Code,Full\_Title,Indicative\_Content,Learning\_OutcomesA00841,Biopharmaceutical Analysis and Cell Culture,"Biopharmaceutical products: biologics; immunotherapies; vaccines; stem-cell therapeutics; gene therapies; biosimilars; biosuperiorsCore concepts in molecular biology and recombinant protein production: gene requirements; transfection and cloning; prokaryotic and eukaryotic cell culture systemsOptimisation of biopharmaceutical product and bioprocessing; upstream and downstream bioprocessing; screening and selection of cells; cell line engineering; metabolic engineering; post-translational modificationsCase studies of recent biopharmaceutical products & emerging technologies/topics in biopharmaceutical production (transgenics, cell line engineering, designer peptides etc.)Ethics and public concern over biopharmaceutical production from genetically modified organismsIntroduction to mammalian cell culture; history, perspectives and biology of cultured cellsSources of mammalian cells & types available; selection of appropriate media, supplements and growth conditions for different cell lines; bioreactorsImportance of sterility, good culture practice (aseptic techniques), clean room and environmental control; sources of biocontamination and detection and elimination; disposal of cells and health & safety in cell culture labGeneration and maintenance of cell banks; maintenance and sub-culturing of cell lines; cell counting and viability checksProteomics in biopharmaceutical analysis and quality control: protein/peptide and post-translational modification analysis using spectroscopic, chromatographic, electrophoretic and other analytical techniques e.g. capillary electrophoresis, SDS-PAGE, Western blot, advanced mass spectroscopy, ion chromatography and nuclear magnetic resonance spectroscopyBioassays and immunoassays in biopharmaceutical analysis and quality control: cell-based assays, immunoassays, flow cytometry, cytometric bead arrays, binding assays and surface plasmon resonanceGenomics in biopharmaceutical analysis and quality control: DNA sequencing, micro-array analysis and real-time PCR","Evaluate the principles of biopharmaceutical analysis and cell culture.Evaluate the different techniques (traditional and modern) used in biopharmaceutical analysis and cell culture.Design suitable practical techniques for biopharmaceutical analysis from troubleshooting to successful experimental outcomes.Determine the appropriate medium and growing conditions for different mammalian cells and manage routine maintenance and troubleshooting of the cells.Appraise approaches for method developments and future trends in the area of biopharmaceutical analysis and cell culture through scientific literature.Comment on current and emerging biopharmaceutical products, trials and topics such as ethics and public concern."A00901,Certificate in Introduction to Dairy Science,"Herd health, feeding & management, breeding replacementsFarm hygiene, milking & collectionEconomics of dairy productionRaw milk intake, storage and antibiotic testing, off-loading issuesMilk processing operations: separation, evaporation, homogenization, pasteurisation, concentration, spraying and baggingChemistry of fat, production of milk products such as butter, yogurt, cheese and milk powdersTechnology of microbial starter cultures and rennetTypes of whey proteins, whey, skim, whole and enriched milk powdersRecovery and extraction of milk components, nutritive value and interaction with mineralsPowder functionality and testingQuality improvement through quality control, quality assurance, TQM and in-process testingQuality auditing: types of audits, non-conformance and corrective actionsFood hazards: microbiological, chemical and physicalGMP as pre-requisite to HACCP and CIP, origin of HACCP and basic principles of HACCP systemWaste management hierarchy, waste as a resource and appropriate legislation","Describe the origins of milk, the impact of source on the overall quality of the end product produced, and the issues/challenges facing farmers in milk production.Explain the core milk processing stages, including the pasteurisation process, and recognise the role of non-dairy ingredients in dairy manufacturing.Recognise milk constituents, and illustrate an understanding of the range of milk products using milk or a derivative of milk.Outline the role and function of quality control, quality assurance, quality auditing and in-process testing in dairy processing.Discuss the significance of GMP as a pre-requisite to HACCP in the food industry, and discuss the origins of HACCP and its basis as a Food Safety Management System.Identify food and environmental pathogens associated with the dairy industry and the importance of hygiene and cleaning in place.Describe where effluent comes from, what it consists of and how it should be treated/disposed of, with both relevant legislation and also company profitability in mind."