subject Code	ISE5758	WM9F7-15
Credit Value	3	15
Level	Level 5	Taught Postgraduate Level
Pre-requisite/ Co-requisite/Exclusion	None but some preliminary reading of managing design and manufacturing technology would be beneficial.	
Introduction	Design is vital to any engineering business's aim of creating successful products. Design can also be viewed as a systematic and disciplined process. The design process is a framework that engineers utilise to design products. Manufacturing involves the conversion of raw materials into usable products and can be summarised as:- the design and manufacture of products; and using various manufacturing processes, operations and techniques, following an organised plan. Design and manufacturing is interrelated and should not be viewed as separate disciplines. Designed products should meet the design requirements AND be able to be manufactured relatively easily and economically. Effective implementation of design for manufacture requires engineers to have fundamental understanding of materials, manufacturing processes and related operations. In addition, they must be able to assess the impact of designs on; manufacturing process selection, assembly, automation, quality control, tools and dies, cost and sustainability. Management of design and manufacture is complex and as such Computer aided design (CAD), computer aided manufacture (CAM), computer aided process planning (CAPP), computer aided engineering (CAE) computer integrated manufacture (CIM) and product data management (PDM) have become indispensable in management and optimisation of the design and manufacturing process.	
Objectives	No 1 To provide an introduction to the fundamental aspects of product design and manufacture including, the design process, selecting materials, selecting processes, assembly, computers in manufacturing, automation, sustainability. No 2 To learn a framework approach to the design and manufacture of products emphasising current trends in Industry 4.0 and sustainability.	
Intended Learning Outcomes (ILO's) *(Note 1)*	Upon completion of the subject, participants will be able to: No 1 demonstrate an advanced understanding of the fundamentals of product design and development processes, including: methods; technologies; latest trends; tools and techniques; outcome and functional/resource interdependence, interpreting their relationships from concept to customer. No 2 critically evaluate and make recommendations on approaches to the management of product design and development processes. No 3 critically evaluate and contrast: materials; manufacturing processes; manufacturing tools and technologies that are most used in the manufacturing industry. No 4 critically evaluate manufacture-design, demonstrating detailed knowledge of fundamental aspects of manufacturing and materials processes and technologies in the context of a circular /sustainable	

<table>
<tr><td></td><td>economy.</td></tr>
<tr><td>Indicative Syllabus Topics
(Note 2)</td><td>No 1 Design process framework: Product design specification, Conceptual design, Design for manufacture, Design management, Computers aids to design, Appreciation of the scope and usage of further methods to aid design (Quality function deployment, Failure mode and effect analysis, Functional cost analysis, Life cycle analysis, Matrix analysis, Taguchi methods)
No 2 Manufacturing technologies, processes & materials, comprising: Engineering materials properties & selection (Metals, Polymers, Ceramics and Composites), Manufacturing process knowledge and selection (Casting, Forming, Machining, Joining and Finishing), Assembly methods, Sustainability
No 3 Advanced understanding of the scope and impact of automation and computing in design and manufacturing: Machine control systems (CNC), Computer Aided Design and Manufacture (CADCAM), Finite Element Analysis (FEA), Industry 4.0, Automation fundamentals, Robotics technology and Robotic demonstrations</td></tr>
<tr><td>Teaching/Learning Methodology
(Note 3)</td><td>Lectures and case studies are used to deliver the various topics in this module. It adopts a case study approach, based on the functional capabilities and management methods of one of the major ERP vendors, to understand how companies manage their subsidiaries in different locations and deal with external suppliers and customers. Thus, these real case studies help to enhance the learning objectives and learning outcomes.
<u>Alignment between Teaching/Learning Methodologies and ILOs:</u>
<table>
<tr><td>Teaching/Learning Methodologies</td><td colspan="4">Intended Subject Learning Outcomes to be assessed</td></tr>
<tr><td></td><td>No 1</td><td>No 2</td><td>No 3</td><td>No 4</td></tr>
<tr><td>Lecture</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Case studies</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
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<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes
(Note 4)</td><td>
<table>
<tr><td rowspan="2">Assessment Methods/Tasks</td><td rowspan="2">% Weight</td><td colspan="4">Intended Learning Outcomes (ILO’s)</td></tr>
<tr><td>No 1</td><td>No 2</td><td>No 3</td><td>No 4</td></tr>
<tr><td>1. Group Case Studies and Presentation</td><td>20</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Post Module Assignment & Assessment</td><td>80</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100</td></tr>
</table>
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes (ILO’s). The case studies will cover all the topics covered in the module which will therefore embrace all the learning outcomes. The PMA requires participants to apply what they have learnt in the module to their own work environment. These will embrace the ILO’s albeit in different work situations.</td></tr>
<tr><td>Student Study Effort Required</td><td>
<table>
<tr><td>Class Contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>15 Hours</td></tr>
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	▪ Case Study	15 Hours
	Other Participant Study Effort:	
	▪ Private Study	120 Hours
	Total Participant Study Effort	150 Hours
Reading List and References	The list given to participants is comprehensive and embraces all the topics covered in the module. In total there are about 20 references provided. They can be found in the Folder Notes given to participants at the commencement of the module.	

Note 1: Intended Learning Outcomes
Intended learning outcomes state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus
The syllabus adequately addresses the intended learning outcomes. At the same time over-crowding of the syllabus has been be avoided.

Note 3: Teaching/Learning Methodology
This section includes a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method
This section includes the assessment method(s) used and its relative weighting, and indicates which of the subject intended learning outcomes that each method assesses. It also provides a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.