SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Mathematics)
Semester: IV
Syllabus with Effect from: November-2013

Paper Code: PS04EMTH31	**Total Credit: 4**
Title Of Paper: Algebra - II	

Unit	Description in detail	Weighting (%)
I	Modules, definition and examples, modules over a division ring, submodules and direct sums, products and quotient modules, R-homomorphisms, first isomorphism theorem, second isomorphism theorem, third isomorphism theorem.	25%
II	Characterization of a module multiplication on an abelian group, factorization and lifting of module homomorphisms, correspondence theorem, annihilator, torsion element and torsion module, torsion free module.	25%
III	External direct product and external direct sum, canonical projection, internal direct sum, direct summand, exact sequence, short exact sequence, split exact sequence. Free modules, cyclic modules, finitely generated free modules, invariant rank property and rank of a free module.	25%
IV	Infinite dimensional free modules, free modules over PIDs, invariant factor theorem for sub modules, finitely generated modules over PIDs. Projective and injective modules, simple and semisimple modules, characterization of finitely generated semisimple modules, left and right semisimple rings and its applications to semisimple modules.	25%

Basic Text & Reference Books:-

- V. Sahai and V Bist, Algebra (3/e), Narosa Publishing House, New Delhi, 2008.
- P.B. Bhattacharya, SK Jain and SR Nagpaul, Basic Abstract Algebra (2/e), Cambridge University Press, South Indian Edition 2002.
- I.S. Luthar and I.B.S. Passi, Algebra Vol 3: Modules, Narosa Publishing House, New Delhi, 2004.