

**CBCC offered by Department of Biophysics, Molecular Biology and  
Bioinformatics**

**Biology by the numbers**

**The building blocks of life**

Four classes of biological macromolecules. Polymeric codes in proteins and nucleic acids.

**Biological spatial scales**

Cells and structures; diversity of shapes, sizes and functions; organelles; macromolecular assemblies; viruses

Multicellularity; biofilms; slime molds; tissues and networks of cells; differentiation of cells; formation of organs and organisms; development - *C. elegans* as a model; colonies of organisms

**Biological time scales**

Diversity of time scales in biology; cell cycle and the standard clock

Transcription; translation and replication time scales

Clocks and oscillators; segmentation in development; circadian clocks

Checkpoint and cell cycle; genetic network

Chemical kinetics and enzyme turnover; diffusive transport; motor transport

**The art of quantitative modeling in biology**

**Recommended text**

1. Phillips, R. et al. (2012) Physical Biology of the Cell. 2nd edition. Garland Science.