



# CA010: Modular Curriculum Design



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Industry Partner: ADDX

## What:

Explore the ATO's curriculum architecture design in an effort to modularize the Air Traffic Management and Technical Operations Training curriculum.

## Goals:

Create a concept for curriculum architecture design that will demonstrate the feasibility of deploying modular and reusable curriculum in a variety of learning modalities.

Objective 1: Map existing training delivery system encompassing processes from job-task identification through training delivery and feedback

Objective 2: Map new processes to address any gaps identified through mapping the process

Objective 3: Develop a curriculum architecture design that will facilitate modular curriculum development

## How:

The team analyzed and categorized all of the FAA ATO's Academy and Shared Academy task statements in an effort to identify areas of modularization. Additionally, they identified these task statements levels of learning. Lastly, they analyzed the current state of the FAA ATO's curriculum development and approval process and recommended a future state that would enable modularity.

Brief on the Proposed State of Curriculum Architecture for the FAA ATO Training

Through the analysis of the course development guides and conversations with ATO Technical Training Team Members, the team was able to map the current curriculum architecture related to the approval, development, and dissemination of academy and shared academy courses. Afterwards, the team examined the current literature related to curriculum development. Using this information, the team was able to map a curriculum architecture that enables the FAA to begin the transition to a modular curriculum approach. The following sections detail the most ideal curriculum architecture approach.

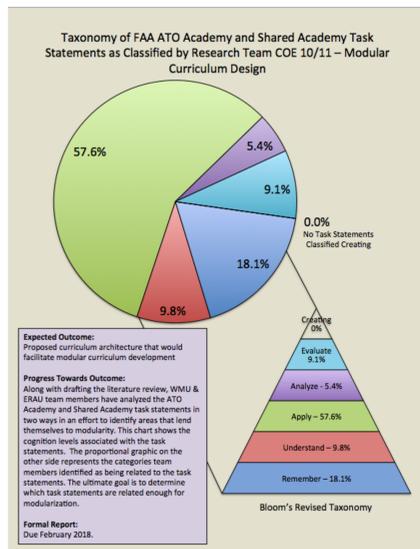
**Course Design Guides**  
The current process requires Course Design Guides (CDG) for every course developed. This is the case even when the FAA utilizes a vendor to design the course (FAA/2017). However, the team found many courses that did not have CDGs or had incomplete CDGs written in varied detail. The team believes it is imperative that the CDGs are completed for each course since the information in the CDGs will be entered into the proposed JETS database (see Knowledge Tracking Database section). Additionally, the CDG needs to be updated to include a Curriculum Evaluation Frequency Scale (CEFS) (see CEFS section). Lastly, the completion of a CDG by a course designer and then approval by the Instructional Design Team requires the course or module has been developed using necessary instructional design strategies and techniques.

**Content Delivery**  
The team suggests that content is delivered in a modular form rather than by courses. This will require a major shift in the current approach to content delivery. For example, all current content is organized by courses. By nature, developing content that is delivered by a course creates the potential for learners to be exposed to content that is duplicative to what they already know. This is because course designers never know exactly where to begin and end the content of a course. Additionally, they may not know what is taught in other FAA ATO courses.

By contrast, modules cover a narrow scope of content, typically linked to a specific job task(s). Therefore, there is less chance for redundant curriculum. When a course designer is asked to develop a module the covers a certain set of job tasks that is their primary goal. Because modules are finite, it is easier to develop a course that utilizes a series of separately developed modules. Additionally, module type instruction links returning to job tasks rather than courses. Therefore, if a participant needs retraining on a specific job task, they would not need to take an in-person course; they would just complete the module attached to that particular job task.

