



<b>ULO MTB-1</b>	<u>TITLE</u> Manage the process for mechanical treatment	EQF 6
Work tasks:	Ensure efficiency and continuous improvement during the mechanical treatment	
Assessment criteria:	2	
<p><b>Learning outcomes:</b> LO 1: Provide for supervision and improvement of the separation processes, including the adoption of innovative technologies          LO 2: Implement measures in order to increase efficiency of the system, improving the energy performance and reducing waste          LO 3: Improve the mechanical step of the processes in order to reduce the size of the matter as most as possible, in view of the next step</p>		
<p><b>Knowledge</b> <i>(assimilation of knowledge throughout learning)</i></p>	<p><b>Skills</b> <i>(Ability to apply knowledge)</i></p>	<p><b>Competences</b> <i>(Measure of responsibility and autonomy; ability to use knowledge, skills, social abilities)</i></p>
<p><b>1) Provide for supervision and improvement of the separation processes, including the adoption of innovative technologies / LO1</b></p>		
<ul style="list-style-type: none"> <li>• Distinguish in detail existing separation processes</li> <li>• Demonstrate an advanced knowledge on how to separate flows on the basis of the homogeneity of composition</li> </ul>	<ul style="list-style-type: none"> <li>• Integrate preparatory separation techniques</li> <li>• Apply the most appropriate techniques for the pre-treatment of waste according to the characterisation of the waste source</li> <li>• Integrate preparatory separation</li> </ul>	<ul style="list-style-type: none"> <li>• Assume responsibility for carrying out the examination of physical quantities related to the mechanical treatment</li> </ul>



	techniques	
<b>2) Implement measures in order to increase efficiency of the system, improving the energy performance and reducing waste / LO2</b>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the technologies for size, gravimetric and electromagnetic separation</li> <li>• Demonstrate a critical understanding of the key performance indicators of plants in terms of mass balance, recovery and separation</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate advanced skills to design and combine different separation systems</li> </ul>	<ul style="list-style-type: none"> <li>• Manage the observation, examination and selection of the processes and the existing technologies in view to maximize the recovery</li> <li>• Assume responsibility for the implementation of technologies to reduce emissions and energy consumption</li> </ul>
<b>3) Improve the mechanical step of the processes in order to reduce the size of the matter as most as possible, in view of the next step / LO3</b>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the technologies for size reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate advanced skills to identify the desired size of the final product</li> <li>• Demonstrate advanced skills to identify the payload of waste to be treated</li> </ul>	<ul style="list-style-type: none"> <li>• Act independently to examine the most appropriate technologies for size reduction on the basis of the material to be treated and of its composition</li> </ul>



<b>ULO MTB-2</b>	<u>TITLE</u> Manage the process for biological treatment	EQF 6
<b>Work tasks:</b>	Ensure efficiency and continuous improvement during the biological treatment	
<b>Assessment criteria:</b>	2	
<b>Learning outcomes:</b> LO1: Check that the stabilization process is carried out in compliance with fixed limits, benchmarks and deadlines LO2: Supervise and improve sanitation operations LO3: Optimize the parameters of the biological treatment process and maximize the methanogen yield		
<b>Knowledge</b> <i>(assimilation of knowledge throughout learning)</i>	<b>Skills</b> <i>(Ability to apply knowledge)</i>	<b>Competences</b> <i>(Measure of responsibility and autonomy; ability to use knowledge, skills, social abilities)</i>
<b>1) Check that the stabilization process is carried out in compliance with fixed limits, benchmarks and deadlines / LO1</b>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge about the chemical and biochemical reactions</li> <li>• Demonstrate an advanced knowledge about the reactions related to aerobic and anaerobic degradation</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate advanced skills to check stabilisation times and parameters and identify appropriate solutions if these parameters are not maintained</li> </ul>	<ul style="list-style-type: none"> <li>• Manage the implementation of the stabilisation processes in compliance with the limits established by law</li> <li>• Manage that stabilised fractions are reused</li> </ul>
<b>2) Supervise and improve sanitation operations / LO2</b>		
<ul style="list-style-type: none"> <li>• Has in-depth knowledge of the different types of equipment for sanitation</li> </ul>	<ul style="list-style-type: none"> <li>• Control the air intake and purification systems</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure objectives for sanitation are achieved by the established deadlines</li> </ul>



