

## ON CONTINUITY OF AVIATION ENGINEER TRAINING BASED ON MODULAR CURRICULUM

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**Abstract.** The topic of the present paper is ensuring the continuity of the training of aviation engineers at Tartu Aviation College (TAC), where instruction is provided in cooperation with the University of Tartu and Tallinn University of Technology.

**Keywords:** aviation engineer, modular training, continuity, curriculum.

## **Introduction**

The first flight school in Estonia (an air force training unit) was founded in 1919 but due to the annexation of Estonia by the Soviet Union in 1940, national aviation training was prohibited in the country. When the Republic of Estonia regained its independence in 1991, there arose the necessity to restore a centre coordinating and providing the training of aviation personnel. For this purpose, Tartu Aviation College was founded in 1993. Since two major Estonian universities – the University of Tartu and Tallinn University of Technology – managed to continue their activities during the Soviet era, it was reasonable for the newly opened aviation school to use their teaching personnel and infrastructure: study and research laboratories, libraries, etc. This was the starting point of smooth cooperation between the two universities and Tartu Aviation College, which is a professional institution of higher education (corresponding to a university of applied sciences in Germany, Switzerland, or some other countries).

## **Training of aviation engineers in TAC**

### **The specific character of TAC**

TAC is specific since there are not many teaching personnel at the college. The majority of instructors are experienced specialists of Estonian and foreign aviation enterprises and schools of higher education working at the college on a contractual basis. This guarantees the permanent high quality of the teaching process, and it corresponds to the requirements of the International Civil Aviation Organization (ICAO) and the Joint Aviation Authorities (JAA). This, in its turn, guarantees good opportunities for the graduates in the Estonian and European labor markets. Quality assurance is given special attention at the college and for this purpose the post of quality manager has been created [3].

### **Description of curricula**

Engineers are trained in the following professional fields: Air Traffic Management (incl. communication and navigation systems), Aircraft Piloting (pilot-engineers), Aviation Management (incl. aircraft maintenance).

The curriculum consists of four modules: basic engineering studies, basic aviation studies, professional studies, and speciality studies. Below a closer look is taken at the curriculum of communication and navigation systems engineers. Figure shows the scheme of training of those engineers.

As one can see, the graduates of TAC have the possibility to continue in master's studies and proceed to doctoral studies after that. After graduating from the college, students usually go on to degree studies at the University of Tartu or Tallinn University of Technology, but they can also continue at foreign universities.

For example, one alumnus of the college is studying for a master's degree at Bremen University of Applied Sciences.

### **Basic engineering studies**

Basic engineering studies are carried out at the University of Tartu. The duration of the module is three semesters, during which higher mathematics; physics, engineering graphics, applied mechanics, electrotechnics, and other general engineering subjects are provided. An essential part in the curriculum is given to the English language, which is taught in all four modules.

### **Basic aviation studies**

Basic aviation studies are conducted at the college, and in this phase students already learn about practical work at an airport. Among other subjects, the curriculum also includes humanities.

### **Professional studies**

Professional studies with a duration of two semesters take place at Tallinn Technical University. This module includes lectures and laboratory work in subjects like signal analogue and digital processing, communication technology, radio transmitters and receivers, propagation of radio waves, antennas, etc.

### **Speciality studies**

Speciality studies are carried out at Estonian and foreign aviation enterprises and at the college. The module contains subjects like radio navigation, radar technologies, landing equipment, etc.

