Federative Republic of Brazil
Defense Ministry
Aeronautics Command / Brazilian Air Force
Aeronautics Institute of Technology
Postgraduate Program in Aeronautics Infrastructure Engineering

COURSE SYLLABUS – 2021

Course name:	**Air Transport Innovation**
Course code:	IT-212
Professor:	Dr. Mauro Caetano
Number of credits:	3
Day/hours schedule:	**Tuesday, from 8:48 a.m. to 11:53 a.m.**
Weekly workload*:	3-0-2-4
Prerequisite:	None
Type of course:	Postgraduate (levels: Doctorate, Masters, Special Student, Isolated Discipline and Master's Degree Program – PMG/ITA)
Area:	Air Transport and Airports

* X-Y-W-Z - The first one: number of hours per week, for the exposure of the Course; second: the number of operating hours for solving exercises in the classroom; third: number of hours estimated in the laboratory, design, project, technical visit or sports practice; and fourth: the number of hours estimated for home study, which is mandatory to follow the Course.

1. Course description

The Innovation concept; Taxonomies and types of innovation; Dimensions of the innovation process; Differences between technology and product / service / process; Open innovation; Planning and management of the innovation process; Innovations in Air Transport; Airport, Airline and Aeronautical Industry Innovations; Policies in Air Transport Innovation.

2. Course objectives

Discuss the dynamics of the innovation process. Identify the characteristics and specificities of the innovation processes, considering their determinants, dimensions and activities. Identify and discuss innovation practices in air transport, as well as other aspects related to the state of the art on the subject and the management of innovation in the sector.

3. Preliminary course calendar

The schedule presented in Table 1 with the contents to be treated was developed in order to address the key elements related to Innovation in Air Transport, and its distribution throughout the semester may undergo small changes according to the development of the activities. Note that this is a preliminary schedule, and may change due to class needs, the number of students, complementary programs, etc.

Class	Date	Main Topics
1	March 2nd	Course introduction Syllabus and procedures.
2	March 9th	The Innovation Concept applied on Air Transport.
3	March 16th	Technology Innovation Management (TIM).
4	March 23rd	Techniques and Tools for the Innovation Process Management.
5	March 30th	Airport and Airline Business Model Innovation.
6	April 6th	Innovation Measurement and Innovation Metrics.
7	April 13th	Air Transport Innovation System – Airport, Airlines, Aeronautics Industry, Policies and Air Traffic Management.
8	April 20th	Evolution of Innovations in the Aeronautics Industry.
-	April 27th	Institutional Technical Halt.
9	May 4th	Airlines Innovation.
10	May 11th	Airport Infrastructure Innovation.
11	May 18th	Innovations in Passengers and Cargo Processing.
12	May 25th	Individual Airport, Airline, Aircraft or Air Traffic Innovation Study Outline.
13	June 1st	Airport Innovation Integrated Index (AI^3).
14	June 8th	Air Transport Innovation Policies.
15	June 15th	Emergency Innovations in Air Transport during a Pandemic period.
16	June 22nd	Algorithm for Innovation Indicators and Metrics applied to General Aviation.
17	June 29th	Final Exam Schedule.

Table 1: class schedule and content, subject to change according to the class calendar.

4. Instructional methods and assignments

- ➔ **Theoretical classes:** classes with slide presentations, texts discussions and reflections on the overview of subjects related to the Course, as well as debates based on the analysis of literature and practical cases;
- ➔ **Deliveries (D):** specifics deliveries related to the structuring of studies that guide the final paper of Course. These deliveries will be made gradually with the studies progress, as the initial research theme, initial theoretical basis, research method procedures, results analysis and final text;
- ➔ **Scientific study presentations of the Basic (BT) and Additional Text (AT)**: in previously defined classes, the students will be drawn to present the BT and the AT of the class, and both will have up to 20 minutes for the text presentation, which should include the following items: 1) The context of the study; 2) Theoretical gap to be filled; 3) Research method used and its authors on methods; 4) Main results of the study; 5) Final considerations with the implications for air transport innovation. The AT must be sent to the class 48 hours before the corresponding class;
- ➔ **Final Exam (FE):** a written test containing questions that address the topics studied during the semester will be applied at the end of the course.
- ➔ **Individual Study in a Final Paper (FP):** for the composition of the final grade, each student will individually produce a paper related to any topic discussed at the Course. This paper should have a digital version, in Word, sent to the Professor's email (mauro.caetano@gp.ita.br and caetano@ita.br) at the end of the Course (until 06/29/2021). For this paper production, guidance will be given throughout the classes and also directly in the documents of Deliveries (D1 to D4). This paper should have between 3 and 12 pages in total, in Arial 12 font and 1.5 spacing between lines, as well as the following structure with their respective weights in the composition of the score: Title, Abstract (1), Introduction (1), Theoretical basis (2,5), Methods (2,5), Results analysis (2), Conclusions (1), References.
    - ❖ **Crucial and far-reaching consequences: if any part of the paper submitted has been extracted from a publication and that characterizes it as plagiarism, even if it is only one or two sentences, a zero score (0) will be assigned to the entire paper and all other Deliveries. In addition, institutional disciplinary procedures will be applied.**

