Co-funded by the Erasmus+ Programme of the European Union

585336-EPP-1-2017-1-BG-EPPKA2-CBHE-JP

PROJECT

"Euro-Mongolian Cooperation for Modernisation of Engineering Education" (EU-Mong)

Learning Outcomes of Courses

Course	Knowledge	Skills	Competences
'learning outcomes' means statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence;	'knowledge' means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study.	'skills' means the ability to apply knowledge and use know-how to complete tasks and solve problems.	'competence' means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development
Curriculum "Power supply", National technical University			
Electric energy quality and application mode	Gain theory knowledge to estimate power coefficient of electric device, its decline techniques and economical consequences Study power supply quality and main factors of power techniques and gain knowledge shift to energy efficiency mode.	Able to apply techniques to increase efficiency indicator and power coefficient of supply system and estimate voltage adjustment. There for gain skills to eliminate bad effects of frequency deviation. Able to ensure sinusoidal of voltage current and to choose compensation devices. Be able to measure and analyze result of test and research works . Able to determine factors of electric energy quality effect on consumption, design optimal solution and engineering abilities to make decisions	Obtain professional ethical obligations and gain high-level communication skill. Tendency to observe how engineering solution affects electrical software and research and inclination. Define self knowledge needs and pursue self lifelong learning.
Calculation of the electroenergy supply algorithm and programme	Study mathematical techniques used in electricity calculation, develop software with advanced	Gain skill to make decision on result of computer based calculation through problem	Be able to planning and executive test and to analyze test result. Develop engineering capability to

	algorithmic language and earn ability to use object oriented program. Conduct research to determine electric production, distribution and supply with creating electrical supply simulation and earn knowledge to draw graphics.	determined in research which used probability statistic an optimization method. Be able to design regulation for electricity systems production and supply based on software of plan administration. Be able to design regulation for electricity systematical production and supply based on software of plan administration . Be able to study English which is essential for working international professionals team.	make decision , design potential solution and determine problems on electricity systems production and supply. Obtain professional ethical obligations and gain high-level communication. Tendency to observe how engineering solution affects electrical software and research and inclination to seek its improvement. Define self-knowledge needs and pursue self-lifelong learning.
Specific course of electric machinery	Gain knowledge about different types of mini electric machines, their purpose, design, working principals and physical value of parameters, correlation along with study survey method of technique and economic indicator, specification of utility.	Gain skill to working on modern automatic system through applying top information technologies rank high in the world in main factors of industrial technology, working scheme and control. Be able to develop program to optimize electric supply in industry. Be able to work with devices of high voltage breakdown, dial devices, prepare for urgent operation, execute lightning protection and grounding and measuring instruments. Be able to work with 1 and 3 phase transformer, different types of electric motors, current converter, rectifier wit semiconductor, controllers and measuring	Obtain professional ethical obligations and gain high-level communication. Tendency to observe impact of engineering solution in society, economy, nature and human life and to seek its improvement. Define self knowledge needs and pursue self lifelong learning

		instruments of electric energy parameters. Be able to learn skills to work with techniques used to convert research result, industrial process, rules to electric calculation, automatic control and check-ups. Gain skill to determine problems in energy system industry , design solution and make decision. Gain engineering skills to determine problems in electric supply system, design optimal solutions and make decisions. .	
Specific course of electric supply	Gain knowledge on increase efficiency of electric supply through mathematical method for choosing optimal power and improving power quality. Gain knowledge on selecting methods to switch on high voltage engine and automatic setting of condensation device. Study how to compensate electric current with capability of 6-10kV and improving techniques of electric energy quality. Therefore, gain knowledge of research techniques, development project and technique-economic estimation.	Able to calculate energy loss based on load probability of electric supply system and design parameters of electric system. Be able to develop program to optimize electric supply in industry. Be able to determine loss of energy, power and electric system parameter and additional loss in electric energy system. Able to estimate and increase efficiency. Be able assess theory studied in the course by on computer and able to solve the result. Be able to use English to work in international professionals team. Plan test and analyze result and data. Gain engineering skills to determine problems in electric	Obtain professional ethical obligations and gain high-level communication. Tendency to observe impact of engineering solution in society, economy, nature and human life and to seek its improvement. Define self knowledge needs and pursue self lifelong learning

