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Local teaching plan

Heavy duty Equipment & Agricultural Machinery Training

The Basic Course 2, 20 weeks

Contents

Link to current rules and frameworks:

Executive/ministerial ordinance: https://www.retsinformation.dk/eli/lta/2023/953

Educational Order: https://www.retsinformation.dk/eli/lta/2023/272

Training regulation: https://iu.dk/education/vocational education/vocational education-and-specialties/entreprenor-and-agricultural machinery education/

The school's common pedagogical and didactic basis: https://heguddannelser.dk/om-skolen/organisation/skolens-joint-paedagogical-and-didactic-basis https://heguddannelser.dk/om-skolen/organisation/skolens-faelles-paedagogiske-og-didaktiske-grundlag

General pedagogical/didactical framework for GF2 Heavy Duty Equipment and agricultural Machinery Training

The course's three main subject themes are structured according to the same basic principle:

1. Knowledge acquisition
2. Study/Organisation/Structuring
3. Testing and evaluation

This means that the 3 academic topics, and sub-topics, are preceded by a knowledge-based characterization of the basic material. Knowledge aquisition is achieved through teacher-led activities that best present the basic material to the student, e.g. through oral presentations, learning videos or introductory practical tasks.
Students use and subsequently test the acquired theoretical knowledge when performing practical tasks in the workshop. Throughout the course, the teacher ensures that the student receives clear feedback and feedforward, which supports and develops the student's learning. Furthermore, the teaching is designed so that the students are challenged by qualified demands awakening their curiosity, desire for learning and courage to try something new.
Finally, the subject themes are concluded with a submission documenting the student's work and results. The handover can be done both orally to the teacher, where the student undergoes the performed practical task (Submission to customer), or it can be done as written, video or image documentation.

Holistic orientation

Under the 3 main themes, different objectives are intertwined in the practical exercises, i.e. a practical exercise consists of different sub-objectives, which ultimately provide an overall achievement of the learning objectives. Under each overall theme, the teaching and task building is organized so you end up with a holistic task solving. For example, the student will start the hydraulics theme with initial theoretical and practical tasks, which are then eventually tied together into project tasks where the student works with all aspects within the hydraulics objectives. When the student then later comes to the Engine/Electrical theme, the achieved theoretical and practical knowledge, both in hydraulics and Engine/Electrical, is linked in, among other things, a service task where the student, in a report, describes a specific tractor's service needs. The Metal theme is, in accordance with the same procedure, structured so the pupil firstly achieves sub-objectives through theoretical and practical tasks, in order to finally produce a product that can be included in a tractor's

structure. In this way, the overall themes are linked together in a holistic orientation.

Differentiation

Many assignments are designed for the student to have a practical and/or theoretical approach when starting the assignment. For example, in the Engine/electrical theme, where a complete vehicle lighting system is to be built, the task can be started with the practical approach where the student tries out the structure, after which the finished result must be documented with a diagram. The task can also start with the diagram, where the student designs the structure of the light panel and subsequently tests the result through the practical structure of the light panel. Students work in smaller groups, but also have the opportunity to work alone. The tasks for the different overall themes are divided with mandatory tasks to be solved, but in addition, they can be expanded with more tasks where the difficulty increases, or the student builds up more routine. The tasks generally provide great opportunities for different uses of media and formats, e.g. a simple drawing of the charging system is just as acceptable as a written description.

Interdisciplinarity

Throughout all vocational themes work environment is involved where the student assesses ergonomics in the various tasks. Furthermore, the student must assess the environmental aspects of the various work routines and work with the industry's various substances and materials. including how engine oil, coolant and other chemicals are handled and disposed of.
Basic subjects are involved as individual elements as context. For example, the Service Manual for a specific engine is an English version, forcing student to use English terms for data retrieval. In Mathematics and Physics, subjects and formulae used in hydraulics reappear, students see a practical connection between e.g. cylinder calculations and the hydraulic setups that are built up in the workshop.

Practice relation

Theoretical activities are supported by practical tasks, for students to relate the acquired theory to practice, continuously in the process. Most of the assignment material in the course is a mixture of theory and practice in the task itself to support both elements simultaneously. The student is presented with work cards in the assignments, so that the customer relationship and the necessary documentation can be related to the workflow at one of the industry's workshops.

Performance standards

- Beginner level.

