

MS2014 – Materials Structure and Defects

Course Code	MS2014				
Course Title	Materials Structure and Defects				
Co-requisites	MS1018	Properties of Materials			
Pre-requisite for	MS1017	Introduction to Materials Science			
	NIL				
No of AUs	3				
Contact Hours	LECTURES	26 hrs	TUTORIALS	12 hrs	

Course Aims

This is one of the core modules for MSE students. It aims to develop your ability to describe materials' crystal structure and defects, and to understand how they affect materials' properties and performance. This course prepares MSE students for their future courses on materials properties, processing, and characterization. The principles learnt from this course will be useful for you in designing / selecting materials in your future career.

Intended Learning Outcomes (ILO)

By the end of the course, the students should be able to:

1. describe and understand various types of lattice structures (Bravais lattices).
2. express crystallographic directions and planes and calculate their properties (vector length, unit cell volume, d-spacing, linear density, planar density, atomic / ionic packing factor etc.) and geometric relationship with the aid of formulae.
3. describe and explain representative metal and ceramic structures.
4. define different types of defects in metals and ceramics.

Determine how crystalline defects would affect material properties based on basic principles and propose possible solutions.

Reading and References

Main references:

1. Samuel M. Allen and Edwin L. Thomas, The Structure of Materials, John Wiley, 1999
2. Anthony Kelly and Kevin M. Knowles, Crystallography and Crystal Defects, 2nd Edition, John Wiley, 2012

Special topics:

3. Christopher Hammond, Introduction to Crystallography, Revised Edition, Oxford University Press, 1992
4. Derek Hull and D. J. Bacon, Introduction to Dislocations, 5th Edition, Pergamon Press, 2011

Course Policies and Student Responsibilities

Absentee in continuous assessment must be supported by a medical certificate submitted through the University online system.

Attendance is taken for every tutorial classes for information on student's participation of class discussion.

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.