School	School of Arts & Science
Major	Masters of Science in Applied Mathematics

Core Requirements			
Code	**Title**	**Credits**	**Description**
MATH502	Algebra	3	Sylow Theorems, finite abelian groups. Ring theory: rings, integral domains, fields of quotients, homomorphisms, ideals, quotient rings, P.I.D.s, U.F.D.s, polynomial rings. Advanced topics in linear algebra: canonical forms. Field theory: extensions, splitting fields, finite fields, geometric constructions.
MATH510	Real Analysis	3	Lebesgue measure; general measures; measurable functions; integration (monotone and dominated convergence theorems); function spaces; Lebesgue spaces; modes of convergence; product measures; Fubini theorem. Differentiation; relationship between differentiation and integration; Radon-Nikodym theorem.
MATH520	Functional Analysis	3	Topological vector spaces, completeness, normed and Banach spaces, linear operators, inner product bounded operators in Hilbert spaces, fundamental theorems, Hahn-Banach theorem, uniform boundedness theorem, open mapping theorem, closed graph theorem, spectral theory, operators on normed spaces, compact operators, and self-adjoint operators.
MATH522	Topology	3	TopologyTopological spaces and continuous functions; connectedness; compactness; product and quotient spaces; metric spaces; Urysohn's lemma; function spaces and modes of convergence; Tietze extension theorem; homotopy; covering spaces and path lifting; the fundamental group and examples; Brouwer fixed point theorem and applications.
MATH595	Special graduate skills	0	This course will introduce students to academic skills concerning preparing and writing proposals, projects, grants, thesis, articles, and how to present seminars.
MATH599	Thesis	6	Students will conduct some research connected to some of the areas within Mathematics. Students should coordinate with a supervisor at the university to select the subject. The student should carry out the work under the supervisor□s direction and at the end, present orally the thesis to a committee in an official seminar.
MATH505	Numerical linear algebra	3	Numerical linear algebra
MATH560	Modern Differential Geometry	3	Manifolds: Charts, Atlas, induced topology, differentiable map between 2 manifolds, germs. Tangent spaces : Tangent vector, the manifold TM, vector fields, derivation on an algebra, bracket, the tangent map, the cotangent manifold T*M, fields of 1-form. Immersion, submersion, the rank theorem, immersed parts, sub-tangent space of an immersed part, submanifolds. Differential equations and intégral manifolds: System of differential equations, theorem of existence and uniqueness, flows, sub-integral manifolds, Frobenius theorem.