

Local Education Plan (LUP)

**MDVP Composite Technology program at Techcollege,
Vocational component (34 weeks)**

2025-2026

Topic/Module 1:	
Mould Design, Building and Preparation (Entry Level Basic Training)	
Beginner Level	Duration: 25 Days
Proficiency goals	
<ul style="list-style-type: none"> - The student has knowledge about mould building and -preparation - The student is able to perform calculations and measurements for material consumption, such as resins, reinforcement etc. - The student is able to use and maintain hand tools correctly. - The student is able to choose the correct materials for composite moulds - The student has knowledge about safety protocols and regulations while working with the chemicals used in composite production, i.e. epoxy resin, polyester resins and polyurethanes and a variety of organic solvents. This element is mandatory for working with epoxy, isocyanates and styrene-based materials. The students will gain a certificate equivalent the mandatory Danish certificate for handling Epoxy, isocyanates and polyester resin. - The student is able to be able to carry out production and preparation of moulds and materials under guidance. - The student is able to read, understand and produce basic technical drawings, - The student can perform practical work with composite materials, release agents and organic solvents, while adhering to the applicable health and safety regulations. 	
Focus and Level	
<p>This module is focused on providing the students with their first experiences concerning the role and construction of composite moulds and laminates.</p> <p>This module is rated as “Beginner Level” based on the Danish Ministry of Education “Taksonomivejledning 2021” (Guide to Taxonomy, 2021). Beginner level is defined as the following:</p>	

Beginner level

The student can solve a task and perform an activity in a familiar situation or based on a known problem or can carry out a more complex activity with guidance. At this level, emphasis is placed on personal competence to understand the fundamental knowledge and skill areas of the education and competence to develop responsibility and a foundation for continued learning. Independence in task-solving is also established at the beginner level.

- The student will get to know about common materials for composite production. They will also learn to make measurements for quality requirements. This will lay the groundwork for future skills in both handling and subsequently performing repairs and finishing on final products.
- The student will become familiar with materials, tools and the basic manufacturing processes. The student will also learn how to determine the appropriate manufacturing technique for the individual task.
- The student will also be tasked with performing repairs on simple moulds and items. The student is expected to be able to do this under supervision upon conclusion of this module.
- The student is taught how to read and understand suppliers’/manufacturers’ requests and instructions. Upon completion of this module students should be able to react according to these documents.
- The student will become familiar with both repair and finishing within composite production. In this way, the module established the foundation for more advanced repair processes later in the program.

Delivery

This module is delivered through the application of a mixture of lecture-based learning, cooperative learning, problem-based learning and experiential learning processes.

Lecture-based learning: Imparting knowledge to the students concerning the basics on chemistry, material knowledge and techniques

- How to perform quality measurements and inspections on composite laminates.
- Providing the students with a general overview of the standards and regulations concerning composite production.
- Providing the students with the tools and knowledge to read and understand technical drawings, incl. understanding common symbols and drawing elements.

Experiential Learning: Providing the students with opportunities to practice how to test basic specifications on composite laminates.

- Practicing how to identify common materials used for composite manufacturing.
- Practicing how to perform practical work on simple moulds and how to use simple composite materials.
- Practicing how to handle and maintain hand tools common to the manufacturing of composite laminates.

Cooperative Learning: In small groups, the students will perform calculations and measurements on simple composite items.

Likewise, the students will research and learn how to use and read the relevant technical datasheets and standards for quality in the fields of composite work.

- Researching and understanding technical drawings and common symbols.

Problem-based learning: In groups of two, the students will be solving a project assignment concerning simple mould manufacturing.

Together the students will be tasked with building a mould and prepare this for continuous manufacturing. The students will also be asked to produce their very first moulded composite item in these moulds.

The students will perform this task based on a technical drawing, which they need to read and understand in order to accomplish the above production goals.

The students are expected to follow the measurements outlined in the project and be able to deliver a visually appealing end-product, build to the fictional project assignment customer's requirements and in accordance with the quality standards stated in the assignment.

