

MS4621 – Polymer Science

Course Code	MS4621				
Course Title	Polymer Science				
Pre-requisites	MS1014	Materials Chemistry II			
	MS2013	Polymers and Composites			
Pre-requisite for	NIL				
No of AUs	3				
Contact Hours	LECTURES	24	Tutorials	12	
Course Aims					
<p>This course consists of two parts: Part A polymer physics and Part B polymer chemistry. The aim of Part A is to present you with the mechanical and time-dependent properties of polymers with respect to the underlying physics of polymers in solution, melt, and solid state.</p> <p>The aim of Part B is to provide you with fundamental understanding of polymer chemical structures and properties with reference to their applications as engineering and functional materials.</p>					
Intended Learning Outcomes (ILO)					
<p>By the end of this course, you (as a student) would be able to:</p> <ol style="list-style-type: none"> 1. Explain the static and time-dependent mechanical response of polymers. 2. Explain the thermodynamics behind polymer solutions - miscible and immiscible 3. Define and calculate the average molecular weight of polymers as well as explain its importance 4. Differentiate thermoplastics, thermosets and elastomers based on their chemical structures, mechanical properties and processability; 5. Explain the relationships between the chemical structures and properties of polymers; 6. Select polymers suitable for various common applications based on the structures of the polymers; 7. Select polymerisation and co-polymerisation approaches to obtain polymers with a set of desired chemical structures. 					
Course Content					
<p>Part A covers mechanical properties of polymers, thermodynamics of polymer solutions, molecular weights and time-dependent properties.</p> <p>Part B covers polymerization and copolymerization methods that involve different mechanisms, and industrial polymerization processes. Factors affecting polymer</p>					

properties, including polymer chain structures and important thermal transitions in polymers, will also be taught.

Reading and References

MS4621 – Polymer Science and Technology, a custom publication designed for Part A of the course in association with Pearson.

Joel R. Fried, Polymer Science and Technology, 3rd Edition, Prentice Hall, 2014.

George G. Odian, Principles of Polymerization, 4th Edition, Wiley-Interscience, 2004.

Robert J. Young, Introduction to Polymers, 3rd Edition, CRC Press, 2011.

Course Policies and Student Responsibilities

CAs

All non-attendance must be supported by a medical certificate or other valid official documents. There is a possibility of arrangement of supplementary CA2 (Quiz) in the case of a validated and justified cause. The above doesn't apply to CA1 as it is a take-home assignment.

Academic Integrity

Good academic work depends on honesty and ethical behavior. Quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honor Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student of NTU, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at the University. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, and collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.