SUBJECT: Training Syllabus

This order establishes and directs the vZKC training process and defines the standards, requirements and regulations, and training items to which all instructors and mentors must present the student. It prescribes vZKC training process for use by any individual participating in the training program. This is order is regulated by the "ZKC ORDER 02.100 Training Order."

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Date: 8/29/18

RECORD OF CHANGES

CHANGE TO BASIC	SUPPLEMENTS			EFFECTIVE DATE	OPTIONAL

Table of Contents

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Chapter 1. General

Section 1. Introduction

1-1-1. PURPOSE OF THIS ORDER

This order establishes and directs the vZKC training process and defines the standards, requirements and regulations, and training items to which all instructors and mentors must present the student. It prescribes vZKC training process for use by any individual participating in the training program.

1-1-2. AUDIENCE

This order applies to any/all participants in the vZKC training program, including the Training Administrator, instructors, mentors and students, as well as any individual operating under the scope of the training program. Although all participants in the program are subject to this order, only the Training Administrator, instructors and mentors of vZKC **must** be familiar with the provisions of this order.

1-1-3. CANCELLATION

This is the first version of this order; no previous version to supersede.

1-1-4. EXPLANATION OF CHANGES

No changes have been made to this order.

1-1-5. EFFECTIVE DATES AND REVIEW

This order is effective 08/29/18 until further notice. The TA- or his/her designee- should initiate periodic reviews of this order, at least annually.

Section 2. Order Use

1-2-1. MANAGEMENT

The TA- or his/her designee- is the manager of this order. All changes and revisions are initiated, handled, and approved through the TA/designee.

1-2-2. ANNOTATIONS

Revised, new, or reprinted pages will be marked as follows:

1. The change number and the effective date are printed on each revised or additional page.
2. A reprinted page not requiring a change is reprinted in its original form with original effective date.

3. Bold vertical lines in the margin of the text mark the location of substantive changes; e.g., when material affecting the performance of duty is added, revised, or deleted.
4. Statements of fact of a prefatory or explanatory nature relating to directive material are set forth as notes.

1-2-3. WORD MEANINGS

As used in this order:

1. *Must*, or an action verb in the imperative sense, means mandatory.
2. *Should* means recommended
3. *May* and *need* not mean optional
4. *Will* indicates futurity

1-2-4. ABBREVIATIONS AND REFERENCES

This order uses abbreviations and refers to words/phrases as defined in TBL 1-2-1 below:

TBL 1-2-1

Abbreviations and Word References

ABBR / REFERENCE	DESCRIPTION
ATM	AIR TRAFFIC MANAGER
DATM	DEPUTY AIR TRAFFIC MANAGER
TA	TRAINING ADMINISTRATOR
EC	EVENTS COORDINATOR
FE	FACILITY ENGINEER
IAW	in accordance with
DEL	Clearance Delivery (ATC position)
GND	Ground (ATC position)
TWR	Tower (ATC position)
APP	Approach (ATC position)
DEP	Departure (ATC position)
CTR	Center (ATC position)
TIR	time-in-rating (time logged on the live network at the given rating)
ST	sweatbox time (time logged on *sweatbox* at the given rating)

the program	the training program established in this program
training staff	mentors and instructors as defined in this order
the website	http://www.kcartcc.com and any/all associated features/programs
AWTS	Alpha Whiskey Training System
FAA	Federal Aviation Administration

1-2-5 Use of Zoom Video Conferencing

This information provided in this syllabus may be presented to the student using Zoom Video Conferencing. Zoom is a private “meeting” that will allow one-on-one teaching with a student and allows for screen sharing, video sharing, and a constant live mic (to simulate a real-world classroom setting.) The program is ideal for classroom lectures but may also be used when teaching in VRC.

Chapter 2. S1 – Delivery & Ground Control

Lesson 1. Basic Air Traffic Control

2-1-1 FAA Topics

Below are the points from the "*FAA JO7110.65X CHG 1*" that accompany this lesson and its topics. It is recommended that students and the instructor/mentor review these items when in this lesson.