  The student or apprentice can solve a task and perform an activity in a known situation or from a known problem or can perform a

more complicated activity under guidance. At this level, emphasis is placed on personal competence to familiarise oneself with the fundamental knowledge and skills areas of education and the competence to develop accountability and the basis for continued learning. At the beginner's level, autonomy in solving tasks is also established. (Order No 953 of 22 June 2023 - §40)

Performancestandard	Verbum	Function/task		Situation	Degree of responsibility and autonomy
Beginner	Participate in, recognize, reproduce, operate, retell assist	Basic,simple, common,basic,	Activiteten (workfunction or task)	1 known situationer, in clear situations, in ordinary si-tuations	Sub-advice,independence is founded, according to instruction,

VET - In order to be admitted to school education in the VET main course, the student must have completed the following basic subjects:

1) Danish at E-level, passed.
2) Mathematics at E-level, passed.
3) English at E-level, passed.
4) Physics at F-level, passed.

EUX - In order to be admitted to school education in the EUX main course, the student must have completed the following basic subjects:

1) Danish at C-level. (Mandatory on GF1)
2) English at C-level. (Mandatory on GF1)
3) Social studies at C-level. (Mandatory on GF1)
4) Mathematics at C-level. (Mandatory on GF2)
5) Physics at C-level. (Mandatory on GF2)

6) Technology at C-Level. (Mandatory on GF2)

Certificate subjects

Certificate subjects in the training will be carried out as a course in accordance with the rules, guidelines and training plans published in the certificate area. For Contractor and Agricultural Mechanical Engineer carried out at GF2:

- Working environment and safety, welding and thermal cutting, cf. the Danish Working Environment Authority's rules (Section 17)
- Personal safety when working with epoxy and isocyanates, cf. the Danish Working Environment Authority's guidelines.
- First aid in vocational training, including road-related first aid, according to the Danish First Aid Council's training plans.
- Elementary fire-fighting according to the guidelines of the Danish Institute of Fire and Security Technology.

The specific organisation of teaching in the profession

Hydraulic theme

HYDRAULIC PERIOD: 3 weeks

Description:

In the theme 'hydraulics', the teaching includes tasks and projects based on the following:

- How to read and draw a hydraulic diagram with standard symbols.
- Knowledge of the structure and function of the various components.
- Know which hydraulic components are used for different tasks.
- Construction of various hydraulic systems, following a diagram, on a test bench.
- Knowledge of concepts such as pressure, flow
- Knowledge of hydraulic oil.
- Pump testing.
- Basic hydraulic math.
- Knowledge of hydraulic hoses and pipes.

Objectives:

The pupil or apprentice must have the competence, with the performance standard beginner level, to be able to do the following:

- 1) Independently plan simple tasks.
- 2) Perform tasks ergonomically, safety and occupational health and safety correctly.
- 3) Apply relevant professional terms and concepts in task solving.
- 4) Take responsibility for solving tasks in cooperation with others.
- 5) Take a position on the value of ongoing documentation, evaluation and dissemination of own work processes, methods and results.
- 6) Use existing professional documentation, including diagrams, tables or workshop manuals in a practical work process, as well as prepare simple diagrams.
- 7) Describe applicable environmental rules in relation to own and others ' safety in the performance of work.
- 8) Prepare commonly used professional documentation such as worksheets and self-monitoring, and assess whether own work meet the quality requirements selected by the trainer.

- 10) Contribute to simple maintenance and service tasks on construction and agricultural machinery.

- 14) Build simple hydraulic systems, including selecting the right materials and components for the task.
- 18) Independently carry out simple maintenance of the most common tools for repair and maintenance of contractor- and agricultural machinery.
- 19) Explain the use of common machines, tools and materials used within the subject area.
- 20) Apply basic mathematical methods within the subjects geometry, functions, graphs and statistics, including calculations of e.g. voltage, power, frequency, pressure and volume in connection with technical elements such as steering angles, brake pressure, braking distance, cylinder capacity, hydraulic systems and the conversion of Ohm's law to electrical systems in vehicles.
- 21) Use it for professional information seeking and communication.

Criteria for assessment:

Standpoint is judged according to the 7-point scale

- The student demonstrates the minimally acceptable degree of achievement of the subject's objectives. This means, inter alia, that:
- The student explains, with some uncertainty applied, simple, basic professional concepts and models.
- With uncertainty, the student relates the academic theory to the vocational practice - and vice versa.
- The pupil expresses himself coherently, but uses the technical language insecurely
- The student can work with the subject in a safety and working environment correct way, and can with some help explain the working method used.
- The student can prepare relevant documentation, with minor shortcomings.
- The pupil can select the right materials and components for the construction of single hydraulic systems, with minor deficiencies.
- The student may, with some uncertainty, use basic mathematical methods for calculations in connection with hydraulic structures;

Successful completion - examples of shortcomings:

- A small number of terms and concepts that cannot be explained or are misunderstood
- The student lacks knowledge of individual elements, but can explain the overall context.
- The student can partially transfer knowledge between theory and practice, but has an understanding of coherence.
- Inaccurate and deficient everyday language replaces some technical terms.

