MATHEMATICS (MTH)

MTH 500 Advanced Geometry (3 Credits)
Contact the department for specific course information.

MTH 500L Geometry and the Middle School Teacher (3 Credits)
See department for more information

MTH 500S Probability and Statistics (3 Credits)
See department for more information

MTH 501J Number Systems and Operations (3 Credits)
Special contract course requested by Norfolk Schools Portsmouth, for in service teachers to acquire Math Specialist Cerification

MTH 501K Alga&afunctionsamidaschateache (3 Credits)
See department for more information

MTH 501L Rational Numbers & Proportional Reasoning (3 Credits)
Special Grant Course Requested by Norfolk Public Schools & Va Beach Public School

MTH 504 Graph Theory in Data Science, Graph Theory in Data Science (3 Credits)
A graduate-level introduction to advanced, introduction to various graphs, trees, flows in, networks, maps, walks, networks, and cycles. This, course will primarily introduce all the standard, graphs theory results, emphasizing its, applications in Data Science. Large datasets with, multiple interconnections between dataset, variables can be distilled and illuminated using, various graphs, trees, and networks, recognizing, situations where graphs delineate a given dataset., An introduction to the tree search algorithm and, solutions to four color problems is covered.

MTH 505 Topological Data Analysis (3 Credits)
A graduate level course on topological methods for, data analysis. The focus is split between basic, topological theory and applications such as , topological persistence, zigzag persistence,, topological analysis of point clouds, Reeb graphs,, and topological invariants for directed graphs.

MTH 510 Discrete Mathematics (3 Credits)
Contact the department for specific course information
Prerequisites: Take MTH-251;

MTH 511 Adv Topics in Geom (3 Credits)
Contact the department for specific course information
Prerequisites: Take MTH-311;

MTH 514 Probability and Stats for Data Analytics (3 Credits)
A graduate level introduction to probability and, statistical with emphasis towards applications in, data sciences. Probabilistic and statistical, methods regularly provide the foundations for data, science, the methodologies included in this course, will provide the students the knowledge needed in, several fields as marketing, finance, and other, disciplines. This course will prepare the students, for modeling and understanding big data problems.

MTH 520 Mathematicalalogical and Setatheory (3 Credits)
Contact the department for specific course information.
Prerequisites: Take MTH-307 or MTH-331;

MTH 524 Mathmematical Foundations for Mac Lrn (3 Credits)
A graduate level introduction to mathematical, foundations for machine learning provides a, collection of tools for doing machine learning., While the theory of the tools may be technical,, the emphasis is on a balance between theory and, practice, with hands-on activities assigned to, help the understanding of the theory.

MTH 530 Mathematical Models and Applications (3 Credits)
See department for more information

MTH 531 Topics in Algebra (3 Credits)
Contact the department for specific course information.
Prerequisites: Take MTH-331;

MTH 534 Applications in Adv Numerical Linear Alg (3 Credits)
This course is a continuation of linear algebra,, towards topics relevant to applications as well as, theoretical concepts. The course starts with a, review of matrices, linear systems, subspaces,, determinants, eigenvalues and eigenvectors, and, orthogonal vectors. Then it introduces the basic, techniques, analysis methods, and implementation, details of numerical linear algebra. Emphasis, will be given on the matrix computations that, arise in solving linear systems, least squares, problems, and eigenvalue problems. Students will, demonstrate knowledge by completing a final, project that demonstrates understanding of linear, systems applications.

MTH 535 Applied Matrix Theory (3 Credits)
The purpose of this course is to present, fundamental mathematical concepts in matrix, theory, essential for contemporary approaches in , data analysis, scientific computing, optimization,, and virtually all quantitative domains in science, and engineering. Topics covered include , fundamental matrix operations, SVD, matrix, factorizations, Jordan canonical form theorem,, Hermitian matrices, algebraic and analytic , properties of norms, duality and geometric, properties of norms, vector norms, and condition, numbers for inverse and linear system. , Although the selection of topics is influenced by, their application in diverse fields, the course, will prioritize exploring the theoretical and , conceptual foundations of this subject, aligning, with the approach taken in other applied, mathematics courses.

