Doc. 300.1.1

Date: 13 May 2022

External Evaluation Report

(Conventional-face-to-face programme of study)

- Educational Institution:
  Post-secondary Institutes of Vocational Education and Training (PSIVET) - Larnaca
- Town: **Larnaca, Cyprus**
- School/Faculty (if applicable): **n/a**
- Department/ Sector: **n/a**
- Programme of study- Name (Duration, ECTS, Cycle)
  In Greek:

  Τεχνολογία CNC - Ξυλουργική Βιομηχανία (2 έτη, 120 ECTS, Diploma)

  In English:

  CNC Technology - Woodworking Industry (2 years, 120 ECTS, Diploma)
- Language of instruction:
  Greek
- Programme's status: **Running**
- Concentrations (if any): **n/a**

The present document has been prepared within the framework of the authority and competencies of the Cyprus Agency of Quality Assurance and Accreditation in Higher Education, according to the provisions of the "Quality Assurance and Accreditation of Higher Education and the Establishment and Operation of an Agency on Related Matters Laws" of 2015 to 2021 [L.136(I)/2015 – L.132(I)/2021].

A. Introduction

The External Evaluation Committee (EEC) had the opportunity to study all the materials which were provided, that is:

- application for the re-evaluation and certification of the Programme of Study (PS)
- guidelines for the EEC members, and
- evaluation template document 300.1.1

The EEC visited the premises and the facilities of the Technical School of Larnaca (TSL) on Wednesday, 11 May 2022. The visit covered all the installations relevant to the Programme of Study, including laboratories. The visit lasted from 10:00 am to 16:00 pm, including a 30 min lunch break, in which the three members of the EEC and Mr. Konstantinou of DIPAE shared all together.

The visit included extensive discussions and opinion exchanges among the members of the EEC and the following parties:

- Dr. E. Margadjis, General Manager MIEEK
- Mr. K. Kyriakou, Coordinator MIEEK
- Mr. P. Zacharoplastis, Quality Assurance Officer MIEEK
- Mr. A. Costeas, Manager MIEEK Larnaca
- Mr. M. Michaelides, Assistant Manager MIEEK Larnaca
- Mr. S. Sofocleous, Coordinator of the Programme Study (PS).

The agenda of the visit included the following items:
- Meeting with the Managers and Officers, as well as with the Programme Coordinator.
- Short presentation of the School structure.
- The PS standards, admission criteria for new students, the learning outcomes and ECTS.
- The teaching and other personnel involved in the development of the Programme Study.

The visit also included a meeting of the EEC with several members of the teaching staff (Mr. Elias Skordis, Mr. Andreas Michail, Mr. Panos Epameidonda, Mr. Andreas Palou), and discussion on each course of study (teachers' CVs, course contents, implementation, methodologies, learning outcomes, course assessment).

Also, the EEC members held a meeting with five graduates and one active student of the present PS, as well as with members of the administrative staff of the MIEEK. It was finally concluded with a meeting of the EEC with the Head of the relevant Department and the Programme Coordinator (exit discussion: questions, clarifications). In addition, the EEC requested plenty of materials of the PS; in the following day, the Coordinator Mr. S. Sofocleous provided them all to the EEC.

The entire EEC mission was fully supported by Mr. Kostas Konstantinou, DIPAE Officer.

B. External Evaluation Committee (EEC)

Name	Position	University
Prof. George I. MANTANIS	Chairperson	University of Thessaly
Prof. Sotirios KARASTERGIOU	Member	University of Thessaly
Prof. Georgios CHAMILOTHORIS	Member	University of West Attica
Student George Christodoulou	Member	Open University Cyprus

C. Guidelines on content and structure of the report

- The external evaluation report follows the structure of assessment areas.

- At the beginning of each assessment area there is a box presenting:
  (a) sub-areas
  (b) standards which are relevant to the European Standards and Guidelines (ESG)
  (c) some questions that EEC may find useful.

- The questions aim at facilitating the understanding of each assessment area and at illustrating the range of topics covered by the standards.

- Under each assessment area, it is important to provide information regarding the compliance with the requirements of each sub-area. In particular, the following must be included:

  Findings

  A short description of the situation in the Higher Education Institution (HEI), based on elements from the application for external evaluation and on findings from the onsite visit.

  Strengths

  A list of strengths, e.g. examples of good practices, achievements, innovative solutions etc.

  Areas of improvement and recommendations

  A list of problem areas to be dealt with, followed by or linked to the recommendations of how to improve the situation.

- The EEC should state the compliance for each sub-area (Non-compliant, Partially compliant, Compliant), which must be in agreement with everything stated in the report. It is pointed out that, in the case of standards that cannot be applied due to the status of the HEI and/or of the programme of study, N/A (= Not Applicable) should be noted.

- The EEC should state the conclusions and final remarks regarding the programme of study as a whole.