1. -2-1-1. ATC Service
2. -2-1-2. Duty Priority
3. -2-1-4. Operational Priority (Just the first line is important)
4. -2-1-5. Expeditious Compliance Phraseology
5. -2-1-13. Formation Flights
6. -2-1-14. Coordinate Use of Airspace
7. -2-1-15. Control Transfer
8. -2-1-17. Radio Communications Transfer
9. -2-1-18. Operational Requests
10. -2-1-19. Wake Turbulence
11. -2-1-20. Wake Turbulence Advisory
12. -2-1-21. Traffic Advisory
13. -2-4-8. Radio Message Format
14. -2-4-9. Abbreviated Transmissions
15. -2-4-14. Words and Phrases
16. -2-4-16. ICAO Phonetics
17. -2-4-17. Numbers Usage
18. -2-4-18. Number Clarification
19. -2-4-19. Facility Identification
20. -2-4-20. Aircraft Identification
21. -2-4-21. Description of Aircraft Types
22. -2-4-22. Airspace Classes

2-1-2 Lesson Topics

1. __Provide student a downloadable copy of the most current JO7110.65X
2. __Overview of all ATC positions: GND, TWR, DEP, APP, CTR, FSS.

3. __ Overview of Staff positions: ATM, DATM, TA, EC, FE
4. __ U.S. National Airspace System: Class Alpha, Bravo, Charlie, Delta, Echo, Golf
5. __ ATC Duty Priorities & Operational Priorities
6. __Review the *"01.100A: ATC SOP"*
7. __Introduce to Skyvector or another aviation diagram site to find necessary charts.
8. __Introduce to weather topics and where to find them. (METARs, SIGMETs, TAFs, ATIS, etc.)
9. __Overview of aircraft suffixes & aircraft equipment types.
10. __Demonstrate general phraseology procedures, number use, clarification, callsigns, and facility identification.
11. __Proper use of the interphone for coordination
12. __ Reading METARs
13. __ Weather Minima (VFR, SVFR, IFR)
14. __ Special Transponder codes (7500 Hijack, 7600 Radio Failure, 7700 Emergency)
15. __ Use of Radio (Voice Phraseology)

2-1-3 Written Exams to Issue

1. General ATC

Lesson 2. Clearance Delivery

2-2-1 FAA Topics

Below are the points from the "FAA JO7110.65X CHG 1" that accompany this lesson and its topics. It is recommended that students and the instructor/mentor review these items when in this lesson.

1. -4-2-1. Clearance Items
2. -4-2-5. Route or Altitude Amendments
3. -4-5-1. Vertical Separation Minima
4. -4-5-2. Flight Direction
5. -4-5-3. Exceptions
6. -4-5-4. Lowest Usable Flight Level
7. -4-5-7. Altitude Information (Phraseology)
8. -4-5-9. Altitude Confirmation – Nonradar

2-2-2 Lesson Topics

1. __Setting up VRC for Clearance Delivery
2. __ Position jurisdiction (Responsible for issuing all IFR and VFR Clearances)
3. __ IFR Clearance Phraseology
4. __ VFR Clearance Phraseology (Class Bravo: In-to, out of, through)
5. __ Local SOPs
6. __ Amending flight plans and ensuring the correct clearance phraseology is used
7. __ Altitude Assignments (NEODD/SWEVEN Rule)
8. __Departure frequencies and when they are needed to be included in clearances
9. __When and who to coordinate with when amending or requesting a special clearance
10. __Coordination & Handoffs between Delivery, Ground, and Local Control

Lesson 3. Ground Control

2-3-1 FAA Topics

Below are the points from the "FAA JO7110.65X CHG 1" that accompany this lesson and its topics. It is recommended that students and the instructor/mentor review these items when in this lesson.

1. 3-7-1 and 3-7-2 -- Cover all Taxi Phraseology

2-3-2 Lesson Topics

1. __Setting up VRC for Ground Control
2. __ Position Jurisdiction (All movement areas. Not including runways)
3. __ Taxi with route instructions
4. __ Taxi with hold short instructions
5. __ Taxi with route instructions and hold short
6. __ Taxi by following an aircraft (Have the aircraft in sight first, then can follow)
7. __ Hold Position/Hold Taxi
8. __ Give Way
9. __Coordination and handoffs between Ground, Tower, and Delivery Control

2-3-3 Written Exams to Issue

1. Ground

2. Major Ground - When applicable

Chapter 3. S2 – Local Control

Lesson 1. General Operations

3-1-1 FAA Topics

Below are the points from the "FAA JO7110.65X CHG 1" that accompany this chapter and its topics. It is recommended that students and the instructor/mentor review these items when in this chapter.