Motor-El theme

Motor-El Duration: 6 weeks

Description:

In the theme 'Motor-El', the teaching includes tasks and projects based on the following:

- The four bars, including the engine timing
- Engine construction and components;
- Engine fuel system
- Engine lubrication system, includingKnowledge of motor oil
- Engine cooling system

- Ignition system of the petrol engine
- Different measurement and troubleshooting methods such as cylinder balance, compression and leakage measurement
- General service needs of the tractor, including data retrieval and documentation
- Search for machine-specific data, create work text on work cards and search for spare parts in the spare parts catalogue.
- Ohm's Law and the Effects Law
- Electrical diagram, including own execution with standard symbols
- Measuring technique on electrical circuits
- Charging and starting installations, including construction and operation
- Measurement technology at charge-starter systems
- Accumulator, including structure and function
- Measuring technique on accumulator, including principles for measuring density and electronic battery testing.

Objectives:

The pupil or apprentice must have the competence, with the performance standard beginner level, to be able to do the following:

- 1) Independently plan simple tasks.
- 2) Perform tasks ergonomically, safety and occupational health and safety correctly.
- 3) Apply relevant professional terms and concepts in task solving.
- 4) Take responsibility for solving tasks in cooperation with others.
- 5) Take a position on the value of ongoing documentation, evaluation and dissemination of own work processes, methods and results.
- 6) Use existing professional documentation, including diagrams, tables or workshop manuals in a practical work process, as well as prepare simple diagrams.
- 7) Describe applicable environmental rules in relation to own and others ' safety in the performance of work.
- 8) Prepare commonly used professional documentation such as worksheets and self-monitoring, and assess whether own work meet the quality requirements selected by the trainer.
- 9) Explain the structure and operation of diesel and petrol engines, including the four bars.
- 10) Contribute to simple maintenance and service tasks on construction and agricultural machinery.
- 11) Independently carry out simple dismantling and installation tasks of electrical systems relevant to construction and agricultural machinery.
- 12) Independently perform simple adjustment and repair tasks on petrol and diesel engines based on an understanding of the four beams and also use measuring equipment to measure wear and tear on petrol and diesel engines.
- 13) Contribute to simple troubleshooting tasks on electrical systems on construction and agricultural machinery.
- 18) Independently carry out simple maintenance of the most common tools for repair and maintenance of contractor- and agricultural machinery.

- 19) Explain the use of common machines, tools and materials used within the subject area.
- 20) Apply basic mathematical methods within the subjects geometry, functions, graphs and statistics, including calculations of e.g. voltage, power, frequency, pressure and volume in connection with technical elements such as steering angles, brake pressure, braking distance, cylinder capacity, hydraulic systems and the conversion of Ohm's law to electrical systems in vehicles.
- 21) Use it for professional information seeking and communication.

Criteria for assessment:

Standpoint is judged according to the 7-point scale

- The student demonstrates the minimally acceptable degree of achievement of the subject's objectives. This means, inter alia, that:
- The student explains, with some uncertainty applied, simple, basic professional concepts and models.
- With uncertainty, the student relates the academic theory to the vocational practice - and vice versa.
- The pupil expresses himself coherently, but uses the technical language insecurely
- The student can work with the subject in a safety and working environment correct way, and can with some help explain the working method used.
- The student can prepare relevant documentation, with minor shortcomings.
- The pupil can measure compression pressure, with minor defects
- The pupil can carry out the installation of shock bars and tilting gear, including correct valve adjustment without serious defects, during separation/on and on installation, as well as logical sequence.
- The student can explain the safety when handling engine oil.
- The pupil can carry out measurement with multimeter, with minor defects
- The student can perform assembly tasks on an electrical system, with minor defects
- The student can perform troubleshooting on electrical system, with no uncertainty.
- The student can with some help measure a starter plant

Successful completion - examples of shortcomings:

- A small number of terms and concepts that cannot be explained or are misunderstood
- The student lacks knowledge of individual elements, but can explain the overall context.
- The student can partially transfer knowledge between theory and practice, but has an understanding of coherence.
- Inaccurate and deficient everyday language replaces some technical terms.