**Topic/Module 2:
Repair and Finish on Composite Moulds and Simple Composite Items,
(Entry Level Basic Training)**

Beginner Level	Duration: 20 Days
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Proficiency goals

- The student has knowledge about repairing composite moulds and produced composite items
- The student knows how to finalize moulded items, such as cutting, grinding, sanding and polishing of composite items
- The student is able to identify production defects and damages caused by transportation, handling etc.
- The student is able to analyze the defects and damages at hand, and based on this, decide the correct materials and techniques for carrying out correct repairs of the damage.
- The student is able to carry out necessary repairs and finishing operations on composite items under guidance.
- The student is able to read, understand suppliers’/manufacturers’ recommendations/instructions for repair of their products (turbine blades, boats etc.).
- The student can carry out simple tests for documenting the results of the repair/finish under guidance.
- The student has obtained competencies equivalent to "First Aid in Vocational Education" according to the Danish First Aid Council's training plans of October 2020.
- The student has obtained competencies equivalent to Basic Firefighting according to the guidelines of the Danish Fire and Security Institute of September 1, 2014.

Focus and Level

This module focuses on providing the students with their first experience concerning the repair of composite items and the finishing of composite items and surfaces.

This module is rated as “Beginner Level” based on the Danish Ministry of Education “Taksonomivejledning 2021” (Guide to Taxonomy, 2021). Beginner level is defined as the following:

Beginner level

The student can solve a task and perform an activity in a familiar situation or based on a known problem or can carry out a more complex activity with guidance. At this level, emphasis is placed on personal competence to understand the fundamental knowledge and skill areas of the education and competence to develop responsibility and a foundation for continued learning. Independence in task-solving is also established at the beginner level.

- The student will get to know about most common defects and damages. They will also learn to do the correct repair of these. This will lay the groundwork for further skills to be acquired in both repair and finishing of the final product later in the program.
- The student will become familiar with materials, techniques and tools and the basic repair and finishing processes. The student will also learn how to determine the appropriate choice of technique and materials for repair of the damage at hand.
- The student will also be tasked with performing repairs of simple moulds and items. The student is expected to be able to perform this task under supervision upon conclusion of this module.
- The student is taught how to read and understand instructions given by the supplier/manufacturer. Upon completion of this module students should be able to read and understand these documents - and react in accordance with the requirements/recommendations.
- The student will become familiar with a variety of defects and damages to composite items and products.
- As a result, this module will establish the foundation for subsequent, more advanced repair and finishing processes on composite items later in the program.

Delivery

This module is delivered through the application of a mixture of lecture-based learning, cooperative learning, problem-based learning and experiential learning processes.

Lecture-based learning: Imparting knowledge to the students concerning the basic material knowledge and techniques.

- How to analyze common types of defects and how to perform quality inspections on finalized repairs of composite items.
- Providing students the tools and knowledge to read and understand instructional drawings and customer claims and recommendations.

Experiential Learning: Teaching the students how to test and evaluate basic specifications on composite items.

- Practicing how to identify common defects and damages.
- Practicing how to perform practical work on defect items and moulds and how to fix the errors/defects at hand.

Cooperative Learning: Through cooperation and sharing of experience, the students will perform identification, analysis and repair of simple faults/defects on composite items.

Likewise, the students will research and learn how to use and read the relevant technical datasheets and customer/manufacturer's documentation.

Problem-based learning: The students will be given a project concerning simple mould and/or item repair.

Individually, the students will be tasked with repairing defect/damaged moulds and prepare these for continuous manufacturing use. The students will also be asked to produce the very first moulded composite item in these repaired moulds. This will be performed as a simulated test of the completed repair, before handing the mould back to the production line.

The students will perform this task based on their visual inspection of the mould and item.

The students are expected to carry out these projects/tasks in accordance with the applicable quality standards included as part of the project.

**Topic/Module 3:
Practical Skills Development “The Shipyard Project”**

Beginner Level	Duration: 20 Days
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Proficiency goals

- The student has produced a small boat, by applying their achieved skills from the entry level basic training
- The student has acquired knowledge about collaboration in groups and how to communicate about a common task.
- The student is be able to inspect and prepare the moulds for the production and furthermore be able to choose the right materials, tools and techniques for the production of the boat. If required, the student is able to make necessary repairs on the moulds. All the production steps will be carried out under guidance.
- The student is able to inspect the mould and prepare it for the production. The students can carry out the boat production under guidance.
- The student is able to make simple technical drawings for use in the boat production.
- The student is able to calculate the required quantity of materials for use in overall project calculation.
- The student is able to assemble the individual parts produced for the boat.
- The student is able to perform the quality inspection of the produced boat and recommend any necessary corrections/repairs of possible defects, under guidance.
- The student is able to carry out the necessary repair and finish on the composite items under guidance.