1. -3-5-1. Runway Selection
2. -3-5-3. Tailwind Components
3. -3-9-1. Departure Information
4. -3-9-4. Line up and Wait
5. -3-9-5. Anticipating Separation
6. -3-9-6. Same Runway Separation
7. -3-9-7. Wake Turbulence and Intersection Departures
8. -3-9-9. Takeoff Clearance
9. -3-9-10. Cancellation of Clearance
10. -3-10-1. Landing Information
11. -3-10-3. Landing Separation
12. -3-10-4. Intersecting Runway Separation
13. -3-10-5. Landing Clearance
14. -3-10-6. Anticipating Separation
15. -3-10-9. Runway Exiting
16. -3-10-11. Closed Traffic
17. -3-10-12. Overhead Maneuver
18. -3-11-All

3-1-2 Lesson Topics

1. __Setting up VRC for Local Control
2. __Position Jurisdiction (All runways)
3. __ Runway Selection
4. __ vATIS usage and installation
5. __ Departure Separation/Minima
6. __ Landing Separation/Minima
7. __ Arrival Types: Full Stop, Touch and Go, Stop and Go, Low Approach, Option
8. __ Review Traffic Advisories
9. __ Helicopter Procedures
10. __ Local SOPs
11. __Coordination & handoffs between Local, Ground, and Delivery Control

Lesson 2. IFR Aircraft

3-2-1 Lesson Topics

1. __Departure Clearances (RNAV, Non-RNAV, and radar vectors after departure)
2. __Departure Releases (Rolling Release or verbal/written release)
3. __Cancellation of Takeoff Clearance
4. __Landing Clearances
5. __Go Around/Missed Approach Procedures
6. __Issuing traffic advisories
7. __Side Step/Change Runway Procedures and Phraseology
8. __Runway Exiting Phraseology
9. __Wake Turbulence Separation – Landing Behind
10. __Class D Tower
    a. Advising overlying radar facility of an IFR arrival on the ground.

Lesson 3. VFR & Military Aircraft

3-3-1 Lesson Topics

1. __Departure Clearances (Straight-out, to the N/E/S/W, etc.)
2. __VFR Towers = No Radar
3. __VFR Traffic Advisories

4. __Landing Clearances (Option, Full Stop, Low Approach, Stop-and-Go, Touch-and-Go)
5. __VFR General Transitions
6. __ VFR Traffic Pattern
7. __VFR Traffic Pattern Altitudes
8. __Instructing Aircraft to enter VFR Traffic Pattern
9. __Sequencing VFR Aircraft (S-Turns, 360's, 270's, visual holding of aircraft, extending pattern leg, etc.)
10. __ VFR Entering the Class Bravo
11. __ VFR Exiting the Class Bravo
12. __VFR Transitioning the Class Bravo
13. __Military overhead approach, simulated flame out, etc.

3-3-2 Written Exams to Issue (Includes Major Endorsements)

1. Local Control
2. Major Ground & Local Control

Lesson 4. Helicopter Operations

3-4-1 Lesson Topics

1. __Departure Clearances (Runway, Movement Area but not runway, Non-Movement Area)
2. __Arrival Clearances (Runway, Movement Area but not runway, Non-Movement Area)
3. __Traffic Advisories
4. __Terrain and other obstacle Advisories

Chapter 4. S3 – Radar Control

Lesson 1. Basic Radar Operations

4-1-1 FAA Topics

Below are the points from the "FAA JO7110.65X CHG 1" that accompany this chapter and its topics. It is recommended that students and the instructor/mentor review these items when in this chapter.

