



## **Qualifications**

### **Diploma in Distilling**

#### **Module 2**

### **Examination Syllabus 2021**

## Unit 1: Distillation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Pre-distillation influences on quality	<ul style="list-style-type: none"><li>• Water supply</li><li>• Raw materials</li><li>• Culture yeast(s) and fermentation</li><li>• Microbial infection</li></ul>
Distillation theory	<ul style="list-style-type: none"><li>• Vapour/liquid equilibrium in ethanol/water distillation</li><li>• Relationship between relative volatility and ethanol concentration</li><li>• Theoretical plates</li><li>• Deviations from theoretical behaviour</li><li>• Azeotropes</li></ul>
Effects of copper	<ul style="list-style-type: none"><li>• Thermal degradations and the role of copper</li><li>• Aspect ratios in still design and the effect on spirit quality</li><li>• Removal of sulphur compounds by reaction with copper</li></ul>

## Unit 2: Batch Distillation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Design	<ul style="list-style-type: none"><li>• Still size</li><li>• Still design and construction</li></ul>
Operation	<ul style="list-style-type: none"><li>• Still operation</li><li>• Cutting points</li><li>• Double and triple distillation</li><li>• Measurement of ethanol concentration</li><li>• Duration of still operation</li></ul>
Ethanol profiles	<ul style="list-style-type: none"><li>• Ethanol profile of wash still distillation</li><li>• Ethanol profile of spirit still distillation</li><li>• Importance of optimising ethanol recovery</li></ul>
Congener behaviour	<ul style="list-style-type: none"><li>• Types of congener</li><li>• Effect of changes in spirit still cut points</li><li>• Removal of congeners from the system</li></ul>

## Unit 3: Continuous Distillation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Design	<ul style="list-style-type: none"><li>• Basic single-column continuous still</li><li>• Two-column still systems</li><li>• Multi-column still systems</li><li>• Plate/column design</li><li>• Heating of column stills</li></ul>
Operation	<ul style="list-style-type: none"><li>• Still operation</li><li>• Start-up and close-down procedures</li><li>• Re-distillation of spirit below specification</li></ul>
Ethanol profiles	<ul style="list-style-type: none"><li>• Wash strength</li><li>• Ethanol profile in the rectifier column</li><li>• Control of reflux ratio</li><li>• Control of distillate concentration</li><li>• Legal ethanol concentrations for grain whisky spirit and neutral spirit</li></ul>
Congener distribution	<ul style="list-style-type: none"><li>• Types of congener</li><li>• High volatile congeners in spirit and heads streams</li><li>• Low volatile congeners in spent wash</li><li>• Recycling of hot and cold feints</li><li>• Recovery of fusel oil from rectifier column and recycling of ethanol</li></ul>

## Unit 4: Non-matured spirits

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Vodka	<ul style="list-style-type: none"><li>• Quality standards of neutral spirit for vodka production</li><li>• Purification of spirit for vodka</li></ul>
Gin botanicals	<ul style="list-style-type: none"><li>• Sources of the botanicals</li><li>• Flavours imparted by the botanicals</li></ul>
Gin distillation	<ul style="list-style-type: none"><li>• Quality standards of neutral spirit for gin production</li><li>• Operation of gin still</li><li>• Recovery of gin feints for re-use</li><li>• Preparation and use of essences for non-distilled gin</li></ul>
Other botanical spirits	<ul style="list-style-type: none"><li>• Botanicals used</li><li>• Preparation of the spirits</li></ul>

## Unit 5: Maturation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Basic concepts of maturation	<ul style="list-style-type: none"> <li>• Characteristics of new and mature spirit</li> <li>• Immature characteristics to be removed</li> <li>• Desirable mature attributes</li> </ul>
Principle factors involved in maturation	<ul style="list-style-type: none"> <li>• Cask type</li> <li>• Spirit strength</li> <li>• Storage conditions, especially temperature and humidity</li> <li>• Effect of atmospheric oxygen</li> </ul>
Properties of oak wood	<ul style="list-style-type: none"> <li>• Physical properties: low porosity, internal structure, resistance to cracking</li> <li>• Chemical composition of oak wood</li> <li>• American and European oaks</li> </ul>
Cask types and properties	<ul style="list-style-type: none"> <li>• Manufacture of new casks</li> <li>• Refill casks</li> <li>• Matching of spirit to cask</li> </ul>
General nature of maturation changes	<ul style="list-style-type: none"> <li>• Physical and chemical effects during maturation</li> </ul>
Cask filling	<ul style="list-style-type: none"> <li>• Principles of cask filling</li> </ul>

## Unit 6: Pre-package

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Blending	<ul style="list-style-type: none"><li>• The purpose of blending, and the need to meet any legislative requirements for product type.</li><li>• Consistency of blend</li><li>• Significance of stated age of blend</li><li>• Management of stocks for correct age at blending</li><li>• New make versus aged spirit blending requirements</li><li>• Flavoured spirits – Liqueurs, including common additions</li></ul>
Haze	<ul style="list-style-type: none"><li>• Prevention of haze</li><li>• Distinction between haze and floc</li><li>• Relevance of the heads/foreshots cut</li><li>• Removal of haze by precipitation of fatty acid esters and chill-filtration</li><li>• Prevention of floc by use of de-mineralised water and chill-filtration</li></ul>
Filtration	<ul style="list-style-type: none"><li>• The principles of design and operation, relative merits and typical performance of:<ul style="list-style-type: none"><li>○ a plate and frame filter</li><li>○ a cartridge filter</li></ul></li></ul>

## Unit 7: Quality

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Quality management	<ul style="list-style-type: none"> <li>• Quality control principles and practices</li> <li>• Quality assurance principles and practices</li> <li>• International standards</li> <li>• Food safety</li> <li>• Procedures and controls</li> <li>• The basic principles of analytical and on-line measurement techniques</li> <li>• Hazard Analysis Critical Control Point (HACCP)</li> </ul>
Laboratory analysis	<ul style="list-style-type: none"> <li>• Basic analytical techniques and their use in distilling</li> <li>• The basic concepts applied to interpretation of analytical data</li> </ul>
Sensory analysis	<ul style="list-style-type: none"> <li>• Basic sensory techniques and their use in distilling</li> </ul>
Hygiene	<ul style="list-style-type: none"> <li>• Microbial contamination:</li> <li>• Preventing microbial contamination:</li> <li>• Cleaning-in-Place (CIP) principles</li> <li>• Design and operation of CIP systems</li> <li>• Detergents and sanitising agents</li> <li>• Detection and quantification of residual surface contamination</li> </ul>