- **The report may also address other issues which the EEC finds relevant.**

1. Study programme and study programme's design and development

Sub-areas

- **1.1 Policy for quality assurance**
- **1.2 Design, approval, on-going monitoring and review**
- **1.3 Public information**
- **1.4 Information management**

1.1 Policy for quality assurance

The Programme of Study (PS) was created in application of the joint Decision no. 73.215/28-02-2012 taken by the Council of Ministers concerning the establishment of the Post-secondary Institutes of Vocational Education and Training (MIEEK). Starting in the academic year 2016-2017, the PS was formally accredited and applied on an annual basis.

The policy for quality assurance forms an integral part of the PS. The policy is described in a comprehensive *Quality Assurance Manual* (Εγχειρίδιο Διασφάλισης Ποιότητας) of the MIEEK which formalizes all aspects of the organization and operations for quality assurance. The manual is publicly available and includes clear and detailed descriptions of processes relevant to the quality assurance function, and the roles of teaching staff, administrative staff and students regarding quality assurance. The manual also describes measures to inform and preserve academic standards of the PS, and states the ethical codes governing the PS, including a clear policy of non-discrimination and mutual respect within and beyond the MIEEK community. Based on the documentation and the on-site visit, it is clear that the key instrument for the application of the quality assurance processes, the Internal Quality Board, operates effectively at the level of the MIEEK of Larnaca in coordination with a Central Quality Board of the MIEEKs.

1.2 Design, approval, on-going monitoring and review

Overall, Programme of Studies is logically structured and corresponds to the learning objectives, in terms of content, articulation, workload and methods. The procedures for shaping, assessment and review of the PS are implemented according to the provisions of the Quality Assurance Manual. At the level of the MIEEK, the main instrument for monitoring the PS is the Programme Board, chaired by the Programme's Academic Coordinator and comprising the Local Coordinator of the PS, members of the teaching staff and also an elected representative of the current student cohort. Particular aspects of

Strengths

Very efficient flow of information between stakeholders, supported by continuous and strong interaction between administrators, teachers, students, graduates and industry professionals.

Areas of improvement and recommendations

Informed by rich interaction with relevant stakeholders, the present Programme of Study aligns well with the present situation in the machining and woodworking industry in Cyprus, on one hand, and with real-life employment aspirations and perspectives of secondary education graduates, on the other. However, the sector continues to undergo changes, chiefly driven by the need to respond to competitive challenges. Such challenges appear at several levels: technology, organization, distribution, business paradigm, marketing methods and more. In anticipation of these changes, it is advisable for the Programme of Study to gradually adapt towards achieving maximum competitiveness, along the directions mentioned in the concluding remarks of the EEC report.

Sub-area		Non-compliant/ Partially Compliant/Compliant
1.1	Policy for quality assurance	***Compliant***
1.2	Design, approval, on-going monitoring and review	***Partially compliant***
1.3	Public information	***Compliant***
1.4	Information management	***Compliant***

2. Student – centred learning, teaching and assessment

Sub-areas

2.1 Process of teaching and learning and student-centred teaching methodology

2.2 Practical training

2.3 Student assessment

2.1 Process of teaching and learning and student-centred teaching methodology

PS includes project-based learning, evening classes for workers, live contact with students from other courses of life, contact with professionally active teachers. Provides opportunities for career development. Specifically, PS involves courses with theoretical (lectures) and practical (laboratory) approach. Students firstly receive the theoretical approach of the objects of each lesson and later acquire the practical knowledge in the laboratories with project assignment.

Teaching is conducted every working day during afternoon hours with live contact with students. This timetable facilitates students to work in morning time. Lectures take place in a public educational building in the city of Larnaca, which is in a central point in Cyprus (about 50 Km away from the capital Nicosia and the port of Limassol). PS attracts considerable part-time teachers with special capabilities from the Cypriot job market.

Adequate different modes of delivery: lectures, laboratory practice, individual and group coursework. Projects shaped together with individual students. It is reported that in several cases, the topics of individual projects (coursework) are shaped jointly by the student and the teacher, with a view to bring the project closer to the interests and experiences of the student. This is a commendable practice, and should be expanded.

Excursions and visits to industrial establishments, on-going projects, and exposure of students to real-life work activities are an important part of the training. They can contribute greatly in shaping the student's appreciation of professional and entrepreneurial outlets offered by the programme. Where appropriate, it is recommended to dedicate one such session in the schedule of the course. In a similar vein, participation of student in sector-relevant presentations, seminars, exhibitions etc. events for professionals and practitioners is a practice to be encouraged.

Adequate teaching equipment. Conventional and digital (CNC) equipment. Relatively modern laboratory equipment corresponds to the current industrial practice, appropriate software and workflow approaches. Specifically, PS disposes adequate laboratory settings, capable to support the practical objectives-needs. Labs are equipped with conventional (classic) and modern machines. 3-axis router, CNC lathe and laser cutting are the basic machines that introduce students into modern technologies. The combination of conventional and modern

equipment provides complete knowledge in practical level to the students. Also, computer rooms with special software are available to the students for the accomplishment of PS's objectives in digital design (CAD lessons).

