INSTRUMENTATION AND PROCESS CONTROL IN FOOD INDUSTRY

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TYPE OF COURSE : New | Elective | UG
COURSE DURATION : 8 Weeks (24 Jan' 22 - 18 Mar' 22)
EXAM DATE : March 27, 2022

PRE-REQUISITES : Transform Calculus/ Complex Algebra

INTENDED AUDIENCE : Food Industry Professionals, ICAR,CIPHET Scientists

INDUSTRIES APPLICABLE TO : SSP Pvt. Ltd.(info@sspindia.com); Neologic Engineers Pvt. Ltd. (ravindramahajan1@gmail.com); CIPHET - Ludhiana (deepyadav18@gmail.com)

COURSE OUTLINE :
The course aims to introduce the first principles of controlled systems as sensed by instruments and fedback for effective control strategies. Design of stable controllers based on proportional – integral – derivative combinations will be the final outcome of the course objectives. The participants are expected to apply transform calculus to obtain real time solutions to second order system response.

ABOUT INSTRUCTOR :
Prof. Ashis Kumar Datta is Emeritus Professor of Agricultural and Food Engineering Department post retirement in 2019. His expertise includes, but not limited to process systems analyses and control modeling. Prof. Datta developed and taught the subject of same title in 1998. Since then he had been teaching this subject either by himself or jointly. Dr. Datta is a Fellow of The Institution of Engineers (I) and he is a doctorate degree holder from the Pennsylvania State University (USA). He had been serving the fields of Agricultural Process and Food Engineering since 1982.

COURSE PLAN :

Week 1**:** Review of Laplace Transform

Week 2**:** General models for instrumental response – zero and first order systems

Week 3**:** Particular model development for second order system

Week 4**:** Continuous stirred tank reactor models for P, PI, PID controllers with negative and positive feedbacks

Week 5**:** Stability Analyses – Routh's theorem, Root Loci

Week 6**:** Stability Analyses – Frequency Response, Bode plots

Week 7**:** Controller tuning – Zeigler-Nichols controller settings

Week 8**:** Introduction to Digital Control