

<b>Faculty</b>	Natural Sciences			
<b>Home Department</b>	Physics and Astronomy			
<b>Module Topic</b>	Solid State Physics, Statistical Physics			
<b>Generic Module Name</b>	Physics 322			
<b>Alpha-numeric Code</b>	PHY322			
<b>NQF Level</b>	7			
<b>NQF Credit Value</b>	30			
<b>Duration</b>	Semester			
<b>Proposed semester to be offered.</b>	First Semester			
<b>Programmes in which the module will be offered</b>	BSc (Physical Science) (3233, 3120) BSc (Applied Geology) (3214, 3011) BSc (Chemical Sciences) (3220, 3019) BSc (Computer Science) (3221, 3023) BSc (Mathematics and Statistical Sciences) (3227, 3031)			
<b>Year level</b>	3			
<b>Main Outcomes</b>	<p>On completion of this module students should be able to:</p> <ul style="list-style-type: none"> <li>• Integrate and find coherence from the experimental results using the Solid state theory</li> <li>• Explain thermal and electronic properties of crystals</li> <li>• Demonstrate how the theory should be used to solve problems</li> <li>• Solve the problems numerically using computer programs</li> </ul>			
<b>Main Content</b>	<ul style="list-style-type: none"> <li>• Crystal structures, X-ray diffraction, Defects in crystals: vacancies, impurities, dislocations and grain boundaries. Boltzmann, Maxwell and Planck distributions. Phonons in crystals, Debye theory of the lattice specific heat. Electrons in metals: conduction electrons, electrical conductivity, motion in a magnetic field. Free electron model: Fermi-Dirac statistics, Fermi energy. Electrons in semiconductors: energy bands, intrinsic and doped semiconductors, mobility, Hall effect, p-n junctions.</li> <li>• Practical component provides students with the skills to acquire and analyse data in solid state physics experiments, to apply the computational methods and to hone the report writing and presentation skills.</li> </ul>			
<b>Pre-requisite modules</b>	PHY212 and PHY222 and MAT211 and MAT221			
<b>Co-requisite modules</b>	None			
<b>Prohibited module Combination</b>	None except from timetable clash groups			
<b>Breakdown of Learning Time</b>	<b>Hours</b>	<b>Time-table Requirement per week</b>		<b>Other teaching modes that does not require time-table</b>
<i>Contact with lecturer / tutor:</i>	56	Lectures p.w.	3	
<i>Assignments &amp; tasks:</i>	30	Practicals p.w.	4	
<i>Practicals:</i>	56	Tutorials p.w.	1	
<i>Assessments</i>	12			
<i>Selfstudy</i>	146			
<i>Other:</i>				
<b>Total Learning Time</b>	<b>300</b>			
<b>Method of Student Assessment</b>	Continuous Assessment (CA): 60% Final Assessment (FA): 40%			
<b>Assessment Module type</b>	Continuous and Final Assessment (CFA)			