Aeronautical Engineering Degree Program

Learning Outcomes

ESAT University has positioned itself to be a regional player when it comes to educate a highly skilled engineer in the area of Aeronautics which represents global challenges nowadays. The need for engineer's who can work in the aviation industry (Design & manufacturing, and aircraft maintenance) drives the exploration of innovative solutions for engineering education in this sector of aerospace science and technology in Tunisia, the Middle East and North Africa (MENA) Region.

ESAT University was launched in 2003 in order to educate engineers in the area of aeronautics & aviation sector. The aeronautical engineering programme was designed and compiled in accordance with the French system (2+3). The first 2 years are called the Preparatory Cycle and the programme has a concentration on Math and Physics (up to 15 contact hours/week). At the end of this cycle students can register in one of the available engineering programmes, or also register at the affiliated institution ***Airline Flight Academy*** for Pilot training. Students who register in the aeronautical engineering programme will spend 3 years at ESAT University to complete the engineering cycle. The orientation at the end of the preparatory cycle is processed during the second year depending on the student choice and the orientation committee results (normally final results are available at the first week of July each academic year).

Programme Objectives:

1. Prepare the graduates to be able to develop their professional competence to work in the highest positions dealing with aeronautical engineering technology in industry, solution providers or officials.
2. Prepare the graduate abilities to adapt, to adjust, to grow independently as well as to compete globally
3. Prepare the graduates to be able to develop the chosen field, including the ability to continue to post-graduate studies.

Learning outcomes are as follows:

Field Specific Outcomes

Stage 1: Preparatory Cycle

1) To have fundamental understanding of Mathematics (Calculus, Algebra & Geometry); Physics (Optics, Electromagnetism, Electronics, Thermodynamics, Fluid Mechanics, and Solid Mechanics).
2) To have appropriate aviation and engineering related basic knowledge's such as (Air navigation, Air law, Meteorology, Electronics, computer programming, etc...)

Stage 2: Engineering Cycle

3) To have fundamental understanding of mechanical & Electrical engineering principles and practices through mathematical, methodological, numerical and experimental courses & workshops,
4) To have necessary skills for the study, design, analysis and development of aircraft structure, engines, avionics and other high technology flight systems,

General & Soft Skills Outcomes:

5) Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
6) Select, and apply modern design & Simulation engineering and IT tools to complex engineering activities with an understanding of the limitations.
7) To have necessary oral and written communication skills mainly in French, English, and encouraging them to be certified at the international level.
8) To be prepared for socialization, business work and scientific environments in a dynamic and global environment by building partnerships between the institution and the industry.
9) To have awareness of the importance of life-long learning