1. -5-2-2 Discrete Environment
2. -5-2-7 Emergency Code Assignment

3. -5-2-8 Radio Failure
4. -5-2-9. Beacon Termination
5. -5-3-1. Application
6. -5-3-2. Primary Radar Identification Methods
7. -5-3-3. Beacon Identification Methods
8. -5-3-7. Identification Status
9. -5-4-1. Application
10. -5-4-2. Terms
11. -5-4-3. Methods
12. -5-4-5. Transferring Controller
13. -5-4-7. Point Out
14. -5-4-10. Prearranged Coordination
15. -5-5-1. Application
16. -5-5-2. Target Separation
17. -5-5-3. Target Resolution
18. -5-5-4. Minima
19. -5-5-5. Vertical Application
20. -5-5-10. Adjacent Airspace
21. -5-6-1. Application
22. -5-6-2. Methods
23. -5-7-1. Application
24. -5-7-2. Methods
25. -5-7-3. Minima
26. -5-7-4. Termination
27. -5-8-1. Procedures
28. -5-8-2. Initial Heading
29. -5-8-3. Successive or Simultaneous Departures
30. -5-9-1. Vectors to final approach course
31. -5-9-2. Final Approach Course Interception
32. -5-9-3. Vectors across Final Approach Course
33. -5-9-4. Arrival Instructions
34. -5-9-5. Approach Separation Responsibility
35. -5-9-6. Parallel Dependent ILS Approaches (Parallel Approaches)
36. -5-9-7. Simultaneous Independent ILS Approaches (Simultaneous Approaches)
37. -4-8-1. Approach Clearance
38. -4-8-2. Clearance Limit
39. -4-8-6. Circling Approach
40. -4-8-7. Side-Step Maneuver

41. -4-8-8. Communications Release (Important for Delta airfields)
42. -4-8-9. Missed Approach
43. -4-8-12. Low Approach and Touch-and-Go
44. -4-6-1. Clearance to Holding Fix
45. -4-6-2. Clearance Beyond Fix
46. -4-6-3. Delays
47. -4-6-4. Holding Instructions
48. -4-6-5. Visual Holding Points
49. -7-1-1. Class A Airspace Restrictions
50. -7-1-2. VFR Conditions
51. -7-1-3. Approach Control Service for VFR Arriving Aircraft
52. -7-1-4. Visual Holding of VFR Aircraft
53. -7-2-1. Visual Separation
54. -7-3-1. VFR On Top
55. -7-3-2. Altitude for Direction of Flight
56. -7-4-1. Visual Approach
57. -7-4-2. Vectors for Visual Approach
58. -7-4-3. Clearance for Visual Approach
59. -7-4-4. Approaches to Multiple Runways
60. -7-4-6. Contact Approach
61. -7-5-1. Authorization
62. -7-5-2. Priority
63. -7-5-3. Separation
64. -7-6-1. Application
65. -7-6-3. Initial Contact
66. -7-6-4. Identification
67. -7-6-5. Holding
68. -7-6-6. Approach Sequence
69. -7-6-7. Sequencing
70. -7-6-10. VFR Departure Information
71. -7-6-11. Termination of Service
72. -7-8 All
73. -7-9 All

4-1-2 Lesson Topics

1. __Setting up VRC (or vSTARS when applicable) for Radar Control
2. __ All aircraft being tracked by radar should have a beacon code

3. __ Radar Identification and Techniques
4. __ Automated/Radar Handoffs, Radio Handoffs (Handoff within 15 miles for Approaches, within 30 miles for Centers)
5. __ Radar Separation
6. __Radar Phenomena (Coasting and Incorrect speed due to simulation rate)
7. __Cancellation of Radar Services and Phraseology
8. __Point Outs, Handoffs, APREQs

Lesson 2. Vectoring and Approach Procedures

4-2-1 Lesson Topics

1. __Requirements to vector aircraft
   a. Must have been radar identified
2. __General Vectoring
   a. Specific Heading
   b. Number of Degrees to turn left/right
   c. No-Gyro Vector
   d. Heading to fly after NAVAID or fix
3. __Vectoring Rules
   a. Must tell aircraft why
   b. When vectoring the aircraft through something they are expected to join they must be told.
4. __ "Proceed Direct" & "Cleared direct", or Area Navigation, Aircraft Equipment Types
   a. /Y, /C, /I, /E, /F, /G, /R, /J, /K, /L, /W
5. __Non-Area Navigation Aircraft Equipment Types
   a. /X , /T , /U, /D, /B, /A, /M, /N, /P
6. __ Arrival Initial Contact Procedures/Separation
   a. What approach to expect
   b. The altimeter of that airport
   c. Any other pertinent information
7. __ Approach Plates, FAF and Step Down Fixes
8. __ Approach Phraseology/Minima Requirements
   a. ILS
   b. Localizer
   c. Localizer-Backcourse
   d. GPS and RNAV-GPS
   e. VOR and VOR-DME
   f. Visual

i. Vector the aircraft to the point where they can see the field.
ii. Issue a traffic advisory to point out the aircraft (if they are following another aircraft).