MTH 540 Mathematical Model and Application (3 Credits)
Contact the department for specific course information
Prerequisites: Take MTH-384;

MTH 544 Numerical Analy Fo Comput Meth for Analy (3 Credits)
A graduate level introduction to numerical, algorithms for linear algebra problems with, applications to data analytics. Algorithms will be, studied and analyzed for efficiency and accuracy., Topics include Singular Value Decomposition, QR, factorization, Least Squares, Conditioning and, Stability, Systems of Equations, Eigenvalues and, Eigenvalue algorithms and Iterative methods.

MTH 545 Optimization for Data Science (3 Credits)
The course covers theoretical foundations, necessary for the in-depth understanding of modern, optimization methods for data science. The , optimization methods are presented in the context, of relevant applications. The course prepares, students for applications of modern , numerical methods to problems in data science and, helps them build sufficient mastery of, optimization tools and techniques for designing , and implementing tailored methods for solving new, problems.

MTH 554 Data Visualization and Technical Report (3 Credits)
This course presents a graduate level, comprehensive introduction to data visualization, and technical reporting. The course will provide, the students with the necessary background for, visual representation and analytics of complex, data and data communication to a target audience., The course will cover design strategies,, techniques to display multidimensional information, structures, and exploratory visualization tools., As part of the course, students will be required, to present written reports and oral presentations.

MTH 600 Modern Applied Statistics: Data Mining (3 Credits)
A graduate level introduction to new techniques, for predictive descriptive learning using concepts, from statistics, programming and artificial, intelligence with emphasis on statistical aspects, and integration with standard methodologies., Course covers regression and classification models, with descriptive methods to discover patterns and, data relationships without inference. This course, will prepare students to view data from a, statistical perspective with automated analysis of, large complex data sets.

MTH 620 Mathematical Modeling Proj in Data Scien (3 Credits)
The course structure follows a graduate case-study, model. Throughout the semester, students will be, presented with various case studies of, mathematical models as applied to the fields of, engineering, technology, natural/physical science,, social science, business, and/or management. , Completion of a formal project with proposal, describing the modeling problem with outline of a, possible solution path concluding in guided, solution as primary focus. Regular progress, reports and presentation of the completed project, by the end of the semester will be required. The, project will provide solution(s) to the modeling, problem and demonstrate skill on problem-solving,, data-fitting, writing, and presenting.

MTH 630 Statistical Meth in Big Data Analy, Statistical Methods in Big Data Analytic (3 Credits)
A graduate level of statistical methods with, emphasis towards applications in data sciences., Statistical learning methods regularly provide the, foundations for data science, the methodologies, included in this course will provide the students, the knowledge needed in several fields as, marketing, finance, and other disciplines. This, course will prepare the students for modeling and, understanding the fundamentals of statistical, methods useful for modeling, analyzing and, forecasting problems, which include big data.

MTH 640 Ethics and Communication in Data Science (3 Credits)
A graduate level introduction to issues of ethical, deliberation involved data analytics including, topics like machine learning and working with, incomplete data. Issues on how to collect data to, reflect population of interest, model validations, with appropriate error rate, model performance to, standards when deployed are explored. Choice of, learning algorithm and approach to maximize, models' performance with interpretability with, consideration of ethics into trade-off, considerations are studied. D ecision making for, real-world effects. Reporting and communication, topics emphasized through projects.

MTH 699 Math Modeling in Data Science (3 Credits)
The course structure follows a graduate case-study, model. Throughout the semester, students will be, presented with various case studies , of mathematical models as applied to the fields of, engineering, technology, natural/physical science,, social science, business, and/or , management. Completion of a formal project with, proposal describing the modeling problem with, outline of a possible solution path , concluding in guided solution as primary focus., Regular progress reports and presentation of the, completed project by the end of the , semester will be required. The project will, provide solution(s) to the modeling problem and, demonstrate skill on problem-solving,, data-fitting, writing, and presenting.