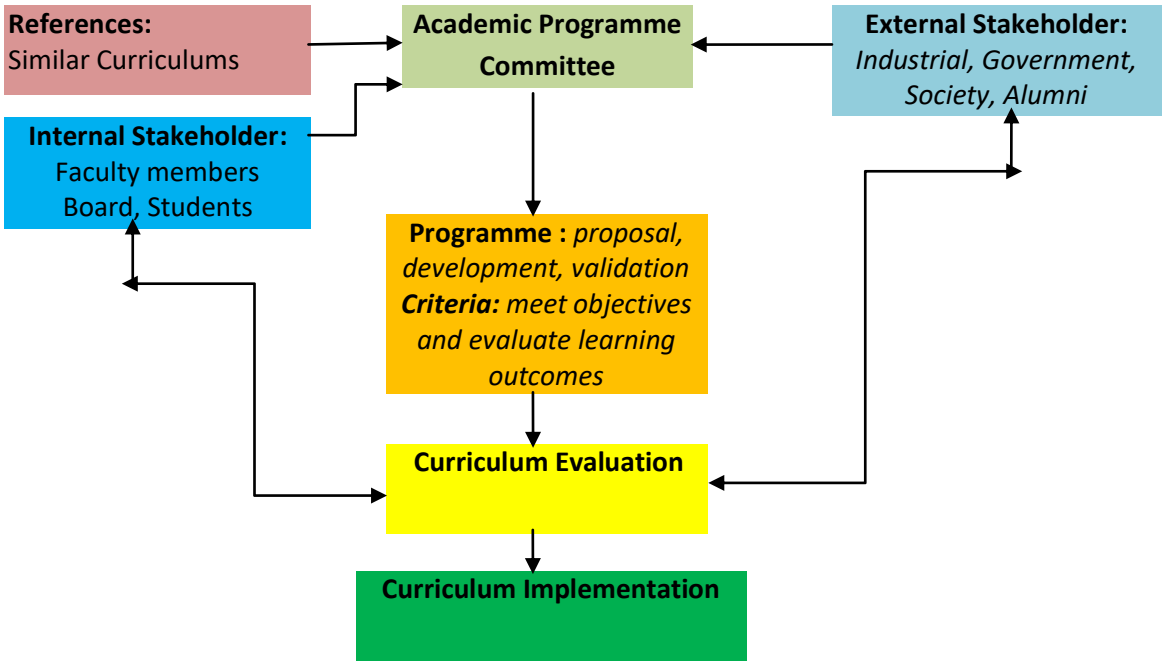

Figure 1.1. Programme Concept, content & implementation

In order to reach the learning outcomes, the curriculum is implemented with a variation of learning and teaching methods (e.g. classroom lectures, Lab workshops, Industry guided tour, professional internships, annual research projects, etc) as well as assessment methods to measure the outcomes (e.g. oral & written quizzes, exams, presentation and practice exams). Complete descriptions about learning, teaching and assessment strategies are explained in Chapter 2.

Graduates are considered to be skilled practitioners who apply their knowledge and technical skills to solve relevant engineering problems in both aeronautical and any other related profession. The curriculum was designed initially to produce a " *generalist aeronautical engineer*" who can work in several area in order to open up as much as possible carrier prospects and avoid unemployment situation.
ESAT University has been working closely with industry and also academic partners in order to evaluate the programme on a yearly basis depending on their feedback where some minor adjustment mainly in workshops or professional modules content are done.

Graduates acquired the necessary knowledge, competencies and skills (including soft skills) that can help them to work in the aviation industry (design office, manufacturing), Airline company and aircraft Maintenance and Repair Organization (MRO), Civil Aviation, and Airports Authority, International organizations such as ICAO, Consulting Organizations, etc.
Honours graduates can pursue advanced postgraduate studies abroad (Germany, Canada, China, France, Spain, USA, ...).

By using the ASIIN Subject-Specific Criteria (SSC) based Objectives-Module-Matrix that is most relevant for the degree programme, Table 1.1. shows the correlation between these criteria's and the study programme learning outcome mentioned above.

Table 1.1 Objectives-Module-Matrix for the degree programme Aeronautical Engineering -ESAT University

TC 01 – Mechanical Engineering/Process Engineering - more practice-oriented Master's degree programme

ASIIN SSC	**Intended Learning Outcomes[1] of the Degree Programme**									**Corresponding Modules**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Knowledge and Understanding										
Graduates have in particular	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
consolidated knowledge of mathematic-scientific and engineering principles of mechanical engineering / process engineering / chemical engineering as well as deepened practice-oriented knowledge in special subjects;	**X**	**X**	**X**	**X**						
critical awareness of the newer findings in their discipline.										
Engineering Analysis										
Graduates are particularly qualified to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
analyse and solve problems scientifically, which are incompletely defined and show competing specifications;	**X**		**X**	**X**	**X**					
formulate practice-oriented problems arising from a new or emerging field of their specialised subject;					**X**	**X**				
use innovative methods for practice-oriented problem-solving (EUR-ACE).						**X**				

[1] See Section 2.1 „Programme Objectives and Learning Outcomes" of the *General Criteria for the Accreditation of Degree Programmes* of ASIIN, as of 28.03.2014

Engineering Design										
Graduates are particularly qualified to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
develop solutions for practice-oriented and partially unusual problems also under consideration of other disciplines;			**X**	**X**	**X**	**X**				
use their creativity to develop new and inventive practical solutions;				**X**	**X**	**X**				
apply their scientific ability to judge in order to work with complex, technologically impure or incomplete information.				**X**	**X**					
Investigations and Assessment										
Graduates are in particular qualified to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
identify, find and procure necessary information;					**X**	**X**				
plan and carry out analytic, model and experimental investigations;										
critically assess data and draw conclusions;						**X**				
investigate and assess the application of new and emerging technologies in their discipline.					**X**	**X**				
Engineering Practice										
Graduates are in particular able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
combine knowledge in different fields for fast realisation and to handle complexity;	**X**	**X**	**X**	**X**				**X**		

familiarise themselves in a fast and targeted way with the new and unknown;								**X**	**X**	
assess applicable techniques on the basis of their imminent knowledge and to assess their limits;						**X**				
recognise non-technical effects of engineering activities systematically and to integrate them into their actions in a responsible manner.							**X**	**X**	**X**	
Transferable Skills										
Graduates are able to	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
fulfill all the Transferable Skill requirements of a First Cycle graduate at the more demanding level of Second Cycle;	**X**	**X**	**X**				**X**			
function effectively as leader of a team that may be composed of different disciplines and levels;							**X**	**X**	**X**	
work and communicate effectively in national and international contexts.							**X**	**X**		