Basic physical metallurgy 701 (NFM 701)

Qualification	Postgraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	0.00
Programmes	BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Academic organisation	Materials Science and Metallur
Period of presentation	Year

Module content

This module serves as a bridge into full post graduate studies in physical and mechanical metallurgy for students who do not have a formal first degree in these subjects. The following topics are covered in this module: phases in alloys, diffusion, solidification, the precipitation of second phases in alloys and the recrystallisation and grain growth of single phase alloys, aluminium and its alloys, copper and its alloys, nickel base alloys, the iron-carbon phase diagram, the heat treatment of steels, dislocations and the deformation of metals, engineering strength of metals and alloys, creep deformation, introduction to fracture mechanics and fatigue and failure analysis. This module will, therefore, enable the student to understand the fundamentals that govern alloy design, heat treatment, physical and mechanical properties and behaviour of materials during heat treatment and under stress and will enable the correct selection of alloys for a particular use, the prescription of heat treatments and further mechanical processing of these alloys to achieve the required metallurgical and mechanical properties.