



Mechatronics

<p>1. Name of CAPW</p>	<p>Mechatronics</p>
<p>2. Economic sector, position</p>	<p>According with the International Standard Classification of Occupations, ISCO-08 corresponds to the group:</p> <ul style="list-style-type: none"> • 311410 Mechatronic Technician • 3114 Electronics engineering technicians <p>Occupation common name:</p> <ul style="list-style-type: none"> • mechatronics <p>technical mechanics</p>
<p>3. CAPW level (also according to NQF)</p>	<p>Beginner (BG) Demonstrates basic knowledge and skills in practice, does not make decisions on his own, professional experience does not exceed 1 year.</p>
<p>4. Description of CAPW</p>	<p>Knowledge: (What the employee knows and understands)</p> <ol style="list-style-type: none"> 1. knows the rules of the selected company functioning in the economic market environment; 2. knows the technical documentation of a mechatronic device or system; 3. knows the rules of device decomposition due to the elements present in it; 4. knows the principles of operation of a mechatronic device or system; 5. knows and understands the most important laws applicable in the mechatronics industry; 6. knows the MS Office package, knows the principles of using computer office programs, Internet resources related to the conducted activity, other technical / technological solutions used in the mechatronics industry; 7. knows the basics of knowledge in the field of office work (IT software, office programs, professional secrecy, personal data protection, operation of equipment and office technology devices, etc. 8. knows and understands the rules, procedures and health and safety standards relating to the performed professional tasks, 9. knows a foreign language (e.g. English) at a communicative/basic level, 10. knows the basic rules of communication necessary to execute orders, maintain contacts with clients and cooperate in a team, 11. knows the basic negotiation methods and marketing techniques, 12. knows the basic principles of ethics and culture in the performance of professional tasks. <p>Skills: (What the employee can do)</p> <ol style="list-style-type: none"> 1. can assemble and disassemble mechatronic devices and



	<p>systems;</p> <ol style="list-style-type: none">2. can operate mechatronic devices and systems;3. can design and program mechatronic devices and systems;4. can install and run mechatronic machines and devices;5. can make and repair elements of machines, devices and tools;6. can measure basic quantities which are control parameters;7. can operate a computer, office programs and use Internet resources to perform simple professional tasks;8. is able to supervise the operation of automated industrial processes and modern technical devices;9. is able to work in interdisciplinary teams solving problems related to the design, manufacture and diagnosis of mechatronic systems;10. can use a foreign language at a communicative level in contacts with clients/contractors;11. can use organizational and analytical skills in their own work, e.g. planning and correcting simple professional tasks according to the circumstances;12. can search, compare, analyze and process information needed to perform simple professional tasks;13. is able to shape working conditions, taking into account the principles of occupational health and safety - observes the requirements resulting from technology and the principles of work organization; acts in accordance with the regulations and instructions that are related to professional activities;14. can prepare documentation related to the tasks performed in accordance with applicable regulations, i.e. develop and use documentation regarding simple professional tasks, e.g. quantitative data in the documentation for obtained orders, prepare a data summary;15. can work under time pressure;16. is able to work in a team and communicate with representatives of contractors responsible for the execution of the order;17. is able to follow the received instructions, orders and follow the advice received in professional activity;18. is able to determine the easy to predict effects of his professional activities;19. can observe the principles of culture and ethics in professional contacts;20. can cope with stress;21. can plan their own professional development. <p>Social competences: (attitudes, features, values that a person represents, readiness to perform specific tasks and preparation to fulfill specific obligations; Ability to shape one's own development</p>
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	<p>and autonomous and responsible participation in professional and social life. They take into account the ethical context of one's own conduct .)</p> <ol style="list-style-type: none"> 1. planning and organizational skills; 2. the ability to concentrate and divide attention; 3. resistance to stress, resistance to working under time pressure; 4. openness, communicativeness; 5. discipline; 6. commitment, taking responsibility for entrusted professional tasks; 7. accuracy, conscientiousness, reliable performance of the entrusted professional tasks; 8. readiness to exercise due diligence in performing professional activities, 9. due care for the workplace, tools and materials; 10. observance of professional secrecy; 11. availability; 12. readiness to follow instructions received; follow instructions and take advice; 13. readiness to cooperate in the performance of professional activities; 14. readiness to comply with applicable ethical standards and cultural principles; 15. readiness to act in accordance with the regulations and procedures established by the employer, related to professional activities - to comply with the principles of work discipline; 16. readiness to take into account direct and deferred, easy ones to predict the effects of your job; 17. readiness to communicate in the work environment in the following way: <ul style="list-style-type: none"> • not disturbing the circulation of information related to the performed professional tasks, • ensuring flexibility in communication with clients and good cooperation within the team, 18. readiness to create and maintain contacts with clients; 19. readiness to complete and deepen own professional competences in the scope of performed tasks. <p>The competencies and features that are particularly important for this level are bolded.</p>
<p>5. Requirements for obtaining a CAPW (if any, requirements for education and / or training completed, duration of employment, competencies, etc.)</p>	<p>Formal requirements regarding education/Informal requirements regarding the candidate's professional experience necessary to take up the job.</p> <p>The education formally required to pursue the mechatronics profession is related to:</p> <ol style="list-style-type: none"> 1. the educational path in force in a given country leading to obtaining formal qualifications necessary to practice the profession