		supply system, design optimal solutions and make decisions.	
Techniques to Determine Leakage Of Electric Supply System	Gain knowledge about methods to reduce loss on electric transfer and distribution network. Gain knowledge about International practical techniques on electric saving policy and principals.	Able to data required to calculate electric energy loss, analyze calculation and implement ways to define loss. Be able to estimate genuine and artificial leakage to reduce power loss in electric network and its transfer. Be able to implement methods to energy saving in home, office and public places. Basic methods to calculate maximum loss of transfer and distribution network and gain skills to estimate impact on power loss. Be able to plan and executive test and to analyze test result. Develop engineering capability to make decision , design potential solution and determine problems on electric network transfer and supply.	Obtain professional ethical obligations and gain high-level communication. Tendency to observe how engineering solution affects electrical software and research and to seek its improvement. Define self knowledge needs and pursue self lifelong learning.
Use new recourse of energy in power supply	Gain knowledge about law of energy formation from renewable energy and its accurate consumption in electric energy. Gain knowledge about selecting device which uses renewable energy, measuring, analyzing, calculating and repairing theory .	Able to assess current situation of renewable energy and use general scheme bind renewable energy to the costumers. Able to adjust new techniques and technologies that applied in solar, wind and water energy resource, estimate accurate capability and repair techniques.	Obtain professional ethical obligations and gain high-level communication. Tendency to observe impact of engineering solution in society, economy, nature and human life and to seek its improvement. Define self knowledge needs and pursue self lifelong learning.

		Be able to estimate resource reserve identified in Mongolia and able to do engineering calculation. Be able to use English to work in international professionals team. Be able to apply renewable energy in electric industry and able to plan energy system tying up with economy, nature and labor health and safety. Plan test and analyze result and data. Gain engineering skills to determine problems in renewable energy industry, design optimal solutions and make decisions. .	
Nanotechnology, materials sciences	To acquire a basic knowledge on nanoscience, nanoelectronics, nanophototonics, nanobiotechnology, nanotechnology, nanostructured materials and methods of obtaining them, as well as the tools.	To obtain a skill of developing methods, analysing and formulating the nanotechnology and nanomaterial characteristics.	Students will learn to observe and improve the way the programmes, developed in power system, affects the engineering and technological solution.
Curriculum "Technology Process and Automation", Mongolian University of Science and Technology			
Introduction of Research Methodology	After taking this course, students will explore what is a scientific research and understand different research designs as well as obtaining an in-depth understanding of various research types and the most desired research ethic.	Students will develop skills to raise research questions, and propose and test hypothesis. Students will obtain advanced skills to collect, analyze, and interpret data in both quantitative and qualitative approaches.	Students will build abilities to make useful contributions to shared knowledge of science and make innovative research findings due to their research skills, knowledge, and experience.

Patent Study	During this course, students will build an in-depth understanding of patent law concepts and its application procedure as well as social and economic effects of patents.	Student will obtain skills to successfully draft patent specifications and make patent applications.	Students will polish their abilities to successfully market their novel ideas and findings into both local and global knowledge markets.
Modelling for Engineering Science	While students are studying this course, they will discover how to apply statistics and math knowledge for engineering study or research	Students will develop skills to use various techniques to visualize data, compute probability distribution, use point and interval estimates for some typical statistical problems, and make a hypothesis test for a single sample.	Students will build abilities to make new knowledge and innovations through the effective use of their knowledge, skills, and expertise in probability and statistics.
Advanced course of PLC and microprocessor technique	After completing this course the students will understand and be able to explain circuit designing process of microprocessor and microcontroller system, programming approaches and its development procedure.	The student studies advanced skill selection, connection, installation and programming of MP and PLC system for electric energy generation, transmission, and distribution stage, control and monitoring process, technology process and industrial automation.	The student obtains practical skill that how to use a microcontroller and PLC system, how to develop, update and extend programming code, and ladder circuit.
Automatic control for Industrial process and modelling	The students will be able to explain approach of modern control systems, improved ability of calculation methods, modelling & simulation for automatic control of manufacture. After completing this course the students will understand comparison the traditional control and modern control algorithms.	The students will be able to determine relations between models of linear dynamic systems in form of differential equations, state space models, transient responses, transfer functions and frequency responses. In addition, the ability to design the control system for industrial process and perform the simulation.	Ability to solve problems modelling and simulating for control system and plant. Demonstrate how to find transfer function of plant, development of new modelling, and an understanding of the building blocks of basic and modern control systems by feedback components.
Control and data acquisition system, HMI	This course teaches structure of digital control monitoring system, to learn specific knowledge	The ability to communicate with the digital control system, to read and analyze information. Student	The course content should be taught and implemented with the aim to develop required skills in the

