Topic № 7
INNOVATIONS IN TEXTILE EDUCATION


ТЕХНИЧЕСКИ УНИВЕРСИТЕТ
СОФИЯ


ПРОФЕСИОНАЛНА ГИМНАЗИЯ ПО ТЕКСТИЛ И ОБЛЕКЛО
ДОБРИ ЖЕЛЯЗКОВ


ЮГОЗАПАДЕН
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MODERN LEARNING ENVIRONMENT FOR THE TEXTILE AND CLOTHING STUDENTS AT ITM, TU DRESDEN

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Technische Universit?t Dresden (TU Dresden) dates back to 1828 when the 'Saxon Technical School' was established in Dresden, and is one of the eleven German Universities distinguished as an "Excellence University". The Institute of Textile Machinery and High Performance Materials Technology (ITM) at TU Dresden is one of the leading educational and research institutes in the world focusing mainly on the world's leading textile machinery manufacturers in Germany and the processing of textile high performance materials for technical applications.

Technical Textiles are ubiquitous, and Germany is the global leader for their production. Engineers working in the textile industries not only design fashionable textiles for clothes brands, but high-tech products with a focus on functionality. Their work is often invisible, but all the more important from a technical perspective. The applications are diverse, ranging from fiber composite materials and medical textiles to textile architecture and membrane constructions. Textile machines manufacturing functional and high performance textiles are high-tech mechatronic devices, able to control large set of process parameters and to perform complex programmed sequences. Their scale may vary, such as for micro machines for assembling of medical devices to very large, several dozens of meters machines for producing textiles for architecture, agriculture and other applications. In large scale manufacturing, different process stages are connected in series for seamless process flow.

Therefore, another important aspect of the work at ITM is to provide industry-related education programs. The main teaching task of the ITM is the preparation of the future specialists for the textile and clothing industry, covering all levels - traditional in Germany Dipl.-Ing, Masters, and doctorate studies. The ITM provides excellent facilities for performing the fundamental research as well as research projects with industrial partners. The interdisciplinary collaboration with national and international versatile research institutes as well as industrial partners helps to transfer the research results into applied outcomes. ITM provides its student excellent opportunity for training and education in an unmatched interdisciplinary study environment, with possibilities to specialize in mechanical engineering, assembly technology, material modelling, smart textiles, sports and functional textiles, protective clothing, lightweight construction, measuring and sensing technology, machine development or bio-medical technology and many more. There are nearly 100 research associates working in ITM in various research groups. These research groups work independently as well as work together for interdisciplinary research on pure fundamental research as well as on industry driven applied projects.

For students with an undergraduate degree, the ITM offers a four-semester graduate Master program in Textile and Clothing Technology. Students with their bachelors or higher degrees in textile engineering, mechanical engineering, chemical engineering or industrial engineering are eligible for this study. Successful participants are awarded a Master of Science degree. The interdisciplinary study opportunities for students from other disciplines of TU Dresden as well as other universities within the framework of general studies, special lectures, seminars, assignments, graduate or master thesis, as well as exchange of students on ERASMUS + or E-team programs are also carried out. Fully funded scholarships are offered by the German Academic Exchange Service (DAAD) for the applicants from

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developing countries for the study in the Master course Textile and Ready-made Clothing Technology at ITM.

This paper will give an overview of the modern teaching methods with application of CAD systems, modern e-learning platforms and practical use of the textile and sewing machines, applied during the master course.

Keywords: TU Dresden, ITM, Textile and Clothing, study, research

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ANTHROPOGENIC INNOVATION IN VOCATIONAL TRAINING ON WEAVING TECHNIQUES

