

MS1017 – Introduction to Materials Science

Course Code	MS1017				
Course Title	Introduction to Materials Science				
Pre-requisites	NIL				
Co-requisite for	MS1016	Thermodynamics of Materials			
	MS2018	Electronic & Magnetic Properties of Materials			
Pre-requisite for	MS2014	Materials Structure and Defects			
	MS4664	Environmental Sustainability & Materials			
No of AUs	2				
Contact Hours	LECTURES	20	TUTORIALS	8 hrs	
		hrs			

Course Aims

'Introduction to Materials Science' initiates students to the fascinating world of Materials across different length scales from atoms to devices and applications, starting from a historical perspective of materials developments at the beginning of civilizations to today's advanced materials powering growth of societies in this modern world. You will gain knowledge in the fundamental aspects of bonding, crystallography, microstructures and phases for the three key classes of material systems, that is, metals, polymers and ceramics. Understand these facets will allow you to design and control the associated materials properties.

Intended Learning Outcomes (ILO)

By the end of this course, you (as a student) would be able to:

1. Determine the types of atomic and molecular bonds of materials based on the knowledge of the electronic configurations of the elements and the Periodic Table.
2. Construct basic crystallographic crystal structures (e.g., cubic), crystal directions and planes based on the Miller indices.
3. Analyse the equilibrium phase diagram and perform calculations to derive compositional and structural information.
4. Determine mechanical properties materials from stress-strain curves.
5. Explain the basics of optical and electron microscopy
6. Evaluate the importance of Materials Science in engineering technologies from a broader context.

Reading and References

Suggested reading:

Materials Science and Engineering, 10th Edition, SI Version, Willian D. Callister, David G. Rethwisch, 2018, John Wiley & Sons Inc.

Additional reading:

Introduction to Materials Science for Engineers, James F. Shackelford, 8th Edition, Global Edition, Pearson.

Course Policies and Student Responsibilities

(1) Group Project Assignment

Students are given sufficient time to prepare group project to complete submission before deadline.

(2) CA

Absentees must be supported by a medical certificate or other valid official documents.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour 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, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. 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, 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.