Focus and Level

This module is focused on providing the students with the first experiences concerning the production and repair of larger composite items and the finishing of these items and surfaces.

This module is rated as “Beginner Level” based on the Danish Ministry of Education “Taksonomivejledning 2021” (Guide to Taxonomy, 2021). Beginner level is defined as the following:

Beginner level

The student can solve a task and perform an activity in a familiar situation or based on a known problem or can carry out a more complex activity with guidance. At this level, emphasis is placed on personal competence to understand the fundamental knowledge and skill areas of the education and competence to develop responsibility and a foundation for continued learning. Independence in task-solving is also established at the beginner level.

- The student will get to know about cooperation and communication within industrial manufacturing. They will also learn the necessity of planning and sharing of knowledge. This will enlarge the foundation laid out for future skills acquisition in both production, repair and finishing of the final product.
- The students will learn how to assemble an item consisting of more than one part.
- The student will become familiar with the industrial production context.
- This further expands the student's foundation for approaching more advanced repair and finishing processes of composite items later in the program.

Delivery

This module is delivered through the application of a mixture of lecture-based learning, cooperative learning, problem-based learning and experiential learning processes.

Lecture-based learning: Imparting knowledge to the students concerning the basic material knowledge and techniques and how to use that knowledge in a simulated workplace (industrial production) environment.

- Learning how to communicate and cooperate about a common task.
- Providing students with the tools and knowledge to understand and carry out the communication and planning of a common work situation

Experiential Learning: Teaching the students how to use achieved skills in a larger work situation and how to solve disagreements in the group.

Cooperative Learning: Through cooperation and sharing of knowledge and experience the students will achieve understanding for the necessity of communication and cooperation.

Problem-based learning: The students will be issued a common project consisting of several moulds, which require assembly, as well as good planning and communication. The project also calls for the students to carry out quality inspection on the final product produced and students will have to agree on a quality level before starting the project. The students will perform this task based on their visual inspection of the boat produced. The students are expected to correct any errors/defects on the final product, before handing it over to the imaginary customer.

**Topic/Module 4:
Advanced Production of Composite Moulds**

Experienced Level	Duration: 25 Days
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Proficiency goals

- The student has experienced knowledge about advanced composite materials, such as epoxy resin, polyester resin, polyurethane and a variety of core-materials for sandwich constructions.
- Furthermore, the student has an advanced knowledge about reinforcement materials - such as fiberglass, carbon fibers, kevlar fibers and natural fibers.
- The student also has advanced knowledge about curing, curing agents, and post curing - and what impact this might have on the technical specifications of the final mould.
- The student has knowledge about prototyping and rapid tooling. The student also has knowledge about drawing in Solid Works and about 3D printing. The student has knowledge of development processes from idea generation, through R/D to prototyping.
- The student has knowledge about testing samples in the laboratory, such as tensile strength, curing stage, exact fibre content etc.
- The student is able to choose the correct materials for repair processes.
- The student is able to read and understand suppliers’/manufacturers’ recommendations/instructions for use of their products.

Focus and Level

This module is focused on providing the students with advanced experience concerning the production of composite moulds and the finishing of the moulds and surfaces.

This module is rated as “Experienced Level” based on the Danish Ministry of Education “Taksonomivejledning 2021” (Guide to Taxonomy, 2021). Experienced level is defined as the following:

Experienced Level

The student can plan and complete a task or activity or solve a problem in a routine or familiar situation and environment, both independently and in collaboration with others. At this level, emphasis is placed on personal competence in independently understanding more complex issues and communicating with others about their resolution. Additionally, flexibility and adaptability are emphasized.