	hardware and software of digital control monitoring system. Communication method with the digital control system, to read and analyze information.	obtains ability that send control commands to system with information processing and analysis	students so that they are able to acquire following competency: • Configure and maintain DCS and SCADA system related to instrumentation and control for industrial automation. • The ability to communicate with the digital control system, to read and analyze information. Student obtains ability that send control commands to system with information processing and analysis.
Theory of digital automat	The student studies advanced knowledge of digital protection principles, functions, calculation parameters, and protection algorithms.	The student obtains practical skill to install the digital relays and set threshold values of protection, and to use protection software.	The student will be able to select and use the required digital protection for industrial process and power system.
Instrumentation, control and measurement	This course will introduce industrial instrumentation as used for troubleshooting, process measurements and process control. Understand the theory of measurement uncertainty, and how the theory is used in practice.	Ability to apply theoretical understanding of the measurement and instrumentation for the technological process automation.	The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of following competency: • Maintain various test and measuring instrument. • The student will have knowledge and insight into make accuracy statements for various types of measurements. Students will be able to use instrumentation and

			measurement, sensor technique for their projects.
Computer based control system	On successful completion of this course students will be able to explain and understand data transmission method and topology, system architecture, database of computer based control system. Additional able to identify and compare data transmission protocols.	Ability to select control system architecture and topology, structure, design with optimal. Solving problems of data transmission protocols that is between computer and devices.	Ability to transmit data from self-developed device to computer and solving problems of SCADA and HMI system. Student ability to independently develop modelling and design of control system.
Digital signal processing	After completing this course the students will be able to identify applications of digital signal processing and how this is used in modern equipment. In addition, the students will be able to explain advanced knowledge of digital signal classification, sampling theorem, representation of digital signal in time and frequency domain, and its analysis, and the steps of system implementation, and efficient execution.	Ability to apply theoretical understanding of Discrete Fourier transform and Fast Fourier transform and to use implementation methods. The students will be able to analyze the signal properties in the time domain and in the frequency domain and to describe the properties of digital circuits	Solve problems about practical algorithms and methods of image processing for intelligent industrial process, design for adaptive digital filter, and audio signal processing. Demonstrate how to generate basic signals, basic operation, usage and programming of FFT algorithms, development of digital filter, and an understanding of image processing application for industrial automation
Digital filter design	The student studies knowledge of digital filter design, classification, main constraints, theorethical definition, the use of schematic technical solutions and software tools for electrical system and industrial automation equipment.	The student obtains practical skill to use digital filters for digital technology equipment and automation of electrical energy production and distribution technology, control and management system, technology process, to apply microprocessor and microcontroller systems for the	The student studies development process of digital filter using microprocessor and microcontroller, hardware and software applications for digital filter design.

