The Cooper Union
Department of Mathematics

SYLLABUS

MA 113 (4 cr.) **Calculus II** (Fall)

Text: *Thomas' Calculus,*
Weir, Hass
Twelfth Edition,
Pearson

1. Volumes using cross-sections (6.1). Volumes using cylindrical shells (6.2). Arc length (6.3).

2. Areas of surfaces of revolution (6.4). Work and Fluid forces (6.5). Moments and centers of mass (6.6).

3. Parametrization of plane curves (11.1). Calculus with parametric curves (11.2). Polar coordinates (11.3).

4. Graphing in polar coordinates (11.4). Areas and lengths in polar coordinates (11.5). Conic sections (11.6).

5. Conics in polar coordinates (11.7). Sequences (10.1). Infinite series (10.2).

6. The integral test (10.3). Comparison tests (10.4). The ratio and root tests (10.5).

7. Alternating series. Absolute and conditional convergence (10.6). Power series (10.7). Taylor series (10.8).

8. Convergence of Taylor series (10.9). The binomial series and Applications of Taylor series (10.10). Complex numbers and Euler's formula (Ap. 7).

9. Curves in space and their tangents (13.1). Integrals of vector functions (13.2). Arc length in space (13.3).

10. Curvature and normal vectors of a curve (13.4). Tangential and normal components of acceleration (13.5). Velocity and acceleration in polar coordinates. (13.6).

11. Function in several variables (14.1). Cylinders and quadratic surfaces (12.6). Limits and continuity (14.2).

12. Partial derivatives (14.3). The chain rule (14.4). Directional derivatives and gradient vectors (14.5).

13. Tangent planes and differentials (14.6). Taylor's formula for two variables (14.9). Extremal values and saddle points. (14.7).

14. Lagrange multipliers (14.8).