<b>Mandatory Course Components</b>	Modularity requires that certain components of courses be mandatory for all newly developed courses. More specifically, at minimum, our team recommends that all courses have the following components - assessment strategies, enabling objectives, terminal objectives, and instructional methods, and target audiences. These components will become variables that will be entered into the JETS database.
<b>Content Remediation</b>	Currently, content remediation is completed within the field, but not formally tracked. Additionally, there is no formal remediation efforts that occur after a participant has completed a course. Therefore, the team proposes a formalized content remediation process where SMEs define required proficiency levels, as well as, timelines for remediation.
<b>Andragogy Expert</b>	While the Safety and Technical Training Standard Operating Procedure manual identifies the Instructional Design Lead "ensures instructional integrity of course content" and "leads instructional design tasks" (p.2), it is unclear as to if these individuals are experts in adult learning principles. Adult learners are motivated to learn differently than adolescent learners. Therefore, the team suggests that an andragogy (adult learning) expert be apart of the course approval, creation, and review stages of new course development. This position may be the instructional design lead or it may be an entirely different role within the course/module design process.
<b>Indicators of Mastery</b>	The team suggests that course/module mastery is determined by SMEs at all instances, using standardized grading criteria with similar scales between course/modules.
<b>Assessment Analysis</b>	Currently, there are a variety of assessment types utilized throughout the ATO coursework. From consulting with FAA representatives, the team has learned that some courses do not have an actual assessment other than the transference of coursework to a participant. The team suggests that current and future assessments be analyzed to ensure that they are producing valid and defensible results.
<b>Course Approval</b>	The team has reviewed the Safety and Technical Training Standard Operating Procedure manual and suggests that the FAA fully implements these intensive procedures. However, the team suggests that they add procedures for considering what courses or curriculum elements would be better delivered as modules. Additionally, we suggest the addition of an andragogy expert (if the

<b>Course Prerequisites</b>	Currently, prerequisites are defined through the courses that participants have previously taken prior to enrolling in another course, among other things. Instead, the team suggests that prerequisites be defined as competencies rather than courses. This would enable a shift to modularity.
<b>Course to Module Conversion Protocol</b>	The team suggests that a conversion protocol be developed to help SMEs and course developers convert existing courses to modules. Through the use of the JETS database, this process would also assist the SME or course developer in searching for similar modules that have already been developed.
<b>Curriculum Evaluation Frequency Scale (CEFS)</b>	The curriculum development process is a continual one that requires frequent review of content and modules. Therefore, the team proposes that a curriculum evaluation frequency scale (CEFS) be developed and then added to the CDG guide. This scale would allow the course content developer(s) and SMEs to rate each course content on its need for revision. The team proposes the CEFS consider factors such as frequency of delivery, risk to safety, technological changes, and other factors identified by SMEs. Course content that is rated high on the scale would need to be examined more often for content validity. The data from this scale would help the FAA training personnel prioritize their course updating process. The creation of the CEFS would allow for retrospective analysis of FAA courses in order to identify areas where updating is needed.
<b>Stackable Credentials</b>	To recognize the work FAA personnel put into furthering their education, a credentialing system would be developed that would highlight the courses/modules they have completed and job tasks they are proficient in. The credentialing system would utilize the JETS database to track employees' progress towards future credentials.
<b>Knowledge Tracking Database</b>	The team suggests the development of a comprehensive database. The proposed name of the database is the Job Expertise Tracking System (JETS). The JETS database will assist in the potential modularity of current and future course content. Additionally, it would be the central educational tracking system for ATO employees. In other words, the database would enable the FAA to identify and track the educational path of each ATO employee. Also, the JETS database would enable the FAA to track when course remediation or retraining would need to occur. Lastly, the
	JETS database would allow searches of employee knowledge by job task, which is a requisite component of modularity. See the next page for a graphic representation of the JETS relational database.



## Why:

- Improve training efficiency by reducing training cost and time
- Improving and/or standardizing training systems, processes, procedures, etc.
- Improving the quality of instruction
- Improving learner engagement
- Increasing trainee knowledge retention

## Impact:

Modularization allows for a rapid response to shifting industry demands. Transitioning to a modular delivery of instruction can lead to less redundancy in training as well as duplication of efforts. In subsequent years of this project, the team encourages the exploration a stackable credentialing system as well as the standardization of task statements' indicators of mastery. Lastly, the team offers to develop course to module conversion protocol and a curriculum evaluation frequency scale (CEFS) for the FAA's ATO curriculum.