Teacher-learner relations appear balanced, considering the small number of students and frequent interaction, particularly during laboratory practice. Students are encouraged by the teachers to take an active role in creating the learning process during laboratory practice. Students in the laboratory projects have the opportunity to see the final result of their work, and under teacher's guidance, can suggest revisions – upgrades. Generally, the educational 'environment' is amiable making students more creative. Student complaints are handled by the PS Coordinator, MIEEK Director.

2.2 Practical training

Practical training (PT) in relevant industrial setting, mostly woodworking, for a total of 12 ECTS (10% of the total). PT is accomplished in two six-week periods, one at the end of each year.

PT in relevant industrial setting provides students with specialized practical knowledge and skills, under real working conditions. In this way, students prepare their selves for a smooth transition to the employment market, consolidate and put into action the received from the PS knowledge, and sub served to improve their business conscience.

Students PT accomplished in Cypriot enterprises in the woodworking and furniture sectors. Enterprises come in contact with the Supervisor of the PS and express their desire to employ students for PT. A dynamic list of enterprises for PT is available for all students, via PS webpage. Generally, there is a strong demand by companies for trainees.

Placement of students in enterprises for PT is accomplished by PT inspector in agreement with the student and the enterprise's director. Students record objects of occupation in daily basis in a special "Manual of Practical Training". PT is inspected by a PT supervisor during the entire period time.

2.3 Student assessment

Students are obliged to participate at least the 80% of the accomplished teaching hours. In the case that a student attends less than 80% of the accomplished teaching hours, he obtains a "Transcript' and not the qualified 'Diploma'.

Each and every course assessed through four components: participation (contributes 10% of overall mark, if the student is present at 85% of the teaching hours)), continuous evaluation (20%), mid-term assessment (30%), and final assessment (40%). Assessment is transparent and supports the development of the learner. Criteria for the method of assessment are published in advance, so students know from the beginning of each semester the way of assessment.

In case that a student be of the opinion that outcome markings during assessment disserve his performance, he behaves the right to express an objection. First he has to discuss with the examiner of the specific lesson about his marking results and if his disagreement continuous to exist, submit his objection to the Supervisor of PS and the council of the PS adjudicate definitely.

Findings

Adequate and appropriate all the facilities, lectures, laboratories, equipment, teaching process, and assessment methods.

Strengths

Small number of students, high teacher to student ratio. Evening classes. Space and facilities with potential to expand installations, host new equipment. Access to professionally active teachers to bring in industry-relevant practices. Student assessment is appropriate and transparent. Strong, continuous offer of trainee positions by SMEs woodworking and machine shops.

Areas of improvement and recommendations

More individual projects, shaped with the student. More industry visits / excursions. Include presentations and seminars from industry and technical experts. Extend and organise practice training. Create open show-room displaying of students projects, create incentives e.g. selected projects participate in industry events, participate in design contests. Introduce career days.

Sub-area		Non-compliant/ Partially Compliant/Compliant
2.1	Process of teaching and learning and student-centred teaching methodology	***Partially compliant***
2.2	Practical training	***Compliant***
2.3	Student assessment	***Compliant***

3. Teaching staff

Sub-areas

3.1Teaching staff recruitment and development
3.2 Teaching staff number and status
3.3 Synergies of teaching and research

3.1 Teaching staff recruitment and development

Generally, the PS Coordinator has a key role for staffing lessons with appropriate specializations. National call for expression of interest by the potential applicants publicized in the press and posted on the Internet by the Ministry of Education. Every candidate teacher can easily be informed about the overall transparent procedure.

Each position concerns a particular course. In this way the most experienced applicants from Cyprus can be attracted. Applicants submit academic qualifications, teaching experience, professional experience, research and development work, relevant consulting services, professional achievements. Submission accomplished to the Ministry of Education.

Detailed guidelines for recruitment of teachers are easy accessible to the applicants. The evaluation of applications uses a grading system with clearly stated and applied criteria. Teaching staff is contracted for a three-year period. New teachers participate in an adult education seminar.

In some cases, positions for Laboratory Technical Staff (e.g. carpenters, cabinet-makers, wood-working practitioners) left empty. This impacts the delivery of the practice-based courses. In these types of courses the presence of technical staff is necessary for the success completion of the projects and the connection of the theoretical part of the lesson with the practical (laboratory).

According to the Cypriot regulations, visiting teaching staff does not include in the teaching staff.

Students participate in the evaluation of teacher's efficiency in every course. Evaluation is based on an official questionnaire and accomplished anonymously by the students. Besides teaching staff, students evaluate the courses and the management of PS.

3.2 Teaching staff number and status

Teaching includes two members of permanent staff and nine part-time members of visiting staff on three-year contracts. The teaching staff covers adequately the entirety of the courses of the Programme of Study.

