

Marine Engineering Programme

Presently the maritime transport represents the motor of the global commerce growth providing sustainable development of worldwide economy. In the past 20 years the volume of cargo carried by sea has doubled, while the number of ships has increased by almost 60%. Consequently, Constanta Maritime University has decided to develop its educational offer by providing two curricular tracks in English. As a target group it focused on foreign citizens wishing to study in English in a country member of the European Union. The university organizes students' training through the undergraduate and Master's Degrees and at present is developing a school for doctoral studies in Navigation and Marine Engineering domain.

Marine Engineering covers the whole field of the professional management of marine mechanical and electrical propulsion and control systems.

The University provides graduates with theoretical and practical competencies so as to ensure engineer watchkeeping. Apart from the basic training allowing graduates to become a maritime engineer officer, they will have the necessary knowledge to employ in maritime commerce, shipbuilding and various land-based services.

Studies are organized in two cycles. The first one, university degree studies, takes four years and 240 ECTS, and graduates receive the Engineer title. The second cycle, master's degree studies, takes 1.5 years, allowing graduates of the first cycle to continue their studies and improve their knowledge about a specific direction. When graduating, they obtain the Master's degree.

Study programmes are issued according to the European standards, combining the Romanian maritime school tradition with the present tendencies towards informatics and modern practices of higher education, the quality of the teaching personnel being approved at national and international level.

The curricula for the new study programmes have been developed according to an analysis of demands of European universities and other international maritime universities and according to the consultancy of chairs, students, graduates' representatives, employers, maritime companies and crewing agencies. The main targets have been established during meetings between the University and representatives from crewing agencies, while the faculty maintained its traditional courses, representing fundamental points of reference for the navigation and maritime engineering domain, which were part of acquiring and consolidating the faculty's recognition both nationally and internationally.

Apart from all these, there is also a number of modern, updated disciplines defining the university degree graduate's profile stated in the study programmes of the University.

Curricula harmoniously combine teaching activities with applications (tutorials, projects, and laboratory work) and practical stages in industrial units, onboard practice by means of Agreements with maritime companies and crewing agencies.

During the teaching process, in laboratories provided with complex navigation and ship's manoeuvre simulators, real scenarios can be tested and possible errors may be corrected. All laboratories have internet access, providing source for homework solving, annual projects, degree projects and dissertation thesis drawing up. Students and master's degree students are encouraged to perform scientific research activities through faculty's research contracts.

Students can participate in the mobility programme ERASMUS. Students of the university can also gain a scholarship of 100 EURO per month granted by the Japanese Company Nippon Ship management NYK, after a careful selection of best students organized by the company representatives. Apart from this scholarship, as a support for their tuition, students can also receive wages of 400-500 Euros during their onboard training as cadets.

Students' training programme develops according to the European transfer credits training programme (ECTS – European Credit Transfer System). The credit transfer system functions according to the mutual compatibility amongst academic institutions participating in this system. The three main elements of the credit transfer system are: information about teaching subjects, mutual convention between partner institutions and students, and using ECTS credits, as a measurement of student's activities.

There are 60 ECTS credits per year which means 30 credits for each semester. Therefore, the University- Bachelor degree, 4 years of study – sums up a number of 240 ECTS, while the Master's degree programme – three semesters of study- amounts to a total number of 90 ECTS.

Students are accommodated in modern hostels (of about 500 available hosting places). They have internet access, reading rooms, and modern equipped kitchens for preparing their meals. The university also provides a canteen with good food at modest prices. In the neighbourhood there are: a commercial shopping area, modern restaurants and clubs where students spend their leisure time as pleasantly as possible.

The curriculum provides students with coherent professional training and a large knowledge spectrum by harmoniously combining fundamental disciplines, specific engineering disciplines and specialty disciplines. As a result, at the end of the 4 years of study, students will have competencies and general cognitive abilities, as well as specific abilities and competencies according to their specialization. The great majority of students are training for a maritime career, but even so, this specialization is flexible enough to provide competencies in the operation and port activities domain, for those who do not wish to embrace a seafarer's career.

General cognitive competencies and abilities for undergraduates of Marine Engineering faculty.

Undergraduates will be able to
Identify, analyze and describe the running of the electromechanical naval systems
Analyze physical processes within the electromechanical naval systems
Ensure maintenance of electromechanical naval systems
Safe running of electromechanical naval systems
Ability to exchange information with other specialists.