### 3) Optimize the parameters of the biological treatment process and maximize the methanogen yield / LO3

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|---|---|--|
| <ul style="list-style-type: none"><li>• Demonstrate an advanced knowledge of the chemical parameters necessary to evaluate the organic fraction and formulate a balanced and productive ration</li><li>• Demonstrate an advanced knowledge of the reference values for the main parameters of the process</li></ul> | <ul style="list-style-type: none"><li>• Assess costs and productivity of the organic matrix</li></ul> | <ul style="list-style-type: none"><li>• Monitor the feeding process of the digester in order to achieve the maximum performance according to the methanogen output</li></ul> |
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<b>ULO MTB-3</b>	<u>TITLE</u> Check performance and trends of parameters - Maintenance	EQF 6
Work tasks:	Analyse data continuously, react properly to deviations and carry out necessary interventions	
Assessment criteria:	1	
<p><b>Learning outcomes:</b> LO1: Ensure that maintenance operations are adapted to the needs of the system          LO2: Interpret data and information resulting from monitoring activities          LO3: Implement specific measures in case of deviation from the parameters</p>		
<p><b>Knowledge</b>  <i>(assimilation of knowledge throughout learning)</i></p>	<p><b>Skills</b>  <i>(Ability to apply knowledge)</i></p>	<p><b>Competences</b>  <i>(Measure of responsibility and autonomy; ability to use knowledge, skills, social abilities)</i></p>
<p><b>1) Ensure that maintenance operations are adapted to the needs of the system / LO1</b></p>		
<ul style="list-style-type: none"> <li>Demonstrate an advanced knowledge the operations related to the levels of maintenance (daily, periodic, scheduled and preventive)</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate advanced skills by planning some days of production standstill during the year as a preventive measure for all levels of maintenance</li> <li>Demonstrate advanced skills by preparing a prompt intervention to restore normal operating conditions in the event of extraordinary maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Execute the validation of the schedule for maintenance operations</li> </ul>
<p><b>2) Interpret data and information resulting from monitoring activities / LO2</b></p>		



<ul style="list-style-type: none"><li>• Distinguish between the monitoring actions to be implemented during start-up and management</li><li>• Demonstrate an advanced knowledge to the main monitoring techniques that can be used depending on the parameter</li></ul>	<ul style="list-style-type: none"><li>• Identify the most appropriate sampling points depending on the stream to be sampled</li></ul>	<ul style="list-style-type: none"><li>• Assume responsibility to choose the appropriate measurement units (respecting the given timescales) depending on the parameter that needs to be monitored</li><li>• Manage the selection of the most effective and efficient monitoring techniques depending on the parameter that needs to be monitored</li></ul>
<b>3) Implement specific measures in case of deviation from the parameters / LO3</b>		
<ul style="list-style-type: none"><li>• Demonstrate an advanced knowledge of the chemical and physical parameters and the ranges within which parameters must be kept</li><li>• Demonstrate an advanced knowledge of the advantages and disadvantages of the possible strategies to be implemented for the control of pH, C: N ratio, oxygen saturation, alkalinity, etc..</li></ul>	<ul style="list-style-type: none"><li>• Demonstrate advanced skills to design the most appropriate strategy in terms of costs and benefits to ensure the maintenance of reaction parameters</li></ul>	<ul style="list-style-type: none"><li>• Lead the continually improvement of BATs</li></ul>