Some members of part-time teaching staff spend additional time to commute between Larnaca and their living place.

Meetings between individual teaching staff and the Supervisor of the PS can take place every working afternoon. The Supervisor is always present (every afternoon) during conduction of courses. Meeting of all staff accomplished on-line (via internet special platforms, e.g. MS-Teams).

3.3 Synergies of teaching and research

This is a EQF Level 5 Programme of Studies, not organically related to research. Contact with sector innovations are kept through the active participation of most teachers in industrial practice.

The teaching staff publications are within discipline. Also, there exists a dynamic internal process for developing teaching skills.

Findings

Transparent and appropriate system for selection of educators. Adequate staff in number and qualifications. Professional engaged teachers and evening hours creates difficulties in coordination between teachers. Selection criteria for technical laboratory staff can lead to empty positions (no eligible applicants). Some members of visiting staff spend additional time to commute between Larnaca and their living place. This may create a negative financial motive and may discourage experienced qualified professionals active in the woodworking industry.

Strengths

Appropriate teachers as they combine academic qualifications with professional experience and practice.

Areas of improvement and recommendations

Investigate and develop ways to avoid empty positions of technical laboratory staff (e.g. relax selection criteria, use a cascade evaluation system). Research ways to introduce financial motives to cover transport costs for off-city teaching staff. Generally, a higher salary- reward for part-time teachers, could attract more and highly experienced staff.

Sub-area		Non-compliant/ Partially Compliant/Compliant
3.1	Teaching staff recruitment and development	***Partially Compliant***
3.2	Teaching staff number and status	***Compliant***
3.3	Synergies of teaching and research	***Compliant***

4. Student admission, progression, recognition and certification

Sub-areas

4.1 Student admission, processes and criteria
4.2 Student progression
4.3 Student recognition
4.4 Student certification

4.1 Student admission, processes and criteria

Open calls for student candidatures are published yearly in the press and on the Internet. The call states clearly the overall access policy, the preconditions and criteria for admission, and the procedures for the submission and evaluation of applications. Applications are accepted within an eight week period (typically spanning June and July). The instructions for applicants are published at the beginning of this period (6 June 2022 for entrants in the forthcoming study year).

4.2 Student progression

A comprehensive system for recording and monitoring student progression is in place. It is based on paper and electronic means, on one hand, and on exchanges between teachers, in both formal and casual context. The system operates efficiently. Related action (e.g. in the case of a student's performance dropping, or failing to take off) is timely, focused and includes addressing the issues in face-to-face discussion with the student and or teachers. Again, this high level of responsiveness is facilitated by the low number of students, the close style of interaction, and the didactic and professional experience of administrators and teachers.

4.3 Student recognition

The procedures and regulations for student recognition are well-defined and adequately published. Methods to assess and calculate student credits are compliant with the European Credit Transfer System. Completion of the Programme of Study provides a total of 120 ECTS units, corresponding to European Qualifications Framework level 5.

4.4 Student certification

Graduates of the Programme of Study receive the Higher Education (MIEEK) Title of Studies in "Computer Numerical Control - Woodworking Industry". The Title of Studies is

certified by the Cyprus Agency of Quality Assurance and Accreditation in Higher Education (ΔΙΠΑΕ) and recognised by the Cyprus Board for the Recognition of Higher Education Qualifications (ΚΥΣΑΤΣ).

Findings

Based on the documentation and on the on-site visit, the processes and conditions for the admission of students, the monitoring student progress and the recognition of title obtained are clearly defined and publicly available.

Strengths

The structures of the Programme of Studies display a high degree of responsiveness in monitoring and reacting to the students' progress (or lack thereof).

Areas of improvement and recommendations

Publishing the criteria from admission sometime ahead of the start of the application period would improve the exposure and attractiveness of the programme to potential students.

Sub-area		Non-compliant/ Partially Compliant/Compliant
4.1	Student admission, processes and criteria	***Compliant***
4.2	Student progression	***Compliant***
4.3	Student recognition	***Compliant***
4.4	Student certification	***Compliant***

5. Learning resources and student support

Sub-areas

5.1 Teaching and learning resources
5.2 Physical resources
5.3 Human support resources
5.4 Student support

5.1 Teaching and learning resources

The present teaching and learning resources are well adequate, easily accessible, and all fit for the purpose of courses. The PS can also accommodate a slight increase in the number of enrolling students.

Where appropriate, flexible approaches to learning are to be implemented, e.g. to carry out more individual (technical) projects for the students. This can be very beneficial.

The current, ongoing programme, definitely, corresponds to the requirements of the Cypriot wood-working enterprises, present and future. It may be extended to other types of enterprises as well; for instance, in aluminum-working small enterprises, or even construction companies which utilize HPL or WPC products, which mostly use CNC machinery in their production. This will further increase the potential of the graduates.

In addition, the present programme has the unique advantage, that is, it is the only one of its kind in Cyprus.

