



Qualifications

Diploma in Brewing

Module 2

Examination Syllabus 2019

Unit 1: Yeast Fundamentals

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Yeast morphology and evaluation	<ul style="list-style-type: none"> • Key features and functions of a yeast cell • Mechanism of growth and cell division • Genetic characteristics of yeast • The outline of genetic tests for typing yeasts • Key features and functions of a yeast cell • Methods of characterising and evaluating brewing yeast • The nutritional factors necessary to promote effective fermentation and healthy yeast • The basic principles of yeast flocculation, sedimentation and adhesion
Yeast biochemistry	<ul style="list-style-type: none"> • The selective mechanisms for transferring carbohydrate through the cell wall and conversion to fermentable sugars • The carbohydrates not utilisable by normal brewing yeasts • The basic differences between aerobic and anaerobic carbohydrate metabolism • The main purpose and effects of the Embden-Meyerhof-Parnas pathway • The significance of pyruvate in the metabolic chain • The importance of glycerol production in NAD/NADH balance • The importance of the pentose-phosphate pathway
Yeast propagation	<ul style="list-style-type: none"> • The principles and respective merits of isolating pure cultures • The principles and respective merits of preserving pure cultures in the laboratory • The principles of design and operation of yeast propagation systems
Yeast management	<ul style="list-style-type: none"> • Methods for measuring yeast concentration and their relative merits in practice • Methods for assessing yeast viability and vitality and their relative merits in practice • Measurement and calculation of yeast growth in a brewery fermentation • The principles and design of yeast handling systems • Selection criteria for yeast pitching

Unit 2: Fermentation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Fermentation principles	<ul style="list-style-type: none"> • Control parameters and value ranges throughout fermentation
Effect of fermentation variables	<ul style="list-style-type: none"> • The biochemical mechanisms, flavour descriptors and thresholds for compounds produced during fermentation • The effect and main reasons of fermentation control parameters on fermentation performance and the formation of beer flavour components • The basis of alcohol sensitivity/tolerance in yeast • Other microorganisms (yeast and bacteria) used for fermentation and the production control parameters and flavour descriptors for each
Fermenter design and operation	<ul style="list-style-type: none"> • The design and operational principles of fermenting vessels • Criteria for fermenting vessel selection

Unit 3: Beer Maturation and Finishing

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Warm and cold maturation	<ul style="list-style-type: none"> • The design and operational principles of maturation systems designed for beer processing above 0°C • The design and operational principles of maturation systems designed for beer processing below 0°C • Theory of sedimentation • The design and operational principles of wood ageing
Clarification by centrifugation	<ul style="list-style-type: none"> • Theory of centrifugal sedimentation • The design and operational principles of centrifuges and their application in breweries

Processing aids and additions to beer	<ul style="list-style-type: none"> • The nature, purpose, function, and application of processing aids • The nature, purpose, function, and application of additions to beer • The design, operational principles and function of de-aerated water
Clarification by filtration	<ul style="list-style-type: none"> • Theory of filtration • The design and operational principles of filtration systems • Criteria for filter selection • The nature, purpose, function, and application of filter aids • The effect of filtration control parameters on filter performance and filtered beer quality • Basic plant features and control procedures from filtration through to Final Product Tank • The design, operational principles and function of the Final Product Tank

Unit 4: Beer Properties

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Beer foam	<ul style="list-style-type: none"> • The physical principles of foam formation, collapsing and lacing • Methods for measuring foam quality • Factors affecting foam performance. • The nature, purpose, function and application of foam stabilisers • Factors affecting gushing
Beer hazes	<ul style="list-style-type: none"> • The nature and typical composition of biological, chill and permanent hazes • The scientific principles behind, and relevance of, process factors in non-biological haze formation • The measurement of non-biological haze • The prediction of shelf-life using accelerated haze formation techniques
Beer flavour and stability	<ul style="list-style-type: none"> • The nature and contribution to beer flavour of raw materials (yeast, and flavours produced by yeast, will be covered in the Yeast and Fermentation Units) • The nature and origin of common flavour taints • The nature of flavour changes which occur during beer storage

	<ul style="list-style-type: none"> • The importance of oxidation in causing flavour instability • Control of oxidation throughout the brewing process • The nature, purpose, function and application of anti-oxidants
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Unit 5: Hygiene

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Cleaning systems and control	<ul style="list-style-type: none"> • The design and operational principles of hygienic brewing plants (Brewhouse to Beer Filler) • The design and operational principles of Cleaning-in-Place (CIP) systems (Brewhouse to Beer Filler) • The nature, purpose, function and application of detergents and sanitisers • Measurement of cleaning effectiveness
Types of microorganisms	<ul style="list-style-type: none"> • Microorganisms which can be intentionally added to wort and beer and their application • Spoilage microorganisms and their effects on beer quality
Microorganism detection and control	<ul style="list-style-type: none"> • The principles of detection and quantification of microorganisms • Factors that affect susceptibility/tolerance of microorganisms to grow in wort or beer

Unit 6: Quality

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Quality management	<ul style="list-style-type: none"> • Quality control principles and practices • Quality assurance principles and practices
Laboratory analysis	<ul style="list-style-type: none"> • Analytical techniques for wort and beer • The basic concepts applied to interpretation of analytical data

Sensory analysis

- Basic sensory techniques and their use in brewing