Blacksmith theme

Forged duration: 2 weeks

Description:

In the theme ‘Smed’, the teaching includes tasks and projects based on the following:

- MAG welding, including repair welding
- MIG welding
- Working drawing
- Threading drill
- Cutting
- Selection and processing
- Construction of workpieces

Objectives:

The pupil or apprentice shall have the competence to achieve, with the performance standard beginner level, the following:

- 1) Independently plan simple tasks.
- 2) Perform tasks ergonomically, safety and occupational health and safety correctly.
- 3) Apply relevant professional terms and concepts in task solving.
- 4) Take responsibility for solving tasks in cooperation with others.
- 5) Take a position on the value of ongoing documentation, evaluation and dissemination of own work processes, methods and results.
- 6) Use existing professional documentation, including diagrams, tables or workshop manuals in a practical work process, as well as prepare simple diagrams.
- 7) Describe applicable environmental rules in relation to own and others ' safety in the performance of work.
- 8) Prepare commonly used professional documentation such as worksheets and self-monitoring, and assess whether own work meets the quality requirements selected by the trainer.
- 10) Contribute to simple maintenance and service tasks on construction and agricultural machinery.
- 15) Independently carry out repair welding with MAG welding on materials above 10 mm, including selecting relevant welding material.
- 16) Draw up common thread types.
- 17) independently carry out the construction of machine parts in materials exceeding 10 mm from the given simple working drawing.
- 18) Independently carry out simple maintenance of the most common tools for repair and maintenance of contractor- and agricultural machinery.
- 19) Explain the use of common machines, tools and materials used within the subject area.
- 20) Apply basic mathematical methods within the subjects geometry, functions, graphs and statistics, including

calculations of e.g. voltage, power, frequency, pressure and volume in connection with technical elements such as steering angles, brake pressure, braking distance, cylinder capacity, hydraulic systems and the conversion of Ohm's law to electrical systems in vehicles.

- 21) Use it for professional information seeking and communication.

Criteria for assessment:

Standpoint is judged according to the 7-point scale

- The student demonstrates the minimally acceptable degree of achievement of the subject's objectives. This means, inter alia, that:
- The student explains, with some uncertainty applied, simple, basic professional concepts and models.
- With uncertainty, the student relates the academic theory to the vocational practice - and vice versa.
- The pupil expresses himself coherently, but uses the technical language insecurely
- The student can work with the subject in a safety and working environment correct way, and can with some help explain the working method used.
- The student can prepare relevant documentation, with minor shortcomings.
- The student can perform MIG and MAG welding, with minor defects
- The student can perform flame cutting without serious defects,
- The student can perform a working drawing, with minor defects

Successful completion - examples of shortcomings:

- A small number of terms and concepts that cannot be explained or are misunderstood
- The student lacks knowledge of individual elements, but can explain the overall context.
- The student can partially transfer knowledge between theory and practice, but has an understanding of coherence.
- Inaccurate and deficient everyday language replaces some technical terms.

Documentation

The student prepares documentation of various and relevant processes and products, e.g. thematic tasks, synopsis, port folio, or other professional documentation. In the documentation can be included a professional product.

Requirements for student documentation

The student submits ongoing documentation in relation to the individual tasks and projects. It is clearly described in the individual task presentations and projects, what the student must submit of documentation. For example, calculations, diagrams or measurements of various kinds.

Evaluation and assessment

Continuous evaluation

The student must in the course of teaching achieve a clear perception of the subject's objectives as well as of its own challenges and its own options in relation to being able to meet the objectives. This must be done through individual guidance and feedback in relation to the learning processes and products included in the teaching activities. In addition, activities that stimulate the individual and collective reflection on the benefits of teaching are included. The basis for the evaluation is the professional goals.

Final assessment of position

A final standpoint character is given according to the 7-step scale. Standpoint character expresses the pupil's fulfilment of the subject's goals.