Special cognitive competencies and abilities for undergraduates of Marine Engineering faculty.

Undergraduates will be able to
Know and understand concepts, theories and basic methods in the field and use them adequately in professional communications.
Use basic knowledge to explain and interpret various types of concepts, processes, projects associated to the field.
Apply methods and basic principles to solve problems under qualified assistance
Draw up professional projects by using methods and principles specific to the field
Operational level of control of the safe running of the vessel and care for people on board , by drawing up action plans for emergency situations, management of risk situations, safety of life at sea, protection of marine environment and maintaining the seaworthiness of the vessel
Lead the engine crew to maintain work safety and security of the ship and of passengers.

The required knowledge will be gained not only by means of theoretical courses, but also by using simulators and modern lab facilities such as: "Autolaud Software", "Autopower Software" and "Autohydro Software" for Theory, Construction and Vitality of Ships; "Software – Simulator for handling liquid cargo", "Laboratory of handling liquid bulk cargo", "Software – Simulation for navigation and ship handling of TRANSAS NT PRO" type; "Software multisimedication with MCU – module – 10 USERS – License", "Soft TRANSAS NT Expert 4000",

The B. Sc degree graduates (four years of study and 240 transferable credits) have the advantage of a double certification. They get:

- Engineer diploma in the Naval Engineering and Navigation field (the European equivalent of Bachelor of Science diploma);
- Officer of the Watch Endorsement.

Constanta Maritime University is particularly aiming at providing training by means of delivering safety courses for the students of all maritime specializations as well as guiding students who carry out onboard training. First year students are attending four safety courses necessary to get the Seaman's Book and Apprentice Engineer Officer Certificate:

1. First Medical Aid;
 2. Basic Fire Fighting;
 3. Personal Survival Techniques;
 4. Personal Safety and Social Responsibilities on Board Ships;
- In the second year, students take part in another four safety courses:
5. Transport and Handling of Dangerous, Hazardous and Harmful Cargoes;
 6. Pollution Prevention of the Marine Environment – MARPOL 75/78;
 7. Proficiency in Survival Craft and Rescue Boats (other than fast rescue boats);

8. Maritime English.

All the students that have passed the safety courses and the medical tests get the Seaman's Book and the Apprentice Engineer Officer certificate from the Romanian Naval Authority. As a consequence, students can be trained on board merchant ships. This period of training (12 months) is compulsory for getting the Engineer Officer Certificate of Competency. Students' training can be performed on board merchant ships of 500 GRT or above, on international voyages. In order to ensure the onboard training and get the minimum sea service required for their promotion to OOW, Constanta Maritime University concluded Collaboration Agreements with 22 crewing agencies. The crewing agencies develop programs for monitoring the professional evolution of the engineer cadets, and at present the best students of third and fourth years from all maritime specializations are on board ships engaged in international voyages.

Purchased software

The Engine Room Simulator at the Constanta Maritime University (CMU)

1. Software and hardware upgrades of the existing ERS simulator to the today's version of the Slow Speed MC90 v V, Full Mission Class A.

With the new software version, a new module simulator instructor is included and this one provides advanced training methods and assessment of learners. Its minimal features are:

- individual loading of the exercise for each student station,
- running the exercise,
- stop the exercise at any stage of its deployment,
- stopping the exercise,
- loading of the initial conditions,
- creation of the new initial conditions,
- running the independent exercises by the students,
- the introduction of the defects in the system,
- access to the list alarms,
- access to the list of variables,
- starting the student stations,
- full registration of the exercises,
- possibility of the resume of the whole exercise,
- resuming the exercise of any point thereafter,
- the creation of exercises including the creating of the initial conditions;
- launch the exercises in the student stations,
- stopping / resuming the exercises in all the student stations at a time,
- grouping several student stations for team training,
- transmission of the instant messages to the student stations,
- stopping the student stations,
- the possibility of set up a student station,
- development of the exercises including actions,
- software training system for students (electronical teacher)
- the possibility of the student assessment.

2. Completing the Full Mission Simulator, including the software, electronics and consoles required by the extension:

- Boiler console push button
- Reconfiguration Power Chief / Pump Compressors & Electric Generator;
- Shaft Generator Section;
- Turbo Generator Section;
- Emergency generator section (with separate sound system);
- Emergency switchboard section.

