



**UNIVERSITI TEKNOLOGI MARA**

**PST642: COMPUTER SIMULATION**

<b>Course Name (English)</b>	COMPUTER SIMULATION <b>APPROVED</b>
<b>Course Code</b>	PST642
<b>MQF Credit</b>	3
<b>Course Description</b>	This course covers the basic principles employed to simulate injection moulding processes so as to optimise the mould design digitally. It begins with an overview of the injection moulding process, material properties and basic functions of an injection mould. The use of an injection moulding simulation software (i.e CADMOULD) demonstrated the analytical method of optimising the product and its mould design. Consequently, this course will enable the students to understand all aspects of the injection moulding process and how to successfully design an injection moulded product and its mould.
<b>Transferable Skills</b>	Computer aided simulation of injection moulding process.
<b>Teaching Methodologies</b>	Lectures, Tutorial, Computer Aided Learning
<b>CLO</b>	CLO1 Explain the injection moulding process stage CLO2 Simulate an injection moulding process using Cadmould CLO3 Optimize injection moulding process, the design of injection moulded parts and its mould with respect to filling, packing and cooling phase CLO4 Explain the relation between material properties, process and product quality
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. Review of the injection moulding</b> 1.1) Machine. mould, product design and process parameters in Injection Moulding 1.2) Defects and issues in Injection Moulding	
<b>2. Material properties</b> 2.1) Rheological data, Thermal data, Pressure-Specific Volume -Temperature data, Mechanical data and Reactivity data.	
<b>3. Product design</b> 3.1) Thickness and thickness distribution. 3.2) Gate position, number of gates, filling pattern, pressure required, cycle time and part quality.	
<b>4. Injection phase</b> 4.1) Pressure requirement 4.2) Pressure/Stress distribution 4.3) Filling speed profile, frozen layer and orientation, pressure 4.4) Sheer stress and shear rate 4.5) pressure course in the cavity.	
<b>5. Feeding Systems Optimization</b> 5.1) Gates and runner sizing and location, 5.2) Multi-cavity mould,	
<b>6. Packing phase</b> 6.1) Transferring to holding pressure phase, course of state of the material.	

**7. Cooling phase**

- 7.1) Cooling fluids
- 7.2) Cooling mechanism
- 7.3) Mould temperature distribution
- 7.4) hot spots
- 7.5) cooling efficiency
- 7.6) Heat transfer load for each channel

**8. Shrinkage and warpage**

- 8.1) Residual Stresses and Crystallisation

Assessment Breakdown		%	
Continuous Assessment		100.00%	

  

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment	30%	CLO3
	Individual Project	Individual Project1	25%	CLO1
	Individual Project	Individual Project2	25%	CLO2
	Test	Test	20%	CLO4

  

Reading List	Recommended Text	• Simcon, <i>Cadmould manual</i>
	Reference Book Resources	<ul style="list-style-type: none"> <li>• Gerd Pötsch,Walter Michaeli 1995, <i>Injection Molding</i>, Hanser Gardner Publications [ISBN: 1569901937]</li> <li>• Charles L. Tucker,Martin R. Barone 1989, <i>Fundamentals of Computer Modeling for Polymer Processing</i>, Oxford University Press, USA [ISBN: 0195207661]</li> <li>• Malloy, Robert A. 1994, <i>Plastics Part Design for Injection Molding: A</i>, Ed., , Hanser Publishers,Munich: New York [ISBN: ]</li> <li>• Menges, G., Michaeli, W.,Mohren, P. 2000, <i>How to make Injection Molds</i>, 3 Ed., , Hanser, Munich, New York [ISBN: ]</li> </ul>

  

<b>Article/Paper List</b>	This Course does not have any article/paper resources
<b>Other References</b>	This Course does not have any other resources