

## ANALYSIS SYLLABUS

### Metric Space Topology

Metrics on  $R^n$ , compactness, Heine-Borel Theorem, Bolzano-Weierstrass Theorem.

### Sequences and Series

Limits and convergence criteria.

### Functions defined on $R^n$

Continuity, uniform continuity, uniform convergence, Weierstrass Comparison Test, uniform convergence and limits of integrals, Ascoli's Theorem.

### Differentiability

Differentiable functions, chain rule, local maxima and minima.

### Transformations on $R^n$

Derivative as a linear transformation, inverse function theorem, implicit function theorem.

### Riemann integration on $R^n$

Riemann-integrable functions, improper integrals; line integrals, surface integrals; change of variable formula; Green's theorem, Stokes' theorem, Gauss' divergence theorem.

### References

Bartle, R. G, and Sherbert, D. R., *Introduction to Real Analysis*. John Wiley & Sons (1992)

R. Creighton Buck, *Advanced Calculus*. McGraw-Hill (1978)

Walter Rudin, *Principles of Mathematical Analysis*. McGraw-Hill (1976)

Strichartz, R. S., *The Way of Analysis*. Jones and Bartlett (1995)