# BREW H4102: Post Distillation Downstream Processing

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| **Module Title:** | Post Distillation Downstream Processing |
| **Language of Instruction:** | English |

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| **Credits:** | 10 |

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| **NFQ Level:** | 8 |

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| **Module Delivered In** | No Programmes |

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| **Teaching & Learning Strategies:** | Theory classes will be closely aligned to the practical classes. Emphasis will be given to case studies linking concepts to realistic situations. |

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| **Module Aim:** | The aim of this module is to give students a functional competency in the theorectical knowledge and the practical considerations in downstream distilling processes |

| **Learning Outcomes** | |
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| *On successful completion of this module the learner should be able to:* | |
| LO1 | Describe and discuss the maturation process in distilling |
| LO2 | Establish the importance of product preparation for packaging and critique the elements necessary for quality control in packaging |
| LO3 | Investigate and explain the microbiological methods and plant design factors necessary for distillery hygiene and cleaning |
| LO4 | Demonstrate competency in a range of laboratory skills involved in monitoring, sampling, detecting and quantifying microbial contaminants |

| **Pre-requisite learning** |
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| ***Module Recommendations***<br>*This is prior learning (or a practical skill) that is recommended before enrolment in this module.* |
| No recommendations listed |
| ***Incompatible Modules***<br>*These are modules which have learning outcomes that are too similar to the learning outcomes of this module.* |
| No incompatible modules listed |
| ***Co-requisite Modules*** |
| No Co-requisite modules listed |
| ***Requirements***<br>*This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.* |
| No requirements listed |

# BREW H4102: Post Distillation Downstream Processing

## Module Content & Assessment

| Indicative Content |
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| **Post Distillation Flavour Development**<br>The role of wood treatment. The process of maturation. Manufacture/source of casks. Heat treatment of casks, reuse/rejuvenation of casks. Cost implications of maturation. Calculation of losses. Changes in the spirit during maturation. Scottish Whisky laws. Reduction, filtration, colour adjustment and polish filtration. Quality standards for neutral spirit, chemical analysis, sensory characteristics. Gin Production Flavouring with botanicals. Other local products made from neutral spirit. Selection of botanicals for addition to gin. Gin flavourings – advantages/disadvantages. Gin distillation, production methods and gin quality. Vodka Production Production. Activated carbon treatment. Mouthfeel/flavour additions. Sensory evaluation. Analysis to detect irregular sources of alcohol in vodka. Flavour control Sensory evaluation, flavour wheels, flavour panels. |
| **Packaging**<br>Objectives. Primary packaging: technical and marketing purposes, materials specifications. Secondary and tertiary packaging. Preparation of product for packaging: reduction, product water quality, polishing. Packaging lines, filling lines, filter, capper design etc. Bottle inspection/labelling. Quality control issues for packaging/packaging equipment. Purchase labelling, legal implications. |
| **Plant cleaning and environmental managment**<br>Microbiological contamination of the brewing/distilling environment and raw materials. Infection at key stages of production. Sampling. Relevant microbiological methods. Conditions that inhibit microbiological growth. Plant design for hygiene, plant cleaning, sterilization, disinfection. Chemical disinfectants/sterilizers, detergents, steam sterilization. CIP systems. Vessel, pipework, valve and pump design for hygiene. Spray balls/heads. Energy conservation and environmental management • Carbon dioxide production, emission and recovery. • Energy costs, conservation, energy management. Steam generation, heat recovery systems • Water quality and conservation. Uses of water: Product water, production water, process water, service water, cooling tower water. Legionella risks. Water treatment. • Malting, brewing and distillery by-products: Malt screenings, spent grains, CO2, spent yeast, spent lees, fusil oil – disposal of. • Effluent: Types of effluent, effluent treatment, packaging waste/legislation. Health and Safety in the Brewing and Distilling industries. |
| **Practicals**<br>1. The design and operation of pot and plate distillation systems. 2. The design and operation of various condensers. 3. The concentration of esters and removal of sulphur compounds by distillation. 4. Volatility of components in distillation feedstocks. 5. Principles of distillation, cut points for heads and tails. 6. Removal of propanol, methanol and acetaldehyde. 7. Composition of fusil oil 8. Post-distillation control of flavour. 9. Characteristics of new and mature spirits. 10. Effect of wood, char, previous use and storage conditions on spirits maturation |

| Assessment Breakdown | % |
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| Continuous Assessment | 10.00% |
| Practical | 30.00% |
| End of Module Formal Examination | 60.00% |

| Special Regulation |
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| Students must achieve a minimum grade (35%) in both the practical/CA and final examination. |

**Continuous Assessment**

| *Assessment Type* | *Assessment Description* | *Outcome addressed* | *% of total* | *Assessment Date* |
|---|---|---|---|---|
| Examination | Short examination | 1,2,3 | 10.00 | n/a |

No Project

**Practical**

| *Assessment Type* | *Assessment Description* | *Outcome addressed* | *% of total* | *Assessment Date* |
|---|---|---|---|---|
| Practical/Skills Evaluation | Laboratory work | 3,4 | 30.00 | n/a |

**End of Module Formal Examination**

| *Assessment Type* | *Assessment Description* | *Outcome addressed* | *% of total* | *Assessment Date* |
|---|---|---|---|---|
| Formal Exam | Final Examination | 1,2,3 | 60.00 | End-of-Semester |

**Continuous Assessment**

| *Assessment Type* | *Assessment Description* | *Outcome addressed* | *% of total* | *Assessment Date* |
|---|---|---|---|---|
| Examination | n/a | 1 | 10.00 | n/a |

No Project

| Practical | | | | |
|---|---|---|---|---|
| *Assessment Type* | *Assessment Description* | *Outcome addressed* | *% of total* | *Assessment Date* |
| Practical/Skills Evaluation | n/a | 3,4 | 30.00 | n/a |

| End of Module Formal Examination | | | | |
|---|---|---|---|---|
| *Assessment Type* | *Assessment Description* | *Outcome addressed* | *% of total* | *Assessment Date* |
| Formal Exam | n/a | 1,2,3 | 60.00 | End-of-Semester |

**SETU Carlow Campus reserves the right to alter the nature and timings of assessment**

# BREW H4102: Post Distillation Downstream Processing

## Module Workload

| Workload: Full Time | | |
|---|---|---|
| *Workload Type* | *Frequency* | *Average Weekly Learner Workload* |
| Lecture | 30 Weeks per Stage | 2.00 |
| Laboratory | 30 Weeks per Stage | 1.00 |
| Independent Learning | 30 Weeks per Stage | 2.00 |
| | Total Hours | 150.00 |

| Workload: Part Time | | |
|---|---|---|
| *Workload Type* | *Frequency* | *Average Weekly Learner Workload* |
| Practicals | 20 Weeks per Stage | 3.00 |
| Independent Learning | 20 Weeks per Stage | 7.00 |
| | Total Hours | 200.00 |