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|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Title:</b>                                                                                                | Quantitative Methods and Quality Control 1                                                                                                                                                                                              |
| <b>Language of Instruction:</b>                                                                                     | English                                                                                                                                                                                                                                 |
| <b>Credits:</b>                                                                                                     | 5                                                                                                                                                                                                                                       |
| <b>NFQ Level:</b>                                                                                                   | 6                                                                                                                                                                                                                                       |
| <b>Module Delivered In</b>                                                                                          | <a href="#">6 programme(s)</a>                                                                                                                                                                                                          |
| <b>Teaching &amp; Learning Strategies:</b>                                                                          | This module will be delivered via two lectures of Quantitative Methods, two lectures of Quality Control and one computer practical per week. Self-tests and tutorial sheets will be available through Blackboard to reinforce learning. |
| <b>Module Aim:</b>                                                                                                  | The aim of this module is to develop the students' understanding of the statistical concepts and techniques used in science and their understanding of the role and benefits of quality systems in industry.                            |
| <b>Learning Outcomes</b>                                                                                            |                                                                                                                                                                                                                                         |
| <i>On successful completion of this module the learner should be able to:</i>                                       |                                                                                                                                                                                                                                         |
| LO1                                                                                                                 | Calculate and interpret summary statistical measures and display data using statistical graphs and charts. Apply statistical tools to explore data.                                                                                     |
| LO2                                                                                                                 | Identify common probability distributions, in particular the normal distribution, and calculate associated probabilities.                                                                                                               |
| LO3                                                                                                                 | Describe fundamental quality concepts and identify quality improvement methodologies.                                                                                                                                                   |
| <b>Pre-requisite learning</b>                                                                                       |                                                                                                                                                                                                                                         |
| <b>Module Recommendations</b>                                                                                       |                                                                                                                                                                                                                                         |
| <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>           |                                                                                                                                                                                                                                         |
| No recommendations listed                                                                                           |                                                                                                                                                                                                                                         |
| <b>Incompatible Modules</b>                                                                                         |                                                                                                                                                                                                                                         |
| <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i> |                                                                                                                                                                                                                                         |
| No incompatible modules listed                                                                                      |                                                                                                                                                                                                                                         |
| <b>Co-requisite Modules</b>                                                                                         |                                                                                                                                                                                                                                         |
| No Co-requisite modules listed                                                                                      |                                                                                                                                                                                                                                         |
| <b>Requirements</b>                                                                                                 |                                                                                                                                                                                                                                         |
| <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

#### Summary Statistics Data Organisation

Review of measures of central tendency and measures of dispersion. Data reduction, organisation and presentation. Population and sample, and data collection. Statistical critical thinking. Data cleaning.

#### Sampling and types of variables

Sampling techniques and introduction to probability distributions. Discrete and continuous random variables.

#### Fundamentals of Probability

Random variables and their associated probability distribution function. Examples of discrete random variables. Overview of general discrete probability distributions, common discrete probability distributions, including the Binomial and Poisson probability distributions.

#### Normal Distribution

Continuous random variables, probability density functions. The Normal Distribution. Use of tables. Applications of the Normal Distribution in the Biological Sciences. Indicators of normality and Normal Probability Plots.

#### Fundamental Quality Concepts

Definitions of Quality Control, Quality Assurance and Quality Management. Total Quality Management (TQM) and W Edwards Deming. Process model of quality and continuous quality improvement.

#### Quality Standards

Definition of standards and standardization. Rationale, development and structure of standards. Standards supporting innovation. Accreditation and certification. GxPs. National and international standards bodies.

#### Economics of Quality

Definition and classification of quality costs, value of quality versus cost of quality. Problem solving tools including Pareto analysis, Vendor rating schemes, Flowcharting and Cause and effect analysis.

| Assessment Breakdown  | %      |
|-----------------------|--------|
| Continuous Assessment | 70.00% |
| Practical             | 30.00% |

### Special Regulation

Students must achieve a minimum grade (35%) in both the CA and practical components of the course.

### Continuous Assessment

| Assessment Type | Assessment Description                                                | Outcome addressed | % of total | Assessment Date |
|-----------------|-----------------------------------------------------------------------|-------------------|------------|-----------------|
| Examination     | Quantitative Methods and Quality Control examinations and assessments | 1,2,3             | 70.00      | n/a             |

No Project

### Practical

| Assessment Type             | Assessment Description               | Outcome addressed | % of total | Assessment Date |
|-----------------------------|--------------------------------------|-------------------|------------|-----------------|
| Practical/Skills Evaluation | Computer practicals and assessments. | 1                 | 30.00      | n/a             |

No End of Module Formal Examination

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

**Module Workload**

| <b>Workload: Full Time</b> |                    |                                        |
|----------------------------|--------------------|----------------------------------------|
| <i>Workload Type</i>       | <i>Frequency</i>   | <i>Average Weekly Learner Workload</i> |
| Lecture                    | 12 Weeks per Stage | 4.00                                   |
| Practicals                 | 12 Weeks per Stage | 1.00                                   |
| Estimated Learner Hours    | 15 Weeks per Stage | 4.33                                   |
| Total Hours                |                    | 125.00                                 |

**Module Delivered In**

| Programme Code | Programme                                                                             | Semester | Delivery  |
|----------------|---------------------------------------------------------------------------------------|----------|-----------|
| CW_SABTP_B     | <a href="#">Bachelor of Science (Honours) in Biosciences with Biopharmaceuticals</a>  | 3        | Mandatory |
| CW_SABRE_B     | <a href="#">Bachelor of Science (Honours) in Brewing and Distilling</a>               | 3        | Mandatory |
| CW_SAPHA_B     | <a href="#">Bachelor of Science (Honours) in Pharmaceutics and Drug Formulation</a>   | 3        | Mandatory |
| CW_SAASC_D     | <a href="#">Bachelor of Science in Analytical Science</a>                             | 3        | Mandatory |
| CW_SABFQ_D     | <a href="#">Bachelor of Science in Biosciences</a>                                    | 3        | Mandatory |
| CW_SASCI_C     | <a href="#">Higher Certificate in Science in Applied Biology or Applied Chemistry</a> | 3        | Mandatory |