iUCO65 – Chemistry of hair and beauty products

URN – J/617/4374

Guided Learning Hours: 75

Learning outcome	Assessment criteria	Taught content to include
LO1 Understand the chemistry of active ingredients in hair and beauty products	1.1. Explain the differences between chemical compounds found in hair and beauty products	• Matter • Element • Atom • Nucleus • Protons • Neutrons • Electrons • Ions • Ionic bonding • Anions • Cations • Molecules • Covalent bonding • Compound • Mixture • Solution • Solvent • Solute • Bases
	1.2. Explain the chemical processes that occur in ingredients found in hair and beauty products and their effects on the hair, skin and nails	• Chemical reaction • Catalyst • Covalent bonding • Ionic bonding • Cell action potential • Cell-electricity conducted unit

	1.3. Describe the active ingredients found in different hair and beauty products	• Detergents • Surfactants • Emollients • Emulsifiers • Humectants • Fatty acids • Fatty • Alcohols • Fatty esters • Solvents • Buffering agents • Chelating agents • Masking agents • Gellants/thickening agents • Colouring agents • Hydroxy acids • Preservatives • Fillers • UV absorbers • Occlusives • Polymers • Enzymes • Free radical scavengers • Proteins • Lipids • Vehicles • Active agents • Micro-encapsulation • Liposomes • Nanotechnology • Stabilisers • Vitamins - Vitamin A ▪ Retin A (tretinoin) ▪ Retinoic acid ▪ Retinol ▪ Retinyl palmitate ▪ Retinaldyhide

		- Vitamin B
		  ▪ Niacin
		  ▪ Nicotinamide
		  ▪ Niacinamide
		- Vitamin C
		  ▪ Ascorbic acid
		  ▪ Ascorbyl palmitate
		- Vitamin E
		  ▪ Copper peptides
		  ▪ Tocopherols/tocotrinols
		• Anti-microbials
		- Arnica extracts
		- Azelaic acid
		• Anti-inflammatories
		- Aloe vera
		- Azulene
		- Allantoin
		• Antioxidants
		- Selenium
		- Green tea
		- Acai
		- Alpha lipoic acid
		- Ubiquinone
		- Glutathione
		- Resveratrol
		• Cleansers
		- Sodium lauryl sulphate
		- Cocamidopropyl betaine
		- Diethanolamine
		- Isohexadecane
		• Moisturisers
		- Shea butter
		- Vegetable glycerine
		- Ceramides
		- Urea
		- Coenzyme Q10
		- Amino acids
		- Lactate
		- Liquid crystals

		• Skin lighteners - Hydroquinone - Kojic acid - Licorice - Azelaic acid - Arbutin • Serums - Phytoestrogens - Flavonoids - Omegas - Peptides - Amino acids - Alcohol - Acetone - Phytosterols - Polyphenols - Microbiomes • Delivery technology - Liposomes - Nanosomes - Fullersomes
	1.4. Explain the effect of functional groups on the reactivity of molecules in products	• Hydrocarbons • Alkanes • Alkenes • Alkynes • Aromatic • Alcohols • Ethers • Aldehydes • Ketones • Carboxylic acids • Esters • Amines • Amides • Nitrile • Thiol

LO2 Understand the effects and safe use of active ingredients in hair and beauty products	2.1. Explain the desired effects of products in relation to their chemical composition	• Facial skincare products • Make-up products • Body care products • Hair care products • Nail care products
	2.2. Explain how to follow safe working practices with regard to contra-indications presented by the client	• Compliance with current legislation • Client consultation and contra-indications • Client disclosure • Scope of practice • Compliance with any relevant code of conduct • Referral
	2.3. Explain how to follow safe working practices with regard to the storage, handling and application of hair and beauty products	• Use and storage of products • Stock control/rotation • Storage temperatures • UVR exposure • Appropriate bottles and closures • Product stability • Out of reach of children • Breakages/spillages • Product data sheets • Shelf life • Appropriate personal protective equipment • Current legislative controls • Adherence to all product safety precautions and manufacturers' instructions
	2.4. Identify the relevant organisations responsible for monitoring the safety, use and dosage of chemicals, ingredients and products	• General compliance of the country therein • Cosmetic product regulations • Local authorities • Governmental legislation • Legal compliance • Trading standards • Consumer safety
	2.5. Explain the problems associated with the use of oils as active ingredients	• Animal, vegetable, mineral or synthetic • Instability • Absorb oxygen • Polymerise

		• Comedogenic • Water immiscible • Carcinogenic • Combustible • Viscous

LO3 Understand the properties of packaging materials in relation to their structure	3.1. Explain the chemical properties of packaging materials in relation to their chemical structure	• Packaging types, size, shape and uses • Packaging and dispensing systems i.e. glass, metal, plastic
	3.2. Explain the effects of tensile and compressive forces on metals, glasses, elastomers, thermoplastics, thermosets and ceramics, fibrous materials	• Compressive stress • Tensile stress • Ductile failure • Brittle failure • Fatigue • Buckling • Wear • Creep • Fracture • Deformation • Yielding
	3.3. Explain the effects of shape and temperature on the properties of packaging materials	• Packaging types i.e. glass, plastic, double insulated • Loose fill • Paper • Corrugated fibreboards • Foam structures • Moulded pulp • Inflated products

LO4 Understand the properties and effects of ultra-violet radiation on hair and beauty products and their packaging materials	4.1. Explain the properties and categories of ultra-violet radiation	• Light spectrum • UVA • UVB • UVC
	4.2. Explain how ultra-violet radiation can affect the chemical composition of hair and beauty products	• Efficacy and life expectancy of active ingredients • Oxidation • Polymerisation • Hydrolysis

	4.3. Explain how the exposure and transmission of ultra-violet radiation can affect packaging materials for hair and beauty products	• Degradation of packaging • Shelf life • Life expectancy after opening • Oxidation

Assessment	
Portfolio of evidence containing: • Assignment MCQ	Assignment guidance and assessment forms may be downloaded from the website. www.itecworld.co.uk. The assignment will be assessed by the college lecturer and verified by the external examiner/EQA (if sampled)

Guide to taught content
The content contained within the unit specification is not prescriptive or exhaustive but is intended to provide helpful guidance to teachers and learners with the key areas that will be covered within the unit, and, relating to the kinds of evidence that should be provided for each assessment objective specific to the unit learning outcomes.

Document History

Version	Issue Date	Changes	Role
v1	18/09/2019	First published	Qualifications and Regulation Co-ordinator