3. **The BigView** concept is based on 4-four touch screens (65" diagonal line) enabling the visualization of all systems and installations on board.
4. **Desktop Variant:** Instructor station and 8 Neptune Student stations with dual screens (19" TFT) and with Neptune Professional and the same Engine Room model as with the Full Mission simulator. (MAN B&W 5L90MC VLCCL11-V). Additional models for the below engines/ships types are also included:
 - Sulzer 12RTA84 - Container L11 ;
 - GE LM2500 30 - Gas Turbine ;
 - SP11 (Steam Propulsion) - LNG - Dual Fuel ;
 - Pielstick 10PC4 M22 - Ferry Boat.

The Engine Room Simulator FULL MISSION CLASS A is in accordance with the latest specifications IMO (International Maritime Organisation), STCW and shipping classification societies, and is certified by the classification society DNV, internationally recognized.

Quality management

Implementation and development of Quality Management System in CMU has been a primary preoccupation starting with 2008 on the basis of 12.12.2008 CMU Senate Decision, of the 78/15.12.2008 Rector's Decision and the decision concerning the members' nomination of CMU Quality Council, which were approved by the Senate.

Based on all these documents The Regulations for CMU Quality Management System performance has been developed.

The Assessment and Quality Committee carries out collaboration and information activities regarding CMU good practice, and other international maritime universities.

CMU organizes the following structures that focus on the development of pro-quality opinion trend:

- Quality Committee on the faculty level run by the Dean assisted by people in charge of quality assurance;
- Quality Committee on the Chair level, run by people in charge of quality assurance;

72

- Assessment and Quality Assurance Committee;

- Quality Department

Quality Committees are made up of students as well as of members of the administrative staff and researchers.

For Quality Management System implementation, there were organized regular meetings of the teaching staff members with specialists and beneficiaries of the educational programs. As a result of these meetings, the standard required documents were elaborated and revised.

The reference points were ISO 9001:2000 and ISO 14001:2004 BVQI

The following documents are mentioned here:

- ▶ The Quality Book
- ▶ Regulation for Quality Management System in CMU;
- ▶ Politics, Strategies and Procedures for Quality Assurance in CMU (Quality procedures for teaching, financial and accounting activities).

Swot analysis

The strength points of the study program for ,Navigation and maritime and inland waterways transport derive from some internal and external elements:

- external elements that support specialization:

- country's traditions concerning navigation;
- high demand for maritime officers in international and European fleets;
- international recognition and collaboration with international universities; - university (faculty)

internal elements:

- good tradition regarding teaching and training merchant ship officers;
- professionalism of the teaching staff;
- good results obtained in the field of scientific research;
- equipment of the laboratories for this specialization;
- high training quality for students;
- the majority of teaching staff are rather young;

- The instructors for the simulators have certificates and international recognition;
- Existence of an accredited master's studies programme, which contributes to the graduates' upgrading process.

Weak points of this specialization are due to the elements that depend only on the university (faculty):

- Necessity of the existence of laboratories for some subjects;
- Insufficient correlation of the curriculum for different subjects;
- Discontinuous monitoring of the activities carried out by students;
- The students' contribution to the scientific research is relatively reduced;
- Lack of practical experience for some young members of the teaching staff

Opportunities of the program derive from the external positive circumstances for the project:

- There are enough requirements from the students for BS degree and master studies;
- There are enough funds for the PhD scholarships which encourages people to apply for a 75 doctor's degree;
- The shortage of labour force (officers) in the international fleet favours the attractiveness of the program;
- The graduates of this specialization benefit from a double qualification; this fact enables them to find a job more easily both at sea or on land;
- The University has established partnerships with some of the most important crewing companies of this sector. Thus students of this specialization have the possibility to perform/fulfill the onboard training stage on very modern ships. Later, they have the possibility of being employed as officers by these companies;
- The University has human resources who ensure both the professional training and the abilities of communicating in English, managerial and ITC competences;
- The conditions of the present crisis also offer the possibility of reforming the system and of a 12-18 delay of entering the labour market.

Threats:

- The present crisis may reduce the number of students;
- Demographical decrease may diminish the number of candidates;
- Loss of students' interest for some subjects which contain too much theoretical knowledge and which are not adapted to the present day realities.