- The student will acquire knowledge about producing complex composite moulds with advanced materials.
- The student will become familiar with materials, techniques and tools and the basic use of these in various processing techniques. The student will also learn how to determine the appropriate technique and materials for a specific customer request.
- The student will also be tasked with production of complex composite moulds. The student is expected to be able to do this under supervision upon conclusion of this module.
- The student is taught how to read and understand instructions given by the supplier/customer. Upon completion of this module, students should be able to read and understand these documents and react in accordance with the requirements/recommendations from both suppliers and customers.
- This further extends the student's foundation for engaging in more advanced manufacturing of composite moulds later in the program.

Delivery

This module is delivered through the application of a mixture of lecture-based learning, cooperative learning, problem-based learning and experiential learning processes.

Lecture-based learning: Imparting knowledge to the students concerning the basic material knowledge and techniques.

- How to choose the optimal technique and the most suitable and efficient materials to meet the customer's requirements.
- Providing students with the tools and knowledge to read and understand instructional drawings, as well as customer claims and recommendations for complex composite moulds.

Experiential Learning: Teaching the students how to test and evaluate basic specifications on advanced composite moulds.

- Practice how to carry out production of advanced composite moulds.

Cooperative Learning: Through sharing of experience and knowledge, the students will be able to perform complex production of composite moulds.

Likewise, the students will research and learn how to use and read the relevant technical datasheets and customer/manufacturers documentation.

Problem-based learning: The students will be issued a project concerning complex moulds and/or mould repair.

- Individually, the students will be tasked with repairing defect/damaged moulds and prepare these for continuous manufacturing. The students will also be asked to produce the very first moulded composite item in these repaired moulds. This will be performed as a test of the performed repair, before handing the mould back to the production line/customer.
- The students will perform this task based on their visual inspection of the mould. The students are expected to carry out these projects/tasks in accordance with the applicable quality standards issued as part of the project.

Topic/Module 5: Advanced Production of Composite Items/Products	
Experienced Level	Duration: 25 Days
<p>Proficiency goals</p> <ul style="list-style-type: none"> - The student has detailed knowledge about advanced composite materials, such as epoxy resin, polyester resin, polyurethane and a variety of core-materials for sandwich constructions. - Furthermore, the student has advanced knowledge about reinforcement materials, such as fiberglass, carbon fibers, kevlar fibers and natural fibers. - The student also has advanced knowledge about curing, curing agents and post curing and what impact this might have on the technical specifications of the final mould. - The student has advanced knowledge about various production techniques for manufacturing of composite products. - The student has knowledge about production in advanced and complex moulds and with high-standard customer specifications regarding technical properties and quality. - The student has knowledge about testing samples in the laboratory, such as tensile strength, curing stage, exact fibre content etc. - The student is able to choose the correct materials for the production, in accordance with the customer's requirements. - The student has gained knowledge about LEAN manufacturing and 5S in the workshop, in order to perform efficiently and in a structured manner. LEAN and 5S is a cornerstone in efficiency and quality focus in work processes. 	
<p>Focus and Level</p> <p>This module is focused on providing the students with advanced experience concerning the production of composite products and the finishing of the items and surfaces.</p> <p>This module is rated as "Experienced Level" based on the Danish Ministry of Education "Taksonomivejledning 2021" (Guide to Taxonomy, 2021). Experienced level is defined as the following:</p> <p style="text-align: center;"><i>Experienced Level</i></p> <p><i>The student can plan and complete a task or activity or solve a problem in a routine or familiar situation and environment, both independently and in collaboration with others. At this level, emphasis is placed on personal competence in independently understanding</i></p>	

more complex issues and communicating with others about their resolution. Additionally, flexibility and adaptability are emphasized.

- The student will become familiar with materials, techniques and tools and the basic use of these in various processing techniques. The student will also learn how to determine the appropriate technique and materials for a specific customer request.

Delivery

This module is delivered through the application of a mixture of lecture-based learning, cooperative learning, problem-based learning and experiential learning processes.

Lecture-based Learning: Imparting knowledge to the students concerning advanced composite production knowledge and techniques.

- How to perform more complex production concerning complex moulds and the use of advanced materials, such as carbon fibers, kevlar, hybrid materials and natural fibers. Furthermore, the students will be tasked with manufacturing of sandwich constructions, consisting of a variety of core materials, such as balsa wood, polyurethane foam etc. and how to perform quality inspections on finalized composite items.
- Providing students the tools and knowledge to read and understand instructional drawings, technical data sheets and manuals and to use these in the productions of customer requests.