Examination basis:

Name of training	**Entrepreneurial and agricultural machinery training**
The basis for the examination is at least the following **selected objectives from the education-specific subject.**	**The pupil or apprentice must have the competence, with the performance standard beginner level, to be able to do the following:** - 1) Independently plan simple tasks. - 2) Perform tasks ergonomically, safety and occupational health and safety correctly. - 3) Apply relevant professional terms and concepts in task solving. - 4) Take responsibility for solving tasks in cooperation with others. - 5) Take a position on the value of ongoing documentation, evaluation and dissemination of their own work processes, methods and results. - 6) Use existing professional documentation, including charts, tables or workshop manuals in a practical work process, as well as draw up simple diagrams. - 7) Describe applicable environmental rules in relation to own and others ' safety in the performance of the work. - 8) Draw up commonly used professional documentation such as worksheets and self-monitoring, and assessing whether own work meets the quality requirements selected by the teacher. - 9) Explain the structure and operation of diesel and petrol engines, including the four bars. - 10) Contribute to simple maintenance and service tasks on contractor and agricultural machinery. - 11) Independently perform simple disassembly and installation tasks of electrical systems relevant to construction and agricultural machinery. - 12) Independently perform simple adjustment and repair tasks on gasoline and diesel engines based on an understanding of the four bars and also use measuring equipment to measure wear on petrol and diesel engines.

	- 14) Build simple hydraulic systems, including selecting the right materials and components of the task. - 18) Independently carry out simple maintenance of the most common tools for repair and maintenance of construction and agricultural machinery. - 19) Explain the use of common machines, tools and materials used in the professional field. - 20) Apply basic mathematical methods within the subjects geometry, functions, graphs and statistics, including calculations of e.g. voltage, power, frequency, pressure and volume in connection with technical elements such as steering angles, line pressure, braking distance, cylinder capacity, hydraulic systems and translation of Ohm's law on electrical systems in vehicles. - 21) Use it for professional information seeking and communication.
In the specific test must be in accordance with a random principle enter into other of the subject's objectives	
The examination basis must give the student the opportunity to demonstrate his or her knowledge, skills and competencies in relation to the selected objectives. Therefore, the basis for examination shall include:	Examination basis is for each student the goals associated with the extracted task, as well as the student's portfolio folder. The portfolio folder must be located at the examinee's (the student's) workplace during the test, so the examiner and examiner have the opportunity to ask questions during the test. The portfolio folder is NOT subject to assessment.

The assessment basis must provide a basis for assessing the pupil's knowledge, skills and competences, therefore, the assessment basis must include:	The assessment basis is made up of the examinee's performance in connection with the practical execution and answering of the extracted task. The examinee is judged on his/her ability to demonstrate his/her knowledge, skills and competencies within the task.
The following **assessment criteria,** which are precise and exhaustive in relation to the selected objectives, are laid down: knowledge, skills and competences;	The student demonstrates the minimally accepted degree of the subject's goals. This means, among other things, that the student • With some uncertainty can explain applied, simple, basic professional concepts and models • Can with uncertainty relate the academic theory to the vocational practice and vice versa. • Can express itself coherently, but uses technical language insecurely. • Can work with the subject in a safety and working environment correct way, and can with some help explain the working method used. • Can produce relevant documentation with minor deficiencies. Examples of flaws in a successful performance include: • A small number of terms and concepts that cannot be explained or are misunderstood. • The student lacks knowledge of individual elements, but can explain the overall context. • The student can partially transfer knowledge between theory and practice, but has an understanding of coherence. • Inaccurate and deficient everyday language replaces some technical terms. If there are material errors in relation to all the assessment criteria, the assessment is 'fail'.

Practical conduct of the test	There is no preparation for the test, and the assignments are distributed by drawing lots just before the test. The number of draw options must exceed the number of examinees by at least 3. All drawing possibilities shall be provided at the start of the test. At the draw, the examiner and the examiner must be present. During the test, the use of assistive devices, including electronic, is permitted. However, the examinee must not improperly procured help for the solution of the tasks. The examinee will be during the test continuously examined by the examiner and examiner, where the examinee orally explains the selected solutions. The examinee is assessed both when this orally examined by the examiner and examiner, and during the test, where the examiner and examiner look at how the examinee demonstrates its practical skills. Examiner and examiner will generally use 30 minutes per examinee for examination and deliberation, however, not coherent, as up to 7 examinees at a time continuously will be examined during the test of 3.5 hours. The examinee summons along the way (as specified in the task) examiner (teacher) and examiner for control of the task. When the examinee reports finished with the task, the examiner and examiner may ask some final questions or ask the examinee to demonstrate individual elements of the extracted task. Voting takes place after the examinees practical/oral performance is completed. As a final assessment, the examiner and examiner submit an overall assessment with either passed or failed.

The test must be	**Practical**	**Oral**	**Written**	A combination
	x	x		x
The **duration** of the exam per student must be (minimum 30 minutes and maximum 7 hours)	The duration of the test is 3.5 hours.			
Special conditions if the test is organised as a group test	The test is not organised as a group test.			