<b>ULO AD/MTB-1</b>	<u>TITLE</u> <b>Store the waste resulting from the treatment process in compliance with the regulations in force</b>	EQF 6
<b>Work tasks:</b>	<b>Ensure the usage of septic and equalisation tanks, the characterisation and the direction of residuals</b>	
<b>Assessment criteria:</b>	1	
<b>Learning outcomes:</b> LO1: Provide for adequate pits and tank in order to receive matter LO2: Ensure the presence of the necessary equipment and guarantee adequate residues characterization LO3: Direct the residuals of the treatment to the most appropriate place		
<p style="text-align: center;"><b>Knowledge</b> <i>(assimilation of knowledge throughout learning)</i></p>	<p style="text-align: center;"><b>Skills</b> <i>(Ability to apply knowledge)</i></p>	<p style="text-align: center;"><b>Competences</b> <i>(Measure of responsibility and autonomy; ability to use knowledge, skills, social abilities)</i></p>
<b>1) Provide for adequate pits and tank in order to receive matter / LO1</b>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the parameters related to size and payload of septic or equalisation tanks</li> <li>• Demonstrate an advanced knowledge of the processes for stabilisation of volumes</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the appropriate materials to build tanks</li> </ul>	<ul style="list-style-type: none"> <li>• Verify the security levels of tanks</li> <li>• Monitor water flow and pollutant load</li> </ul>
<b>2) Ensure the presence of the necessary equipment and guarantee adequate residues characterization / LO2</b>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the principal methods for sampling,</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate advanced skills during the evaluation of the reactivity of</li> </ul>	<ul style="list-style-type: none"> <li>• Assume responsibility of the characterisation of the quality of the</li> </ul>



<p>preparation and analysis in order to carry out the physical-chemical characterisation of residuals</p> <ul style="list-style-type: none"><li>• Demonstrate an advanced knowledge of the limits for parameters to be analysed</li></ul>	<p>residuals</p> <ul style="list-style-type: none"><li>• Identify the basic equipment of a laboratory for physical-chemical characterisation of residuals</li></ul>	<p>residuals according to the specific end use</p>
<b>3) Direct the residuals of the treatment to the most appropriate place</b>		
<ul style="list-style-type: none"><li>• Demonstrate an advanced knowledge of the plants for the recovery and disposal where outputs and residues can be directed</li><li>• Demonstrate an advanced knowledge of the amount of residuals produced</li></ul>	<ul style="list-style-type: none"><li>• Assess the suitability of residuals to disposal or recovery</li></ul>	<ul style="list-style-type: none"><li>• Manage the evaluation and selection of the proper destination on the basis of the characterisation and of the amount of residuals</li></ul>



<b>ULO AD/MTB-2</b>	<u>TITLE</u> <b>Manage entering and outgoing waste streams in compliance with the legislation</b>	EQF 6	
<b>Work tasks:</b>	<b>Ensure on time delivery of waste, plant utilization and evaluate reuse option for outgoing products</b>		
<b>Assessment criteria:</b>	2		
<b>Learning outcomes:</b> LO1: Ensure waste delivery according to legal regulation and respect of the preliminary procedures LO2: Check the system runs according to the authorised purpose and capacity LO3: Develop possibility concerning reuse of the ending product			
<p style="text-align: center;"><b>Knowledge</b> <i>(assimilation of knowledge throughout learning)</i></p>	<p style="text-align: center;"><b>Skills</b> <i>(Ability to apply knowledge)</i></p>	<p style="text-align: center;"><b>Competences</b> <i>(Measure of responsibility and autonomy; ability to use knowledge, skills, social abilities)</i></p>	
<b>1) Ensure waste delivery according to legal regulation and respect of the preliminary procedures / LO1</b>			
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the EWC (European Waste Catalogue)</li> </ul>	<ul style="list-style-type: none"> <li>• Carry out preliminary checks to waste transfer/delivery</li> </ul>	<ul style="list-style-type: none"> <li>• Assume responsibility to ensure compliance of incoming waste</li> <li>• Lead the implementation of measures to prevent the onset of problems for health and hygiene</li> </ul>	
<b>2) Check the system runs according to the authorised purpose and capacity / LO2</b>			
<ul style="list-style-type: none"> <li>• Demonstrate a critical understanding</li> </ul>	<ul style="list-style-type: none"> <li>• Size the receiving and storage areas</li> </ul>	<ul style="list-style-type: none"> <li>• Manage that the operation are in</li> </ul>	



