Module Synopsis

CP1301: Specialty Chemicals

This module provides an overview of the chemistry and functionalities of specialty chemicals such as surfactants and additives that are utilised in high performance applications (e.g. consumer care, lubricants, adhesives, coatings, paints etc.). They may be categorised according to their functions such as dispersants, foam boosters, wetting agents, emulsifiers, cleansing agents, solubilisers, photoinitiators, colourants, light stabilisers, aesthetic enhancers, protective barriers, preservatives and others. The effective application of the ingredients will influence the final qualities of the formulations in accordance to specific requirements.

CP1302: Specialty Polymer

This module covers the science of macromolecules in terms of the underlying principles of chain- and step-growth polymerisation, concepts of average molecular mass and its distribution, polymer solution and rheology behaviour. It further develops an in-depth understanding of the relationship between structure, property and application of the various thermoplastics and thermosets.

CP1303: Performance Evaluation Techniques

This module aims to investigate the chemical composition, morphology, thermal, mechanical and physical properties of materials. It covers the working principles of a wide range of instrumentations for chemical analysis and material characterisation. Students will learn the application of *UV*-Vis/FTIR/ICP-OES and EDS spectroscopy, HPLC/GC and LC-MS/GPC chromatographic techniques, TGA, DSC, light scattering/diffraction, microscopic methods, etc. for performance evaluation purposes.

CP1304: Formulation Science & Technology I

This module aims to develop an in-depth understanding of science underlying the formulation of stable colloidal systems. Students will hone their ability to generate creative ideas and design product formulations with appropriate evaluation protocols that would bring about desirable attributes required for specific applications in consumer care. Students will be able to rationalise the underlying chemical interactions of the various ingredients as well as the principles of the different delivery mechanisms in a formulation.

CP1305: Formulation Science & Technology II

This module further extends the application of the formulation principles for other industrial product formulations (i.e. coatings, lubricants etc.). Students will leverage on the formulation science and technology to create feasible solutions for various end-use situations. With the help of case studies, students will be able to design product formulations and evaluation protocols to meet the desirable performance requirements in the targeted field of application.

CP1306: Statistical Data Analysis

This module introduces the concepts and methods of statistical data analysis using statistical tool such as Minitab with emphasis on interpretation of results. Topics include review of descriptive statistics, fundamental of sampling distributions and continuous probability distributions, concepts of inference and hypothesis testing, linear regression and correlation, analysis of single factor and factorial experiments, and statistical quality control.

CP1307: Specialised Topics

This module provides an overview of selected current topics in the Specialty Chemicals industry. It covers the concepts and principles of the latest scientific advances and technological know-hows employed which may include microencapsulation, nanomaterial and biomaterial technologies.

CP1308: Product Optimisation

This module aims to provide a practical perspective in optimising formulation design and processing parameters for enhanced performance in accordance to standards and quality requirements. Students will apply their technical knowledge to achieve optimum performance characteristics with the help of experimental design methodology. Students will hone their problem solving and data analysis skills using statistical aids to optimise product formulae and processing variables.

CP1309: New Product Development

This module analyses the different stages of new product development process (NDP) with a focus in the concepts and challenges central to product innovation, including economic, environmental, regulatory considerations during the design and development process. The principles and techniques of quality design, quality assurance and project management will also be employed.