5. Assessment weighting procedures

For each of the course activities (D, BT, AT, FE and FP), a score from 0 to 10 will be assigned in their respective analyzes, as described in the previous item, and the composition of the final grade (FG) for the student will be carried out from Equation 1.

$$FG = \left[\left(\frac{\sum_{i=1}^{4} D_i}{4} \right) + 2 \left(\frac{\sum_{j=1}^{n} BT_j}{n} + \frac{\sum_{k=1}^{m} AT_k}{m} + FE \right) + 3FP \right] \quad (1)$$

Since *n* and *m* the total number of scientific studies presented by the student as basic and additional, respectively, the maximum FG can be one hundred (100). The classification of the student in each of the concepts adopted by the ITA Programs will be carried out based on the following distribution:

- 100 ≥ **L** (“louvor”: praise) ≥ 95;
- 94 ≥ **MB** (“muito bom”: very good) ≥ 85;
- 84 ≥ **B** (“bom”: good) ≥ 75;
- 74 ≥ **R** (“regular”: regular) ≥ 65;
- 64 ≥ **I** (“insuficiente”: insufficient) ≥ 50;
- 49 ≥ **D** (“deficiente”: disabled) ≥ 0.

Additionally, the student who fails to reach 85% (eighty-five percent) of frequency in the discipline will be disapproved.

Basic references

Albors-Garrigos, J.; Igartua, J. I.; Peiro, A. Innovation management techniques and tools: its impact on firm innovation performance. **International Journal of Innovation Management**, v. 22, (6), 1850051, 2018.

Belobaba, P.; Odoni, A.; Barnhart, C. **The global airline industry**. 2nd Edition, John Wiley & Sons, Ltd., 2016.

Brattström, A.; Frishammar, J.; Richtnér, A.; Pflueger, D. Can innovation be measured? A framework of how measurement of innovation engages attention in firms. **Journal of Engineering and Technology Management**, v. 48, pp 64-75, 2018.

Caetano, M.; Alves, C. J. P. Innovation system in air transport management. **Journal of Information Systems and Technology Management**, v. 16, pp. 1-13, 2019.

Caetano, M.; Amaral, D. C. Roadmapping for technology push and partnership: a contribution for open Innovation environments. **Technovation**, v. 31, pp. 320-335, 2011.

Carayannis, E. G.; Goletsis, Y.; Grigoroudis, E. Composite innovation metrics: MCDA and the Quadruple Innovation Helix framework. **Technological Forecasting & Social Change**, v. 131, pp. 4-17, 2018.

Chesbrough, H. W. **Open innovation: the new imperative for creating and profiting from technology.** Boston: Harvard Business School Press, 2006.

Dodgson, M.; Gann, D.; Salter, A. **The management of technological innovation: strategy and practice**. Oxford University Press Inc., New York, 2008.

Franke, M. Innovation: the winning formula to regain profitability in aviation? **Journal of Air Transport Management**, v. 13, p. 23–30, 2007.

Gil, N.; Miozzo, M.; Massini, S. The innovation potential of new infrastructure development: An empirical study of Heathrow airport's T5 project. **Research Policy** 41, 452–466, 2012.

Ginieis, M.; Sánchez-Rebull, M.-V.; Campa-Planas, F. The academic journal literature on air transport: analysis using systematic literature review methodology. **Journal of Air Transport Management**, v. 19, pp. 31-35, 2012.

Jacquiliat, A.; Odoni, A. A roadmap toward airport demand and capacity management. **Transportation Research Part A**, v. 114, pp. 168-185, 2017.

Schumpeter, J. A. **The theory of economic development: an inquiry into profits, capital, credit, interest and the business cycle**. Transaction Publishers, New Brunswick, New Jersey, 1988.

Slayton, R., Spinardi, G. Radical innovation in scaling up: Boeing's Dreamliner and the challenge of socio-technical transitions. **Technovation,** 47, 47–58, 2016.

Young, S. B., Well, A. T. **Airport planning and management**. New York: McGraw-Hill., 2011.

Good studies to all!

Prof. Dr. Mauro Caetano Professor IT-212	Prof. Dr. Wilson Cabral de Sousa Júnior Program Coordinator (PG-EIA / ITA)