Experiential Learning: Providing the students with opportunities to practice how to perform the production of advanced composite products and to choose the optimal choice of manufacturing techniques and tools.

Cooperative Learning: Through cooperation and sharing of experience, the students will perform preparation of moulds, tools and materials and they will be able to carry out the complete manufacturing activities starting with planning and preparation and until the delivery to the customer.

Problem-based Learning: The students will be issued a project concerning complex moulds and advanced customer requirements for the final product

- Individually, the students will be tasked with producing a composite item, where they must consider and evaluate every step of the production.
- The student will use their knowledge about sustainability and use that knowledge in the working process. This task/project will also include the students' knowledge re. waste handling and sort it for reuse/recycle it if possible.
- The student will also be tasked with production of complex composite items. The student is expected to be able to perform this production under supervision upon conclusion of this module.

**Topic/Module 6:
Advanced Repair and Finish on Composite Moulds and Simple Composite Items (Experienced Level Training)**

Experienced Level	Duration: 25 Days
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Proficiency goals

- The student has extended knowledge about repairing complex composite moulds and produced complex composite items, by using advanced resins and reinforcement materials
- The student knows how to finalize complex moulds and moulded complex items, such as cutting, grinding, sanding, putting of surfaces and polishing of advanced composite items.
- The student is able to identify defects and damages caused by transportation, handling, during production etc.
- The student is able to analyze the defects and damages at complicated moulds and items, and based on this, to decide on the optimal materials and techniques for carrying out a correct repair of the damage.
- The student is able to carry out the necessary repair and finish on the composite items.
- The student is able to read and understand suppliers’/manufacturers’ recommendations/instructions for repairing their complex products (turbine blades, boats etc.).
- The student can carry out simple tests for documenting the results of the repair/finish processes performed.

Focus and Level

This module is focused on providing the students with extended experiences concerning the repair of complex composite items and performing finishing of complex items and surfaces.

This module is rated as “Experienced Level” based on the Danish Ministry of Education “Taksonomivejledning 2021” (Guide to Taxonomy, 2021). Experienced level is defined as the following:

Experienced Level

The student can plan and complete a task or activity or solve a problem in a routine or familiar situation and environment, both independently and in collaboration with others. At this level, emphasis is placed on personal competence in independently understanding more complex issues and communicating with others about their resolution. Additionally, flexibility and adaptability are emphasized.

- The student will get to know about most common complex defects and damages. They will also learn to perform the correct repair of these. This will extend the student's foundation for future skills in both repair and finishing of the final product.
- The student will become familiar with advanced materials, advanced techniques and tools, and advanced repair and finishing processes. The student will also learn how to determine the appropriate technique and materials for the defect or damage at hand.
- The student will also be tasked with repair of complex moulds and items. The student is expected to be able to perform such repairs upon conclusion of this module.
- The student is taught how to read and understand complex instructions given by the supplier/manufacturer. Upon completion of this module, students should be able to read and understand these documents and react in accordance with the requirements/recommendations
- The student will become familiar with a variety of complex defects and damages. This further expands the student's basis for undertaking more advanced repairs and finishing of composite moulds and items.

Delivery

This module is delivered through the application of a mixture of lecture-based learning, cooperative learning, problem-based learning and experiential learning processes.

Lecture-based learning: Imparting knowledge to the students concerning advanced material knowledge and techniques.

- How to analyze common types of more complex defects and how to perform quality inspections on finalized repairs of these composite items.
- Providing students the tools and knowledge to read and understand instructional drawings and customer claims and recommendations.

Experiential Learning: Providing the students with opportunities to practice how to test and evaluate advanced specifications on composite items.

- Practice how to identify common defects and damages on complex composite items.
- Practice how to perform practical work on complex defect items and moulds and how to fix the errors/defects at hand.

Cooperative Learning: Through cooperation and sharing of experience, the students will perform identification, analysis, and repair of complex composite items.

Problem-based learning: The students will be issued a project/task concerning complex moulds and/or items repair.