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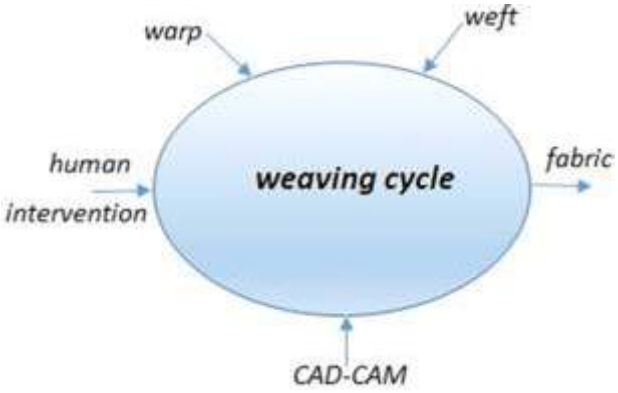
Everywhere in the modern world, education and training in the field of textiles and clothing are meeting with unspoken public resistance. The visible part of this negative attitude is the low willingness of young people to pursue these professions and the corresponding small number of students in vocational schools, colleges and universities. This issue is of enormous scope and affects almost every direction in the life of the modern man. Weaving technique as a craft is a typical example in this regard. The peculiarity of the weaving most shortly and clearly is reflecting in the generally accepted definition of fabric: the mutual perpendicular intersection of two systems of threads - the warp and the weft. This entails two basic concepts - threads motions and the weaving cycle. The warp threads make two movements: vertically when the weaving mouth is formed and horizontally when the warp is unwinding and the fabric is winding. The wefts also make two horizontal movements: transversal to the warp when the weft is woven into the weaving mouth and longitudinally to the warp when the weft is inserted at the end of the fabric. The weaving cycle unites the disjointed movements of the working bodies that control the warp and weft threads. One cycle involves the weaving of one weft of fabric. Human involvement in weaving goes in two directions: physical intervention and observation. The intersection of the warp threads and wefts was originally carried out entirely and solely with the help of the limbs of the human body. Even so far, some civilization reserves have shown primordial weaving techniques. Human involvement in the weaving cycle is limited in the formation of the weaving mouth, the passage and the weaving of the weft. The observation applies the basic senses such as sight and touch. Visual control maintains the correctness of the weave, and the groove maintains the tension of the warp threads and the uniformity of the fabric. Compulsory human intervention is reducing to three movements: formation of the weaving mouth, insertion and beating the weft. An independent operator can maintain all other parameters of the weaving cycle. From this point of view, the functions and service of the modern hand loom focus on the possibility of direct human involvement in the weaving cycle. Other functions, such as heddle frame alignment, warp tension, and even regularly pulling of the fabric, are assigned to a parallel automatic control system. The wooden structure of the handloom implies the initial origin of the weaving and creates the necessary cosiness to focus on the meaning of the intersection. The industrial nature and cost-effectiveness of weaving as a technology remain secondary. The weaver focuses on the creative conception of the intersection and the artistic combination between the weaving threads. The combined action of a handloom and the computer management of secondary functions support the author's freedom in the weaving project and the ability to obtain fabric with practical application.



Keywords: hand loom weaving, vocational education.

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FORMATION OF TWILL WEAVE WITH TWO PAIRS OF INTERCONNECTED HEDDLE FRAMES

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The weaving cycle for making a weft involves three basic actions that begin with the opening of the shed, promotion the weft by the shuttle and beating-up the weft to the end of the fabric through the reed brought by the batten. For industrial weaving machines, the longitudinal displacement of the warp is achieved within the weaving cycle by unwinding the weaving warp and pulling the raw fabric from the work area. It is common knowledge that, regardless of the number of suspended shed frames - heddles, when they are paired with a roller coil, half the frames are always up and others down. This means that only weaves whose weft rapport is equal to and multiple of 2: plain weave, reps and panama can be played. Then how do we get uni-faces twill 2/2? The answer to this question is related to the seemingly unstable and flexible construction of the old wooden loom. Simultaneously pushing down two adjacent pedals is sufficient to remove two adjacent warp threads that are threaded into a pair of paired frames. The wooden structure of the loom allows deformation of the frame supports and the corresponding main filaments remain in the lower tissue mouth and the rest in the upper. All of this is essential in preserving and reproducing wooden weaving looms for hand horizontal weaving.

What is the appeal of handmade or artistic weaving? What is the difference between handloom and artistic weaving? The only technique available in which a person can directly, with a touch of the raw material, convert threads into fabric. And to date, only woven fabric can meet everyday needs such as clothing and household furnishings. At the same time, hand weaving is the only opportunity for a person to carry out his own artistic project directly and cheaply. To express his personality as skills and aesthetics. As a fabric drawing, as a combination of fibrous materials and as a colour variety. The major problem in this case is the lack of proper weaving equipment. Generally, old looms are available. The mandatory accessory equipment is missing. These are nibbles, shuttles, drones, hills, snowdrifts, etc. Old weaving looms are not only depreciated and damaged by the weather and the tree eater.

They were manufactured using woodworking technology from the mid-19th century. These looms are cumbersome and it would be difficult for a modern man to devote himself to working life or to secure his livelihood. The maintenance of these looms is accompanied by unnecessary effort and low productivity. Also, ordinary wooden looms have 2 or 4 heddles. Those with 4 frames, on the other hand, use interdependent controls and can perform plain weave or twill 2/2 as a special variety. These looms are generally intended only for plain weave fabrics, which limits the possibilities for creative idea / activity.

Keywords: hand weaving loom, textile craft, shed formation, vocational education.

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