Because the EEC sees this as a dynamic (learning) process, specific suggestions (please review the Annexes) can be realized in the forthcoming 3-4 years in the programme, to make it even more valuable, simultaneously being adapted to the changing circumstances (e.g., rapid developments in the technology of CNC equipment).

It seems that the teaching materials are readily available to the students, via several ways, for example, by the teaching staff or even through the library (which remains open even during the evenings).

Other flexible modes of learning should be taken into consideration, for instance: i) “project” type homeworks for the students to work at home, and, ii) higher number of daily excursions to the production sites of industrial wood enterprises; this apparently will help the students to learn more about their future working environments in Cyprus.

5.2 Physical resources

The physical resources, as noted, are adequate in the school, and can be rather easily accessible. This fits the purpose of courses.

Obviously, there are profits from the well-established installations of the Technical School of Larnaca. This includes: easy-to-find parking, plenty of office spaces for the administration and the teaching staff, as well as canteen, recreation room, library, and noticeably, plenty of lecture rooms, drawing room, IT rooms and facilities, storage rooms. Added to these, the woodworking shops and the finishing laboratory are in a good condition.

The EEC is highly satisfied with the level of the CNC-working laboratories, as well as with the machine shop. In the latter, it is advised in few of machinery to apply some necessary precaution measures for the safety of both teachers and students.

The EEC was also informed about the upcoming installation of some new equipment -very soon- which is expected to enrich further the overall physical resources.

5.3 Human support resources

During course hours, the teaching staff is readily and continuously available to provide support to for the students' requests and questions. This is obviously supported by the relatively high ratio between no. of teaching staff to no. of students.

The level of management is satisfied, and also the number of administrative and technical staff is adequate and appropriate for the programme. In some cases, the EEC highly suggests some (1-2) working positions for a laboratory technical staff (e.g. carpenters, cabinet-makers, wood-working practitioners) can be employed because it can help the PS. Such positions are left empty last year due to some reasons. The Ministry of Education, as well as the DIPAE can assist in solving this simple issue. Such experience technical staff apparently can assist in the laboratories, especially those related with the practice-based courses (e.g. furniture- and CNC- related courses).

5.4 Student support

The PS supports smoothly different student profiles as can be seen by the present diversity in student population regarding employment and family status, age, working background etc. However, the general student support provided in at a satisfied level.
No support service is provided for some, very few students (1 or 2), who have special needs in the field of learning (e.g. dyslexia). This may be addressed by the administration.

Findings
In general, the teaching, physical, human and student-related resources are adequate.

The field of CNC, and the woodworking industry itself, is characterised by a rapid technological advancement relating specifically to new materials and digital technologies. At the same time, the sector is expected to experience a larger growth, also indicated by the apparent market pull and high demand for the CNC equipment, as a whole. Graduates of the present PS will be employed very quickly.

Strengths
The current resources, combined with the synergy with the Technical School of Larnaca, in sharing installations are very satisfied. Also these are within the urban area, in an accessible location. The EEC thinks that there is a potential to accommodate a moderate expansion.

Areas of improvement and recommendations
In view of the dynamic features of the CNC-relating industry in Cyprus, the EEC considers this PS as an important one, having also the main challenge to ensure that all the available resources will continue supporting the competitiveness edge of the PS. The latter means continuous adaptation to the societal and market needs.

In that respects, the EEC considers that an adaptation of the main teaching resources, i.e. the curriculum, can be a key initiative, which can take place within the next three years of the PS.

Please select what is appropriate for each of the following sub-areas:

Sub-area		Non-compliant/ Partially Compliant/Compliant
5.1	Teaching and Learning resources	***Partially Compliant***
5.2	Physical resources	***Compliant***
5.3	Human support resources	***Compliant***
5.4	Student support	***Compliant***

6. Additional for doctoral programmes

Sub-areas

6.1 Selection criteria and requirements
6.2 Proposal and dissertation
6.3 Supervision and committees

This chapter (6) is not examined by the EEC, since it is **Not Applicable** for the PS.

D. Conclusions and final remarks

The present evaluation of the EEC revealed that the present status of the ongoing program study (PS) is "positive".

The PS has been carried out, since 2016, in a proper way, and lots of prospective exist for it, since presently the Cypriot market is growing up and the related wood-working enterprises are expanding, also due to the touristic market (see wooden articles and furniture, and other timber-relating structures).

In overall, we can summarize in the following important points:

- The PS offers a high quality vocational training in an industrial sector, which has significant market pull.
- The PS complies with the EQF level 5.
- Since its creation, the PS has been matured in several areas, such as organization and processes, laboratory equipment, and teaching materials.
- Through its implementation, the PS has gathered hands-on experiences and quite significant learnings.
- These learnings, in conjunction with trends in the wood-working industry, are reflected in and drive the adaptation of the curriculum.
- Directions for an adapted Curriculum towards competitiveness are outlined in the Annex.

