

<b>Module Title:</b>	Yeast Biology
<b>Language of Instruction:</b>	English
<b>Credits:</b>	5
<b>NFQ Level:</b>	6
<b>Module Delivered In</b>	No Programmes
<b>Teaching &amp; Learning Strategies:</b>	The purpose of the theory component is to provide the learner with a broad overview of each topic in the syllabus. Lectures will be in a format that encourages active learning and learner autonomy and will form the basis for further critical independent enquiry. Competency skills are developed by learners in a laboratory environment whilst working both individually and in groups. Practical classes allow learners to explore and develop real world applied learning environment in the application of theory.
<b>Module Aim:</b>	To provide students with a foundation knowledge in yeast biology and its application in brewing and distilling
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Describe yeast cells, growth and division, and characteristics of brewing yeasts
LO2	Explain yeast typing, genetic modification and the application of yeast in brewing
LO3	Describe yeast metabolism, growth and factors influencing growth and flavour
LO4	Develop practical skills in yeast growing
LO5	Describe yeast propagation
LO6	Measure yeast pitching rate, viability and vitality
<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
<b>Yeast</b> Yeast cells, cell organelles, yeast growth and division, budding, characteristics of brewing yeasts
<b>Characteristics of yeast</b> Genetic characteristics, differentiation of brewing yeast strains, DNA fingerprinting, benefits of genetically modifying yeast for the brewing industry
<b>Yeast strains</b> Characterisation of yeast strains, distinguishing yeast strains,
<b>Yeast metabolism</b> Carbohydrate and sugar uptake, metabolism, fermentation, Pasteur Effect, Crabtree effect
<b>Flavour</b> Biochemical mechanisms resulting in flavour compounds, alcohols, esters, carbonyls
<b>Yeast growth</b> Factors affecting yeast growth, oxygen, vitamins, ions (phosphorous, hydrogen, sodium, magnesium, calcium, potassium), cations
<b>Yeast cultures</b> Yeast propagation from pure cultures, effects of bacteria and wild yeasts, determining pitch rate, viability and vitality, yeast storage
<b>Yeast flocculation</b> Flocculation mechanisms, assessing flocculation and sedimentation, adhesion and sedimentation, harvesting
<b>Yeast genomics</b> Yeast evolution, genetic improvement, interrelationships
<b>Practicals</b> 1. Study of the yeast cell. 2. Identification and isolation of brewing and wild yeast. 3. Isolation and identification of common brewery contaminants. 4. Demonstration of the Pasteur and Crabtree effects in brewing yeast. 5. Demonstration of the effect of oxygen, sterols and pitching rate of the growth of brewing yeast. 6. Lab-scale beer fermentation. 7. Post-fermentation beer processing – clarification, centrifugation and maturation. 8. Yeast flocculation – the effect of ions and water type. 9. Selection of non-flocculent and non-maltotriose fermenting mutants. 10. Comparison of brewing yeast strains – flavour production by yeast.

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	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 write up	4,5	40.00	n/a

**End of Module Formal Examination**

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

**Continuous Assessment**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	n/a	1,2	10.00	n/a

No Project

<b>Practical</b>				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Practical/Skills Evaluation	n/a	3,4,6	40.00	n/a

<b>End of Module Formal Examination</b>				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Formal Exam	n/a	1,2,4,5	50.00	End-of-Semester

**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	30 Weeks per Stage	1.00
Laboratory	30 Weeks per Stage	1.00
Independent Learning	30 Weeks per Stage	1.00
Total Hours		90.00

  

<b>Workload: Part Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Practicals	15 Weeks per Stage	3.00
Independent Learning	15 Weeks per Stage	3.67
Total Hours		100.00