g. Contact Approach

9. __ Wake Turbulence Separation - Approach
10. __Visual Separation and Requirements
11. __Merging Target Procedures and Phraseology
12. __Traffic Advisories and Phraseology
13. __Traffic Alert and Phraseology
14. __Terrain Alert and Phraseology
15. __Altitude Change Phraseology
16. __Speed Change Phraseology
    a. Maintain a specific speed
    b. Maintain higher or lower than a specified speed
    c. Maintain the highest or lowest practical speed
    d. Increase or decrease by a specified number of knots
17. __Holding Aircraft
    a. Holding fix or waypoint
    b. Direction of holding from the fix/waypoint.
    c. Radial, course, bearing, track, azimuth, airway, or route on which the aircraft is to hold.
    d. Leg length in miles if DME or RNAV is to be used. Specify leg length in minutes if the pilot requests it or the controller considers it necessary.
    e. Direction of holding pattern turns only if left turns are to be made, the pilot requests it, or the controller considers it necessary.
    f. Expect Further Clearance Time (EFCT)

Lesson 3. Departure Procedures

4-3-1 Lesson Topics

1. __Releasing IFR Aircraft (Rolling Releases or Verbal/Written Releases)
    a. Release Phraseology
    b. What frequency to tune to after departure and when
2. __Radar identifying aircraft on departure
3. __ Radar Departures
    a. When to vector aircraft on course

   b. When to hand off to Center or exit controlled airspace
4. __ Exiting to Uncontrolled Airspace

Lesson 4. VFR Aircraft

4-4-1 Lesson Topics

1. __Radar identifying VFR Aircraft
2. __Flight Following
   a. Radar Identify
   b. Issue any Traffic or Terrain/Obstacle Alerts
   c. Cancel Radar Service at Pilot or at your own discretion
3. __VFR-on-Top vs VFR-Over the Top
4. __VFR Departures
   a. Radar identify
   b. Vector only if needed
   c. Cancel radar service
5. __ VFR Arrivals
   a. Assign squawk & Radar Identify
   b. Vector as needed
   c. Handoff to Tower
6. __VFR Transitions
   a. Assign squawk & Radar Identify
   b. Vector as needed
   c. Cancel radar service

Lesson 5. Uncontrolled Fields

4-5-1 Lesson Topics

1. __This includes Class D fields that become class E when tower is closed.
2. __IFR Aircraft: One-In One-Out Rule

3. __Issuing IFR Clearances
4. __Releasing IFR Aircraft & Departure Instructions
    a. Departure Restrictions – Airspace & NAVAID for example
    b. Basic Release “Released for departure.”
    c. Clearance Void Time Release “Released for departure at (time). Clearance void if not off by (time). If not off by (time), advise (controller) on (frequency) no later than (time) of intentions. Time now (time).
5. __Arriving IFR Aircraft
    a. Radar services cancellation in the air. “Radar service terminated. Frequency change to advisory is approved.”
    b. Advising pilot to report when on the ground.

4-1-3 Written Exams to Issue

1. Radar – Solo Cert when applicable
2. Radar Control

Chapter 5. En-Route

Lesson 1. En-Route Operations

5-1-1 FAA Topics

Below are the points from the "FAA JO7110.65X CHG 1" that accompany this chapter and its topics. It is recommended that students and the instructor/mentor review these items when in this chapter.

1. -7-1-1. Class A Airspace Restrictions
2. -7-1-2. VFR Conditions
3. -7-1-3. Approach Control Service for VFR Arriving Aircraft
4. -7-1-4. Visual Holding of VFR Aircraft
5. -7-5-1. Authorization
6. -7-5-2. Priority
7. -7-5-3. Separation

5-1-2 Lesson Topics

1. __ Setting up VRC (or vERAM when applicable) for En-Route Control
2. __ Special VFR
3. __RVSM airspace requirements
4. __SID/STAR Recognition & Understanding
   a. RNAV & Non-RNAV
5. __Handoffs to other Center Controllers
6. __Special Weather information including but not limited to: Cloud types, SIGMETs, CWAs, AIRMETs, PIREPs, etc.
7. __Correct use of procedure, phraseology/terminology, and communication when issuing weather deviations.
8. __Separation Requirements (Lateral and Vertical)
   a. Below FL600 – 5NM
   b. Above FL600 – 10NM
   c. Up to and including FL410 – 1,000 feet
   d. Above FL 410 – 2,000 feet
   e. Above FL600 – 5,000 feet
9. TMU and traffic flow

5-1-3 Written Exams to Issue

1. En-Route