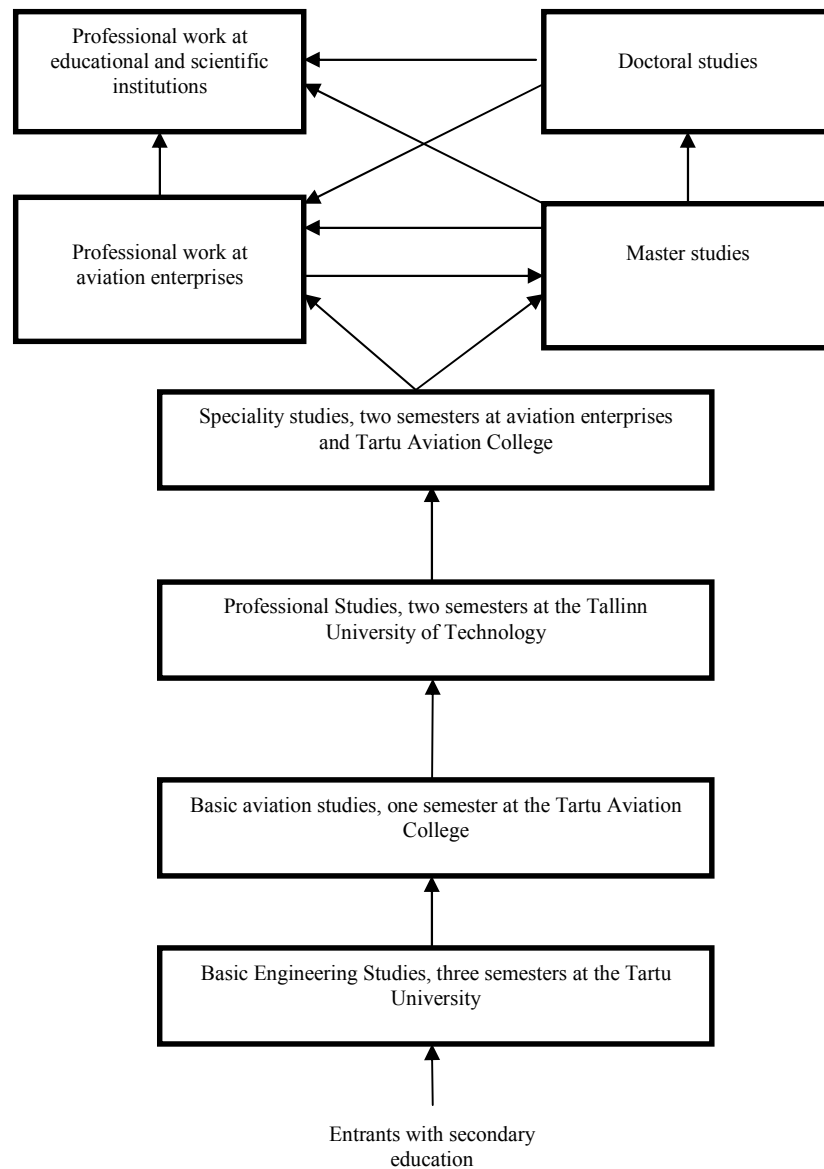
### **The advantages and problems of cooperation with universities**

The aforementioned modular structure enables the personnel and infrastructure of three schools of higher education to be involved. The cooperation with universities that have good reputations – Tallinn University of Technology and the University of Tartu – ensures a high level of student motivation and a high quality teaching process. At the end of 2003, an international body accredited the curricula of TAC. One of the reasons for the successful accreditation was the smooth cooperation with the two universities.

The system has several advantages, but there are also drawbacks that have to be taken into account and that demand certain corrections that have been paid special attention to. One of the major problems in modular training provided by different schools is ensuring continuity between the modules.

### **Continuity in training**

The notion of continuity in its wider sense in pedagogy means that the rendering of new material (teaching) is based on knowledge and skills already acquired, and the new material is rendered on a scholastic level higher than the material already acquired [1].



**Fig.** Scheme of training communication and navigation system engineers

Keeping this in view, one has to pay attention to the following to ensure continuity in training engineer:

- There should be optimum connections and correct proportions between different modules; unnecessary repetition should be avoided in the teaching process;
- Necessary links should be ensured between the forms, methods, and types of teaching in different stages of the process; it is essential that the practical work in one location is based on the theory taught at another location (institution);
- One should determine the requirements for students' knowledge and their skills to use intra- and interdisciplinary logical bonds.

One of the major factors in creating aviation specialists is the aviation environment where the student studies and exists [2]. When students study at the University of Tartu or Tallinn University of Technology, they have to be away from the college for several

semesters and the influence of their aviation background is interrupted for some period. During the ten years of its existence, Tartu Aviation College has attempted to bring up its own young teaching staff and develop the necessary infrastructure: lecture rooms, study laboratories, computer rooms, recreation rooms, libraries, a navigation equipment centre etc. This enables more training for students to be done at the college creating the appropriate aviation background. For the next year, it has been planned to transfer one semester of the professional field module from Tallinn University of Technology to the college. In the future, part of the basic engineering module will also be moved to the college. This will require new lecture rooms and laboratories to be built.

## Conclusions

The mission of Tartu Aviation College is to provide up-to date, high quality, and efficient training of aviation personnel needed in Estonia, to carry out applied research

in the field of aviation and to organise international cooperation and development activities in accordance with international requirements. Alongside aviation requirements, the educational requirements that are necessary to guarantee the efficiency of the teaching process are also followed.

Tartu Aviation College is open for cooperation in the field of training and development with all institutions of higher education, research centers, and other interested parties in Estonia and other countries.

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