Individually, the students will be tasked with repairing the defect/damaged mould and prepare this for continuous manufacturing use. The students will also be asked to produce the very first moulded composite item in these repaired moulds. This will be performed as a test of the completed repair, before handing the mould back to the production line, and to assure that the repair is done correctly.

The students are expected to carry out these projects/tasks in accordance with the applicable quality standards issued as part of the project.

Topic/Module 7:

Practical Skills Development: “Building a Windmill Project”

Experienced Level

Duration: 20 Days

Proficiency goals

- The student will produce a small windmill, by applying and practicing the achieved skills from the advanced level training in this workplace environment simulation project.
- The student will acquire further knowledge of collaboration in groups and how to communicate about a complex task, using the knowledge gained from the advanced training modules.
- The student is able to inspect and prepare the moulds for advanced production and furthermore will be able to choose the right materials, tools and techniques for the production of the windmill. If required, the student is able to perform the necessary repairs on the moulds. All production steps will be carried out under guidance.
- The student is able to inspect the mould and prepare it for the production. The students can carry out the production under guidance.
- The student is able to prepare basic technical drawings for use in the production.
- The student is able to calculate the required quantity of materials for use in both production and in calculation of the price for the customer.
- The student is able to assemble the individual parts for the windmill, as it consists of 6 different parts.
- The student is able to carry out the quality inspection on the produced parts and the assembled windmill and recommend necessary corrections/repairs of any potential defects under guidance.
- The student is able to carry out the necessary repairs and finishing of any potential defects on the produced parts, under guidance.

Focus and Level

This module is focused on providing the students with their first extended experiences concerning the production of larger composite items and the finishing of these items and surfaces.

This module is rated as “Experienced Level” based on the Danish Ministry of Education “Taksonomivejledning 2021” (Guide to Taxonomy, 2021). Experienced level is defined as the following:

Experienced Level

The student can plan and complete a task or activity or solve a problem in a routine or familiar situation and environment, both independently and in collaboration with others. At this level, emphasis is placed on personal competence in independently understanding more complex issues and communicating with others about their resolution. Additionally, flexibility and adaptability are emphasized.

- The student will get to know about team cooperation and communication within industrial manufacturing of complex composite items. They will also learn the necessity of planning and sharing of knowledge. This will extend the student's foundation for adopting additional future skills in both production and finishing of the final product.
- The student will learn how to assemble an item consisting of several complex parts.
- The student will become familiar with the context in complex industrial production.
- This further expands the foundation for the student to engage in more advanced production and finishing of composite items.

Delivery

This module is delivered through the application of a mixture of lecture-based learning, cooperative learning, problem-based learning and experiential learning processes.

Lecture-based learning: Imparting knowledge to the students concerning the advanced material knowledge and techniques and how to use and adapt knowledge into new situations/tasks in a simulated workplace environment

Experiential Learning: Providing the students with the opportunity to practice how to use their achieved extended skills in a larger work situation and how to adapt that knowledge into new/unknown situations.

Cooperative Learning: This workplace simulation project will underline the importance of sharing knowledge and experience, as well as professional communication to solve the project task in accordance with the customer request.

Problem-based learning: The students will be issued a common project consisting of several complex moulds, which require assembly and good planning and communication. The project also calls for the students to use their knowledge about mould building, as the project requires that the students has to build mould parts to succeed with the production. They also have to agree on a quality level before starting the project and they must decide tolerances for the measures.

The students are expected to correct any errors/defects on the final product, before handing it over to the imaginary customer.

**Topic/Module 8:
Final Test Assignment**

Without level | Duration: 10 Days

Final Test Details

The student will complete a final test assignment, consisting of both a theoretical test and a practical test/exercise.

The theoretical test will be a multiple-choice test consisting of 25 questions concerning material knowledge and knowledge about processing technologies.

The practical test/exercise covers the following:

- Preparing technical drawing material
- Performing calculation on materials
- Planning of the production
- Determining quality requirements for the final result
- Performing the production in accordance with a customer request (part of the assignment)
- Performing post processing and final finish on the produced item
- Checking and documenting that the achieved quality fulfills the customer's requirements
- Displaying compliance with the legislation on health and safety
- Preparing and a presentation of the complete product and presenting this for the teacher and the examiner.