A significant advantage is that, in the whole Cyprus area, this PS is the only one being taught.

The EEC further suggests to DIPAE to strengthen even more the content of the programme, in the near future, as follows: «***Σχεδιασμός & Τεχνολογία CNC – Ξυλουργική Βιομηχανία***». This will make it even more attractive, and even more students will attend it.

In conclusion, the ongoing program study is a very important program in the educational system of Cyprus. It must be supported by any possible means by the Ministry of Education of the Cyprus Government.

E. Signatures of the EEC members

Name	Signature
Dr. George I. MANTANIS FIAWS	
Dr. Sotirios KARASTERGIOU	
Dr. Georgios CHAMILOTHORIS	
Student George Christodoulou	

Date: 13-05-2022

ANNEX I (in Greek)

Προτάσεις της Εξ. Επιτροπής Αξιολόγησης για *περαιτέρω αναβαθμισμένο* πρόγραμμα σπουδών:

Α/Α	Τύπος Μαθήματος	Όνομα Μαθήματος	Κωδικός Μαθήματος	Περίοδοι ανά εβδομάδα			
Α' Εξάμηνο							
1.	(Θ)	Μαθηματικά	CNC 0101	3			
2.	(Θ, Ε)	Τεχνικό και Ελεύθερο Σχέδιο	CNC 0102	7			
3.	(Θ, Ε)	Υπολογιστικές Εφαρμογές	CNC 0103	5			
4.	(Θ, Ε)	Σχεδιασμός με Η/Υ Ι	CNC 0104	5			
5.	(Θ)	Ασφάλεια και Υγιεινή στην Εργασία	CNC 0105	2			
6.	(Θ)	Τεχν. Υλικών και Κατεργασιών Ι	CNC 0203	3			
Β' Εξάμηνο							
1.	(Θ)	Συστήματα Ισχύος Ι	n/a	3			
2.	(Θ)	Αγγλικά – Τεχνική Ορολογία	CNC 0106	2			
3.	(Θ, Ε)	Προγράμματα CAD/CAM	CNC 0202	5			
4.	(Ε, Θ)	Μηχανές Επεξεργασίας Ξύλου	CNC 0403	5			
5.	(Θ, Ε)	Σχεδιασμός με Η/Υ ΙΙ	CNC 0205	5			
6.	(Θ, Ε)	Εισαγωγή στις εργαλειομηχανές CNC	CNC 0206	5			
7.		Πρακτική Εξάσκηση 6 εβδομάδων Παρουσίαση αποτελεσμάτων	INTERN 1				

Α/Α	Τύπος Μαθήματος	Όνομα Μαθήματος	Κωδικός Μαθήματος	Περίοδοι ανά εβδομάδα			
Γ' Εξάμηνο							
1.	(Ε)	Εργ. Εργαλειομηχανών CNC I	CNC 0301	5			
2.	(Θ, Ε)	Τεχνολογία Παραγωγής Επίπλου I	CNC 0402	5			
3.	(Ε)	Τεχν. Υλικών και Κατεργασιών II	CNC 0303	5			
4.	(Ε, Θ)	Κοστολόγηση	CNC 0304	5			
5.	(Θ)	Συστήματα Ισχύος II	n/a	3			
6.	(Ε)	Τεχνολογία Κοπής Laser	CNC 0306	2			
Δ' Εξάμηνο							
1.	(Θ, Ε)	Εργ. Εργαλειομηχανών CNC II	CNC 0401	10			
2.	(Ε)	Τόρνος και Ρούτερ CNC	CNC 0302	5			
3.	(Θ, Ε)	Τεχνολογία Παραγωγής Επίπλου II	CNC 0402	5			
4.	(Θ)	Επιχειρηματικότητα και Μάρκετινγκ		5			
5.		Πρακτική Εξάσκηση 6 εβδομάδων Παρουσίαση αποτελεσμάτων	INTERN 2				

ANNEX II (in Greek)

Το τρέχον πρόγραμμα σπουδών (ΠΣ) είναι σε καλή κατάσταση.

Ωστόσο, η Επιτροπή Εξωτερικής Αξιολόγησης, με βάση και τη δυναμική της εξέλιξης της τεχνολογίας και τις ανάγκες του αύριο, *εισηγείται* στην ΔΙΠΑΕ τόσο το ανωτέρω προτεινόμενο ΠΣ (Annex I - που η επιτροπή αξιολόγησης συστήνει με την εμπειρία της στο αντικείμενο), όσο και τις ακόλουθες τεχνικές διευκρινίσεις που αφορούν τη διδακτέα ύλη του κάθε μαθήματος:

-Μαθηματικά
Να ενισχυθεί κατά πολύ η ύλη που περιλαμβάνει τις έννοιες της Παραστατικής Γεωμετρίας. Να αφαιρεθούν οι ενότητες που είναι σχετιζόμενες με Μιγαδικούς αριθμούς, Πίνακες, κτλ.

