I.N.Beckman Transdisciplinary University
Transdisciplinary on-line education

A treatise on

Synergetics

its concepts and applications

BY
prof. Igor N. Beckman

A word to the Reader:

This volume represents the synopsis of lectures which have been developed and delivered to the audience of the Interdisciplinary University by Dr.Igor Nikolaevich Beckman, professor of chemistry at Lomonosov Moscow State University, Russia. The treatise thoroughly examines applicability of reductivism, systems analysis, synergetics and holism to scientific cognition of our world. Effects of synergy, which have led up to the creation of the new discipline – synergetics, are reviewed in great details. Comparison of synergetics and cybernetics is presented. Essential terms and definitions such as order, disorder, chaos, deterministic chaos and methods of their control, as well as processes of self-organization are all outlined by prof. Beckman in this study, along with numerous examples of their usage. Author draws special attention of the reader to the mathematical backgrounds of synergetics, including methods of mathematical physics (namely, linear and non-linear partial differential equations), equilibrium and non-equilibrium thermodynamics, statistical physics, nonstationary processes, fractal geometry and catastrophe theory. Significant portion of the textbook is devoted to practical applications of synergetics ideas and methods within the realms of physics, chemistry, biology, ecology, history, sociology, politics, public administration, economics, education, art and culture. Concluding chapters of the textbook offer insights into possible usage of synergetics for predictions of the future of human civilization. In particular, the author studies ways and means to recreate an intricate union of mankind and nature on new grounds, which should involve not only unity of

both the environment and human beings, but also an amalgamation of science and culture within modern society.

The textbook was written with the wide range of readers in mind, particularly those interested in new and emerging disciplines.

Brief Table of Contents :