		removal process of noise from a signal	
Digital electronics design	Design of state machines, Mealy and Moore circuits, multiplexer based design, digital circuit designing method using different type of EDA tools, behavioral and structural design using VHDL language	Students will be able to design complex digital circuits using VHDL language based on knowledge they obtain though this course.	Students will be designing digital circuits using Xilinx ISE – VHDL tools and complete laboratory assignments and their design on Spartan 3E FPGA kit.
Advanced course of power electronics	On completion of the course, the student should be able to explain and deeply understand the static and dynamic characteristics of power semiconductor devices, working principle of Pulse-width modulation (PWM) and inverter current rectifiers. Additional able to identify by working principle and explain any kind of converter and inverter	Ability to simulate power electronic circuits using PSIM software or MATLAB/Simulink. Ability to operate and design of power semiconductor devices which are Diodes, Thyristors, BJT, MOSFET, IGBT.	Ability to simulate power electronic circuits using simulation software and prove theory. And assemble qualified control device for electrical equipment which are motor and heater etc.
Industrial robots and manipulators	After completing this course the students will be able to explain basic knowledge of industrial robotics and industrial manipulators, and its control system In addition, the students will understand the steps of robot system implementation, application software of robot modelling and simulation, kinematics and dynamic constraints of manipulators	Ability to compare the traditional control methods and modern control methods for robot manipulator Students will be able to design the robot arm, choose degree of freedom, arm type and perform the simulation	Ability to solve problems of kinematics and dynamic calculation, constraints. Demonstrate image processing algorithms of industrial robot, modelling and simulation tools of mobile robot, calculation of kinematics and dynamic for industrial manipulators. Ability to connect and install the industrial manipulators, to use and choose control system, communication interfaces, and protocols for industrial robot.

Curriculum "Electronics", National University of Mongolia			
Control System	Students who successfully complete the course will be able to: - demonstrate an understanding of the fundamentals of (feedback) control systems. - express and solve system equations in state-variable form (state variable models). - determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs. - determine the (absolute) stability of a closed-loop control system	Students who successfully complete the course will be able to: - determine and use models of physical systems in forms suitable for use in the analysis and design of control systems. - apply root-locus technique to analyze and design control systems. - write PLC program for industrial process automation. - communicate design results in written reports.	Students will be able to: - analyze existing conditions to identify the true nature of the problem and define critical issues. - obtain the configuration, specifications, and identification of the key parameters of a proposed system to meet an actual need. - design, simulate and implement a control system. - work as an effective member or leader of process control project.
3D Display	The course progresses to a detailed discussion of the five 3D technologies: stereoscopic, autostereoscopic displays, integral imaging, holography, and volumetric displays. A timely guide is provided to the present status of development in 3D display technologies.	Students from other disciplines interested in understanding the various 3D technologies. Ability to simulate and design the 3D display and to take the experiment.	Ability to understand new 3D technologies and develop new idea. Students can prove with results of simulation and experiment and present the own work.
CMOS VLSI Design	- Understand the fundamentals of CMOS VLSI technologies. - Demonstrate understanding of static and dynamic behavior of MOSFETs and the secondary effects of the MOS transistor model - Estimate MOS transistor switching time and its capacitance	- Solve problems in the design of CMOS logic circuits, with particular reference to speed and power consumption. - Acquire hands-on skills of using CAD tools in VLSI design. - Appreciate the design process in VLSI through a mini-project on the	- Complete a report on laboratory experiments and mini projects - Asses the relative advantages/disadvantages of new modeling and simulation tools - Develop abilities to find and locate required information and use information resources

	- Understand the concept behind ASIC (Application Specific Integrated Circuits) design and the different implementation approaches used in industry	design of a CMOS sub-system. - Apply Power reduction techniques possible at circuit , logic level - Analyze Clock as a major source of power dissipation and distinguish various methods to reduce it	
Solid State Electronics	- Analyse of thermal and electrical properties of solid materials from view of band-structure - Explain non-equilibrium processes of charge carriers in semiconductors - Explain processes in basic elements of solid state electronic - Demonstrate understanding of key concepts involved in semiconductor device operation and thier characterictics - Predict influence of semiconductor proterries on device design variations	- Develop analytical approaches to understanding semiconductor devices - Undertake on-line virtual laboratory experiments - Application of systematic engineering synthesis and design processes - Apply appropriate techniques to solve semiconductor device problems	- Complete a report on laboratory experiments and mini projects - Asses the relative advantages/disadvantages of new modeling and simulation tools - Develop abilities to find and locate required information and use information resources
Sensor technology	Students who successfully complete the course will be able to: - attain a broad familiarity with many different sensors, emerging applications and technologies - provide sensing principles for displacement, force, pressure, acceleration, temperature, optical radiation, nuclear radiation - understand and explain the common circuits for calibrating and conditioning sensor signals to improve their performance	Students will be able to: - develop judgment of what sensors and modalities are appropriate for different applications - explain the physics of transduction mechanisms, interpret a spec sheet.	Studens will be able to: - analyze and interpret sensor output data and propose a sensor system design to solve a problem. - apply sensor technologies to solve environmental problem.