<p>of the origin, type and characteristics of the waste in terms of volume, mass and weight</p> <ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the capacity of the plant</li> </ul>	<p>on the basis of incoming material</p> <ul style="list-style-type: none"> <li>• Calculate the remaining treatment capacity</li> </ul>	<p>compliance with the authorised treatment capacity</p>
<p><b>3) Develop possibility concerning reuse of the ending product / LO3</b></p>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the benefits arising from the use of outgoing products</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate advanced skills to identify and classify the outgoing materials</li> <li>• Demonstrate advanced skills to prepare the requested documents</li> </ul>	<ul style="list-style-type: none"> <li>• Assume responsibility of possible use of the outgoing products</li> <li>• Manage differentiate flows and fractions of the outgoing products</li> </ul>



<b>ULO AD-1</b>	<u>TITLE</u> Manage the process for anaerobic digestion	EQF 6
<b>Work tasks:</b>	<b>Oversee the proper functioning of the anaerobic digestion process in order to reach the wanted biogas quantity</b>	
<b>Assessment criteria:</b>	2	
<p><b>Learning outcomes:</b> LO 1: Provide for waste supply to ensure the continuous operation of the plant          Avoid overload and intermittent operation that prevent gas production          LO 2: Obtain a mix with optimal chemical and physical parameters to be introduced in the digester          LO 3: Optimise the homogenisation in order to increase the hydrolysis efficiency related to the digestion          LO 4: Monitor chemical, physical and biological parameters          LO 5: Check the conditions that help the metabolism of microorganisms          LO 6: Maintain the conditions that help the metabolism of microorganisms          LO 7: Optimise the performance of the digester</p>		
<p align="center"><b>Knowledge</b> <i>(assimilation of knowledge throughout learning)</i></p>	<p align="center"><b>Skills</b> <i>(Ability to apply knowledge)</i></p>	<p align="center"><b>Competences</b> <i>(Measure of responsibility and autonomy; ability to use knowledge, skills, social abilities)</i></p>
<p><b>1) Provide for waste supply to ensure the continuous operation of the plant          Avoid overload and intermittent operation that prevent gas production/ LO1</b></p>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of basics of chemistry, agronomy, genetics, thermodynamics, biology</li> <li>• Demonstrate an advanced knowledge of the phases of the anaerobic digestion process and the related</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate advanced skills to provide the requested quantity of waste at the lowest cost</li> <li>• Demonstrate advanced skills to obtain a mix as homogeneous as possible</li> </ul>	<ul style="list-style-type: none"> <li>• Manage the selection process of the best techniques and technologies according to the mixture to be obtained</li> </ul>



needs	<ul style="list-style-type: none"> <li>Calculate the waste needed for plant operation</li> </ul>	
<b>2) Obtain a mix with optimal chemical and physical parameters to be introduced in the digester / LO2</b>		
<ul style="list-style-type: none"> <li>Demonstrate a critical understanding of the main types of physical treatment, chemical and biological principles and their reaction (thermal, mechanical, oxidative and enzymatic)</li> <li>Demonstrate an advanced knowledge of the most common mixer systems</li> </ul>	<ul style="list-style-type: none"> <li>Place the mixing unit in an easily accessible location for inspections</li> <li>Identify the more appropriate type of mixer according to the characteristic to be obtained</li> </ul>	<ul style="list-style-type: none"> <li>Execute the selection of the equipment, pre-treatment activities and their sequence according to the nature and characteristics of the incoming waste</li> <li>Assume responsibility to regulate the humidity of the mixture to the optimum value, before sending it to digester</li> </ul>
<b>3) Optimise the homogenisation in order to increase the hydrolysis efficiency related to the digestion / LO3</b>		
<ul style="list-style-type: none"> <li>Demonstrate an advanced knowledge of the activities about: laceration, metal separation, inert separation, size control</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate advanced skills of carrying out the activities (laceration, metal separation, inert separation, size control)</li> </ul>	<ul style="list-style-type: none"> <li>Assume responsibility of the removing of unwanted components</li> </ul>
<b>4) Monitor chemical, physical and biological parameters / LO4</b>		
<ul style="list-style-type: none"> <li>Demonstrate an advanced knowledge of the effects of temperature on reaction kinetics</li> <li>Demonstrate an advanced knowledge of the main parameters of monitoring and management</li> </ul>	<ul style="list-style-type: none"> <li>Identify strategic activities in order to maintain the required level of parameters when a deviation happens</li> </ul>	<ul style="list-style-type: none"> <li>Manage the mixing of the substrate in order to promote the contact between substrate and bacteria</li> </ul>
<b>5) Check the conditions that help the metabolism of microorganisms / LO 5 Maintain the conditions that help the metabolism of microorganisms / LO 6</b>		