-Τεχνικό και Ελεύθερο Σχέδιο
Να ενισχυθεί η ύλη του υφιστάμενου μαθήματος με 4-5 διδακτικές ενότητες Ελευθέρου Σχεδίου.

-Τεχν. Υλικών και Κατεργασιών Ι

Η ύλη του εν λόγω μαθήματος να επικεντρωθεί στο πρώτο μέρος στην Τεχνολογία υλικών, και επιπρόσθετα να δοθεί η βαρύτητα όχι στο δάσος ή τη συγκομιδή ξυλείας, αλλά στα βασικά υλικά κατεργασιών, τα χαρακτηριστικά και στις ιδιότητές τους: λ.χ. μαλακή ξυλεία (κωνοφόρα, έλατο-πεύκο-ερυθρελάτη), σκληρή ξυλεία (πλατύφυλλα, οξιά-δρυς-ιρόκο), κόντρα πλακέ (αντικολλητά), μοριοσανίδες, ινοσανίδες (MDF), HPL (high-pressure laminates, compact, indoor & outdoor grades), και στα μεταλλικά υλικά με έμφαση μόνο στο αλουμίνιο, το χυτοσίδηρο και τον χάλυβα.

-Τεχν. Υλικών και Κατεργασιών ΙΙ

Η ύλη του εν λόγω μαθήματος να επικεντρώνεται στην Τεχνολογία των Κατεργασιών (ήτοι: εγκοπές, προεξοχές, διατρήσεις, ξεμορσαρίσματα, μορφοποιήσεις, καμπυλώσεις, τορνεύσεις, κτλ.) αποκλειστικά με τα συμβατικά μέσα μηχανικής κατεργασίας, κυρίως: πλάνη, γωνιάστρα, πριονοκορδέλα, ξεμορσαρίστρα, πολυτρύπανο, μορσοτρύπανο, αλυσοτρύπανο, φρέζα επιτραπέζια, φρέζα χειρός και τόρνο.

-Τεχνολογία Παραγωγής Επίπλου Ι
Η ύλη του μαθήματος προτείνεται να περιλαμβάνει: βασικές αρχές της τεχνολογίας παραγωγής επίπλου, είδη επίπλου, υλικά επιπλοποιίας, βασικά εργαλεία χειρός για την κατασκευή ενός επίπλου, ασφαλής χειρισμό τους, λήψη των απαραίτητων μέτρων υγιεινής και όλες τις κατηγορίες συνδέσμων που μπορούν να χρησιμοποιηθούν για την κατασκευή ενός επίπλου (π.χ. συνδέσμους μήκους, πλάτους, γωνιακούς, κιβωτίου, διασταυρούμενων ξύλων, πλαισίων, τρεσών προστασίας, τριών διευθύνσεων, ραφιών, λυόμενων συνδέσμων με φυράμια, κλπ.). Γενικοί κανόνες για την επιλογή και κατασκευή ενός συνδέσμου, καταπονήσεις που δέχεται μία κατασκευή

στο σημείο του συνδέσμου, διαστάσεις που πρέπει να έχει ένας σύνδεσμος, έννοια της επιφάνειας συγκόλλησης στην αντοχή των συνδέσεων και πλεονεκτήματα-μειονεκτήματα των σταθερών συνδέσεων σε σύγκριση με τις αντίστοιχες λυόμενες συνδέσεις. Πίνακας υλικών και σημασία αυτού στην κατασκευή ενός επίπλου. Τεχνολογία κατασκευής απλών επίπλων (π.χ. σκαμπό, τραπεζάκι, κλπ.).

-Τεχνολογία Παραγωγής Επίπλου ΙΙ

Η ύλη του μαθήματος προτείνεται να περιλαμβάνει: μέθοδοι και τεχνολογία που χρησιμοποιείται κατά την παραγωγή επίπλων από σύνθετα προϊόντα ξύλου σε πλάκες. Ανασκόπηση των βασικών υλικών: ινοπλάκες, μοριοπλάκες, αντικολλητά (διαθέσιμες διαστάσεις, επενδύσεις, βασικές χρήσεις, κόστος αγοράς, κλπ.). Συνδεσμολογία, τεχνολογία κατασκευής του βασικού σκελετού του επίπλου, κατασκευής και εφαρμογής πόρτας – συρταριού – πλάτης. Δημιουργία βέλτιστων σχεδίων τεμαχισμού. Δημιουργία πίνακα υλικών.
Μέθοδοι και τεχνολογία που χρησιμοποιείται κατά την κατασκευή επίπλων από συμπαγές ξύλο (καρέκλες, τραπεζαρίες, κλπ.)Προσδιορισμός και ανασκόπηση των υλικών: μασίφ ξυλεία, επικολλητό ξύλο, κλπ. (διαθέσιμες διαστάσεις, βασικές χρήσεις, κόστος αγοράς, κλπ.). Συνδεσμολογία, τεχνολογία κατασκευής του βασικού σκελετού του επίπλου από συμπαγές ξύλο, κατασκευής και εφαρμογής άλλων στοιχείων (καπάκια τραπεζιών, πορτών, συρταριών, κλπ.).Δημιουργία βέλτιστων σχεδίων τεμαχισμού. Δημιουργία πίνακα υλικών.