Image Processing and Pattern Recognition	Students are able - To understand the fundamentals of image formation. - To understand the major ideas, methods, and techniques of image processing - To identify and describe operation of different filters, feature extraction and classification, clustering methods. - To identify different pattern recognition methods by reading papers	Students are able - To analyze the different segmentation techniques - To apply different de-noising models to recover original image. - To identify and apply relevant problem-solving methodologies - To implement and test solutions	Students are able - To apply different pattern recognition methods in problem areas. - To communicate effectively in ways appropriate to the discipline, audience and purpose - To work as an effective member or leader of diverse teams within a multilevel, multidisciplinary and multicultural setting - To do research works to use those methods into own thesis.
Artificial Intelligence and Machine Learning	The student should be able to: - Explain different types of intelligence - Verify different machine learning techniques - The principles, design, implementation and validation of learning systems	Students will be able to design and conduct original research in machine learning. Students will also be able to apply machine learning techniques in solving real-life problems.	The students will be familiar with the use of artificial intelligence and machine learning techniques. Students will be able to present their work in a scientific way by written report and oral presentation.
Smart Device Programming	The student should be able to: - Understand difference between smart device and PC - Explain android based programming concepts - Controlling the different type of sensors - Verify different type of programming methods - Design and implement mobile or smart device application	Students will be able to design and conduct android application. Students will also be able to implement real-life applications used Android core component libraries, sensors, connectivity, graphics, audio, video and camera	The students will be familiar with the use android development environment, libraries, operating system and smart device. Students will be able to deploy their application to Playstore
Safety Engineering	Students are able - to understand and implement	Engineering skills are reinforced by requiring	The subject offers more sophisticated hazard and risk

	following knowledges on regulatory and professional aspects of occupational safety - To provide principles and theory of hazard - To assess qualitative hazard of equipment and technologies, - To understand and explain on the influence of risk on the environment.	students to apply basic engineering principles to safety related problems	assessment tools necessary for the elaboration of accident plans and the investigation of accidents
Courses, contribution of Technical University of Sofia to the curricula of Mongolian universities			
CMOS VLSI Design (NUM) - Design of Nanoscale MOS ICs (TUS)	The students will be able to identify the devices in a CMOS integrated circuit layout, to discuss the basic technology processes, to explain the principles of IC design and modelling and specific physical effects in short channel transistors.	Ability to design submicron CMOS ICs using CADENCE and MicroWind and solving problems with modelling of submicron devices behaviour.	Demonstrate innovation, autonomy, scholarly to the development of new modelling and design rules at the forefront of work or study contexts including research in nanoelectronics design.
Digital electronic design using VHDL (MUST and TUS)	After completing this course the students will understand and be able to explain the structure, syntax and behaviour of the VHDL language	Ability to apply the theoretic concepts to the design and implementation of novel digital devices and use modern development tools to design complex digital circuits.	Ability to manage the design of digital electronic devices and to apply the innovative approaches to the study of a not standard solution for the realisation of new digital circuits.
Nanotechnology, material science (NTU and TUS)	Advanced knowledge of a field of materials for nanoelectronics and their use in nanodevices fabrication, involving a critical understanding of theories and principles of their physical and chemical properties.	Advanced skills, demonstrating mastery and innovation in the use of new materials for the fabrication of new submicronic devices.	Manage complex technical and professional activities and projects in using new materials for nanoelectronics.

