Introduction to food engineering

13-15 May 2024 Melbourne

Short course Objectives

- introduce the basic concepts of engineering to non-engineers and graduate engineers
- focus on the chemical / physical attributes of food
- provide foundational information on various processing technologies
- provide tools for basic process analysis
- showcase how process parameters relate to product quality
- introduction to emerging technologies and digital tools

DAY 1 – Foundations *

	Topic	Presenter
8.30	**Welcome and introduction**	
8.45	**Food engineering – an overview** *basic principles, unit operations, the future*	Regine Stockmann, CSIRO
9.30	**Chemical and physical properties of food** *gross composition, density, heat capacity, thermal conductivity, viscosity, diffusivity and texture*	Dennis Forte, Dennis Forte & Assoc
10.15	**Morning Break**	
10.30	**Food safety and stability** *basic micro, food spoilage, water activity, sorption isotherms, hurdle technology*	Rozita Spirovska Vaskoska, CSIRO
11.15	**An introduction to dimensional analysis** *basic principles, dimensionless groups (nre, etc), correlations*	Dennis Forte, Dennis Forte & Assoc
12.00	**Lunch**	
12.30	**RVA and rheology** *Focus on understanding Newtonian and non-Newtonian fluid flow*	Leonie van 't Hag, Monash University
13.15	**Psychrometrics** $T_{dry\ bulb}$, $T_{wet\ bulb}$, *humidity, dew point, psychrometric chart*	Bhesh Bhandari, University of Queensland
14.00	**Mass and energy balances** *conservation laws, enthalpy, heat capacity, latent heat*	Dennis Forte, Dennis Forte & Assoc
14.45	**Afternoon break**	
15.00	**Heat and mass transfer** *conservation laws, enthalpy, heat capacity, latent heat*	Danyang Ying, CSIRO
15.45	**Thermal processing, refrigeration and chilling technology** *rate of microbial inactivation, Fo, d values, physical interaction for product stability*	Danyang Ying, CSIRO
16.30	**End of day 1**	

DAY 2 – Process applications*

	Topic	Presenter
08.30	**Size reduction technology** *Cutting, grinding, homogenizing and emulsification*	Darren Gardiner, CSIRO
9.15	**Fluid mixing technology** *Agitator types, mixing dynamics, process control, static mixers*	Dennis Forte, Dennis Forte & Assoc
10.00	**Morning Break**	
10.15	**Fluid flow in pipes** *Pressure drop calculation, alternative fans & pumps, npsh, pump / fan curves*	Dennis Forte, Dennis Forte & Assoc
11.00	**Drying technology – Part 1** *Drying principles, drying curves, moisture diffusivity and dryer types (batch vs continuous)*	Henry Sabarez, CSIRO
11.45	**Evaporation and drying technology** *Tray, conveyor, spray dryers, fluid beds, evaporators, freeze drying*	Darren Gardiner, CSIRO
12.30pm	**Lunch**	
13.00	**Extrusion technology**	Eddie Attenborough Monash University
13.45	**Membrane separation technology**	Filip Janakievski, CSIRO
14.30	**Centrifugal *s*eparation technologies**	Mark Player, Flottweg
15.15	**Afternoon break**	
15.30	**Demonstrations – FPC and lab** *Separations technologies, drying, extrusion and rheology in lab*	
17.00	**End of day 2**	

Day 3 – Process applications and the future of food engineering*

	Topic	Presenter
08.30	**Dough mixing and handling** *Rolling and sheeting*	Dennis Forte Dennis Forte & Assoc
09.15	**Solids mixing technology**	Dennis Forte, Dennis Forte & Assoc
10.00	**Morning Break**	
10.15	**Food process scale-up**	Craig Bolch Process Partners
11.00	**The role of packaging**	Ralph Moyle, Australian Institute of Packaging
11.45	**Plant Design for food grade operations**	Asgar Farahnaky, RMIT University
12.30pm	**Lunch**	
13.00	**Cleaning In Place**	Hong Lee Lim, IXOM
13.45	**Process modelling and simulation**	Francisco Trujillo, University of NSW
14.30	**New and emerging technologies** *HPP, ultrasonics, PEF,*	Roman Buckow, LaTrobe University
15.15	**Afternoon break**	
15.30	**IIoT in manufacturing and supply chains** *Internet of things*	Abhik Banerjee, Swinburne University of Technology
16.15pm	**Final wrap up and end of course**	

*Program is subject to change