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| Module Title: | Analytical Techniques for Brewing and Distilling |
| Language of Instruction: | English |
| Credits: | 5 |
| NFQ Level: | 6 |
| Module Delivered In | 1 programme(s) |
| Teaching & Learning Strategies: | This module will be taught in two theory classes of one hour duration for 12 weeks plus one 3 hour practical per week for 12 weeks. Lectures will be linked to practical classes and the practical component will allow students to develop the required technical competencies, attitudes and behaviours and promote timely submission of reports written in the standard format |
| Module Aim: | The aim of this module is to develop knowledge of basic analytical principles together with practical applications in the brewing and distilling industry |
| Learning Outcomes | |
| <i>On successful completion of this module the learner should be able to:</i> | |
| LO1 | Explain and demonstrate a range of analytical techniques such as , Titration, UV assay, spectroscopic techniques and calibration curves. |
| LO2 | Discuss and describe the theoretical background on which these techniques are based and understand how error occurs and can be minimized in each technique |
| LO3 | Comprehend and apply quality control measures |
| Pre-requisite learning | |
| Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i> | |
| No recommendations listed | |
| Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i> | |
| No incompatible modules listed | |
| Co-requisite Modules | |
| No Co-requisite modules listed | |
| Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i> | |
| No requirements listed | |

Module Content & Assessment

Indicative Content

Analytical Techniques and Procedures

General approach to analytical procedures. Steps in analytical analysis. Representative sampling, sample preparation, analysis and interpretation of results. Systematic error and random error. Precision and accuracy. Measurement uncertainty.

Titrimetric Methods:

Review of concentration calculations, ppm, w/w,w/v dilutions of solutions. Principles of titrations

Spectroscopic Methods

Properties of light. Electromagnetic spectrum. Absorption of light. Beers Law. Absorption Spectra and colour. Spectrometer - good operating techniques. Applications of Beers' Law. Principles of atomic absorption and flame emission spectroscopy, sample treatment, use of standards. Interferences standard addition methods applications. Infra-red spectroscopy sample preparation care and maintenance of cells. Identification of compounds using correlation charts

The Brewing and Distilling industry

Introduction to analytical techniques in brewing and distilling. Basic calculations.

Control of the quality of analytical methods

Control of errors in analysis. Repeatability and reproducibility. Validation, precision specificity, LOD, LOQ, linearity, ruggedness and robustness.

Practical

Practicals will develop skills in the use of analytical equipment and techniques from, AAS, AES, FTIR and UV. The practicals covered will reinforce and amplify the material covered in the lecture course. The use of updated software, PROBE for UV-Vis will be used also.

| Assessment Breakdown | % |
|----------------------------------|--------|
| Continuous Assessment | 10.00% |
| Practical | 40.00% |
| End of Module Formal Examination | 50.00% |

Special Regulation

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 | Written assessment | 1,2,3 | 5.00 | n/a |
| Examination | Written assessment | 2,3 | 5.00 | n/a |

No Project

Practical

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------------------|------------------------|-------------------|------------|-----------------|
| Practical/Skills Evaluation | Practical log book | 1 | 40.00 | n/a |

End of Module Formal Examination

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|------------------------|-------------------|------------|-----------------|
| Formal Exam | Written examination | 1,2,3 | 50.00 | End-of-Semester |

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

Module Workload

| Workload: Full Time | | |
|----------------------------|--------------------|--|
| <i>Workload Type</i> | <i>Frequency</i> | <i>Average Weekly Learner Workload</i> |
| Lecture | 12 Weeks per Stage | 2.00 |
| Laboratory | 12 Weeks per Stage | 3.00 |
| Independent Learning | 15 Weeks per Stage | 4.33 |
| Total Hours | | 125.00 |

Module Delivered In

| Programme Code | Programme | Semester | Delivery |
|----------------|---|----------|-----------|
| CW_SABRE_B | Bachelor of Science (Honours) in Brewing and Distilling | 3 | Mandatory |