

## Math 565 Syllabus (102)

Dr. K. M. Furati

**Course Title:** Advanced Ordinary Differential Equations I

**Course Description:** Existence, uniqueness and continuity of solutions. Linear systems, solution space, linear systems with constant and periodic coefficients. Phase space, classification of critical points, Poincare'-Bendixson theory. Stability theory of linear and almost linear systems. Stability of periodic solutions. Laypunov's direct method and applications.

**Prerequisite:** Math 465

**Textbook:** Verhulst F., Nonlinear Differential Equations & Dynamical Systems. Springer; 2000.

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Week #	Ch.	Topic	HW
1	1	Introduction	
2	handout	Review of linear analysis	
3	2	Autonomous equations	1, 2, 5, 8.
4			
5	3	Critical points	1, 3, 7
6	4	Periodic solutions	2, 4, 5, 6
7			
8	5	Introduction to the theory of stability	1, 4
9			
10	6	Linear equations	2, 5, 6
11	7	Stability by linearisation	2, 3, 5
12			
13	8	Stability analysis by the direct method	1, 7
14			
15	..	Review and discussion of homework	