of mechatronics, e.g. technical school, vocational school (in Poland a 2nd degree trade school), professional exam for mechatronics qualifications;

2. higher education path in a given country, e.g.:

- 1) graduation from higher education – 1st or 2nd degree (engineer or master's degree) in the field of mechatronics. These are studies in the field of engineering and technical sciences, whose curriculum focuses on issues in the field of automation and robotics, construction and operation of machines, electronics, computer science and mechanics. Popular specialties in the field of mechatronics: automatics and robotics, automatics and control, medical engineering, weapons and ammunition design, intelligent constructions, vehicle mechatronics, industrial mechatronics, micromechanics.
- 2) completion of postgraduate studies ("Mechatronics for engineers").

FORMAL REQUIREMENTS regarding the documentation of your education:

1. a diploma confirming professional qualifications after graduating from a technical school, a 2nd degree vocational school or a post-secondary school or obtaining this education through other equivalent educational forms and after passing exams confirming qualifications in the profession. Maturity certificate. (PQF qualification level IV)
or
2. 1st or 2nd degree diploma in the field of mechatronics (engineering and/or master's degree) - (PQF level VI and VII)
or
3. diploma of postgraduate studies after completing 1st or 2nd degree studies in technical fields (PQF level VI and VII) or
4. Additionally, the employer may require/prefer other documents: other diplomas, attestations, certificates confirming qualifications useful for the mechatronics profession (e.g. level of foreign language skills, basic/advanced computer skills/advanced computer programs)

INFORMAL REQUIREMENTS regarding professional qualifications (if the employee does not meet the formal requirements): confirmation of acquired rights to practice the profession by proving professional experience in work in the field of mechatronics in the period required by the employer (e.g. work in a technical profession was performed by candidate for at least 2 years in the last 5 years).

INFORMAL REQUIREMENTS regarding the documentation of competences to practice the profession (if the employee does not



	<p>meet the formal requirements), 1) certificates from potential employers confirming the candidate's work in a profession with a technical profile for a minimum of 2 years in the last 5 years before the date of issuing the certificate; 2) written recommendations of previous employers of the candidate applying for a position in the mechatronics profession.</p> <p>REQUIREMENTS FOR OBTAINING CAPW AFTER THE FIRST YEAR OF WORK IN MECHATRONIC PROFESSION Accession of the employee to the process of validation of the achieved learning outcomes, including:</p> <ol style="list-style-type: none"> 1. identifying by the employee (independently or with the support of a career advisor/mentor/traineeship supervisor - a mechatronics engineer with more professional experience) the learning outcomes that have been achieved; 2. documenting the achievement of selected learning outcomes by the employee (e.g. in the form of certificates, certificates of completed apprenticeships/internships, work samples, video recordings, recommendations, job description); the documentation process can be carried out independently or with the support of a career advisor/professional mentor/traineeship supervisor; 3. verification by the employer of the learning outcomes (knowledge, skills and social competences) necessary to perform simple/not very complex professional tasks in the position of mechatronics assistant/junior mechatronics technician.
<p>6. Ways to acquire CAPW</p>	<p>Ways to aquire CAPW:</p> <ol style="list-style-type: none"> 1. through formal education (school, university) - the achievement of learning outcomes is confirmed by an appropriate diploma; 2. through non-formal education - vocational training, language courses, technical and IT training and in the field of improving the soft skills (building relationships, negotiation techniques, communication techniques, marketing techniques); 3. through informal learning - self-education, acquiring knowledge and specific skills while performing professional tasks, apprenticeship and professional internships in enterprises with a technical profile; <p>assistance/support of a career counselor/other professional mentor in diagnosing the achieved learning outcomes, identifying competence gaps, ways of eliminating them, and helping the employee plan his/her own professional development.</p>
<p>7. Criteria for assessing the competencies that make up the CAPW (eg. statements illustrating the acquisition of the CAPW)</p>	<p>The verification/assessment of learning outcomes (knowledge, skills and social competences) necessary to perform simple/not very complex professional tasks at the workplace includes 6 sets of learning outcomes.</p> <p style="text-align: center;">1) The use of information and communication</p>



technology, technological processes, mechatronic systems and office work techniques to perform professional tasks