-Μηχανές Επεξεργασίας Ξύλου

Η ύλη του μαθήματος προτείνεται να περιλαμβάνει: βασικές αρχές μηχανικής κατεργασίας ξύλου, βασικά μηχανήματα κατεργασίας ξύλου, ασφαλής χειρισμός τους και λήψη των απαραίτητων μέτρων υγιεινής. Τεχνολογία πρίσης με ταινιοπρίονα – δισκοπρίονα. Τεχνολογία πλανίσματος με πλάνη – ξεχονδριστήρα – ραμποτέζα (πολυκέφαλη). Τεχνολογία δημιουργία προφίλ με σβούρα – φρέζα. Τεχνολογία διάνοιξης οπών – εγκοπών με απλό τρυπάνι, μορσοτρύπανο, αλυσοτρύπανο – πολυτρύπανο – σκαρπελιέρα. Τεχνολογία λείανσης με τριβεία ταινίας – δίσκου – κυλίνδρου. Τόρνος. Πρέσες. Σε κάθε τύποκατεργασίας διδάσκονται οι τύποι των μηχανημάτων, τα τεχνικά τους χαρακτηριστικά, τα κοπτικά τα οποία χρησιμοποιούν και οι μορφές κατεργασίας που αυτά επιτελούν και οι εφαρμογές τους στην κατασκευή προϊόντων.

-Επιχειρηματικότητα και Μάρκετινγκ

Η ύλη του μαθήματος να εστιάσει σε θέματα επιχειρηματικότητας με έμφαση σε Μικρές και Μεσαίες Επιχειρήσεις (ΜΜΕ). Η ενδεικτική ύλη μπορεί να καλύπτει ενότητες όπως η δημιουργία ΜΜΕ (ίδρυση, εγκατάσταση, εγγραφή σε Επιμελητήριο), οι νομικές υποχρεώσεις της ΜΜΕ (φορολογία, τήρηση κανονισμών, οικονομικοί έλεγχοι), στοιχεία διαχείρισης των βασικών πόρων της ΜΜΕ (προσωπικό, εξοπλισμός, χώρος, κεφάλαιο), βασικές μεθόδους και πρακτικές ανάπτυξης εργασιών (προβολή, προώθηση, marketing). Στις μεθόδους διδασκαλίας μπορεί να περιληφθεί προσομοίωση εργασιών από την ίδρυση και λειτουργία ΜΜΕ στον κλάδο των κατεργασιών ή της βιοτεχνίας ξύλου και επίπλου.

-Συστήματα Ισχύος Ι

Η ύλη του μαθήματος να εστιάσει στα συστήματα ηλεκτρομηχανικής ισχύος, με έμφαση σε εκείνα που απαντώνται στις εργαλειομηχανές και τις μηχανές κατεργασίας ξύλου. Η ενδεικτική θεματολογία μπορεί να καλύπτει ενότητες όπως: βασικά στοιχεία ηλεκτροτεχνίας και ηλεκτρομηχανικών κυκλωμάτων (διακόπτες, ηλεκτρονόμοι), διατάξεις παροχής βιομηχανικής ηλεκτρικής ισχύος (AC, DC), βασικά στοιχεία ηλεκτρονικών ισχύος, ηλεκτρικούς κινητήρες (επαγωγικούς, βηματικούς, ΣΡ με και χωρίς ψήκτρες).

-Συστήματα Ισχύος ΙΙ

Η ύλη του μαθήματος να εστιάσει στα συστήματα πνευματικής και υδραυλικής ισχύος, με έμφαση σε εκείνα που απαντώνται στα κυκλώματα συγκράτησης, κίνησης και αυτοματισμού των μηχανών και συστημάτων κατεργασίας ξύλου. Η ενδεικτική θεματολογία μπορεί να καλύπτει ενότητες όπως: παροχή και διανομή πνευματικής ισχύος, συνήθη εξαρτήματα πνευματικών κυκλωμάτων, απλοί υπολογισμοί ισχύος και κατανάλωσης αέρα, συνήθη κυκλώματα και εφαρμογές πνευματικού συστήματος - και τα ανάλογα για υδραυλική ισχύ.

Η Επιτροπή Εξωτερικής Αξιολόγησης είναι **πολύ ικανοποιημένη** από την ενίσχυση του εργαστηριακού εξοπλισμού, που αξιοποιείται στο τρέχον ΠΣ. Δεν συστήνει κάτι περαιτέρω σε εργαστηριακό εξοπλισμό πέραν και αυτού που λίαν συντόμως θα αγοραστεί για τις εκπαιδευτικές ανάγκες του προγράμματος.