In this course the basic concepts of one-dimensional analysis (a limit, a derivative, an integral) are introduced and explored in different applications: graphing functions, approximations, calculating areas etc.

1. Limit of a function, continuity.

2. Derivative, basic derivative formulas.

3. Derivative of an inverse function; derivative of a composite function, the chain rule; derivative of an implicit function.

4. Derivatives of high order.

5. The mean value problem theorem. Indeterminate forms and l’Hopital’s rule.

6. Rise and fall of a function; local minimal and maximal values of a function.


8. Linear approximations and differentials. Taylor’s theorem and approximations of an arbitrary order.

9. Indefinite integrals: definition and properties.

10. Integration methods: the substitution method, integration by parts.


12. Calculating areas.