Courses, contribution of Institut national d'énergie solaire to the curricula of Mongolian universities			
Energy efficiency. Airtightness. Positive energy building	Gaining a good understanding of the energy efficiency of buildings	Ability to calculate the thermal load of a building and the airtightness. Planning the basic order of magnitudes of the energy consumption reduction when insulating the facades	Managing the design for a positive energy building Be able to train employees to implement on site the selected insulation material
Solar resource	Origin of solar resource Solar potential Components of solar irradiation	Ability to understand the solar variation on a map and the sun path depending on the latitude	Manage a project on the solar resource in the world
Fundamentals of photovoltaics. Solar photovoltaic technologies. Solar photovoltaic applications	Understanding of the photovoltaic sector : technology, formalities, tenders and all the applications	Ability to compare different technologies. Ability to design and to scale a solar installation	Coordinating a photovoltaic project
Silicon homojonction solar cells	Understanding the fundamentals and principle of photovoltaic cell	Ability to understand the process of the silicon homojonction solar cells	Project in advanced technologies and the roadmap
Courses, contribution of Politecnico di Torino to the curricula of Mongolian universities			
Electrical Machines	Know the principles of main electro-mechanical equipment and electrical machinery used in industry. Know the criteria for use and application fields of the electrical machinery	Ability to analyze and evaluate the performance of electric machines	Make the choice of the appropriate electrical equipment to be included in mechanical systems
Electric plant design	Know the professional aspects concerning electrical plant design and multi-disciplinary integrated design Know the design solutions for	Identify the design objectives and to translate the operating choices into specific documents (technical reports, schemes and drawings, economic assessments).	Interpret and apply legislative documents and standards.

	electrical plants in ordinary environments.		
Electrical Systems	Understand and interpret the structure and operation of electrical installations in High Voltage, Medium Voltage and Low Voltage systems analyze three phase systems, in normal state and after fault	Model the main components to study the operating conditions in normal state and after faults Select protection systems against overcurrents and overvoltages Interpret and apply the concepts referred to safety and the related standards and regulatory documents;	Apply the basic concepts of the design of user power plants, with ability to define basic scheme, to size the components in function of operating requirements and of the possible occurrence of anomalous events (short circuits and overvoltages), to identify the protections types and settings applying the relevant standards.
Power Generation from Renewable Sources	At the end of the course the students will know the main technologies about the photovoltaic generators and wind turbines (including general aspects of power electronics),	Students will be able to calculate the productivity and to correctly design the main components of these power systems.	
Courses, contribution of Technical University Berlin to the curricula of Mongolian universities			
Effective communication with groups and presentation techniques	Advanced knowledge in the field of communication and presentation, involving deep understanding of varied presentation techniques	Students will be able to: - improve their verbal & non-verbal communication skills to enable them for an effective communication with groups -identify ways that communication can happen and barriers to communication & how to overcome them -to not only listen actively but also effectively, use I-messages, use the STAR method to speak on the spot and use appreciative inquiry as a communication tool	Demonstration of advanced ability to use different presentation techniques. Ability to describe how video and audio enhance a presentation and list criteria for determining what types to use. Develop and use flip charts with colour; create targeted PowerPoint presentations, utilize white boarding for reinforcement.

Project management	Advanced knowledge in the field of Project Management. Ability to define projects, project management, project managers and identify the importance of the PMBOK and PMI.	Ability to perform a project needs assessment and write goals, requirements, and deliverables; Create key project documents and project planning documents, Build a project schedule by estimating time, costs, and resources; Understand and use the work breakdown structure.	Demonstration of the advanced ability to use planning tools, including the gantt chart, network diagram, and RACI chart. In addition, the knowledge how to establish and use baselines, monitor and maintain the project. As well as the ability to perform basic management tasks, including leading status meetings and ensuring all documents are complete at the end of the project.
Survival in labour market	Advanced knowledge in the field of survival in labour market involving solid understanding of the benefits of Six Sigma, such as improved processes, greater productivity, reduced operating costs, greater throughput and improved quality.	Ability in understanding the importance of interpersonal skills, such as communication, in the business world and how to make the right decision for an organization (of any size). Additionally, the ability to define success in labour market and identify the importance of the Six Sigma methodology.	Advanced ability of selecting the suitable strategies for survival in labour market. Demonstration of advanced ability in performing management tasks such as the writing of required documents and use project management techniques presented in the course.

Definitions
For the purposes of the RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning, the definitions which apply are the following:
(a) 'qualification' means a formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards;
(f) 'learning outcomes' means statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence;
(g) 'knowledge' means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual;
(h) 'skills' means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments);
(i) 'competence' means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy.