

**MATH 664 — Topics in Mathematical Data Science \***

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**Instructor:** Simon Foucart, 502D Blocker Building, [foucart@tamu.edu](mailto:foucart@tamu.edu)

**Office hours:**

**Course web page:** accessed via eCampus at <http://ecampus.tamu.edu/>

**Textbook:** none; lecture notes will be distributed.

**Course Content:** The following topics will (tentatively) be covered:

- Machine Learning: general concepts, VC dimension, binary classification, support vector machines, regression, clustering;
- Optimal Recovery: fundamental results, approximability models, optimal observations, tractability and curse of dimensionality;
- Compressive Sensing: sparse recovery, optimality, low-rank recovery, one-bit sensing;
- Optimization: basics, linear programming, semidefinite programming, duality;
- Neural Networks: general concepts, expressiveness of shallow networks, the advantages of depth, training by back-propagation.

**Prerequisite:** Some basic knowledge of linear algebra, analysis, and probability; familiarity with a programming language is a plus.

**Grading:** Based on attendance and class participation.

**Electronic Etiquette:** Cell phones must absolutely be put on silent mode, left closed, and put away. If you have a family emergency and need to take a call during class, I shall be notified in advance so that a special arrangement can be made.

**Academic Honesty:** *"An Aggie does not lie, cheat, or steal or tolerate those who do."*

See <http://aggiehonor.tamu.edu> for more information.

**Americans with Disabilities:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit <http://disability.tamu.edu>.

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\*this syllabus is a general plan for the course; deviations announced in class may be necessary