<ul style="list-style-type: none"><li>• Demonstrate an advanced knowledge of the main degradation process and their own performance</li></ul>	<ul style="list-style-type: none"><li>• Demonstrate advanced skills to maintain optimal and stable operative conditions</li></ul>	<ul style="list-style-type: none"><li>• Ensure the most performing bacterial strains for the degradation of incoming mix</li></ul>
<b>6) Maintain the conditions that help the metabolism of microorganisms / LO 7</b>		
<ul style="list-style-type: none"><li>• Demonstrate an advanced knowledge of the limiting factors of the bacterial growth and/or the performance of the biogas production</li><li>• Demonstrate an advanced knowledge of the range of biogas yield, depending on the initial substance</li></ul>	<ul style="list-style-type: none"><li>• Demonstrate advanced skills to implement strategies to improve the energetic yield</li></ul>	<ul style="list-style-type: none"><li>• Ensure energy yields within the identified range initially</li></ul>



<b>ULO AD-2</b>	<u>TITLE</u> Employ the biogas produced	EQF 6
<b>Work tasks:</b>	Ensure the biogas production and the aimed biogas quality (purification level)	
<b>Assessment criteria:</b>	1	
<b>Learning outcomes:</b> LO1: Implement BAT for the purification of biogas, in respect of legal limits LO2: Make compatible biogas production kinetics with use kinetics LO3: Maximise the use of biogas in terms of economic and energetic aspects, considering the parameters of the produced biogas		
<b>Knowledge</b> <i>(assimilation of knowledge throughout learning)</i>	<b>Skills</b> <i>(Ability to apply knowledge)</i>	<b>Competences</b> <i>(Measure of responsibility and autonomy; ability to use knowledge, skills, social abilities)</i>
<b>1) Implement BAT for the purification of biogas, in respect of legal limits / LO1</b>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of the most common techniques for biogas depuration</li> <li>• Demonstrate a critical understanding of the treatments of desulfurization, CO<sub>2</sub> removal, dehumidification</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate advanced skills to size the equipment for the purification of biogas</li> <li>• Choose the best techniques and treatments, taking into account economic aspects</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure compliance with the emission limits imposed by law</li> </ul>
<b>2) Make compatible biogas production kinetics with use kinetics / LO2</b>		
<ul style="list-style-type: none"> <li>• Demonstrate an advanced knowledge of parameters that have been</li> </ul>	<ul style="list-style-type: none"> <li>• Size a storage system based on the plant kinetics</li> </ul>	<ul style="list-style-type: none"> <li>• Manage the determination of pressure and volume of the storage system in</li> </ul>



respected in order to safely store the biogas		terms of costs and benefits
<b>3) Maximise the use of biogas in terms of economic and energetic aspects, considering the parameters of the produced biogas / LO3</b>		
<ul style="list-style-type: none"><li>• Demonstrate an advanced knowledge of the biological and chemical characteristics of the produced biogas</li><li>• Demonstrate a critical understanding of the form of incentives and the market for green certificates</li></ul>	<ul style="list-style-type: none"><li>• Demonstrate advanced skills to identify the most suitable solutions for energy use and conversion considering the needs of the local context</li></ul>	<ul style="list-style-type: none"><li>• Assume responsibility of the calculation of the energetic balance of the plant</li></ul>