

## Design, Materials and Manufacturing: An Integrated Tripartite Approach (3 Credits)

### 设计、材料和制造：集成化的三分模式

Instructor	Mike MUNRO, Dept of Mechanical Engineering, University of Ottawa, <a href="mailto:mmunro@UOttawa.ca">mmunro@UOttawa.ca</a>	
Description	Primarily, a course on advanced fiber-reinforced polymer and traditional metal manufacturing processes with constant connections with associated engineering materials issues and mechanical design predictions. Emphasis will be on the ability to predict the manufacturability of metal and fiber-reinforced components.	
Offering	2017 Julmester (July Semester)	
Audience	Year 3 and Year 4 Undergraduate Students	
Prerequisites	Introductory courses in mechanical properties of metals and polymers	
Classroom	Room xxx, Teaching Bldg. No. XX, Peking University	
Frequency	<u>Class</u> : 1-4 PM, M-F, July 3–21, 2017	<u>Total Contact Hours</u> : 45
	<u>Final Exam</u> : 1-3 PM, July 22, 2017 (closed book, equation sheet provided)	
Objectives	<ol style="list-style-type: none"> <li>1. Become familiar with advanced fiber-reinforced polymer and traditional metal manufacturing processes.</li> <li>2. Understand the relationships between mechanical design, engineering materials and manufacturing processes</li> <li>3. Using design formulae and guidelines, determine the manufacturability of components.</li> </ol>	
Topics	<ol style="list-style-type: none"> <li>1. Connections between materials engineering, mechanical design and manufacturing processes (examples)</li> <li>2. Introduction to fiber-reinforced polymer composite materials</li> <li>3. Filament winding (manufacturing-controlled design)</li> <li>4. 2D braiding (manufacturing-controlled design)</li> <li>5. Introduction to traditional metal manufacturing processes</li> <li>6. Manufacturing and materials-controlled design equations for traditional metal manufacturing processes (machining; sand, die and investment casting; rolling, forging, extrusion; deep drawing and sheet forming, and powder metallurgy processes).</li> </ol>	
References	<ul style="list-style-type: none"> <li>• Course notes will be provided in soft copy form. They will be sufficient for course material.</li> <li>• Reference text (if desired): S. Kalpakjian (main author), <i>Manufacturing Engineering and Technology</i>, any edition will do.</li> </ul>	
Grading	Final Exam	50%
	MidTerm Exam	20%
	Assignments	30%
	<b>Total</b>	<b>100%</b>