CRITERIA:

Employee

- a) can solve simple technical problems based on the knowledge of the laws of mechanics;
- b) is able to use information technologies in mechatronic applications;
- c) knows how to apply the principles of occupational health and safety in the work of a mechatronics engineer;
- d) is able to assess the usefulness of basic methods and tools for solving tasks in the field of mechatronics;
- e) operates a computer and programs used in the profession of mechatronics;
- f) operates office programs, observing the rules of professional secrecy and personal data protection;
- g) can obtain information from the Internet, databases and other sources.

2) Planning, organizing and monitoring the correct mechatronic process

CRITERIA:

Employee

- a) has the ability to design simple mechatronic systems using computer-aided design methods;
- b) applies the regulations regarding the implementation of mechatronic processes;
- c) searches the Internet for potential suppliers, subcontractors and recipients;
- d) is able to accept orders for execution, e.g. obtains information about the terms of orders proposed by clients/contractors; can choose a subcontractor.

3) Keeping records of simple/not very complex professional tasks related to the mechatronic process

CRITERIA:

Employee

- a) can develop and use documentation for simple professional tasks, e.g. quantitative data in mechatronic documentation for acquired orders, prepare a report - data summary.
- b) can, after developing the documentation of a mechatronic task, prepare a discussion of the results of this task;

4) Cooperation with clients/contractors



	<p>CRITERIA: Employee</p> <ul style="list-style-type: none"> a) Can communicate (including in a foreign language at a basic level) with clients and contractors; b) Is able to present a commercial offer to the client; c) In contacts with customers and contractors, he can use negotiation and marketing techniques. <p style="text-align: center;">5) Work organization and discipline</p> <p>CRITERIA: Employee</p> <ul style="list-style-type: none"> a) applies the rules, procedures, health and safety standards relating to the performed professional tasks; b) works individually and in a team, is able to estimate the time needed to complete the assigned task, and is able to develop and implement a work schedule that ensures meeting deadlines; c) acts in accordance with the regulations and procedures established by the employer, related to professional activities - observes the principles of work organization and discipline; d) complies with the requirements resulting from the technology; e) complies with the operating instructions for office equipment and devices; f) uses technical devices in the forwarding process in accordance with quality procedures and legal regulations. <p style="text-align: center;">6) Social competences determining the proper performance of professional tasks</p> <p>CRITERIA: Employee</p> <ul style="list-style-type: none"> a. is able to work under time pressure and cope with professional stress; b. is able to work in a team and communicate with representatives of the external environment (contractors, suppliers); c. is able to follow the received instructions, orders and follow the advice received in professional activity; d. is able to determine the foreseeable effects of his professional actions; e. is able to observe the rules of culture and ethics in professional contacts; f. is able to plan and organize their own professional development.
<p>8. Methods for assessing the competencies that make up the CAPW</p>	<ul style="list-style-type: none"> 1. Analysis of evidence and declarations (portfolio prepared by the employee); 2. Unstructured interview; 3. Theoretical test - (however, it carries the risk of excessive stress and resistance to verification in people who have achieved learning outcomes mainly outside formal education);



	<p>4. Balance of competences; 5. Observation in real/simulated workplace conditions.</p>
<p>9. Career opportunities for a person who has acquired a CAPW</p>	<p>An example of career development opportunities in the profession through the prism of the positions held: Path 1: junior automation → automation → junior constructor → head of the technology department. Path 2: electromechanical specialist → foreman of the electromechanical department → head of the department. Path 3: electromechanic → maintenance technician → maintenance specialist → senior designer Path 4: CNC operator → CNC programmer → foreman → manager.</p> <p>In the opinion of employers, within the next 5 years, new competency requirements may appear in relation to people working in the profession of a mechatronics technician. They will be related to:</p> <ul style="list-style-type: none"> – practical use of CMMS (Computerized Maintenance Management Systems) software; – implementation of industrial manipulators; – industrial networks and the use of data from the current operation of the production line (industry 4.0); – operation of the laser, welding robot.

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